

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

**SAMSUNG ELECTRONICS CO., LTD. AND
SAMSUNG ELECTRONICS AMERICA, INC.,**

Petitioners,

v.

**MAXELL, LTD.,
Patent Owner**

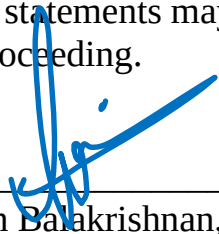
Case: IPR2024-00777

U.S. Patent No. 11,017,815

**DECLARATION OF RAVIN BALAKRISHNAN, PH.D.
CONCERNING PATENTABILITY OF U.S. PATENT NO. 11,017,815**

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine and/or imprisonment under Section 1001 of Title 18 of the United States Code, and such willful false statements may jeopardize the validity of the patent which is under review in this proceeding.

Dated: January 31, 2025



Ravin Balakrishnan, Ph.D.

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I. INTRODUCTION

1. My name is Ravin Balakrishnan. I have been asked by Patent Owner in this IPR (Maxell, Ltd.) to respond to the Declaration of Dr. Benjamin Bederson (the “Bederson Decl.”) and to provide my opinion as to the patentability of U.S. Patent No. 11,017,815 (Ex. 1001, the “’815 Patent”) in view of the opinions in the Bederson Decl.

2. Although I am being compensated at my usual consulting rate of \$750 per hour for my time reviewing materials and preparing this declaration, my opinions expressed here are my own. My compensation is in no way dependent on the outcome of this case or upon the Court or jury accepting my opinions. I have no other financial interest in this matter or the parties thereto.

3. Depending on new information learned during discovery or positions taken throughout the IPR by Samsung or its experts, I may edit, add to, or otherwise refine the topics and expected testimony described here. I reserve the right to supplement my opinions based on new information.

II. BACKGROUND AND QUALIFICATIONS

4. My qualifications to testify about the ’815 Patent and the relevant technology are set forth in my curriculum vitae (“CV”), which I have attached here as Appendix A. My CV includes a list of all my publications within at least the past

ten years, as well as the matters in which I have testified (either at trial or by deposition) in the past four years.

5. I will briefly summarize my qualifications to render opinions regarding this technology in the following paragraphs.

6. I am currently a tenured Full Professor of Computer Science in the Department of Computer Science at the University of Toronto. I joined the faculty at the University in 2001, received tenure in 2006, and served as Chair of my Department from 2015 to 2019. From 2006-2016, I held the Canada Research Chair in Human-Centered Interfaces in the Department of Computer Science.

7. I earned a B.Sc. in Computer Science from the University of New Brunswick in 1993. From the University of Toronto, I received an M.Sc. in Computer Science in 1997 and a Ph.D. in Computer Science in 2001. Since receiving my Ph.D., I have been a member of the faculty of the Department of Computer Science at the University of Toronto where my research has focused on human-computer interaction (“HCI”), interactive computer graphics, and computer systems. Within these areas, my research has included the development of user interface technologies on a variety of computational platforms and application areas including mobile devices, touch input devices, video editing systems, computer vision and image detection/tracking systems, video games, large displays, televisions, 3D displays, and virtual and augmented reality technologies.

8. I am also the co-founder of the following companies: Conceptualiz, a company that develops virtual surgical planning technology; FindSpace (formerly Arcestra and Sketch2Corp), a commercial real estate marketing and interior design platform; and Bump Technologies Inc., which developed a physically realistic desktop user interface system. FindSpace grew out of research conducted in my lab and was acquired by Cougar Group in 2021. Bump Technologies, Inc. also grew out of research conducted in my lab and was acquired by Google in May 2010.

9. I teach and supervise graduate students and postdoctoral fellows in their research work as part of my professorial duties. To date, 27 research M.Sc. students, 16 Ph.D. students, and 9 postdoctoral fellows have completed their research training under my guidance. Their research has led to theses and peer-reviewed publications over a broad range of topics covering interactive computing and user interfaces for multiple applications and technology platforms. Example systems built by my team include a new physics enabled touch computing platform, a video conferencing system using face detection to identify and track multiple participants in meetings to enable dynamic camera positioning and focus, and a large scale interactive display system that used camera based image detection and tracking to handle user interaction by multiple simultaneous users in a room sized environment. I have taught courses covering computing topics, including interactive computing, human-computer interaction, information systems and design, digital design, and computer

architecture, and courses covering various user interface technologies for various platforms.

10. I have published over 140 refereed publications in peer-reviewed journals. I have presented numerous conference abstracts, posters, talks, and demonstrations in my field. My work has been cited more than 21,000 times across a spectrum of high-impact publications, and my current h-index score (from Google Scholar) is 84, which is an indication of the significant impact of my research on scholarly literature in the field of Computer Science.

11. I have received major awards and honors in my field. For example, in 2007, I received an Alfred P. Sloan Research Fellowship. In 2011, I was elected into the Association for Computing Machinery's Computer Human Interaction Academy, which is an honorary group consisting of researchers who have made extensive contributions to the study of HCI and who have led the shaping of the HCI field. The stated criteria for being elected into the Association for Computing Machinery's Computer Human Interaction Academy are: (1) cumulative contributions in the field; (2) impact on the field through development of new research directions and/or innovations; and (3) influence on the work of others. In 2020, I was presented with the Canadian Human Computer Communications Society's Achievement Award, which recognizes researchers who have made a

substantial contribution to the fields of computer graphics, visualization, or human-computer interaction.

12. In addition to my research at the University of Toronto, I have collaborated with researchers at leading institutions worldwide. For example, I have been a visiting professor at Laboratoire de Recherche en Informatique (LRI) at the Université Paris-Sud, France and at INRIA Lille, France. Additionally, I have been a visiting researcher at several industrial laboratories, including: (1) HPLabs, (2) Mitsubishi Electric Research Laboratories (MERL), and (3) Microsoft Research Labs. At those companies, my work generally focused on developing new user interface techniques for a variety of technology platforms. Before becoming a professor, during my MSc and PhD studies, I was concurrently a part-time researcher at Alias|wavefront (now part of Autodesk), a leading developer of 3D graphics software applications. Some of my work at these companies, and at my startup companies, have resulted in software and hardware implementations that were shipped within consumer-level products.

13. I have also served on the organizing and paper-reviewing committees of leading conferences in my field, and I have taken on editorial roles for leading technical journals in fields pertinent to my research. For example, I have been an associate editor of the Association for Computing Machinery (“ACM”) Transactions on Computer-Human Interaction and an associate editor of the IEEE Transactions

on Visualization and Computer Graphics, both peer-reviewed journals. Similarly, I have been the paper's chair for the ACM UIST Symposium on User Interface Software and Technology, and have served multiple times as an associate chair for the ACM CHI Conference on Human-Computer Interaction. Over my career, I have also reviewed hundreds of published and unpublished papers, including many on user interfaces for mobile devices.

14. I am the co-inventor on 20 patents, all in the area of user interfaces, including new techniques and technologies for handling user input to computational platforms in novel and more facile ways.

III. UNDERSTANDING OF LEGAL STANDARDS

15. I am not a lawyer, but I have been informed by Maxell's counsel of the legal principles necessary to my validity analysis. In this section, I set forth my understanding of these legal principles as they have been explained to me.

16. I understand that a validity analysis of a patent claim consists of two steps. The first step is the construction (or interpretation) of any disputed claim terms. The second step is a comparison of the properly construed claims to the prior art.

A. Obviousness

17. I understand that a patent claim can be invalid under 35 U.S.C. § 103 if the claimed subject matter would have been "obvious" to a person of ordinary skill

in the art as of the priority date of the patent based upon one or more prior art references. I understand that an obviousness analysis should consider each of the following so-called “*Graham* factors”: (1) the scope and content of the prior art; (2) the differences between the claims and the prior art; (3) the level of ordinary skill in the pertinent art; and (4) secondary considerations, if any (such as unexpected results, commercial success, longfelt but unsolved needs, failure of others, copying by others, licensing, and skepticism of experts).

18. I understand that a conclusion of obviousness may be based upon either a single prior art reference or a combination of prior art references, particularly if the combination of elements does no more than yield predictable results. However, I understand that merely demonstrating that each of the claim elements was, independently, known in the prior art does not prove that a patent composed of several claim elements is obvious.

19. Moreover, I understand that it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in a way the claimed new invention does.

20. I further understand that, to determine obviousness, courts look to the interrelated teachings of multiple patents or other prior art references, the effects of demands known to the design community or present in the marketplace, and the background knowledge possessed by a person having ordinary skill in the art.

21. I also understand that, in determining whether a combination of prior art references renders a claim obvious, it may be helpful to consider whether there is some teaching, suggestion, or motivation to combine the references and a reasonable expectation of success in doing so. I understand, however, that the teaching, suggestion, or motivation to combine inquiry is not required and may not be relied upon in lieu of the obviousness analysis outlined above.

22. I understand that the following exemplary rationales may lead to a conclusion of obviousness: the combination of prior art elements according to known methods to yield predictable results; the substitution of one known element for another to obtain predictable results; and the use of known techniques to improve similar devices in the same way.

23. However, a claim is not obvious if the improvement is more than the predictable use of prior art elements according to their established functions. Similarly, a claim is not obvious if the application of a known technique is beyond the level of ordinary skill in the art.

24. Further, when the prior art teaches away from combining certain known elements, discovery of successful means of combining them is not obvious. I understand that similar subject matter may not be sufficient motivation for a person of skill in the art to combine references if the references have conflicting elements.

25. I understand that, in order to be used in an obviousness combination, a prior art reference must be “analogous.” I understand that a prior art reference may be analogous if it is in the same field of endeavor as the other references with which it is combined, or if the reference is reasonably pertinent to the solving the problems the inventors of the patent-at-issue sought to solve.

26. I understand that obviousness of a patent claim cannot properly be established through hindsight, and that elements from different prior art references, or different embodiments of a single prior art reference, cannot be selected to create the claimed invention using the invention itself as a roadmap. I understand that the claimed invention as a whole must be compared to the prior art as a whole, and courts must avoid aggregating pieces of prior art through hindsight that would not have been combined absent the inventors’ insight.

27. I understand that obviousness is not established by simply combining previously known elements from the prior art. A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. An invention is unpatentable as obvious if the differences between the patented subject matter and the prior art would have been obvious at the time of the invention to a person of ordinary skill in the art.

28. I understand that obviousness of a patent cannot properly be established by mere conclusory statements. Instead, there must be some articulated reasoning

with some rational underpinning to support the legal conclusion of obviousness. When an expert opines that all the elements of a claim disparately exist in the prior art, the expert should provide the rationale to combine the disparate references. A reason for combining disparate prior art references is a critical component of an obviousness analysis. The obviousness analysis should be made explicit and needs to provide an articulated reasoning with some rational underpinning to identify the reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.

29. I also understand that inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known. This is another reason why merely pointing to the elements being known in the art in separate locations is not the end of the obviousness inquiry.

30. I understand that technical experts may testify to matters like the level of skill in the art at the time of the invention and what a skilled artisan might find obvious in light of the prior art without addressing objective indicia of non-obviousness. However, where an expert purports to testify not just to certain factual components underlying the obviousness inquiry, but to the ultimate question of obviousness, the expert must consider all factors relevant to that ultimate question, including all objective evidence of nonobviousness.

B. Priority Date and Written Description

31. I understand that a patent claim is entitled to the priority date of the earliest application providing written description support to which it claims priority. I further understand that, where there is a “chain” of priority, such that a patent claims priority to another patent application which in turn claims priority to another application, each application in the chain leading back to the earlier application must comply with the written description requirement. However, I also understand that each application in the chain need not use the exact same language.

32. I also understand that a patent claim is entitled to the priority date of a foreign patent application if the foreign application provides written description support for the patent claim and enables a person of ordinary skill in the art to make and use the invention recited in the patent claim without undue experimentation.

33. I understand that that written description requirement requires an application to provide a description of all limitations of a claim. I understand that the analysis of whether a prior application satisfies the “written description” requirement is performed from the viewpoint of a person having ordinary skill in the field of technology of the patent when that application was filed. The written description is sufficient if it reasonably conveys to those skilled in the art that the inventor had possession of the claimed subject matter as of the filing date.

34. I understand that the enablement requirement requires an application to contain sufficient information regarding the subject matter of a claim such that a person having ordinary skill in the art could make or use the invention from the disclosures in the patent coupled with information known in the art without undue experimentation. I further understand that enablement is determined from the viewpoint of a person having ordinary skill in the art as of the filing date of the application.

C. Claim Construction

35. I understand that a patent may include two types of claims: independent claims and dependent claims. An independent claim stands alone and includes only the limitations it recites. A dependent claim can depend from an independent claim or another dependent claim and includes all the limitations that it recites in addition to all of the limitations recited in the claim or claims from which it depends.

36. I understand that the claim construction exercise begins with the language of the claims themselves, and that the general rule is that claim terms are given their plain and ordinary meaning to a person of ordinary skill in the art, in view of the specification of the patent, at the time of the invention. I also understand that the intrinsic evidence (i.e., the claims, written description, and prosecution history) are the primary sources used in interpreting claim language.

37. I understand that the Board has adopted the following construction:

Claim Term	Board's Construction
"user profile(s)"	"data representing a user's distinctive features or characteristics"

38. In the related District Court Litigation, the court also provided construction for the "user profile(s)" term:

Claim Term	District Court Construction
"user profile(s)"	"a collection of settings and information associated with a user"

39. After reviewing the court's claim construction order, I find its reasoning to be sound and well-supported. Ex. 2033 at 16. The court specifically noted that the term "user profile" has a well-known ordinary meaning, which is further reinforced by multiple dictionary definitions. This reinforces that the concept of a "user profile" is widely understood in the field and does not require an alternative or ambiguous interpretation.

40. Accordingly, for my analysis, I have applied the court's construction of the term "user profile." This ensures consistency and prevents any misinterpretation of the term beyond its widely accepted meaning.

41. I have also construed the following term for my analysis:

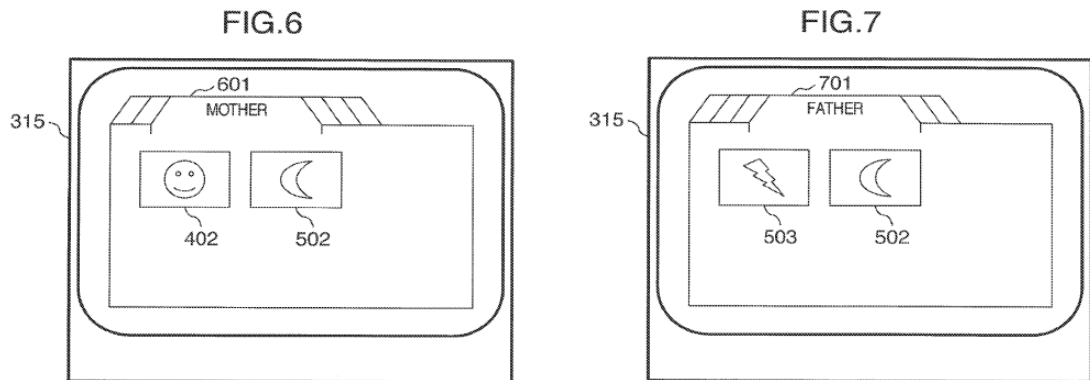
Claim Term	Construction
“in response to the selection of the first user profile, the display displays a second user interface for a user to select desired video information to be reproduced from among the first video information.” Claims 16 and 21	“in response to the selection of the first user profile, the display displays a new second user dedicated screen for a user to select desired video information to be reproduced from among the first video information”

42. Both independent claims 16 and 21 require the processor, in response to the selection of a user profile, to display a new, user-dedicated screen that allows the user to select video information. The claims, specification, and figures of the '815 Patent explicitly establish that the second interface is distinct from the first interface and appears on a new screen. For instance, see Ex. 1001 at 6:19-41 and Figures 4-7. Notably, Figures 5 and 6 illustrate a new user-dedicated interface/screen that presents user-defined information for selection:

FIG. 6 shows an example in which **menu display is conducted by using the user-defined unified information #1** shown in FIG. 1. Reference numeral 601 designates a menu display tag for user #1 (who is supposed to be “mother” here). As appreciated from FIG. 1, reference numerals 402 and 502 designate thumbnails indicating the program information #1 and the play list information #1, respectively. The “mother” can use the menu display tag for mother 601 as **a folder dedicated to herself**, and freely register and delete data to be reproduced. In the same way, FIG. 7 shows an example in which **menu display is conducted by using the user-defined unified information #2** shown in FIG. 1. Reference numeral 701 designates a menu display tag for user #2 (who is supposed to be “father” here). As appreciated from FIG. 1, reference numerals 503 and 502 designate thumbnails

indicating the play list information #2 and the play list information #1, respectively. In this case, the “father” selects two play lists. However, the reproduction sequence of them can be altered. In the same way as the “mother,” the “father” can use the menu display tag for father 701 **as a folder dedicated to himself**, and freely register and delete data to be reproduced.

Ex. 1001 at 6:19-41 (annotation added).



Ex. 1001 at Figs. 6 and 7. A POSITA, when reading claims 16 and 21 in their entirety, would understand that the second interface refers to a new screen separate from the first user interface. This new screen displays user-specific information, as further evidenced by the claims' requirement that the second interface includes a character identifying the user associated with the selected user profile:

the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first group of video information and indicating an identity of the user of the first user profile.

Ex. 1001 at Claims 16 and 21 (limitations (21f) and (16g)).

43. Additionally, a POSITA would interpret this claim limitation to mean that the second interface must be a new screen because the characters identifying the user profile are already present in the first interface. The only logical purpose for requiring these identifying characters in the second interface is that it operates as a new screen distinct from the first, which does not carry over the information from the first interface.

44. Accordingly, I propose that “in response to the selection of the first user profile, the display displays a second user interface for a user to select desired video information to be reproduced from among the first video information” be construed as “in response to the selection of the first user profile, the display displays a new second user dedicated screen for a user to select desired video information to be reproduced from among the first video information.”

45. I understand that in the related District Court Litigation, the court also provided construction for “the processor generates a group of video information based on user preferences determined by the user selections of the video information” term:

Claim Term	District Court Construction
“the processor generates a group of video information based on user preferences determined by the user selections of the video information”	“generating a group of video information that includes (i) only video information that has previously been selected by a user, (ii) only

	video information that has not previously been selected by a user, or (iii) a mix of video information including video information that has been previously selected by a user and video information not previously selected by a user”
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46. After reviewing the court’s claim construction order, I understand that the court adopted Samsung’s construction for this term. Ex. 2033 at 9. In providing its reasoning for this construction, the court specifically noted:

“There’s nothing wrong with Samsung pointing to Maxell’s **infringement contentions** in its briefing. Doing so often highlights the need for claim construction, such as when one party argues no construction is necessary but the contentions clearly show that party is interpreting the claim language otherwise. Instead, **Samsung simply says its construction aligns with how Maxell interpreted the clause in its contentions**, thus suggesting there should be no dispute from Maxell on whether its construction is proper.”

Id (emphasis added).

47. Upon further review of Samsung’s briefing, I sought to better understand its reasoning for providing this specific construction. Based on my analysis, it appears that Samsung’s interpretation in the District Court Litigation of “generating a list of video information” is consistent with Maxell’s own interpretation of the claim. Specifically, “generating a list of video information based on preferences of a user” aligns with the understanding that this phrase refers to generating a recommendation video list:

Samsung's construction aligns with the meaning that Maxell employed in its infringement contentions, which identify: (i) a group of video information including information previously selected by the user, which corresponds to group type (i) in Samsung's construction (Ex. B, p. 169 ("User's Preferences are indicated based on user selections of three videos and selecting 'Copy' or 'Move' to album")); and (ii) a group of video information including "recommended" videos, which is information not previously selected by user that corresponds to group type (ii) in Samsung's construction (*id.* at p. 676 ("Netflix provides recommendations with a list based on a user's watch history that corresponds to user selections.")). Group type (iii) was included in Samsung's construction in response to Maxell's assertion during the meet and confer process that Netflix's recommendations were not limited to previously unselected videos.

Notably, Maxell's opening brief never argues that any of these three group types is incorrect, nor does it identify any video information incorrectly excluded from Samsung's construction. There is thus no dispute that Samsung's construction is correct.

Ex. 2034 at 2-3.

48. Additionally, the '815 Patent specification supports this understanding that "generating a list of video information based on preferences of a user" refers to "generating a recommendation video list":

For example, when a plurality of users use a single recording medium, it becomes possible to manage reproduced contents that meet respective users' **tastes** by using one user-defined unified information every user.

Ex. 1001 at 4:35-39 (emphasis added).

In the case where the number of play lists has become very large, a play list that is high in **user's use frequency** can be displayed in the first place in the GUI view.

Ex. 1001 at 8:23-26 (emphasis added).

49. Accordingly, for my analysis, I have applied the construction that is “generating a group of video information, which is video recommendation list, that includes (i) only video information that has previously been selected by a user, (ii) only video information that has not previously been selected by a user, or (iii) a mix of video information including video information that has been previously selected by a user and video information not previously selected by a user.”

50. I have interpreted the remaining terms in accordance with their “plain and ordinary” meaning. As such, I have applied the ordinary and customary meaning that the terms would have had to a person of ordinary skill in the art at the time of the invention of December 2, 2004 (the ’815 Patent’s priority date) in view of the patent’s specification.

D. Level of Ordinary Skill in the Art

51. I understand that claims are to be interpreted from the viewpoint of one of ordinary skill in the relevant art. To determine the level of skill that would be “ordinary,” I understand that a person of ordinary skill must generally have the capability of understanding the general principles that are applicable to the pertinent art.

52. In the case of the ’815 Patent, these general principles include the concepts of Human Computer Interaction, user interfaces, and content management. A person of ordinary skill in the art should be familiar with these principles.

53. In my opinion, “a person of ordinary skill in the art” in the field of the ’815 Patent would have a Bachelor of Science degree in Electrical Engineering, Computer Engineering, Computer Science, Human Computer Interaction, or a related technical field, with at least one year of experience working in the field of user interfaces and/or content management. More education (e.g., a Master’s degree) or work experience may compensate for a deficit in one of the relevant qualifications stated invention.

54. I understand the PTAB found that a person of ordinary skill in the art would have “a bachelor’s degree in Computer Science, Electrical Engineering, and Computer Engineering, or a related field, and two years of practical experience in digital data management.” Institution Decision, at 10.

55. I do not believe that my definition of a person of ordinary skill is materially different, and I qualify under the PTAB’s definition or my proposed definition. Accordingly, my opinions here would not change under my or the PTAB’s definition of a POSITA.

IV. MATERIALS CONSIDERED

56. Among the materials I specifically considered at the time I formed my opinions on validity are the ’815 Patent (Ex. 1001); the ’815 Patent’s prosecution history (Ex. 1002); the Bederson Declaration (Ex. 1003) and the materials cited therein; the parties’ claim construction briefing; Samsung’s Petitions for institution

of an Inter Partes Review (IPR) of the '815 Patent, matter number IPR2024-00735 and IPR2024-00777 (“'815 IPR Petition”) and related filings from that matter; the alleged prior art relied upon by Dr. Bederson; and the other materials that I specifically cite to and mention throughout this declaration.

57. In addition to these materials, I relied upon my decades of experience and expertise in computer science and electrical engineering, particularly in system design, video processing, and communications. I have also taken into account the knowledge and background principles that a person of ordinary skill in the art would be familiar with at the time of the Patent Owner’s invention (no later than December 2, 2004).

V. BACKGROUND OF THE TECHNOLOGY OF THE '815 PATENT

A. Overview of the '815 Patent

58. The '815 Patent is entitled “Editing Method and Recording and Reproducing Device,” and claims priority to multiple Japanese applications, the earliest of which was filed on December 2, 2004. The '815 Patent issued on May 25, 2021.

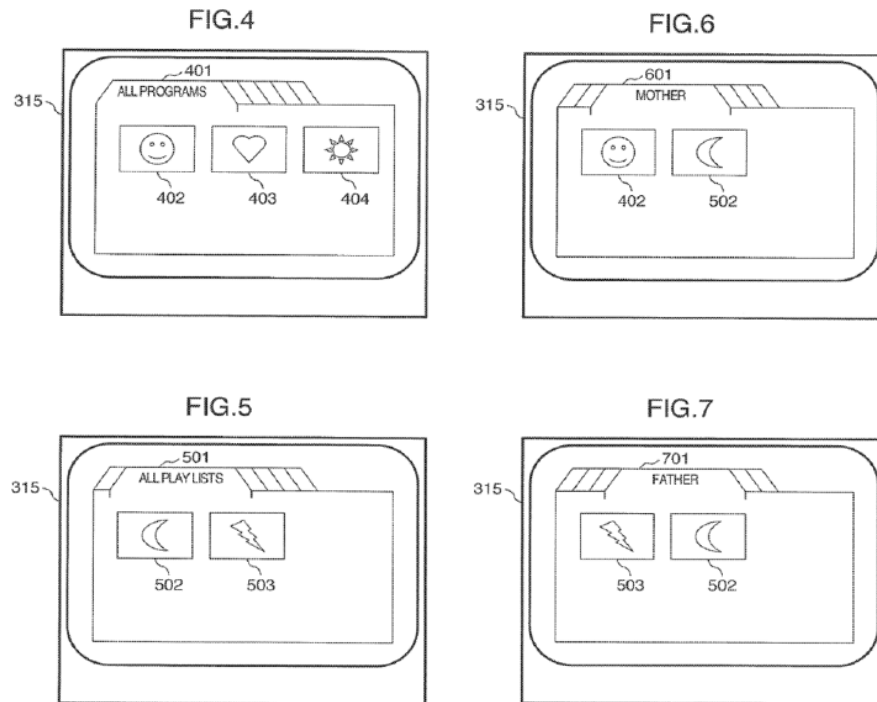
59. The '815 Patent is directed to an information processing apparatus, and related methods, that manages digital data and reproduces video content associated with user profiles in a specific manner that enables improved video management, storage, and the presentation of groups of video information. Ex. 1001, at 2:63-3:6.

At the time of the invention, content systems allowed users to group media into “playlists,” but those playlists were not optimized for multiple users. Id. at 2:28-47. Different members of the same household, for instance, could not customize their views with select playlists and programs. The ’815 Patent solved this problem by providing a recording and reproducing device in which the user can select and manage arbitrary playlists in a particular manner using hierarchical levels of information management.

60. More specifically, the claimed inventions are directed to a hierarchical management interface with different areas and classifications associated with different user information, association, and/or behavior. For example, one of the claimed inventions contains a “first area” and a “second area.” The first area includes a “first character” associated with a “first group” of video information for a “first classification” and a “second character” that is associated with a “second group” of video information for a “second classification.” The second area displays a first or second group of thumbnails configured upon user selection of the first and second characters.

61. Both groups of video information are stored as part of the plurality of stored video information, and the first group of video information is configured to allow a user to edit. Finally, when one video information is deleted from the first group it continues to be included in the second group and a thumbnail corresponding

to the video information is displayed as one of the second group of thumbnails. Examples of display output of an information processing apparatus that are capable of implementing the invention of the '815 Patent are shown below:



Id. at Figs. 4-7. As a result, it becomes possible for the user to select arbitrary playlists or reproduction ranges and conduct management of that data. Even in the case where a plurality of users share a single recording medium, each user can manage his or her favorite reproduction content, resulting in improved usability.

B. Prosecution History of the '815 Patent

62. U.S. Application No. 16/883,124 (the "'124 Application"), which issued as the '815 Patent, was filed on 5/26/2020. The '124 Application claimed priority to a series of continuation applications that matured into various patents. See

Exs. 2006-2011; *see also* Exs. 1040-1045 (file histories of related patents) All the patents stemming from the Japanese priority applications were examined by the same Primary Examiner.

C. The '815 Patent's Priority Date

63. To support its use of Wong for Grounds 9 and 10, Petitioner and Dr. Bederson contend that none of the applications to which the '815 Patent claims priority that were filed prior to 11/9/2017 “satisfy the requirements of 35 U.S.C. §112 for at least the following terms found in each independent claims of the Challenged Claims”:

- “receiving . . . first video information wirelessly from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted” (“Term 1”);
- “upon the one video being removed from the first group of video information, the one video information continues to be included in the second group of video information for the second user profile and the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected” (“Term 2”);
- “user profile” or “user profiles” (“Term 3”)

Pet. at 9-12; Ex. 1003 at ¶85.

64. However, each of Terms 1-3 has written support in several applications prior to 11/9/2017. In fact, each term has support in the priority application JP2004-

378767. See Ex. 2019 (Translation of JP2004-378767); Ex. 2020 (certification of accuracy).

65. With respect to Term 1, the “encryption” limitation is disclosed in the priority application at least in the following:

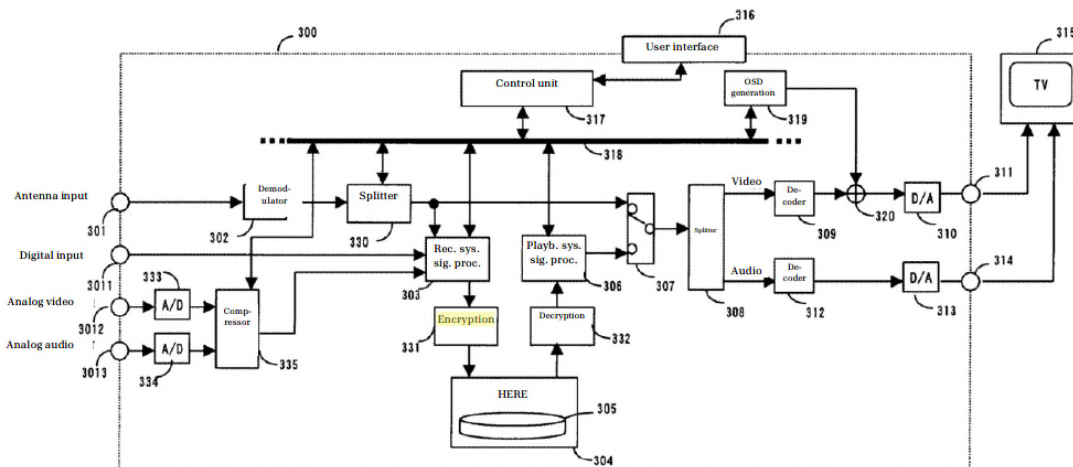
331 is an encryption circuit for encrypting recorded data, 304 is a recording and playback system including drive functionality for the recording medium, 305 is a recording medium, 332 is a decryption circuit for decrypting data which has been encrypted and recorded on the recording medium, 306 is a playback system signal processing circuit....

During recording, a signal transmitted by **digital broadcast**, for example, and received is demodulated using a predetermined method in the demodulation circuit 302 and then subjected to any requisite signal processing such as modulation or addition of data for timing adjustment in the recording system signal processing circuit 303 before being encrypted in the encryption circuit 331 and recorded on the recording medium 305 by the recording and playback system 304. The digital signal input by the digital input terminal 3011 is subjected to any requisite signal processing such as modulation and addition of data for timing adjustment in the recording system signal processing circuit 303 before being encrypted in the encryption circuit 331 and recorded to the recording medium 305 by the recording and playback system 304. The analog video signal input by the analog video input terminal 3012 and the analog audio signal input by the analog audio input terminal 3013 are compressed in the compression circuit 335, pass through the

recording system signal processing circuit 303, and are encrypted by the encryption circuit 331 before being recorded on the recording medium 305 by the recording and playback system 304.

During playback, encrypted digital data read via the recording and playback system 304 from the recording medium 305 in response to a user command is decrypted by the decryption circuit 332, subjected to any requisite signal processing for playback such as demodulation in a manner consistent with a predetermined modulation method in the playback system signal processing circuit 103 and sent to the splitter circuit 308 via the switching circuit 307.

FIG. 3



Ex. 2019, ¶¶[0017]-[0019]; Fig. 3.

66. Thus, the Japanese priority application provides written description support for “receiving encrypted video information.” Moreover, in my opinion, a POSITA would know that the digital broadcast is typically encrypted.

67. Specifically, a POSITA would know about encrypted video information that is wirelessly received by a device and would also know that the circuits (for example, input and decryption) described above could be used to receive the digital broadcast signal (encrypted video information), decrypt it, and produce it for viewing, all satisfy the written description requirement because the essence of the original disclosure conveys the necessary information.

68. Further, A POSITA, at the time of '815 Patent invention in 2004 would know through the technical documents and specifications that the digital broadcast is generally encrypted, as shown in the documents and figures below:

ETSI TS 101 197 V1.2.1 (2002-02)

Technical Specification

**Digital Video Broadcasting (DVB);
DVB SimulCrypt;
Head-end architecture and synchronization**

8.1 Timing issues

In all systems there is a Crypto Period (CP) when data is scrambled with a particular Control Word (CW).

For STBs to regenerate the CW in time, the ECM play-out shall be correctly synchronized with this CP.

To accommodate different synchronization approaches, the SCS will be responsible for requesting enough CWs and ECM packets in advance of their play-out time.

The timing diagram in figure 3 illustrates this relationship between CW generation, ECM generation, ECM play-out and CP.

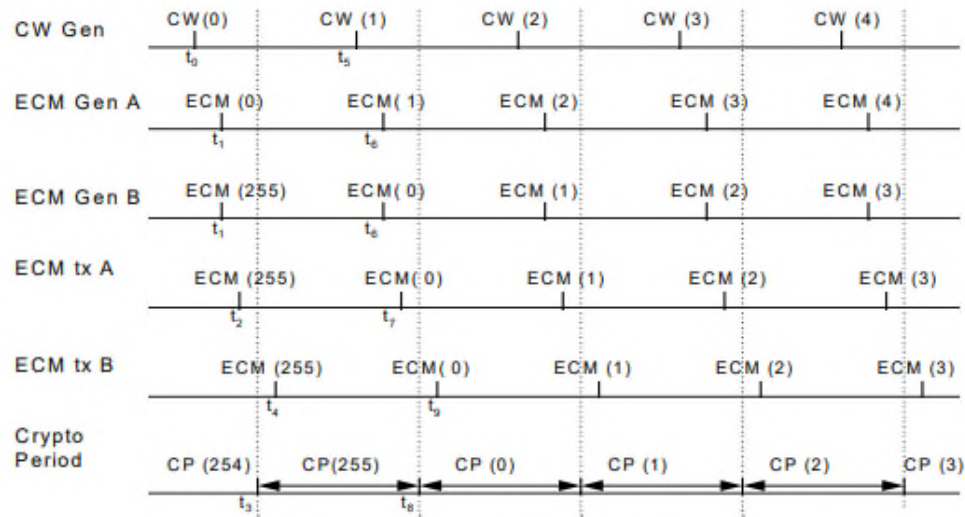


Figure 3: ECM timing diagram

At the beginning of CP(0), at t_6 , the scrambler begins using CW(0) to encrypt the signal. Each CA system shall ensure that its STBs obtain this CW in advance of this point.

Ex. 2030, ETSI TS 101 197 V1.2.1 (2002-02) at 32.

1. Digital broadcasting and conditional access systems

The essential role of broadcasting is to convey information on a broad scale; therefore, "scrambling", which has the aim of restricting reception, is at odds with this role. In recent years, however, the implementation of fee-based broadcasting has made it necessary to prevent non-subscribers from receiving broadcasts, so scrambling of broadcast signals has nonetheless become widespread. This has been achieved through the "conditional access system", which is now a normal prescription for any new broadcast system. Although scrambling began with cable television (CATV) and limited-range terrestrial broadcasts, the advent of worldwide satellite-based broadcasts has fueled the development and implementation of large-scale conditional access systems.

A conditional access system generally consists of two main subsystems:

- ① A scrambling subsystem that a) scrambles the signal to prevent non-subscribers from receiving it and b) descrambles the signal at the subscribers' receivers.
- ② An access control subsystem that processes access control messages to determine whether descrambling is to be performed.

Satellite broadcasting, in particular, features a very broad broadcast target, for which unauthorized reception can have far reaching effects. It is for this reason that highly secure systems are employed for both the scrambling subsystem and access control subsystem.

The general requirements that scrambling systems must satisfy are as follows:

- (1) it must be difficult for a third party to perform unauthorized reception (security);
- (2) scrambled signal content must not be understandable (concealment);
- (3) quality must not deteriorate (perceptibly) on restoring the signal (quality restoration); and
- (4) receiver and operating costs must be low.

In digital broadcasting, moreover,

- (5) efficient scrambling of all kinds of signals (as in multimedia broadcasts) must be possible, and
- (6) various business formats such as multi-channel services and billing schemes must be supported.

2. Configuration of a conditional access system

Although a conditional access system can be achieved in

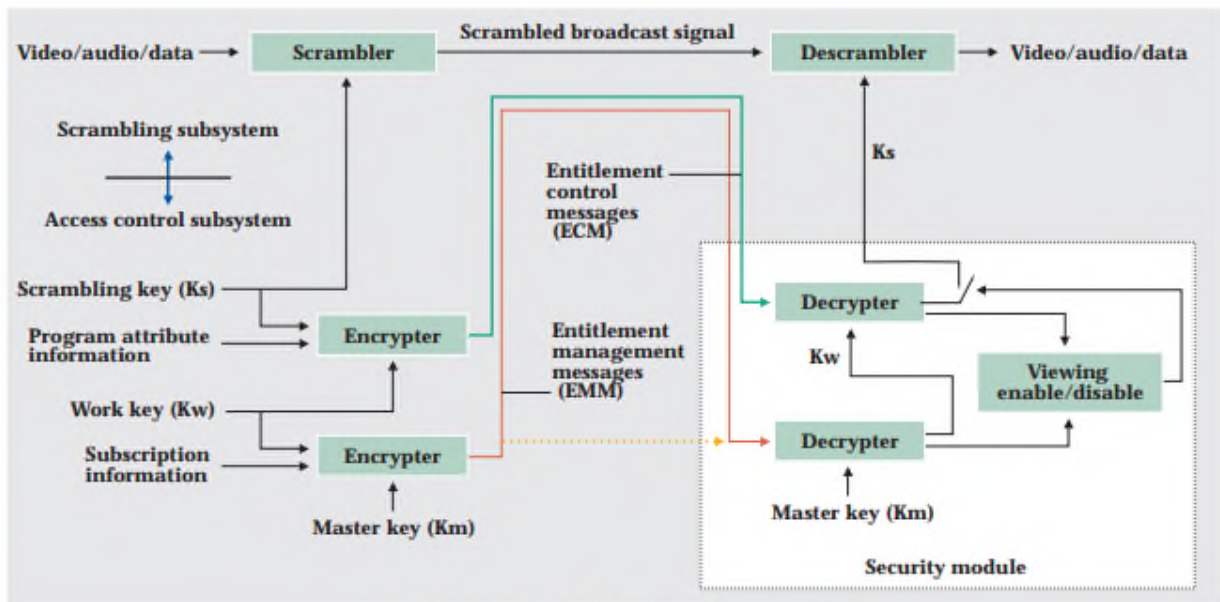


Figure 1: Configuration of a conditional access system

Ex. 2031, at 1.

Broadcast Encryption

Broadcast encryption is a type of encryption scheme first proposed by Amos Fiat and Moni Naor in 1993. Their original goal was to prove that two devices, previously unknown to each other, can agree on a common key for secure communications over a one-way communication path. Broadcast encryption allows for devices that may not have even existed when a group of devices was first grouped together to join into this group and communicate securely. This paper describes broadcast encryption in general, how a few different broadcast encryption schemes work, differences between broadcast encryption and public-key cryptography, and some common uses of broadcast encryption, including cable TV systems and digital content protection.

Ex. 2035, Broadcast Encryption, Dave Lassalle, January 12, 2005, at 3.

69. Dr. Bederson also has previously testified that digital broadcast is typically encrypted:

Q. I'm saying like the data you mentioned which typically should be encrypted, does that include the broadcast -- digital broadcast data, also?

A. Yes, it does.

Ex. 2036, June 6, 2024 Bederson deposition (DCT) at 30:3-7). In addition, Dr. Bederson in the District Court further confirmed that encryption is typically applied to data before transmission:

31. Third, from a technical perspective, a person of ordinary skill in the art would understand that encryption is a process typically (but, as discussed below, not always) applied to data before transmission to a receiving device in order to protect the data during transit. This can be seen, for example, in the documents cited by Plaintiff in the parties' P.R. 4-3 chart, which discuss encryption of pay television content. *See, e.g., Broadcast Encryption, Dave Lassalle, January 12, 2005*¹ (Ex. A). It would be technically logical to a POSITA that the second video information is already in an encrypted state when it is received. This understanding of the plain

Ex. 2037, Bederson Decl. May 30, 2024, ¶31.

70. As such, in my opinion, the claim language “receiving . . . first video information wirelessly from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted” (“Term 1”) is fully supported by the Japanese priority application at least as of December 2004.

71. With respect to Term 2, the claim language “upon the one video being removed” is disclosed in the priority application at least in the following:

402 and 502 are the thumbnails showing program information #1 and playlist information #1, as can be seen from FIG. 1. "Mom" can freely register and delete data to be played back, using the mom menu display tag 601 as her own folder.

503 and 502 are the thumbnails for playlist information #2 and playlist information #1, as can be seen from FIG. 1. In this case, "dad" has selected two playlists and can change the playback order. As with

"mom" above, "dad" can freely register and delete data to be played back, using the dad menu display tag 701 as his own folder.

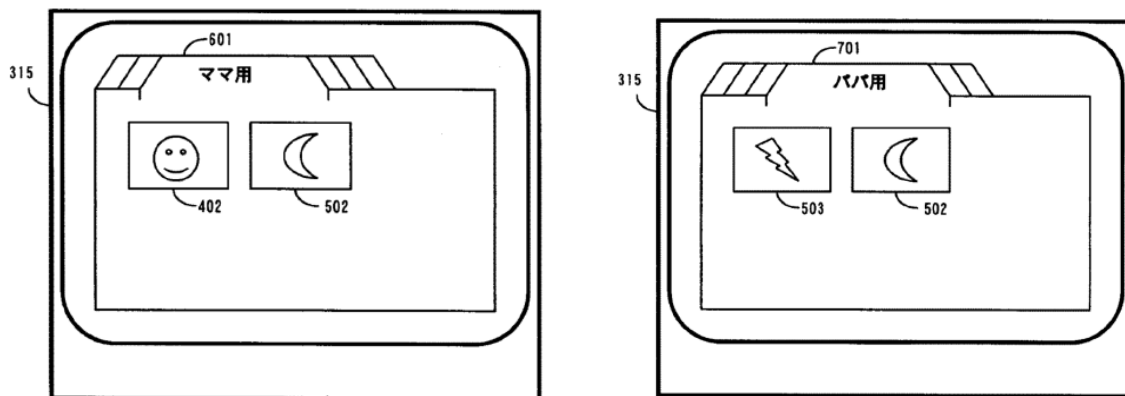
Ex. 2019, at ¶¶[0024]-[0025];

72. As such, it is my opinion that the claim language “upon the one video being removed” (Term 2) is fully supported by the Japanese priority application at least as of December 2004.

73. With respect to Term 3, the “user profile” limitation is disclosed in the priority application:

Next, FIG. 6 is an example of a menu display using integrated user defined information #1 in FIG. 1. 601 is a user #1 (here being "mom") menu display tag, and 402 and 502 are the thumbnails showing program information #1 and playlist information #1, as can be seen from FIG. 1. "Mom" can freely register and delete data to be played back, using the mom menu display tag 601 as her own folder.

Similarly, FIG. 7 is an example of a menu display using integrated user defined information #2 in FIG. 1. 701 is a user #2 (here being "dad") menu display tag, and 503 and 502 are the thumbnails for playlist information #2 and playlist information #1, as can be seen from FIG. 1. In this case, "dad" has selected two playlists and can change the playback order. As with "mom" above, "dad" can freely register and delete data to be played back, using the dad menu display tag 701 as his own folder.



Ex. 2019, at ¶¶[0024]-[0025]; Figs. 6-7.

74. While the precise term “user profile” is not used *in haec verba* in the specification, it discloses user “dedicated” folders where each user can store its playlists according to his/her preferences. ’815 Patent, 6:21-40 and Figs 1, 6-7 where “mother” and “father” are shown to have user dedicated folders supporting their profiles). *See also* Ex. 2019, at ¶¶[0024]-[0025] and Figs 1, 6-7. Further, the ’815 Patent also discloses that these user dedicated folders are possible by the use of hierarchical data directories with a “Root” directory followed by “user-defined unification information” and “contents of user-defined information” grouped to “meet respective users’ tastes by using one user-defined unified information [for] every user.” *See* ’815 Patent, 4:35-39; Ex. 2019, at ¶[0027] . *See also* Figs. 8 and 9 and corresponding descriptions to show how the ’815 Patent discloses the concept of a user profile consistent with the usage of root directories and folders, used for example to implement user profiles by a POSITA in Windows NT at that time. Ex. 2039 (User’s Guide for Microsoft 95 and Windows NT).

75. The '815 Patent provides even more exemplary details about user profiles. For example, it explains that a “[r]eference numeral 601 designates a menu display tag for **user #1** (who is supposed to be “**mother**” here). As appreciated from FIG. 1, reference numerals 402 and 502 designate thumbnails indicating the program information #1 and the play list information #1, respectively. The “**mother**” can use the menu display tag for mother 601 as **a folder dedicated to herself**, and freely register and delete data to be reproduced.” ’815 Patent at 6:21-28 (emphasis added); *see also* Ex. 2019, at ¶¶[0024]-[0025] and Figs 1, 6-7.

76. The '815 Patent further describes a “[r]eference numeral 701 designates a menu display tag for **user #2** (who is supposed to be “**father**” here). As appreciated from FIG. 1, reference numerals 503 and 502 designate thumbnails indicating the play list information #2 and the play list information #1, respectively. In this case, the “father” selects two play lists. However, the reproduction sequence of them can be altered. In the same way as the “mother,” the “father” can use the menu display tag for father 701 as **a folder dedicated to himself**, and freely register and delete data to be reproduced. ’815 Patent at 6:31-40 (emphasis added); Ex. 2019, at ¶¶[0024]-[0025]. Specifically, Figures 6 and 7 show the two user profiles (“mother” and “father”), as shown below:

FIG.6

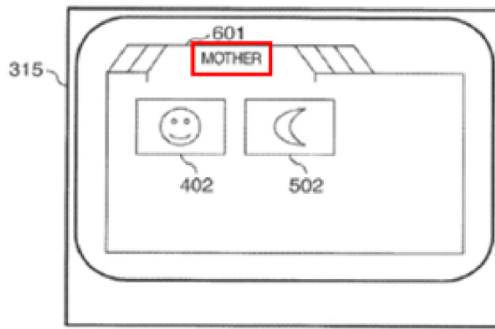
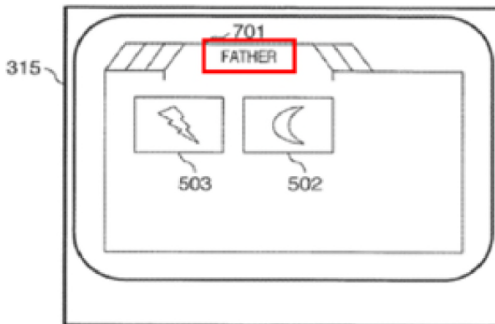


FIG.7

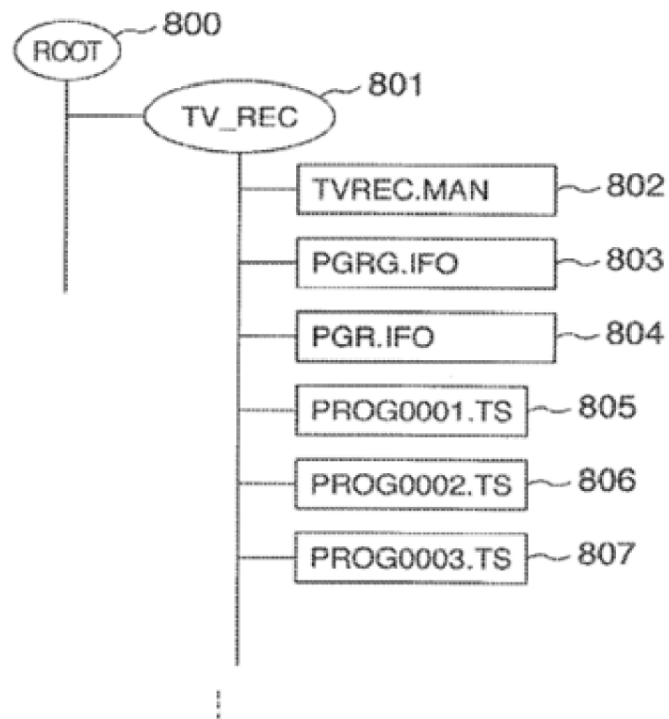


77. The '815 Patent even includes “[f]or example, a plurality of users can set play lists that they want to view and recorded original contents freely and individually. Even when the number of recorded programs is very large, the user can rapidly find out a program that the user wants to view, because the user can refer to a folder defined by the user.” ’815 Patent at 8:28-34; Ex. 2019, at ¶[0033].

78. The '815 Patent further describes a hierarchical directory structure with different levels of stored information such that a plurality of users can use playlists that include some of the same videos stored on a data storage medium without interfering with each other. For example, the '815 Patent discloses that “[i]n FIG. 8, ‘ROOT’ 800 represents a highest hierarchical level of a file directory. ‘TV_REC’

801 is a directory under the highest hierarchical level. ‘TVREC.MAN’ 802, ‘PGRG.IFO’ 803, ‘PGR.IFO’ 804, ‘PROG0001.TS’ 805, . . . of files which implement the management structure shown in FIG. 1 according to the present invention are recorded in the ‘TV_REC’ 801. In the ‘TVREC.MAN’ 802, the original unified information, the play list unified information, and the user-defined unified information #1 to # m on the management level 1 shown in FIG. 1 are described as management tables.” ’815 Patent at 7:7-17; Ex. 2019, at ¶¶[0027]-[0028]. This directory structure, as shown below in Figure 8, is similar to Microsoft Windows NT’s directory structure that stores the settings associated with the user profiles within the system root folder. *See* Ex. 2039, User’s Guide for Microsoft 95 and Windows NT at 108 (“You can also create and modify user profiles on a computer running Windows NT Server. On Windows NT, all user-specific settings are automatically saved into the Profiles folder within the system root folder (typically C:\winnt\profiles)”).

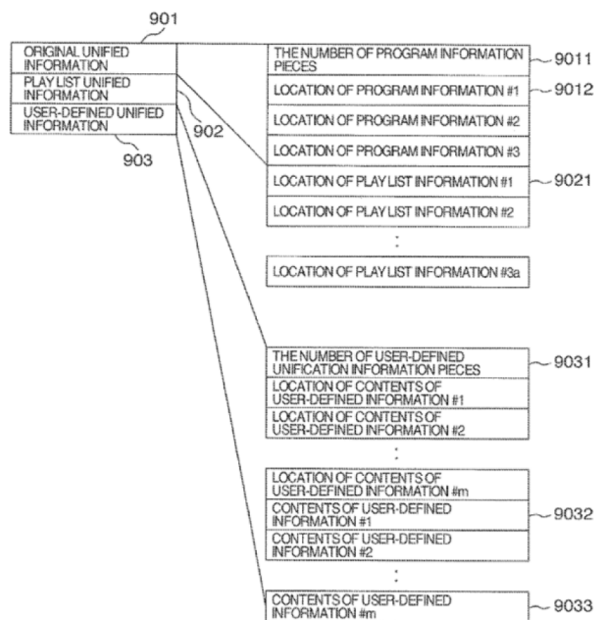
FIG.8



79. The '815 Patent goes on to describe that “FIG. 9 shows a configuration of management tables of the “TVREC.MAN” 802 (FIG. 8). As original unified information 901, the number of AV data recorded as the number of program information pieces 9011, i.e., the total number (three in this case) of entity files (“PROG0001.TS” 805, “PROG0002.TS” 806 and “PROG0003.TS” 807) of the AV data is described. Under the original unified information 901, location tables 9012 of respective original program information pieces are recorded. As play list unified information 902, play list location information tables are recorded in 9021 and subsequent tables. In 9031, the number of user-defined unified information pieces is

recorded.” ’815 Patent at 7:39-52; Ex. 2019, at ¶[0029]. In particular, Figure 9 shows that the “user defined information” is linked to specific contents shown in 9031, 9032, and 9033, whereas “unified information” is linked to overall playlists 9011, 9012, and 9022, which shows that the user profile is one level below root directory. Thus, using such a hierarchical data structure and user dedicated folders, a plurality of users can use playlists that include some of the same videos stored on a data storage medium without interfering with each other.

FIG.9



80. As such, it is my opinion that the claim language “user profile” (Term 3) is fully supported by the Japanese priority application at least as of December 2004.

81. As can be seen from the foregoing, Terms 1-3 are well supported in the priority application, and certainly by 2004.

82. In addition, I am not aware of any intervening prior art between December 28, 2004 (JP2004-378767 filing date) and August 11, 2005 when the parent patent (U.S. Patent No. 7,613,383) of the '815 Patent was filed with identical specification as the '815 Patent. It is my opinion, that the '815 Patent is entitled to the 2004 priority date because the certified translation of JP2004-378767 discloses that this application discloses the claimed subject matter including Terms 1-3. My opinions are supported in view of the evidence set forth herein and the various exhibits I rely upon.

83. Moreover, the '815 Patent is a continuation of application No. 16/221,908, filed on Dec. 17, 2018, now Pat. No. 10,679,674, which is a continuation of application No. 15/808,175, filed on Nov. 9, 2017, now Pat. No. 10,199,072, which is a continuation of application No. 15/176,435, filed on Jun. 8, 2016, now Pat. No. 9,818,449, which is a continuation of application No. 14/141,417, filed on Dec. 26, 2013, now Pat. No. 9,384,783, which is a continuation of application No. 12/567,898, filed on Sep. 28, 2009, now Pat. No. 8,644,684, which is a continuation of application No. 11/203,457, filed on Aug. 11, 2005, now Pat. No. 7,613,383. *See* Exs. 2006-2011.

84. Additionally, as shown in the charts below, it is my opinion that all of the earlier application/patents, as described above, to which the '815 Patent claims priority, provides written description for and enables a person of ordinary skill in the art to make and use the inventions recited in claims 16- 27 of the '815 Patent without undue experimentation. I note that the Figures in the '815 Patent and earlier applications/patents are the same, and thus the equivalent descriptions in the specifications apply and support priority. In addition, although my analysis below is based on the independent claim 21 and its dependent claims, the same analysis applies to the corresponding method claim 16 and its dependent claims:

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '674 Patent
[21.pre]	An information processing apparatus comprising:	'674 Patent at 4:42-5:58; 6:55-63; Fig. 3
[21.a]	a network interface receiving first video information wirelessly from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted;	'674 Patent at 1:42-47; 4:41-5:44; 6:55-63; 8:41-46; Fig. 3
[21.b]	a display displaying a first user interface for a user to select a user profile from among a plurality of user profiles including a first user profile associated with a first character and a second user profile associated with a second character,	'674 Patent at 2:33-37; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.c]	the plurality of user profiles being associated with video information and the first user interface including an option for a user to select the first user profile from the plurality of user profiles by selecting the first character;	'674 Patent at 2:33-37; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.d]	an input interface receiving a selection of the first user profile at a first time and a selection of the second character at a second time,	'674 Patent at 2:33-37; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.e]	wherein, in response to the selection of the first user profile, the display displays a second user interface for a user to select desired video	'674 Patent at 2:33-37; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '674 Patent
	information to be reproduced from among the first video information,	
[21.f]	the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first group of video information and indicating an identity of the user which the first user profile is associated with,	'674 Patent at 2:33-37; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.g]	the second user interface further displaying thumbnails corresponding to the first group of video information, and	'674 Patent at 2:33-37; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.h]	wherein, in response to the selection of the second user profile, the display displays the second character and a second group of thumbnails corresponding to a second group of video information associated with the second user profile when the second character is selected,	'674 Patent at 2:33-37; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.i]	the first group of video information and the second group of video information including one video information that is the same; and	'674 Patent at 2:33-37; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.j]	a processor for removing one video information from the first group of video information after the input interface receives a selection to remove the one video information from	'674 Patent at 2:33-37; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '674 Patent
	the first group of video information associated with the first user profile,	
[21.k]	wherein, upon the one video information being removed from the first group of video information, the one video information continues to be included in the second group of video information for the second user profile and the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected,	'674 Patent at 2:33-37; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.l]	wherein the processor decrypts second video information corresponding to a selected thumbnail when the input interface receives a selection of desired video information based on a selection of a thumbnail from the first group of thumbnails, and	'674 Patent at 2:33-37; 3:53-4:37; 4:42-5:58; 5:59-6:38; 6:39-54; 6:55-63; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.m]	wherein the display displays the decrypted video information.	'674 Patent at 4:42-5:58; 5:59-6:38; Figs. 3, 4, 5, 6, 7
[24]	The information processing apparatus of claim 21, wherein the processor generates a list of video information based on preferences of a user determined by a user selections of thumbnails from the first or second group of thumbnails.	'674 Patent at 2:7-38; 2:33-37; 3:61-4:37; 5:59-6:38; 6:3-38; Figs. 1, 4, 5, 6, 7

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '674 Patent
[27.a]	The information processing apparatus of claim 21, further comprising: an on screen display generator generating on screen display information,	'674 Patent at 4:41-5:58; Fig. 3
[27.b]	wherein the first video information includes third video information such that, upon selection for playback, the third video information is outputted with the on screen display information for display of the third video information and the on screen display information.	'674 Patent at 4:41-5:58; Fig. 3

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '072 Patent
[21.pre]	An information processing apparatus comprising:	'072 Patent at 4:42-5:58; 6:55-63; Fig. 3
[21.a]	a network interface receiving first video information wirelessly from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted;	'072 Patent at 1:41-45; 4:40-5:44; 6:55-63; 8:41-46; Fig. 3
[21.b]	a display displaying a first user interface for a user to select a user profile from among a plurality of user profiles including a first user profile associated with a first character and a second user profile associated with a second character,	'072 Patent at 2:31-36; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.c]	the plurality of user profiles being associated with video information and the first user interface including an option for a user to select the first user profile from the plurality of user profiles by selecting the first character;	'072 Patent at 2:31-36; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.d]	an input interface receiving a selection of the first user profile at a first time and a selection of the second character at a second time,	'072 Patent at 2:31-36; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.e]	wherein, in response to the selection of the first user profile, the display displays a second user interface for a user to select desired video information to be reproduced from among the first video information,	'072 Patent at 2:31-36; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.f]	the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first group of video information and	'072 Patent at 2:31-36; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '072 Patent
	indicating an identity of the user which the first user profile is associated with,	51; 7:52-8:40; Figs. 1, 4-11, 13
[21.g]	the second user interface further displaying thumbnails corresponding to the first group of video information, and	'072 Patent at 2:31-36; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.h]	wherein, in response to the selection of the second user profile, the display displays the second character and a second group of thumbnails corresponding to a second group of video information associated with the second user profile when the second character is selected,	'072 Patent at 2:31-36; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.i]	the first group of video information and the second group of video information including one video information that is the same; and	'072 Patent at 2:31-36; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.j]	a processor for removing one video information from the first group of video information after the input interface receives a selection to remove the one video information from the first group of video information associated with the first user profile,	'072 Patent at 2:31-36; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13
[21.k]	wherein, upon the one video information being removed from the first group of video information, the one video information continues to be included in the second group of video information for the second user profile and the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected,	'072 Patent at 2:31-36; 3:53-4:37; 5:59-6:38; 6:39-54; 7:3-51; 7:52-8:40; Figs. 1, 4-11, 13

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '072 Patent
[21.l]	wherein the processor decrypts second video information corresponding to a selected thumbnail when the input interface receives a selection of desired video information based on a selection of a thumbnail from the first group of thumbnails, and	'072 Patent at 2:31-36; 3:53-4:37; 4:42-5:58; 5:59-6:38; 6:39-54; 6:55-63; 7:3-51; 7:52-8:40; Figs. 1,3, 4-11, 13
[21.m]	wherein the display displays the decrypted video information.	'072 Patent at 4:42-5:58; 5:59-6:38; Figs. 3, 4, 5, 6, 7
[24]	The information processing apparatus of claim 21, wherein the processor generates a list of video information based on preferences of a user determined by a user selections of thumbnails from the first or second group of thumbnails.	'072 Patent at 1:63-2:36; 2:31-36; 3:61-4:37; 5:59-6:38; 6:3-38; Figs. 1, 4, 5, 6, 7
[27.a]	The information processing apparatus of claim 21, further comprising: an on screen display generator generating on screen display information,	'072 Patent at 4:41-5:58; Fig. 3
[27.b]	wherein the first video information includes third video information such that, upon selection for playback, the third video information is outputted with the on screen display information for display of the third video information and the on screen display information.	'072 Patent at 4:41-5:58; Fig. 3

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '449 Patent
[21.pre]	An information processing apparatus comprising:	'449 Patent at 4:34-5:50; 6:47-55; Fig. 3
[21.a]	a network interface receiving first video information wirelessly from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted;	'449 Patent at 1:34-39; 4:33-5:36; 6:47-55; 8:32-37; Fig. 3
[21.b]	a display displaying a first user interface for a user to select a user profile from among a plurality of user profiles including a first user profile associated with a first character and a second user profile associated with a second character,	'449 Patent at 2:24-29; 3:45-4:29; 5:51-6:30; 6:31-46; 6:62-7:42; 7:43-8:31; Figs. 1, 4-11, 13
[21.c]	the plurality of user profiles being associated with video information and the first user interface including an option for a user to select the first user profile from the plurality of user profiles by selecting the first character;	'449 Patent at 2:24-29; 3:45-4:29; 5:51-6:30; 6:31-46; 6:62-7:42; 7:43-8:31; Figs. 1, 4-11, 13
[21.d]	an input interface receiving a selection of the first user profile at a first time and a selection of the second character at a second time,	'449 Patent at 2:24-29; 3:45-4:29; 5:51-6:30; 6:31-46; 6:62-7:42; 7:43-8:31; Figs. 1, 4-11, 13
[21.e]	wherein, in response to the selection of the first user profile, the display displays a second user interface for a user to select desired video	'449 Patent at 2:24-29; 3:45-4:29; 5:51-6:30; 6:31-46; 6:62-7:42; 7:43-8:31; Figs. 1, 4-11, 13

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '449 Patent
	information to be reproduced from among the first video information,	
[21.f]	the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first group of video information and indicating an identity of the user which the first user profile is associated with,	'449 Patent at 2:24-29; 3:45-4:29; 5:51-6:30; 6:31-46; 6:62-7:42; 7:43-8:31; Figs. 1, 4-11, 13
[21.g]	the second user interface further displaying thumbnails corresponding to the first group of video information, and	'449 Patent at 2:24-29; 3:45-4:29; 5:51-6:30; 6:31-46; 6:62-7:42; 7:43-8:31; Figs. 1, 4-11, 13
[21.h]	wherein, in response to the selection of the second user profile, the display displays the second character and a second group of thumbnails corresponding to a second group of video information associated with the second user profile when the second character is selected,	'449 Patent at 2:24-29; 3:45-4:29; 5:51-6:30; 6:31-46; 6:62-7:42; 7:43-8:31; Figs. 1, 4-11, 13
[21.i]	the first group of video information and the second group of video information including one video information that is the same; and	'449 Patent at 2:24-29; 3:45-4:29; 5:51-6:30; 6:31-46; 6:62-7:42; 7:43-8:31; Figs. 1, 4-11, 13
[21.j]	a processor for removing one video information from the first group of video information after the input interface receives a selection	'449 Patent at 2:24-29; 3:45-4:29; 5:51-6:30; 6:31-46; 6:62-7:42; 7:43-8:31; Figs. 1, 4-11, 13

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '449 Patent
	to remove the one video information from the first group of video information associated with the first user profile,	
[21.k]	wherein, upon the one video information being removed from the first group of video information, the one video information continues to be included in the second group of video information for the second user profile and the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected,	'449 Patent at 2:24-29; 3:45-4:29; 5:51-6:30; 6:31-46; 6:62-7:42; 7:43-8:31; Figs. 1, 4-11, 13
[21.l]	wherein the processor decrypts second video information corresponding to a selected thumbnail when the input interface receives a selection of desired video information based on a selection of a thumbnail from the first group of thumbnails, and	'449 Patent at 2:24-29; 3:45-4:29; 4:34-5:50; 5:51-6:30; 6:31-46; 6:47-55; 6:62-7:42; 7:43-8:31; Figs. 1,3, 4-11, 13
[21.m]	wherein the display displays the decrypted video information.	'449 Patent at 4:34-5:50; 5:51-6:30; Figs. 3, 4, 5, 6, 7
[24]	The information processing apparatus of claim 21, wherein the processor generates a list of video information based on preferences of a user	'449 Patent at 1:56-2:29; 2:24-29; 3:53-4:29; 5:51-6:30; 5:62-6:30; Figs. 1, 4, 5, 6, 7

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '449 Patent
	determined by a user selections of thumbnails from the first or second group of thumbnails.	
[27.a]	The information processing apparatus of claim 21, further comprising: an on screen display generator generating on screen display information,	'449 Patent at 4:33-5:50; Fig. 3
[27.b]	wherein the first video information includes third video information such that, upon selection for playback, the third video information is outputted with the on screen display information for display of the third video information and the on screen display information.	'449 Patent at 4:33-5:50; Fig. 3

'815 Claim Number	Patent Element	Claim Text	Exemplary Disclosures From the '783 Patent
[21.pre]		An information processing apparatus comprising:	'783 Patent at 4:25-5:40; 6:34-42; Fig. 3
[21.a]		a network interface receiving first video information wirelessly from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted;	'783 Patent at 1:30-35; 4:25-5:26; 6:34-42; 8:16-21; Fig. 3
[21.b]		a display displaying a first user interface for a user to select a user profile from among a plurality of user profiles including a first user profile associated with a first character and a second user profile associated with a second character,	'783 Patent at 2:20-24; 3:39-4:21; 5:41-6:18; 6:19-33; 6:48-7:28; 7:29-8:15; Figs. 1, 4-11, 13
[21.c]		the plurality of user profiles being associated with video information and the first user interface including an option for a user to select the first user profile from the plurality of user profiles by selecting the first character;	'783 Patent at 2:20-24; 3:39-4:21; 5:41-6:18; 6:19-33; 6:48-7:28; 7:29-8:15; Figs. 1, 4-11, 13
[21.d]		an input interface receiving a selection of the first user profile at a first time and a selection of the second character at a second time,	'783 Patent at 2:20-24; 3:39-4:21; 5:41-6:18; 6:19-33; 6:48-7:28; 7:29-8:15; Figs. 1, 4-11, 13
[21.e]		wherein, in response to the selection of the first user profile, the display displays a second user interface for a	'783 Patent at 2:20-24; 3:39-4:21; 5:41-6:18; 6:19-33; 6:48-7:28; 7:29-8:15; Figs. 1, 4-11, 13

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '783 Patent
	user to select desired video information to be reproduced from among the first video information,	
[21.f]	the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first group of video information and indicating an identity of the user which the first user profile is associated with,	'783 Patent at 2:20-24; 3:39-4:21; 5:41-6:18; 6:19-33; 6:48-7:28; 7:29-8:15; Figs. 1, 4-11, 13
[21.g]	the second user interface further displaying thumbnails corresponding to the first group of video information, and	'783 Patent at 2:20-24; 3:39-4:21; 5:41-6:18; 6:19-33; 6:48-7:28; 7:29-8:15; Figs. 1, 4-11, 13
[21.h]	wherein, in response to the selection of the second user profile, the display displays the second character and a second group of thumbnails corresponding to a second group of video information associated with the second user profile when the second character is selected,	'783 Patent at 2:20-24; 3:39-4:21; 5:41-6:18; 6:19-33; 6:48-7:28; 7:29-8:15; Figs. 1, 4-11, 13
[21.i]	the first group of video information and the second group of video information including one video information that is the same; and	'783 Patent at 2:20-24; 3:39-4:21; 5:41-6:18; 6:19-33; 6:48-7:28; 7:29-8:15; Figs. 1, 4-11, 13
[21.j]	a processor for removing one video information from the	'783 Patent at 2:20-24; 3:39-4:21; 5:41-6:18; 6:19-33;

'815 Claim Number	Patent Element	Claim Text	Exemplary Disclosures From the '783 Patent
		first group of video information after the input interface receives a selection to remove the one video information from the first group of video information associated with the first user profile,	6:48-7:28; 7:29-8:15; Figs. 1, 4-11, 13
[21.k]		wherein, upon the one video information being removed from the first group of video information, the one video information continues to be included in the second group of video information for the second user profile and the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected,	'783 Patent at 2:20-24; 3:39-4:21; 5:41-6:18; 6:19-33; 6:48-7:28; 7:29-8:15; Figs. 1, 4-11, 13
[21.l]		wherein the processor decrypts second video information corresponding to a selected thumbnail when the input interface receives a selection of desired video information based on a selection of a thumbnail from the first group of thumbnails, and	'783 Patent at 2:20-24; 3:39-4:21; 4:25-5:40; 5:41-6:18; 6:19-33; 6:34-42; 6:48-7:28; 7:29-8:15; Figs. 1,3, 4-11, 13
[21.m]		wherein the display displays the decrypted video information.	'783 Patent at 4:25-5:40; 5:41-6:18; Figs. 3, 4, 5, 6, 7

'815 Claim Number	Patent Element	Claim Text	Exemplary Disclosures From the '783 Patent
[24]		The information processing apparatus of claim 21, wherein the processor generates a list of video information based on preferences of a user determined by a user selections of thumbnails from the first or second group of thumbnails.	'783 Patent at 1:53-2:24; 2:20-24; 3:46-4:21; 5:41-6:18; 5:52-6:18; Figs. 1, 4, 5, 6, 7
[27.a]		The information processing apparatus of claim 21, further comprising: an on screen display generator generating on screen display information,	'783 Patent at 4:25-5:40; Fig. 3
[27.b]		wherein the first video information includes third video information such that, upon selection for playback, the third video information is outputted with the on screen display information for display of the third video information and the on screen display information.	'783 Patent at 4:25-5:40; Fig. 3

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '684 Patent
[21.pre]	An information processing apparatus comprising:	'684 Patent at 4:23-5:38; 6:32-40; Fig. 3
[21.a]	a network interface receiving first video information wirelessly from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted;	'684 Patent at 1:27-32; 4:23-5:24; 6:32-40; 8:14-19; Fig. 3
[21.b]	a display displaying a first user interface for a user to select a user profile from among a plurality of user profiles including a first user profile associated with a first character and a second user profile associated with a second character,	'684 Patent at 2:18-22; 3:37-4:19; 5:39-6:16; 6:17-31; 6:46-7:26; 7:27-8:13; Figs. 1, 4-11, 13
[21.c]	the plurality of user profiles being associated with video information and the first user interface including an option for a user to select the first user profile from the plurality of user profiles by selecting the first character;	'684 Patent at 2:18-22; 3:37-4:19; 5:39-6:16; 6:17-31; 6:46-7:26; 7:27-8:13; Figs. 1, 4-11, 13
[21.d]	an input interface receiving a selection of the first user profile at a first time and a selection of the second character at a second time,	'684 Patent at 2:18-22; 3:37-4:19; 5:39-6:16; 6:17-31; 6:46-7:26; 7:27-8:13; Figs. 1, 4-11, 13
[21.e]	wherein, in response to the selection of the first user profile, the display displays a second user interface for a user to select desired video	'684 Patent at 2:18-22; 3:37-4:19; 5:39-6:16; 6:17-31; 6:46-7:26; 7:27-8:13; Figs. 1, 4-11, 13

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '684 Patent
	information to be reproduced from among the first video information,	
[21.f]	the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first group of video information and indicating an identity of the user which the first user profile is associated with,	'684 Patent at 2:18-22; 3:37-4:19; 5:39-6:16; 6:17-31; 6:46-7:26; 7:27-8:13; Figs. 1, 4-11, 13
[21.g]	the second user interface further displaying thumbnails corresponding to the first group of video information, and	'684 Patent at 2:18-22; 3:37-4:19; 5:39-6:16; 6:17-31; 6:46-7:26; 7:27-8:13; Figs. 1, 4-11, 13
[21.h]	wherein, in response to the selection of the second user profile, the display displays the second character and a second group of thumbnails corresponding to a second group of video information associated with the second user profile when the second character is selected,	'684 Patent at 2:18-22; 3:37-4:19; 5:39-6:16; 6:17-31; 6:46-7:26; 7:27-8:13; Figs. 1, 4-11, 13
[21.i]	the first group of video information and the second group of video information including one video information that is the same; and	'684 Patent at 2:18-22; 3:37-4:19; 5:39-6:16; 6:17-31; 6:46-7:26; 7:27-8:13; Figs. 1, 4-11, 13
[21.j]	a processor for removing one video information from the first group of video information after the input	'684 Patent at 2:18-22; 3:37-4:19; 5:39-6:16; 6:17-31; 6:46-7:26; 7:27-8:13; Figs. 1, 4-11, 13

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '684 Patent
	interface receives a selection to remove the one video information from the first group of video information associated with the first user profile,	
[21.k]	wherein, upon the one video information being removed from the first group of video information, the one video information continues to be included in the second group of video information for the second user profile and the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected,	'684 Patent at 2:18-22; 3:37-4:19; 5:39-6:16; 6:17-31; 6:46-7:26; 7:27-8:13; Figs. 1, 4-11, 13
[21.l]	wherein the processor decrypts second video information corresponding to a selected thumbnail when the input interface receives a selection of desired video information based on a selection of a thumbnail from the first group of thumbnails, and	'684 Patent at 2:18-22; 3:37-4:19; 4:23-5:38; 5:39-6:16; 6:17-31; 6:32-40; 6:46-7:26; 7:27-8:13; Figs. 1,3, 4-11, 13
[21.m]	wherein the display displays the decrypted video information.	'684 Patent at 4:23-5:38; 5:39-6:16; Figs. 3, 4, 5, 6, 7
[24]	The information processing apparatus of claim 21, wherein the processor generates a list of video	'684 Patent at 1:50-2:22; 2:18-22; 3:44-4:19; 5:39-6:16; 5:50-6:16; Figs. 1, 4, 5, 6, 7

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '684 Patent
	information based on preferences of a user determined by a user selections of thumbnails from the first or second group of thumbnails.	
[27.a]	The information processing apparatus of claim 21, further comprising: an on screen display generator generating on screen display information,	'684 Patent at 4:23-5:38; Fig. 3
[27.b]	wherein the first video information includes third video information such that, upon selection for playback, the third video information is outputted with the on screen display information for display of the third video information and the on screen display information.	'684 Patent at 4:23-5:38; Fig. 3

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '383 Patent
[21.pre]	An information processing apparatus comprising:	'383 Patent at 4:20-5:35; 6:29-37; Fig. 3
[21.a]	a network interface receiving first video information wirelessly from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted;	'383 Patent at 1:23-28; 4:20-5:21; 6:29-37; 8:11-16; Fig. 3
[21.b]	a display displaying a first user interface for a user to select a user profile from among a plurality of user profiles including a first user profile associated with a first character and a second user profile associated with a second character,	'383 Patent at 2:13-17; 3:33-4:16; 5:36-6:13; 6:14-28; 6:43-7:23; 7:24-8:10; Figs. 1, 4-11, 13
[21.c]	the plurality of user profiles being associated with video information and the first user interface including an option for a user to select the first user profile from the plurality of user profiles by selecting the first character;	'383 Patent at 2:13-17; 3:33-4:16; 5:36-6:13; 6:14-28; 6:43-7:23; 7:24-8:10; Figs. 1, 4-11, 13
[21.d]	an input interface receiving a selection of the first user profile at a first time and a selection of the second character at a second time,	'383 Patent at 2:13-17; 3:33-4:16; 5:36-6:13; 6:14-28; 6:43-7:23; 7:24-8:10; Figs. 1, 4-11, 13
[21.e]	wherein, in response to the selection of the first user profile, the display displays a second user interface for a user to select desired video	'383 Patent at 2:13-17; 3:33-4:16; 5:36-6:13; 6:14-28; 6:43-7:23; 7:24-8:10; Figs. 1, 4-11, 13

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '383 Patent
	information to be reproduced from among the first video information,	
[21.f]	the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first group of video information and indicating an identity of the user which the first user profile is associated with,	'383 Patent at 2:13-17; 3:33-4:16; 5:36-6:13; 6:14-28; 6:43-7:23; 7:24-8:10; Figs. 1, 4-11, 13
[21.g]	the second user interface further displaying thumbnails corresponding to the first group of video information, and	'383 Patent at 2:13-17; 3:33-4:16; 6:14-28; 6:43-7:23; 7:24-8:10; Figs. 1, 4-11, 13
[21.h]	wherein, in response to the selection of the second user profile, the display displays the second character and a second group of thumbnails corresponding to a second group of video information associated with the second user profile when the second character is selected,	'383 Patent at 2:13-17; 3:33-4:16; 5:36-6:13; 6:14-28; 6:43-7:23; 7:24-8:10; Figs. 1, 4-11, 13
[21.i]	the first group of video information and the second group of video information including one video information that is the same; and	'383 Patent at 2:13-17; 3:33-4:16; 5:36-6:13; 6:14-28; 6:43-7:23; 7:24-8:10; Figs. 1, 4-11, 13
[21.j]	a processor for removing one video information from the first group of video information after the input interface receives a selection to	'383 Patent at 2:13-17; 3:33-4:16; 6:14-28; 6:43-7:23; 7:24-8:10; Figs. 1, 4-11, 13

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '383 Patent
	remove the one video information from the first group of video information associated with the first user profile,	
[21.k]	wherein, upon the one video information being removed from the first group of video information, the one video information continues to be included in the second group of video information for the second user profile and the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected,	'383 Patent at 2:13-17; 3:33-4:16; 5:36-6:13; 6:14-28; 6:43-7:23; 7:24-8:10; Figs. 1, 4-11, 13
[21.l]	wherein the processor decrypts second video information corresponding to a selected thumbnail when the input interface receives a selection of desired video information based on a selection of a thumbnail from the first group of thumbnails, and	'383 Patent at 2:13-17; 3:33-4:16; 4:20-5:35; 5:36-6:13; 6:14-28; 6:29-37; 6:43-7:23; 7:24-8:10; Figs. 1,3, 4-11, 13
[21.m]	wherein the display displays the decrypted video information.	'383 Patent at 4:20-5:35; 5:36-6:13; Figs. 3, 4, 5, 6, 7
[24]	The information processing apparatus of claim 21, wherein the processor generates a list of video information based on preferences of a user	'383 Patent at 1:46-2:17; 2:13-17; 3:40-4:16; 5:36-6:13; 5:47-6:13; Figs. 1, 4, 5, 6, 7

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the '383 Patent
	determined by a user selections of thumbnails from the first or second group of thumbnails.	
[27.a]	The information processing apparatus of claim 21, further comprising: an on screen display generator generating on screen display information,	'383 Patent at 4:20-5:35; Fig. 3
[27.b]	wherein the first video information includes third video information such that, upon selection for playback, the third video information is outputted with the on screen display information for display of the third video information and the on screen display information.	'383 Patent at 4:20-5:35; Fig. 3

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the JP2004-378767
[21.pre]	An information processing apparatus comprising:	Ex. 2019, ¶¶[0017]-[0026]; Fig. 3
[21.a]	a network interface receiving first video information wirelessly from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted;	Ex. 2019, ¶¶[0002],[0017]-[0027], [0034]; Fig. 3
[21.b]	a display displaying a first user interface for a user to select a user profile from among a plurality of user	Ex. 2019, ¶¶[0006], [0014]-[0034]; Figs. 1, 4-11, 13

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the JP2004-378767
	profiles including a first user profile associated with a first character and a second user profile associated with a second character,	
[21.c]	the plurality of user profiles being associated with video information and the first user interface including an option for a user to select the first user profile from the plurality of user profiles by selecting the first character;	Ex. 2019, ¶¶[0006], [0014]-[0034]; Figs. 1, 4-11, 13
[21.d]	an input interface receiving a selection of the first user profile at a first time and a selection of the second character at a second time,	Ex. 2019, ¶¶[0006], [0014]-[0034]; Figs. 1, 4-11, 13
[21.e]	wherein, in response to the selection of the first user profile, the display displays a second user interface for a user to select desired video information to be reproduced from among the first video information,	Ex. 2019, ¶¶[0006], [0014]-[0034]; Figs. 1, 4-11, 13
[21.f]	the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first group of video information and indicating an identity of the user which the first user profile is associated with,	Ex. 2019, ¶¶[0006], [0014]-[0034]; Figs. 1, 4-11, 13

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the JP2004-378767
[21.g]	the second user interface further displaying thumbnails corresponding to the first group of video information, and	Ex. 2019, ¶¶[0006], [0014]-[0034]; Figs. 1, 4-11, 13
[21.h]	wherein, in response to the selection of the second user profile, the display displays the second character and a second group of thumbnails corresponding to a second group of video information associated with the second user profile when the second character is selected,	Ex. 2019, ¶¶[0006], [0014]-[0034]; Figs. 1, 4-11, 13
[21.i]	the first group of video information and the second group of video information including one video information that is the same; and	Ex. 2019, ¶¶[0006], [0014]-[0034]; Figs. 1, 4-11, 13
[21.j]	a processor for removing one video information from the first group of video information after the input interface receives a selection to remove the one video information from the first group of video information associated with the first user profile,	Ex. 2019, ¶¶[0006], [0014]-[0034]; Figs. 1, 4-11, 13
[21.k]	wherein, upon the one video information being removed from the first group of video information, the one video information continues to be included in the second group of video information for the	Ex. 2019, ¶¶[0006], [0014]-[0034]; Figs. 1, 4-11, 13

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the JP2004-378767
	second user profile and the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected,	
[21.l]	wherein the processor decrypts second video information corresponding to a selected thumbnail when the input interface receives a selection of desired video information based on a selection of a thumbnail from the first group of thumbnails, and	Ex. 2019, ¶¶[0006], [0014]-[0034]; Figs. 1, 4-11, 13
[21.m]	wherein the display displays the decrypted video information.	Ex. 2019, ¶¶[0017]-[0025]; Figs. 3, 4, 5, 6, 7
[24]	The information processing apparatus of claim 21, wherein the processor generates a list of video information based on preferences of a user determined by a user selections of thumbnails from the first or second group of thumbnails.	Ex. 2019, ¶¶[0006], [0014]-[0034]; Figs. 1, 4, 5, 6, 7
[27.a]	The information processing apparatus of claim 21, further comprising: an on screen display generator generating on screen display information,	Ex. 2019, ¶¶[0017]-[0025]; Fig. 3
[27.b]	wherein the first video information includes third	Ex. 2019, ¶¶[0017]-[0025]; Fig. 3

'815 Patent Claim Element Number	Claim Text	Exemplary Disclosures From the JP2004-378767
	video information such that, upon selection for playback, the third video information is outputted with the on screen display information for display of the third video information and the on screen display information.	

86. In particular, as shown above, the '815 Patent claims priority to the application JP2004-378767. It is my opinion that the application JP2004-378767 provides written description support for and enables the inventions recited in claims 16- 27 (including Terms 1-3) of the '815 Patent without undue experimentation.

D. Challenged Claims

87. The challenged claims are 1-27. The language of these claims is as follows:

CLAIMS
[1pre] An information processing apparatus comprising:
[1a] a network interface;
[1b] a recording medium on which is stored a plurality of video information including first video information received wirelessly by the network interface over a network from another information processing apparatus,
[1c] wherein at least some of the plurality of video information is associated with a user profile;
[1d] a display; and
[1e] a processor for controlling the display to display:
[1f] a first area including a first character associated with a first group of video information for a first classification and a second character associated with a second group of video information for a second classification different from the first classification,
[1g] the first group of video information being configured to allow a user to edit,

[1h] wherein the first group of video information and the second group of video information are part of the plurality of stored video information, and
[1i] a second area displaying thumbnails corresponding to at least a portion of the plurality of stored video information,
[1j] wherein user selection of the first character enables the display of a first group of thumbnails corresponding to the first group of video information in the second area,
[1k] wherein user selection of the second character enables the display of a second group of thumbnails corresponding to the second group of video information in the second area,
[1l] wherein, upon one video information stored on the recording medium included in both the first group of video information and the second group of video information being deleted from the first group of video information, the one video information continues to be included in the second group of video information and
[1m] the processor controls the display to display a thumbnail corresponding to the one video information as one of the second group of thumbnails when the second character is selected.
[2] The information processing apparatus of claim 1, further comprising: wherein the processor generates a group of video information based on user preferences determined by the user selections of the video information, and wherein, upon user selection of the group, the processor controls the display to display thumbnails that correspond to the video information and no other thumbnails associated with video information of other users.
[3] The information processing apparatus of claim 1, further comprising: an antenna for wirelessly receiving the first video information from the other information processing apparatus.
[4a] The information processing apparatus of claim 1, wherein the plurality of stored video information includes third video information recorded by the information processing apparatus, fourth video information, and fifth video information,
[4b] wherein the display displays a user interface having thumbnails corresponding to each of the third, fourth, and fifth video information.
[5] The information processing apparatus of claim 4, wherein the display displays the third, fourth, and fifth video information according to predetermined playback sequence.
[6a] The information processing apparatus of claim 1, wherein the plurality of stored video information includes third video information, fourth video information, and fifth video information,

[6b] wherein the plurality of stored video information includes management information corresponding to the third, fourth, and fifth video information,
[6c] wherein the management information includes filename information and timing information for each of the third, fourth, and fifth video information such that when the third, fourth, and fifth video information is stored in the recording medium the filename information is updated according to a predetermined sequence.
[7a] The information processing apparatus of claim 1, further comprising: an analog to digital converter for converting analog audio information being recorded into digital audio information;
[7b] a compressor for compressing the plurality of video information including digital video information and the digital audio information;
[7c] a decoder for decoding, during playback, the compressed digital video information and the compressed digital audio information included in the plurality of stored video information and selected for reproduction by the user; and
[7d] a digital to analog converter for converting at least the decoded digital audio information into analog audio information during playback.
[8a] The information processing apparatus of claim 1, further comprising: an on screen display generator generating on screen display information,
[8b] wherein the plurality of stored video information includes third video information such that, upon selection for playback, the third video information is outputted with the on screen display information for display of the third video information and the on screen display information.
[9pre] An information processing method implemented on an information processing apparatus, the information processing method comprising:
[9a] storing a plurality of video information including first video information received wirelessly by a network interface over a network from another information processing apparatus,
[9b] wherein at least some of the plurality of video information is associated with a user profile; and
[9c] displaying:
[9d] a first area including a first character associated with a first group of video information for a first classification and a second character associated with a second group of video information for a second classification different from the first classification,
[9e] the first group of video information being configured to allow a user to edit,
[9f] wherein the first group of video information and the second group of video information are part of the plurality of stored video information, and

[9g] a second area displaying thumbnails corresponding to at least a portion of the plurality of stored video information,
[9h] wherein user selection of the first character enables the display of a first group of thumbnails corresponding to the first group of video information in the second area, and
[9i] wherein user selection of the second character enables the display of a second group of thumbnails corresponding to the second group of video information in the second area;
[9j] upon one video information stored on the recording medium included in both the first group of video information and the second group of video information being deleted from the first group of video information, the one video information continues to be included in the second group of video information,
[9k] and displaying a thumbnail corresponding to the one video information as one of the second group of thumbnails when the second character is selected;
[9l] wherein the processor generating a group of video information based on user preferences determined by the user selections of the video information, and
[9m] upon user selection of the group, displaying thumbnails that correspond to the video information and no other thumbnails associated with video information of other users.
[10] The information processing method of claim 9, further comprising: wirelessly receiving the first video information from the other information processing apparatus via an antenna of the information processing apparatus.
[11a] The information processing method of claim 9, wherein the plurality of stored video information includes third video information recorded by the information processing apparatus, fourth video information, and fifth video information,
[11b] wherein the information processing apparatus displays a user interface having thumbnails corresponding to each of the third, fourth, and fifth video information.
[12] The information processing method of claim 11, wherein the information processing apparatus displays the third, fourth, and fifth video information according to predetermined playback sequence.
[13pre] The information processing method of claim 9,
[13a] wherein the plurality of stored video information includes third video information, fourth video information, and fifth video information,
[13b] wherein the plurality of stored video information includes management information corresponding to the third, fourth, and fifth video information,

[13c] wherein the management information includes filename information and timing information for each of the third, fourth, and fifth video information such that when the third, fourth, and fifth video information is stored in the recording medium the filename information is updated according to a predetermined sequence.
[14a] The information processing method of claim 9, further comprising: converting, by an analog to digital converter of the information processing apparatus, analog audio information being recorded into digital audio information;
[14b] compressing, by a compressor of the information processing apparatus, the plurality of video information including digital video information and the digital audio information;
[14c] decoding, during playback and by a decoder of the information processing apparatus, the compressed digital video information and the compressed digital audio information included in the plurality of stored video information and selected for reproduction by the user; and
[14d] converting, by a digital to analog converter of the information processing apparatus, at least the decoded digital audio information into analog audio information during playback.
[15a] The information processing method of claim 9, further comprising: generating, by the information processing apparatus, on screen display information,
[15b] wherein the plurality of stored video information includes third video information such that, upon selection for playback, the third video information is outputted with the on screen display information for display of the third video <u>information and the on screen display</u>
[16pre] A method for reproducing video content associated with user profiles being implemented on an information processing apparatus, comprising:
[16a] receiving, via a network, first video information wirelessly from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted;
[16b] displaying, on a display device, a first user interface for a user to select a user profile from among a plurality of user profiles including a first user profile associated with a first character and a second user profile associated with a second character,
[16c] the plurality of user profiles being associated with video information and the first user interface including an option for a user to select the first user profile from the plurality of user profiles by selecting the first character;
[16d] receiving a selection of the first user profile;

[16e] displaying, in response to the selection, a second user interface for a user to select desired video information to be reproduced from among the first video information,
[16f] the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first group of video information and indicating an identity of the user of the first user profile,
[16g] the second user interface further displaying thumbnails corresponding to the first group of video information;
[16h] displaying the second character and a second group of thumbnails corresponding to a second group of video information associated with the second user profile when the second character is selected,
[16i] the first group of video information and the second group of video information including one video information that is the same;
[16j] receiving a selection to remove the one video information from the first group of video information associated with the first user profile;
[16k] removing the one video information from the first group of video information, wherein, upon the one video information being removed from the first group of video information, the one video information continues to be included in the second group of video information for the second user profile and the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected;
[16l] receiving a selection of desired video information based on a selection of a thumbnail from the first group of thumbnails, the desired video information included in the second video information;
[16m] decrypting video information corresponding to the selected thumbnail; and displaying the decrypted video information.
[17] The method of claim 16, wherein any user can delete stored video information regardless of a user profile from the plurality of user profiles that was used to record the stored video information.
[18] The method of claim 16, further comprising: generating a list of video information based on preferences of a user determined by a user selections of thumbnails from the first or second group of thumbnails.
[19a] The method of claim 16, further comprising: generating a list of video information based on preferences of a user determined by a user selections of thumbnails associated with the first video information, the list including third video information;

[19b] receiving a selection of the list by the user; and in response to the selection of the list, displaying the thumbnails that correspond to the third video information and no other thumbnails associated with video information of other users.
[20a] The method of claim 16, further comprising: generating on screen display information,
[20b] wherein the first video information includes third video information such that, upon selection for playback, the third video information is outputted with the on screen display information for display of the third video information and the on screen display information.
[21pre] An information processing apparatus comprising:
[21a] a network interface receiving first video information wirelessly from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted;
[21b] a display displaying a first user interface for a user to select a user profile from among a plurality of user profiles including a first user profile associated with a first character and a second user profile associated with a second character,
[21c] the plurality of user profiles being associated with video information and the first user interface including an option for a user to select the first user profile from the plurality of user profiles by selecting the first character;
[21d] an input interface receiving a selection of the first user profile at a first time and a selection of the second character at a second time,
[21e] wherein, in response to the selection of the first user profile, the display displays a second user interface for a user to select desired video information to be reproduced from among the first video information,
[21f] the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first group of video information and indicating an identity of the user which the first user profile is associated with,
[21g] the second user interface further displaying thumbnails corresponding to the first group of video information, and
[21h] wherein, in response to the selection of the second user profile, the display displays the second character and a second group of thumbnails corresponding to a second group of video information associated with the second user profile when the second character is selected,
[21i] the first group of video information and the second group of video information including one video information that is the same; and

[21j] a processor for removing one video information from the first group of video information after the input interface receives a selection to remove the one video information from the first group of video information associated with the first user profile,
[21k] wherein, upon the one video information being removed from the first group of video information, the one video information continues to be included in the second group of video information for the second user profile and the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected,
[21l] wherein the processor decrypts second video information corresponding to a selected thumbnail when the input interface receives a selection of desired video information based on a selection of a thumbnail from the first group of thumbnails, and
[21m] wherein the display displays the decrypted video information.
[22] The information processing apparatus of claim 21, further comprising: an antenna for wirelessly receiving the first video information.
[23] The information processing apparatus of claim 21, wherein any user can delete stored video information regardless of a user profile from the plurality of user profiles that was used to record the stored video information.
[24] The information processing apparatus of claim 21, wherein the processor generates a list of video information based on preferences of a user determined by a user selections of thumbnails from the first or second group of thumbnails.
[25a] The information processing apparatus of claim 21, wherein the processor generates a list of video information based on preferences of a user determined by a user selections of thumbnails associated with the first video information, the list including third and fourth video information, and,
[25b] in response to the input interface receiving a selection of the list by the user, the display displays only those thumbnails that correspond to the third and fourth video information and no other thumbnails associated with video information of other users.
[26a] The information processing apparatus of claim 21, further comprising: an analog to digital converter for converting analog audio information being recorded into digital audio information;
[26b] a compressor for compressing the first video information;
[26c] a decoder for decoding, during playback, audio and video information included in the first video information and selected for reproduction by the user; and
[26d] a digital to analog converter for converting at least the digital audio information into audio information during playback.

[27a] The information processing apparatus of claim 21, further comprising:
an on screen display generator generating on screen display information,

[27b] wherein the first video information includes third video information such
that, upon selection for playback, the third video information is outputted with
the on screen display information for display of the third video information and
the on screen display information.

VI. SUMMARY OF MY OPINIONS

88. After considering the material available to me in this proceeding in view of my experience in the field of image recording and reproduction and processing, it is my opinion that the challenged claims of the '815 Patent are patentable over the cited prior art. Specifically, it is my opinion that Dr. Bederson has not shown by a preponderance of the evidence that the challenged claims 1-27 are rendered obvious by the cited prior art.

89. Moreover, it is my understanding that, even if the claimed elements of the '815 Patent independently existed in the prior art references (which they do not), such disclosure is not enough to demonstrate that the challenged claims are unpatentable.

90. Accordingly, and as I will explain in greater detail in the following section, it is my opinion that Claims 1-27 of the '815 Patent are patentable over the art and arguments that Petitioner and Dr. Bederson have presented. I discuss the bases for my opinions in the following section.

VII. THE PRIOR ART

91. Here, I will provide a brief overview of each of the references used in Dr. Bederson's obviousness combinations.

A. Description of Horn

92. Horn, titled "Computer System for Automatic Organization Indexing and Viewing of Information from Multiple Sources," was filed on July 16, 2003 and issued on September 25, 2007.

93. Horn discloses a computer data processing system including a central processing unit configured with an integrated computer control software system for the management of data objects including dynamic and automatic organization, linking, finding, cross-referencing, viewing and retrieval of multiple objects regardless of nature or source. Ex. 1005, Abstract.

B. Description of Baumgartner

94. Baumgartner, titled "Interactive Television System with Custom Video-On -Demand Menus Based on Personal Profiles," was filed on January 21, 2004 and published on July 21, 2005.

95. Baumgartner discloses an interactive television system in which a user can use an interactive television application to access and request media-on-demand programming. The interactive television application may display customized interface display screens that include video-on-demand programs and categories that may be of particular interest to the user. These programs and categories of interest

may be based on the user's personal profile. Once a list of programs and categories based on a user's personal profile is generated, one or more of these programs may be incorporated in a menu interface template to generate a video-on-demand menu customized for the user. Ex. 1016, Abstract.

C. Description of WinTV

96. WinTV purports to be an "Installation and Reference Manual" for the WinTV product. Dr. Bederson indicates that "I have been informed by counsel for Petitioners that WinTV is prior art to the '815 patent under pre-AIA 35 U.S.C. §102(b) and post-AIA § 102(a)." Ex. 1003, ¶101. Dr. Bederson provides no opinions on the accessibility of WinTV.

97. Petitioner contends that WinTV "was a product offered for sale/sold in the U.S. by Hauppauge Computer Works, Inc. at least by 11/10/1999." As evidence of this, Petitioner includes Exhibit 1011, which purports to be a pdf of installation and reference manual at the path <https://web.archive.org/web/20030914203323/http://www.hauppauge.com:80/manuals/wintvpci.pdf>. Ex. 1008 at 2.

98. Other than being presented with the WinTV manual (Ex. 1010), and by accessing the link provided by Petitioner, I could not independently find the manual as set forth by Petitioner after considerable attempts through use of the Internet Archive around 2003. In my opinion, Petitioner has not shown that the link provided

to the manual or the manual itself was publicly accessible to POSITA before the critical date.

99. For example, I navigated within the Internet Archive to the Hauppauge web site around the time Petitioner contends the WinTV manual was available (in August or September 2003) (*see, e.g.*, Exs. 2022 and 2023). I explored some links present at the time within those web pages, for example:

Exhibit	Link
2027	https://web.archive.org/web/20031001191953/http://www.hauppauge.com:80/html/tech.htm
2028	https://web.archive.org/web/20031001185005/http://www.hauppauge.com:80/html/specs.htm
2029	https://web.archive.org/web/20031011045622/http://www.hauppauge.com:80/manuals/

100. With respect to the link at Exhibit 2029, it is the next higher level directory where one would expect the manuals to be accessible. However, as can be seen from Exhibit 2029, that access was denied.



101. This leads me to conclude that the general public, or a POSITA at the time, did not have access to the various WinTV manuals, at least through the

Hauppauge web site at the time. I could find no link to current or archived manuals. Even further exploring some of the links on the home page failed to provide accessibility to product manuals.

102. Dr. Bederson also references several patents (Exs. 1037-1038) and states “[t]hese products were also mentioned in patents that would have come to the attention of a POSITA looking for information on such products.” Ex. 1003, at ¶101. However, after examining these patents, it is my opinion that they are not evidence of the public accessibility of the WinTV manual Dr. Bederson uses to support his opinions. Dr. Bederson never explains how the vague references to “WinTV” in these documents provides any evidence of the public accessibility of the manual. Nor does Dr. Bederson attempt to make any connection between these documents and their relevance to the WinTV manual, rather than the products themselves.

103. In my opinion, whether a POSITA was looking for information on the WinTV products is irrelevant to whether the WinTV *manual* was publicly accessible prior to December 2, 2004.

104. In my opinion, there is no evidence that the various WinTV manual (Ex. 1010) was indexed or catalogued such that a POSITA would have had access to it in 2003. Rather, it appears that only Hauppauge employees would know where to access the manuals in 2003.

D. Description of Chao

105. Chao, titled “Method and Apparatus for Archiving and Visualizing Digital Images,” was filed on December 17, 2002 and issued on June 28, 2011. Chao discloses a computer-based, digital image management system that visually presents an entire archive in a manner that facilitates easy, non-textual, searching for specific images. Ex. 1006, Abstract.

E. Description of Candelore

106. U.S. Patent Application Publication No. 2003/0174844 to Candelore describes a method for scrambling and descrambling program data comprising the receipt of a mating key generator message including a manufacturer identifier. The mating key generator message is transmitted to a first remote source identified by the manufacturer identifier. In response, a mating key is received from the first remote source. Then, the mating key is supplied to a second remote source, the mating key being subsequently used to encrypt a service key used for scrambling program data. Ex. 1013, Abstract.

F. Description of Wong

107. U.S. Patent No. 7,650,361 to Wong titled “Media content modification and access system for interactive access of media content across disparate network platforms” was filed July 21, 2005 and issued on January 19, 2010. Wong describes a media content playlist generation and access system for a video entertainment

network in which a plurality of media content received from various disparate networks may be gathered into a customized list. Ex. 1007, Abstract.

108. Dr. Bederson's opinions with respect to Wong are limited to Grounds 9 and 10 addressing Claims 16-27. However, as set forth above in Section V.C., all limitations of Claims 16-27 are fully supported prior to the filing of Wong. As such, Wong is not prior art.

G. Description of Kaplan

109. U.S. Patent App. Pub. No. 2001/0056434 titled "Systems, Methods, and Computer Program Products for Managing Multimedia Content" by Jon Kaplan et al. ("Kaplan") was filed on March 29, 2001 and was published on December 27, 2001.

110. Kaplan discloses a multimedia management system for storing, manipulating, and displaying multimedia content. Ex. 1014 at Abstract, ("The present invention is a multimedia management system for storing, manipulating, and displaying multimedia content. The system comprises a user interface, a plurality of predefined functions, a multimedia acquisition interface, and system controls. The system provides users with a simple and intuitive method and computer program for reviewing multimedia content, which can include digital video, digital audio and text, still images, animation, and MIDI.").

H. Description of Bryant

111. U.S. Patent App. Pub. No. 2004/0201691 titled “Method for Producing Electronic Job Pages” by Steven Bryant et al. (“Bryant”) was filed on April 11, 2003 and was published on October 14, 2004.

112. Bryant discloses a method for producing a plurality of electronic job pages using a digital camera and a computer. Ex. 1015, Abstract, (“A method for producing a plurality of electronic job pages using a digital camera and a computer comprises the steps of capturing and storing a first group of digital images using the digital camera; designating, in response to a user input, that subsequent captured digital images are to form a second group of digital images; and capturing and storing a second group of digital images using the digital camera.

113. The method further includes the steps of storing data in a memory of the digital camera which identifies the first and second groups of digital images; transferring the first and second group of digital images, and the data identifying the first and second groups of digital images, from the digital camera to the computer; and using the transferred data identifying the first and second groups of digital images to produce a first electronic job page including the first group of digital images and a second electronic job page including the second group of digital images.”).

VIII. ANALYSIS OF INSTITUTED GROUNDS

114. I understand that the Board instituted review of the '815 Patent on ten grounds across two petitions (Grounds 1-5 in IPR2024-00735 and Grounds 6-10 in IPR2024-00777):

Ground	'815 Patent Claim(s)	Type of Challenge	Primary Reference	Secondary Reference(s)
1	1-6, 9-13	§ 103	Horn	Baumgartner
2	7, 8, 14, 15	§ 103	Horn	(1) Baumgartner (2) WinTV
3	1-15	§ 103	Horn	(1) Baumgartner (2) WinTV (3) Chao
4	1-6, 9-13	§ 103	Kaplan	Bryant
5	7, 8, 14, 15	§ 103	Kaplan	(1) Bryant (2) WinTV
6	16-19, 21-25	§ 103	Horn	(1) Baumgartner (2) Candelore
7	20, 26, 27	§ 103	Horn	(1) Baumgartner (2) Candelore (3) WinTV
8	16-27	§ 103	Horn	(1) Baumgartner (2) Candelore (3) WinTV (4) Chao
9	16-19, 21-25	§ 103	Kaplan	(1) Bryant (2) Wong (3) Candelore
10	20, 26, 27	§ 103	Kaplan	(1) Bryant (2) Wong (3) Candelore (4) WinTV

115. I have analyzed each of the instituted grounds. As explained in greater detail below, it is my opinion that each of these grounds does not show that the challenged claims of the '815 Patent are unpatentable as obvious.

116. As I discuss herein, Dr. Bederson and Petitioner failed to show that the challenged claims of the '815 Patent are obvious. Note that my decision not to discuss a particular limitation in detail here is not an indication that I agree that limitation is met by the prior art. Rather, I have elected to focus my opinions on the most glaring deficiencies in Dr. Bederson's obviousness analysis.

117. To show how the claims are not obvious over the prior art, I will follow the framework of the four *Graham* factors.

118. Regarding level of ordinary skill in the art, I have provided my opinions regarding the appropriate level of ordinary skill in the art in Section III(D) of this declaration. I incorporate that discussion by reference into my opinions for each Ground.

119. Regarding the scope and content of the prior art, I have provided a brief overview of the six prior art references at issue in Section VII and incorporate that discussion by reference herein for each respective Ground that a given prior art reference is discussed.

120. Regarding the differences between the prior art and the claimed invention, I set forth my detailed analysis regarding those differences in the subsequent sections for each Ground.

A. Ground 1: Horn in view of Baumgartner Does Not Render Claims 1-6 and 9-13 Obvious

121. For Ground 1, neither the Petitioner nor Dr. Bederson have shown a likelihood of prevailing because Horn in view of Baumgartner does not teach each and every element of Claims 1-6 and 9-13. Specifically, Horn in combination with Baumgartner does not teach elements 1[b], 1[c], 1[g], 1[l] (and comparable elements of claim 9: 9[a], 9[b], 9[e], 9[j]), as required for each of these claims. Additionally, because dependent claims 2-6 and 10-13 depend from claim that Dr. Bederson has not shown to be unpatentable, Petitioner and Dr. Bederson have also failed to show that claims 2-6 and 10-13 are unpatentable by Horn in view of Baumgartner.

1. No Motivation to Combine Horn with Baumgartner

122. In my opinion, at the time of the '815 Patent, it would not have been obvious to a POSITA to combine Horn with Baumgartner. Dr. Bederson's statement as to why Horn and Baumgartner should be combined is conclusory and unsupported by sufficient evidence and analysis.

123. A POSITA would not be motivated to combine Horn with Baumgartner because they are two different systems. The problem solved by Horn is unrelated to the technical problems addressed by Baumgartner. Horn discloses a "truly **open**

computer system having data structures, input interfaces, displays and operational systems that permits the organization of information, as data objects” and permit a “**faster archiving** , retrieval and viewing of the information.” Ex. 1005, 3:10-17 (emphasis added). Moreover, Horn proposes a computer data processing system that has a “**simple-to-use** data structure and operating mechanism to link information together in a dynamic, memory-and- space-efficient manner.” Ex. 1005, 3:19-22 (emphasis added). In contrast, Baumgartner discloses an “interactive television system” that uses a set-top box to access and request video-on-demand programming. Ex. 1016, Abstract. A POSITA would not be motivated to combine the components from Baumgartner’s set-top box system to Horn’s simple-to-use computer file system, because Horn is directed to making “collections” based on keywords in documents, and is not directed to making any video-on-demand collections based on a user watch history.

124. Additionally, Dr. Bederson fails to provide any rationale as to why a POSITA would substitute the hardwired LAN of Horn with the wireless modem of Baumgartner. Dr. Bederson simply provides a conclusory statement that “a POSITA would have found it obvious to implement Horn’s LAN with a wireless LAN because they were often cheaper and easier to install than a wired LAN due to elimination of the need to run wires to all of the endpoint computers in the network.” Ex. 1003, ¶143. Dr. Bederson’s conclusory statements are insufficient and provide

no factual support. In fact, Dr. Bederson's assertion that wireless LAN was cheaper at the time of the '815 Patent's invention is also unsupported. For example, publicly available information shows that at the time of the '815 Patent's invention the price of wireless PC card and wireless access point was more than \$300,¹ as compared to the wired LAN card that cost on average less than \$50.² Dr. Bederson's assertion regarding the costs involved might be true today but not around the early 2000's. Today of course a wireless solution may be more cost effective, but not at the time of the '815 invention (Dec. 2004).

125. Dr. Bederson states that a POSITA would have considered obvious to include the wireless communication from Baumgartner in Horn. Ex. 1003, ¶143. This is incorrect.

126. Specifically, Dr. Bederson's analysis of the Horn system is fundamentally flawed because it fails to evaluate the system within the proper context of the prior art. Specifically, the Horn system is a **specialized, server-based computer** running the Metadata Filing System (MFS), **not just a general-purpose or personal computer**. Rather than assessing the technology in light of its intended enterprise environment, Dr. Bederson applies his analysis to a general-purpose or personal computer and assumes that a wireless LAN would be beneficial. This

¹ Ex. 2024 (<http://www.bricklin.com/homenetwork.htm>)

² Ex. 2025 (<https://www.itprotoday.com/it-infrastructure/mixing-wired-and-wireless-networking-in-your-home>)

mischaracterization leads to incorrect conclusions that are not supported by the Horn's disclosure.

127. For example, Horn's MFS is designed for **high-performance, data-intensive computing**, a characteristic that distinguishes it from general-purpose computers, which are optimized for single-user, lower-complexity tasks. Horn's system's architecture and functionality indicate that it is a robust, server-based solution that is intended to handle large volumes of data. Ex. 1005, 6:59-63. A POSITA evaluating the Horn disclosure would immediately recognize that the system is a server-based solution designed for large-scale data processing and management. This conclusion is evident from several key factors in the system's disclosure.

128. **First**, the Horn system is not a simple general-purpose computer but a dedicated server architecture specifically designed for **automatic organization, indexing, and retrieval** of data from multiple sources. Ex. 1005, 3:10-17. The emphasis on handling vast amounts of structured data further supports the conclusion that the system is a server-based architecture rather than a consumer-grade or personal-use system.

129. **Second**, the system's capabilities align with enterprise-level data management, including aggregating data from multiple inputs, performing complex indexing operations, and providing structured data views. These are defining

characteristics of server-based computing environments—features that are neither typical nor necessary for general-purpose personal computers, which primarily function for localized, single-user tasks.

130. Furthermore, the architectural framework described in the Horn disclosure supports **high availability, scalability, and efficient handling** of extensive data volumes. Such design considerations are commonly associated with enterprise data centers, further reinforcing that the Horn system is a server-based computing environment requiring a high-performance infrastructure.

131. As such, Dr. Bederson’s assumption that a wireless LAN is a suitable alternative to a wired connection is inconsistent with the Horn system’s technical and operational requirements. The system requires advanced reliability, stability, and security, all of which are best provided by a wired LAN.

132. In particular, a POSITA would understand that from performance standpoint, wired networks provide a more **stable and reliable** connection with lower packet loss and reduced latency, which is critical for high-throughput enterprise computing. In contrast, wireless networks are inherently vulnerable to interference, congestion, and signal degradation, making them highly unreliable for large-scale, high-performance data environments like the Horn system.

133. Moreover, Horn’s real-time indexing and retrieval of high data volumes necessitate low-latency, high-speed communication. Wired networks are

specifically designed to minimize latency, ensuring efficient and predictable data transmission. Wireless networks, on the other hand, introduce variable latency and bandwidth limitations, which would severely impact system performance and render wireless connectivity unsuitable for Horn's operational needs. Dr. Bederson admitted on cross-examination that if a system's goal is to permit faster archiving, retrieval and viewing information (similar to Horn's system) then it is better to transfer data at higher speeds:

Q. If you had a computer system whose goal is to permit faster archiving, retrieval and viewing of information, would it be better to have the data transferred at higher speeds or lower speeds?

A. If your goal was faster communication, then I would think faster communication speeds probably would help you address that goal more readily. I will note there is nothing about any speed requirement in the claims of the '815 patent though.

Ex. 2038, Bederson Dep. Tr. at 51:22-52:8.

134. A POSITA would have understood that at the time of the '815 Patent the speed and bandwidth of wireless communication was much slower than that of the cable LAN, and hence Baumgartner's wireless communication would not be

appropriate for Horn's distributed computer system that **requires** higher speed and bandwidth to **"faster"** retrieve and view information on a communication network. In particular, at the time of the '815 Patent, the wireless communication protocols (802.11b/g) offered communication speeds much slower than that of wired ethernet:

The current standard: 802.11b

Standards insure that wireless networks that consist of components from several different vendors will work properly. Theoretically, cards manufactured by one company will work with an access point from another company. The current standard for wireless networks is known as 802.11b. This standard is in the same family as Ethernet, generally known by the designation 802.3.

Equipment that follows 802.11b standard will be capable of a theoretical data throughput rate of 11 mb/sec. This level of bandwidth is quite respectable, given that many wired networks continue to operate at 10mb/sec. The actual usable bandwidth averages about half the theoretical, though.

The previous generation of wireless networks operated at 2-3 mb/sec. Not surprisingly, wireless networks did not become popular until the emergence of the 802.11b standard that increased the data flow to 11 mb/sec. The emerging 802.11a standard, expected to find more common use in the next 1-2 years, will deliver data at 54MB/sec.

Still a Niche product

Despite the steadily increasing speed of wireless technology, wired networks will always outperform them by long strides. Today 100mb/sec Ethernet cards prevail in most business LANs, with Gigabit Ethernet (1024 mb/sec) finding common use as network backbones and for connecting high-performance servers. 10 GB/sec Ethernet for fibre-based networks is already on the horizon.

Ex. 2026 (<https://librarytechnology.org/document/9643>)

135. Security is another critical concern that Dr. Bederson's analysis fails to address adequately. The Horn system is explicitly designed for data aggregation and management, making **data integrity and security paramount**. Ex. 1005, 19:25-60, 5:47-60. A POSITA would have understood that network security is important to Horn's system as it stores user data and could host websites. Ex. 1005, 19:25-60, 5:47-60. In particular, Dr. Bederson admitted that data security is important for Horn's system:

Q. In Horn's system, Exhibit 1005, does Horn store user data?

A. Yes, I believe it does.

Q. Does Horn's system host websites?

A. I don't recall if it does.

Q. Just take a look at column 5, line 47, and the subsequent sentences.

A. Okay.

(Witness perusing document.)

A. Okay, I see that, and I do see that Horn discloses hosting internet pages.

Q. So in 2004, in a system such as Horn's, would data security be important to one of skill in the art?

A. Well, I think in 2004, data security was certainly less important, less top of mind than it is today. But I think a person of skill in the art would at least have some awareness of data security.

Ex. 2038, Bederson Dep. Tr. at 52:9-53:4.

136. Wired LANs offer a superior security framework by eliminating risks associated with wireless transmissions, such as hacking, data interception, and unauthorized access. Wireless LANs, especially those in 2004, were significantly more vulnerable to security breaches, further supporting the conclusion that Horn's intended infrastructure is wired, not wireless.

Security problems remain

Organizations that implement wireless networks have to consider the security implications. Wireless networks suffer from the same basic weakness as wired networks, where some unknown party might be listening in on the network conversation. Any information transported across a network must be encrypted to ensure that it remains private. The problem is amplified in wireless networks since anyone with the right equipment in physical proximity might be able to capture your network traffic, gain unprotected passwords, and launch an attack on your computers.

The 802.11b standard includes provision for protecting data transmissions through the use of encryption. The standard includes a security layer called Wired Equivalency Privacy (WEP) that uses a private key in its encryption. Many wireless networks have been installed without implementing this security feature. The security available on encrypted wireless LANs should be considered as weak, since it has recently been demonstrated that any third party capturing network packets off an access point can fairly easily determine the keys needed to decrypt network traffic.

The basic lesson for wireless networks is to avoid their use by computers with highly confidential or proprietary information. Assume that an unknown third party can intercept any information that isn't separately protected with strong encryption. As with wired network, never transmit a password that provides root or administrative access unless it is protected through strong encryption.

Ex. 2026 (<https://librarytechnology.org/document/9643> (annotated)).

137. In addition, Dr. Bederson's argument for wireless LAN based on mobility (See Ex. 2038, Bederson Dep. Tr. at 102:7-20) is entirely misplaced and not supported by the Horn disclosure. The Horn system is a mainframe server running the MFS—it is not a mobile system nor does the patent suggest any mobility requirements. Ex. 1005, 6:59-63. A POSITA reviewing the Horn disclosure would find no indication that mobility is a relevant factor in the system's design. The enterprise-level nature of the system, its focus on large-scale data management, and its reliance on stable, high-throughput processing all point toward a fixed, stationary computing environment. Ex. 1005, 7:7-10. As such, there is no justification for implementing wireless networking, reinforcing that a wired infrastructure is both the intended and optimal choice.

138. Given its specific design, integrating wireless LAN would introduce unnecessary performance bottlenecks, security vulnerabilities, and operational

inefficiencies, making it an impractical and unjustifiable choice for such an infrastructure.

139. In my opinion, even today's distributed computer systems, which are similar to Horn's system, prefer wired network connectivity at least at the backend for higher speeds, bandwidth, and network security. In sum, a POSITA would readily conclude that the Horn system is a wired, server-based architecture, designed for high-performance data management and optimized for security, stability, and scalability—all of which necessitate wired network infrastructure. Wireless LAN such as that disclosed in Baumgartner is not a viable option, and Dr. Bederson's analysis fails to consider these fundamental technical realities.

140. Therefore, a POSITA would not have considered it obvious to combine Baumgartner with Horn.

2. The Combination of Horn, Baumgartner Fails to Disclose Limitation 1[b] and 9[a]

141. Petitioner and Dr. Bederson fail to show that that Horn in combination with Baumgartner discloses claim elements 1[b] and 9[a]: a recording medium on which is stored a plurality of video information including first video information received wirelessly by the network interface.

142. Specifically, Dr. Bederson admits that "Horn does not expressly disclose receiving digital video information wirelessly." Ex. 1003, ¶283. In fact, Horn does not even disclose receiving video, let alone receiving it wirelessly. Horn

discloses receiving files, music and images: “[t]he e-mail domain is linked through a network for the communication of files, music and images to and from a network.” Ex. 1005, 12:5-7. This is because Horn is focused on providing a “space-saving” file system, and not a system like videos that would use up too much storage.

143. Petitioner and Dr. Bederson try to plug this deficiency by simply pointing to Horn’s LAN: “A POSITA would have understood that a LAN is often implemented as a wireless LAN, and a POSITA would have found it obvious to implement Horn’s LAN with a wireless LAN because they were often cheaper and easier to install than a wired LAN due to elimination of the need to run wires to all of the endpoint computers in the network. Additionally, wireless LANs can be more convenient for users.” Ex. 1003, ¶14. Specifically, Dr. Bederson attempts to use Baumgartner to fill this gap in the teachings of Horn. However, a POSITA wouldn’t be motivated to combine Baumgartner with Horn. As discussed above, at the time of the ’815 Patent, it would not have been obvious to a POSITA to combine Baumgartner with Horn because they are solving different problems and hence directed to different solutions, and the wireless LAN is not necessarily cheaper (e.g., a wireless LAN card is more expensive than a wired LAN card at the time of the patent) as Dr. Bederson claims.

144. In addition, Horn fails to show that “[a]n information processing apparatus ... [having a] recording medium such that first video information is

received first video information received wirelessly by the network interface over a network *from another information processing apparatus,*” as required by claim 1[b] and 9[a] of the ’815 Patent. Dr. Bederson points to “PC” as the information processing apparatus in both Horn and Baumgartner, but fails to show “another PC,” as required by claim element 1[b] and 9[a], from which video information is received wirelessly by the network interface. In particular, Dr. Bederson admits that “Horn does not expressly disclose that the digital video information is received by the network interface wirelessly.”

145. In addition, Baumgartner also doesn’t meet this limitation either because it discloses a PC receiving video on demand from a “television distribution facility 14.” Dr. Bederson has not provided any explanation if the Baumgartner’s “PC” corresponds to the claimed “information processing apparatus.” Specifically, Baumgartner’s “television distribution facility 14” cannot correspond to “another information processing apparatus,” as the claims require communication between two information processing apparatuses, and not communication between in any category of devices.

146. Therefore, because Petitioner and Dr. Bederson has not shown Horn in view of Baumgartner discloses claim elements 1[b] and 9[a], in my opinion, there is no reasonable likelihood of success of any claim challenged in Ground 1.

3. The Combination of Horn and Baumgartner Fails to Disclose Limitation 1[c] and 9[b]

147. Dr. Bederson fails to show that Horn in combination with Baumgartner discloses “at least some of the plurality of **video information** is associated with a **user profile**” as required by claim elements 1[c] and 9[b]. As discussed above, I have applied the district court’s construction that the “user profile” term should be construed to mean “a collection of settings and information associated with a user.”

148. Dr. Bederson erroneously relies on Horn’s disclosure regarding “collections” to argue that the user profile limitation is met. Ex. 1003, ¶146. However, this interpretation is fundamentally flawed, as collections, as disclosed by Horn, are not equivalent to user profiles. Horn explicitly defines a collection as:

Collection: means a grouping of objects based on a metadata specification describing properties that all objects in the group have in common, or objects that were grouped together specifically by the user as having some shared meaning or logical grouping.

Ex. 1005 at 4:1-5.

149. This definition clearly distinguishes collections from user profiles. Collections, as described in Horn, are metadata-driven groupings or manually curated sets of objects. They do not represent specific settings and information associated with a user, which is the core requirement of a user profile.

150. Moreover, Horn discloses a system-centric approach rather than a user-centric system. The MFS system in Horn is designed for generalized data

management, ensuring broad applicability across various data types and sources, rather than enabling customization for individual users. Critically, Horn does not disclose any personalization features such as saved user settings or user-based configurations, which are essential components of a user profile per court's construction.

151. Recognizing this gap in Horn, Dr. Bederson attempts to bridge the deficiency by relying on Baumgartner. Ex. 1003, ¶147. However, as previously established, a POSITA would not be motivated to combine Baumgartner with Horn. Dr. Bederson's attempt to extend Horn's disclosure beyond its intended scope is unsupported by the evidence and inconsistent with the system's actual functionality.

152. Thus, Horn's disclosure of "collections" does not meet the user profile limitation, and Dr. Bederson's reliance on this argument is both incorrect and misleading.

4. The Combination of Horn and Baumgartner Fails to Disclose Limitation 1[g] and 9[e]

153. Petitioner and Dr. Bederson fails to show that Horn in combination with Baumgartner discloses claim elements 1[g] and 9[e]: "at least the first group of video information being configured to allow a user to edit." Dr. Bederson contends that the Horn-Baumgartner combination renders this limitation obvious. Ex. 1003, ¶152. In support, Dr. Bederson cites only to Horn at 20:16-46, and 17:18-45 as well as Figures 21-22 and 30. *Id.* As set forth above, Horn does not disclose "video

information,” and a POSITA would not be motivated to combine Horn and Baumgartner to include first video information received wirelessly by the network interface, as discussed above. Dr. Bederson’s deficiency in regard to element 1[g] can be seen by Dr. Bederson’s elimination of any contention that Horn discloses the “first group of video information”: “Horn discloses the first group of information, i.e., a collection, is configured to allow a user to edit membership in the collection....” Ex. 1003, ¶152.

5. The Combination of Horn and Baumgartner Fails to Disclose Limitation 1[m] and 9[k]

154. Petitioner and Dr. Bederson fails to show that Horn in combination with Baumgartner discloses claim element 1[m]: “the processor controls the display to display a thumbnail corresponding to the one video information as one of the second group of thumbnails when the second character is selected” and 9[k]: “displaying a thumbnail corresponding to the one video information as one of the second group of thumbnails when the second character is selected.”

155. As set forth above, Horn does not disclose “video information,” and a POSITA would not be motivated to combine Horn and Baumgartner to include video information received wirelessly by the network interface. The Petition’s deficiency in regard to elements 1[m] and 9[k] can be seen by Dr. Bederson’s and Petitioner’s elimination of any contention that Horn discloses the “thumbnail corresponding to the one video information”: “a POSITA would have understood that selection of the

second collection (e.g., the Today collection) in the collection pane 2602 would result in the display of thumbnails for all objects in the second collection ...” Pet. at 42-43; Ex. 1003, ¶159.

156. Therefore, Petitioner and Dr. Bederson failed to establish unpatentability by a preponderance of the evidence for any claim challenged in Ground 1.

B. Ground 2: Horn in view of Baumgartner and WinTV Does Not Render Claims 7, 8, 14, and 15

157. Claims 7 and 8 depends from claim 1, and claims 14 and 15 depends from claim 9. As set forth above, in my opinion, the combination of Horn, Baumgartner fails to teach all of the limitations of claims 1 and 9. Additionally, Petitioner and Dr. Bederson have not provided sufficient evidence to show that WinTV was publicly accessible. For these reasons, Ground 2 fails to show unpatentability by a preponderance of the evidence.

1. Dr. Bederson Has Not Provided Sufficient Evidence that WinTV Was Publicly Accessible.

As set forth above in Section VII.C, incorporated herein, Dr. Bederson has not shown that the WinTV manual upon which he relies was publicly accessible to a POSITA prior to December 2, 2004. Ground 2 fails for this reason alone.

2. No Motivation to Combine WinTV with Horn and Baumgartner

158. For Ground 2, Petitioner and Dr. Bederson attempt to use the WinTV reference to fill in the various gaps of the teachings of Horn with regard to the dependent claims of the '815 Patent. *See generally* Pet. at 54-60; Ex. 1003, ¶¶194-208. As set forth above, Petitioner and Dr. Bederson have not met their burden in showing that WinTV was publicly accessible and thus have not met their burden of showing WinTV is prior art. Additionally, as set forth above in Section VIII.A.1, a POSITA would not be motivated to combine Horn and Baumgartner. Again, Ground 2 fails for this reason alone.

159. Even if WinTV were available as prior art, Petitioner and Dr. Bederson have not shown how a POSITA would have combined the teachings of WinTV with at least the teachings of Horn in addition to Baumgartner with any expectation of success. A POSITA wouldn't be motivated to combine Horn with WinTV because they are two different systems. The problem solved by Horn is unrelated to the technical solutions addressed by WinTV. Horn discloses a “truly **open computer system** having data structures, input interfaces, displays and operational systems that permits the organization of information, as data objects” and permit a “**faster archiving**, retrieval and viewing of the information.” Ex. 1005, 3:10-17 (emphasis added). Moreover, Horn proposes a computer data processing system that has a “**simple-to-use** data structure and operating mechanism to link information together

in a dynamic, memory-and- space-efficient manner.” Ex. 1005, 3:19-22 (emphasis added). In contrast, WinTV discloses a “Plug and Play” device installed to receipt, playback and record video. Ex. 1010, 3-4, 4-1. A POSITA would not be motivated to combine the TV tuner card from WinTV to Horn’s simple-to-use computer file system, because Horn is directed to making “collections” based on keywords in documents, and is not directed to receiving, playing and recording of video.

160. Additionally, the Petitioner and Dr. Bederson state that Baumgartner suggests including a television tuner card for decoding tv channels. Pet. at 54; Ex. 1003, ¶355. However, Horn does not suggest or teach to incorporate a tv tuner card in its system. In particular, while a POSITA maybe motivated in modifying a set-top box system of Baumgartner with a TV tuner card, it does not follow that a POSITA would not motivated to include a TV tuner card in a “truly open system” with an MFS system as disclosed in Horn that is directed to collection of various documents.

161. Therefore, in my opinion, Petitioner and Dr. Bederson failed to establish unpatentability by a preponderance of the evidence for any claim in Ground 2.

C. **Ground 3: Horn in view of Baumgartner, WinTV, and Chao Does Not Render Claims 1-15 Obvious**

162. As I describe above, the combination of Horn, Baumgartner, and WinTV fails to teach all of the limitations of claims 1-15. Additionally, Dr. Bederson

and Petitioner have not shown how a POSITA would have combined the teachings of Horn with at least the teachings of Baumgartner in addition to WinTV, and Chao with any expectation of success. Again, Dr. Bederson has not shown that WinTV was publicly accessible and thus has not shown WinTV is prior art. Ground 3 fails for this reason alone.

163. Additionally, Dr. Bederson and Petitioner have provided only conclusory statements regarding the combination of these references and has failed to identify how each claim element will be mapped against these **four** references.

164. Moreover, Dr. Bederson and Petitioner fail to state why a POSITA would be motivated to modify Horn to add thumbnails for folders of content data as disclosed in Chao. Horn discloses a **simple-to-use** data structure system that provides interfaces for organization of data objects in a memory-and-space-efficient manner. See Ex. 1005, 3:10-22. Horn teaches away from adding further complexity to its system, because its goal is to organize and display data in a space efficient manner. Additionally, Dr. Bederson and Petitioner fail to state what thumbnails would be used from Chao to modify the folders in Horn.

165. In particular, Dr. Bederson and Petitioner fail to disclose why a POSITA would be motivated to modify the operating system (OS) code of Horn computer to include the thumbnails features from Chao. Horn's system is already optimized for efficient data organization and display. Simply identifying that

thumbnails exist in Chao is not sufficient motivation to modify Horn. Without a clear rationale for the combination, the Petitioner's argument relies on impermissible hindsight reconstruction.

166. Horn explicitly teaches away from additional complexity. A POSITA would recognize that modifying Horn to include Chao's thumbnails would undermine its core functionality by introducing processing overhead that conflicts with its space-efficient design. In particular, the modifications which contradict the intended function of the prior art (Horn) cannot be considered obvious.

167. Dr. Bederson does not explain how a POSITA would access or modify Horn's OS code to integrate Chao's thumbnails. Chao provides no guidance on which specific lines of Horn's OS code would require modification, leaving a POSITA to engage in an uncertain and speculative process. Specifically, obviousness requires a reasonable expectation of success, which Dr. Bederson has failed to establish.

168. Furthermore, Dr. Bederson ignores the fact that Horn's OS architecture is not compatible with Chao's thumbnail-based system. A POSITA would not simply extract Chao's thumbnail implementation and insert it into Horn without overcoming significant hardware and software integration challenges. Dr. Bederson fails to address these challenges, making the proposed modification impractical and non-obvious.

169. Therefore, Petitioner and Dr. Bederson failed to show unpatentability by a preponderance of the evidence for any claim in Ground 3.

D. Grounds 4-5: Kaplan in view of Bryant Does Not Render Claims 1 and 9 Obvious

170. As with prior grounds, Dr. Bederson and Petitioner relies on cursory analysis in an attempt to utilize Kaplan and Bryant to show Claims 1-15 are unpatentable. However, Dr. Bederson and Petitioner fail to show Kaplan and Bryant, either alone or together, render the claims unpatentable.

1. Dr. Bederson Does Not Adequately Articulate a Combination of Kaplan and Bryant's Teachings

171. Dr. Bederson attempts to address the combination of Kaplan and Bryant and alleged motivation to combine up front, Ex. 1003, ¶¶218-222, and then Dr. Bederson makes fleeting references of the purported combination within individual limitations. *See, e.g.*, Ex. 1003, ¶¶235-241 (limitation 1[l]), 87 (limitation 1[m]). But neither the generic motivation to combine section nor the cursory mentions of a combination in a few limitations meets Dr. Bederson's burden to explain what the combined teachings of Kaplan and Bryant would have suggested to a POSITA.

172. Dr. Bederson's general motivation-to-combine discussion makes only conclusory statements that a POSITA would have modified the teachings in Kaplan based on Bryant's digital camera and "usable-customizable metadata." Ex. 1003, ¶¶219-220. However, these vague suggestions merely parrot portions of Kaplan and

Bryant. For example, Dr. Bederson alleges “a POSITA would have known how to modify any data structures and user interfaces to include additional metadata because modifying data structures and user interfaces was well within their skill, and they had already created those data structures and user interfaces to create the system of Kaplan in the first place.” Ex. 1003, ¶221.

173. Therefore, Petitioner and Dr. Bederson failed to show unpatentability by a preponderance of the evidence for any claims in Ground 4-5.

2. The Combination of Kaplan and Bryant Fails to Disclose Limitation 1[b] and 9[a]

174. Petitioner and Dr. Bederson argue that that Bryant discloses “a recording medium on which is stored a plurality of video information including first video information received **wirelessly** by the network interface over a network from another information processing apparatus, wherein at least some of the **plurality of video information** is associated with a **user profile**,” as required by claim element 1[b] and 9[a] of the '815 Patent.

175. Bryant cites the hard drive 20 of the home computer 10 in the Figure 1 as the claimed recording medium. However, there is no description about the “first video information received wirelessly by the network interface over a network from another information processing apparatus.” Although, the home computer 10 includes a modem 22, Bryant does not disclose that the home computer 10 wirelessly

receives video information by the network interface over a network from another information processing apparatus.

176. Additionally, Kaplan also fails to disclose that it receives video information wirelessly, as required by claim 1 of the '815 Patent. Dr. Bederson recognizes this deficiency in Kaplan-Bryant combination when he states that “receiving this information wireless via a wireless modem at the Kaplan-Bryant PC would have been obvious to a POSITA.” Ex. 1003, ¶225.

177. Therefore, Petitioner and Dr. Bederson failed to show unpatentability by a preponderance of the evidence for any claim in Grounds 4-5.

3. The Combination of Kaplan and Bryant Fails to Disclose Limitation 1[c] and 9[b]

178. Dr. Bederson fails to show that Kaplan in combination with Bryant discloses “at least some of the plurality of **video information** is associated with a **user profile**” as required by claim elements 1[c] and 9[b]. As discussed above, I have applied the district court’s construction that the “user profile” term should be construed to mean “a collection of settings and information associated with a user.

179. Dr. Bederson erroneously relies on Bryant’s disclosure regarding “affective information” about images to argue that the user profile limitation is met. Ex. 1003, ¶226. However, Dr. Bederson, agrees that Bryant discloses “information that relates to the feelings or emotions of a person towards images.” Ex1015, ¶30.

Notably, the feelings and emotions information is not a “collection of settings and information associated with a user.”

180. Thus, Bryant’s disclosure of “affective information” about images does not meet the user profile limitation, and Dr. Bederson’s reliance on this argument is both incorrect and misleading.

181. Therefore, Petitioner and Dr. Bederson failed to show unpatentability by a preponderance of the evidence for any claim in Grounds 4-5.

4. The Combination of Kaplan and Bryant Fails to Disclose Limitation 1[g] and 9[e]

182. Petitioner and Dr. Bederson have failed to provide any evidence that Bryant-Kaplan combination discloses “the first group of video information being configured to allow a user to edit” as required by claim elements 1[g] and 9[e] of the ’815 Patent.

183. Specifically, Dr. Bederson simply points to Kaplan’s paragraph 44 to show that the buttons 26, 28 represent “containers that are configured to allow a user to edit, such as by adding a video to a container using standard operating system window functions 20, such as FILE which can include marking a video as a favorite.” Ex. 1003, ¶230. Dr. Bederson is mischaracterizing Kaplan’s disclosure. Paragraph 44 of Kaplan doesn’t refer to button 28. Additionally, the disclosure provides no evidence that a user can edit “video information.”

184. Therefore, Petitioner and Dr. Bederson failed to show unpatentability by a preponderance of the evidence for any claim in Grounds 4-5.

5. The Combination of Kaplan and Bryant Fails to Disclose Limitation 1[l] and 9[j]

185. Petitioner and Dr. Bederson have failed to show that the combination of Kaplan and Bryant discloses “wherein, upon one video information stored on the recording medium included in both the first group of video information and the second group of video information being deleted from the first group of video information, the one video information continues to be included in the second group of video information and the processor controls the display to display a thumbnail corresponding to the one video information as one of the second group of thumbnails when the second character is selected” as required by claim elements 1[l] and 9[j] of the '815 Patent. After contending that Kaplan alone discloses this limitation, Ex. 1003, ¶236, Dr. Bederson then states that “to the extent that this limitation [1l] is not disclosed or obvious over Kaplan, it is disclosed or at least obvious over Bryant.” Ex. 1003, ¶238. However, Dr. Bederson is silent as to what circumstances Kaplan would not disclose this element.

186. Therefore, Petitioner and Dr. Bederson failed to show unpatentability by a preponderance of the evidence for any claim in Grounds 4-5.

6. Kaplan and Bryant Fail to Disclose Claim Elements 1[m] and 9[k]

187. Dr. Bederson appears to acknowledge that Kaplan-Bryant combination does not disclose that “the processor controls the display to display a thumbnail corresponding to the one video information as one of the second group of thumbnails when the second character is selected,” as required by claim 1 of the ’815 Patent, because he only argues, in a cursory fashion, that “a POSITA would have understood that selection of a second collection (e.g., the History or All Images collection) would result in the display of thumbnails for all objects in the second collection even if one of those objects had been removed from a favorites collection.” Ex. 1003, ¶241. However, Kaplan discloses folder icons and does not show the thumbnails corresponding to the video information. For example, Figure 8 of Kaplan shows that selection of History button results in displaying of objects that include a film icon on folder 56 instead of the video information thumbnail. Ex. 1014, Fig. 8.

188. Therefore, Petitioner and Dr. Bederson failed to show unpatentability by a preponderance of the evidence for any claim in Grounds 4-5.

E. Ground 6: Horn in view of Baumgartner and Candelore Does Not Render Claims 16-19 Obvious

189. For Ground 6, neither the Petitioner nor Dr. Bederson has shown a likelihood of prevailing because Horn in view of Baumgartner does not teach each and every element of Claims 16-19 and 21-25. Specifically, Horn in combination

with Baumgartner and Candelore does not teach each and every element of claim 16 and 21. Additionally, because dependent claims 17-19 and 22-25 depend from claims that Petitioner has not shown to be unpatentable, Petitioner has also failed to show that claims 17-19 and 22-25 are unpatentable by Horn in view of Baumgartner and Candelore.

1. No Motivation to Combine Horn with Baumgartner

190. In my opinion, at the time of the '815 Patent, it would not have been obvious to a POSITA to combine Horn with Baumgartner. Dr. Bederson's statement as to why Horn and Baumgartner should be combined is conclusory and unsupported by sufficient evidence and analysis.

191. A POSITA would not be motivated to combine Horn with Baumgartner because they are two different systems. The problem solved by Horn is unrelated to the technical problems addressed by Baumgartner. Horn discloses a “truly **open computer system** having data structures, input interfaces, displays and operational systems that permits the organization of information, as data objects” and permit a “**faster archiving** , retrieval and viewing of the information.” Ex. 1005, 3:10-17 (emphasis added). Moreover, Horn proposes a computer data processing system that has a “**simple-to-use** data structure and operating mechanism to link information together in a dynamic, memory-and- space-efficient manner.” Ex. 1005, 3:19-22 (emphasis added). In contrast, Baumgartner discloses an “interactive television

system” that uses a set-top box to access and request video-on-demand programming. Ex. 1016, Abstract. A POSITA would not be motivated to combine the components from Baumgartner’s set-top box system to Horn’s simple-to-use computer file system, because Horn is directed to making “collections” based on keywords in documents, and is not directed to making any video-on-demand collections based on a user watch history.

192. Additionally, Dr. Bederson fails to provide any rationale as to why a POSITA would substitute the hardwired LAN of Horn with the wireless modem of Baumgartner. Dr. Bederson simply provides a conclusory statement that “a POSITA would have found it obvious to implement Horn’s LAN with a wireless LAN because they were often cheaper and easier to install than a wired LAN due to elimination of the need to run wires to all of the endpoint computers in the network.” Ex. 1003, ¶143. Dr. Bederson’s conclusory statements are insufficient and provide no factual support. In fact, Dr. Bederson’s assertion that wireless LAN was cheaper at the time of the ’815 Patent’s invention is also unsupported. For example, publicly available information shows that at the time of the ’815 Patent’s invention the price of wireless PC card and wireless access point was more than \$300,³ as compared to the wired LAN card that cost on average less than \$50.⁴ Dr. Bederson’s assertion

³ Ex. 2024 (<http://www.bricklin.com/homenetwork.htm>)

⁴ Ex. 2025 (<https://www.itprotoday.com/it-infrastructure/mixing-wired-and-wireless-networking-in-your-home>)

regarding the costs involved might be true today but not around the early 2000's. Today of course a wireless solution may be more cost effective, but not at the time of the '815 invention (Dec. 2004).

193. Dr. Bederson states that a POSITA would have considered obvious to include the wireless communication from Baumgartner in Horn. Ex. 1003, ¶143. This is incorrect.

194. Specifically, Dr. Bederson's analysis of the Horn system is fundamentally flawed because it fails to evaluate the system within the proper context of the prior art. Specifically, the Horn system is a **specialized, server-based computer** running the Metadata Filing System (MFS), **not just a general-purpose or personal computer**. Rather than assessing the technology in light of its intended enterprise environment, Dr. Bederson applies his analysis to a general-purpose or personal computer and assumes that a wireless LAN would be beneficial. This mischaracterization leads to incorrect conclusions that are not supported by the Horn's disclosure.

195. For example, Horn's MFS is designed for **high-performance, data-intensive computing**, a characteristic that distinguishes it from general-purpose computers, which are optimized for single-user, lower-complexity tasks. Horn's system's architecture and functionality indicate that it is a robust, server-based solution that is intended to handle large volumes of data. Ex. 1005, 6:59-63. A

POSITA evaluating the Horn disclosure would immediately recognize that the system is a server-based solution designed for large-scale data processing and management. This conclusion is evident from several key factors in the system's disclosure.

196. **First**, the Horn system is not a simple general-purpose computer but a dedicated server architecture specifically designed for **automatic organization, indexing, and retrieval** of data from multiple sources. Ex. 1005, 3:10-17. The emphasis on handling vast amounts of structured data further supports the conclusion that the system is a server-based architecture rather than a consumer-grade or personal-use system.

197. **Second**, the system's capabilities align with enterprise-level data management, including aggregating data from multiple inputs, performing complex indexing operations, and providing structured data views. These are defining characteristics of server-based computing environments—features that are neither typical nor necessary for general-purpose personal computers, which primarily function for localized, single-user tasks.

198. Furthermore, the architectural framework described in the Horn disclosure supports **high availability, scalability, and efficient handling** of extensive data volumes. Such design considerations are commonly associated with

enterprise data centers, further reinforcing that the Horn system is a server-based computing environment requiring a high-performance infrastructure.

199. As such, Dr. Bederson's assumption that a wireless LAN is a suitable alternative to a wired connection is inconsistent with the Horn system's technical and operational requirements. The system requires advanced reliability, stability, and security, all of which are best provided by a wired LAN.

200. In particular, a POSITA would understand that from performance standpoint, wired networks provide a more **stable and reliable** connection with lower packet loss and reduced latency, which is critical for high-throughput enterprise computing. In contrast, wireless networks are inherently vulnerable to interference, congestion, and signal degradation, making them highly unreliable for large-scale, high-performance data environments like the Horn system.

201. Moreover, Horn's real-time indexing and retrieval of high data volumes necessitate low-latency, high-speed communication. Wired networks are specifically designed to minimize latency, ensuring efficient and predictable data transmission. Wireless networks, on the other hand, introduce variable latency and bandwidth limitations, which would severely impact system performance and render wireless connectivity unsuitable for Horn's operational needs. Even Dr. Bederson admitted that if a system's goal is to permit faster archiving, retrieval and viewing

information (similar to Horn's system) then it is better to transfer data at higher speeds:

Q. If you had a computer system whose goal is to permit faster archiving, retrieval and viewing of information, would it be better to have the data transferred at higher speeds or lower speeds?

A. If your goal was faster communication, then I would think faster communication speeds probably would help you address that goal more readily. I will note there is nothing about any speed requirement in the claims of the '815 patent though.

Ex. 2038, Bederson Dep. Tr. at 51:22-52:8.

202. A POSITA would have understood that at the time of the '815 Patent the speed and bandwidth of wireless communication was much slower than that of the cable LAN, and hence Baumgartner's wireless communication would not be appropriate for Horn's distributed computer system that **requires** higher speed and bandwidth to **"faster"** retrieve and view information on a communication network. In particular, at the time of the '815 Patent, the wireless communication protocols (802.11b/g) offered communication speeds much slower than that of wired ethernet:

The current standard: 802.11b

Standards insure that wireless networks that consist of components from several different vendors will work properly. Theoretically, cards manufactured by one company will work with an access point from another company. The current standard for wireless networks is known as 802.11b. This standard is in the same family as Ethernet, generally known by the designation 802.3.

Equipment that follows 802.11b standard will be capable of a theoretical data throughput rate of 11 mb/sec. This level of bandwidth is quite respectable, given that many wired networks continue to operate at 10mb/sec. The actual usable bandwidth averages about half the theoretical, though.

The previous generation of wireless networks operated at 2-3 mb/sec. Not surprisingly, wireless networks did not become popular until the emergence of the 802.11b standard that increased the data flow to 11 mb/sec. The emerging 802.11a standard, expected to find more common use in the next 1-2 years, will deliver data at 54MB/sec.

Still a Niche product

Despite the steadily increasing speed of wireless technology, wired networks will always outperform them by long strides. Today 100mb/sec Ethernet cards prevail in most business LANs, with Gigabit Ethernet (1024 mb/sec) finding common use as network backbones and for connecting high-performance servers. 10 GB/sec Ethernet for fibre-based networks is already on the horizon.

Ex. 2026 (<https://librarytechnology.org/document/9643>)

203. Security is another critical concern that Dr. Bederson's analysis fails to address adequately. The Horn system is explicitly designed for data aggregation and management, making **data integrity and security paramount**. Ex. 1005, 19:25-60, 5:47-60. A POSITA would have understood that network security is important to Horn's system as it stores user data and could host websites. Ex. 1005, 19:25-60, 5:47-60. In particular, Dr. Bederson admitted that data security is important for Horn's system:

Q. In Horn's system, Exhibit 1005, does Horn store user data?

A. Yes, I believe it does.

Q. Does Horn's system host websites?

A. I don't recall if it does.

Q. Just take a look at column 5, line 47, and the subsequent sentences.

A. Okay.

(Witness perusing document.)

A. Okay, I see that, and I do see that Horn discloses hosting internet pages.

Q. So in 2004, in a system such as Horn's, would data security be important to one of skill in the art?

A. Well, I think in 2004, data security was certainly less important, less top of mind than it is today. But I think a person of skill in the art would at least have some awareness of data security.

Ex. 2038, Bederson Dep. Tr. at 52:9-53:4.

204. Wired LANs offer a superior security framework by eliminating risks associated with wireless transmissions, such as hacking, data interception, and unauthorized access. Wireless LANs, especially those in 2004, were significantly more vulnerable to security breaches, further supporting the conclusion that Horn's intended infrastructure is wired, not wireless.

Security problems remain

Organizations that implement wireless networks have to consider the security implications. Wireless networks suffer from the same basic weakness as wired networks, where some unknown party might be listening in on the network conversation. Any information transported across a network must be encrypted to ensure that it remains private. The problem is amplified in wireless networks since anyone with the right equipment in physical proximity might be able to capture your network traffic, gain unprotected passwords, and launch an attack on your computers.

The 802.11b standard includes provision for protecting data transmissions through the use of encryption. The standard includes a security layer called Wired Equivalency Privacy (WEP) that uses a private key in its encryption. Many wireless networks have been installed without implementing this security feature. The security available on encrypted wireless LANs should be considered as weak, since it has recently been demonstrated that any third party capturing network packets off an access point can fairly easily determine the keys needed to decrypt network traffic.

The basic lesson for wireless networks is to avoid their use by computers with highly confidential or proprietary information. Assume that an unknown third party can intercept any information that isn't separately protected with strong encryption. As with wired network, never transmit a password that provides root or administrative access unless it is protected through strong encryption.

Ex. 2026 (<https://librarytechnology.org/document/9643> (annotated)).

205. In addition, Dr. Bederson's argument for wireless LAN based on mobility (See Ex. 2038, Bederson Dep. Tr. at 102:7-20) is entirely misplaced and not supported by the Horn disclosure. The Horn system is a mainframe server running the MFS—it is not a mobile system nor does the patent suggest any mobility requirements. Ex. 1005, 6:59-63. A POSITA reviewing the Horn disclosure would find no indication that mobility is a relevant factor in the system's design. The enterprise-level nature of the system, its focus on large-scale data management, and its reliance on stable, high-throughput processing all point toward a fixed, stationary computing environment. Ex. 1005, 7:7-10. As such, there is no justification for implementing wireless networking, reinforcing that a wired infrastructure is both the intended and optimal choice.

206. Given its specific design, integrating wireless LAN would introduce unnecessary performance bottlenecks, security vulnerabilities, and operational

inefficiencies, making it an impractical and unjustifiable choice for such an infrastructure.

207. In my opinion, even today's distributed computer systems, which are similar to Horn's system, prefer wired network connectivity at least at the backend for higher speeds, bandwidth, and network security. In sum, a POSITA would readily conclude that the Horn system is a wired, server-based architecture, designed for high-performance data management and optimized for security, stability, and scalability—all of which necessitate wired network infrastructure. Wireless LAN such as that disclosed in Baumgartner is not a viable option, and Dr. Bederson's analysis fails to consider these fundamental technical realities.

208. Therefore, a POSITA would not have considered it obvious to combine Baumgartner with Horn.

2. The Combination of Horn, Baumgartner, and Candelore Fails to Disclose Limitation 16[a] and 21[a]

209. Petitioner and Dr. Bederson fail to show that that Horn in combination with Baumgartner and Candelore discloses claim elements 16[a] and 21[a]: receiving, via a network, first video information wirelessly from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted.

210. Specifically, Dr. Bederson admits that "Horn does not expressly disclose receiving digital video information wirelessly." Ex. 1003, ¶283. In fact,

Horn does not even disclose receiving video, let alone receiving it wirelessly. Horn discloses receiving files, music and images: “[t]he e-mail domain is linked through a network for the communication of files, music and images to and from a network.” Ex. 1005, 12:5-7. This is because Horn is focused on providing a “space-saving” file system, and not a system like videos that would use up too much storage.

211. Petitioner and Dr. Bederson try to plug this deficiency by simply pointing to Horn’s LAN: “A POSITA would have understood that a LAN is often implemented as a wireless LAN, and a POSITA would have found it obvious to implement Horn’s LAN with a wireless LAN because they were often cheaper and easier to install than a wired LAN due to elimination of the need to run wires to all of the endpoint computers in the network. Additionally, wireless LANs can be more convenient for users.” Ex. 1003, ¶14. Specifically, Dr. Bederson attempts to use Baumgartner to fill this gap in the teachings of Horn. However, a POSITA wouldn’t be motivated to combine Baumgartner with Horn. As discussed above, at the time of the ’815 Patent, it would not have been obvious to a POSITA to combine Baumgartner with Horn because they are solving different problems and hence directed to different solutions, and the wireless LAN is not necessarily cheaper (e.g., a wireless LAN card is more expensive than a wired LAN card at the time of the patent) as Dr. Bederson claims.

212. Therefore, because Petitioner and Dr. Bederson has not shown Horn in view of Baumgartner and Candelore discloses claim elements 16[a] and 21[a], in my opinion, Petitioner and Dr. Bederson failed to show unpatentability by a preponderance of the evidence for any claim in Ground 6.

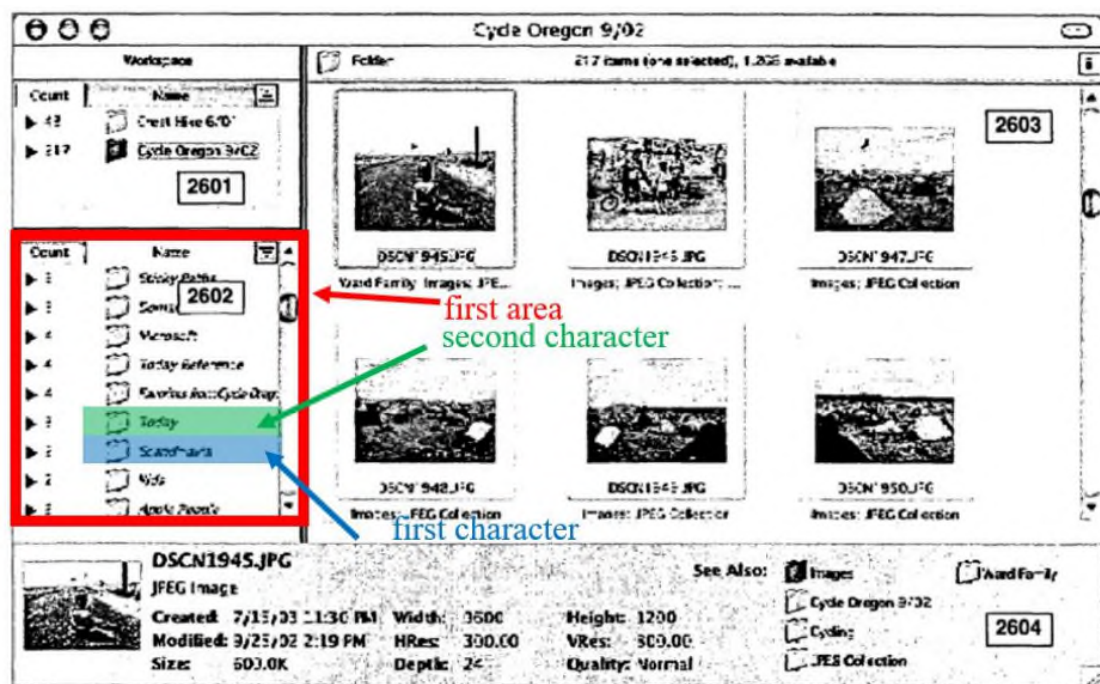
3. The Combination of Horn, Baumgartner, and Candelore Fails to Disclose Limitation 16[b] and 21[b]

213. Petitioner and Dr. Bederson fail to show that Horn in combination with Baumgartner and Candelore discloses “displaying, on a display device, a first user interface for a user to select a user profile from among a plurality of user profiles including a first user profile associated with a first character and a second user profile associated with a second character” as required by claim elements 16[b] and 21[b].

214. In particular, Horn's disclosure falls short by failing to present a user interface that enables a user to select a profile from multiple user profiles. Dr. Bederson attempts to bridge this gap by referencing features from Baumgartner. However, even Dr. Bederson admits that “Baumgartner does not provide additional details on how to implement such user profile buttons.” Ex. 1003, ¶288. Without explicit guidance from Baumgartner, it would not have been obvious to a POSITA to implement in Horn the user profile buttons as described in Baumgartner.

215. Moreover, Dr. Bederson's reliance on modification to panes 2601 and 2602 in Horn's Workspace is misguided and lacks substantiation. The suggestion to add buttons labeled with user names for profile selection appears arbitrary and

unsupported. An analysis of Horn's Figure 26 (below), which illustrates the Workspace, shows no clear rationale or incentive for a POSITA to introduce additional buttons or information in these sections. Dr. Bederson's recommendation is speculative and fails to provide a convincing basis for why such modifications would be necessary or obvious to a POSITA. Therefore, Dr. Bederson's argument lacks merit and should not be considered a valid resolution to the deficiencies in Horn's disclosure.



Ex. 1005 at Fig. 26.

216. Therefore, Petitioner and Dr. Bederson failed to show unpatentability by a preponderance of the evidence for any claim in Ground 6.

4. The Combination of Horn, Baumgartner, and Candelore Fails to Disclose Limitation 16[e] , 16[f], 16[g], 16[h], 21[e], 21[f], 21[g], and 21[h]

217. Petitioner and Dr. Bederson fail to show that Horn in combination with Baumgartner discloses claim element 16[e] and 21[e]: “displaying, in response to the selection, a second user interface for a user to select desired video information to be reproduced from among the first video information.”

218. Dr. Bederson points to Horn’s Workspace view as a second user interface. Ex. 1003, ¶297. However, Horn’s Workspace view cannot be the second user interface as the Petitioner and Dr. Bederson already selected it as a first user interface. Ex. 1003, ¶288. In particular, ’815 Patent discloses the first and second user interfaces as two separate display screens. *See Supra* Section III.C. As discussed above, the claims, specification, and figures of the ’815 Patent explicitly establish that the second interface is distinct from the first interface and appears on a new screen. For instance, see Ex. 1001 at 6:19-41 and Figures 4-7.

219. In particular, a POSITA, when reading claims 16 and 21 in their entirety, would understand that the second interface refers to a new screen separate from the first user interface. This new screen displays user-specific information, as further evidenced by the claims' requirement that the second interface includes a character identifying the user associated with the selected user profile:

the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first

group of video information and indicating an identity of the user of the first user profile.

Ex. 1001 at Claims 16 and 21 (limitations (21f) and (16g)).

220. Additionally, in my opinion, a POSITA would interpret this claim limitation to mean that the second interface must be a new screen because the characters identifying the user profile are already present in the first interface. The only logical purpose for requiring these identifying characters in the second interface is that it operates as a new screen distinct from the first, which does not carry over the information from the first interface.

221. Even if we were to assume, *arguendo*, that Horn's Workspace view discloses the second interface—which it does not—the Horn-Baumgartner combination still fails to satisfy the claim limitation requiring “displaying, in response to the selection, a second user interface for a user to select desired video information to be reproduced from among the first video information,” as specified in claim element 16[e].

222. Specifically, if Baumgartner's user profile feature is incorporated into Horn, the result is that, upon the selection of a user profile, Horn would only display the folders or content associated with that profile within the first interface (panes 2601/2602). It would not display content in the second interface (pane 2603) as required by the claim. Instead, content in pane 2603 is displayed only in response to

a user selecting a specific folder or item from the first interface, as detailed in Horn's disclosure:

"MFS also provides a Workspace view (FIG. 26) in which the following information is visible in four separate panes:

- 1) the original folders from which the images were examined (the working set); (2601)
- 2) a list of all collections defined by MFS and the user; (2602)
- 3) a content pane, which dynamically displays the contents of whatever item is selected in the first two views (2603). In the case of a folder or collection, the contents of the folder or collection is shown in an icon or list view; in the case of an individual item, the item itself is shown in detail (such as the full image, or contact information)
- 4) and a metadata pane, which describes the currently-selected item's metadata, including the set of containers to which the item belongs. (2604)"

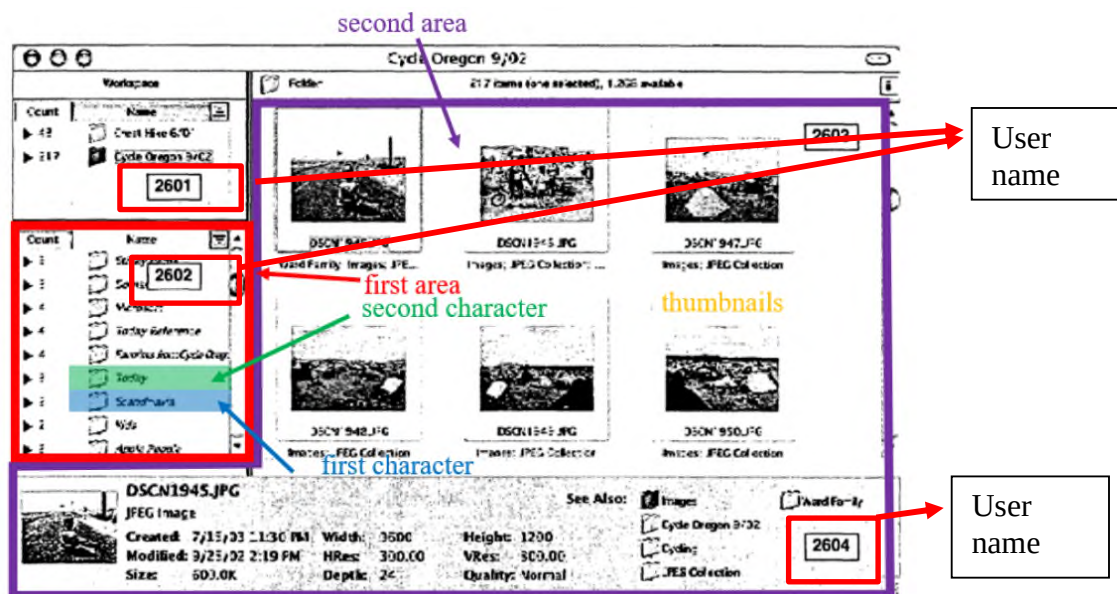
Ex. 1005 at 19:41-57.

223. Specifically, a POSITA reading this disclosure would understand that pane 2603 only displays the contents of "whatever item is selected" in panes 2601 and/or 2602. Therefore, if the user changes the selected user profile, it merely updates the folders or content displayed in panes 2601 and 2602. No content would appear in pane 2603 (the dynamic content pane) unless the user explicitly selects a folder or item from panes 2601 or 2602. Consequently, Horn's Workspace view does not meet the claimed requirement for a second user interface that displays desired video information in response to a user profile selection.

224. Further, regarding the "the second user interface being associated with the first user profile and displaying the first character, the first character associated

with a first group of video information and indicating an identity of the user of the first user profile” limitation as required by the claim element 16[f], Dr. Bederson admits that “[t]he second user interface/second area of Horn's Workspace view in Fig. 26 above does not explicitly show the user name associated with the user profile to which the content in the content pane 2603 pertains, but doing so would have been obvious to a user.” Ex. 1003, ¶298. Dr. Bederson further states that “a POSITA would have found it obvious to include the user name in the metadata pane 2604.”

Id.



Ex. 1005 at Fig. 26.

225. As previously discussed, the Horn-Baumgartner combination fails to disclose the second interface required by claims 16 and 21 of the '815 Patent. A POSITA would lack any motivation to add a username to the Workspace view

interface since the Petitioner and Dr. Bederson have already integrated the username into panes 2601 and/or 2602. Pet. at 32; Ex. 1003, ¶288. Specifically, a POSITA would understand that adding usernames multiple times to the same user interface or screen undermines the teachings of the invention claimed in the '815 Patent. Claims 16 and 21 are explicitly directed toward two distinct user interfaces or screens, each designed to display the username characters for identifying the user on a specific interface or screen. In contrast, there would be no reason to repeatedly display the user name in the different panels of Fig 26 of Ex. 1005 as there is no ambiguity as to the identity of the user in its four panes. By suggesting the redisplay of the user's name multiple times in a single interface, Dr. Bederson contradicts the fundamental design and intended functionality of the '815 Patent, and thereby a POSITA would not be motivated to modify Horn's Workspace view screen to arrive at the '815 patent's teachings.

226. For the same reasons discussed above, Dr. Bederson fails to show that Horn in combination with Baumgartner discloses claim element 16[h] and 21[h]: “displaying the second character and a second group of thumbnails corresponding to a second group of video information associated with the second user profile when the second character is selected.”

227. Therefore, Petitioner and Dr. Bederson failed to show unpatentability by a preponderance of the evidence for any claim in Ground 6.

5. The Combination of Horn, Baumgartner, and Candelore Fails to Disclose Limitation 16[i], 16[j], 16[k], 16[l], 21[i], 21[j], and 21[k]

228. Petitioner and Dr. Bederson fail to show that Horn in combination with Baumgartner discloses claim element 16[i] and 21[i]: “the first group of video information and the second group of video information including one video information that is the same.”

229. As a threshold issue, Petitioner and Dr. Bederson appears to misunderstand the limitations of claim 16. The claim explicitly requires that the first group of video information, associated with the first user profile (claim element 16[f]), and the second group of video information, associated with the second user profile (claim element 16[h]), include one video that is the same (claim element 16[i]). However, Petitioner and Dr. Bederson rely on Horn’s collections rather than user profiles. Pet. at 40; Ex. 1003, ¶303. Collections, as disclosed by Horn, are not equivalent to user profiles. Specifically, Horn defines a collection as:

Collection: means a grouping of objects based on a metadata specification describing properties that all objects in the group have in common, or objects that were grouped together specifically by the user as having some shared meaning or logical grouping.

Ex. 1005 at 4:1-5.

230. This definition clearly differentiates collections from user profiles, as collections are metadata-based groupings or manually defined groupings—not user-specific profiles as required by the claims.

231. Moreover, Dr. Bederson fails to establish that the combination of Horn and Baumgartner discloses claim element 16[k]: “removing the one video information from the first group of video information ... the one video information continues to be included in the second group of video information for the second user profile.” Instead, Dr. Bederson relies on Horn’s collections for removal of content (Ex. 1003, ¶308), but fails to explain how Horn’s collections function across multiple user profiles, as disclosed by Baumgartner.

232. Critically, Dr. Bederson does not identify any disclosure in Horn or Baumgartner showing that removing a video from the first group (associated with the first profile) results in the video remaining in the second group (associated with the second profile). Furthermore, Dr. Bederson provides no analysis of the final portion of element 16[k], which requires that “the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected.”

233. Dr. Bederson remains silent on this aspect, likely because, in my opinion, neither Horn nor Baumgartner discloses this limitation. While Horn discusses collections and Baumgartner mentions multiple user profiles, neither explains how removing content from one user profile impacts other profiles or how video thumbnails are displayed across profiles after removal.

234. For the same reasons discussed above, Dr. Bederson fails to show that Horn in combination with Baumgartner discloses claim element 16[j] “receiving a selection to remove the one video information from the first group of video information associated with the first user profile,” and claim element 16[l] “receiving a selection of desired video information based on a selection of a thumbnail from the first group of thumbnails, the desired video information included in the second video information.”

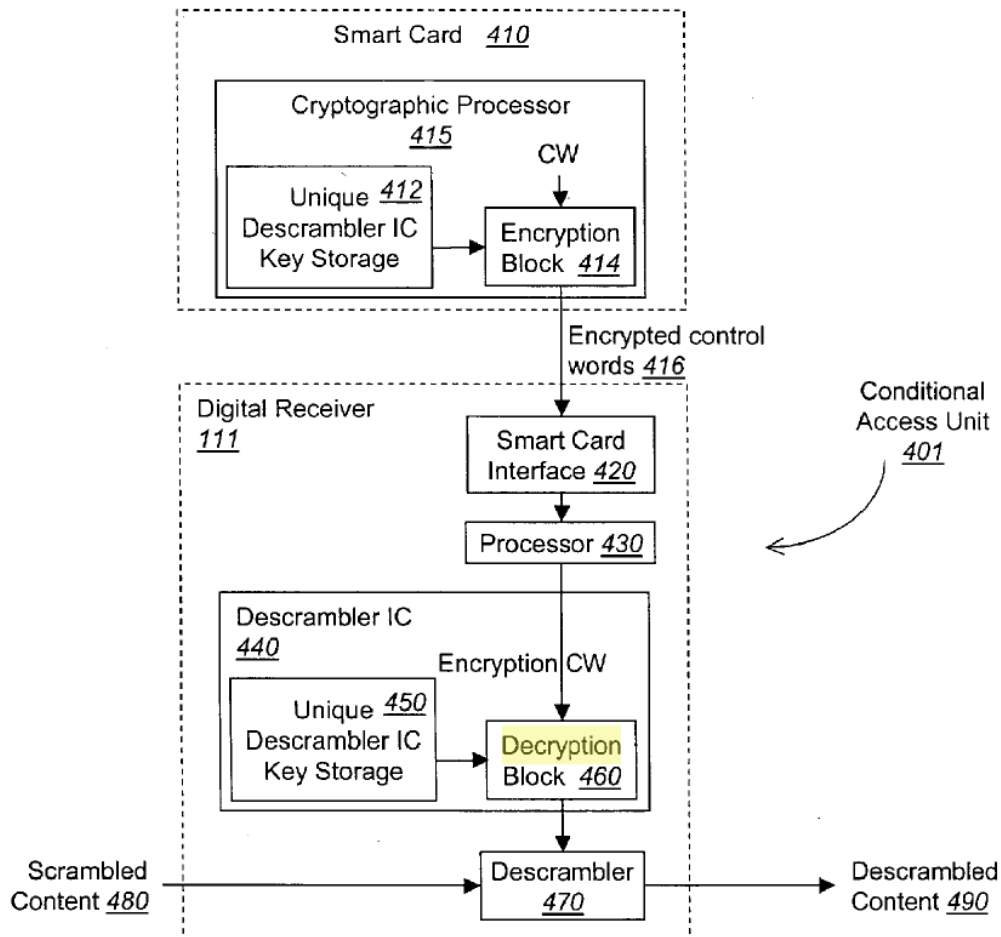
235. In sum, Dr. Bederson’s opinions are conclusory and unsupported. The combination of Horn and Baumgartner fails to satisfy the specific limitations of claim elements 16[i], 16[j], 16[k], 16[l], 21[i], 21[j], and 21[k], as required by the claims 16 and 21.

6. The Combination of Horn, Baumgartner, and Candelore Fails to Disclose Limitation 16[m], 21[l], and 21[m]

236. Petitioner and Dr. Bederson fail to show that Horn in combination with Baumgartner and Candelore discloses claim elements 16[m]/21[l]: “decrypting video information corresponding to the selected thumbnail; and displaying the decrypted video information,” and 21[m]: “wherein the display displays the decrypted video information.”

237. In particular, the Horn and Baumgartner disclosures fall short by failing to provide decryption of video information and displaying the decrypted video. Dr. Bederson attempts to bridge this gap by referencing features from Candelore.

However, Candelore discloses a very specific hardware to decrypt the video content in a set-top box that a POSITA would not have found obvious to include in the Horn-Baumgartner system as Petitioner and Dr. Bederson suggest:



Ex. 1013, Candelore at Fig. 2.

238. In my opinion, a POSITA would not have a reasonable expectation of success in the combination because decryption in Candelore is performed by an “embedded” IC—an embedded IC that is required to co-work with a “smart card” to perform the decryption—that a POSITA simply cannot pick and put in another

system. Dr. Bederson Specifically, Horn-Baumgartner does not suggest any benefit to such a combination, and without a clear teaching or motivation, Dr. Bederson's argument is based purely on hindsight.

239. In particular, Dr. Bederson's proposed combination would require modifying Horn-Baumgartner's architecture in a way that is fundamentally incompatible with Candelore's embedded IC decryption process. A POSITA would recognize that such modifications would render the original system inoperable or significantly alter its intended function, making the combination impractical and non-obvious.

240. Even assuming a POSITA was motivated to make the proposed modification, there is no reasonable expectation of success. Candelore's decryption relies on a dedicated embedded IC that must interface with a smart card—something that cannot simply be transferred to Horn-Baumgartner's architecture without a complete redesign. Dr. Bederson fails to provide any evidence that such an integration was feasible or even contemplated by a POSITA at the time of the invention.

241. Furthermore, Dr. Bederson ignores the reality that Candelore's embedded IC cannot simply be abstractly combined with Horn-Baumgartner. The prior art does not teach any method for making this integration work, nor does Dr. Bederson provides any technical rationale for overcoming the clear

incompatibilities. A POSITA would recognize that this is not an obvious combination but an impractical and speculative one.

7. The Combination of Horn, Baumgartner, and Candelore Fails to Disclose Claims 18 and 24

242. Petitioner and Dr. Bederson fail to show that Horn in combination with Baumgartner and Candelore discloses claims 18 and 24: “generating a list of video information based on preferences of a user determined by a user selections of thumbnails from the first or second group of thumbnails.”

243. Dr. Bederson relies on Horn’s disclosure of “information management tools that facilitate communication to generate, transmit and receive, archive, search, order, retrieve, and render objects, including information organization personalized for each individual user based on preferences selected by the user.” Ex. 1003, ¶312. However, this falls short of satisfying the specific requirements of claim 18 of the ’815 Patent, which explicitly calls for the system to generate a video list—specifically, a recommendation list—based on user preferences determined through their selection of video information.

244. As discussed above in Section III.C, “generating a list of video information based on preferences of a user” refers to generating a **recommendation video list**.

245. Horn, on the other hand, does not disclose generating a recommendation video list based on user preferences. Instead, Horn describes a

system that merely organizes information for a user based on preferences they select. For example, Horn discusses categorizing information for different view approaches:

Collections: ... allow[] users to categorize objects in ways that most clearly reflect different approaches and ways of viewing the same information. Users can select predetermined collections provided in a basic menu, such as Family, Friends, Work, To Do, Activities, and Vacation when running the MFS program for the first time, and can create and set up user-defined collections as well.

Ex. 1005, Horn at 8:58-67

246. This categorization of information into collections is fundamentally different from a system that generates a recommendation video list based on user selections of video thumbnails. Horn's disclosure merely allows users to organize objects according to predetermined or user-defined groupings; it does not involve the dynamic generation of a recommendation list based on user behavior or thumbnail selections, as required by claims 18 and 24.

247. In summary, Dr. Bederson's reliance on Horn does not establish that the combination with Baumgartner and Candelore satisfies the limitations of claims 18 and 24. In my opinion, the cited disclosures fail to demonstrate the required functionality of generating a recommendation video list based on user selections of video thumbnails, as claimed in the '815 Patent.

F. Ground 7: Dr. Bederson Fails To Establish That Claims 20, 26, and 27 are Rendered Obvious By Horn in View of Baumgartner, Candelore, and WinTV

248. Claims 20 depends from claim 16, and claims 26 and 27 depends from claim 21. As set forth above, in my opinion, the combination of Horn, Baumgartner, and Candelore fails to teach all of the limitations of claims 16 and 21. Additionally, Petitioner and Dr. Bederson have not provided sufficient evidence to show that WinTV was publicly accessible. For these reasons, Grounds 7, 8, and 10 fail to show with unpatentability by a preponderance of the evidence..

1. Dr. Bederson Has Not Provided Sufficient Evidence that WinTV Was Publicly Accessible.

249. As set forth above in Section VII.C, Petitioner and Dr. Bederson have not shown WinTV was publicly accessible and thus has not shown WinTV is prior art. Ground 7 fails for this reason alone.

2. No Motivation to Combine WinTV with Horn and Baumgartner

250. For Ground 7, Petitioner and Dr. Bederson attempt to use the WinTV reference to fill in the various gaps of the teachings of Horn with regard to the dependent claims of the '815 Patent. *See generally* Pet. at 48-55. As set forth above, Petitioner and Dr. Bederson have not met its burden in showing that WinTV was publicly accessible and thus has not met its burden of showing WinTV is prior art.

Additionally, as set forth above, a POSITA would not have had the motivation to combine Horn and Baumgartner. Ground 7 fails for these additional reasons.

251. Additionally, Petitioner and Dr. Bederson have not shown how a POSITA would have combined the teachings of WinTV with at least the teachings of Horn in addition to Baumgartner with any expectation of success. A POSITA wouldn't be motivated to combine Horn with WinTV because they are two different systems. The problem solved by Horn is unrelated to the technical solutions addressed by WinTV. Horn discloses a “truly **open computer system** having data structures, input interfaces, displays and operational systems that permits the organization of information, as data objects” and permit a “**faster archiving** , retrieval and viewing of the information.” Ex. 1005, 3:10-17 (emphasis added). Moreover, Horn proposes a computer data processing system that has a “**simple-to-use** data structure and operating mechanism to link information together in a dynamic, memory-and- space-efficient manner.” Ex. 1005, 3:19-22 (emphasis added). In contrast, WinTV discloses a “Plug and Play” device installed to receipt, playback and record video. Ex. 1010, 3-4, 4-1. A POSITA would not be motivated to combine the TV tuner card from WinTV to Horn's simple-to-use computer file system, because Horn is directed to making “collections” based on keywords in documents, and is not directed to receiving, playing and recording of video.

252. Additionally, the Petitioner and Dr. Bederson state that Baumgartner suggests including a television tuner card for decoding tv channels. Petition at 54; Ex. 1003, ¶355. However, Horn does not suggest or teach to incorporate a tv tuner card in its system. In particular, while a POSITA maybe motivated in modifying a set-top box system of Baumgartner with a TV tuner card, it does not follow that a POSITA would not motivated to include a TV tuner card in a “truly open system” with an MFS system as disclosed in Horn that is directed to collection of various documents.

253. Therefore, Petitioner and Dr. Bederson failed to show unpatentability by a preponderance of the evidence for any claim in Ground 7.

G. Ground 8: Dr. Bederson Fails To Establish That Claims 16-27 are Rendered Obvious By Horn in View of Baumgartner, Candelore, WinTV, and Chao

254. As I described above, the combination of Horn, Baumgartner, WinTV, and Candelore fails to teach all of the limitations of claims 16-27. Additionally, Dr. Bederson has not shown how a POSITA would have combined the teachings of Horn with at least the teachings of Baumgartner in addition to Candelore, WinTV, and Chao with any expectation of success. Again, Dr. Bederson has not met his burden in showing that WinTV was publicly accessible and thus has not met its burden of showing WinTV is prior art. Ground 8 fails for this reason alone.

255. Additionally, Dr. Bederson has provided only conclusory statements regarding the combination of these references and has failed to identify how each claim element will be mapped against these **five** references.

256. Moreover, Dr. Bederson and Petitioner fail to state why a POSITA would be motivated to modify Horn to add thumbnails for folders of content data as disclosed in Chao. Horn discloses a **simple-to-use** data structure system that provides interfaces for organization of data objects in a memory-and-space-efficient manner. *See* Ex. 1005, 3:10-22. Horn teaches away from adding further complexity to its system, because its goal is to organize and display data in a space efficient manner. Additionally, Dr. Bederson and Petitioner fail to state what thumbnails would be used from Chao to modify the folders in Horn.

257. In particular, Dr. Bederson and Petitioner fail to disclose why a POSITA would be motivated to modify the operating system (OS) code of Horn computer to include the thumbnails features from Chao. Horn's system is already optimized for efficient data organization and display. Simply identifying that thumbnails exist in Chao is not sufficient motivation to modify Horn. Without a clear rationale for the combination, the Petitioner's argument relies on impermissible hindsight reconstruction.

258. Horn explicitly teaches away from additional complexity. A POSITA would recognize that modifying Horn to include Chao's thumbnails would

undermine its core functionality by introducing processing overhead that conflicts with its space-efficient design. In particular, the modifications which contradict the intended function of the prior art (Horn) cannot be considered obvious.

259. The Petitioner does not explain how a POSITA would access or modify Horn's OS code to integrate Chao's thumbnails. Chao provides no guidance on which specific lines of Horn's OS code would require modification, leaving a POSITA to engage in an uncertain and speculative process. Specifically, obviousness requires a reasonable expectation of success, which Dr. Bederson has failed to establish.

260. Furthermore, Dr. Bederson ignores the fact that Horn's OS architecture is not compatible with Chao's thumbnail-based system. A POSITA would not simply extract Chao's thumbnail implementation and insert it into Horn without overcoming significant hardware and software integration challenges. Dr. Bederson fails to address these challenges, making the proposed modification impractical and non-obvious.

261. Therefore, Petitioner and Dr. Bederson failed to show unpatentability by a preponderance of the evidence for any claim in Grounds 8.

H. Grounds 9-10 Fail Because Kaplan, Bryant, Wong, and Candelore Do Not Disclose Claims 16 and 21 Either Alone Or In Combination

262. As with prior grounds, Petitioner and Dr. Bederson rely on cursory analysis in an attempt to utilize Kaplan, Bryant, Wong, and Candelore to show

Claims 16-27 are unpatentable. However, Petitioner and Dr. Bederson fail to show Kaplan and Bryant, either alone or together, render the claims unpatentable. Additionally, Grounds 9 and 10 fail because Wong is not prior art, and Dr. Bederson relies on Wong for all claims of Grounds 9 and 10. As set forth above in Section V.C, all limitations of Claims 16-27 are fully supported prior to the filing of Wong. Finally, because Claims 20, 26, and 27 all depend on Dr. Bederson's faulty analysis with respect to Claims 16 and 21, Ground 10 fails for this additional reason.

1. Dr. Bederson Does Not Adequately Articulate a Combination of Kaplan's, Bryant's, Wong's, and Candelore's Teachings

263. The Petition is organized such that Petitioner attempts to address the combination of Kaplan, Bryant, Wong, and Candelore and alleged motivation to combine up front, Petition at 61-66, and then the Petition makes fleeting references of the purported combination within individual limitations. *See, e.g.*, Pet. at 76-79 (limitation 16[f]), 81-83 (limitation 16[h]). But neither the generic motivation to combine section nor the cursory mentions of a combination in a few limitations meets Petitioner's and Dr. Bederson's burden to explain what the combined teachings of Kaplan, Bryant, Wong, and Candelore would have suggested to a POSITA.

264. Dr. Bederson's general motivation-to-combine discussion makes only conclusory statements that a POSITA would have modified the teachings in Kaplan based on Bryant's digital camera and "usable-customizable metadata." Ex. 1003,

¶220. However, these vague suggestions merely parrot portions of Kaplan and Bryant. For example, Dr. Bederson alleges “a POSITA would have known how to modify any data structures and user interfaces to include additional metadata because modifying data structures and user interfaces was well within their skill, and they had already created those data structures and user interfaces to create the system of Kaplan in the first place.” Ex. 1003, ¶221.

265. Therefore, Petitioner and Dr. Bederson failed to show unpatentability by a preponderance of the evidence for any claim in Grounds 9-10.

2. The Combination of Kaplan, Bryant, Wong, and Candelore Fails to Disclose Limitation 16[a] and 21[a]

266. Petitioner and Dr. Bederson argue that Bryant discloses “**receiving, via a network, first video information wirelessly** from a device external to the information processing apparatus, the first video information being received including second video information that is encrypted,” as required by claim element 16[a] and 21[a] of the ’815 Patent.

267. Bryant cites the hard drive 20 of the home computer 10 in the Figure 1 as the claimed recording medium. However, there is no description about the “**receiving, via a network, first video information wirelessly**” from an external device. Although, the home computer 10 includes a modem 22, Bryant does not disclose that the home computer 10 wirelessly receives video information by the network interface over a network from an external device. Dr. Bederson recognizes

this deficiency in Kaplan-Bryant combination when it states that “[r]eceiving this video information wireless via a wireless modem at the Kaplan-Bryant PC would have been obvious to a POSITA for the reasons discussed above.” Ex. 1003, ¶367.

268. Therefore, Petitioner and Dr. Bederson failed to show unpatentability by a preponderance of the evidence for any claim in Grounds 9-10.

3. The Combination of Kaplan, Bryant, Wong, and Candelore Fails to Disclose Limitation 16[b] and 21[b]

269. Petitioner and Dr. Bederson fail to show that Kaplan in combination with Bryant and Wong discloses “displaying, on a display device, a first user interface for a user to **select a user profile from among a plurality of user profiles** including a first user profile associated with a first character and a second user profile associated with a second character” as required by claim elements 16[b] and 21[b]. In particular, Kaplan and Bryant falls short by failing to present a user interface that enables a user to select a profile from multiple user profiles. Dr. Bederson attempts to bridge this gap by referencing features from Wong. However, as discussed above, Wong is not a prior art. Additionally, Dr. Bederson provides no explanation to how a POSITA would incorporate the teachings of Wong in Bryant.

270. Therefore, Petitioner and Dr. Bederson have failed to show unpatentability by a preponderance of the evidence for any claim in Ground 9-10.

4. The Combination of Kaplan, Bryant, Wong, and Candelore Fails to Disclose Limitation 16[e], 16[f], 16[g], 16[h], 21[e], 21[f], 21[g], and 21[h]

271. Petitioner and Dr. Bederson fail to show that Kaplan in combination with Bryant discloses claim element 16[e] and 21[e]: “displaying, in response to the selection, a second user interface for a user to select desired video information to be reproduced from among the first video information.”

272. Dr. Bederson points to Kaplan’s menu display in Figure 4 having a second user interface. Ex. 1003, ¶379. However, Kaplan’s menu display cannot be the second user interface as the Dr. Bederson already selected it as a first user interface. In particular, the ’815 Patent discloses the first and second user interfaces as two separate display screens. *See Supra* Section III. As discussed above, the claims, specification, and figures of the ’815 Patent explicitly establish that the second interface is distinct from the first interface and appears on a new screen. For instance, *see* Ex. 1001 at 6:19-41 and Figures 4-7.

273. In particular, a POSITA, when reading claims 16 and 21 in their entirety, would understand that the second interface refers to a new screen separate from the first user interface. This new screen displays user-specific information, as further evidenced by the claims' requirement that the second interface includes a character identifying the user associated with the selected user profile:

the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first

group of video information and indicating an identity of the user of the first user profile.

Ex. 1001 at Claims 16 and 21 (limitations (21f) and (16f)).

274. Additionally, in my opinion, a POSITA would interpret this claim limitation to mean that the second interface must be a new screen because the characters identifying the user profile are already present in the first interface. The only logical purpose for requiring these identifying characters in the second interface is that it operates as a new screen distinct from the first, which does not carry over the information from the first interface.

275. Even if we were to assume, *arguendo*, that Kaplan's menu display discloses the second interface—which it does not—the Kaplan-Bryant combination still fails to satisfy the claim limitation requiring “displaying, in response to the selection, a second user interface for a user to select desired video information to be reproduced from among the first video information,” as specified in claim element 16[e]. Dr. Bederson provides no explanation how “in response to selection” the second user interface is displayed. Dr. Bederson does not disclose first and second interface and simply points to some blue or red areas on a menu display. Ex. 1003, ¶379.

276. Regarding the limitation “the second user interface being associated with the first user profile and displaying the first character, the first character associated with a first group of video information and indicating an identity of the

user of the first user profile” as required by claim element 16[f], Dr. Bederson’s arguments are fundamentally flawed.

277. Dr. Bederson merely points to folder names such as “Favorites” or “History” as examples of the first and second characters. This interpretation is nonsensical and unsupported by the claim language. The claim explicitly requires that the first and second characters are associated with user profiles and identify a user. Folder names like “Favorites” or “History” do not represent user profiles and cannot serve as identifiers for a user, as required by the claim.

278. To address this clear deficiency, Dr. Bederson attempts to rely on Wong. However, this argument fails for two key reasons. First, Wong is not prior art. Second, Dr. Bederson fails to explain how Wong would be integrated into the Kaplan-Bryant system to satisfy the claim limitation. Dr. Bederson provides no technical details or rationale for how the combination of Kaplan-Bryant and Wong would achieve the claimed functionality of associating characters with user profiles and using them to indicate a user’s identity.

279. In short, Dr. Bederson’s reliance on folder names as user identifiers is baseless, and its attempt to use Wong to fill these gaps is both procedurally and substantively deficient. Dr. Bederson fails to meet the burden of showing that the Kaplan-Bryant system, alone or in combination with Wong, discloses or renders obvious the limitation required by claim element 16[f].

5. The Combination of Kaplan, Bryant, Wong, and Candelore Fails to Disclose Limitation 16[i], 16[j], 16[k], 16[l], 21[i], 21[j], and 21[k]

280. Petitioner and Dr. Bederson have failed to show that the combination of Kaplan and Bryant discloses “removing the one video information from the first group of video information, wherein, upon the one video information being removed from the first group of video information, the one video information continues to be included in the second group of video information for the second user profile and the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected” as required by claim elements 16[k] and 21[k] of the '815 Patent.⁵

281. Dr. Bederson fails to show that Kaplan in combination with Bryant discloses claim element 16[i] and 21[i]: “the first group of video information and the second group of video information including one video information that is the same.”

282. As a threshold issue, Dr. Bederson appears to misunderstand the limitations of claim 16. The claim explicitly requires that the first group of video information, associated with the first user profile (claim element 16[f]), and the second group of video information, associated with the second user profile (claim element 16[h]), include one video that is the same. However, Dr. Bederson relies on

⁵ Petitioner provides absolutely no analysis for Claim element 21[j]. *See* Pet. at 96.

Kaplan's Favorites and History folders rather than user profiles. Ex. 1003, ¶380. Favorites and History folders, as disclosed by Kaplan, are not equivalent to user profiles as required by the claims.

283. For limitations 16[j], 16[k], and 21[k] Dr. Bederson cites to paragraphs 89-106 (over three columns), and figures 9A-9C of Kaplan without explanation. Ex. 1003, ¶¶388-396. It is not the Board's job to cobble together assertions from different sections of a petition or citations of various exhibits in order to infer every possible permutation of a petitioner's and Dr. Bederson's arguments, but that is what the Dr. Bederson asks the Board and Patent Owner to do here. The result of Dr. Bederson's mix-and-match approach to combining Kaplan, Bryant, Wong, and Candelore along with the overly broad citations asks the Board and Patent Owner to interpret which elements from each reference a POSITA would choose to combine, which portions of each reference should be considered when, and what the combined teachings might suggest to a POSITA.

284. Specifically, Dr. Bederson fails to establish that the combination of Kaplan and Bryant discloses claim element 16[k]: "removing the one video information from the first group of video information ... the one video information continues to be included in the second group of video information for the second user profile." Instead, Dr. Bederson relies on Kaplan's file pointers in "Favorites"

and “History” folders for removal of content (Ex. 1003, ¶380), but fails to explain how Kaplan’s folders function across multiple user profiles.

285. Critically, Dr. Bederson does not identify any disclosure in Kaplan and Bryant showing that removing a video from the first group (associated with the first profile) results in the video remaining in the second group (associated with the second profile). Furthermore, Dr. Bederson provides no analysis of the final portion of element 16[k], which requires that “the second group of thumbnails continues to display a thumbnail corresponding to the one video information when the second character is selected.”

286. Dr. Bederson remains silent on this aspect, likely because neither Kaplan nor Bryant discloses this limitation. Specifically, neither Kaplan nor Bryant explains how removing content from one user profile impacts other profiles or how video thumbnails are displayed across profiles after removal.

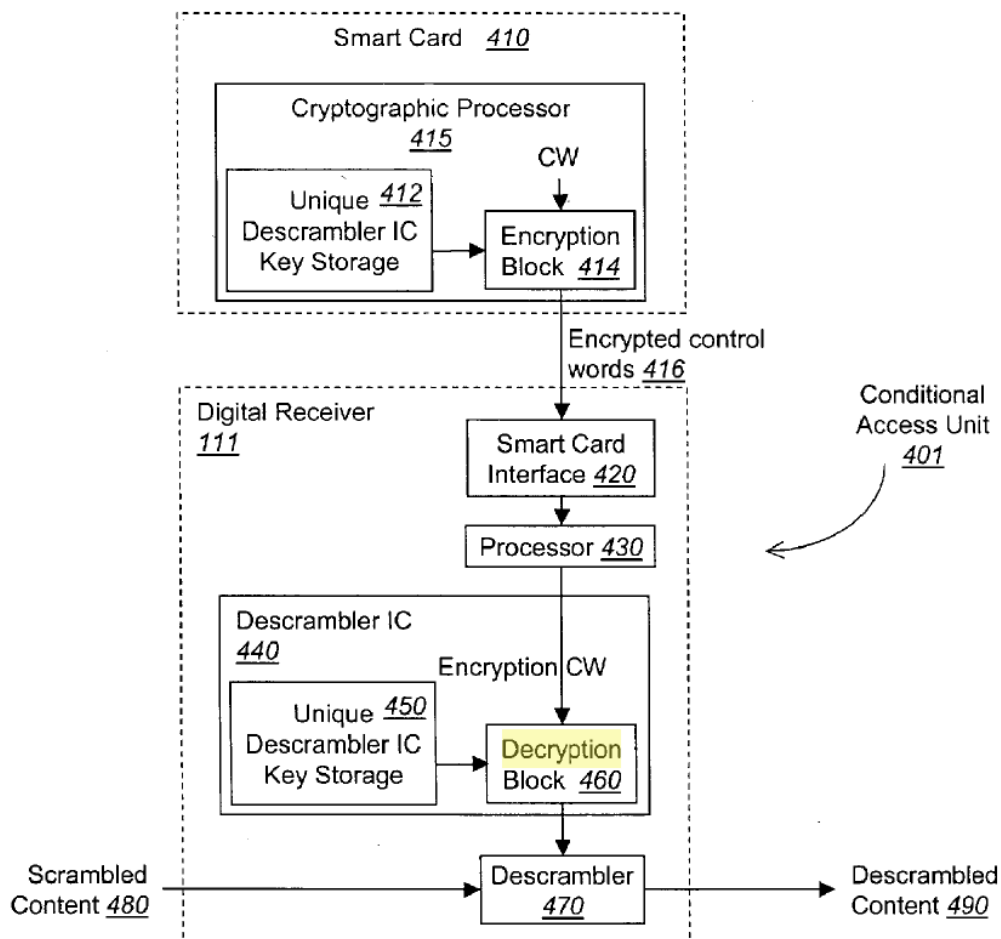
287. In sum, Dr. Bederson’s opinions are conclusory and unsupported. The combination of Kaplan, Bryant, Wong, and Candelore fails to satisfy the specific limitations of claim elements 16[i], 16[j], 16[k], 16[l], 21[i], 21[j], and 21[k], as required by the claims 16 and 21.

6. The Combination of Kaplan, Bryant, Wong, and Candelore Fails to Disclose Limitation 16[m], 21[l], and 21[m]

288. Petitioner and Dr. Bederson fails to show that Kaplan in combination with Bryan, Wong, and Candelore discloses claim element 16[m] and 21[l]:

“decrypting video information corresponding to the selected thumbnail; and displaying the decrypted video information.”

289. In particular, Kaplan and Bryant disclosures fall short by failing to provide decryption of video information and displaying the decrypted video. Dr. Bederson attempts to bridge this gap by referencing features from Candelore. However, Candelore discloses a very specific hardware to decrypt the video content in a set-top box that a POSITA would not have found obvious to include in the Kaplan-Bryant system as Dr. Bederson suggests:



290. In my opinion, a POSITA would not have a reasonable expectation of success in the combination because decryption in Candelore is performed by an “embedded” IC—an embedded IC that is required to co-work with a “smart card” to perform the decryption—that a POSITA simply cannot pick and put in another system. Dr. Bederson Specifically, Kaplan-Bryant does not suggest any benefit to such a combination, and without a clear teaching or motivation, Dr. Bederson’s argument is based purely on hindsight.

291. In particular, Dr. Bederson’s proposed combination would require modifying Kaplan-Bryant’s architecture in a way that is fundamentally incompatible with Candelore’s embedded IC decryption process. A POSITA would recognize that such modifications would render the original system inoperable or significantly alter its intended function, making the combination impractical and non-obvious.

292. Even assuming a POSITA was motivated to make the proposed modification, there is no reasonable expectation of success. Candelore’s decryption relies on a dedicated embedded IC that must interface with a smart card—something that cannot simply be transferred to Horn-Baumgartner’s architecture without a complete redesign. Dr. Bederson fails to provide any evidence that such an integration was feasible or even contemplated by a POSITA at the time of the invention.

293. Furthermore, Dr. Bederson ignores the reality that Candelore's embedded IC cannot simply be abstractly combined with Horn-Baumgartner. The prior art does not teach any method for making this integration work, nor does Dr. Bederson provide any technical rationale for overcoming the clear incompatibilities. A POSITA would recognize that this is not an obvious combination but an impractical and speculative one.

294. In my opinion, a POSITA would not have a reasonable expectation of success in the combination because decryption in Candelore is performed by an "embedded" IC—an embedded IC that is required to co-work with a "smart card" to perform the decryption—that a POSITA simply cannot pick and put in another system. In particular, the Kaplan-Bryant hardware may not even be modifiable to add additional circuitry.

7. The Combination of Kaplan, Bryant, Wong, and Candelore Fails to Disclose Claims 18 and 24

295. Dr. Bederson fails to show that Kaplan in combination with Bryant, Wong, and Candelore discloses claims 18 and 24: "generating a list of video information based on preferences of a user determined by a user selection of thumbnails from the first or second group of thumbnails."

296. Dr. Bederson relies on Kaplan's disclosure of "History" group. Ex. 1003, ¶398. However, this falls short of satisfying the specific requirements of claim 18 of the '815 Patent, which explicitly calls for the system to generate a video list—

specifically, a recommendation list—based on user preferences determined through their selection of video information.

297. As discussed above in Section III.C, “generating a list of video information based on preferences of a user” refers to generating a **recommendation video list**.

298. Kaplan, on the other hand, does not disclose generating a recommendation video list based on user preferences. Instead, Kaplan describes a system that merely organizes information for a user based on prior access of those object by the user. Ex. 1003, ¶398.

299. This categorization of information into a history list is fundamentally different from a system that generates a recommendation video list based on user selections of video thumbnails. Kaplan’s disclosure merely allows users to organize objects according to prior access grouping; it does not involve the dynamic generation of a recommendation list based on user behavior or thumbnail selections, as required by claims 18 and 24.

300. In summary, Dr. Bederson’s reliance on Kaplan does not establish that the combination with Bryant, Wong, and Candelore satisfies the limitations of claims 18 and 24. The cited disclosures fail to demonstrate the required functionality of generating a recommendation video list based on user selections of video thumbnails, as claimed in the ’815 Patent.

301. For the reasons expressed above, Dr. Bederson and the Petitioner has failed to show that any of Grounds 1-10 render claims 1-27 unpatentable by a preponderance of the evidence.

IX. RESERVATION OF RIGHTS

302. In addition to the opinions and evidence expressed herein, I reserve the right to rebut any arguments made or evidence presented in response to this report. I also reserve the right to supplement this report based on further investigation or analysis.

APPENDIX A

Ravin Balakrishnan

Curriculum Vitae

Contact information

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Education

Ph.D. Computer Science, University of Toronto, Canada. Feb 2001.
Thesis: "Issues in Bimanual Interaction for Computer Graphics."
Advisor: Prof. Bill Buxton
Advisory Committee: Prof. Mark Chignell, Prof. Eugene Fiume, Prof. Scott MacKenzie

M.Sc. Computer Science, University of Toronto, Canada. Jan 1997.
Thesis: "The Evolution and Evaluation of a 3D Input Device."
Advisor: Prof. Bill Buxton

B.Sc. (1st Class Honours), Computer Science, University of New Brunswick, Canada. May 1993.

Employment

Professor (tenured), Department of Computer Science, University of Toronto, 2011 – present.
Canada Research Chair (CRC-Tier II) in Human-Centred Interfaces, Department of Computer Science, University of Toronto, March 2006 – 2016.

Chair, Department of Computer Science, University of Toronto, 2015 – 2019.

Associate Professor (tenured), Department of Computer Science, University of Toronto, 2006- 2011.
Canada Research Chair (CRC-Tier II) in Human-Centred Interfaces, Department of Computer Science, University of Toronto, March 2006 – 2016.

Associate Chair, Research and Industrial Relations, Department of Computer Science, University of Toronto. July 1, 2008 – June 30, 2010.

Assistant Professor (tenure-track), Department of Computer Science, University of Toronto, 2001 –2006. Appointed as Full Member of the Graduate Faculty in 2001.

Researcher, User Interface Research Group, Alias|wavefront (now Autodesk), Aug 1996 – July 2001.
Conducted basic and applied research on interfaces for interactive 3D graphics, alternate multi degree-of-freedom input devices, two-handed input, haptic feedback interfaces, tablet based input, and large scale displays. Some of the ideas and interaction techniques developed in this research have been incorporated into Alias|wavefront's market leading software products for 3D design, modeling, and animation.

Instructor, Dept. of Computer Science, University of Toronto, May 1995 – Aug 2000, on a per course basis.
Lectured and took complete responsibility, including managing several teaching assistants, for various undergraduate courses (listed in section entitled "Teaching" below).

Teaching Assistant, Dept. of Computer Science, University of Toronto. Sep 1993 - Dec 1996.
Conducted tutorials and marked assignments, tests, and exams for various courses (listed in section entitled "Teaching" below).

Research Assistant, Human Computer Interaction Laboratory, University of New Brunswick, May - Sept 1993.
Worked with Prof. Colin Ware on empirical research into the effects of lag in fishtank virtual reality environments. Also helped design, build, and evaluate a haptic feedback input/output device.

Programmer Analyst, Indigo Software Ltd, Ottawa, Canada. Sep - Dec 1990, May - Aug 1991, Jan - May 1992.

Visiting and consulting researcher activities

Visiting professor, INRIA, Lille, France. Aug 2024 – Aug 2025.

Visiting researcher, HPLabs Bangalore, India. Feb 2009.

Visiting researcher, Microsoft Research - Redmond, Beijing, Bangalore and Cambridge labs. July 2007 – June 2008.

Visiting professor, Laboratoire de Recherche en Informatique (LRI), Université Paris-Sud. France. June-July, 2006

Visiting researcher, Mitsubishi Electric Research Lab (MERL), Cambridge, MA, USA. Feb 2005 – Mar 2007.

Expert witness and litigation consulting

(Note: confidential retentions or retentions where no work has been to date are not listed here)

Number of depositions: ~46

Number of times testified at trials and hearings: ~22

Expert witness for Twitch Interactive Inc through Perkins Coie LLP. Plaintiff: RazDog Holdings LLC. Case No. 3:24-CV-3638, N.D. Cal. 2024 – ongoing.

Expert witness for Figma through Allen & Gledhill LLP Singapore. Defendant: Motiff. 2024 – ongoing.

Expert witness for Apple through Haynes and Boone LLP in an IPR. 2024 – ongoing

Expert witness for Apple through GoldmanIsmail LLP. Plaintiff: S.M.R. Innovations and Y.M.R. Tech. 2024 – ongoing

Expert witness for Maxell Ltd. through Mayer Brown LLP. Defendant: LG. Maxell Ltd v. LG Electronics. Case No: 6:23-cv-00479-ADA, Western District of Texas. 2024 – ongoing.

Expert witness for Keyless Licensing through KramerAlberti. Defendant: Samsung. Keyless Licensing LLC v. Samsung Electronics America Inc. et al. Case No. 2:24-cv-00464-JRG. 2024 – ongoing.

Expert witness for ClearCorrect through Wilmer Hale. Plaintiff: Align Technology. Align Technology Inc. v. ClearCorrect Operating LLC et al., WDTX-6:24-CV-00187-ADA-DTG. 2024 – ongoing.

Expert witness for Microsoft through Sidley Austin LLP. Plaintiff: Haptix Solutions LLC. Case No. 8:24-cv-00428-JWH-JDE (C.D. California). 2024. Did some preliminary work. Case Settled.

Expert witness for Apple through Morrison Foerster LLP. Plaintiff: NL Giken Inc. Case No. 1:24-cv-00013-MN om the US District Court for the District of Delaware. 2024. Did some preliminary work. Case settled.

Expert witness for Maxell Ltd. through Mayer Brown LLP. Defendant: Samsung. Maxell v. Samsung Case No. 5:23-cv-00092-RWS, in the Eastern District of Texas, Texarkana Division. Also in IPR proceedings. 2024 – ongoing. Two reports. One deposition.

Expert witness for Lenovo Inc. through DLA Piper LLP. Defendant: ASUSTeK Computer, Inc. Case No. 5:23-cv-05892, filed in the Northern District of California, and ITC 337-TA-3708. 2024. Two reports. One deposition.

Expert witness for Apple, Inc. through Desmarais LLP. Defendant: Masimo Corporation. C.A. Nos. 22-1377 and 22-1378 in the US District Court for the District of Delaware. 2023 – ongoing. One report.

Expert witness for Niantic, Inc., through Cooley LLP. Plaintiff: NantWorks. Case No. 20-cv-06262-LB in the US District Court for the Northern District of California. 2022 – 2024. One report. One deposition. Case terminated on summary judgement in Niantic's favor.

Expert witness for Broadband iTV Inc. through Kramer Day. Defendant: Comcast, Charter, Altice. ITC Investigation No 337-1315. 2022-2023. Did some preliminary infringement analysis. Case terminated.

Expert witness for MyPort Inc. initially through One LLP then Skiermont Derby LLP. Defendant: Samsung. Case No. 2:22-cv-00114 in the US District Court for the Eastern District of Texas Marshall Division. 2022 – 2024. One report, one deposition. Case settled in 2024.

Expert witness for Consumeron LLC through Kramer Levin. Defendant: Maplegear, Inc., d/b/a/ Instacart. Case no: 1:21-cv-01147-VAC-MPT (Del). 2022 – 2023. One report, one deposition.

Expert witness for Fujifilm through Baker Botts. Defendant: Butterfly Network. Case 1:22-cv-00309-UNA (Del). 2022 – 2023. Did some preliminary work, case settled.

Expert witness for Blue Yonder Group Inc. through Cravath and then through McKool Smith. Defendant: Kinaxis. US District Court for the Northern District of Texas. Civil Action No. 3:20-cv-3636-K. 2021 – 2024. Three reports. One deposition. Case settled.

Expert witness for G Holdings through Hall Booth Smith. Defendant: Samsung. US District Court for the Eastern District of Texas Marshall Division. Civil Action No. 2:20-cv-342. 2021. One report. Case settled.

Expert witness for MLB Advanced Media through Goldman Ismail LLP. Plaintiff: Sportvision, Inc. Case No. 18-cv-03025, in the United States District Court for the Southern District of New York. 2021 – ongoing. One report.

Expert witness for Spacetime3D through Susman Godfrey. Defendant: LG Electronics. Case No. 2:22-cv-00049 (E.D. Tex.). 2022 – 2023. Did some preliminary work. Case settled.

Expert witness for Polaris PowerLED Technologies Ltd., through Kramer Day. Defendants: Nintendo. Case No. 2:22-cv-00386: 2022 -- 2023. One report.

Expert witness for Dropbox and Box through Cooley LLP in an IPR. Two reports, two depositions. 2022-2024.

Expert witness for Roku through Dickinson-Wright in an IPR Case No. IPR2022-00818. 2022. Two reports. One deposition.

Expert witness for Roku through Dickinson-Wright. Defendant: UEI. ITC Investigation No. 337-TA-1264. 2021 – 2022. Several reports. One deposition. Testified at trial.

Expert witness for Roku through Dickinson-Wright. Plaintiff: UEI. ITC Investigation No. 337-TA-1200. 2020 – 2021. Several reports. One deposition. Testified at trial.

Expert witness for Dell through Alston Bird. Plaintiff: Neodron. Case No. 1-cv-003182020. 2020. One report. Case settled.

Expert witness for Content Square SAS v. Medallia Inc. through Cooley then Troutman Pepper. IPR IPR2022-00152. 2021. One report.

Expert witness for Apple through Morrison Foerster. Plaintiff: MemoryWeb LLC. Case No. 6:21-cv-521-ADA. 2021-2022. Did some preliminary work. Case settled.

Expert witness for Spacetime3D through Susman Godfrey. Defendant: Samsung. Case 2:19-cv-00372-JRG in the U.S. District Court for the Eastern District of Texas. 2020 – 2021. Several reports. One deposition. Case settled.

Expert witness for Supercell Oy through Fenwick and West. Defendant: Gree. IPR Proceeding. 2020. Several reports.

Expert consultant for Abbott Labs UK through Taylor Wessing LLP. 2020-2021.

Expert witness for Kannuu through Progress LLP in an IPR proceedings (IPR2020-00736, -00737, -00738, -00739, -00740). Plaintiff: Samsung. 2020 – 2021. Several reports. One deposition.

Expert witness for Facebook through Cooley LLP. Plaintiff: Mirror Worlds Technologies. Case No. 1:17-cv-03473-JGK in the U.S. District Court in the Southern District of New York. 2020 – 2021. One report. One deposition.

Expert witness for Facebook through Cooley LLP. Plaintiff: Blackberry. Case No. 18-cv-1844 (C.D. Cal.). Several reports. One deposition. Case stayed in 2020 pending IPRs.

Expert witness for Bumble through Cooley LLP. Plaintiff: KinectUs LLC. Case No: 6-20-cv-00942-ADA, Western District of Texas. 2021. One report. Case settled.

Expert witness for Bumble through Cooley LLP. Plaintiff: Match. Case No: 6:18-cv-00080-ADA, Western District of Texas. 2020. One report. One deposition. Case settled.

Expert witness for Polaris PowerLED Technologies Ltd., through Feinberg Day. Defendants: Vizio. In the US District Court for the Central District of California, Civil Action No: 8-18-cv-01571-JVS-DFM. 2019 – 2020. Several reports.

Expert witness for NexStep Inc. through Kramer Levin LLP. Defendant: Comcast. Case C.A. No. 19-1031 (RGA)(SRF) in the U.S. District Courts for the State of Delaware. Judge: Hon. Richard Andrews. 2019 – 2021. One report. One deposition. Testified at trial.

Expert witness for iTools Media Inc., through Gilberts LLP. Plaintiffs: Caps Group Inc., and CASLCure Inc. Court File No T-1543-17. 2019. One report. Case settled.

Expert witness for Polaris PowerLED Technologies Ltd., through Dentons and Feinberg Day. Defendants: Samsung. No. 2-17-cv-00715-JRG, in the U.S. District Court for the Eastern District of Texas. 2018 – 2019. Several reports. One deposition. Case settled.

Expert witness for Immersion Corp, through Morrison and Foerster. Defendants: Motorola Mobility and Samsung. Case No. 1:17-cv-01081-RGA District of Delaware, Civil Action No 2:17-cv-572-JRG, Eastern District of Texas. 2017 – 2019. Several reports. Two depositions. Cases settled in 2019.

Expert witness for Immersion Corp. through McKool Smith. IPR2018-00588. 2018. One report.

Expert witness for 3Shape Inc. through Buchanan Ingersoll & Rooney. Plaintiff: Align Technology, Inc. IPR proceedings IPR2018-00197, IPR2018-00198. One report. One deposition. 2018 – 2019.

Expert witness for Rovi Corp, through Gilberts LLP then Lenczner Slaght. Plaintiffs, Videotron, Bell, Telus. 2017 – 2020. Several reports. Testified at trial. Federal Court of Canada.

Expert witness for Phillips, through Fitzpatrick, Cella, Harper and Scinto. Plaintiff: HTC corp. IPR proceedings IPR2017-00857. One report. 2017 – 2018.

Expert witness for Rovi Corp, through Ropes and Gray. Plaintiff: Comcast Corp. IPR proceedings for several patents. 2017 – 2018. Several reports, two depositions.

Expert witness for Rovi Guides Inc. through McKool Smith. Plaintiff: Comcast Corp. in Rovi Guides Inc., et al. v. Comcast Corp., et al., No. 2:16-cv-321 (EDTX); Rovi Guides Inc. v. Comcast Corp., et al., No. 2:16-cv-322 (EDTX); Certain Digital Video Receivers and Hardware and Software Components Thereof, Inv. No. 337-TA-1001,

TA-3135 (ITC); Comcast Corp., et al. v. Rovi Corp., et al., No. 1:16-cv-03852 (SDNY). 2016 – 2020. Several reports. Three depositions. Testified at two ITC trials.

Expert witness for Oculus and Palmer Luckey through Cooley, LLP, at the US District Court for the Northern District of California. Plaintiff: Total Recall Technologies. Case No. 3:2015cv02281. 2016 – 2021. Judge: Hon. William Alsup. One report. One deposition. Attended trial and prepared to testify, but ultimately was not called to testify.

Expert witness for Nuance Communications through Weil Gotshal and Manges LLP, in an IPR proceeding at the US Patent Office. 2016. Draft report prepared. Case terminated.

Expert witness for Oculus, Facebook and Palmer Luckey through Cooley, LLP. Plaintiff: ZeniMax Media Inc. and ID Software LLC. Case No. 3:14-cv-01849-P (N.D. Texas). 2015-2016. Several reports. One deposition. Testified at trial.

Expert consultant for ZTE through Upshaw PLLC. 2015. Did some preliminary prior art research.

Expert witness for Mojo Media Inc. through Morrison Foerster LLP, in a patent interference action. Interference No. 106,005, Mojo Media, Inc. v. Snapchat, Inc. 2014 – 2015. Prepared several reports. Case terminated in 2015.

Expert witness for Queens University and PARTEQ Research and Development Innovations (plaintiff) through Susman Godfrey LLP, and Sterne, Kessler, Goldstein & Fox in a patent infringement action at the US District Court for the Eastern District of Texas and an IPR proceedings at the US Patent office. Case: 2:14-cv-53. Defendant: Samsung. 2014-2016. Prepared several reports. Two depositions.

Expert witness for Greenwood Publishing Group, Inc. d/b/a Heinemann (defendant) through Wilmer Hale in a patent infringement action at the US District Court for the Southern District of New York. Case: 1:13-cv-02687-LTS-RLE. Plaintiff: Amplify Education Inc. 2014. Prepared one declaration on claim construction. Case settled in 2014.

Expert witness for Microsoft (defendant) through Sidley Austin LLP, in a patent infringement action at the US District Court for the District of Maine. Case: 2:12-cv-333-DBH. Plaintiff: SurfCast Inc. 2013 – 2014. Several reports. One deposition.

Expert witness for VMware (defendant) through Morrison Foerster, LLP, in a patent infringement action at the US District Court for the District of Delaware. Case: 13-cv-116. Plaintiff: UbiComm LLC. 2013. Several reports.

Expert witness for Hockeyline Inc. (plaintiff) through Freitas Tseng & Kaufmann LLP, in a patent infringement action at the US District Court for the Southern District of New York. Case: 1:13-cv-01446-CM. Defendant: STATS LLC. 2013 – 2015. One report. Case terminated in 2015.

Expert witness for Pixcir Microelectronics (defendant) through Nixon Peabody LLP, in a patent infringement action at the US District Court for the District of Nevada. Case: 2:10-cv-00014-GMN-PAL. Plaintiff: Elan Microelectronics. 2013. One report. Case settled in 2013.

Expert witness for Nuance (complainant) through Weil, Gotshal & Manges, LLP, in a patent infringement action at the ITC. Investigation No. 337-TA-785. Respondent: Cootek. Several reports. One deposition. Case settled in 2013.

Expert witness for Immersion (complainant) through Morrison Foerster, LLP, in a patent infringement action at the ITC, Investigation No: 337-TA-834 and in the District Court for the District of Delaware. Respondent: HTC. 2012-2015. Several reports. Two depositions. ITC case terminated in 2012, District court case settled in 2015.

Expert witness for Apple (plaintiff) through Freehills in a patent infringement action in the Federal Courts of Australia. Defendant: Samsung. 2012-2013. Prepared several reports. Testified at trial.

Expert witness for Apple (plaintiff) through Freshfields Bruckhaus Deringer in a patent infringement action in the United Kingdom. Defendant: HTC. 2012. Several reports. Case settled in Nov 2012.

Expert witness for Apple (plaintiff) through Freshfields Bruckhaus Deringer in a patent infringement action in the Netherlands. Defendant: Samsung. Prepared one declaration and attended injunction hearing.

Expert witness for Apple (plaintiff) through Gibson Dunn, LLP, in a patent infringement action at the US District Court for the Northern District of California. Defendant: Samsung. Case No. 12-cv-00630-LHK. 2012. Judge: Hon. Lucy Koh. One report. One deposition.

Expert witness for Apple (complainant) through Feinberg Day, LLP, in a patent infringement action at the ITC. Respondent: HTC. Investigation No. 337-TA- 797. 2011-2012. ALJ: Hon. E. James Gildea. Several expert reports. One deposition. Testified at trial.

Expert witness for Apple (defendant) through O'Melveny & Myers, LLP, in a patent infringement action at the US District Court for the District of Delaware. Plaintiff: MobileMedia Ideas LLC. Case No: 10-258-SLR. 2011-2016. Judge: Hon. Sue Robinson. Several reports. Two depositions. Testified at two trials.

Expert witness for Apple (respondent) through Wilmer Hale, LLP, in a patent infringement action at the ITC. Complainant: Samsung. Investigation No. 337-TA- 794. 2011-2012. ALJ: Hon. E. James Gildea. Several reports. One deposition. Testified at trial.

Expert consultant for Apple through Wilmer Hale LLP. Plaintiff: Nokia. Case No 09-791-GMS in the US District Court for the District of Delaware. 2011. Did some preliminary work.

Expert witness for Apple (plaintiff) through Morrison & Foerster, LLP, in a patent infringement action at the US District Court for the Northern District of California. Defendant: Samsung. Case No. 11-cv-01846 LHK. 2011-2013. Judge: Hon. Lucy Koh. Several reports. Multiple depositions. Testified at technology tutorial and three trials.

Expert witness for Apple (complainant) through Morrison & Foerster, LLP, in a patent infringement action at the ITC. Respondent: Samsung. Investigation No. 337-TA- 796. 2011-2012. ALJ: Hon. Thomas Pender. Several reports. One deposition. Testified at technology tutorial and at trial.

Expert witness for Apple (complainant) through Weil, Gotshal & Manges, LLP, in a patent infringement action at the ITC. Respondent: Motorola. Investigation No. 337-TA- 750. 2011. ALJ: Hon. Theodore Essex. Several reports. One deposition. Testified at trial.

Expert witness for Apple (defendant) through Weil, Gotshal & Manges, LLP, in a patent infringement action in the US District Court for the Northern District of California. Plaintiff: Elan Microelectronics. Case No. 5:09-cv-01531-RS (N.D. Cal) 2010-2012. Judge: Hon. Richard Seeborg. Several declarations. Case settled in 2012.

Expert witness for Apple (respondent) through Weil, Gotshal & Manges, LLP, in a patent infringement action at the ITC. Complainant: Elan Microelectronics. Investigation No. 337-TA-714. 2010-2011. CALJ: Hon. Paul Luckern. Several reports. Two depositions. Testified at Markman hearing and at trial.

Expert witness for Nintendo (respondent) through Covington and Burling, LLP, in a patent infringement action at the ITC. Complainant: Hillcrest Laboratories. Investigation No. 337-TA-658. 2008-2009. CALJ: Hon. Paul Luckern. Several reports. Two depositions. Testified at trial.

Entrepreneurial Activities

Co-founder, Conceptualiz www.conceptualiz.com. Developing surgical planning technology.

Co-founder, FindSpace (formerly Arcestra, and Sketch2 Corp). Acquired by Cougar Group in 2021. Developed software for designing 3D building interior layouts. The concept grew out of research conducted in my lab with my colleague Prof. Karan Singh and graduate students Steven Tsang and Abhishek Ranjan.

Co-founder, Bump Technologies Inc. www.bumptop.com. Acquired by Google in May, 2010. Developed a physically realistic desktop user interface system, which grew out of research conducted in my lab with graduate student Anand Agarawala.

Awards, fellowships, scholarships

Canadian Human Computer Communications Society Achievement Award, 2020

Dean's Excellence Award, Faculty of Arts and Science, University of Toronto. 2016.

10-year impact award at the ACM Interactive Tabletops and Surfaces conference 2016 for paper published in 2006.

Two best paper honorable mention awards at the ACM CHI 2016 Conference on Human Factors in Computing Systems.

Best paper honorable mention award at the ACM CHI 2013 Conference on Human Factors in Computing Systems.

Elected to the ACM CHI Academy in 2011.

Dean's Excellence Award, Faculty of Arts and Science, University of Toronto. 2010.

Best paper award at the ACM CHI 2010 Conference on Human Factors in Computing Systems.

Best paper honorable mention award at the ACM CSCW 2010 Conference on Computer Supported Cooperative Work.

Dean's Excellence Award, Faculty of Arts and Science, University of Toronto. 2009.

Best paper honorable mention award at the ACM CHI 2009 Conference on Human Factors in Computing Systems.

Dean's Excellence Award, Faculty of Arts and Science, University of Toronto. 2008.

Best paper honorable mention award at the ACM CHI 2008 Conference on Human Factors in Computing Systems.

Alfred P. Sloan Research Fellowship. 2007-2009. US\$45,000.

Dean's Excellence Award, Faculty of Arts and Science, University of Toronto. 2007.

Canada Research Chair (CRC-Tier II) in Human-Centred Interfaces, University of Toronto, March 2006 – 2016.

Dean's Excellence Award, Faculty of Arts and Science, University of Toronto. 2006.

Best paper honorable mention award at the ACM CSCW 2006 Conference on Computer Supported Cooperative Work.

Best student paper award at the ACM UIST 2006 Symposium on User Interface Software and Technology.

Best paper award at the Graphics Interface 2005 Conference.

Dean's Excellence Award, Faculty of Arts and Science, University of Toronto. 2005.

Best paper award at the ACM CHI 2005 Conference on Human Factors in Computing Systems.

Best paper award at the ACM UIST 2004 Symposium on User Interface Software and Technology.

Dean's Excellence Award, Faculty of Arts and Science, University of Toronto. 2004.

Ontario Premier's Research Excellence Award (PREA). 2003. \$100,000.

IBM Toronto Centre for Advanced Studies Faculty Fellow (2003-present).

Bell University Laboratories Associate Chair in Human Computer Interaction, U. of Toronto, Jan 2002 – 2006.

Ph.D. fellowship from Alias|wavefront, \$30,000 per annum plus travel/research expenses, Sep 1996 – July 2001.

University of Toronto, Dept. of Computer Science award for outstanding Teaching Assistant, 1994.

University of Toronto Open Fellowship, \$4500, Sep - Dec 1994 .

University of Toronto Connaught Scholarship, \$13,500 plus tuition fees, Sep 1993 - Aug 1994.

Harry Levine Award for outstanding graduating student in Computer Science, University of New Brunswick, 1993.
University of New Brunswick, Dept. of Computer Science Dean's List, 1990, 1991, 1992, 1993.

Research Grants

(Unless otherwise indicated, all figures are in Canadian dollars and I am the sole investigator/recipient of the following grants and awards)

“Subtle user interfaces.”

NSERC discovery grant DND supplement, 1 Jan 2018 – 31 Dec 2020, \$120,000.

“Subtle user interfaces.”

NSERC discovery grant, 1 April 2017 – 31 March 2023, \$204,000.

“User interfaces and visualization for variable format displays.”

NSERC discovery grant, 1 April 2012 – 31 March 2017, \$52,000 per year.

Network Investigator in the “GRAND Networks Centres of Excellence”. PI: Kellogg Booth. 2010-2013.

Sony Corporation Grant, 2012. \$42,000.

HPLabs India unrestricted gift. Jan 2010. US\$15,000.

“Going beyond the surface”.

Microsoft Research unrestricted gift. 1 July 2009. US\$100,000 + hardware donation valued at approximately US\$15,000.

“3-D visualization and gestural interaction with multimodal neurological data.”

NSERC Strategic Project Grants Supplemental Competition, 1 April 2008 – 31 March 2010, \$196,000 over 2 years (\$98,000 per year).

PI: Jeremy Cooperstock. Co-investigators: Ravin Balakrishnan, Tal Arbel, Louis Collins.

“Multi channel and multi degree-of-freedom user interfaces for heterogeneous display environments.”

NSERC discovery accelerator supplement grant, 1 April 2007 – 31 March 2010, \$120,000 over 3 years (\$40,000 per year)

“Multi channel and multi degree-of-freedom user interfaces for heterogeneous display environments.”

NSERC discovery grant, 1 April 2007 – 31 March 2012, \$166,000 over 5 years (\$33,200 per year)

“Multi-Scale Environments”

INRIA "Equipes Associées" grant. 60,000 Euros over 3 years beginning Jan 2007.

PIs: Wendy Mackay and Ravin Balakrishnan

“3D Sketch Graphics Software Development Project”.

NSERC Idea to Innovation (I2I) Phase 2 grant. \$125,000 for one year, 2006.

PI: Karan Singh. Co-investigator: Ravin Balakrishnan

“Management, Access, and Visualization of Archived Meeting Transcripts”,

NSERC Collaborative Research and Development (CRD) grant. \$360,000 over 3 years beginning 1 Jan 2006.

PI: Charles Clarke. Co-investigators: Ravin Balakrishnan, Mark Chignell, Sharon Strauss.

“3D Sketch Graphics Software Development Project”.

NSERC Idea to Innovation (I2I) Phase 1 grant. \$125,000 for one year, 2005.

PI: Karan Singh. Co-investigator: Ravin Balakrishnan

“3D Sketching with a Suggestion Database”.

CITO Technical Readiness grant. \$25,000, for one year, 2005.

PI: Karan Singh. Co-investigator: Ravin Balakrishnan

“3D Sketching Software”

NSERC IPM grant. \$50,000, for one year, 2005.

PI: Karan Singh. Co-investigator: Ravin Balakrishnan

“Improved Medical Collaboration and Case Management: Capture, Structuring and Dissemination of Spoken Discussion”.

CITO research grant. \$280,000 over two years beginning 1 Sep 2004.

PI: Mark Chignell. Co-investigators: Ravin Balakrishnan, Charles Clarke, Sharon Strauss.

“Next Generation User Interfaces for Data Visualization”

NSERC strategic grant. \$263,800 over the period 1 Jan 2004 – 31 Dec 2006.

PI: Ravin Balakrishnan. Co-investigator: Karan Singh

“User Interfaces for Database Visualization”

CITO student internship program grant, \$15,000, 1 Jan – 31 Dec 2004.

“Network for Effective Collaboration Technologies through Advanced Research”

NSERC research network grant. \$5.5million over 5 years beginning Jan 2004.

PI: Ron Baecker. Co-investigators: Ravin Balakrishnan, Saul Greenberg, Carl Gutwin, Kellogg Booth, Sheelagh Carpendale, Kori Inkpen, Gerald Penn, Kostas Plataniotis, Elaine Toms, Roel Vertegaal.

“Memories of Synchronicity: Knowledge Management and Visualization of Interaction Transcripts in Innovative Collaboration Environments”

IBM-ARISE research grant. Sept 2003 – Aug 2006, \$450,000.

PI: Mark Chignell. Co-investigators: Ravin Balakrishnan, Charles Clarke.

“Mathematical Surface Representations for Conceptual Design”

Mathematics of Information Technology and Complex Systems (MITACS) grant.

Original award: May 2003 – Apr 2005, \$180,000.

Additional award: May 2005, \$180,000

PI: Karan Singh. Co-investigators: Ravin Balakrishnan, Eugene Fiume, Pierre Poulin, Michiel van de Panne, Richard Zhang.

“Tablet Interfaces”

Microsoft Research unrestricted gift. July 2003. US\$25,000 cash.

“Laboratory for human-computer interaction and computer graphics”

CFI New Opportunities Fund grant. 2003-2007. \$994,066. 40% CFI, 40% OIT, 20% from industrial partners

PI: Ravin Balakrishnan. Co-investigator: Karan Singh.

“Laboratory for human-computer interaction and computer graphics”

CFI Infrastructure Operating Fund grant. 2004-2006. \$132,000.

PI: Ravin Balakrishnan. Co-investigator: Karan Singh.

“User interfaces for 3D environments”

IBM Centre for Advanced Studies grant to support my Ph.D. student, Michael McGuffin. 1 Jan 2003 – 31 Dec 2005
\$102,000 cash + \$23,000 in-kind.

“Tilting text input for mobile devices.”

Microsoft Research unrestricted gift. 1 Jan 2003. US\$25,000 cash + hardware donation valued at approximately US\$5,000.

“User interfaces for volumetric displays.”

Connaught Fund matching grant, 1 April 2002 – 31 March 2003. \$30,000 (+\$15,000 from the department)

“Laboratory for large scale high resolution interaction, graphics and vision research.”

NSERC equipment grant, 1 April 2002 – 31 March 2003, \$96,792

PI: Ravin Balakrishnan. Co-investigators: Karan Singh, Kyros Kutulakos, Eugene Fiume

“Multi-channel and multi degree-of-freedom interaction with large displays.”

NSERC discovery grant, 1 April 2002 – 31 March 2007, \$140,000 over 5 years (\$28,000 per year)

“Techniques for multi-channel and multi degree-of-freedom interaction.”

Connaught startup grant, 1 July 2001 – 30 June 2003, \$10,000.

Bell University Laboratories startup funding, 1 July 2001 – 31 Dec 2003, \$60,000

Publications

Copies of the following papers and related videos are available online at www.dgp.toronto.edu/~ravin/#publications

A note on publication venues: in my primary area of research in Human Computer Interaction (HCI), the ACM Conference on Human Factors in Computing Systems (CHI) is considered one of the best forums for dissemination of research results and covers the broad spectrum of research in HCI. The ACM Symposium on User Interface Software and Technology (UIST), the ACM Conference on Computer Supported Cooperative Work (CSCW), and the European Conference on Computer Supported Cooperative Work (ECSCW) are also of similar quality, but are focused on particular sub-areas of the field. Papers in these conferences are refereed as full papers, and have an acceptance rate of around 15-25% each year. The top journals in the HCI field are the ACM Transactions on Computer-Human Interaction, the Human Computer Interaction journal, and the International Journal of Human Computer Studies. I also do research in the fields of Information Visualization and Information and Communication Technologies for Development (ICTD) where the IEEE Visualization Conference, IEEE Information Visualization Symposium, and the IEEE/ACM International Conference on Information and Communication Technologies for Development are the top publication venues with acceptance rates of around 20-30%.

Refereed journal papers

- J1. Jian Zhao, R. William Soukoreff, Ravin Balakrishnan. (2015). Exploring and modeling unimanual object manipulation on multi-touch displays. *IJHCS: International Journal of Human-Computer Studies*, 78(0). p. 68-80.
- J2. Jian Zhao, R. William Soukoreff, Xiangshi Ren, Ravin Balakrishnan. (2014). A model of scrolling on touch-sensitive displays. *IJHCS: International Journal of Human-Computer Studies*, 72(12). p. 805-821
- J3. Jian Zhao, Christopher Collins, Fanny Chevalier, Ravin Balakrishnan. (2013). Interactive exploration of implicit and explicit relations in faceted datasets. *IEEE Transactions on Visualization and Computer Graphics (Proceedings of VAST 2013)*. p. 2080-2089.
- J4. Xiaojun Bi, Seok-Hyung Bae, Ravin Balakrishnan. (2013). WallTop: Managing overflowing windows on a large display. *Human-Computer Interaction*, 29(2). p. 153-203.
- J5. Chun Yu, Ravin Balakrishnan, Ken Hinckley, Tomer Moscovich, Yuanchun Shi. (2013). Implicit bookmarking: Improving support for revisitation in within-document reading tasks. *International Journal of Human Computer Studies*, 71(3). p. 303-320.
- J6. Jian Zhao, Fanny Chevalier, Christopher Collins, Ravin Balakrishnan. (2012). Facilitating discourse analysis with interactive visualization. *IEEE Transactions on Visualization and Computer Graphics*. 18(12). p. 2639-2648.
- J7. Jian Zhao, Fanny Chevalier, Emmanuel Pietriga, Ravin Balakrishnan. (2011). Exploratory analysis of time-series with ChronoLenses. *IEEE Transactions on Visualization and Computer Graphics*. 17(12). p. 2422-2431
- J8. Daniel Vogel, Ravin Balakrishnan. (2010). Direct pen interaction with a conventional graphical user interface. *Human-Computer Interaction*, 25(4). p. 324 -388.
- J9. Jeremy Birnholtz, Abhishek Ranjan, Ravin Balakrishnan. (2010). Providing dynamic visual information for collaborative tasks: Experiments with automatic camera control. *Human-Computer Interaction*, 25(3). p. 261-287.
- J10. Jennifer Keelan, Vera Pavri, Ravin Balakrishnan, Kumanan Wilson. (2010). An analysis of the Human Papilloma Virus vaccine debate on MySpace blogs. *Vaccine*, 28(6). p. 1535-1540
- J11. Gery Casiez, Daniel Vogel, Ravin Balakrishnan, Andy Cockburn. (2008). The impact of control-display gain on user performance in pointing tasks. *Human-Computer Interaction*, 23(3). p. 215-250.

- J12. Michael McGuffin, Ravin Balakrishnan. (2005). Fitts' law and expanding targets: Experimental studies and designs for user interfaces. *ACM Transactions on Computer-Human Interaction*, 12(4). p. 388-422.
- J13. Tovi Grossman, Ravin Balakrishnan. (2005). A probabilistic approach to modeling two-dimensional pointing. *ACM Transactions on Computer-Human Interaction*, 12(3). p. 435-459.
- J14. Anastasia Bezerianos, Ravin Balakrishnan. (2005). Canvas portals: view and space management on large displays. *IEEE Computer Graphics and Applications* 25(4). p. 34-43.
- J15. Ravin Balakrishnan. (2004). "Beating" Fitts' law: Virtual enhancements for pointing facilitation. *International Journal of Human-Computer Studies*, 61(6). p. 857-874.
- J16. George W. Fitzmaurice, Azam Khan, William Buxton, Gordon Kurtenbach, Ravin Balakrishnan. (2003). Sentient data access via a diverse society of devices. *ACM Queue*, November 2003. p. 53-62.
- J17. Ravin Balakrishnan, George W. Fitzmaurice, Gordon Kurtenbach. (2001). User interfaces for volumetric displays. *IEEE Computer*, March 2001. p. 37-45.
- J18. William Buxton, George W. Fitzmaurice, Ravin Balakrishnan, Gordon Kurtenbach. (2000). Large displays in automotive design. *IEEE Computer Graphics and Applications*, July/August 2000. p. 68-75.
- J19. George W. Fitzmaurice, Ravin Balakrishnan, Gordon Kurtenbach. (1999). Sampling, synthesis, and input devices. *Communications of the ACM*, August 1999, 42(8). p. 54-63.
- J20. Colin Ware, Ravin Balakrishnan. (1994). Reaching for objects in VR displays: Lag and frame rate. *ACM Transactions on Computer-Human Interaction*, 1(4). p. 331-356.

Refereed conference full-length papers

- C1. Jiannan Li, Maurício Sousa, Karthik Mahadevan, Bryan Wang, Paula Akemi Aoyagui, Nicole Yu, Angela Yang, Ravin Balakrishnan, Anthony Tang, Tovi Grossman. (2023). Stargazer: An Interactive Camera Robot for Capturing How-To Videos Based on Subtle Instructor Cues. *Proceedings of CHI 2023 – the ACM Conference on Human Factors in Computing Systems*.
- C2. Jiannan Li, Maurício Sousa, Chu Li, Jessie Liu, Yan Chen, Ravin Balakrishnan, Tovi Grossman. (2022). Asteroids: Exploring Swarms of Mini-Telepresence Robots for Physical Skill Demonstration. *Proceedings of CHI 2022 – the ACM Conference on Human Factors in Computing Systems*.
- C3. Jiannan Li, Jiahe Lyu, Maurício Sousa, Ravin Balakrishnan, Anthony Tang, Tovi Grossman. (2021). Route Tapestries: Navigating 360° Virtual Tour Videos Using Slit-Scan Visualizations. *Proceedings of UIST 2021 – the ACM Symposium on User Interface Software and Technology*.
- C4. Jiannan Li, Ravin Balakrishnan, Tovi Grossman. (2020). StarHopper: A Touch Interface for Remote Object-Centric Drone Navigation *Proceedings of Graphics Interface 2020*.
- C5. Laura Di Chen, Ravin Balakrishnan, Tovi Grossman (2020). Disambiguation Techniques for Freehand Object Manipulations in Virtual Reality. *Proceedings of IEEE Conference on Virtual Reality and 3D User Interfaces*.
- C6. Di Chen, Dustin Freeman, Ravin Balakrishnan. (2019). Integrating Multimedia Tools to Enrich Interactions in Live Streaming for Language Learning. *Proceedings of CHI 2019 – the ACM Conference on Human Factors in Computing Systems*.
- C7. Aakar Gupta, Jiushan Yang, Ravin Balakrishnan. (2018). Asterisk and Obelisk: Motion Codes for Passive Tagging. *Proceedings of UIST 2018 – the ACM Symposium on User Interface Software and Technology*.
- C8. Teng Han, Jiannan Li, Khalad Hasan, Keisuke Nakamura, Randy Gomez, Ravin Balakrishnan, Pourang Irani. (2018). PageFlip: Leveraging page-flipping gestures for efficient command and value selection on smartwatches. *Proceedings of CHI 2018 – the ACM Conference on Human Factors in Computing Systems*.

- C9. Aakar Gupta, Antony Irudayaraj, Ravin Balakrishnan. (2017). HapticClench: Investigating squeeze sensations using memory alloys. *Proceedings of UIST 2017 – the ACM Symposium on User Interface Software and Technology*.
- C10. Aakar Gupta, Thomas Pietrzak, Cleon Yau, Nicolas Roussel, Ravin Balakrishnan. (2017). Summon and Select: Rapid interaction with interface controls in mid-air. *Proceedings of ISS 2017 – the ACM Conference on Interactive Surfaces and Spaces*.
- C11. Rorik Henrikson, Bruno De Araujo, Fanny Chevalier, Karan Singh, Ravin Balakrishnan. (2016). Multi-device storyboards for cinematic narratives in VR. *Proceedings of UIST 2016 – the ACM Symposium on User Interface Software and Technology*.
- C12. Aakar Gupta, Antony Irudayaraj, Vimal Chandran, Goutham Palaniappan, Khai Truong, Ravin Balakrishnan. (2016). Haptic learning of freehand semaphoric gesture shortcuts. *Proceedings of UIST 2016 – the ACM Symposium on User Interface Software and Technology*.
- C13. Aakar Gupta, Muhammed Anwar, Ravin Balakrishnan. (2016). Porous interfaces for small screen multitasking using finger identification. *Proceedings of UIST 2016 – the ACM Symposium on User Interface Software and Technology*.
- C14. Dustin Freeman, Ravin Balakrishnan. (2016). Improv Remix: Mixed-reality video manipulation using whole-body interaction to extend improvised theatre. *Proceedings of DIS 2016 – The ACM Conference on Designing Interactive Systems*.
- C15. Rorik Henrikson, Bruno De Araujo, Fanny Chevalier, Karan Singh, Ravin Balakrishnan. (2016) Storeoboard: Sketching stereoscopic storyboards. *Proceedings of CHI 2016 – the ACM Conference on Human Factors in Computing Systems*. p. 4587–4598
- C16. Aakar Gupta, Ravin Balakrishnan. (2016). DualKey: Miniature screen text entry via finger manipulation. *Proceedings of CHI 2016 – the ACM Conference on Human Factors in Computing Systems*. p. 59-70 [**ACM CHI 2016 Best Paper Honorable Mention Award**]
- C17. Aakar Gupta, Thomas Pietrzak, Nicolas Roussel, Ravin Balakrishnan. (2016). Direct manipulation in tactile displays. *Proceedings of CHI 2016 – the ACM Conference on Human Factors in Computing Systems*. p. 3683–3693. [**ACM CHI 2016 Best Paper Honorable Mention Award**]
- C18. Dustin Freeman, Stephanie Santosa, Fanny Chevalier, Ravin Balakrishnan, Karan Singh. (2013). LACES: Live authoring through compositing and editing of streaming video. *Proceedings of CHI 2014 – the ACM Conference on Human Factors in Computing Systems*. p. 1207-1216.
- C19. Jian Zhao, Daniel Wigdor, Ravin Balakrishnan. (2013). TrailMap: Facilitating information seeking in a multi-scale digital map via implicit bookmarking. *Proceedings of CHI 2013 – the ACM Conference on Human Factors in Computing Systems*. p. 3009-3018.
- C20. Sajad Shirali-Shahreza, Gerald Penn, Ravin Balakrishnan, Yashar Ganjali. (2013). SeeSay and HearSay CAPTCHAs for mobile interaction. *Proceedings of CHI 2013 – the ACM Conference on Human Factors in Computing Systems*. p. 2147-2156.
- C21. Stephanie Santosa, Fanny Chevalier, Ravin Balakrishnan, Karan Singh. (2013). Direct space-time trajectory control for visual media editing. *Proceedings of CHI 2013 – the ACM Conference on Human Factors in Computing Systems*. p. 1149-1158. [**ACM CHI 2013 Best Paper Honorable Mention Award**]
- C22. Mohit Jain, Ravin Balakrishnan. (2012). User learning and performance with bezel menus. *Proceedings of CHI 2012 – the ACM Conference on Human Factors in Computing Systems*. p. 2221-2230.

- C23. Aakar Gupta, William Thies, Edward Cutrell, Ravin Balakrishnan. (2012). mClerk: Enabling mobile crowdsourcing in developing regions. *Proceedings of CHI 2012 – the ACM Conference on Human Factors in Computing Systems*. p. 1843-1852.
- C24. Navkar Samdaria, Akhil Mathur, Ravin Balakrishnan. (2012). Paying in kind for crowdsourced work in developing regions. *Proceedings of the Pervasive 2012 Conference*. p. 343-360.
- C25. Dustin Freeman, Ravin Balakrishnan. (2011). Tangible actions. *Proceedings of ITS 2011 – the ACM International Conference on Interactive Tabletops and Surfaces*. p. 87-96.
- C26. Yannick Thiel, Karan Singh, Ravin Balakrishnan. (2011). Elasticurves: Exploiting stroke dynamics and inertia for the real-time neatening of sketched 2D curves. *Proceedings of UIST 2011 – the ACM Symposium on User Interface Software and Technology*. p. 383-392.
- C27. Sajad Shirali-Shahreza, Yashar Ganjali, Ravin Balakrishnan. (2011). Verifying human users in speech-based interactions. *Proceedings of the Annual Conference of the International Speech Communication Association (INTERSPEECH)*. p. 1585-1588.
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11. Clifton Forlines, Ravin Balakrishnan. (2009). Method and system for switching between absolute and relative pointing with direct input devices. *United States Patent # 7640518*.

12. Clifton Forlines, Ravin Balakrishnan. (2009). Method for stabilizing and precisely locating pointers generated by handheld direct pointing devices. *United States Patent #7486274*.
13. Ravin Balakrishnan, George Fitzmaurice, Gordon Kurtenbach. (2008). Techniques for pointing to locations within a volumetric display. *United States Patent # 7324085, 7,528,823*
14. Ravin Balakrishnan, George Fitzmaurice, Gordon Kurtenbach, Karan Singh. (2008). System for creating and modifying curves and surfaces. *United States Patent #7289121*
15. George Fitzmaurice, Ravin Balakrishnan, Gordon Kurtenbach. (2007). Graphical user interface widgets viewable and readable from multiple viewpoints in a volumetric display. *United States Patent #7205991*
16. Ravin Balakrishnan, Gordon Kurtenbach, George Fitzmaurice. (2006). System for physical rotation of volumetric display enclosures to facilitate viewing. *United States Patent #7138997*
17. Ravin Balakrishnan, Gordon Kurtenbach. (2005). A system for dynamically mapping input device movement as a user's viewpoint changes. *United States Patent # 6981229, 7,640,515*
18. Gordon Kurtenbach, George Fitzmaurice, Ravin Balakrishnan. (2004). Three dimensional volumetric display input and output configurations. *United States Patent #6753847, 7,583,252*
19. Ravin Balakrishnan, William Buxton, George W. Fitzmaurice, Gordon Kurtenbach. (2003). Digital tape drawing system. *United States Patent #6642927, 7,102,642*
20. Ravin Balakrishnan, Thomas Baudel, George W. Fitzmaurice, Gordon Kurtenbach. (2000). Three-dimensional input system using tilt. *United States Patent #6115028*.

Invited talks

Distinguished Lecture, University of New Brunswick, Faculty of Computer Science. Apr 2017.

Invited lecture, National University of Singapore. 26 Mar 2014. Host: Dr. Shengdong Zhao.

China HCI Symposium 2012. Invited distinguished Lecture. Chinese Academy of Sciences, Beijing, China. 18 June 2012. Hosts: Prof. Hongan Wang and Dr. Xiang Cao.

“Facile interaction with displays all over the place”. Invited lecture. Department of Computer Science, UOIT. Host: Dr. Faisal Qureshi. 26 Jan 2011.

“Facile interaction with displays all over the place”. Invited lecture. Department of Computer Science, Queens University. Host: Dr. Roel Vertegaal. 19 Jan 2010.

“Facile interaction with displays all over the place”. Colloquim. Department of Computer Science, Harvard University. Host: Dr. Chia Shen. 5 Mar 2009.

“Facile interaction with displays all over the place”. HP Labs India Lecture Series. Bangalore, India. 17 Feb 2009.

“Interacting with displays all over the place.” Invited talk at the UK-India Winter School on HCI. Bangalore, India. Host: Sriram Subramanian. 3 Feb 2009.

“Interacting with displays all over the place.” Invited talk at the McGill University CRMMRT Workshop on Multimodal Interaction. Host: Dr. Jeremy Cooperstock. 26 Sep 2008.

“Interacting with displays all over the place.” Invited talk at the iCORE Banff Informatics Summit. Host: Dr. Saul Greenberg and Dr. Sheelagh Carpendale. 22 Aug 2008.

“Towards more casual and realistic user interfaces.” Invited talk at HP Labs, Bangalore, India. Host: Dr. Sriganesh Madvanath. 20 Feb 2008.

“Towards more casual and realistic user interfaces.” Keynote talk at TECS Week, Pune, India. Host: Dr. Harrick Vin. 10 Jan 2008.

“Towards more casual and realistic user interfaces.” Keynote talk at Conference on Human-Machine Environments, Jinan, Shangdong Province, China. Host: Dr. Yuanchun Shi. 15 Oct 2008.

“Towards more casual ubiquitous interfaces.” Invited talk at Microsoft Research India, Bangalore. Host: Dr. Kentaro Toyama. 12 June 2007.

“Physics, projection, piles, and pens: user interfaces in the post GUI era.” Invited talk at Institute of Software, Chinese Academy of Sciences, Beijing. Host: Dr. Guozhong Dai. 5 Sep 2006.

“Physics, projection, piles, and pens: user interfaces in the post GUI era.” Invited talk at Tsinghua University, Beijing. Host: Dr. Yuanchun Shi. 1 Sept 2006.

“Physics, projection, piles, and pens: user interfaces in the post GUI era.” Invited talk at Microsoft Research Asia, Beijing. Host: Dr. Jian Wang. 30 Aug 2006.

“UI Projects at DGP lab”. Informal talk at Microsoft Research Cambridge. Host: Dr. Abigail Sellen. 12 July 2006.

“Physics, projection, piles, and pens: user interfaces in the post GUI era.” Invited talk at the University of Lille, France. Host: Prof. Gery Casiez. 10 July 2006.

“Physics, projection, piles, and pens: user interfaces in the post GUI era.” Invited talk at the iLog, France. Host: Dr. Thomas Baudel. 6 July 2006.

“Physics, projection, piles, and pens: user interfaces in the post GUI era.” Invited talk at LRI, University of Paris-Sud, France. Host: Prof. Michel Beaudouin-Lafon. 20 June 2006.

“Why aren’t we using 3D interfaces, and will we ever?” Keynote lecture, IEEE Symposium on 3D User Interfaces, 26 March 2006.

“Interaction and Visualization Techniques for Next-Generation Displays.” HCIL Colloquium, Department of Computer Science, University of Maryland, College Park. Host: Prof. Ben Bederson. 15 March 2005.

“Interaction Design for Future Computing Environments.” Colloquium, Department of Computer Science, University of Washington. Host: Prof. James Landay. 1 March 2005.

“Interaction and Visualization Techniques for Next-Generation Displays”. Distinguished Lecture, Department of Electrical Engineering and Computer Science, University of California, Berkeley. Host: Prof. John Canny. 17 Nov 2004.

“Usability challenges of large scale off-the-desktop interaction”. Invited talk at the IBM MITE Conference, Toronto, Canada. 4 Oct 2004.

“High degree-of-freedom interfaces”. Invited talk at the TTI/Vanguard Technology Transfer Symposium. Phoenix, Arizona: 3-4 Dec 2003.

“Non-wimp user interfaces”. Invited talk at IBM Centre for Advanced Studies. Host: Dr. Paul Smith. 26 Aug 2003.

“Fluid interaction techniques for the control and annotation of digital video”. Invited talk at Nokia Research Centre, Helsinki, Finland. Host: Miika Silfverberg. 9 May 2003.

“Interaction techniques for tabletop and volumetric displays”. Invited talk at Swedish National Defence College, Stockholm, Sweden. Host: S. Anders Christensson. 8 May 2003.

“Interaction with high degree-of-freedom input and next generation display technologies”. Invited lectures spanning 2 days at the University of Tampere, Tampere, Finland. Host: Prof. Kari-Jouko R  ih  . 5-6 May 2003.

“High degree-of-freedom interaction and visualization”. Presentation at an invitation-only workshop at the Banff Centre for the Arts, Banff, Alberta. Host: Sara Diamond. 12-15 Sep 2002.

“Multi-channel and multi degree-of-freedom interaction for computer graphics”. Invited talk at National Research Council, Ottawa. Host: Dr. Janice Singer. 20 Feb 2002.

“Devices and Interaction Techniques for Interfaces to 3D Graphics”. Invited talk at University Telekom, Melaka, Malaysia. Host: Dr. Abu Hasan Ismail, Dean. Dec 1998.

“Multi Stream and Multi Degree of Freedom Input for Desktop 3D Interaction”. Invited talk at Microsoft Research. Host: Dr. Ken Hinckley. 15 Oct 1998.

"Overview of Alias|wavefront User Interface Research Group's research projects". Presentation at Toron-Nihon Workshop organized by Dr. Paul Milgram at the University of Toronto. 19 Mar 1998.

Teaching

Graduate courses taught as a faculty member

CSC2604, "Topics in Human Centered and Interdisciplinary Computing", Sep – Dec 2023.

A research seminar in human-centered computing.

CSC2524, "Topics in Interactive Computing", Sep – Dec 2022.

A research seminar in human-computer interaction.

CSC2604, "Topics in Human Centered and Interdisciplinary Computing", Sep-Dec 2013.

A research seminar in human-centered computing. This year, the focus was on mobile and cyber-physical computing.

CSC2524, "Topics in Interactive Computing", Jan - Apr 2013.

A research seminar in human-computer interaction. This year, the focus was on mobile computing.

CSC2524, "Topics in Interactive Computing", Sep - Dec 2010.

A research seminar in human-computer interaction. This year, the focus was on next generation user interfaces.

CSC2524, "Topics in Interactive Computing", Sep - Dec 2006.

A research seminar in human-computer interaction. This year, the focus was on advanced "off-the-desktop" interfaces.

CSC2524, "Topics in Interactive Computing", Jan - Apr 2006.

A research seminar in human-computer interaction. This year, the focus was on interactive information visualization.

CSC2524, "Topics in Interactive Computing", Sep - Dec 2004.

A research seminar in human-computer interaction. This year, the focus was on audio and gesture based user interfaces and interaction techniques.

CSC2514, "Human-Computer Interaction", Sep - Dec 2004.

This is the same course as CSC428 (the second undergraduate course on Human-Computer Interaction). The graduate students taking the course were required to do a more substantial research paper.

CSC2524, "Topics in Interactive Computing", Sep - Dec 2003

A research seminar in human-computer interaction. This year, the focus was on sketch and gesture based user interfaces and interaction techniques.

CSC2514, "Human-Computer Interaction", Sep - Dec 2003.

CSC2524, "Topics in Interactive Computing", Sep - Dec 2002

A research seminar in human-computer interaction. This year, the focus was large and tabletop display user interfaces and interaction techniques.

CSC2514, "Human-Computer Interaction", Sep - Dec 2002.

CSC2514, "Human-Computer Interaction", Sep - Dec 2001

Undergraduate courses taught as a faculty member

CSC490, "Capstone Design Project", Sep - Dec 2006.

CSC490, "Capstone Design Project", Sep 2005 - Apr 2006.

CSC490, "Capstone Design Project", Sep 2004 - Apr 2005.

4th year undergraduate course. This is a new course I proposed and developed last year that has students working on substantial projects spanning several areas of computer science.

CSC428, "Human-Computer Interaction", Sep - Dec 2004
 4th year undergraduate course. This second Human-Computer Interaction course at Toronto builds on the department's first course in HCI, CSC318. While the focus in CSC318 is largely on the design process, this second course focuses more on the underlying models of human-computer interaction, rigorous formal evaluation techniques, and research frontiers

CSC490, "Capstone Design Project", Sep 2003 - Apr 2004.

CSC428, "Human-Computer Interaction", Sep - Dec 2003

CSC428, "Human-Computer Interaction", Sep - Dec 2002

CSC318, "The Design of Interactive Computational Media", Jan - Apr 2002
 3rd year undergraduate course on methodologies for designing and evaluating user interfaces. The first course on Human-Computer Interaction at the University of Toronto.

CSC428, "Human-Computer Interaction", Sep - Dec 2001

Undergraduate courses taught while I was a graduate student

CSC258, "Computer Organization", May - Aug 2000.
 2nd year undergraduate course on digital logic design, machine languages, and computer system organization fundamentals.

CSC258, "Computer Organization", Jan - Apr 2000.

CSC258, "Computer Organization", Sep - Dec 1999.

CSC108, "Introduction to Computer Programming", May - Aug 1999.
 1st programming course for computer science undergraduates, taking an object-oriented approach using Java.

CSC258, "Computer Organization", Jan - Apr 1999.

CSC340, "Information Systems Analysis and Design", Sep - Dec 1998.
 3rd year undergraduate course on theory, tools, and techniques for information systems analysis and design.

CSC258, "Computer Organization", May - Aug 1998.

CSC340, "Information Systems Analysis and Design", Sep - Dec 1997.

CSC104, "The How and Why of Computing", Jan - Apr 1997.
 1st year undergraduate course in computing for non computer science students.

CSC258, "Computer Organization", May - Aug 1995.

Teaching assistantships while I was a graduate student

CSC428, "Human Computer Interaction", Sep - Dec 1996.

CSC228, "File Structures and Data Management", Sep - Dec 1995, Jan - Apr 1995.

CSC258, "Computer Organization", Jan - Apr 1996, Sep - Dec 1994, May - Aug 1994, Jan - Apr 1994, Sep - Dec 1993.

Academic advising

Current Ph.D. students

Laura Di Chen, Jan 2018 – ongoing, Co-advised with Tovi Grossman

Former postdoctoral fellows

1. Priyank Chandra, 2019 – 2021. Co-advised with Syed Ishtiaque Ahmed.
2. Fanny Chevalier, Jan 2012 – Nov 2013, co-advised with Karan Singh and Sara Diamond.
3. Thomas Pietrzak, Jan 2011 – Sep 2011, sole advisor
4. William Soukoreff, May 2010 – Nov 2011, sole advisor
5. Seok-Hyung Bae, Sept 2007 – Feb 2010, co-advised with Karan Singh.
6. Tomer Moscovich, Feb 2007 – June 2008.
7. Jeremy Birnholtz, Sep 2005 – July 2007, co-advised with Ron Baecker, Saul Greenberg, Carl Gutwin.
8. Géry Casiez, Feb - Aug 2005
9. Pierre Dragicevic, Feb 2006 – Apr 2007.

Graduated Ph.D. students

1. Jiannan Li. Graduated 2023. Co-advised with Tovi Grossman
Thesis: “Robotic Tools for Interactive Viewpoint Control in Video Communication”
2. Aakar Gupta, Graduated 2018. Sole advisor.
Thesis: “Extended Hand Attributes for Touch Input, Touch Output and Touchless Interaction”
3. Sajad Shirali-Shahreza. Graduated 2017. Co-advised with Yashar Ganjali.
Thesis: “FleXight: Flexible Information Channel for Software-Defined Networking”
4. Rorik Henrikson, Graduated 2016. sole advisor.
Thesis: “Facilitating Real-Time Sketch-Based Storyboards for Stereoscopic and Virtual Reality Environments”
5. Dustin Freeman. Graduated 2015, sole advisor
Thesis: “Improv Remix: A system for Improv Theatre Performers to record and re-project Stage Video using wholebody interaction”
6. Jian Zhao. Graduated Apr 2015, sole advisor
Thesis: “Interactive visual data exploration: a multi-focus approach”
7. Xiaojun Bi. Graduated June 2011, sole advisor
Thesis: “Processing desktop work on a large high-resolution display: studies and designs”
8. Daniel Vogel. Graduated April 2010, sole advisor.
Thesis: “Direct pen input and hand occlusion”. Received award for best Canadian thesis in HCI for 2011.
9. Clifton Forlines. Graduated Nov 2008, sole advisor
Thesis: “User interfaces for visual search”
10. Abhishek Ranjan. Graduated Oct 2008, sole advisor
Thesis: “Automatic camera control for capturing collaborative meetings”
11. Xiang Cao. Graduated Oct 2008, sole advisor
Thesis: “Handheld projector interaction”
12. Tovi Grossman. Graduated Apr 2008, sole advisor
Thesis: “Interaction with volumetric displays”
13. Daniel Wigdor. Graduated Apr 2008, sole advisor
Thesis: “The design of table-centric interactive spaces”
14. Gonzalo Ramos. Graduated Jan 2008, sole advisor
Thesis: “Pressure sensitive pen interactions”
15. Anastasia Bezerianos. Graduated Sept 2007, sole advisor

Thesis: “Designs for single user, up-close interaction with wall-sized displays”

16. Michael McGuffin. Graduated May 2007, sole advisor

Thesis: “An investigation of issues and techniques in highly interactive computational visualization”

Graduated masters students

(note: prior to 2007, the master’s degree at Toronto required a formal thesis; since 2007, the thesis is optional and a research paper can be submitted instead).

1. Laura Di Chen. Graduated Jan 2018, sole advisor.
Research paper: “Learning by Interacting: an Investigation of Multi-Modal Communication in Live Streaming for Language Learning”.
2. Rinat Abdrashitov. Graduated Jan 2015. co-advised with Karan Singh.
Research paper: “Interactive Shape Modeling using a Skeleton-Mesh Co-Representation”.
3. Jonathan Deber. Graduated Jan 2013, sole advisor
Research paper: “Métamorphe: augmenting hotkey usage with actuated keys”.
4. Stephanie Santosa. Graduated Jan 2013. co-advised with Karan Singh
Research paper: “Direct space-time trajectory control for visual media editing”.
5. Aakar Gupta. Graduated Jan 2012, sole advisor
Research paper: “mClerk: Enabling Mobile Crowdsourcing in Developing Regions”.
6. Rorik Henrikson. Graduated Jan 2012, sole advisor
Research paper: “An exploration of multi-user games using projector phones”.
7. Navkar Samdaria. Graduated Jan 2012, sole advisor
Research paper: “Paying in kind for crowdsourced work in developing regions”.
8. Mohit Jain. Graduated Jan 2011, sole advisor
Research paper: “An exploratory study of mobile collaborative learning in developing regions”.
9. Akhil Mathur. Graduated Jan 2011, sole advisor
Research paper: “An exploratory study of a cameraphone-projector system”.
10. Dustin Freeman. Graduated Sep 2010, sole advisor.
Research paper: “Tangible Actions: More efficient direct multitouch through replaying gestures”.
11. Dominika Ruszkowski. Graduated Sep 2010, sole advisor.
Research paper: “Exploring user adaptability of mouse and touch in the desktop environment”.
12. Patrick Dubroy. Graduated May 2009, sole advisor
Research paper: “A field study on the use of tabs in Mozilla Firefox”.
13. Azam Khan. Graduated Sep 2008, sole advisor
Research paper: “ViewCube: A 3D orientation indicator and controller”.
14. Michael Jurka. Graduated Jan 2008, sole advisor
Research paper: “Visualizing user activity to enhance document retrieval”.
15. Gerald Chu. Graduated Dec 2007, sole advisor
Research paper: “Haptic conviction widgets”
16. Tristan Campbell. Graduated Oct 2006, sole advisor
Thesis: “MCurve: A crossing based system for graphical music composition”
17. Steven Tsang. Graduated Aug 2006, co-advised with Karan Singh.
Thesis: “A sketch based 2D animation system using dynamic motion hierarchies”
18. Anand Agarawala. Graduated Jan 2006, sole advisor
Thesis: “Pushing the desktop metaphor with physics, piles and the pen”

19. Daniel Vogel. Graduated Jan 2005, sole advisor
Thesis: "Interactive public ambient displays"
20. Jia Sheng, Graduated Jan 2005, co-advised with Karan Singh.
Thesis: "A gestural 3D modeling interface using fingers and a physical prop tracked in 3D"
21. Abhishek Ranjan. Graduated Jan 2005, sole advisor
Thesis: "Browsing archived meeting audio and time-synchronized data"
22. Wael Aboelsaadat. Graduated Jan 2004, sole advisor
Thesis: "Evaluation of a transparent two-layer display"
23. Xiang Cao. Graduated Jan 2004. co-advised with Allan Jepson.
Thesis: "An exploration of gesture-based interaction"
24. Tovi Grossman. Graduated Jan 2004, sole advisor
Thesis: "Alternate user interfaces for the manipulation of curves in 3D environments"
25. Daniel Wigdor. Graduated Jan 2004, sole advisor
Thesis: "Chording and tilting for rapid, unambiguous text entry to mobile phones"
26. Yan (Grace) Wang. Graduated Dec 2003, sole advisor
Thesis: "Selection techniques for laser pointer interaction"
27. Michael McGuffin. Graduated Aug 2002, co-advised with Gordon Kurtenbach
Thesis: "Fitts' law and expanding targets: an experimental study, and applications to user interface design"

Ph.D. thesis committees

Karin Nieuwenhuizen. 2015. Department of Industrial Design, Eindhoven University of Technology. PhD external examiner. Advisor: Martens Jean-Bernard

Abir Mohammed Al Hajri. 2014. Department of Electrical Engineering, University of British Columbia. PhD external examiner. Advisor: Sid Fels.

Michael Gluek. 2012- present. Department of Computer Science, University of Toronto. Ph.D. Thesis committee member. Advisor: Daniel Wigdor

Marc Fiume. 2012- 2014. Department of Computer Science, University of Toronto. Ph.D. Thesis committee member. Advisor: Michael Brudno

Carrie Demmans Epp. 2012- 2015. Department of Computer Science, University of Toronto. Ph.D. Thesis committee member. Advisor: Ron Baecker

Vincent Cheung. 2013. Department of Electrical and Computer Engineering, University of Toronto. Ph.D. Thesis committee member. Advisor: Brendan Frey.

Felipe Bacim, 2011-2015. Department of Computer Science, Virginia Tech. Ph.D. Thesis committee member. Advisor: Doug Bowman.

Mathieu Nancel. 2012. University of Paris, Sud. Ph.D. Thesis external reader. Advisor: Michel Beaudoin-Lafon.

William Soukoreff. 2010. York University. Ph.D. Thesis External Examiner. Advisor: Scott MacKenzie.

Craig Tashman, 2009 – 2012. GVU Centre, Georgia Tech. Ph.D. Thesis committee member. Advisor: Keith Edwards.

Regis Kopper. 2008 - 2012. Department of Computer Science, Virginia Tech. Ph.D. Thesis committee member. Advisor: Doug Bowman.

Michael Daum. 2006 – 2011. Department of Computer Science, University of Toronto. Ph.D. Thesis committee member. Advisor: Karan Singh.

David Dearman. 2006 – 2011. Department of Computer Science, University of Toronto. Ph.D. Thesis committee member. Advisor: Khai Truong.

Bowen Hui. 2003 – 2011. Department of Computer Science, University of Toronto. Ph.D. Thesis committee member. Advisor: Craig Boutilier

Shahzad Malik. 2005 – 2007. Department of Computer Science, University of Toronto. Ph.D. Thesis committee member. Advisor: Allan Jepson.

Iqbal Mohamed. 2005 – 2008. Department of Computer Science, University of Toronto. Ph.D. Thesis committee member. Advisor: Eyal de Lara.

Tao Ni. 2006 - 2011. Department of Computer Science, Virginia Tech. Ph.D. Thesis committee member. Advisor: Doug Bowman.

Koji Yatani. 2006 – 2011. Department of Computer Science, University of Toronto. Ph.D. Thesis committee member. Advisor: Khai Truong

Shengdong Zhao. 2004 – 2008. Department of Computer Science, University of Toronto. Ph.D. Thesis committee member. Advisor: Mark Chignell.

Maciej Kalisiak. 2002 - 2006. Department of Computer Science. Thesis committee member. Advisor: Michiel van de Panne

Wenbi Wang. 2004. Department of Mechanical and Industrial Engineering. Thesis defense committee member. Advisor: Paul Milgram.

Second reader for masters theses advised by others

Peter Hamilton. 2013. Advisor: Daniel Wigdor

Michael Glueck. 2012. Advisor: Daniel Wigdor

Frank Li. 2011. Advisor: Khai Truong

Yannick Thiel. 2011. Advisor: Karan Singh

James McCrae. 2008. Advisor: Karan Singh

Noah Lockwood. 2006. Advisor: Karan Singh

Naiqi Weng. 2005. Advisor: Karan Singh

Krista Strickland. 2005. Advisor: Ron Baecker

Xia Liu. 2004. Advisor: Karan Singh

Iqbal Mohamed. 2004. Advisor: Eyal de Lara

Michael Tsang. 2002. Advisor: Bill Buxton & George Fitzmaurice

Nicolas Burtnyk. 2002. Advisor: Bill Buxton

Undergraduate research students

Muhammad Anwar. Sep 1 2015 – Apr 30 2016. Engineering Science thesis.

Phoebe Chang. 1 May – 31 Aug 2013. (NSERC USRA award).

Curren Pangler, 1 May – 31 Aug 2007 (NSERC USRA award), co-advised with my postdoc Tomer Moscovich.

Sameer Vohra, 1 May – 31 Aug 2007 (NSERC USRA award), co-advised with my postdoc Tomer Moscovich.

Nicholas Kong, 1 May - 31 Aug 2005, 1 May - 31 Aug 2006 (NSERC USRA Award), 1 May – 31 Aug 2007 (NSERC USRA award), co-advised with my PhD student Tovi Grossman.

Matthew Boulos, 1 May - 31 Aug 2003 (NSERC USRA award) and 1 May - 31 Aug 2004 (NSERC USRA award), co-advised with my PhD student Gonzalo Ramos

Vikas Jain, Intern from IIT Bombay, 1 May - 31 July 2003, sole advisor
Tovi Grossman, 1 May - 31 Aug 2002 (NSERC USRA award), sole advisor
Jeffrey Magder, 1 May - 31 Aug 2002 (NSERC USRA award), sole advisor
Abhishek Ranjan, Intern from IIT Bombay, 1 May - 31 July 2002, sole advisor
Plus roughly 20 other undergraduates informally advised on various research activities in my lab.

Undergraduate project course supervision

(these are undergraduate research projects for which the student gets a CSC494/495 course credit or an Engineering Thesis)

Elaine Wong, Sep 2009 – Apr 2010.
Janek Biczysko-Lasocki, Jan – Apr 2007, co-advised with my PhD student Xiang Cao
Jacky Jie Li, Jan – Apr 2007, co-advised with my PhD student Xiang Cao
Phillip Mach, Jan – Apr 2007, co-advised with my PhD student Abhishek Ranjan
Clarence Chan, Jan - Apr 2004, co-advised with my PhD student Daniel Wigdor.
Steve Tsang, Sep - Dec 2002, sole advisor
Jeffrey Magder, Sep - Dec 2002, sole advisor
Daniel Wigdor, Jan - Apr 2002, sole advisor
Simone Maillard, Jan - Apr 2002, sole advisor
Tovi Grossman, Jan - Apr 2002, sole advisor
Wai Shan Lau, Jan - Apr 2002, sole advisor
Casson Ming Tse Lee, Jan - Apr 2002, sole advisor
Tovi Grossman, May - Aug 2000, co-advised with Gordon Kurtenbach.

Service outside the university

Journal, conference and workshop chairing and organization

ACM Transactions on Computer-Human Interaction. Associate Editor, 2010 – present.
Springer Computer Science HCI Series, Editorial Board, 2013-present.
Mobile HCI 2012, Doctoral Consortium Chair.
IEEE Transactions on Visualization and Computer Graphics. Associate Editor, 2008 – 2011.
ACM UIST 2009 Symposium on User Interface Software and Technology, Sponsorship Chair.
IEEE 3DUI 2009 Symposium on 3D User Interfaces. Conference Co-Chair.
ACM UIST 2008 Symposium on User Interface Software and Technology, Sponsorship Co-Chair.
Human-Computer Interaction journal. Co-editor of Special Issue on Ubiquitous Multi Display Environments. 2007-2008.
ACM UIST 2007 Symposium on User Interface Software and Technology, Program Chair.
ACM UIST 2007 Symposium on User Interface Software and Technology, Sponsorship Co-Chair.
Ubicomp 2005 Workshop on "The Spaces in-between: Seamful vs. Seamless Interactions". Co-organizer.
Graphics Interface 2004 Conference, Conference and Program Co-Chair

Graphics Interface 2002 Conference, Posters and Demonstrations Chair

International Input Research Workshop, Ribeaucourt, France, Apr 2000. Organizing Committee.

Conference and workshop program committees

ACM SIGGRAPH Conference on Computer Graphics and Interactive Techniques (2010).

ACM CHI Conference on Human Factors in Computing Systems, Associate Chair for Papers (2002, 2003, 2004, 2005, 2006, 2009, 2010, 2011, 2013, 2015).

ACM CHI Conference on Human Factors in Computing Systems, Short Papers Program Committee (2001)

International Projector-Camera Systems Workshop (PROCAMS), Program Committee (2008).

ACM SIGGRAPH International Conference on Virtual-Reality Continuum and its Applications in Industry (VRCAI), Program Committee (2008).

ACM UIST Symposium on User Interface Software and Technology, Papers Committee (2003, 2004, 2005, 2006, 2010, 2015). Doctoral symposium committee (2010).

Graphics Interface Conference, Papers Program Committee (2002).

ACM VRST Symposium on Virtual Reality Software and Technology, Full Papers Program Committee (2003).

IUI International Conference on Intelligent User Interfaces, Workshop on Intelligent User Interfaces for Developing Regions, Program Committee (2008).

IEEE InfoVis Symposium on Information Visualization, Papers Program Committee (2006).

ACM I3D Symposium on Interactive 3D Graphics and Games, Papers Program Committee (2006).

NordiCHI Conference, Papers Program Committee (2004).

8th Eurographics Workshop on Virtual Environments, Barcelona, Spain, Papers Program Committee (2002).

5th International Projector-Camera Systems Workshop (PROCAM), Program Committee (2008).

HCI track for CISIS2009, International Conference on Complex, Intelligent and Software Intensive Systems, Fukuoka, Japan. Program Committee (2009).

ACM Dev Conference (2010).

Paper & manuscript refereeing

ACM CHI Conference on Human Factors in Computing Systems (1998, 1999, 2000, 2001, 2007, 2008, 2011, 2013)

ACM UIST Symposium on User Interface Software and Technology (2001, 2002, 2008, 2009, 2013)

ACM SIGGRAPH Conference on Computer Graphics and Interactive Techniques (2001, 2002, 2003, 2004)

ACM I3D Symposium on Interactive 3D Graphics (2001, 2003)

ACM Transactions on Computer Human Interaction (2002, 2004, 2005, 2007, 2008)

ACM Conference on Universal Usability (2000)

ACM Computing Surveys (2008)

Communications of the ACM (1999)

Eurographics Conference (2003, 2004, 2005)

Graphics Interface Conference (1998, 2003, 2005, 2010, 2011)

Human Computer Interaction journal (2005, 2006)

IBM Systems Journal (1997)

IEEE Computer (2004)
IEEE Transactions on Visualization and Computer Graphics (2004, 2005, 2006, 2007)
IEEE Computer Graphics and Applications (2005, 2006)
IEEE InfoVis Symposium on Information Visualization (2005)
Interact Conference (1999, 2000)
Information Visualization journal (2007)
International Journal of Human Computer Studies (2001, 2005, 2006, 2008)
Journal of New Music Research (2003)
MIT Press book review (2005, 2006)
Morgan Kaufmann Press book review (2006).
Ubicomp Conference (2006)
Wiley Press book review (2003)

Grant & fellowship reviewing

NSERC Discovery Grants review committee (2013-2015).
Ontario Ministry of Research and Innovation Grant review (2008)
Netherlands Organisation for Scientific Research, grant review (2008).
Austrian Erwin Schroedinger fellowship review (2008).
Swiss National Science Foundation grant reviews (2007)
NSERC New Media Grant review (2004)
NSERC Strategic Grant reviews (2002, 2003, 2004)
NSERC Discovery Grant reviews (2003, 2004, 2005, 2006)
CFI Grant review (2007)

External organizations, tenure and promotion reviews

External reviewer for one tenure case at the University of Lugano (2013).
External reviewer for INRIA's graphics, interaction and visualization research teams (2010).
External reviewer for one tenure case at the University of North Carolina, Charlotte (2010).
External reviewer for one full professor promotion case at York University. (2010)
External reviewer for one tenure case at Harvard University. (2009)
External reviewer for one appointment renewal case at the University of North Carolina, Charlotte. (2008)
External reviewer for one tenure case at the University of California, Berkeley. (2008)
External reviewer for one tenure case at Nanyang Technological University, Singapore. (2007).
External reviewer for one tenure case at the University of Paris-Sud. (2007)

Other activities

ACM UIST 2005 Session Chair
ACM CHI 2002 Conference Session Chair

ACM CHI 2001 Conference Session Chair

Member of Association for Computing Machinery (ACM)

Service within the University of Toronto

Research and Industrial Relations Committee chair, Department of Computer Science, 2013-2014 academic year.

Faculty recruiting committee, Department of Computer Science, 2013-2014 academic year.

Graduate Admissions Committee., Department of Computer Science, 2012-2013 academic year.

PTR Committee., Department of Computer Science, 2010-2011 academic year.

Professional Masters committee, Department of Computer Science, 2009-2010 academic year.

PTR Committee., Department of Computer Science, 2009-2010 academic year.

Committee developing a proposal for a new “EDU-C” unit at the university called the Information and Communications Forum. Led by Prof. Alberto Leon-Garcia. 2008-2009 academic year.

Faculty recruiting committee, Department of Computer Science, 2008-2009 academic year.

Professional Masters committee, Department of Computer Science, 2008-2009 academic year.

Tenure committee for one tenure case at the Department of Mechanical and Industrial Engineering, 2009.

Evaluation committee for one 3rd year faculty review case at the Department of Computer Science, 2008.

Tenure committee for one tenure case at the Department of Computer Science, 2007.

Teaching evaluation committee for one tenure case at the Department of Computer Science, 2007.

Faculty recruiting committee, Department of Computer Science, 2006-2007 academic year.

Initiated and ran a seminar series on research skills and related topics intended for all graduate students in the department. The seminars are archived at: <http://www.dgp.toronto.edu/~ravin/gradskillsseminars2007/>

Graduate admissions committee, Department of Computer Science, 2005-2006 academic year.

Faculty recruiting committee for a HCI position, Department of Computer Science, 2004-2005 academic year.

Online graduate applications system: I took the lead on developing this system for the Department of Computer Science, Sept 2004 – May 2006.

Graduate admissions committee, Department of Computer Science, 2004-2005 academic year.

Graduate admissions committee, Department of Computer Science, 2003-2004 academic year.

Graduate breadth evaluation committee, Department of Computer Science, 2003-2004 academic year.

Graduate breadth evaluation committee, Department of Computer Science, 2002-2003 academic year.

Undergraduate committee, Department of Computer Science, 2002-2003 academic year.

Faculty support staff committee, Department of Computer Science, 2002-2003 academic year.

Department computing committee, Department of Computer Science, 2002-2003 academic year.

Faculty recruiting committee, Department of Computer Science, 2002-2003 academic year.

Department of Computer Science “planning discussion paper” committee, responsible for putting together a discussion paper on the direction of the department over the next 5-10 years. Apr-May 2003.

Environment and equity committee, Department of Computer Science, 2001-2002 academic year.

Initiated and organized, together with Kyros Kutulakos, Karan Singh, and Sam Roweis, the first visit of potential graduate students to the department. Feb-Mar 2002. I was also involved in organizing the event the next year (2003).

Initiated and organized a new process for graduate student recruiting where we invite short-listed candidates to visit us for a combined interview/recruitment event, *before* admission offers are made. We have found this to be a very successful process for making more informed admissions decisions. First organized in 2003 for the HCI group, then expanded to Graphics and HCI in 2004, and since then other groups in the department have begun to adopt this approach as well.

From July 2001 to September 2006, I was responsible for the day-to-day direction and management (including supervision of 1 full-time and 1 part-time technical staff members) of the Dynamic Graphics Project laboratory (www.dgp.toronto.edu), which is home base to the department's graphics and HCI faculty and graduate students (7 faculty, 50 students).

Graphics and HCI seminar coordinator, Department of Computer Science, 2001-2002, 2002-2003, 2003-2004, 2004-2005, 2005-2006 academic years.