

**IN 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

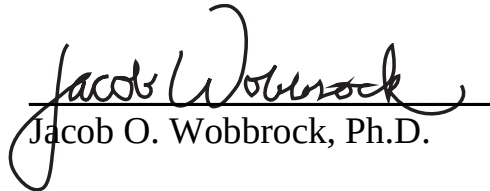
Case: IPR2024-00717

U.S. Patent No. 11,223,757

DECLARATION OF JACOB O. WOBBROCK, PH.D.

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: February 20, 2025



Jacob O. Wobbrock, Ph.D.

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I. INTRODUCTION

1. My name is Jacob O. Wobbrock, and I have prepared this declaration at the request of the Patent Owner, Maxell, Ltd. (“Maxell”). This declaration provides my opinions with respect to various aspects of the Petition filed by Petitioners relating to U.S. Patent No. 11,223,757 (“the ’757 Patent”).

2. Depending on new information learned, including positions taken by Petitioners or Petitioner’s expert, I reserve the right to supplement my opinions herein.

3. Although I am being compensated at my usual consulting rate of \$675 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 and I have no other financial interest in this matter or the parties thereto.

4. In forming my opinions, I have relied on my knowledge and experience as well as the documents and information referenced in this declaration.

II. BACKGROUND AND QUALIFICATIONS

5. My qualifications to testify about the ’757 Patent and the relevant technology are set forth in my curriculum vitae (“CV”), which I have attached here as Exhibit A. My CV includes a list of my peer-reviewed publications. It also includes the matters in which I have served as an expert witness.

6. I now summarize my qualifications to render opinions regarding the '757 Patent and technology therein in the following paragraphs.

7. Since 1995, I have studied, worked, taught, and conducted research in the fields of computer science and human-computer interaction ("HCI"). Specifically, I have worked on projects relating to the human use of interactive computing systems, including their design, construction, and scientific evaluation.

8. As a field, HCI focuses on the design, construction, and evaluation of interactive computing systems, and on the study of such systems' use by individuals, groups, and organizations. Of central importance is the term "interactive," which refers to computing technologies that people directly use and that create some kind of "user experience." Thus, the field of HCI encompasses topics like user interface design, usability engineering, rapid prototyping, user interface technology, interaction design, user research, interactive systems engineering, and the human factors of computing systems, among related topics. The popular notion of a "user friendly" interface comes from the field of HCI. Owing to the broad range of relevant phenomena within the purview of HCI, the field attracts not only computer scientists and engineers (like me), but also designers, psychologists, social scientists, and others interested in shaping or studying the individual or collective human experience of interactive technologies.

9. I earned my Bachelor of Science with Honors (“B.S.”) in Symbolic Systems and my Master of Science (“M.S.”) in Computer Science from Stanford University in 1998 and 2000, respectively. In both degrees, I had official concentrations in HCI. I earned my Ph.D. in Human-Computer Interaction from the HCI Institute in the School of Computer Science at Carnegie Mellon University in 2006. The HCI Institute at Carnegie Mellon is a pioneer in HCI research and education, and my doctoral degree was the first in the United States to be offered in HCI *per se*. Within my Ph.D. degree, I had an official concentration in Computer Science. Upon graduation, I received the Carnegie Mellon School of Computer Science Distinguished Dissertation Award. The award was given for my work on the EdgeWrite text entry system that I invented (U.S. Patent No. 7,729,542), which made text entry highly accurate on mobile touch screen devices and other input devices, especially for people with fine motor disabilities.

10. I have been on the faculty at the University of Washington (“UW”) in Seattle, WA since September 2006. I currently hold the rank of (full) Professor in The Information School, ranked #2 nationally by U.S. News and World Report, and (full) Adjunct Professor in the Paul G. Allen School of Computer Science & Engineering, ranked #7 nationally. For 2024-2025, the University of Washington

overall was ranked #7 in the world by U.S. News in its global university rankings,¹ just ahead of Columbia, Yale, and UCLA.

11. At UW, in addition to my official departmental appointments, I am a founding member of the cross-campus DUB Group. “DUB” stands for “design: use: build:”, and is a grassroots alliance of ~250 HCI professors, students, and industry affiliates at UW and in the Seattle region. The DUB Group is regarded as a premiere center for HCI research and education worldwide. Although there are no official rankings in HCI, *CSRankings.org* maintains rankings of various computing disciplines, including HCI, where the University of Washington is ranked #2 worldwide.²

12. It was out of the DUB Group that I co-founded the Master of Human-Computer Interaction and Design (“MHCI+D”) degree at UW, which I chaired from its inception in 2013 until 2016, and am chairing again from 2024 – 2027. For 2020 – 2023, I served on the Interdisciplinary Faculty Group overseeing the degree. The MHCI+D degree is an intensive one-year practitioner-oriented program that is jointly owned and administered by four separate departments across three separate colleges: The Information School (my unit), the Paul G. Allen School of Computer Science & Engineering (where I hold a courtesy appointment), the Department of

¹ See <https://www.usnews.com/education/best-global-universities/rankings>.

² See <http://csrankings.org/#/index?chi&world> for the top universities in human-computer interaction (HCI) worldwide, where the University of Washington is #2.

Human-Centered Design & Engineering, and the Division of Design. To the best of my knowledge, the MHCI+D degree is the first HCI degree at any university to be owned by four separate departments across three separate colleges, a challenging organizational feat but essential for interdisciplinary education in HCI.

13. I also founded and direct the ACE Lab, which stands for both “Accessible Computing Experiences” and “Advanced Computing Experiences” at UW. The lab incorporates students from Ph.D. programs in information science and computer science working on problems related to understanding and improving people’s interactions with computers and information, especially for people with disabilities. The lab has graduated seventeen (17) Ph.D. students and one (1) postdoctoral fellow to date, ten (10) of whom are currently professors at universities including Harvard, Brown, Toronto, Washington, and Cornell Tech. In addition, I currently advise ten (10) Ph.D. students in information science or computer science who are part of my lab.

14. Most recently, I co-founded the UW Center for Research and Education on Accessible Technology and Experiences (“CREATE”). This high-profile center brings together faculty and students from engineering, computing, information, rehabilitation medicine, and disability studies to tackle big problems in accessible technology. The center’s mission, which I authored, is “to make technology accessible, and to make the world accessible through technology.” It pursues this

mission through three primary activities: research, education, and translation. Center research focuses on cutting-edge problems in accessible technology. Center faculty also educate the next generation of technology designers, engineers, and managers to prioritize accessibility in their work. And center innovations are translated into practice via commercialization, nonprofits, licensing, open-sourcing, field deployments, and community partnerships, among other activities. The formation of CREATE was jointly announced by University of Washington President Ana Marie Cauce and Microsoft President Brad Smith in May 2020 after Microsoft gave an inaugural gift of \$2.5M to launch the center. It has since raised nearly \$10M to date, including a \$4.6M grant from the National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR) program of the Administration for Community Living, U.S. Department of Health and Human Services.

15. I have co-authored over 200 scholarly publications, which currently have been cited 25,514 times, according to Google Scholar.³ From these publications, I have received thirty-three (33) paper awards, including seven (7) best paper winners (top 1% of submissions) and eight (8) honorable mention papers (top 5% of submissions) from the flagship HCI conference, the ACM Conference on Human Factors in Computing Systems, referred to as the “CHI conference” (pronounced “kai”). To the best of my knowledge, this number of CHI paper awards

³ See <https://scholar.google.com/citations?user=TmZ3howAAAAJ>.

is the most received by any member of the HCI community to-date, which numbers thousands of researchers and practitioners. The CHI conference draws about 4,000 attendees annually.

16. In October 2016, I was the Program Co-Chair for the ACM Symposium on User Interface Software and Technology, or “UIST” (pronounced “wist”). In October 2022, I was the General Co-Chair for the same. The UIST conference is the top conference and most prestigious venue for technical innovations in HCI. (The aforementioned CHI conference also publishes technical innovations, but UIST focuses exclusively on them.)

17. In May 2017, I was awarded the SIGCHI Social Impact Award, a major international award “for HCI research applied to pressing social needs.” The basis for the award was my work in accessible computing for people with disabilities, particularly my development of Ability-Based Design, a technology design approach that prioritizes human abilities and requires computing systems to better match those abilities through techniques like automatic user interface adaptation.

18. In May 2019, I was inducted into the prestigious CHI Academy, the international academy of researchers and practitioners in HCI who have made significant contributions to the field. Five (5) to ten (10) people have been inducted each year since 2000, including luminaries from the early days of interactive computing, computer graphics, and human factors. Having received my Ph.D. in

2006, I was one of the youngest inductees into this esteemed group, as measured by time-since-degree.

19. In October 2019, I received the SIGACCESS ASSETS Paper Impact Award, which is an award given every-other-year to one paper 10 or more years after its publication. My paper, published in 2008, was on Slide Rule, a system I co-invented that demonstrated the first finger-driven screen reader for mobile touch screen devices, like the iPod Touch and iPhone 1. Slide Rule exhibited gestures that blind people could use to control a screen reader and select interface elements (e.g., buttons, links, menus, etc.) without lifting their finger. A few years after Slide Rule's publication, an Apple engineer indicated that it had been influential in Apple's design of its VoiceOver accessibility software, which ships on every Apple smartphone and tablet today. (Android devices have a similar feature called TalkBack.)

20. In November 2022, I received my second 10-year lasting-impact award, this time from ACM's International Conference on Multimodal Interfaces ("ICMI"). The award was for the \$P gesture recognizer, which was published in 2012. The \$P gesture recognizer conceived of gestures as "point clouds" and performed a matching algorithm to enable highly accurate gesture recognition with minimal lines of code. \$P was quickly adopted into numerous academic and commercial projects, and helped popularize gesture input as a widespread input modality.

21. In October 2024, I received my third 10-year lasting impact award, this time from ACM's Symposium on User Interface Software and Technology (the aforementioned "UIST" conference). The award was for the \$1 gesture recognizer, which I published in 2007. The \$1 recognizer was a simple geometric and trigonometric template-matching algorithm that required far fewer training examples than existing statistical gesture classifiers. \$1 made it easy for designers and developers to incorporate gestures into their prototypes, just when touch devices were becoming more mainstream. It was quickly adopted by researchers and industry practitioners alike, and is still widely used today.

22. In January 2022, I received my highest honor to date, being named a 2021 ACM Fellow "for contributions to human-computer interaction and accessible computing."⁴ ACM Fellows represent the top 1% of computing professionals worldwide, and must be nominated by at least five (5) existing Fellows. Unsuccessful nominees must wait a period of three (3) years before being nominated again, so only the most competitive nominees are put forward. This prestigious recognition is conferred each year at a black-tie banquet in San Francisco where the A.M. Turing Award is given—the equivalent of the Nobel Prize in computing.

23. From 2012 – 2022, I served as an Associate Editor for *ACM Transactions on Computer-Human Interaction*, a top journal in the HCI field.

⁴ See <https://www.acm.org/media-center/2022/january/fellows-2021>.

Previously, I was an Associate Editor of *Foundations and Trends in Human-Computer Interaction*, the *International Journal of Human-Computer Studies*, and *Advances in Human-Computer Interaction*. I have also peer-reviewed countless journal and conference submissions for the most prestigious publication venues in the field.

24. Within the field of HCI, my overarching research interests involve scientifically understanding people's experiences with interactive technologies, and improving those experiences by designing, building, and evaluating new interactive techniques and systems. My specific research topics include text entry, pointing, touch, and gesture; human performance measurement and modeling; HCI research and design methods; virtual reality; mobile devices; and accessible computing. My work blends computer science, interaction design, and experimental psychology. Several of my research projects have been devoted to inventing or improving user interfaces to make computers, including touch screen devices, easier to use for people with disabilities, particularly people with motor impairments (e.g., due to spinal cord injury) or sensory impairments (e.g., blindness).

25. Besides Slide Rule, other influential projects that I have conducted include: a family of easy-to-implement gesture recognizers that have come to be known as the "\$-family" recognizers, of which the aforementioned \$1 and \$P are two; a popular gesture design methodology called "end-user elicitation" that has

been replicated over 300 times in the literature (and cited over 1600 times), and used by Microsoft to design gestures for their products; classification algorithms for improving typing on adaptive tabletop and mobile touch screen keyboards; and a method for sensing touch-based force without using actual force sensors. Touch input and touch devices have been an important focus of my research. In fact, twenty-eight (28) of my publications contain the term “touch” in their titles. Relatedly, twenty-five (25) of my publications contain the term “gesture” in their titles. And thirty-one (33) of my publications contain the term “mobile” in their titles.

26. My work and views have been covered in The New York Times, The Washington Post, The Seattle Times, The Pittsburgh Post-Gazette, The Huffington Post, The Guardian, Der Spiegel, M.I.T. Technology Review, PC World, Self Magazine, USA Today, and other popular press outlets.

27. I have received several competitive federal research grants to support my work, including a National Science Foundation CAREER award and seven (7) other National Science Foundation grants. I have also received research support for my lab from Microsoft, Intel, Baidu, Facebook, Adobe, Toyota, and Google. All federal grants and any industry support that I have received are listed on my CV.

28. I am the co-inventor of nineteen (19) issued U.S. Patents and six (6) U.S. Patent Applications that are generally directed to user interfaces, information

delivery and display, input and interaction techniques and devices, touch gestures, gesture recognition, mobile devices, touch screens and devices, interactive surfaces, and computer accessibility.

29. Along with being a full-time professor, I have also been an entrepreneur. From September 2012 to May 2015, I was the founding President & C.E.O. of AnswerDash, Inc., a venture capital-funded startup that provided context-sensitive help on websites and mobile apps. I co-founded AnswerDash with another professor and a graduate student from the University of Washington based on our joint research. During my ~3 years as AnswerDash's C.E.O., I raised over \$2.5M in venture capital, recruited a top-notch team, set the vision and priorities for the company, oversaw product development, set pricing, drove initial sales, and spoke and wrote about customer self-service technology. I also served as Chairman of the Board. In May 2015, I stepped down as C.E.O. to transition back to full-time academia by December 2015, at which point I became advisory to the company as AnswerDash's Chief Experience Officer (C.X.O.) and a Board Observer. In June 2020, AnswerDash was acquired by CloudEngage, Inc., a company headquartered in Spokane, WA.

30. Prior to co-founding AnswerDash, I worked in various industry roles related to the design, construction, and evaluation of computer user interfaces. These roles included both in-house and consulting positions at Silicon Valley startups, and

internships and consulting positions at tech giants like Intel (1997, 1999), Google (2001), and Microsoft (2003, 2008).

III. UNDERSTANDING OF LEGAL STANDARDS

31. I am not a lawyer and am not offering any opinions regarding legal matters. However, I have been informed about legal standards of patent law, which I have used in developing my opinions expressed herein.

32. 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.

A. Obviousness

33. 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, long felt but unsolved needs, failure of others, copying by others, licensing, and skepticism of experts).

34. 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.

35. 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.

36. 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.

37. 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.

38. 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.

39. 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.

40. 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.

41. 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 solving the problems the inventors of the patent-at-issue sought to solve.

42. 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 inventor's insight.

43. 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 invention to a person of ordinary skill in the art.

44. 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.

45. 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.

46. 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. Claim Construction

47. 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, the written description including the figures, and prosecution history) are the primary sources used in interpreting claim language.

48. I understand that if disputed claim language is clear on its face, the intrinsic evidence should be consulted to determine whether some deviation from the ordinary meaning of the claim language is warranted.

49. When the disputed claim language is not clear on its face, I understand that the intrinsic evidence should be used to resolve, if possible, any lack of clarity. I also understand that the specification is the best evidence of what the patentee intended the term to mean when there is no clear meaning of a claim term, and that the prosecution history may also shed light on the meaning of ambiguous terms. However, I understand that it is improper to import limitations from the specification into a patent claim through claim construction.

50. I have been informed that sometimes the ordinary meaning of claim language as understood by a person of ordinary skill in the art may be readily apparent even to lay persons. I understand that claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words.

IV. METHODOLOGY AND MATERIALS CONSIDERED

51. I have relied upon my education, knowledge, and experience, as well as other materials discussed in this declaration in forming my opinions.

52. For this declaration, I have been asked to review the '757 Patent, including the specification and the claims, and the '757 Patent's prosecution history (file history). In developing my opinions related to the '757 Patent, I have considered the materials cited herein, including those items listed in the Exhibit Table below.

Description	Exhibit #
U.S. Patent No. 11,223,757	1001
File History of U.S. Pat. No. 11,223,757	1002
Declaration of R. Michael Guidash	1003
U.S. Patent Publication No. 2014/0247368 ("Chinn")	1004
Certified translation of Published JP Application JP2001305642A ("Takahashi"), which is referred to in EX1006	1005
Translator Certification by Sarah Dunham of Lango Translations dated February 23, 2024 for JP2001305642A, including the Japanese language version of JP2001305642A	1006
U.S. Patent No. 8,957,981	1007
U.S. Patent Publication No. 2010/0137026 ("Kim")	1008
U.S. Patent Publication No. 2010/0026815 ("Yamamoto")	1009
Declaration of Nathaniel E. Frank-White	1010
U.S. Patent Publication No. 2009/0167881 ("Thorn")	1011
Appendix 4 to Patent Owner's March 7, 2024 Corrected Infringement Contentions	1012
U.S. Patent Publication No. 2013/0124207 ("Sarin")	1013
Casio Exilim EX-V7 Users Guide ("EX-V7")	1014
2024.06.18 [072] FIRST AMENDED DOCKET CONTROL ORDER	2001
2024.01.12 [045] Docket Control Order	2002
2024.06.20 - Maxell's Supplemental Preliminary Election of Asserted Claims	2003
2024.06.27 Samsung Defendants' Preliminary Election of Prior Art	2004
Claim Construction Order (EDTX)	2006

V. BACKGROUND OF THE TECHNOLOGY OF THE '086 PATENT**A. Background of the '757 Patent**

53. Before discussing my specific opinions on validity, I will first review the '757 Patent's disclosures as they would have been viewed by a person of ordinary skill in the art. My discussion describes only certain examples of the inventions discussed in the '757 Patent, and my description here is in no way meant to suggest that the claimed inventions are limited to these examples. The inventions are limited only by the claims.

54. The '757 Patent is entitled "Video Recording Device and Camera Function Control Program." It was filed on November 18, 2019 and issued on January 11, 2022 to inventors Kazuhiko Yoshizawa and Hirohito Kuriyama. The patent claims priority to PCT/JP2013/074728, filed on September 12, 2013, now U.S. Patent No. 9,774,776.

55. The '757 Patent is directed to an image recording device configured to execute a plurality of different photographing processes using multiple cameras and a touch interface. Specifically, the '757 Patent discloses an apparatus with an "audio input interface," "a touch display," "a first camera arranged on a same side of the touch display," "a second camera arranged on an opposite side of the touch display," "a recorder," and "a controller" such that these components work in conjunction to

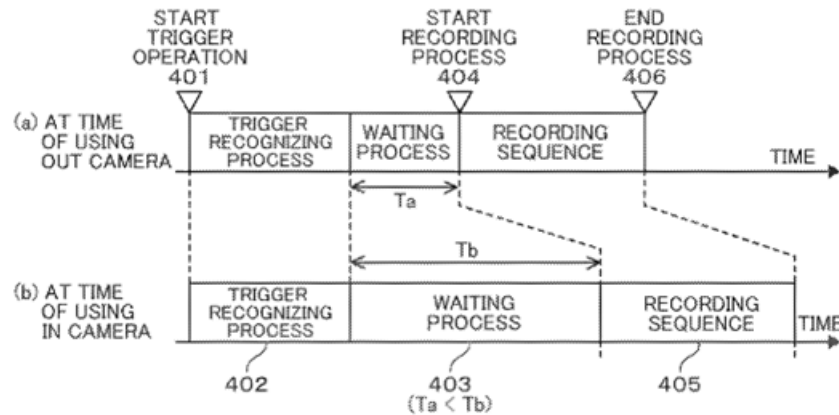
implement a plurality of different photographing processes including taking pictures based on voice input and touch input including after elapse of a first standby time and a second standby time, to give users time to compose themselves before the camera captures a selfie.

56. More specifically, the '757 Patent illustrates a process of automatically switching between recording start delay times in accordance with which one of the two cameras is used. EX1001 at 9:42-47. As the patent describes:

In a control sequence, when a trigger operation start **401** (an input of a command voice) is received, after a trigger recognition process **402** (a process of recognizing a command voice) and a standby process **403** of a predetermined time are performed, a recording process start **404** is performed. Then, a predetermined recording sequence **405** (storage of video data) is executed, and a recording process end **406** is performed.

EX1001 at 9:48-55.

FIG. 9



EX1001, FIG. 9

As illustrated in (a), in a case where a subject is photographed using the second imaging unit **124** (out camera), a standby process **403** of a standby time T_a is performed. On the other hand, as illustrated in (b), in a case where a subject is photographed using the first imaging unit **123** (in camera), a standby process **403** of a standby time T_b is performed. Here, the standby times of both the cases are different from each other, and the standby time T_b is set to be longer than the standby time T_a ($T_a < T_b$). Accordingly, a delay time until the recording process start **404** from the trigger operation start **401** is longer at the time of using the in camera illustrated in (b) than at the time of using the out camera illustrated in (a). In this way, the delay time is automatically switched over in accordance with selection of one of the second imaging unit **124** (out camera) and the first imaging unit **123** (in

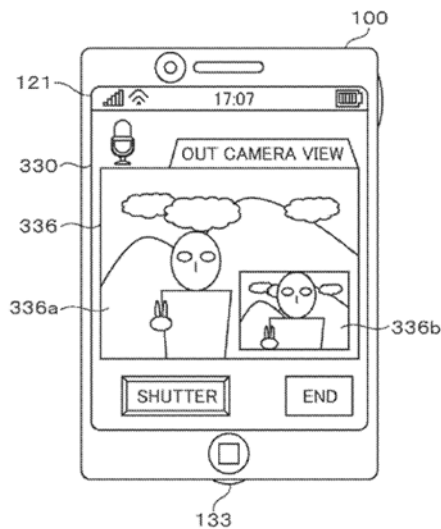
camera). Therefore, an optimal video corresponding to a photographing target (an external subject/a self-image) can be recorded.

EX1001, 9:56-10:6.

57. This control sequence through the control unit can set a delay time until the start of the recording process performed by the recording unit after input of the command voice in accordance with the imaging unit enabled by the operation unit. Here, the control unit sets the delay time of a case where the first imaging unit is enabled by the operation unit to be longer than the delay time of a case where the second imaging unit is enabled. *Id.* at 2:67-3:7. After the image is recorded, a communication processing unit in the device can also transmit the image to a server for storage. *Id.* at 7:6-38.

58. Figure 12 illustrates an example of a screen on which two camera videos are composed and displayed:

FIG. 12



EX1001, FIG. 12. “In this case, both the first imaging unit 123 (in camera) and the second imaging unit 124 (out camera) are simultaneously enabled, and two units of video data are input.” *Id.* at 13:33-35.

B. Prosecution History of the '757 Patent

59. U.S. Application No. 16/686,467 (the “’467 Application”), which issued as the ’757 Patent, was filed on 11/18/2019. The ’467 Application claimed priority to a series of continuation applications: (1) U.S. Application No. 15/678,265, filed on August 16, 2017, now U.S. Patent No. 10,511,757, (2) U.S. Application No. 14/917,586, filed on September 12, 2013 as application No. PCT/JP2013/074728, now U.S. Patent No. 9,774,776.

C. Level of Ordinary Skill in the Art

60. I understand that patent 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. In the case of the ’757 Patent, the relevant field of art for the ’757 Patent is computing devices with voice and touch interfaces.

61. For the ’757 Patent, a person of ordinary skill in the art at the time the first priority application to the ’757 Patent was filed (on or around February 9, 2011) would have had a bachelor’s degree in electrical or computer engineering or a comparable field of study, plus approximately two to three years of professional experience with camera technology. Additional education or experience might substitute for the above requirements.

62. I at least met this definition of a person of ordinary skill in the art at the time of the inventions of the ’757 Patent (no later than September 2013).

D. Claims of the ’757 Patent At Issue

63. I understand that the following claims of the ’757 Patent are at issue:

’757 Patent Claim Element Number	Claim Text
[1.pre]	An image recording device configured to execute a plurality of different photographing processes, comprising:

'757 Patent Claim Element Number	Claim Text
[1.a]	an audio input interface configured to receive a command voice;
[1.b]	a touch display arranged on a first surface of the image recording device and configured to display an image signal and receive a touch operation instruction;
[1.c]	a first camera arranged on a same side of the touch display and configured to photograph an object and acquire a first image signal;
[1.d]	a second camera arranged on an opposite side of the touch display and configured to photograph an object and acquire a second image signal;
[1.e]	a recorder configured to record at least one of the first image signal or the second image signal on a storage; and
[1.f]	a controller,
[1.g]	wherein the controller is configured to: control such that, when the audio input interface receives the command voice giving a first instruction to start a recording of an image signal, the recorder starts a recording of the first image signal acquired by the first camera on the storage in response to the first instruction,
[1.h]	control such that, when the touch display receives the touch operation instruction giving a second instruction to start a recording of an image signal, the recorder starts a recording of the second image signal acquired by the second camera on the storage in response to the second instruction, and
[1.i]	control such that a first standby time of a case where the first camera is enabled and the second camera is disabled is longer than a second standby time of a case where the second camera is enabled and the first camera is disabled,
[1.j]	wherein the first standby time is a time from a recognition of the first instruction to a start of the recording of the first image signal acquired by the first camera, and the second standby time is a time from a recognition of the second instruction to a start of the recording of the second image signal acquired by the second camera.

'757 Patent Claim Element Number	Claim Text
[2.]	The image recording device according to claim 1, wherein the first camera is enabled in accordance with the command voice.
[3.]	The image recording device according to claim 1, wherein the first standby time is settable or selectable by a user.
[4.]	The image recording device according to claim 1, wherein the second standby time is settable or selectable by a user.
[5.]	The image recording device according to claim 1, wherein the controller causes an elapse state of the first standby time from the photographing trigger to the recording start of the image signal to the recorder to be displayed on the touch display.
[6.]	The image recording device according to claim 1, wherein the controller causes an elapse state of the second standby time from the photographing trigger to the recording start of the image signal to the recorder to be displayed on the touch display.
[7.]	The image recording device according to claim 1, wherein the storage is an internal storage of the image recording device.
[8.]	The image recording device according to claim 1, wherein the storage is an external storage connected to the image recording device.
[9.pre]	The image recording device according to claim 1, further comprising,
[9.a]	a communication unit including circuitry and configured to perform communication with a server device on the Internet,
[9.b]	wherein the recorder is configured to record the first image signal input from the first camera or the second image signal from the second camera in the server device through the communication unit.
[10.pre]	The image recording device according to claim 1, further comprising,
[10.a]	a command voice storage configured to store a command voice for instructing photographing,

'757 Patent Claim Element Number	Claim Text
[10.b]	wherein the recorder is configured to perform control such that a command voice to be recorded in the command voice storage is received from the audio input interface and stored in the command voice storage as a command voice registration process, and
[10.c]	in the first photographing process, the recorder determines that the command voice instructs the photographing when the command voice input to the audio input interface is identical to the command voice stored in the command voice storage, and determines that the command voice does not instruct the photographing when the command voice input to the audio input interface is not identical to the command voice stored in the command voice storage.
[11.pre]	An image recording method of an image recording device, comprising:
[11.a]	photographing an object and acquiring an image signal by a first camera or a second camera, the first camera being arranged on the same face side of a touch display and configured to acquire a first image signal, the second camera being arranged on an opposite side of the touch display and configured to acquire a second image signal;
[11.b]	in a case that the first camera is used for photographing: receiving a command voice from an audio input interface;
[11.c]	determining whether or not the command voice includes a first instruction to start a recording of the first image signal;
[11.d]	performing a first standby process during a first predetermined time when the command voice includes the first instruction and when the first camera is enabled and the second camera is disabled; and
[11.e]	start recording the first image signal acquired by the first camera after the first predetermined time; and
[11.f]	in a case that the second camera is used for photographing: receiving a touch operation instruction from the touch display;

'757 Patent Claim Element Number	Claim Text
[11.g]	determining whether or not the touch operation instruction includes a second instruction to start a recording of the second image signal;
[11.h]	performing a second standby process during a second predetermined time when the touch operation instruction includes the second instruction and when the second camera is enabled and the first camera is disabled; and
[11.i]	start recording the second image signal acquired by the second camera after the second predetermined time,
[11.j]	wherein the first predetermined time is set to be longer than the second predetermined time, and
[11.k]	wherein the first predetermined time is a time from a recognition of the first instruction to a start of the recording of the first image signal acquired by the first camera, and the second predetermined time is a time from a recognition of the second instruction to a start of the recording of the second image signal acquired by the second camera.

VI. CLAIM CONSTRUCTION FOR THE '757 PATENT

64. For any terms not specifically construed, I have applied the ordinary and customary meaning that these terms would have had to a person of ordinary skill in the art at the time of the invention (around September 2013) in view of the patent's specification. In other words, I have interpreted the remaining terms in accordance with the "plain and ordinary" meaning

E. "first camera arranged on a same side of the touch display" / "first camera being arranged on the same face side of a touch display" and "second camera arranged on an opposite side of the

touch display” / “second camera being arranged on an opposite side of the touch display”

65. In my opinion the intrinsic evidence makes clear that no construction is necessary and that the plain and ordinary meaning of these claim terms is abundantly clear. Specifically, claim 1 of the '757 Patent recites “a first camera arranged on a same side of the touch display” and “a second camera arranged on an opposite side of the touch display.” '757 Patent, Claim 1. Further, Figs. 4(a) and 4(b) of '757 Patent include drawings showing a first camera 123 arranged on a same side of touch display 141 and second camera 124 arranged on an opposite side of touch display 141. *Id.*, Figs. 4(a)-4(b). Here, both the claims and specification make clear that the plain and ordinary meaning is an arrangement of two cameras such that one camera is on the same side as the touch display and the second camera is opposite to the touch display. It is my opinion that no further construction is necessary.

F. District Court Proceeding

66. In the District Court Proceeding, Petitioners advanced a construction that the second camera limitation should be construed as “plain and ordinary meaning, which is that the first camera is located on a same side of the touch display.” EX2006 at 16. While the district court adopted Petitioners’ construction, it did so with the explanation that “the dispute is whether the recited arrangement contemplates the first and second cameras begin located together on the same side of the recording device.” *Id.* at 17. The claim construction order confirmed that the

plain and ordinary meaning includes a front and rear camera as shown in Figures 4a and 4b of the '757 Patent. *See id.* at 18. In addition, intrinsic evidence in the '757 Patent's specification makes this arrangement clear. *See, e.g.*, EX1001 at Abstract, 2:3-15, 2:56-59, 7:56-60. Accordingly, it is my opinion that the plain and ordinary meaning is an arrangement of two cameras such that one camera is on the same side of the device as the touch display and the second camera is on the opposite side of the device as the touch display. No further construction is necessary.

67. To the extent that Mr. Guidash argues that the district court's construction requires an arrangement of two cameras such that one camera is on one side of the touch display and the second camera is on an opposite side of the touch display, it is my opinion that the Petition provides no evidence of such an arrangement in the prior art. Accordingly, any such arguments would undermine the entire Petition and common sense.

VII. SUMMARY OF PETITIONERS' PROPOSED GROUNDS

68. The Petition raises four grounds of alleged obviousness based on the following six references:

- U.S. Patent Publication No. 2014/0247368 ("Chinn") (Ex. 1004),
- Translation of JP2001305642A ("Takahashi") (Ex. 1005),
- U.S. Patent Publication No. 2010/037026 ("Kim") (Ex. 1008),
- U.S. Patent Publication No. 2010/0026815 ("Yamamoto") (Ex. 1009),

- U.S. Patent Publication No. 2009/0167881 (“Thorn”) (Ex. 1011), and
- Casio Exilim EX-V7 Users Guide (“EX-V7”) (Ex. 1014).

Ground	'757 Patent Claim(s)	Type of Challenge	Primary Reference	Secondary Reference(s)
1	1-8, 10-11	§ 103	Chinn	(1) Takahashi; (2) EX-V7
2	9	§ 103	Chinn	(1) Takahashi; (2) EX-V7 (3) Kim
3	1-3, 7-10	§ 103	Kim	(1) Yamamoto (2) Thorn
4	4-6, 11	§ 103	Kim	(1) Yamamoto (2) Thorn (3) Chinn

A. Chinn (Ex. 1004)

69. Chinn, titled “Ready Click Camera Control,” is an abandoned patent application that was published on September 4, 2014 based on a March 4, 2013 filing date. Chinn describes technologies relating to “ready click” camera control. Camera devices may be equipped with a camera, a microphone, a processor, a memory, and a camera control system stored in the memory and executable by the processor. The camera control system may be configured to provide any of a variety of voice-interactive features, such as a voice-activated shutter, a voice-activated timer, a voice-activated flash, a voice-activated focus setting, a voice-activated ISO setting,

a voice-activated scene setting, and/or a variety of other features, including both voice-interactive as well as other features described herein. Ex. 1004, Abstract.

B. Takahashi (Ex. 1005)

70. Takahashi, titled “Image Capturing Device,” is a Japanese Unexamined Patent Application Publication published on November 2, 2001. Takahashi discloses a one-camera system for taking photographs using voice audio input in cases where the photographer is the subject. Takahashi describes a voice audio registration mode that is set using a mode dial 20, and a first voice audio pattern for shutter release that is registered in response to a voice audio input using a microphone 16. When the voice audio photography mode is set, a voice audio recognition process is performed on voice audio input using the microphone 16, with focus adjustment being performed if voice audio corresponding to the first voice audio pattern is recognized, and shutter release control being performed after a prescribed amount of time has elapsed if voice audio corresponding to the second voice audio pattern is recognized. Ex. 1005, Abstract.

C. Kim (Ex. 1008)

71. Kim, titled “Mobile Terminal and Method of Controlling Display Thereof,” was published June 3, 2010 based on a filing date of April 9, 2009. Kim discloses a mobile terminal that includes a projector module projecting an image onto an external surface, a display having a touchscreen, and a controller configured

to receive a control signal corresponding to a touch input received via the display, where the control signal is for adjusting at least a size or a position of an external display area formed on the external surface such that the external display area is adjusted based on a touch pattern of the touch input, to adjust the external display area in response to the control signal, and to control the projector module to project the image on the adjusted external display area, wherein a screen area set and positioned according to the touch input is displayed via the touchscreen and the external display area is adjusted according to a size and a position of the screen area.

Ex. 1008. Abstract.

D. Yamamoto (Ex. 1009)

72. Yamamoto, titled “Information Processing Method, Information Processing Apparatus, and Computer-Readable Storage Medium,” is a U.S. Patent Application filed on July 24, 2009 and published on February 4, 2010. Yamamoto discloses a method implemented by a single-camera device that includes detecting a start and an end of a first sound that satisfies a present standard, obtaining image data in response to detection of the start and end of the first sound, storing the obtained image data, and determining the image data to be data that is to be stored, in accordance with a content of the first sound. Ex. 1009, Abstract.

E. Thorn (Ex. 1011)

73. Thorn, titled “Camera System and Method for Operating a Camera System,” was filed on January 2, 2008 and published on July 2, 2009. Thorn discloses a one-camera system and method for controlling a camera assembly that may include monitoring an image field for blinks by one or more subjects in the image field. The monitoring may be carried out by generating a video signal of the image field, the video signal having a sequence of frames; subtracting a previous frame of the video signal from a current frame of the video signal to generate a difference frame; and identifying image data in the difference frame that is representative of a blink. Each blink may be tracked and associated with a subject from the one or more subjects. Statistical data regarding blink duration and blink rate for each subject from the one or more subjects may be generated. In response to user input to command the taking of a photograph, a determination if a blink is in progress may be made and a flash of the camera assembly may be fired and image data for the photograph may be captured if no blink is detected at the time of the command. Otherwise, firing of the flash and the capturing of the image data may be delayed by an amount of time that is based on the statistical data to minimize firing the flash and capturing the image data during a blink of the one or more subjects. Ex. 1011, Abstract.

F. EX-V7 (Ex. 1014)

74. EX-V7 is a digital camera user guide. EX-V7 discloses a one-camera system that includes a 2-second self-timer “to prevent blur due to hand movement.” Ex. 1014, at 77.

VIII. GROUND 1: MR. GUIDASH HAS FAILED TO ESTABLISH THAT CLAIMS 1-8 AND 10-11 ARE RENDERED OBVIOUS BY THE COMBIANTION OF CHINN, TAKAHASHI, AND EX-V7

75. Mr. Guidash has failed to show by a preponderance of the evidence that Chinn in view of Takahashi and EX-V7 teaches each and every element of claims 1-8 and 10-11. Specifically, Chinn in combination with Takahashi and EX-V7 does not teach elements [1.i], [1.g], [1.j], [11.d], and [11.h].

A. The Combination of Chinn, Takahashi, and EX-V7 Fails to Render Obvious Claim Element [1.i]

76. Mr. Guidash fails to show that the Chinn-Takahashi-EX-V7 combination discloses or renders obvious claim element [1.i], which recites “control such that a first standby time of a case where the first camera is enabled and the second camera is disabled is longer than a second standby time of a case where the second camera is enabled and the first camera is disabled.” For this limitation, Petitioners rely nearly entirely on Mr. Guidash to fill in the gaps of their three-reference combination. In reality, none of Chinn, Takahashi, or EX-V7 disclose element [1.i]. Mr. Guidash fails to show Chinn, Takahashi, or EX-V7 disclose element [1.i] by a preponderance of the evidence for several reasons.

1. *Chinn does not disclose a voice command for enabling the first camera and disabling the second camera*

77. First, Mr. Guidash separates out the features of this claim element into two sections, (1) Enabled/Disabled First/Second Camera and (2) First Standby Time > Second Standby Time. EX1003, ¶100. In doing so, Mr. Guidash glosses over the requirements of the claim element. For example, the first standby time and the first camera enabled are interrelated. In other words, the first standby time must be implemented while starting to record an image using the enabled first camera. Yet, Mr. Guidash never shows whether the alleged prior art combination ties the alleged first standby time with the first camera being enabled with reference to specific teaching in Chinn (Mr. Guidash relies on Chinn alone for this element in Ground 1).

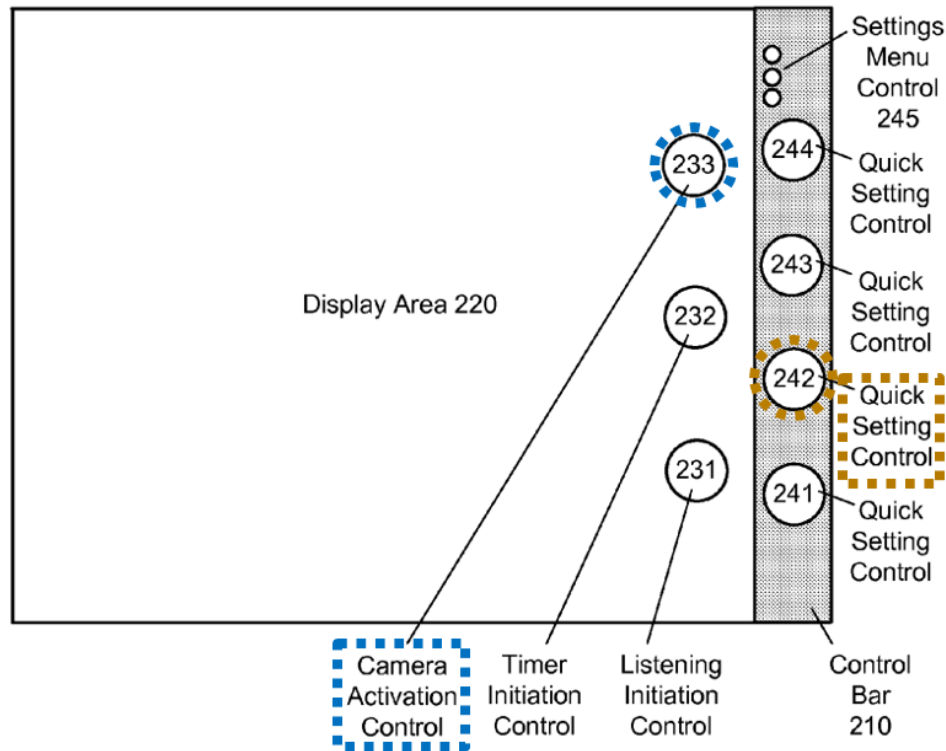
78. To fully appreciate the how Mr. Guidash errs in his analysis of Claim 1, it is important to trace how Claim 1 links various elements together. Claim 1 of the '757 Patent links the “command voice giving a first instruction” (element [1.g]) with the “first standby time” (element [1.i]) in element [1.j]: the first standby time, corresponding to a case where the first camera is enabled and the second camera is disabled, is a time from a recognition of the first instruction, which is given by the command voice, to a start of the recording of the first image signal acquired by the first camera. For example, claim element [1.i] recites “control such that **a first standby time of a case where the first camera is enabled** and the second camera is disabled is longer than a second standby time of a case where the second camera

is enabled and the first camera is disabled,” and that “the first standby time is a time **from a recognition of the first instruction**,” where the first instruction is “the command voice giving a first instruction.” See EX1001, claim 1. Thus, the first standby time is where **the** first camera is enabled and the first standby time is from a recognition of **the** first instruction, which is given by **the** command voice giving a first instruction. The claim provides clear antecedent basis and requires that the first camera is enabled and the second camera is disabled in response to the command voice. Mr. Guidash has simply ignored this antecedent basis and provided no evidence that Chinn discloses such a capability.

79. In contrast, Mr. Guidash relies on a voice command for “set timer: 10 seconds” as the alleged command voice. EX1003, ¶102. However, the language of the claims is clear that the command voice gives “a first instruction to start a recording of an image signal” and that “the recorder starts a recording of the first image signal acquired by the first camera on the storage in response to the first instruction.” EX1001, Claim [1.g]. Using a voice command to set a timer length does not meet the claim language of “a first instruction to start a recording of an image signal” because Chinn’s “set timer” command does not start a recording of an image signal. See EX1004, ¶25. Accordingly, Mr. Guidash has failed to show by a preponderance of evidence that Chinn alone or in combination with Takahashi or EX-V7 teaches at least element [1.i].

80. Similarly, Mr. Guidash’s reliance on a user’s touch input “via the camera selection control 242” does not demonstrate an understanding of the claim scope. EX1003, ¶¶100, 101. As explained, claim 1 provides clear antecedent basis and requires that the first camera is enabled and the second camera is disabled in response to the command voice. Mr. Guidash, however, points to Chinn’s two-step combination of (1) a voice command for taking a picture (“voice-activated shutter”) and (2) manual selection of the camera “via the camera selection control 242.” EX1003, ¶100. Mr. Guidash fails to address the plain reading of the claim and do not offer any opinions—grounded in Chinn or otherwise—for a single voice command that enables the first camera, disables the second camera, and initiates a first standby time preceding the capture of an image with the first camera.

81. In fact, Chinn has designed a system with specific user interfaces and a settings screen that emphasize this two-step, two-instruction process that requires a separation between selecting a front or rear camera (camera selection control 242) and capturing an image with the selected camera (camera activation control 233):



Ex. 1004, Fig. 2 (showing UI 200 having “Camera Activation Control 233” different from “Quick Setting Control 242”).

82. Thus, Chinn discloses mixing two different input methods corresponding to separate instructions to select a camera and only then capturing an image with that camera, if desired by the user. Therefore, Chinn cannot disclose a voice command for enabling the first camera and disabling the second camera where it exclusively discloses a touch input for such an instruction (in addition, as will be further explained below, Chinn does not disclose disabling). In contrast, Chinn requires a touch input to enable the first camera or second camera. See EX1004, ¶22.

2. *There is no motivation to combine Chinn, Takahashi, and EX-V7*

83. Neither Petitioners nor their expert provide any analysis on why a POSITA would be motivated to change Chinn's voice and touch instructions to a single voice instruction process when Chinn provides its own solution that repeatedly emphasizes a separation of tasks and voice instructions. *See, e.g.,* EX1004, ¶¶23, 25. Moreover, Mr. Guidash does not provide any rationale as to why a POSITA would be motivated to redesign OS 171, Camera Control System 175, and user interfaces 200, 300, and 400 of Chinn to arrive at the claimed invention when Chinn has its own solution of camera selection and then subsequent activation of the camera based on a separate instruction. *See, e.g.,* EX1004, ¶¶23, 25. In short, modifying Chinn to arrive at the claimed invention would require a complete redesign of Chinn's system, and there is no rationale to do so beyond the hindsight-driven analysis set forth by Mr. Guidash. This hindsight driven analysis is particularly obvious where Mr. Guidash cherry-picks various elements from devices such as Takahashi and EX-V7 that pre-date the Chinn device by many years.

3. *Chinn does not disclose the first camera being enabled and the second camera being disabled*

84. Second, Mr. Guidash has failed to demonstrate that the first instruction results in the first camera being enabled and the second camera being disabled. Acknowledging Chinn does not disclose this limitation, Mr. Guidash relies on self-serving hindsight allegations that a "POSITA would have understood the need to

activate the front camera 110 means that it was previously disabled.” However, the need to activate the front camera is set forth in the claims, not in Chinn. This lack of evidence underscored by the lack of citation to Chinn (or any reference) in the Petition or Mr. Guidash’s Declaration (EX1003) supporting an enabled first camera **and** disabled second camera. Instead, Mr. Guidash relies on “user selection of the camera activation control 223” and “the need to activate the back camera 125 means that it was previously disabled.” EX1003, ¶100. But, the claims cover “a case where the first camera is enabled and the second camera is disabled” that is triggered by the first instruction, which is the command voice. Then, the claims switch to cover “a case where the second camera is enabled and the first camera is disabled.” In this case, the front camera was previously enabled and would therefore need to be disabled. None of Petitioners, Mr. Guidash, or Chinn provide a disclosure of disabling a camera that was previously enabled.

85. Additionally, Mr. Guidash’s allegation that a “POSITA would have also understood or at least found obvious that because *only* the back camera 125 is activated, the front camera 110 (i.e., first camera) remains disabled” is not supported by Chinn or the ’757 Patent. EX1003, ¶100 (emphasis added). Petitioners rely solely on Mr. Guidash, with no reference to Chinn, Takahashi, EX-V7, or the intrinsic record to cure this deficiency. Yet, such a broad statement is undermined by Chinn’s own teaching (and Mr. Guidash repeatedly cites (*see, e.g.*, EX1003, ¶¶53, 81, 83,

93, 191, n.1) that “camera control system 175 may be configured to activate the camera, **which may be either or both of camera 110 and/or camera 125.**” EX1004 at ¶ [0023] (emphasis added).

86. As another example, the specification of the '757 Patent undermines Mr. Guidash's assertions by specifically providing an example in Figure 12 of “a screen on which two camera videos are composed and displayed. In this case, both the first imaging unit 123 (in camera) and the second imaging unit 124 (out camera) **are simultaneously enabled**, and two units of video are input.” Ex. 1001, 13:32-36. As such, in light of the intrinsic record, it is clear that a POSITA would not necessarily have understood that “because only the front camera 110 is activated, the back camera 125 (i.e., second camera) would remain disabled.” These explicit cases of simultaneous enablement not only undermine the assertions made by Mr. Guidash, but also further highlight the hindsight driven analysis upon which his opinions are based. Similarly, the camera of Chinn may either stay enabled or may never have been enabled initially, thus not requiring a change to a “disabled” state. This results in a scenario where limitation [1.i] is not met because neither camera in Chinn would change from an enabled state to a disabled state. Mr. Guidash provides no evidence in the disclosure of Chinn that supports their conclusory statements requiring the change in state of cameras and associating such changes of states to standby times. In fact, Mr. Guidash even acknowledges that both Chinn's cameras

may be used to “enable and take images with both cameras simultaneously, so it could do either individually or together.” EX2007 at 53:1-54:3.

87. Mr. Guidash’s arguments that the benefits of a camera remaining disabled “include reducing power consumption and increasing battery life” are also unsupported and incorrect. EX1003, ¶100. Such a statement is based on the assumption that a camera that is in an “inactive state” uses less power because it is powered off. However, in modern mobile devices, including those around September 2013, it would be more efficient for battery life to keep both cameras powered on, and switch between an active and inactive state based on the user’s selection.

88. Thus, Mr. Guidash’s hindsight cannot serve as a basis to find that this claim element is disclosed in Chinn or would be within the knowledge of a POSTIA.

89. Accordingly, Mr. Guidash has not shown by a preponderance of the evidence that the Chinn-Takahashi-EX-V7 combination renders obvious element [1.i].

4. *Chinn does not disclose enabling the second camera and disabling the first camera*

90. For similar reasons to those set forth above, Chinn does not disclose the second “case where the second camera is enabled and the first camera is disabled. For example, Chinn does not disclose disabling any camera and Mr. Guidash fails to demonstrate otherwise. Accordingly, Mr. Guidash has not shown by a

preponderance of the evidence that the Chinn-Takahashi-EX-V7 combination renders obvious element [1.i].

5. *Chinn does not disclose a first standby time that is longer than a second standby time*

91. Mr. Guidash relies on hindsight, scattered prior art combinations, and the user's discretion to attempt to demonstrate a first standby time that is longer than a second standby time. His attempts fall short.

92. Furthermore, Chinn's disclosure in paragraph 40 is incomplete when compared with the claim language. See EX1004 at ¶40; EX1003 at ¶109. Where Chinn discloses that "in response to user selection of shutter control 233, camera control system 175 starts a timer and then takes a picture/initiates video recording after the time period specific for the timer elapses," Chinn fails to describe the length of time for the timer. Instead, the length of time is left to the purview of the user. Petitioners allege that a "POSITA would have found it obvious, and would have been motivated, to set a longer delay for a front-camera selfie than for a rear-camera, touch-initiated photograph" without proper support. Pet. at 12. Instead, Petitioners rely on tangential disclosure for Takahashi's single-camera system and "common sense." *Id.* However, this is improper hindsight.

93. Claim 1 includes a "controller, wherein the controller is configured to: ... control such that **a first standby time** of a case where the first camera is enabled and the second camera is disabled **is longer than a second standby time** of a case

where the second camera is enabled and the first camera is disabled.” EX1001, Claim [1.i]. Contrary to the Mr. Guidash’s arguments, the claims set forth that it is the controller that provides for the longer first standby time in comparison to the second standby time, not the user.

94. The “first standby time of a case where the first camera is enabled and the second camera is disabled” corresponds to “recording of the first image signal acquired by the first camera on the storage in response to the first instruction,” which is the voice command. EX1001, Claim [1.g]. Similarly, the “standby time of a case where the second camera is enabled and the first camera is disabled” corresponds to “recording of the second image signal acquired by the second camera on the storage in response to the second instruction,” which is a touch instruction. *Id.*, Claim [1.h].

95. Accordingly, the controller controls the standby time based on the method of input (*i.e.*, voice or touch) and which camera is enabled (front or rear). *See* EX1001 at 6:42-45, 9:42-47, 12:12-19. Leaving such a determination to the user, as Mr. Guidash describes, ignores the advantages of the ’757 Patent described therein. For example, the specification describes a “distinctive feature of this embodiment is a camera operation (recording start timing switching) performed by the camera function executing unit 104b, the voice recognition executing unit 104c, and the timing display executing unit 104d.” EX1001 at 6:42-45. As another example, “in accordance with the out camera or the in camera that is operated, a

delay time until start of recording from timing at which the trigger is received is **automatically** switched over.” EX1001 at 12:12-19. This automatic switching that does not require user intervention is part of the inventiveness of the ’757 Patent. Finally, Figure 9 illustrates “the process of controlling switching between delay times in accordance with which one of the two cameras is used.” EX1001 at 9:42-47.

96. Therefore, Chinn’s user-selected timers do not meet the claim limitation. Furthermore, Takahashi at best describes using a delay for voice-activated images in a single-camera system. See EX1005 at ¶41. Accordingly, the prior art fails to describe a controller that controls a standby time based on *both* input type *and* with which one of two cameras is used.

B. Chinn, Takahashi, and EX-V7 Do Not Render Obvious Claim Elements [1.g] and [1.j]

97. Claim [1.g] recites “control such that, when the audio input interface receives the command voice giving a **first instruction** to start a recording of an image signal, the recorder **starts a recording** of the first image signal acquired by the first camera on the storage **in response to the first instruction** and claim [1.j] recites “wherein the **first standby time** is a time from a recognition of **the first instruction** to a start of the recording of the first image signal acquired by the first camera, and the second standby time is a time from a recognition of the second instruction to a start of the recording of the second image signal acquired by the

second camera.” Thus, the antecedent basis in claim 1 dictates that Chinn record a first image signal acquired by a first camera in response to the same first instruction that also starts the first standby time “wherein the first standby time is a time from a recognition of the first instruction to a start of the recording of the first image signal acquired by the first camera.”

98. Mr. Guidash, however, gives short shrift to this antecedent basis when discussing claim element [1.j], with an entirely conclusory statement: “The Chinn-Takahashi-EX-V7 combination renders obvious that [limitation [1j]] ... for at least the reasons set forth above for limitation [1i]. See above §§X.B.10, X.A.” EX1003, ¶103.” Mr. Guidash relies *entirely* on his analysis of claim element [1.i], and it fails to show the cited prior art renders this element obvious for at least the reasons above with respect to claim element[1.i]. As such, Mr. Guidash has not shown by a preponderance of the evidence that the Chinn-Takahashi-EX-V7 combination renders claim element [1.j] obvious.

99. Nevertheless, there are additional reasons why this claim element is not obvious over the Chinn-Takahashi-EX-V7 combination. Mr. Guidash fails to meet his burden in showing the “first standby time is a time from a recognition of the first instruction to a start of the recording of the first image signal” and the “second standby time is a time from a recognition of the second instruction to a start of the recording of the second image signal.” For example, as introduced above with

respect to claim element [1.i], Chinn discloses providing separate instructions for setting a timer, activating a camera, and taking a picture. *See* Ex. 1004, at Fig. 3 (showing UI 300 having “take the picture” setting 302 different from “start 3 sec ready countdown” setting 303 and “start the timer” setting 304); *id.* at Fig. 4 (showing UI 400 having “take [1/2] photo[s]” settings 401 and 402 different from “Start timer length” settings 411, 412, 413, and 414). Thus, Chinn cannot disclose the claimed “first instruction” that is required by claim elements [1.g] and [1.j] because even if an instruction of setting a timer begins a standby time in Chinn, Chinn does not disclose starting “a recording of the first image signal . . . on the storage in response to the first instruction,” because Chinn requires a second separate instruction to activate a camera, let alone begin recording of an image signal by the camera.

100. Nowhere in his discussion of the purported standby times in the Chinn-Takahashi-EX-V7 combination do Mr. Guidash account for such disclosures in Chinn and why a POSITA would be motivated to completely redesign Chinn’s multi-instruction and separate instruction system to arrive at the claimed “first instruction.”

101. Thus, Mr. Guidash has not shown by a preponderance of the evidence that claim elements [1.g] and [1.j] are met by the Chinn-Takahashi-EX-V7 combination.

C. Chinn, Takahashi, and Ex-V7 Do Not Render Obvious Claim Elements [11.d] and [11.h]

102. Claim element [11.d] recites “performing a first standby process during a first predetermined time when the command voice includes the first instruction and when the first camera is enabled and the second camera is disabled.” Claim element [11.h] recites “performing a second standby process during a second predetermined time when the touch operation instruction includes the second instruction and when the second camera is enabled and the first camera is disabled.”

103. Mr. Guidash refers back to §VI.B.10 (element [1.i]) for their analysis of these two elements. For the reasons expressed above with respect to elements [1.i] and [1.j], Mr. Guidash has not shown by a preponderance of the evidence that elements [11.d] and [11.h] are rendered unpatentable the Chinn-Takahashi-EX-V7 combination.

D. Chinn, Takahashi, and EX-V7 Do Not Render Obvious Claims 2-8, and 10.

104. Claims 2-8 and 10 all depend from independent claim 1, for which Mr. Guidash has failed to show that the Chinn-Takahashi-EX-V7 combination renders the independent claim unpatentable. Thus, for the same reasons, Mr. Guidash has failed to show by a preponderance of the evidence that claims 2-8 and 10 are rendered unpatentable by the Chinn-Takahashi-EX-V7 combination.

IX. GROUND 2: MR. GUIDASH HAS FAILED TO ESTABLISH THAT CLAIM 9 IS RENDERED OBVIOUS BY THE COMBINATION OF CHINN, TAKAHASHI, EX-V7, AND KIM

105. Ground 2 challenges claim 9, which depends from claim 1. Mr. Guidash does not rely on the additional Kim reference to cure any of the deficiencies of the Chinn-Takahashi-EX-V7 combination with respect to claim 1. As such, due to at least the reasons set forth above with respect to Ground 1, Mr. Guidash has similarly failed to establish that claim 9 is rendered obvious by the combination of Chinn, Takahashi, EX-V7, and Kim.

X. GROUND 3: MR. GUIDASH HAS FAILED TO ESTABLISH THAT CLAIMS 1-3 AND 7-10 ARE RENDERED OBVIOUS BY THE COMBINATIONS OF KIM, YAMAMOTO, AND THORN

106. Ground 3 fails because, even if POSITA would have been motivated to combine Kim, Yamamoto, and Thorn, Mr. Guidash has failed to show with particularity how such a combination would render obvious elements [1.i], [1.j], [11.d], and [11.h]. As such, Mr. Guidash has failed to demonstrate obviousness by a preponderance of the evidence.

A. Kim, Yamamoto, and Thorn Do Not Render Obvious Claim Element [1.i]

107. Claim [1.i] recites “control such that a first standby time of a case where the first camera is enabled and the second camera is disabled is longer than a second standby time of a case where the second camera is enabled and the first camera is disabled.” For this limitation, Petitioners rely on Mr. Guidash, rather than the

references themselves because none of Kim, Yamamoto, or Thorn disclose element [1.i]. Mr. Guidash's pronouncements of what POSITA would have understood to not carry Petitioners' burden of showing element [1.i] by a preponderance of the evidence.

1. *The Kim-Yamamoto-Thorn combination does not disclose a command voice for enabling the first camera and disabling the second camera*

108. Again, Mr. Guidash separates out the features of this claim element into two sections, (1) Enabled/Disabled First/Second Camera and (2) First Standby Time > Second Standby Time. EX1003, ¶¶201-202. By doing so, Mr. Guidash attempts to hide the absence of disclosure across the three prior art references directed to the interrelated nature of the first standby time with the first camera and the second standby time with the second camera. Mr. Guidash cannot show that the alleged prior art combination ties the alleged first standby time to the first camera being enabled with reference to specific evidence.

109. Claim 1 of the '757 Patent links the "command voice giving a first instruction" (element [1.g]) with the "first standby time" (element [1.i]) in element [1.j]: the first standby time, corresponding to a case where the first camera is enabled and the second camera is disabled, is a time from a recognition of the first instruction, which is given by the command voice, to start a recording of the first image signal acquired by the first camera. For example, the claim recites "control such that **a first**

standby time of a case where the first camera is enabled and the second camera is disabled is longer than a second standby time of a case where the second camera is enabled and the first camera is disabled,” and that “the first standby time is a time **from a recognition of the first instruction,**” where the first instruction is “the command voice giving a first instruction.” See EX1001, claim 1. Thus, the first standby time is where **the** first camera is enabled and the first standby time is from a recognition of **the** first instruction, which is given by **the** command voice giving a first instruction. The claim provides clear antecedent basis and requires that the first camera is enabled and the second camera is disabled in response to the command voice. Mr. Guidash again ignores this antecedent basis and provided no evidence that the Kim-Yamamoto-Thorn combination discloses such a capability.

110. Instead, Mr. Guidash points to Yamamoto’s disclosure of a “certain amount of time” following a voice command of “Say Cheese” as a first standby time. Pet. at 76. However, this alleged first standby time is dependent upon the input method *alone*, independent of any enabled/disabled status of the first camera or the second camera because Yamamoto does not disclose multiple cameras. The claim language clearly links the first standby time with the “case where the first camera is enabled **and** the second camera is disabled.” Nor does Kim disclose disabling a “second camera” or disabling a “first camera,” and associating such disabling to first

and second standby times. Accordingly, the Petition's mere identification of a "certain amount of time" is deficient.

111. Furthermore, beyond identifying the inept disclosure of Yamamoto (discussed above), Mr. Guidash also fails to explain **how** the "certain period of time" of Yamamoto would be combined with Kim. Neither Petitioners nor their expert provide any analysis as to why a POSITA would be motivated to combine Yamamoto's delay for a single camera device with the multiple camera device of Kim. Specifically, where Yamamoto only discloses a single camera facing away from a user (*i.e.*, a second camera) the Mr. Guidash fails to explain how a POSITA would be motivated to combine the standby time of Yamamoto with the dual camera system in Kim, which lacks any sort of voice activated image capture or corresponding standby time.

112. Moreover, Mr. Guidash relies solely on hindsight and the knowledge of a POSITA to show that a "POSITA would have understood the need to activate the front camera means that it was previously inactive/disabled" and that "because only the front camera is activated, the back camera [] would remain disabled." EX1003, ¶201. However, as with Grounds 1 and 2, Mr. Guidash's conclusion is contradicted by the specification of the '757 Patent, which specifically discloses an example in Figure 12 describing "a screen on which two camera videos are composed and displayed. In this case, both the first imaging unit 123 (in camera) and the second

imaging unit 124 (out camera) **are simultaneously enabled**, and two units of video are input.” Ex. 1001, 13:32-36. As such, in light of the intrinsic record, it is clear that a POSITA would not automatically have understood that “because only the front camera is activated, the back camera (i.e., second camera) would remain disabled.” Thus, Mr. Guidash has not shown through their evidence a scenario where the first camera is enabled and the second camera is disabled.

2. *The Kim-Yamamoto-Thorn combination does not disclose the first camera being enabled and the second camera being disabled*

113. As with Ground 1, Mr. Guidash has failed to demonstrate that the first instruction results in the first camera being enabled and the second camera being disabled. Mr. Guidash refers to the analysis for [1.g] in Ground 3 as disclosing the supposed understanding of a POSITA that “that the need to activate the front camera means that it was previously inactive/disabled.” EX1003, ¶201. However, the “need to activate the front camera” is based on the claim language and not any teaching or disclosure in the prior art, demonstrating Mr. Guidash’s improper hindsight. Further, Mr. Guidash admits in his analysis for element [1.g] that “Kim does not explicitly disclose receiving a command voice for activating the front camera 121.” EX1003 at ¶191. Quizzically, Mr. Guidash repeats the same flawed analysis based on Chinn

to support his contortion of the prior art. *Id.*⁵ Accordingly, for at least the reasons set forth above in Ground 1, or devoid of support in Kim, Yamamoto, and Thorn, Ground 3 is similarly deficient.

114. Additionally, Yamamoto does not disclose a voice command that results in the first camera being enabled and the second camera being disabled. While Yamamoto discloses “speech commands for starting an image capturing operation” (EX1009 at ¶ 205), none of the commands describe an enabled or disabled camera. Indeed, Yamamoto only discloses a single camera. *See* EX1009 at ¶ 32. Therefore, the concept of selecting—let alone enabling—different cameras is necessarily absent from Yamamoto.

115. Additionally, Mr. Guidash allegation that a “POSITA would have also understood or at least found obvious that because *only* the back camera 125 is activated, the front camera 110 (i.e., first camera) remains disabled” is not supported by Kim, Yamamoto, or the ’757 Patent. EX1003, ¶202 (emphasis added). Petitioners again rely solely on Mr. Guidash, with no reference to Kim, Yamamoto, Thorn, or the intrinsic record to cure this deficiency. To the extent Mr. Guidash relies on the teaching of Chinn, the flaws of this broad statement are highlighted in Section VIII.A

⁵ Mr. Guidash confirmed during cross examination that this was a typo and that he was not relying on a Chinn in combination with Kim, Yamamoto, and Thorn for Ground 3. *See* EX2007 at 25:2-26:7.

above, and there is no attempt by Mr. Guidash to salvage this gaping hole in the prior art otherwise.

3. *The Kim-Yamamoto-Thorn combination does not disclose enabling the second camera and disabling the first camera*

116. For similar reasons to those set forth above, the Kim-Yamamoto-Thorn combination does not disclose the second “case where the second camera is enabled and the first camera is disabled. For example, none of Kim, Yamamoto, or Thorn discloses disabling of any camera and Mr. Guidash fails to demonstrate otherwise. Accordingly, Mr. Guidash has not shown by a preponderance of the evidence that the Kim-Yamamoto-Thorn combination renders obvious element [1.i].

4. *The Kim-Yamamoto-Thorn combination does not disclose a first standby time that is longer than a second standby time*

117. Mr. Guidash’s reliance on Yamamoto’s description of a “0.5 second delay before taking a voice activated image” (EX1003, ¶204 (citing EX1009, ¶249), is, at best, incomplete, particularly when paired with Kim’s silence regarding any standby time.

118. Claim 1 includes a “controller, wherein the controller is configured to: ... control such that **a first standby time** of a case where the first camera is enabled and the second camera is disabled **is longer than a second standby time** of a case where the second camera is enabled and the first camera is disabled.” EX1001, Claim

[1.i]. Contrary to Mr. Guidash's arguments, it is the controller that provides for the longer first standby time in comparison to the second standby time, not the user.

119. The "first standby time of a case where the first camera is enabled and the second camera is disabled" corresponds to "recording of the first image signal acquired by the first camera on the storage in response to the first instruction," which is given by the command voice. EX1001, Claim [1.g]. Similarly, the "standby time of a case where the second camera is enabled and the first camera is disabled" corresponds to "recording of the second image signal acquired by the second camera on the storage in response to the second instruction," which is a touch instruction. *Id.*, Claim [1.h].

120. Accordingly, the controller controls the standby time based on the method of input (*i.e.*, voice or touch) and which camera is enabled (front or rear). *See* EX1001 at 6:42-45, 9:42-47, 12:12-19. Mr. Guidash's hindsight-driven selection of 0.5 seconds and 0 seconds, ignores the advantages described in the '757 Patent. For example, the specification describes a "distinctive feature of this embodiment is a camera operation (recording start timing switching) performed by the camera function executing unit 104b, the voice recognition executing unit 104c, and the timing display executing unit 104d." EX1001 at 6:42-45. As another example, "in accordance with the out camera or the in camera that is operated, a delay time until start of recording from timing at which the trigger is received is **automatically**

switched over.” EX1001 at 12:12-19. This automatic switching that does not require user intervention is part of the inventiveness of the ’757 Patent. Finally, Figure 9 illustrates “the process of controlling switching between delays times in accordance with which one of the two cameras is used.” EX1001 at 9:42-47. Therefore, Yamamoto at best describes using a delay for voice-activated images in a single-camera system. See EX1009 at ¶32.

121. Additionally, Kim offers no discussion of a delay whereas the ’757 Patent specifies that “when the second imaging unit 124 (out camera) is used, in order to further decrease the delay time, **it is preferable that the standby time Ta of the standby process 403 is close to zero.**” Ex1001, 10:19-22 (emphases added).

122. Accordingly, the prior art fails to describe a controller that controls a standby time based on *both* input type *and* with which one of two cameras is used.

5. *There is no motivation to combine Kim, Yamamoto, and Thorn*

123. Mr. Guidash fails to provide adequate analysis on why a POSITA would be motivated to combine the voice commands for capturing an images in Yamamoto with the dual camera system of Kim. For example, Mr. Guidash allege that “Kim and Yamamoto both relate to imaging devices with manual and voice activated command for commanding a camera to capture and image.” EX1003, ¶156 (citing EX1008 (Kim), ¶¶54, 56, 64, 66, 160-165). However, upon cross examination, Mr. Guidash could not identify a voice activated command for

commanding a camera to capture an image among the citations to Kim. See EX2007 at 6:5-9:7. Instead, the only voice activated commands grounded in Kim relate to “a voice command that can be used to change the size or position of the area that’s being displayed.” See EX2007 at 8:20-22. Thus, Mr. Guidash’s stated premise of the motivation to combine Kim and Yamamoto fails.

124. Moreover, neither Petitioners nor Mr. Guidash provide any rationale on why a POSITA would be motivated to redesign the overall operation of Kim to arrive at the claimed invention when Kim is separately directed to a mobile terminal configured to display an image on an external display. EX1008, ¶2. In comparison, Yamamoto and Thorn further diverge, describing “starting capturing of an image in response to a sound” in a single-camera device (EX1009, ¶¶1, 32) and monitoring subjects in an image field and controlling flash operations according to detected blinking by the subject in a single-camera device. See EX1011, ¶¶1 36.

125. Additionally, modifying Kim to arrive at the claimed invention would require a complete redesign of Kim’s system, and there is no rationale to do so beyond the hindsight driven analysis set forth by Mr. Guidash. A proper obviousness analysis demands more than the vague, unsupported statements that Mr. Guidash offers here. Instead of providing any “rational underpinning” to support their asserted obviousness grounds, Mr. Guidash offers only conclusory assertions.

B. Kim, Yamamoto, and Thorn Do Not Render Obvious Claim Element [1.j]

126. Claim [1.j] recites “wherein the first standby time is a time from a recognition of the first instruction to a start of the recording of the first image signal acquired by the first camera, and the second standby time is a time from a recognition of the second instruction to a start of the recording of the second image signal acquired by the second camera.” Mr. Guidash summarily dismiss this claim element: “The Kim-Yamamoto-Thorn combination renders obvious [claim element [1j]] ... for at least the reasons set forth above for limitation [1i]; See §§XII.B.8, XII.B.10. EX1003, ¶210. Mr. Guidash relies entirely on his flawed analysis of claim element [1.i], and it fails to show the cited prior art renders this element obvious for at least the reasons above with respect to claim element [1.i]. As such, Mr. Guidash has not shown by a preponderance of the evidence that the Kim-Yamamoto-Thorn combination renders claim element [1.j] obvious.

127. Furthermore, there are separate reasons why this claim element is not rendered obvious over the Kim-Yamamoto-Thorn combination. For example, Mr. Guidash does not identify a standby time in any of Kim, Yamamoto, or Thorn that renders obvious the first standby time set forth in element [1.j]. Mr. Guidash relies on “a certain period of time (for example, 0.5 seconds).” EX1003, ¶204 (citing EX1009, ¶249). However, in the context of Yamamoto the “certain amount of time” describes the time “after, in general, “Say Cheese” or the like has *uttered*” to when

the image has been captured. EX1009, ¶249 (emphasis added); *see also id.* ¶44 (“‘detecting the end of utterance’ means detecting the audio signal satisfied the end condition”). Yamamoto (and Mr. Guidash) fail to explain or distinguish between times allotted for a trigger-recognizing process, a waiting process, and a recording process. *See, e.g.*, EX1009, Fig. 9. Instead, the “certain amount of time” measures from the end of an utterance (*e.g.*, “Say Cheese”) to the end of the image capture process. *Id.*, ¶¶249-250.

128. The end of an utterance described in Yamamoto is not the claimed “recognition of the first instruction.” The processing time for recognition of an instruction happens after and *separately* from detecting the end of an utterance. *See, e.g.*, Ex. 1009, ¶55 (“The recognition result processing unit 108 obtains a recognition result output by the speech recognition unit 107 and determines control corresponding to the command...”); *see also id.*, ¶¶37, 44, 47, 55, 245; EX1001, 9:48-55 (identifying separate “input of a voice command,” “trigger recognition process,” “standby process,” and “recording process”). Yamamoto’s failure to distinguish these processing times demonstrates that it does not disclose the claimed first standby time.

129. Further, the alleged first standby time includes the time for capturing an image. However, the claim language explicitly excludes the capture time from the standby time: “the first standby time is a time from a recognition of the first

instruction to a *start* of the recording of the first image signal.” Therefore, the “certain amount of time” mentioned in Yamamoto cannot be the claimed “first standby time” and Mr. Guidash does not rely on Kim or Thorn to overcome this deficiency.

130. Accordingly, Mr. Guidash has not shown by a preponderance of the evidence that the Kim-Yamamoto-Thorn combination renders obvious element [1.j] of the ’757 Patent.

C. Kim, Yamamoto, and Thorn Do Not Render Obvious Claims 2-3, and 7-10.

131. Claims 2-3 and 7-10 all depend from independent claims for which Mr. Guidash has failed to show that the Kim-Yamamoto-Thorn combination renders the independent claims unpatentable. Thus, for the same reasons, Claims 2-3 and 7-10 are not rendered unpatentable by the Kim-Yamamoto-Thorn combination.

XI. GROUND 4: MR. GUIDASH HAS FAILED TO ESTABLISH THAT CLAIMS 4-6 AND 11 ARE RENDERED OBVIOUS BY THE COMBINATION OF KIM, YAMAMOTO, THORN, AND CHINN

132. In Ground 4, Mr. Guidash adds a fourth reference, Chinn, and refer back to the earlier purported analysis offered in Grounds 1 and 2. Accordingly, Ground 4 falls short of demonstrating that the Kim-Yamamoto-Thorn-Chinn combination would render obvious claims 4-6 and 11 for the same reasons discussed above. For the reasons further set below, Ground 4 additionally fails to show that the Kim-Yamamoto-Thorn-Chinn combination renders Claim 11 unpatentable.

A. Kim, Yamamoto, Thorn, and Chinn Do Not Render Obvious Claim Elements [11.d] and [11.h]

133. Claim element [11.d] recites “performing a first standby process during a first predetermined time when the command voice includes the first instruction and when the first camera is enabled and the second camera is disabled.” Claim element [11.h] recites “performing a second standby process during a second predetermined time when the touch operation instruction includes the second instruction and when the second camera is enabled and the first camera is disabled.”

134. Mr. Guidash refers back to §XII.B.10 (element [1.i] in Ground 3) for his opinions these two elements. For the reasons expressed above with respect to elements [1.i] and [1.j], Mr. Guidash has not met their burden to show by a preponderance of the evidence that elements [11.d] and [11.h] are rendered unpatentable the Kim-Yamamoto-Thorn-Chinn combination.

XII. CONCLUSION

135. 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. I also plan to use graphic exhibits and/or demonstratives to help illustrate the facts and opinions I have expressed herein.

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BIOGRAPHY

Jacob O. Wobbrock is a Professor of Information and, by courtesy, of Computer Science & Engineering at the University of Washington. His field is human-computer interaction (HCI) with a focus on mobile and accessible computing. He directs the ACE Lab; is an Associate Director and former founding Co-Director of the CREATE research center; and is a co-founder of the multi-departmental DUB Group and MHCI+D degree, of which he is Chair. He has co-authored over 200 papers and 19 patents, which have been cited about 25,400 times, and received 33 paper awards, including 7 best papers and 8 honorable mentions from ACM CHI, the flagship conference in HCI. For his contributions to accessible computing, he received the 2017 ACM SIGCHI Social Impact Award and the 2019 SIGACCESS ASSETS Paper Impact Award, a 10-year lasting impact award. He also received 10-year lasting impact awards from ACM ICMI 2022 and ACM UIST 2024 for his work on gesture recognition. In 2018 and 2021, he was named the #1 Most Influential Scholar in HCI by the citation-ranking system AMiner, and he was #2 in 2020. In 2010, he received an NSF CAREER award. In 2019, he was inducted into the ACM SIGCHI Academy. In 2021, he was named an ACM Fellow “for contributions to human-computer interaction and accessible computing.” He holds a B.S. with Honors in Symbolic Systems and an M.S. in Computer Science from Stanford University, and a Ph.D. in Human-Computer Interaction from Carnegie Mellon University, where in 2006, he received the School of Computer Science Distinguished Dissertation Award.

FACULTY POSITIONS

University of Washington · 2006 – present

- Professor, The Information School · 2017 – present
Adjunct Professor, Paul G. Allen School of Computer Science & Engineering · 2017 – present
- Associate Professor, The Information School · 2011 – 2017
Adjunct Associate Professor, Department of Computer Science & Engineering · 2011 – 2017
- Assistant Professor, The Information School · 2006 – 2011
Adjunct Assistant Professor, Department of Computer Science & Engineering · 2006 – 2011

EDUCATION

Ph.D. Human-Computer Interaction, Carnegie Mellon University · 2001 – 2006

- Official concentration in Computer Science. Advisor: Brad A. Myers.
Dissertation: *EdgeWrite: A Versatile Design for Text Entry and Control*.
Committee: Brad A. Myers, Scott E. Hudson, Jennifer Mankoff, Richard C. Simpson, Shumin Zhai.

M.S. Computer Science, Stanford University · 1998 – 2000

- Official concentration in Human-Computer Interaction. Advisor: Terry Winograd.

B.S. with Honors, Symbolic Systems, Stanford University · 1994 – 1998

- Official concentration in Human-Computer Interaction. Advisor: Thomas Wasow.
Honors Thesis: *The Law and Policy of Autonomous Software Agents*.

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- [J.28] Kothari, V., Ho, T.W.W., Cabodevilla, A.G., He, Y., Kramer, F., Shimizu-Albergine, M., Kanter, J.E., Snell-Bergeon, J., Fisher, E.A., Shao, B., Heinecke, J.W., Wobbrock, J.O., Lee, W.L., Goldberg, I.J., Vaisar, T. and Bornfeldt, K.E. (2024). **Imbalance of APOB lipoproteins and large HDL in Type 1 diabetes drives atherosclerosis.** *Circulation Research* 135 (2), pp. 335-349.
- [J.27] Nolte, A., Wobbrock, J., Volkmann, T. and Jochems, N. (2022). **Implementing ability-based design: A systematic approach to conceptual user modeling.** *ACM Transactions on Accessible Computing* 15 (4). Article No. 34.
- [J.26] Hiniker, A. and Wobbrock, J.O. (2022). **Reclaiming attention: Christianity and HCI.** *ACM Interactions* 29 (4), pp. 40-44.
- [J.25] Vatavu, R.-D. and Wobbrock, J.O. (2022). **Clarifying agreement calculations and analysis for end-user elicitation studies.** *ACM Transactions on Computer-Human Interaction* 29 (1). Article No. 5.
- [J.24] Wobbrock, J.O., Hattatoglu, L., Hsu, A.K., Burger, M.A. and Magee, M.J. (2021). **The Goldilocks zone: Young adults' credibility perceptions of online news articles based on visual appearance.** *New Review of Hypermedia and Multimedia* 27 (1-2), pp. 51-96.
- [J.23] Ali, A.X., McAweeney, E. and Wobbrock, J.O. (2021). **Anachronism by design: Understanding young adults' perceptions of computer iconography.** *International Journal of Human-Computer Studies* 151. Article No. 102599.
- [J.22] Ali, A.X., Morris, M.R. and Wobbrock, J.O. (2021). **Distributed interaction design: Designing human-centered interactions in a time of social distancing.** *ACM Interactions* 28 (2), pp. 82-87.
- [J.21] Ross, A.S., Zhang, X., Fogarty, J. and Wobbrock, J.O. (2020). **An epidemiology-inspired large-scale analysis of Android app accessibility.** *ACM Transactions on Accessible Computing* 13 (1). Article No. 4.
- [J.20] Shinohara, K., Jacobo, N., Pratt, W. and Wobbrock, J.O. (2019). **Design for social accessibility method cards: Engaging users and reflecting on social scenarios for accessible design.** *ACM Transactions on Accessible Computing* 12 (4). Article No. 17.
- [J.19] Wobbrock, J.O., Gajos, K.Z., Kane, S.K. and Vanderheiden, G.C. (2018). **Ability-based design.** *Communications of the ACM* 61 (6), pp. 62-71.
- [J.18] Shinohara, K., Bennett, C.L., Pratt, W. and Wobbrock, J.O. (2018). **Tenets for social accessibility: Towards humanizing disabled people in design.** *ACM Transactions on Accessible Computing* 11 (1). Article No. 6.
- [J.17] Ruan, S., Wobbrock, J.O., Liou, K., Ng, A. and Landay, J.A. (2017). **Comparing speech and keyboard text entry for short messages in two languages on touchscreen phones.** *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* 1 (4). Article No. 159.
- [J.16] Wobbrock, J.O. and Kientz, J.A. (2016). **Research contributions in human-computer interaction.** *ACM Interactions* 23 (3), pp. 38-44.
- [J.15] Shinohara, K. and Wobbrock, J.O. (2016). **Self-conscious or self-confident? A diary study conceptualizing the social accessibility of assistive technology.** *ACM Transactions on Accessible Computing* 8 (2). Article No. 5.
- [J.14] Bigham, J.P., Lasecki, W.S. and Wobbrock, J.O. (2015). **Target acquisition and the crowd actor.** *Human Computation* 2 (2), pp. 135-154.
- [J.13] Tran, J.J., Riskin, E.A., Ladner, R.E. and Wobbrock, J.O. (2015). **Evaluating intelligibility and battery drain of mobile sign language video transmitted at low frame rates and bit rates.** *ACM Transactions on Accessible Computing* 7 (3). Article No. 11.
- [J.12] Morris, M.R., Danieleescu, A., Drucker, S., Fisher, D., Lee, B., schraefel, m.c. and Wobbrock, J.O. (2014). **Reducing legacy bias in gesture elicitation studies.** *ACM Interactions* 21 (3), pp. 40-45.
- [J.11] Findlater, L. and Wobbrock, J.O. (2012). **From plastic to pixels: In search of touch-typing touchscreen keyboards.** *ACM Interactions* 19 (3), pp. 44-49.

¹ *ACM Interactions* is not formally a scholarly journal but a “semi-scholarly magazine” with high readership in the HCI field.

- [J.10] Wobbrock, J.O., Kane, S.K., Gajos, K.Z., Harada, S. and Froehlich, J. (2011). **Ability-based design: Concept, principles and examples**. *ACM Transactions on Accessible Computing* 3 (3). Article No. 9.
- [J.9] Gajos, K.Z., Weld, D.S. and Wobbrock, J.O. (2010). **Automatically generating personalized user interfaces with SUPPLE**. *Artificial Intelligence* 174 (12-13), pp. 910-950.
- [J.8] Wobbrock, J.O., Ko, A.J. and Kientz, J.A. (2009). **Reflections on the future of iSchools from inspired junior faculty**. *ACM Interactions* 16 (5), pp. 69-71.
- [J.7] Wobbrock, J.O., Myers, B.A. and Aung, H.H. (2008). **The performance of hand postures in front- and back-of-device interaction for mobile computing**. *International Journal of Human-Computer Studies* 66 (12), pp. 857-875.
- [J.6] Wobbrock, J.O. and Gajos, K.Z. (2008). **Goal crossing with mice and trackballs for people with motor impairments: Performance, submovements, and design directions**. *ACM Transactions on Accessible Computing* 1 (1). Article No. 4.
- [J.5] Wobbrock, J.O. and Myers, B.A. (2008). **Enabling devices, empowering people: The design and evaluation of Trackball EdgeWrite**. *Disability and Rehabilitation: Assistive Technology* 3 (1-2), pp. 35-56.
- [J.4] Wobbrock, J.O. and Myers, B.A. (2006). **Analyzing the input stream for character-level errors in unconstrained text entry evaluations**. *ACM Transactions on Computer-Human Interaction* 13 (4), pp. 458-489.
- [J.3] Wobbrock, J.O., Aung, H.H., Myers, B.A. and LoPresti, E.F. (2005). **Integrated text entry from power wheelchairs**. *Behaviour and Information Technology* 24 (3), pp. 187-203.
- [J.2] Myers, B.A., Nichols, J., Wobbrock, J.O. and Miller, R.C. (2004). **Taking handheld devices to the next level**. *IEEE Computer* 36 (12), pp. 36-43.
- [J.1] Heckman, C.E. and Wobbrock, J.O. (1999). **Liability for autonomous agent design**. *Journal of Autonomous Agents and Multi-Agent Systems* 2 (1), pp. 87-103.

Full Conference Papers^{2†}

- [C.124] Zhong, M., Chen, R., Chen, X., Fogarty, J. and Wobbrock, J.O. (2025). **ScreenAudit: Detecting screen reader accessibility errors in mobile apps using large language models**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '25). Yokohama, Japan (April 26-May 1, 2025). New York: ACM Press. To appear. ^[25%]
- [C.123] Kong, J., Wobbrock, J.O., Cai, T. and Bylinskii, Z. (2025). **Supporting mobile reading while walking with automatic and customized font size adaptations**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '25). Yokohama, Japan (April 26-May 1, 2025). New York: ACM Press. To appear. ^[25%]
- [C.122] Chheda-Kothary, A., Kanchi, R., Sanders, C., Xiao, K., Sengupta, A., Kneitmix, M., Wobbrock, J.O. and Froehlich, J.E. (2025). **ArtInsight: Enabling AI-powered artwork engagement for mixed visual-ability families**. Proceedings of the ACM Conference on Intelligent User Interfaces (IUI '25). Cagliari, Italy (March 24-27, 2025). New York: ACM Press. To appear.
- [C.121] Sharif, A., Kim, J.G., Xu, J.Z. and Wobbrock, J.O. (2024). **Understanding and reducing the challenges faced by creators of accessible online data visualizations**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '24). St. John's, Newfoundland and Labrador (October 28-30, 2024). New York: ACM Press. Article No. 56. ^[29%]
- [C.120] Zhang, Z., Thompson, J.R., Shah, A., Agrawal, M., Sarikaya, A., Wobbrock, J.O., Cutrell, E. and Lee, B. (2024). **ChartAny: Designing accessible touch experiences of visualizations with blind smartphone users**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '24). St. John's, Newfoundland and Labrador (October 28-30, 2024). New York: ACM Press. Article No. 55. ^[29%]
- [C.119] Mitchell, C.L. and Wobbrock, J.O. (2024). **Characterizing “motor ability” for ability-based design**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '24). St. John's, Newfoundland and Labrador (October 28-30, 2024). New York: ACM Press. Article No. 49. ^[29%]
- [C.118]  Chheda-Kothary, A., Wobbrock, J.O. and Froehlich, J.E. (2024). **Engaging with children's artwork in mixed visual-ability families**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '24). St. John's, Newfoundland and Labrador (October 28-30, 2024). New York: ACM Press. Article No. 3. *Best Paper Award*. ^[29%]
- [C.117]  Kong, J., Zhong, M., Fogarty, J. and Wobbrock, J.O. (2024). **The Ability-Based Design Mobile Toolkit (ABD-MT): Developer support for runtime interface adaptation based on users' abilities**. Proceedings of the ACM Conference on Mobile Human-Computer Interaction (MobileHCI '24). Melbourne, Australia (September 30-October 3, 2024). New York: ACM Press. Article No. 277. *Best Paper Award*. ^[32%]

² Unlike in most academic fields, premiere conferences in HCI (e.g., CHI, UIST) are highly selective venues intended for archival papers only. These conferences exceed many HCI journals in their selectivity, visibility, and impact. For a study of the impact of ACM conference proceedings, see <http://dl.acm.org/citation.cfm?id=1743546.1743569>.

[†] Acceptance rates appear in superscript brackets when available.

- [C.116] Zhang, Z.J., Kim, G.S.-H. and Wobbrock, J.O. (2023). **Developing and deploying a real-world solution for accessible slide reading and authoring for blind users**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '23). New York, New York (October 22-25, 2023). New York: ACM Press. Article No. 47. ^[30%]
- [C.115] Franz, R.L., Yu, J. and Wobbrock, J.O. (2023). **Comparing locomotion techniques in virtual reality for people with upper-body motor impairments**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '23). New York, New York (October 22-25, 2023). New York: ACM Press. Article No. 39. ^[30%]
- [C.114] Yamagami, M., Portnova-Fahreva, A.A., Kong, J., Wobbrock, J.O. and Mankoff, J. (2023). **How do people with limited movement personalize upper-body gestures? Considerations for the design of personalized and accessible gesture interfaces**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '23). New York, New York (October 22-25, 2023). New York: ACM Press. Article No. 1. ^[30%]
- [C.113]  Sharif, A., Zhang, A.M., Reinecke, K. and Wobbrock, J.O. (2023). **Understanding and improving drilled-down information extraction from online data visualizations for screen-reader users**. Proceedings of the International Web for All Conference (W4A '23). Austin, Texas (April 30-May 1, 2023). New York: ACM Press, pp. 18-31. *Best Technical Paper*. ^[34%]
- [C.112] Zhang, Z.J. and Wobbrock, J.O. (2023). **AnyBoard: Making digital artboards accessible to blind and low-vision users**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '23). Hamburg, Germany (April 23-28, 2023). New York: ACM Press. Article No. 55. ^[28%]
- [C.111]  Kong, J., Zhong, M., Fogarty, J. and Wobbrock, J.O. (2022). **Quantifying touch: New metrics for characterizing what happens during a touch**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '22). Athens, Greece (October 23-26, 2022). New York: ACM Press. Article No. 33. *Best Paper Nominee*. ^[26%]
- [C.110] Sharif, A., Wang, O.H., Muongchan, A.T., Reinecke, K. and Wobbrock, J.O. (2022). **VoxLens: Making online data visualizations accessible with an interactive JavaScript plug-in**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '22). New Orleans, Louisiana (April 30-May 5, 2022). New York: ACM Press. Article No. 478. ^[25%]
- [C.109] Zhang, M.R., Zhai, S. and Wobbrock, J.O. (2022). **TypeAnywhere: A QWERTY-based text entry solution for ubiquitous computing**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '22). New Orleans, Louisiana (April 30-May 5, 2022). New York: ACM Press. Article No. 339. ^[25%]
- [C.108] Fok, R., Zhong, M., Ross, A.S., Fogarty, J. and Wobbrock, J.O. (2022). **A large-scale longitudinal analysis of missing label accessibility failures in Android apps**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '22). New Orleans, Louisiana (April 30-May 5, 2022). New York: ACM Press. Article No. 461. ^[25%]
- [C.107] Zhang, M.R., Zhong, M. and Wobbrock, J.O. (2022). **Gally: An automated GIF annotation system for visually impaired users**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '22). New Orleans, Louisiana (April 30-May 5, 2022). New York: ACM Press. Article No. 197. ^[25%]
- [C.106] Sharif, A., Chintalapati, S.S., Wobbrock, J.O. and Reinecke, K. (2021). **Understanding screen-reader users' experiences with online data visualizations**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '21). Virtual Event (October 18-22, 2021). New York: ACM Press. Article No. 14. ^[29%]
- [C.105] Elkin, L.A., Kay, M., Higgins, J.J. and Wobbrock, J.O. (2021). **An aligned rank transform procedure for multifactor contrast tests**. Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '21). Virtual Event (October 10-14, 2021). New York: ACM Press, pp. 754-768. ^[26%]
- [C.104] Schaadhardt, A., Hiniker, A. and Wobbrock, J.O. (2021). **Understanding blind screen-reader users' experiences of digital artboards**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '21). Yokohama, Japan (May 8-13, 2021). New York: ACM Press. Article No. 270. ^[26%]
- [C.103] Ali, A.X., Morris, M.R. and Wobbrock, J.O. (2021). **"I am Iron Man": Priming improves the learnability and memorability of user-elicited gestures**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '21). Yokohama, Japan (May 8-13, 2021). New York: ACM Press. Article No. 359. ^[26%]
- [C.102] Zhang, M.R., Wang, R., Xu, X., Li, Q., Sharif, A. and Wobbrock, J.O. (2021). **Voicemoji: Emoji entry using voice for visually impaired people**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '21). Yokohama, Japan (May 8-13, 2021). New York: ACM Press. Article No. 37. ^[26%]
- [C.101] Zhang, M.R., Mariakakis, A., Burke, J. and Wobbrock, J.O. (2021). **A comparative study of lexical and semantic emoji suggestion systems**. Proceedings of iConference 2021. Beijing, China (March 17-31, 2021). Lecture Notes in Computer Science, vol. 12645. Switzerland: Springer, pp. 229-247. ^[31%]
- [C.100] Sharif, A., Pao, V., Reinecke, K. and Wobbrock, J.O. (2020). **The reliability of Fitts's law as a movement model for people with and without limited fine motor function**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '20). Athens, Greece (October 26-28, 2020). New York: ACM Press. Article No. 16. ^[28%]
- [C.99] Cui, W., Zhu, S., Zhang, M.R., Schwartz, A., Wobbrock, J.O. and Bi, X. (2020). **JustCorrect: Intelligent post hoc text correction techniques on smartphones**. Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '20). Minneapolis, Minnesota (October 20-23, 2020). New York: ACM Press, pp. 487-499. ^[22%]

- [C.98] Villarreal-Narvaez, S., Vanderdonckt, J., Vatavu, R.-D. and Wobbrock, J.O. (2020). **A systematic review of gesture elicitation studies: What can we learn from 216 studies?** Proceedings of the ACM Conference on Designing Interactive Systems (DIS '20). Eindhoven, Netherlands (July 6-10, 2020). New York: ACM Press, 855-872. ^[24%]
- [C.97] Franz, R.L., Wobbrock, J.O., Cheng, Y. and Findlater, L. (2019). **Perception and adoption of mobile accessibility features by older adults experiencing ability changes.** Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '19). Pittsburgh, Pennsylvania (October 28-30, 2019). New York: ACM Press, pp. 267-278. ^[26%]
- [C.96] Chaudhuri, B., Perlmutter, L., Petelka, J., Garrison, P., Fogarty, J., Wobbrock, J.O. and Ladner, R.E. (2019). **GestureCalc: An eyes-free calculator for touch screens.** Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '19). Pittsburgh, Pennsylvania (October 28-30, 2019). New York: ACM Press, pp. 112-123. ^[26%]
- [C.95] Zhang, M.R., Wen, H. and Wobbrock, J.O. (2019). **Type, then correct: Intelligent text correction techniques for mobile text entry using neural networks.** Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '19). New Orleans, Louisiana (October 20-23, 2019). New York: ACM Press, pp. 843-855. ^[24%]
- [C.94] Zhang, M.R. and Wobbrock, J.O. (2019). **Beyond the input stream: Making text entry evaluations more flexible with transcription sequences.** Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '19). New Orleans, Louisiana (October 20-23, 2019). New York: ACM Press, pp. 831-842. ^[24%]
- [C.93]  Wobbrock, J.O., Hsu, A.K., Burger, M.A. and Magee, M.J. (2019). **Isolating the effects of web page visual appearance on the perceived credibility of online news among college students.** Proceedings of the ACM Conference on Hypertext and Social Media (HT '19). Hof, Germany (September 17-20, 2019). New York: ACM Press, pp. 191-200. *Douglas Engelbart Award for Best Paper.* ^[29%]
- [C.92] Evans, A.C., Davis, K. and Wobbrock, J.O. (2019). **Adaptive support for collaboration on tabletop computers.** Proceedings of the International Conference on Computer Supported Collaborative Learning (CSCL '19), vol. 1. Lyon, France (June 17-21, 2019). International Society of the Learning Sciences, pp. 176-183.
- [C.91] Zhang, M.R., Zhai, S. and Wobbrock, J.O. (2019). **Text entry throughput: Towards unifying speed and accuracy in a single performance metric.** Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '19). Glasgow, Scotland (May 4-9, 2019). New York: ACM Press. Paper No. 636. ^[24%]
- [C.90] Mott, M.E. and Wobbrock, J.O. (2019). **Cluster Touch: Improving smartphone touch accuracy for people with motor and situational impairments.** Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '19). Glasgow, Scotland (May 4-9, 2019). New York: ACM Press. Paper No. 27. ^[24%]
- [C.89] Ali, A.X., Morris, M.R. and Wobbrock, J.O. (2019). **Crowdlicit: A system for conducting distributed end-user elicitation and identification studies.** Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '19). Glasgow, Scotland (May 4-9, 2019). New York: ACM Press. Paper No. 255. ^[24%]
- [C.88]  Ross, A.S., Zhang, X., Fogarty, J. and Wobbrock, J.O. (2018). **Examining image-based button labeling for accessibility in Android apps through large-scale analysis.** Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '18). Galway, Ireland (October 22-24, 2018). New York: ACM Press, pp. 119-130. *Best Paper Nominee.* ^[26%]
- [C.87] Shinohara, K., Wobbrock, J.O. and Pratt, W. (2018). **Incorporating social factors in accessible design.** Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '18). Galway, Ireland (October 22-24, 2018). New York: ACM Press, pp. 149-160. ^[26%]
- [C.86] Tung, Y.-C., Goel, M., Zinda, I. and Wobbrock, J.O. (2018). **RainCheck: Overcoming capacitive interference caused by rainwater on smartphones.** Proceedings of the ACM International Conference on Multimodal Interaction (ICMI '18). Boulder, Colorado (October 16-20, 2018). New York: ACM Press, pp. 464-471. ^[46%]
- [C.85] Ali, A.X., Morris, M.R. and Wobbrock, J.O. (2018). **Crowdsourcing similarity judgments for agreement analysis in end-user elicitation studies.** Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '18). Berlin, Germany (October 14-17, 2018). New York: ACM Press, pp. 177-188. ^[21%]
- [C.84]  Vatavu, R.-D., Anthony, L. and Wobbrock, J.O. (2018). **\$Q: A super-quick, articulation-invariant stroke-gesture recognizer for low-resource devices.** Proceedings of the ACM Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI '18). Barcelona, Spain (September 3-6, 2018). New York: ACM Press. Article No. 23. *Honorable Mention Paper.* ^[23%]
- [C.83] Mariakakis, A., Parsi, S., Patel, S.N. and Wobbrock, J.O. (2018). **Drunk user interfaces: Determining blood alcohol level through everyday smartphone tasks.** Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '18). Montreal, Quebec (April 21-26, 2018). New York: ACM Press. Paper No. 234. ^[25%]
- [C.82]  O'Leary, K., Schueller, S., Wobbrock, J.O. and Pratt, W. (2018). **"Suddenly, we got to become therapists for each other": Designing peer support chats for mental health.** Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '18). Montreal, Quebec (April 21-26, 2018). New York: ACM Press. Paper No. 331. *Honorable Mention Paper.* ^[25%]
- [C.81]  Ross, A.S., Zhang, X., Fogarty, J. and Wobbrock, J.O. (2017). **Epidemiology as a framework for large-scale mobile application accessibility assessment.** Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '17). Baltimore, Maryland (October 30 – November 1, 2017). New York: ACM Press, pp. 2-11. *Best Paper Nominee.* ^[26%]

- [C.80] Shinohara, K., Bennett, C.L., Wobbrock, J.O. and Pratt, W. (2017). **Teaching accessibility in a technology design course**. Proceedings of the International Conference on Computer Supported Collaborative Learning (CSCL '17), vol. 1. Philadelphia, Pennsylvania (June 18-22, 2017). International Society of the Learning Sciences, pp. 239-246.
- [C.79] Evans, A.C., Davis, K., Fogarty, J. and Wobbrock, J.O. (2017). **Group Touch: Distinguishing tabletop users in group settings via statistical modeling of touch pairs**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '17). Denver, Colorado (May 6-11, 2017). New York: ACM Press, pp. 35-47. ^[25%]
- [C.78] Mott, M.E., Williams, S., Wobbrock, J.O. and Morris, M.R. (2017). **Improving dwell-based gaze typing with dynamic, cascading dwell times**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '17). Denver, Colorado (May 6-11, 2017). New York: ACM Press, pp. 2558-2570. ^[25%]
- [C.77] Zhang, X., Ross, A., Caspi, A., Fogarty, J. and Wobbrock, J.O. (2017). **Interaction proxies for runtime repair and enhancement of mobile application accessibility**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '17). Denver, Colorado (May 6-11, 2017). New York: ACM Press, pp. 6024-6037. ^[25%]
- [C.76] O'Leary, K., Bhattacharya, A., Munson, S., Wobbrock, J.O. and Pratt, W. (2017). **Design opportunities for mental health peer support technologies**. Proceedings of the ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW '17). Portland, Oregon (February 25-March 1, 2017). New York: ACM Press, pp. 1470-1484. ^[34%]
- [C.75] Shinohara, K., Bennett, C.L. and Wobbrock, J.O. (2016). **How designing for people with and without disabilities shapes student design thinking**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '16). Reno, Nevada (October 24-26, 2016). New York: ACM Press, pp. 229-237. ^[25%]
- [C.74] Anthony, L., Stofer, K.A., Luc, A. and Wobbrock, J.O. (2016). **Gestures by children and adults on touch tables and touch walls in a public science center**. Proceedings of the ACM Conference on Interaction Design and Children (IDC '16). Manchester, England (June 21-24, 2016). New York: ACM Press, pp. 344-355. ^[47%]
- [C.73]  Mott, M.E., Vatavu, R.-D., Kane, S.K. and Wobbrock, J.O. (2016). **Smart Touch: Improving touch accuracy for people with motor impairments with template matching**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '16). San Jose, California (May 7-12, 2016). New York: ACM Press, pp. 1934-1946. *Best Paper Award*. ^[23%]
- [C.72] Vatavu, R.-D. and Wobbrock, J.O. (2016). **Between-subjects elicitation studies: Formalization and tool support**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '16). San Jose, California (May 7-12, 2016). New York: ACM Press, pp. 3390-3402. ^[23%]
- [C.71] Evans, A.C., Wobbrock, J.O. and Davis, K. (2016). **Modeling collaboration patterns on an interactive tabletop in a classroom setting**. Proceedings of the ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW '16). San Francisco, California (February 27-March 2, 2016). New York: ACM Press, pp. 860-871. ^[25%]
- [C.70]  Vatavu, R.-D. and Wobbrock, J.O. (2015). **Formalizing agreement analysis for elicitation studies: New measures, significance test, and toolkit**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '15). Seoul, Korea (April 18-23, 2015). New York: ACM Press, pp. 1325-1334. *Honorable Mention Paper*. ^[23%]
- [C.69]  Chilana, P.K., Ko, A.J. and Wobbrock, J.O. (2015). **From user-centered to adoption-centered design: A case study of an HCI research innovation becoming a product**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '15). Seoul, Korea (April 18-23, 2015). New York: ACM Press, pp. 1749-1758. *Best Paper Award*. ^[23%]
- [C.68] Mariakakis, A., Goel, M., Aumi, M.T.I., Patel, S.N. and Wobbrock, J.O. (2015). **SwitchBack: Using focus and saccade tracking to guide users' attention for mobile task resumption**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '15). Seoul, Korea (April 18-23, 2015). New York: ACM Press, pp. 2953-2962. ^[23%]
- [C.67] Vatavu, R.-D., Anthony, L. and Wobbrock, J.O. (2014). **Gesture heatmaps: Understanding gesture performance with colorful visualizations**. Proceedings of the ACM International Conference on Multimodal Interaction (ICMI '14). Istanbul, Turkey (November 12-16, 2014). New York: ACM Press, pp. 172-179. ^[39%]
- [C.66] Tran, J.J., Flowers, B., Riskin, E.A., Ladner, R.E. and Wobbrock, J.O. (2014). **Analyzing the intelligibility of real-time mobile sign language video transmitted below recommended standards**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '14). Rochester, New York (October 20-22, 2014). New York: ACM Press, pp. 177-184. ^[26%]
- [C.65] Mott, M.E. and Wobbrock, J.O. (2014). **Beating the bubble: Using kinematic triggering in the Bubble Lens for acquiring small, dense targets**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '14). Toronto, Ontario (April 26-May 1, 2014). New York: ACM Press, pp. 733-742. ^[23%]
- [C.64] Pasqual, P.T. and Wobbrock, J.O. (2014). **Mouse pointing endpoint prediction using kinematic template matching**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '14). Toronto, Ontario (April 26-May 1, 2014). New York: ACM Press, pp. 743-752. ^[23%]
- [C.63] Vatavu, R.-D., Anthony, L. and Wobbrock, J.O. (2013). **Relative accuracy measures for stroke gestures**. Proceedings of the ACM International Conference on Multimodal Interaction (ICMI '13). Sydney, Australia (December 9-13, 2013). New York: ACM Press, pp. 279-286. ^[20%]

- [C.62] Kane, S.K., Morris, M.R. and Wobbrock, J.O. (2013). **Touchplates: Low-cost tactile overlays for visually impaired touch screen users**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '13). Bellevue, Washington (October 21-23, 2013). New York: ACM Press. Article No. 22. ^[29%]
- [C.61] Tran, J.J., Rodriguez, R., Riskin, E.A. and Wobbrock, J.O. (2013). **A web-based intelligibility evaluation of sign language video transmitted at low frame rates and bitrates**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '13). Bellevue, Washington (October 21-23, 2013). New York: ACM Press. Article No. 2. ^[29%]
- [C.60] Dell, N., Breit, N., Wobbrock, J.O. and Borriello, G. (2013). **Improving form-based data entry with image snippets**. Proceedings of Graphics Interface (GI '13). Regina, Saskatchewan (May 29-31, 2013). Toronto, Ontario: Canadian Information Processing Society, pp. 157-164. ^[38%]
- [C.59] Anthony, L., Vatavu, R.-D. and Wobbrock, J.O. (2013). **Understanding the consistency of users' pen and finger stroke gesture articulation**. Proceedings of Graphics Interface (GI '13). Regina, Saskatchewan (May 29-31, 2013). Toronto, Ontario: Canadian Information Processing Society, pp. 87-94. ^[38%]
- [C.58] O'Leary, K., Wobbrock, J.O. and Riskin, E.A. (2013). **Q-methodology as a research and design tool for HCI**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '13). Paris, France (April 27-May 2, 2013). New York: ACM Press, pp. 1941-1950. ^[20%]
- [C.57] Chilana, P.K., Ko, A.J., Wobbrock, J.O. and Grossman, T. (2013). **A multi-site field study of crowdsourced contextual help: Usage and perspectives of end-users and software teams**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '13). Paris, France (April 27-May 2, 2013). New York: ACM Press, pp. 217-226. ^[20%]
- [C.56]  Vatavu, R.-D., Anthony, L. and Wobbrock, J.O. (2012). **Gestures as point clouds: A \$P recognizer for user interface prototypes**. Proceedings of the ACM International Conference on Multimodal Interaction (ICMI '12). Santa Monica, California (October 22-26, 2012). New York: ACM Press, pp. 273-280. *Outstanding Paper Award; ICMI 2022 Ten-Year Technical Impact Award*. ^[21%]
- [C.55]  Azenkot, S., Rector, K., Ladner, R.E. and Wobbrock, J.O. (2012). **PassChords: Secure multi-touch authentication for blind people**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '12). Boulder, Colorado (October 22-24, 2012). New York: ACM Press, pp. 159-166. *Best Paper Award*. ^[28%]
- [C.54] Goel, M., Wobbrock, J.O. and Patel, S.N. (2012). **GripSense: Using built-in sensors to detect hand posture and pressure on commodity mobile phones**. Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '12). Cambridge, Massachusetts (October 7-10, 2012). New York: ACM Press, pp. 545-554. ^[21%]
- [C.53] Azenkot, S., Wobbrock, J.O., Prasain, S. and Ladner, R.E. (2012). **Input Finger Detection for nonvisual touch screen text entry in Perkinput**. Proceedings of Graphics Interface (GI '12). Toronto, Ontario (May 28-30, 2012). Toronto, Ontario: Canadian Information Processing Society, pp. 121-129. ^[38%]
- [C.52] Levy, D.M., Wobbrock, J.O., Kaszniak, A.W. and Ostergren, M. (2012). **The effects of mindfulness meditation training on multitasking in a high-stress information environment**. Proceedings of Graphics Interface (GI '12). Toronto, Ontario (May 28-30, 2012). Toronto, Ontario: Canadian Information Processing Society, pp. 45-52. ^[38%]
- [C.51] Evans, A.C. and Wobbrock, J.O. (2012). **Taming wild behavior: The Input Observer for obtaining text entry and mouse pointing measures from everyday computer use**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '12). Austin, Texas (May 5-10, 2012). New York: ACM Press, pp. 1947-1956. ^[23%]
- [C.50]  Goel, M., Findlater, L. and Wobbrock, J.O. (2012). **WalkType: Using accelerometer data to accommodate situational impairments in mobile touch screen text entry**. Proceedings of the ACM Conference on Human Factors in Computing System (CHI '12). Austin, Texas (May 5-10, 2012). New York: ACM Press, pp. 2687-2696. *Honorable Mention Paper*. ^[23%]
- [C.49] Findlater, L. and Wobbrock, J.O. (2012). **Personalized input: Improving ten-finger touchscreen typing through automatic adaptation**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '12). Austin, Texas (May 5-10, 2012). New York: ACM Press, pp. 815-824. ^[23%]
- [C.48] Chilana, P.K., Ko, A.J. and Wobbrock, J.O. (2012). **LemonAid: Selection-based crowdsourced contextual help for web applications**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '12). Austin, Texas (May 5-10, 2012). New York: ACM Press, pp. 1549-1558. ^[23%]
- [C.47] Dixon, M., Fogarty, J. and Wobbrock, J.O. (2012). **A general-purpose target-aware pointing enhancement using pixel-level analysis of graphical interfaces**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '12). Austin, Texas (May 5-10, 2012). New York: ACM Press, pp. 3167-3176. ^[23%]
- [C.46] Tran, J.J., Kim, J., Chon, J., Riskin, E.A., Ladner, R.E. and Wobbrock, J.O. (2011). **Evaluating quality and comprehension of real-time sign language video on mobile phones**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '11). Dundee, Scotland (October 24-26, 2011). New York: ACM Press, pp. 115-122. ^[30%]
- [C.45] Avrahami, D., Wobbrock, J.O. and Izadi, S. (2011). **Portico: Tangible interaction on and around a tablet**. Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '11). Santa Barbara, California (October 16-19, 2011). New York: ACM Press, pp. 347-356. ^[25%]

- [C.44] Kane, S.K., Morris, M.R., Perkins, A.Z., Wigdor, D., Ladner, R.E., and Wobbrock, J.O. (2011). **Access Overlays: Improving non-visual access to large touch screens for blind users**. Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '11). Santa Barbara, California (October 16-19, 2011). New York: ACM Press, pp. 273-282. ^[25%]
- [C.43] Harada, S., Wobbrock, J.O. and Landay, J.A. (2011). **Voice Games: Investigation into the use of non-speech voice input for making computer games more accessible**. Proceedings of the IFIP TC13 International Conference on Human-Computer Interaction (INTERACT '11). Lisbon, Portugal (September 5-9, 2011). Lecture Notes in Computer Science, vol. 6946/2011. Berlin, Germany: Springer, pp. 11-29. ^[27%]
- [C.42] Wobbrock, J.O., Shinohara, K. and Jansen, A. (2011). **The effects of task dimensionality, endpoint deviation, throughput calculation, and experiment design on pointing measures and models**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '11). Vancouver, British Columbia (May 7-12, 2011). New York: ACM Press, pp. 1639-1648. ^[26%]
- [C.41] Findlater, L., Wobbrock, J.O. and Wigdor, D. (2011). **Typing on flat glass: Examining ten-finger expert typing patterns on touch surfaces**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '11). Vancouver, British Columbia (May 7-12, 2011). New York: ACM Press, pp. 2453-2462. *Honorable Mention Paper*. ^[26%]
- [C.40] Shinohara, K. and Wobbrock, J.O. (2011). **In the shadow of misperception: Assistive technology use and social interactions**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '11). Vancouver, British Columbia (May 7-12, 2011). New York: ACM Press, pp. 705-714. *Best Paper Award*. ^[26%]
- [C.39] Azenkot, S., Prasain, S., Borning, A., Fortuna, E., Ladner, R.E. and Wobbrock, J.O. (2011). **Enhancing independence and safety for blind and deaf-blind public transit riders**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '11). Vancouver, British Columbia (May 7-12, 2011). New York: ACM Press, pp. 3247-3256. ^[26%]
- [C.38] Kane, S.K., Wobbrock, J.O. and Ladner, R.E. (2011). **Usable gestures for blind people: Understanding preference and performance**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '11). Vancouver, British Columbia (May 7-12, 2011). New York: ACM Press, pp. 413-422. *Best Paper Award*. ^[26%]
- [C.37] Tran, J.J., Johnson, T.W., Kim, J., Rodriguez, R., Yin, S., Riskin, E.A., Ladner, R.E. and Wobbrock, J.O. (2010). **A web-based user survey for evaluating power saving strategies for deaf users of MobileASL**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '10). Orlando, Florida (October 25-27, 2010). New York: ACM Press, pp. 115-122. ^[31%]
- [C.36] Findlater, L., Jansen, A., Shinohara, K., Dixon, M., Kamb, P., Rakita, J. and Wobbrock, J.O. (2010). **Enhanced area cursors: Reducing fine-pointing demands for people with motor impairments**. Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '10). New York, NY (October 3-6, 2010). New York: ACM Press, pp. 153-162. ^[18%]
- [C.35] Rosenthal, S., Kane, S.K., Wobbrock, J.O. and Avrahami, D. (2010). **Augmenting on-screen instructions with micro-projected guides: When it works, and when it fails**. Proceedings of the ACM Conference on Ubiquitous Computing (UbiComp '10). Copenhagen, Denmark (September 26-29, 2010). New York: ACM Press, pp. 203-212. ^[19%]
- [C.34] Ko, A.J. and Wobbrock, J.O. (2010). **Cleanroom: Edit-time error detection with the uniqueness heuristic**. Proceedings of the IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC '10). Madrid, Spain (September 21-25, 2010). Washington, D.C.: IEEE Computer Society, pp. 7-14. *Best Paper Award*. ^[29%]
- [C.33] Morris, M.R., Wobbrock, J.O. and Wilson, A.D. (2010). **Understanding users' preferences for surface gestures**. Proceedings of Graphics Interface (GI '10). Ottawa, Ontario (May 31-June 2, 2010). Toronto, Ontario: Canadian Information Processing Society, pp. 261-268. ^[39%]
- [C.32] Anthony, L. and Wobbrock, J.O. (2010). **A lightweight multistroke recognizer for user interface prototypes**. Proceedings of Graphics Interface (GI '10). Ottawa, Ontario (May 31-June 2, 2010). Toronto, Ontario: Canadian Information Processing Society, pp. 245-252. ^[39%]
- [C.31] Chilana, P.K., Wobbrock, J.O. and Ko, A.J. (2010). **Understanding usability practices in complex domains**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '10). Atlanta, Georgia (April 10-15, 2010). New York: ACM Press, pp. 2337-2346. ^[22%]
- [C.30] Kane, S.K., Jayant, C., Wobbrock, J.O. and Ladner, R.E. (2009). **Freedom to roam: A study of mobile device adoption and accessibility for people with visual and motor disabilities**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '09). Pittsburgh, Pennsylvania (October 25-28, 2009). New York: ACM Press, pp. 115-122. ^[31%]
- [C.29] Kane, S.K., Avrahami, D., Wobbrock, J.O., Harrison, B., Rea, A., Philipose, M. and LaMarca, A. (2009). **Bonfire: A nomadic system for hybrid laptop-tabletop interaction**. Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '09). Victoria, British Columbia (October 4-7, 2009). New York: ACM Press, pp. 129-138. ^[19%]
- [C.28] Cherniavsky, N., Chon, J., Wobbrock, J.O., Ladner, R.E. and Riskin, E.A. (2009). **Activity analysis enabling real-time video communication on mobile phones for deaf users**. Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '09). Victoria, British Columbia (October 4-7, 2009). New York: ACM Press, pp. 79-88. ^[19%]
- [C.27] Wobbrock, J.O., Fogarty, J., Liu, S., Kimuro, S. and Harada, S. (2009). **The Angle Mouse: Target-agnostic dynamic gain adjustment based on angular deviation**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '09). Boston, Massachusetts (April 4-9, 2009). New York: ACM Press, pp. 1401-1410. ^[24%]

- [C.26]  Wobbrock, J.O., Morris, M.R. and Wilson, A.D. (2009). **User-defined gestures for surface computing**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '09). Boston, Massachusetts (April 4-9, 2009). New York: ACM Press, pp. 1083-1092. *Best Paper Nominee*.^[24%]
- [C.25] Harada, S., Wobbrock, J.O., Malkin, J., Bilmes, J. and Landay, J.A. (2009). **Longitudinal study of people learning to use continuous voice-based cursor control**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '09). Boston, Massachusetts (April 4-9, 2009). New York: ACM Press, pp. 347-356.^[24%]
- [C.24] Harada, S., Lester, J., Patel, K., Saponas, T.S., Fogarty, J., Landay, J.A. and Wobbrock, J.O. (2008). **VoiceLabel: Using speech to label mobile sensor data**. Proceedings of the ACM International Conference on Multimodal Interfaces (ICMI '08). Chania, Crete, Greece (October 20-22, 2008). New York: ACM Press, pp. 69-76.^[47%]
- [C.23]  Kane, S.K., Bigham, J.P. and Wobbrock, J.O. (2008). **Slide Rule: Making mobile touch screens accessible to blind people using multi-touch interaction techniques**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '08). Halifax, Nova Scotia (October 13-15, 2008). New York: ACM Press, pp. 73-80. *2019 SIGACCESS ASSETS Paper Impact Award*.^[37%]
- [C.22]  Kane, S.K., Wobbrock, J.O. and Smith, I.E. (2008). **Getting off the treadmill: Evaluating walking user interfaces for mobile devices in public spaces**. Proceedings of the ACM Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI '08). Amsterdam, Netherlands (September 18-20, 2008). New York: ACM Press, pp. 109-118. *Best Paper Award*.^[32%]
- [C.21]  Wobbrock, J.O., Cutrell, E., Harada, S. and MacKenzie, I.S. (2008). **An error model for pointing based on Fitts' law**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '08). Florence, Italy (April 5-10, 2008). New York: ACM Press, pp. 1613-1622. *Best Paper Award*.^[21%]
- [C.20]  Gajos, K.Z., Wobbrock, J.O. and Weld, D.S. (2008). **Improving the performance of motor-impaired users with automatically-generated, ability-based interfaces**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '08). Florence, Italy (April 5-10, 2008). New York: ACM Press, pp. 1257-1266. *Best Paper Award*.^[21%]
- [C.19] Wobbrock, J.O., Rubinstein, J., Sawyer, M.W. and Duchowski, A.T. (2008). **Longitudinal evaluation of discrete consecutive gaze gestures for text entry**. Proceedings of the ACM Symposium on Eye Tracking Research and Applications (ETRA '08). Savannah, Georgia (March 26-28, 2008). New York: ACM Press, pp. 11-18.^[40%]
- [C.18] Wobbrock, J.O. and Gajos, K.Z. (2007). **A comparison of area pointing and goal crossing for people with and without motor impairments**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '07). Tempe, Arizona (October 15-17, 2007). New York: ACM Press, pp. 3-10.^[31%]
- [C.17] Froehlich, J., Wobbrock, J.O. and Kane, S.K. (2007). **Barrier Pointing: Using physical edges to assist target acquisition on mobile device touch screens**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '07). Tempe, Arizona (October 15-17, 2007). New York: ACM Press, pp. 19-26.^[31%]
- [C.16] Harada, S., Wobbrock, J.O. and Landay, J.A. (2007). **VoiceDraw: A voice-driven hands-free drawing application**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '07). Tempe, Arizona (October 15-17, 2007). New York: ACM Press, pp. 27-34.^[31%]
- [C.15] Bigham, J.P., Cavender, A.C., Brudvik, J.T., Wobbrock, J.O. and Ladner, R.E. (2007). **WebinSitu: A comparative analysis of blind and sighted browsing behavior**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '07). Tempe, Arizona (October 15-17, 2007). New York: ACM Press, pp. 51-58.^[31%]
- [C.14]  Wobbrock, J.O., Wilson, A.D. and Li, Y. (2007). **Gestures without libraries, toolkits or training: A \$1 recognizer for user interface prototypes**. Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '07). Newport, Rhode Island (October 7-10, 2007). New York: ACM Press, pp. 159-168. *Invited for special reprise presentation at SIGGRAPH 2008; UIST 2024 Lasting Impact Award*.^[17%]
- [C.13] Gajos, K.Z., Wobbrock, J.O. and Weld, D.S. (2007). **Automatically generating user interfaces adapted to users' motor and vision capabilities**. Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '07). Newport, Rhode Island (October 7-10, 2007). New York: ACM Press, pp. 231-240.^[17%]
- [C.12] González, I.E., Wobbrock, J.O., Chau, D.H., Faulring, A. and Myers, B.A. (2007). **Eyes on the road, hands on the wheel: Thumb-based interaction techniques for input on steering wheels**. Proceedings of Graphics Interface (GI '07). Montreal, Quebec (May 28-30, 2007). Toronto, Ontario: Canadian Information Processing Society, pp. 95-102.^[41%]
- [C.11] Wobbrock, J.O., Chau, D.H. and Myers, B.A. (2007). **An alternative to push, press, and tap-tap-tap: Gesturing on an isometric joystick for mobile phone text entry**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '07). San Jose, California (April 28-May 3, 2007). New York: ACM Press, pp. 667-676.^[22%]
- [C.10] Wobbrock, J.O. and Myers, B.A. (2006). **From letters to words: Efficient stroke-based word completion for trackball text entry**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '06). Portland, Oregon (October 23-25, 2006). New York: ACM Press, pp. 2-9.^[33%]

- [C.9]  Wobbrock, J.O. and Myers, B.A. (2006). **Trackball text entry for people with motor impairments**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '06). Montreal, Quebec (April 22-27, 2006). New York: ACM Press, pp. 479-488. *Best Paper Award*.^[23%]
- [C.8] Myers, B.A. and Wobbrock, J.O. (2005). **Text input to handheld devices for people with physical disabilities**. Proceedings of the International Conference on Human-Computer Interaction (HCI Int'l '05). Las Vegas, Nevada (July 22-27, 2005). Mahwah, New Jersey: Lawrence Erlbaum Associates, vol. 4, pp. 1962-1970.^[39%]
- [C.7]  Wobbrock, J.O., Myers, B.A., Aung, H.H. and LoPresti, E.F. (2004). **Text entry from power wheelchairs: EdgeWrite for joysticks and touchpads**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '04). Atlanta, Georgia (October 18-20, 2004). New York: ACM Press, pp. 110-117. *Best Paper Award*.^[53%]
- [C.6] Wobbrock, J.O., Myers, B.A. and Aung, H.H. (2004). **Writing with a joystick: A comparison of date stamp, selection keyboard and EdgeWrite**. Proceedings of Graphics Interface (GI '04). London, Ontario (May 17-19, 2004). Toronto, Ontario: Canadian Information Processing Society, pp. 1-8.^[38%]
- [C.5] Wobbrock, J.O., Myers, B.A. and Kembel, J.A. (2003). **EdgeWrite: A stylus-based text entry method designed for high accuracy and stability of motion**. Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '03). Vancouver, British Columbia (November 2-5, 2003). New York: ACM Press, pp. 61-70.^[22%]
- [C.4] Myers, B.A., Wobbrock, J.O., Yang, S., Yeung, B., Nichols, J. and Miller, R. (2002). **Using handhelds to help people with motor impairments**. Proceedings of the ACM Conference on Assistive Technologies (ASSETS '02). Edinburgh, Scotland (July 8-10, 2002). New York: ACM Press, pp. 89-96.^[41%]
- [C.3] Nichols, J., Wobbrock, J.O., Gergle, D. and Forlizzi, J. (2002). **Mediator and medium: Doors as interruption gateways and aesthetic displays**. Proceedings of the ACM Symposium on Designing Interactive Systems (DIS '02). London, England (June 25-28, 2002). New York: ACM Press, pp. 379-386.^[22%]
- [C.2] Heckman, C.E. and Wobbrock, J.O. (2000). **Put your best face forward: Anthropomorphic agents, e-commerce consumers, and the law**. Proceedings of the ACM Conference on Autonomous Agents (AGENTS '00). Barcelona, Spain (June 3-7, 2000). New York: ACM Press, pp. 435-442.^[24%]
- [C.1] Heckman, C.E. and Wobbrock, J.O. (1998). **Liability for autonomous agent design**. Proceedings of the ACM Conference on Autonomous Agents (AGENTS '98). Minneapolis, Minnesota (May 10-13, 1998). New York: ACM Press, pp. 392-399.^[32%]

Short Conference Papers³

- [N.20] Zhang, M.R. and Wobbrock, J.O. (2020). **Gedit: Keyboard gestures for mobile text editing**. Proceedings of Graphics Interface (GI '20). Toronto, Ontario (May 28-29, 2020). Toronto, Ontario: Canadian Information Processing Society, pp. 470-473.^[51%]
- [N.19] Franz, R.L., Findlater, L., Neves, B.B. and Wobbrock, J.O. (2019). **Gender and help seeking by older adults when learning new technologies**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '19). Pittsburgh, Pennsylvania (October 28-30, 2019). New York: ACM Press, pp. 136-142.^[26%]
- [N.18] Evans, A. and Wobbrock, J.O. (2014). **Filling in the gaps: Capturing social regulation in an interactive tabletop learning environment**. Proceedings of the International Conference of the Learning Sciences (ICLS '14), vol. 2. Boulder, Colorado (June 23-27, 2014). International Society of the Learning Sciences, pp. 1157-1161.^[32%]
- [N.17] Kay, M., Rector, K., Consolvo, S., Greenstein, B., Wobbrock, J.O., Watson, N.F., Kientz, J.A. (2013). **PVT-Touch: Adapting a reaction time test for touchscreen devices**. Proceedings of the International Conference on Pervasive Computing Technologies for Healthcare (PervasiveHealth '13). Venice, Italy (May 5-8, 2013). Washington, D.C.: IEEE Computer Society, pp. 248-251.^[51%]
- [N.16] Goel, M., Jansen, A., Mandel, T., Patel, S.N. and Wobbrock, J.O. (2013). **ContextType: Using hand posture information to improve mobile touch screen text entry**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '13). Paris, France (April 27-May 2, 2013). New York: ACM Press, pp. 2795-2798.^[20%]
- [N.15]  Findlater, L., Froehlich, J., Fattal, K., Wobbrock, J.O. and Dastyar, T. (2013). **Age-related differences in performance with touchscreens compared to traditional mouse input**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '13). Paris, France (April 27-May 2, 2013). New York: ACM Press, pp. 343-346. *Honorable Mention Paper*.^[20%]
- [N.14] Kane, S.K., Frey, B. and Wobbrock, J.O. (2013). **Access Lens: A gesture-based screen reader for real-world documents**. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '13). Paris, France (April 27-May 2, 2013). New York: ACM Press, pp. 347-350.^[20%]
- [N.13] Anthony, L. and Wobbrock, J.O. (2012). **\$N\$-Protractor: A fast and accurate multistroke recognizer**. Proceedings of Graphics Interface (GI '12). Toronto, Ontario (May 28-30, 2012). Toronto, Ontario: Canadian Information Processing Society, pp. 117-120.^[38%]

³ Short conference papers are just as rigorously peer-reviewed as full conference papers, and often have even lower acceptance rates. CHI and UIST Notes, especially, are considered top-tier publications in Human-Computer Interaction.

- [N.12] Findlater, L., Lee, B.Q. and Wobbrock, J.O. (2012). **Beyond QWERTY: Augmenting touch screen keyboards with multi-touch gestures for non-alphanumeric input.** Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '12). Austin, Texas (May 5-10, 2012). New York: ACM Press, pp. 2679-2682. *Honorable Mention Paper.* ^[23%]
- [N.11] Wobbrock, J.O., Findlater, L., Gergle, D. and Higgins, J.J. (2011). **The aligned rank transform for nonparametric factorial analyses using only ANOVA procedures.** Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '11). Vancouver, British Columbia (May 7-12, 2011). New York: ACM Press, pp. 143-146. *Honorable Mention Paper.* ^[26%]
- [N.10] Wobbrock, J.O., Jansen, A. and Shinohara, K. (2011). **Modeling and predicting pointing errors in two dimensions.** Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '11). Vancouver, British Columbia (May 7-12, 2011). New York: ACM Press, pp. 1653-1656. ^[26%]
- [N.9] Chilana, P.K., Ko, A.J., Wobbrock, J.O., Grossman, T. and Fitzmaurice, G. (2011). **Post-deployment usability: A survey of current practices.** Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '11). Vancouver, British Columbia (May 7-12, 2011). New York: ACM Press, pp. 2243-2246. ^[26%]
- [N.8] Chilana, P.K., Ko, A.J. and Wobbrock, J.O. (2010). **Understanding expressions of unwanted behaviors in open bug reporting.** Proceedings of the IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC '10). Madrid, Spain (September 21-25, 2010). Washington, D.C.: IEEE Computer Society, pp. 203-206. ^[12%]
- [N.7] Wobbrock, J.O. (2009). **TapSongs: Tapping rhythm-based passwords on a single binary sensor.** Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '09). Victoria, British Columbia (October 4-7, 2009). New York: ACM Press, pp. 93-96. ^[17%]
- [N.6] Gajos, K.Z., Weld, D.S. and Wobbrock, J.O. (2008). **Decision-theoretic user interface generation.** Proceedings of the AAAI Conference on Artificial Intelligence (AAAI '08). Chicago, Illinois (July 13-17, 2008). Menlo Park, California: AAAI Press, pp. 1532-1536. ^[21%]
- [N.5] Kane, S.K., Wobbrock, J.O., Harniss, M. and Johnson, K.L. (2008). **TrueKeys: Identifying and correcting typing errors for people with motor impairments.** Proceedings of the ACM Conference on Intelligent User Interfaces (IUI '08). Maspalomas, Gran Canaria, Spain (January 13-16, 2008). New York: ACM Press, pp. 349-352. ^[30%]
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- [N.3] Wobbrock, J.O., Myers, B.A. and Rothrock, B. (2006). **Few-key text entry revisited: Mnemonic gestures on four keys.** Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '06). Montreal, Quebec (April 22-27, 2006). New York, ACM Press, pp. 489-492. ^[23%]
- [N.2] Wobbrock, J.O., Aung, H.H., Rothrock, B. and Myers, B.A. (2005). **Maximizing the guessability of symbolic input.** Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI '05). Portland, Oregon (April 2-7, 2005). New York: ACM Press, pp. 1869-1872. ^[25%]
- [N.1] Wobbrock, J.O., Forlizzi, J., Hudson, S.E. and Myers, B.A. (2002). **WebThumb: Interaction techniques for small-screen browsers.** Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '02). Paris, France (October 27-30, 2002). New York: ACM Press, pp. 205-208. ^[22%]

Conference Papers with Posters/Demos

- [P.24] Sharif, A., Potluri, V., Ang, J.R.X., Wobbrock, J.O. and Mankoff, J. (2024). **TOUCHPAD MAPPER: Examining information consumption from 2D digital content using touchpads by screen-reader users.** Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '24). St. John's, Newfoundland and Labrador (October 28-30, 2024). New York: ACM Press. Article No. 128. *Best Demo Award.* ^[67%]
- [P.23] Yamagami, M., Portnova-Fahreeva, A., Mitchell, C.L., Kong, J. and Wobbrock, J.O. (2024). **Personalized gesture classification for encouraging non-sedentary behavior during technology use in people with motor disabilities.** Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC '24). Orlando, Florida (July 15-19, 2024). Piscataway, New Jersey: IEEE Engineering in Medicine and Biology Society. Paper ID 8380.
- [P.22] Sharif, A., Potluri, V., Ang, J.R.X., Wobbrock, J.O. and Mankoff, J. (2024). **TOUCHPAD MAPPER: Exploring non-visual touchpad interactions for screen-reader users.** Extended Abstracts of the International Web for All Conference (W4A '24). Singapore (May 13-14, 2024). New York: ACM Press, pp. 42-44.
- [P.21] Sharif, A., Zhang, A.M., Reinecke, K. and Wobbrock, J.O. (2023). **Understanding and improving drilled-down information extraction from online data visualizations for screen-reader users.** Extended Abstracts of the International Web for All Conference (W4A '23). Austin, Texas (April 30-May 1, 2023). New York: ACM Press, pp. 168-170.
- [P.20] Zhang, Z. and Wobbrock, J.O. (2022). **AnyBoard: Using multimodal input and output to make digital artboards accessible to blind users.** Adjunct Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '22). Bend, Oregon (October 29-November 2, 2022). New York: ACM Press. Article No. 9. *Honorable Mention Poster.* ^[61%]

- [P.19] Sharif, A., Zhang, A.M., Shih, A., Wobbrock, J.O. and Reinecke, K. (2022). **Understanding and improving information extraction from online geospatial data visualizations for screen-reader users**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '22). Athens, Greece (October 23-26, 2022). New York: ACM Press. Article No. 61. ^[59%]
- [P.18] Kong, J., Zhong, M., Fogarty, J. and Wobbrock, J.O. (2021). **New metrics for understanding touch by people with and without limited fine motor function**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '21). Virtual Event (October 18-22, 2021). New York: ACM Press. Article No. 80. ^[62%]
- [P.17] Franz, R.L., Findlater, L. and Wobbrock, J.O. (2019). **Just ask me: Comparing older and younger individuals' knowledge of their optimal touchscreen target sizes**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '19). Pittsburgh, Pennsylvania (October 28-30, 2019). New York: ACM Press, pp. 591-593. ^[58%]
- [P.16] Perlmutter, L., Chaudhuri, B., Petelka, J., Garrison, P., Fogarty, J., Wobbrock, J.O. and Ladner, R.E. (2019). **Demonstration of GestureCalc: An eyes-free calculator for touch screens**. Proceedings of the ACM Conference on Computers and Accessibility (ASSETS '19). Pittsburgh, Pennsylvania (October 28-30, 2019). New York: ACM Press, pp. 667-669. ^[58%]
- [P.15] O'Leary, K., Dixon, M., Toomim, M., Wobbrock, J.O. and Pratt, W. (2016). **Peer-to-peer psychotherapy tools**. Proceedings of the International Society for Research on Internet Interventions Scientific Meeting (ISRII '16). Seattle, Washington (April 7-9, 2016). Poster No. P3.41.
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- [P.11] Jansen, A., Findlater, L. and Wobbrock, J.O. (2011). **From the lab to the world: Lessons from extending a pointing technique for real-world use**. Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI '11). Vancouver, British Columbia (May 7-12, 2011). New York: ACM Press, pp. 1867-1872. ^[45%]
- [P.10] Levy, D.M., Wobbrock, J.O., Kaszniak, A.W. and Ostergren, M. (2011). **Initial results from a study of the effects of meditation on multitasking performance**. Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI '11). Vancouver, British Columbia (May 7-12, 2011). New York: ACM Press, pp. 2011-2016. ^[45%]
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- [P.8] Choe, E.K., Shinohara, K., Chilana, P.K., Dixon, M. and Wobbrock, J.O. (2009). **Exploring the design of accessible goal crossing desktop widgets**. Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI '09). Boston, Massachusetts (April 4-9, 2009). New York: ACM Press, pp. 3733-3738. ^[34%]
- [P.7] Kane, S.K. and Wobbrock, J.O. (2007). **Automatically correcting typing errors for people with motor impairments**. Adjunct Proceedings of the ACM Symposium on User Interface Software and Technology (UIST '07). Newport, Rhode Island (October 7-10, 2007). New York: ACM Press, pp. 59-60.
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Workshop Papers

- [W.23] Wobbrock, J.O., Franz, R.L. and Kneitmix, M. (2024). **Improving the accessibility of virtual reality for people with motor and visual impairments.** Workshop on “Building a Metaverse for All: Opportunities and Challenges for Future Inclusive and Accessible Virtual Environments (Metaverse4All ’24).” ACM Conference on Human Factors in Computing Systems (CHI ’24). Honolulu, Hawaii (May 11-16, 2024). Paper No. 4.
- [W.22] Mitchell, C.L. and Wobbrock, J.O. (2024). **Physiological signals for ability-based design.** Workshop on “Towards Best Practices for Integrating Physiological Signals in HCI (PhysioCHI ’24).” ACM Conference on Human Factors in Computing Systems (CHI ’24). Honolulu, Hawaii (May 11-16, 2024). Paper No. 18.
- [W.21] Hiniker, A. and Wobbrock, J.O. (2022). **Reclaiming attention: A Christian perspective prioritizing relationships in the design of technology.** Workshop on “Integrating Religion, Faith, and Spirituality in HCI.” ACM Conference on Human Factors in Computing Systems (CHI ’22). New Orleans, Louisiana (April 30-May 5, 2022).
- [W.20] Tigwell, G., Sarsenbayeva, Z., Gorman, B., Flatla, D., Goncalves, J., Yesilada, Y. and Wobbrock, J. (2020). **Future directions for situationally induced impairments and disabilities research.** ACM Interactions Blog. October 6, 2020.
- [W.19] Tigwell, G.W., Sarsenbayeva, Z., Gorman, B.M., Flatla, D.R., Goncalves, J., Yesilada, Y. and Wobbrock, J.O. (2019). **Addressing the challenges of situationally-induced impairments and disabilities in mobile interaction.** Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI ’19). Glasgow, Scotland (May 4-9, 2019). New York: ACM Press. Paper No. W30. ^[318]
- [W.18] Franz, R., Findlater, L. and Wobbrock, J.O. (2018). **Lost in transition: The importance of conceptualizing aging as a process in accessibility research.** Workshop on “Designing Interactions for the Ageing Populations.” ACM Conference on Human Factors in Computing Systems (CHI ’18). Montreal, Quebec (April 21-26, 2018), pp. 53-58.
- [W.17] Wobbrock, J.O. (2017). **The relevance of nonparametric and semi-parametric statistics to HCI.** Workshop on “Moving Transparent Statistics Forward.” ACM Conference on Human Factors in Computing Systems (CHI ’17). Denver, Colorado (May 6-11, 2017). Paper No. 2.
- [W.16] Tran, J.J., Riskin, E.A., Ladner, R.E. and Wobbrock, J.O. (2013). **Human-centered approach evaluating mobile sign language video communication.** Grace Hopper Celebration of Women in Computing Conference (GHC ’13). Minneapolis, Minnesota (October 2-5, 2013).
- [W.15] Azenkot, S., Rector, K., Ladner, R.E. and Wobbrock, J.O. (2013). **The need for research on mobile technologies for people with low-vision.** Third Mobile Accessibility Workshop (MOBACC ’13). ACM Conference on Human Factors in Computing Systems (CHI ’13). Paris, France (April 27-May 2, 2013).
- [W.14] Tran, J.J., Riskin, E.A., Ladner, R.E. and Wobbrock, J.O. (2013). **Increasing mobile sign language video accessibility by relaxing video transmission standards.** Third Mobile Accessibility Workshop (MOBACC ’13). ACM Conference on Human Factors in Computing Systems (CHI ’13). Paris, France (April 27-May 2, 2013).
- [W.13] Chilana, P.K., Ko, A.J. and Wobbrock, J.O. (2013). **Crowdsourced Q&A-based contextual help for web applications: Challenges and opportunities.** Workshop on “Social Media Question Asking.” ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW ’13). San Antonio, Texas (February 23-27, 2013).
- [W.12] Bernstein, M., Cosley, D., DiSalvo, C., Kairam, S., Karger, D., Kriplean, T., Lampe, C., Mackay, W., Terveen, L., Wobbrock, J. and Yardi, S. (2012). **Reject me: Peer review and SIGCHI.** Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI ’12). Austin, Texas (May 5-10, 2012). New York: ACM Press, pp. 1197-1200.
- [W.11] Kristensson, P.O., Clawson, J., Dunlop, M., Isokoski, P., Roark, B., Vertanen, K., Waller, A. and Wobbrock, J.O. (2012). **Designing and evaluating text entry methods.** Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI ’12). Austin, Texas (May 5-10, 2012). New York: ACM Press, pp. 2747-2750.
- [W.10] Wobbrock, J.O. (2011). **Practical statistics for human-computer interaction: An independent study combining statistics theory and tool know-how.** Annual Workshop of the Human-Computer Interaction Consortium (HCIC ’11). Pacific Grove, California (June 14-18, 2011).
- [W.9] Chilana, P.K., Ko, A.J. and Wobbrock, J.O. (2011). **Using crowdsourcing in the design of context-sensitive help for web applications.** Workshop on “Crowdsourcing and Human Computation.” ACM Conference on Human Factors in Computing Systems (CHI ’11). Vancouver, British Columbia (May 7-12, 2011).
- [W.8] Hurst, A., Gajos, K.Z., Findlater, L., Wobbrock, J.O., Sears, A. and Trewin, S. (2011). **Dynamic accessibility: Detecting and accommodating differences in ability and situation.** Extended Abstracts of the ACM Conference on Human Factors in Computing Systems (CHI ’11). Vancouver, British Columbia (May 7-12, 2011). New York: ACM Press, pp. 41-44.
- [W.7] Harada, S., Wobbrock, J.O. and Landay, J.A. (2009). **Beyond speech recognition: Improving voice-driven access to computers.** Proceedings of the 2009 IEEE-IBM Accessing the Future Conference. Boston, Massachusetts (July 20-21, 2009).
- [W.6] Chilana, P.K., Ko, A.J. and Wobbrock, J.O. (2009). **Designing software for unfamiliar domains.** Workshop on Cooperative and Human Aspects of Software Engineering (CHASE ’09). In Companion of the International Conference on Software Engineering (ICSE ’09). Vancouver, British Columbia (May 17, 2009). Washington, D.C.: IEEE Computer Society, p. 22.

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- [W.4] Wobbrock, J.O. (2006). **The future of mobile device research in HCI**. Workshop on "What is the Next Generation of Human-Computer Interaction?" ACM Conference on Human Factors in Computing Systems (CHI '06). Montreal, Quebec (April 22-27, 2006), pp. 131-134.
- [W.3] Wobbrock, J.O. (2006). **A robust design for accessible text entry**. The Newsletter of ACM SIGACCESS (no. 84, January 2006). New York: ACM Press, pp. 48-51. First appeared in the Doctoral Consortium of ACM ASSETS 2005, Baltimore, Maryland (October 9-12, 2005).
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Book Chapters

- [B.9] Zhang, M.R., Wen, H., Cui, W., Zhu, S., Schwartz, H.A., Bi, X. and Wobbrock, J.O. (2021). **AI-driven intelligent text correction techniques for mobile text entry**. Chapter 5 in Y. Li & O. Hilliges (eds.), *Artificial Intelligence for Human Computer Interaction: A Modern Approach*. Switzerland: Springer, pp. 131-168.
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- [B.7] Wobbrock, J.O. (2019). **Situationally-induced impairments and disabilities**. Chapter 5 in Y. Yesilada & S. Harper (eds.), *Web Accessibility: A Foundation for Research (2nd ed.)*. London, England: Springer, pp. 59-92.
- [B.6] Franz, R.L., Neves, B.B., Epp, C.D., Baecker, R. and Wobbrock, J.O. (2019). **Why and how think-alouds with older adults fail: Recommendations from a study and expert interviews**. In S. Sayago (ed.), *Perspectives on Human-Computer Interaction Research with Older People*. Switzerland: Springer, pp. 217-235.
- [B.5] Wobbrock, J.O. and Kay, M. (2016). **Nonparametric statistics in human-computer interaction**. Chapter 7 in J. Robertson & M.C. Kaptein (eds.), *Modern Statistical Methods for HCI*. Switzerland: Springer, pp. 135-170.
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- [IP.12] Kembel, J.A., Kembel, G.A., Kim, D.S., Russell, J., Wobbrock, J., Kembel, G.S., Kembel, J.L. and Gabbay, L.D. (2013). **Indexing, sorting, and categorizing application media packages**. U.S. Patent #8,621,034. Issued December 31, 2013. Priority date April 26, 1999.
- [IP.11] Kembel, J.A., Kembel, G.A., Kim, D.S., Russell, J., Wobbrock, J., Kembel, G.S., Kembel, J.L. and Gabbay, L.D. (2013). **System and method for accessing and displaying internet content via an integrated application media package**. U.S. Patent #8,521,833. Issued August 27, 2013. Priority date April 26, 1999.
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- [IP.8] Kembel, J.A., Kembel, G.A., Kim, D., Russell, J., Wobbrock, J., Kembel, G., Kembel, J., Gabbay, L., Medrano, A., Malloy, S., Bella, J., Devulkar, S. and Wallin, M. (2013). **Tracking and tracing user activity with application media packages**. U.S. Patent #8,346,887. Issued January 1, 2013. Priority date April 26, 1999.
- [IP.7] Kembel, J.A., Kembel, G.A., Kim, D., Russell, J., Wobbrock, J., Kembel, G., Kembel, J., Bella, J., Devulkar, S. and Wallin, M. (2011). **System and methods for creating and authoring internet content using application media packages**. U.S. Patent #8,020,083. Issued September 13, 2011. Priority date April 26, 1999.
- [IP.6] Kembel, J.A., Kembel, G.A., Kim, D.S., Russell, J., Wobbrock, J., Kembel, G.S., Kembel, J.L., Gabbay, L.D., Malloy, S.J. and Chipkin, A.M. (2010). **Apparatus and method for dynamically coordinating the delivery of computer readable media**. U.S. Patent #7,792,947. Issued September 7, 2010. Priority date April 26, 1999.
- [IP.5] Kembel, J.A., Kembel, G.A., Kim, D.S., Russell, J., Wobbrock, J., Kembel, G.S., Kembel, J.L., Bella, J.A., Devulkar, S.T. and Wallin, M. (2010). **Apparatus and method of hosting internet content**. U.S. Patent #7,756,967. Issued July 13, 2010. Priority date April 26, 1999.
- [IP.4] Wobbrock, J.O. and Myers, B.A. (2010). **Using edges and corners for character input**. U.S. Patent #7,729,542. Issued June 1, 2010. Priority date April 4, 2003.
- [IP.3] Kembel, J.A., Kembel, G.A., Kim, D.S., Russell, J., Wobbrock, J., Kembel, G.S., Kembel, J.L. and Gabbay, L.D. (2010). **Apparatus and method for interacting with internet content via one or more applications that do not include native web browsing navigation control features**. U.S. Patent #7,660,868. Issued February 9, 2010. Priority date April 26, 1999.
- [IP.2] Dehlin, J.P., Chen, C.S., Wilson, A.D., Robbins, D.C., Horvitz, E.J., Hinckley, K.P. and Wobbrock, J.O. (2009). **Recognizing gestures and using gestures for interacting with software applications**. U.S. Patent #7,519,223. Issued April 14, 2009. Priority date June 28, 2004.
- [IP.1] Kembel, J.A., Kembel, G.A., Medrano, A.P., Kim, D.S., Russell, J., Wobbrock, J., Kembel, G.S., Kembel, J.L., Gabbay, L.D., Malloy, S.J., Bella, J.A., Devulkar, S.T. and Wallin, M. (2008). **Apparatus and method for tracing the distribution of diversely sourced internet content**. U.S. Patent #7,356,569. Issued April 8, 2008. Priority date April 26, 1999.

R Statistics Packages

- [R.2] Wobbrock, J.O. (2024). **multpois: Analyze nominal response data with the multinomial-Poisson trick**. R package with documentation and one vignette. Initially published on CRAN October 16, 2024. [Link](#)
- [R.1] Kay, M., Elkin, L.A., Higgins, J.J. and Wobbrock, J.O. (2021). **ARTool: Aligned rank transform**. R package with documentation and two vignettes. Initially published on CRAN October 13, 2021. [Link](#)

Selected Popular Press

- [PR.7] Wobbrock, J.O. (2024). **Mac at 40: User experience was the innovation that launched a technology revolution**. The Conversation, January 19, 2024. (Also translated into Spanish, Portuguese, and French editions.) [Link](#)
- [PR.6] Wobbrock, J. (2016). **Why every innovation can't be the next iPhone**. Real Clear Technology, April 27, 2016. [Link](#)
- [PR.5] Wobbrock, J. (2014). **5 lessons that business leaders could learn from academics**. Entrepreneur Magazine, November 7, 2014. [Link](#)
- [PR.4] Wobbrock, J. (2014). **Changing consumer behaviors make self-service growth inevitable**. destinationCRM.com, September 26, 2014. [Link](#)

- [PR.3] Wobbrock, J. (2014). **How millennials require us to design the technologies of tomorrow**. WIRED, September 5, 2014. [Link](#)
- [PR.2] Wobbrock, J. (2014). **Ivory tower research and startup innovation are two sides of a coin**. Entrepreneur Magazine, July 19, 2014. [Link](#)
- [PR.1] Wobbrock, J. (2014). **Power to the people: How to make self-service a priority for your website**. Website Magazine, June 19, 2014. [Link](#)

Other Publications & Reports

- [O.7] Mankoff, J. and Wobbrock, J.O. (2022). **Expanding the pipeline: The Center for Research and Education on Accessible Technology and Experiences (CREATE)**. *Computing Research News* 34 (3), pp. 17-19.
- [O.6] Ladner, R.E., Lazar, J., Lewis, C. and Wobbrock, J.O. (2021). **Accessibility research centers: What they are and how to become involved**. Panel at the CMD-IT/ACM Richard Tapia Celebration of Diversity in Computing Conference (TAPIA '21). Virtual Event (September 14-18, 2021).
- [O.5] Mankoff, J. and Wobbrock, J.O. (2021). **The center for research and education on accessible technology and experiences (CREATE)**. The Newsletter of ACM SIGACCESS (no. 130, June 2021). New York: ACM Press. [Link](#)
- [O.4] Tung, Y.-C., DiVerdi, S., Hertzmann, A. and Wobbrock, J.O. (2018). **Comparing spatial interaction modalities for 2D-widgets in productivity applications in virtual reality**. Technical Report UW-CSE-18-10-01. Seattle, WA: University of Washington, 12 pages.
- [O.3] Kane, S.K., Shinohara, K.S. and Wobbrock, J.O. (2015). **OneView: Enabling collaboration between blind and sighted students**. Computer Science Technical Report 1037. Boulder, CO: University of Colorado Boulder, 6 pages.
- [O.2] Wobbrock, J.O. (2006). **EdgeWrite: A versatile design for text entry and control**. Technical Report CMU-HCII-06-104. Pittsburgh, PA: Carnegie Mellon University, 310 pages. [School of Computer Science Distinguished Dissertation Award](#).
- [O.1] Wobbrock, J.O. (1998). **The law and policy of autonomous software agents**. Stanford, CA: Stanford University, 172 pages. [Robert M. Golden Medal for Excellence in Humanities and Creative Arts](#).

PAPER AWARDS (33)

- 🏆 **Best Paper Award, ACM Conference on Computers and Accessibility (ASSETS '24)**
Chheda-Kothary, Wobbrock & Froehlich: "Engaging with children's artwork in mixed visual-ability families." (Awarded to 1 of 226 submissions.)
- 🏆 **Best Demo Award, ACM Conference on Computers and Accessibility (ASSETS '24)**
Sharif, Potluri, Ang, Wobbrock & Mankoff: "TOUCHPAD MAPPER: Examining information consumption from 2D digital content using touchpads by screen-reader users." (Awarded to 1 of 17 submissions.)
- ⑩ **Lasting Impact Award, ACM Symposium on User Interface Software and Technology (UIST '24)**
Wobbrock, Wilson & Li: "Gestures without libraries, toolkits or training: A \$1 recognizer for user interface prototypes." (The UIST Lasting Impact Award recognizes UIST papers that have had a long-lasting influence on the field of user interface software and technology. The impact can be in terms of new research directions, wide acceptance in industry, or large societal impact.)
- 🏆 **Best Paper Award, ACM Conference on Mobile Human-Computer Interaction (MobileHCI '24)**
Kong, Zhong, Fogarty & Wobbrock: "The Ability-Based Design Mobile Toolkit (ABD-MT): Developer support for runtime interface adaptation based on users' abilities." (Awarded to 1 of 141 submissions.)
- 🏆 **Best Technical Paper, International Web for All Conference (W4A '23)**
Sharif, Zhang, Reinecke & Wobbrock: "Understanding and improving drilled-down information extraction from online data visualizations for screen-reader users." (Awarded to 1 of 32 submissions.)
- ⑩ **Ten-Year Technical Impact Award, ACM International Conference on Multimodal Interaction (ICMI '22)**
Vatavu, Anthony & Wobbrock: "Gestures as point clouds: A \$P recognizer for user interface prototypes," published at ICMI 2012. (The award is presented to a group of scientists for contributing a seminal paper published in ICMI with the largest influence in an area within multimodal interaction, interfaces, and systems, and published 10 years or more in the past.)
- ⑩ **SIGACCESS ASSETS Paper Impact Award, ACM Conference on Computers and Accessibility (ASSETS '19)**
Kane, Bigham & Wobbrock: "Slide Rule: Making mobile touch screens accessible to blind people using multi-touch interaction techniques," published at ASSETS 2008. (Awarded every other year to one paper at least 10 years old that has made a lasting impact on computing and information technology addressing the needs of people with disabilities.)
- 🏆 **Douglas Engelbart Award for Best Paper, ACM Conference on Hypertext and Social Media (HT '19)**
Wobbrock, Hsu, Burger & Magee: "Isolating the effects of web page visual appearance on the perceived credibility of online news among college students." (Awarded to 1 of 102 submissions.)

- 🏆 **Best Paper Award, ACM Conference on Human Factors in Computing Systems (CHI '16)**
Mott, Vatavu, Kane & Wobbrock: "Smart Touch: Improving touch accuracy for people with motor impairments with template matching." (Awarded to 23 of 2325 submissions.)
 - 🏆 **Best Paper Award, ACM Conference on Human Factors in Computing Systems (CHI '15)**
Chilana, Ko & Wobbrock: "From user-centered to adoption-centered design: A case study of an HCI research innovation becoming a product." (Awarded to 21 of 2150 submissions.)
 - 🏆 **Outstanding Paper Award, ACM International Conference on Multimodal Interaction (ICMI '12)**
Vatavu, Anthony & Wobbrock: "Gestures as point clouds: A \$P recognizer for user interface prototypes." (Awarded to 3 of 128 submissions.)
 - 🏆 **Best Paper Award, ACM Conference on Computers and Accessibility (ASSETS '12)**
Azenkot, Rector, Ladner & Wobbrock: "PassChords: Secure multi-touch authentication for blind people." (Awarded to 1 of 89 submissions.)
 - 🏆 **Best Paper Award, ACM Conference on Human Factors in Computing Systems (CHI '11)**
Shinohara & Wobbrock: "In the shadow of misperception: Assistive technology use and social interactions." (Awarded to 15 of 1540 submissions.)
 - 🏆 **Best Paper Award, ACM Conference on Human Factors in Computing Systems (CHI '11)**
Kane, Wobbrock & Ladner: "Usable gestures for blind people: Understanding preference and performance." (Awarded to 15 of 1540 submissions.)
 - 🏆 **Best Paper Award, IEEE Symposium on Visual Languages and Human-Centric Computing (VL/HCC '10)**
Ko & Wobbrock: "Cleanroom: Edit-time error detection with the uniqueness heuristic." (Awarded to 1 of 78 submissions.)
 - 🏆 **Best Paper Award, ACM Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI '08)**
Kane, Wobbrock & Smith: "Getting off the treadmill: Evaluating walking user interfaces for mobile devices in public spaces." (Awarded to 4 of 200 submissions.)
 - 🏆 **Best Paper Award, ACM Conference on Human Factors in Computing Systems (CHI '08)**
Wobbrock, Cutrell, Harada & MacKenzie: "An error model for pointing based on Fitts' law." (Awarded to 7 of 710 submissions.)
 - 🏆 **Best Paper Award, ACM Conference on Human Factors in Computing Systems (CHI '08)**
Gajos, Wobbrock & Weld: "Improving the performance of motor-impaired users with automatically-generated, ability-based interfaces." (Awarded to 7 of 710 submissions.)
 - 🏆 **Best Paper Award, ACM Conference on Human Factors in Computing Systems (CHI '06)**
Wobbrock & Myers: "Trackball text entry for people with motor impairments." (Awarded to 3 of 350 submissions.)
 - 🏆 **Best Paper Award, ACM Conference on Computers and Accessibility (ASSETS '04)**
Wobbrock, Myers, Aung & LoPresti: "Text entry from power wheelchairs: EdgeWrite for joysticks and touchpads." (Awarded to 1 of 50 submissions.)
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- 🏆 **Honorable Mention Poster, ACM Symposium on User Interface Software and Technology (UIST '22)**
Zhang & Wobbrock: "A11yBoard: Using multimodal input and output to make digital artboards accessible to blind users." (Awarded to 3 of 54 submissions.)
 - 🏆 **Best Paper Nominee, ACM Conference on Computers and Accessibility (ASSETS '22)**
Kong, Zhong, Fogarty & Wobbrock: "Quantifying touch: New metrics for characterizing what happens *during* a touch." (Awarded to 8 of 132 submissions.)
 - 🏆 **Best Paper Nominee, ACM Conference on Computers and Accessibility (ASSETS '18)**
Ross, Zhang, Fogarty & Wobbrock: "Examining image-based button labeling for accessibility in Android apps through large-scale analysis." (Awarded to 5 of 108 submissions.)
 - 🏆 **Honorable Mention Paper, ACM Conference on Human-Computer Interaction with Mobile Devices and Services (MobileHCI '18)**
Vatavu, Anthony & Wobbrock: "\$Q: A super-quick, articulation-invariant stroke-gesture recognizer for low-resource devices." (Awarded to 3 of 213 submissions.)
 - 🏆 **Honorable Mention Paper, ACM Conference on Human Factors in Computing Systems (CHI '18)**
O'Leary, Schueller, Wobbrock & Pratt: "'Suddenly, we got to become therapists for each other': Designing peer support chats for mental health." (Awarded to 5% of ~2500 submissions.)

- 🏆 **Best Paper Nominee, ACM Conference on Computers and Accessibility (ASSETS '17)**
 Ross, Zhang, Fogarty & Wobbrock: "Epidemiology as a framework for large-scale mobile application accessibility assessment."
 (Awarded to 5% of 126 submissions.)
- 🏆 **Honorable Mention Paper, ACM Conference on Human Factors in Computing Systems (CHI '15)**
 Vatavu & Wobbrock: "Formalizing agreement analysis for elicitation studies: New measures, significance test, and toolkit." (Awarded to 5% of 2150 submissions.)
- 🏆 **Honorable Mention Paper, ACM Conference on Human Factors in Computing Systems (CHI '13)**
 Findlater, Froehlich, Fattal, Wobbrock & Dastyar: "Age-related differences in performance with touchscreens compared to traditional mouse input." (Awarded to 5% of 1963 submissions.)
- 🏆 **Honorable Mention Paper, ACM Conference on Human Factors in Computing Systems (CHI '12)**
 Goel, Findlater & Wobbrock: "WalkType: Using accelerometer data to accommodate situational impairments in mobile touch screen text entry." (Awarded to 5% of 1577 submissions.)
- 🏆 **Honorable Mention Paper, ACM Conference on Human Factors in Computing Systems (CHI '12)**
 Findlater, Lee & Wobbrock: "Beyond QWERTY: Augmenting touch screen keyboards with multi-touch gestures for non-alphanumeric input." (Awarded to 5% of 1577 submissions.)
- 🏆 **Honorable Mention Paper, ACM Conference on Human Factors in Computing Systems (CHI '11)**
 Findlater, Wobbrock & Wigdor: "Typing on flat glass: Examining ten-finger expert typing patterns on touch surfaces." (Awarded to 5% of 1540 submissions.)
- 🏆 **Honorable Mention Paper, ACM Conference on Human Factors in Computing Systems (CHI '11)**
 Wobbrock, Findlater, Gergle & Higgins: "The aligned rank transform for nonparametric factorial analyses using only ANOVA procedures." (Awarded to 5% of 1540 submissions.)
- 🏆 **Best Paper Nominee, ACM Conference on Human Factors in Computing Systems (CHI '09)**
 Wobbrock, Morris & Wilson: "User-defined gestures for surface computing." (Awarded to 5% of 750 submissions.)

OTHER AWARDS

ACM Fellow (2021)

Named a Fellow of the Association of Computing Machinery "for contributions to human-computer interaction and accessible computing." The ACM Fellow honor recognizes the top 1% of ACM's worldwide membership for significant contributions to computer science. [Link](#)

AMiner #1 and #2 Most Influential Scholar in Human-Computer Interaction Awards (2018-2021)

Placed #1 in 2018, #2 in 2020, and #1 in 2021 by the citation-ranking system AMiner, which says, "The Most Influential Scholars in Human-Computer Interaction are the top 10 most-cited scholars from the top venues of this field over the past 10 years." [Link](#)

ACM CHI Academy (2019)

Major international award for substantial contributions to the field of human-computer interaction. Inducted at ACM CHI 2019 in Glasgow, Scotland on May 5, 2019. [Link](#)

ACM Senior Member (2019)

Admitted as a Senior Member of the Association of Computing Machinery. Admissions require peer nominations and admission by a selection committee. [Link](#)

PROF Award Nominee (2017)

University of Washington Information School Pedagogical Recognition for Our Faculty (PROF) teaching award nominee.

ACM SIGCHI Social Impact Award (2017)

Major international award for human-computer interaction research applied to pressing social needs. Awarded at ACM CHI 2017 in Denver, Colorado on May 7, 2017. [Link](#)

AnswerDash Case by Harvard Business School and the University of Washington Foster School of Business (2016)

AnswerDash was written up and published as a case study by Harvard Business School professor Elie Ofek and University of Washington Foster School of Business professor Jeffrey D. Shulman. Case #9-516-106. June 13, 2016.

Gartner Cool Vendor Award for CRM Customer Service and Support (2015)

Awarded to AnswerDash based on my demos to analysts as Co-founder / CEO for being an "innovative vendor with applications to deliver a superior customer service experience and/or reduce operational costs."

University of Washington Presidential Entrepreneurial Faculty Fellow (2014-2016)

For “success initiating groundbreaking programs for translation, collaborating with industry, or in translating research into products or therapies.” Award included \$10,000 over two years.

Kynamatrix Research Network “Innovation through Collaboration” Award (2014)

For research entitled, “Human-centered approach optimizing the lower limits of intelligible mobile sign language video communication,” by Jessica Tran with advisors Eve Riskin, Richard Ladner and Jacob Wobbrock. Award included \$1,000.

National Science Foundation CAREER Award (2010)

For submission entitled, “Advancing accessible computing with tools for ability-based design.” Award is in the form of a federal research grant for \$509,359.

Honorable Mention, NISH National Scholar Award for Workplace Innovation and Design (2009)

For essay entitled, “Fully accessible touch screens for the blind and visually impaired,” by Shaun K. Kane co-authored with Jeffrey P. Bigham and Jacob O. Wobbrock.

2nd Place, NISH National Scholar Award for Workplace Innovation and Design (2008)

For essay entitled, “Hands-free voice-driven drawing and diagram creation method for people with motor impairments,” by Susumu Harada co-authored with Jacob O. Wobbrock and James Landay. Award included \$10,000 and an invitation for Mr. Harada to attend the NISH Grassroots Advocacy Training Conference, June 10-13 in Washington, D.C.

School of Computer Science Distinguished Dissertation Award, Carnegie Mellon University (2006)

For dissertation entitled, “EdgeWrite: A versatile design for text entry and control,” by Jacob O. Wobbrock. Award included \$500 and an invited Distinguished Lecture at the School of Computer Science, Carnegie Mellon University. Was 1 of 2 awardees.

1st Place, NISH National Scholar Award for Workplace Innovation and Design (2005)

For essay entitled, “Accessible handheld and desktop text entry for people with motor impairments,” by Jacob O. Wobbrock co-authored with Brad A. Myers. Award included \$20,000 and an invitation to attend the NISH National Training and Achievement Conference, May 22-24 in New Orleans, LA.

National Science Foundation IGERT Fellow (2004)

For research in Assistive Technology, Carnegie Mellon University.

Robert M. Golden Medal for Excellence in Humanities and Creative Arts (1998)

For undergraduate honors thesis entitled, “The law and policy of autonomous software agents,” by Jacob O. Wobbrock. Award included \$200, Stanford University.

FUNDING

Federal Research Grants (\$7,619,442)

NSF	Fogarty, J., Wobbrock, J.O., Caspi, A. and Ladner, R.E. (2017-2022). “CHS-MEDIUM: Improving the accessibility of mobile applications by enabling third-party assessment, repair, and enhancement.” National Science Foundation [IIS-1702751]: \$1,198,547. Link
NSF	Ladner, R.E., Ko, A.J., Wobbrock, J.O. and Burgstahler, S. (2015-2020). “BPC-AE: AccessComputing – Third extension.” National Science Foundation [CNS-1539179]: \$4,257,252. Link
NSF	Wobbrock, J.O. and Patel, S.N. (2012-2016). “HCC-SMALL: Understanding, sensing, and accommodating situational impairments in mobile computing.” National Science Foundation [IIS-1217627]: \$499,722. Link
NSF	Wobbrock, J.O. and Shinohara, K. (2012-2013). “DOCTORAL DISSERTATION RESEARCH: Developing Design for Social Acceptance: A new methodology incorporating social acceptability in the design of assistive devices.” National Science Foundation [SES-1230435]: \$15,000. Link
NSF	Wobbrock, J.O. (2010-2016). “CAREER: Advancing accessible computing with tools for ability-based design.” National Science Foundation [IIS-0952786]: \$509,359. Link
NSF	Levy, D.M. and Wobbrock, J.O. (2009-2010). “EAGER: An empirical exploration of contemplative multitasking.” National Science Foundation [IIS-0942646]: \$143,872. Link
NSF	Wobbrock, J.O., Johnson, K.L. and Weld, D.S. (2008-2012). “HCC-SMALL: The end of pointing and clicking: Improving computer access with goal crossing.” National Science Foundation [IIS-0811063]: \$464,905. Link
NSF	Riskin, E.A., Wobbrock, J.O. and Ladner, R.E. (2008-2012). “HCC-SMALL: MobileASL: Providing mobile video communications to the Deaf community through user-centered design and deployment.” National Science Foundation [IIS-0811884]: \$530,785. Link

Industry Gifts and Contracts (\$4,139,849)

GOOGLE	Wobbrock, J.O. and Froehlich, J. (2024). "Exploring AI-enhanced mixed-ability social interactions." Google Award for Society-Centered AI: \$75,000.
GOOGLE	Wobbrock, J.O. and Fogarty, J. (2024). "Ability-Based Design for Generative AI." Google Research Award: \$60,000.
ADOBE	Wobbrock, J.O. (2024). Support for the ACE Lab. Adobe: \$10,000.
TRI	Wobbrock, J.O., Fogarty, J., Best, A., Costa, J., Filipowicz, A., Zhang, Y. and Carter, S. (2024-2026). "Leveraging behavioral signals and generative AI for the rapid creation of interactive, user-adaptive HMI prototypes." Toyota Research Institute: \$399,742.
FB	Wobbrock, J.O., Findlater, L. and Franz, R. (2020). "Recommending VR interaction techniques for users with limited mobility." Request for Proposals on Social Experiences in VR Environments. Facebook Reality Labs: \$75,000. Link
GOOGLE	Wobbrock, J.O. (2020). "The ability-based design mobile toolkit: Enabling accessible mobile interactions through advanced sensing and modeling." Google Award for Inclusion Research: \$60,000. [^{<16%}] Link
MSFT	Mankoff, J., Wobbrock, J.O., Ladner, R.E. and Caspi, A.C. (2020). Inaugural support for the Center for Research and Education on Accessible Technology and Experiences (CREATE). Microsoft: \$3,000,000.
MANI	Wobbrock, J.O. (2018). Support for the Mobile + Accessible Design Lab. Mani Charitable Foundation and Microsoft: \$10,000.
MSR	Wobbrock, J.O. (2017-2019). Support for the Crowdlic project. Microsoft Research: \$18,000.
ADOBE	Wobbrock, J.O. (2017). Support for the Mobile + Accessible Design Lab. Adobe: \$10,000.
MANI	Wobbrock, J.O. (2017). Support for the Mobile + Accessible Design Lab. Mani Charitable Foundation: \$26,000.
BAIDU	Wobbrock, J.O. (2017). Support for the Mobile + Accessible Design Lab. Baidu: \$60,000.
MSFT	Wobbrock, J.O. (2014). Donation of a Perceptive Pixel display for studying touch-based human-computer interaction. Microsoft: valued at \$10,000.
GOOGLE	Wobbrock, J.O. (2014-2015). "Smart Touch: Improving the accessibility of touch screens on Android tablets and smartphones for people with motor impairments." Google Research Award: \$41,107. [^{16%}]
MSR	Wobbrock, J.O. (2012). Support for research and collaboration. Microsoft Research: \$15,000.
GOOGLE	Wobbrock, J.O. and Huang, J. (2011-2012). "Cursor mining in web search." Google Research Award: \$50,000.
MSR	Wobbrock, J.O. (2010-2012). Support for the AIM Research Group. Microsoft Research: \$50,000.
INTEL	Wobbrock, J.O. (2010). Support for new mobile interfaces for nomadic usability and accessibility. Intel: \$25,000.
MSFT	Wobbrock, J.O. (2009). Donation of a Microsoft Surface interactive tabletop and associated software for studying typing on touch surfaces. Microsoft: valued at \$15,000.
INTEL	Wobbrock, J.O. (2008). Support for software development for HCI research. Intel: \$30,000.
MSR	Wobbrock, J.O. (2008-2010). Support for the AIM Research Group. Microsoft Research: \$50,000.
NISH	Harada, S., Wobbrock, J.O. and Landay, J.A. (2008). Second-place award for VoiceDraw project. NISH: \$5,000.
WRF	Wobbrock, J.O. (2007). Support for the development of iPhone/iPod EdgeWrite. Washington Research Foundation: \$20,000.
INTEL	Wobbrock, J.O. (2006). Support for research on new input and interaction techniques, assistive technologies, mobile computing interfaces, and other areas of HCI. Intel Labs Seattle: \$25,000.

University of Washington Research Funding (\$221,489)

CREATE	Wobbrock, J.O. (2024). "Advancing creative expression with digital artboards for blind users through human-AI interaction." University of Washington Center for Research and Education on Accessible Technology and Experiences (CREATE): \$39,989.
CREATE	Wobbrock, J.O. (2020-2023). Support for accessibility research. University of Washington Center for Research and Education on Accessible Technology and Experiences (CREATE): \$120,000.
CIP	Wobbrock, J.O. (2020). "First impressions of news-like articles." University of Washington Center for an Informed Public: \$3500.
iSCHOOL	Wobbrock, J.O. (2016). "Furthering ability-based design: Simulating motor-impaired mouse movement for evaluating the accessibility of user interfaces." University of Washington Information School: \$10,000.
COMOTION	Wobbrock, J.O. (2014). Presidential Entrepreneurial Faculty Fellow. University of Washington CoMotion: \$10,000.
RRF	Landay, J.A. and Wobbrock, J.O. (2008-2009). "Beyond speech recognition: Harnessing the power of voice for effective control of computer interfaces." University of Washington Royalty Research Fund: \$38,000.

Commercialization Financing (\$6,965,000)

vc	Colleran, W.T. and Wobbrock, J.O. (2015). Second-round venture capital financing for AnswerDash. Voyager Capital, Summit Capital, Arnold Ventures, WRF Capital, W Fund, and one angel investor: \$2,875,000.
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SVB	Wobbrock, J.O. (2014). First-round venture debt financing for AnswerDash. Silicon Valley Bank: \$1,000,000.
VC	Wobbrock, J.O. and Ko, A.J. (2013). First-round venture capital financing for AnswerDash (formerly Qazzow). WRF Capital, Voyager Capital, W Fund, Summit Capital, Arnold Ventures, and five angel investors: \$2,540,000.
W FUND	Wobbrock, J.O. and Ko, A.J. (2013). Seed financing for AnswerDash (formerly Qazzow). W Fund: \$500,000.
C4C	Wobbrock, J.O., Ko, A.J. and Chilana, P.K. (2011). "Chime: Bringing crowdsourced contextual help to the masses." Commercialization Gap Fund. University of Washington Center for Commercialization: \$50,000.

ORIGINAL PRESS

Academic Press Coverage

- Curran Nielsen. "iSchool's Wobbrock honored with Lasting Impact Award." UW Information School News. December 6, 2024.
- Jim Davis. "UW accessibility research could help make cars safer." UW Information School News, July 31, 2024.
- Dan Friedell. "Apple's computer launch leads to study of user experience." Voice of America, January 27, 2024.
- Rob Breakenridge. Radio interview about the 40th anniversary of the Apple Macintosh. *The Shaye Ganam Show* airing on 630 CHED in Edmonton, Alberta and on QR Calgary (AM 770 and FM 107.3) in Calgary, Alberta. January 22, 2024.
- Stefan Milne. "A Google Slides extension can make presentation software more accessible for blind users." University of Washington News, October 30, 2023.
- Staff. "A11yBoard seeks to make digital artboards accessible to blind and low-vision users." UW Center for Research and Education on Accessible Technology and Experiences News, April 25, 2023.
- Alice Skipton. "Rethinking disability and advancing access." UW College of Engineering News, February 21, 2023.
- Doug Parry. "iSchool's Wobbrock honored for lasting impact." UW Information School News, December 6, 2022.
- John Delaney. "ACM Member News: Promoting accessibility through ability-based design." Communications of the ACM 65 (12), December 2022, p. 13.
- Jim Davis. "Class puts people first, technology second." UW Information School News, September 12, 2022.
- Imma Perfetto. "Data visualisations made more accessible to screen reader users." Cosmos, June 6, 2022.
- Adam Zewe. "Making data visualization more accessible for blind and low-vision individuals." M.I.T. News, June 2, 2022.
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Entrepreneurship Press Coverage

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4. Sam Sawchuk. "Meet Jacob O. Wobbrock | An entrepreneur focused on interactive solutions that improve the user and customer experience." The Huffington Post, December 6, 2016.
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6. Rachel Lerman. "Tech Spotlight: AnswerDash solves your confusion when using websites." The Seattle Times, September 20, 2015.
7. Taylor Soper. "UW spinout AnswerDash raises \$2.9M to support growth of online contextual help platform." GeekWire, September 14, 2015.
8. Michael Guta. "AnswerDash earns 'Cool Vendor' status from Gartner." TMCnet, Call Center Services Featured Article, July 20, 2015.
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51. Taylor Soper. "Husky Pride: Check out these 5 startups founded by University of Washington grads, professors." GeekWire, April 16, 2014.
52. Joe Veyera. "iSchool spinout receives funding for Q&A technology." The Daily of the University of Washington, January 5, 2014.
53. John Cook. "Startup Hall: University of Washington looks to transform old law school into magnet for startups." GeekWire, December 17, 2013.
54. John Cook. "UW spin-out Qazzow scores \$2.4M to bolster customer service on e-commerce sites." GeekWire, December 16, 2013.
55. Emily Parkhurst. "Helping 'help': UW startup gets \$2.4M to provide smarter in-app help." Puget Sound Business Journal, December 16, 2013.
56. Staff. "Qazzow lands \$2.4M." Northwest Innovation, December 16, 2013.
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60. John Cook. "UW spin out Qazzow scores \$500,000, helps customers get questions answered on e-commerce sites." GeekWire, November 5, 2013.
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62. Staff. "iSchool startup Qazzow receives seed investment from W Fund." UW Information School News, November 5, 2013.
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TEACHING

Coursera.org

Online	Designing, Running, and Analyzing Experiments	>30,000 learners since Feb. 2016
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University of Washington

INSC 599 [†]	Practical Statistics for HCI	>50 students since Nov. 2010
INSC 571	Quantitative Methods in Information Science	Winter 2018-2019, 2021-2025
INSC 570	Research Design	Autumn 2006-2009, 2015
CSE 590W	Research Seminar: Accessibility	Spring 2012
HCID 520	User Interface Software and Technology	Winter 2023, 2025
IMT 565	Designing Information Experiences	Spring 2016-2019, 2021-2025
IMT 540	Design Methods for Interactive Systems	Autumn 2007-2009
INFO 470	Research Methods in Informatics	Autumn 2010-2011, 2016
INFO 463	Input and Interaction	Spring 2008-2009, 2012, 2016
INFO 444	Value Sensitive Design	Spring 2007

Carnegie Mellon University

HCI 413*	Human Factors	Autumn 2004
HCI 291	HCI for Computer Scientists	Spring 2004

Stanford University

CS 247B*	Human-Computer Interaction: Contextual & Organizational Issues	Spring 1999
CS 201*	Computers, Ethics & Social Responsibility	Winter 1999
CS 147*	Introduction to Human-Computer Interaction Design	Autumn 1998-1999
CS 106X*	Programming Methodology and Abstractions	Spring 1999
CS 106A*	Programming Methodology	Autumn 1997

[†]Independent Study; *Teaching Assistant (TA)

INDUSTRY POSITIONS

Industry Positions

1. Co-founder & Board Observer, AnswerDash – Seattle, WA (Feb. 2018 – June 2020)
2. Co-founder & Chief Experience Officer (C.X.O.), AnswerDash – Seattle, WA (Dec. 2015 – Feb. 2018)
3. Co-founder & Chief Scientist, AnswerDash – Seattle, WA (May – Dec. 2015)

4. Co-founder, President & C.E.O., AnswerDash – Seattle, WA (Sept. 2012 – May 2015)
5. Research Intern, Microsoft Research – Redmond, WA (May – Aug. 2003)
6. User Interface Contractor, Google – Mountain View, CA (Feb. – May 2001)
7. Senior User Interface Design-Engineer, DoDots – Sunnyvale, CA (June 2000 – Feb. 2001)
8. User Interface Design-Engineer, DoDots – Mountain View, CA (Oct. 1999 – June 2000)
9. Technical Intern, Intel-Mattel Smart Toy Lab – Portland, OR (June – Sept. 1999)
10. Technical Intern, Intel – Hillsboro, OR (June – Sept. 1997)

Technology Consulting

1. Technical Consultant, Natural Input Solutions – Toronto, ON (Oct. 2008 – Oct. 2009)
2. Research Consultant, Microsoft Research – Redmond, WA (Jan. – Oct. 2008)
3. Usability Consultant, Ingrian Networks – Redwood City, CA (May – Sept. 2002)

Expert Witness

1. *Maxell* v. Lenovo* [U.S. #8,982,086]: Mayer Brown (Aug. 2022 – May 2023)[†]
2. *Smith Interface Technologies* v. Samsung* [U.S. #2016/0188181 patent family]: Norton Rose Fulbright (July 2022 – June 2023)
3. *Impact Engine v. Google** [U.S. #7,870,497 patent family]: Quinn Emanuel (Sept. 2021 – Feb. 2022)
4. *KinectUs v. Bumble** [U.S. #9,294,428 patent family]: Cooley (Sept. – Nov. 2021)
5. *Google* v. Neonode* [U.S. #8,095,879]: Finnegan Henderson (May 2021 – Sept. 2022)[†]
6. *Maxell* v. Apple* [U.S. #8,982,086]: Mayer Brown (Oct. 2020 – July 2021)[†]
7. *Huawei v. Verizon** [U.S. #7,715,832, U.S. #8,761,839]: Quinn Emanuel (June 2020 – Apr. 2021)
8. *Arendi S.A.R.L. v. HTC** [U.S. #7,917,843, U.S. #8,306,993]: Sidley Austin (June – July 2019)
9. *Apple v. Qualcomm** [U.S. #8,683,362]: Baker Botts (Nov. 2018 – June 2019)[†]
10. *Apple v. Qualcomm** [U.S. #8,665,239]: Baker Botts (Oct. 2018 – Aug. 2019)[†]
11. *Qualcomm* v. Apple* [U.S. #8,497,928]: Quinn Emanuel (Apr. 2018)
12. *HTC* v. Philips* [U.S. #RE44,006]: Perkins Coie (Dec. 2016 – Apr. 2018)[†]
13. *Google* v. BlackBerry* [U.S. #8,411,845]: Mayer Brown (Nov. 2016 – Jan. 2017)[†]
14. *Adv. Touchscreen & Gesture Tech.* v. Samsung* [U.S. #8,717,303, U.S. #8,878,810]: Robins Kaplan (Apr. 2015 – Dec. 2016)[†]
15. *BlackBerry v. Typo Products** [U.S. #7,629,964, U.S. #D685,775]: The Taillieu Law Firm (Jan. – Feb. 2014)
16. *HTC* v. Apple* [U.S. #6,473,006, U.S. #7,020,849]: Finnegan Henderson (Dec. 2011 – July 2012)[†]
17. *Apple v. HTC** [U.S. #5,946,647]: Kecker Van Nest (Sept. 2011 – Jan. 2012)[†]
18. *HTC* v. Apple* [U.S. #5,541,988]: Finnegan Henderson and Kecker Van Nest (June 2010 – June 2011)[†]
19. *F&G Research v. Microsoft** [U.S. #5,313,229]: K&L Gates (Oct. – Nov. 2007)

*Retained by; †Inter partes review (IPR); ‡International Trade Commission (ITC)

PRESENTATIONS

Invited Research Talks

1. “Making possible things easy.” (2024). Lasting Impact Award Talk, ACM Symposium on User Interface Software and Technology (UIST '24). Pittsburgh, PA.
2. “Crossing cultures—Global technology perspectives.” (2024). Opening Keynote Panel, ACM Conference on Mobile Human-Computer Interaction (MobileHCI '24). Melbourne, Australia.
3. “Ability-based design: What role might A.I. play?” (2022). Opening keynote, Michigan A.I. Symposium. University of Michigan, Ann Arbor, MI.
4. “My work in gesture: Design, recognition and open questions.” (2021). Invited lecture, Conversations on Scalable Interaction Paradigms. University of Oldenburg, Germany.
5. “Addressing situational impairments in mobile human-computer interaction.” (2021). Invited lecture, HCI Seminar. University College Dublin, Ireland.
6. “Hypertext, social media, and civic engagement: How hypertext is ruining the world, and might just save it.” (2020). Opening keynote address, ACM Workshop on Human Factors in Hypertext (HUMAN '20). Virtual Event.
7. “Ability-based design.” (2020). Invited lecture, COMP 6620: User Interface Design and Evaluation. Auburn University, Auburn, AL.
8. “Research contributions in HCI in a pandemic.” (2020). Invited lecture and panelist, SummerPIT Workshop on Post-COVID Empirical Methods. Aarhus University, Denmark.
9. “Situationally aware mobile devices for overcoming situational impairments.” (2019). Opening keynote address, ACM Symposium on Engineering Interactive Computing Systems. Valencia, Spain.
10. “Recognizing and designing gestures for user interfaces.” (2019). Invited lecture, 05-640: Interaction Techniques. Carnegie Mellon University, Pittsburgh, PA.
11. “Addressing situationally-induced impairments and disabilities in mobile HCI.” (2019). Invited lecture, Seminar on People, Computers and Design. Stanford University, Stanford, CA.
12. “Ability-based design: Designing for all people’s abilities and situations.” (2018). Distinguished lecture, Technology and Social Behavior Program. Northwestern University, Evanston, IL.
13. “Ability-based design: Elevating ability over disability in accessible computing.” (2017). SIGCHI Social Impact Award talk, ACM Conference on Human Factors in Computing Systems. Denver, CO.

14. "Ability-based design: Elevating ability over disability in accessible computing." (2017). Invited lecture, Michigan Interactive and Social Computing Seminar. University of Michigan, Ann Arbor, MI.
15. "Ability-based design: Elevating ability over disability in accessible computing." (2017). Invited lecture, Luxembourg Institute of Science and Technology. Belval / Esch-sur-Alzette, Luxembourg.
16. "Input for people with motor impairments." (2016). Invited lecture, UW CSE MSR Summer Institute on Expanding Accessibility Research. Alderbrook Resort, Union, WA.
17. "From plastic to pixels: In pursuit of effective touch-typing on touch screens." (2012). Invited lecture, Microsoft Research. Redmond, WA.
18. "Back to basics: Making pointing accessible." (2011). Invited lecture, Seminar on People, Computers and Design. Stanford University, Stanford, CA.
19. "Flipping the burden: Making computers accessible with everyday input devices." (2008). Distinguished lecture. School of Computer Science, Carnegie Mellon University, Pittsburgh, PA.
20. "Flipping the burden: Towards ability-based design." (2008). Invited lecture, HCI Seminar. University of Illinois–Urbana-Champaign, Champaign, IL.
21. "Accessible handheld and desktop text entry for people with motor impairments." (2005). Award presentation, NISH National Training and Achievement Conference. New Orleans, LA.
22. "Imagine EdgeWrite." (2005). Invited demonstration, Microsoft Research Tech Fair. Library of Congress, Washington, D.C.

Presentations to Industry or Government

1. "The Center for Research and Education on Accessible Technology and Experiences." (2022). Video, flyer, and executive talking points for fundraiser with top Microsoft executives and alumni in support of the CREATE research center. Redmond, WA.
2. "The pointing magnifier." (2022). Demo presentation to Jenny Lay-Flurrie, Chief Accessibility Officer of Microsoft. Redmond, WA.
3. "UW CREATE." (2020). Invited presentation hosted by Microsoft Chief Accessibility Officer Jenny Lay-Flurrie for the Microsoft Annual Auction. Microsoft Corporation. Redmond, WA.
4. "Technology and disability." Ideagen Global podcast interview. (2019). August 23, 2019. Duration: 36 min.
5. "Ability-based design." (2019). Invited presentation at Microsoft's Annual Ideagen Global Innovation 2030 Summit, followed by a panel discussion on accessible technology. Redmond, WA.
6. "The Mobile and Accessible Design Lab." (2018). Presentation to the Sr. Director of University Research and Collaboration, Intel Corporation. Seattle, WA.
7. "Radical Personalization: Walk the line or be left behind?" (2018). Invited presentation and panelist, iAffiliates Day. University of Washington Information School. Seattle, WA.
8. "Ability-based design: Making technologies match all people's abilities and context." (2018). Invited lecture, Puget Sound SIGCHI. Seattle, WA.
9. "Research projects from the Mobile + Accessible Design Lab." (2017). Presentation to the Chief Accessibility Officer of Microsoft Corporation and the Chief Scientist of Microsoft Research. Redmond, WA.
10. "Research projects from the Mobile + Accessible Design Lab." (2017). Presentation to the Director of Inclusive Hiring and Accessibility, Microsoft Corporation. Redmond, WA.
11. "The five F's for successful university startups." (2015). Invited panelist, visit to New Ventures Facility by Washington State representatives and senators. Seattle, WA.
12. "How to get website self-service right." (2015). Invited speaker, WritersUA West User Assistance Boot Camp. Seattle, WA.
13. "How millennials are shaping the future of customer service." (2015). Invited speaker, Support and Service Management Consortium. Seattle, WA.
14. "AnswerDash." (2014). Invited speaker, Western Regional State Small Business Credit Initiative Meeting. Seattle, WA.
15. "How technology research compares to doing a tech startup." (2014). Invited panelist, Human-Computer Interaction Institute 20th Anniversary Celebration, Carnegie Mellon University. Pittsburgh, PA.
16. "Research outside academia." (2014). Invited panelist, DUB Annual Retreat. Seattle, WA.
17. "Bootstrapped-to-public: The entrepreneurial path." (2014). Invited panelist, UW Foster School of Business and Stanford Graduate School of Business. Seattle, WA.
18. "AnswerDash." (2014). Presenter, UW Center for Commercialization New Ventures Facility Media Event. Seattle, WA.
19. "AnswerDash." (2014). Invited speaker, Seattle Tech Meetup. Seattle, WA.
20. "AnswerDash." (2014). Keynote speaker, UW Information School iAffiliates Day. Seattle, WA.
21. "Qazzow." (2013). Invited speaker, UW Information School All-Board Meeting. Seattle, WA.
22. "Qazzow: Sales, savings, and insights for e-commerce." (2013). Presenter, University Research and Entrepreneurship Symposium (URES '13). Boston, MA.
23. "Qazzow: Sales. Savings. Insights." (2013). Presenter, Technology Alliance Winter 2013 Innovation Showcase. Seattle, WA.
24. "Understanding gestures in user interfaces." (2010). Invited speaker, WritersUA Conference on Software User Assistance. Seattle, WA.
25. "Making computers accessible with everyday input devices." (2009). Invited speaker, WritersUA Conference on Software User Assistance. Seattle, WA.
26. "Flipping the burden: Making computers accessible with everyday input devices." (2008). Keynote speaker, InfoCamp. Seattle, WA.

Conference Paper Presentations

1. "Accessibility research centers: What they are and how to become involved." (2021). Invited panelist, CMD-IT/ACM Richard Tapia Celebration of Diversity in Computing Conference. Virtual Event.

2. "Isolating the effects of web page visual appearance on the perceived credibility of online news among college students." (2019). ACM Conference on Hypertext and Social Media. Hof, Germany.
3. "TapSongs: Tapping rhythm-based passwords on a single binary sensor." (2009). ACM Symposium on User Interface Software and Technology. Victoria, British Columbia.
4. "The Angle Mouse: Target-agnostic dynamic gain adjustment based on angular deviation." (2009). ACM Conference on Human Factors in Computing Systems. Boston, MA.
5. "User-defined gestures for surface computing." (2009). ACM Conference on Human Factors in Computing Systems. Boston, MA.
6. "An error model for pointing based on Fitts' law." (2008). ACM Conference on Human Factors in Computing Systems. Florence, Italy.
7. "A comparison of area pointing and goal crossing for people with and without motor impairments." (2007). ACM Conference on Computers and Accessibility. Tempe, AZ.
8. "Gestures without libraries, toolkits or training: A \$1 recognizer for user interface prototypes." (2007). ACM Symposium on User Interface Software and Technology. Newport, RI.
9. "An alternative to push, press, and tap-tap-tap: Gesturing on an isometric joystick for mobile phone text entry." (2007). ACM Conference on Human Factors in Computing Systems. San Jose, CA.
10. "From letters to words: Efficient stroke-based word completion for trackball text entry." (2006). ACM Conference on Computers and Accessibility. Portland, OR.
11. "In-stroke word completion." (2006). ACM Symposium on User Interface Software and Technology. Montreux, Switzerland.
12. "Few-key text entry revisited: Mnemonic gestures on four keys." (2006). ACM Conference on Human Factors in Computing Systems. Montreal, Quebec.
13. "Trackball text entry for people with motor impairments." (2006). ACM Conference on Human Factors in Computing Systems. Montreal, Quebec.
14. "Maximizing the guessability of symbolic input." (2005). ACM Conference on Human Factors in Computing Systems. Portland, OR.
15. "Text entry from power wheelchairs: EdgeWrite for joysticks and touchpads." (2004). ACM Conference on Computers and Accessibility. Atlanta, GA.
16. "Writing with a joystick: A comparison of date stamp, selection keyboard and EdgeWrite." (2004). Graphics Interface. London, Ontario.
17. "EdgeWrite: A stylus-based text entry method designed for high accuracy and stability of motion." (2003). ACM Symposium on User Interface Software and Technology. Vancouver, British Columbia.
18. "Exploring edge-based input techniques for handheld text entry." (2003). IEEE Conference on Distributed Computing Systems Workshops. Providence, RI.
19. "WebThumb: Interaction techniques for small-screen browsers." (2002). ACM Symposium on User Interface Software and Technology. Paris, France.
20. "Put your best face forward: Anthropomorphic agents, e-commerce consumers, and the law." (2000). ACM Conference on Autonomous Agents. Barcelona, Spain.
21. "Liability for autonomous agent design." (1998). ACM Conference on Autonomous Agents. Minneapolis, MN.

UW Internal Talks

1. "Human-Computer Interaction: Bridging the Gap between People and Technology." (2024). Invited panelist, Women in Informatics (WINFO), University of Washington Information School.
2. "Student spotlight: IMT 565 Designing information experiences." (2022). All-Board Meeting, University of Washington Information School.
3. "Ability-based design." (2022). Immersion Studio, Master of Human-Computer Interaction and Design, University of Washington.
4. "UW CREATE." (2020). Celebration of Accessibility, University of Washington.
5. "Challenges and obligations of deploying and supporting assistive technologies from academic research." (2020). AccessComputing Partner Meeting, University of Washington.
6. "Lasting impact: A panel with 3 recent iSchool award winners." (2019). Research Symposium, University of Washington Information School.
7. "Ability-based design: Elevating ability over disability in accessible computing." (2017). DUB Seminar, University of Washington.
8. "Ability-based design: Elevating ability over disability in accessible computing." (2017). Research Symposium, University of Washington Information School.
9. "From plastic to pixels: In pursuit of effective touch-typing on touch screens." (2012). DUB Seminar, University of Washington.
10. "Back to basics: Making pointing accessible." (2011). DUB Seminar, University of Washington.
11. "Accessing the world: Projects by the iSchool's AIM Research Group." (2009). Board of Regents Meeting, University of Washington.
12. "Overview of the AIM Research Group." (2009). All-Board Meeting, University of Washington Information School.
13. "Making computers accessible with everyday input devices." (2009). Research Conversation, University of Washington Information School.
14. "User-defined vs. researcher-defined gestures." (2009). DUB Seminar, University of Washington.
15. "An error model for pointing based on Fitts' law." (2008). DUB Seminar, University of Washington.
16. "Achieving fundamental improvements in computer access." (2008). Design Machine Group, University of Washington Architecture Department.
17. "Movement, input and errors." (2007). DUB Seminar, University of Washington.
18. "Improving the accessibility of mobile devices for motor and situational impairments." (2007). Invited Speaker, iEdge Conference, University of Washington ASIS&T Chapter.
19. "EdgeWrite text entry and mobile accessibility." (2006). Founders' Board Meeting, University of Washington Information School.

RESEARCH ADVISING

Ph.D. Advisees

1. Seokhyun (Shawn) Hwang, Information Science, 2024 – present.
2. Xiyuan (Alan) Shen, Co-advisor with Shwetak N. Patel, Computer Science, 2024 – present.
3. Yumeng Ma, Advisor, Computer Science, 2024 – present.
4. Melanie Kneitmix, Advisor, Computer Science, 2023 – present.
5. Arnavi Chheda-Kothary, Co-advisor with Jon E. Froehlich, Computer Science, 2023 – present.
6. Claire Mitchell, Advisor, Information Science, 2022 – present.
7. Zhuohao (Jerry) Zhang, Advisor, Information Science, 2021 – present.
8. Judy Kong, Advisor, Information Science, 2020 – present.
9. Mingyuan (Jason) Zhong, Co-advisor with James Fogarty, Computer Science, 2019 – present.
10. Lisa Elkin, Co-advisor with Shwetak N. Patel, Computer Science, 2018 – present.
11. Ather Sharif, Advisor, Computer Science, 2018-2024. *First position as a Bonderman Fellow.*
12. Rachel Franz, Advisor, Information Science, 2017-2024. *First position as assistant professor at Hong Kong University of Science and Technology (HKUST).*
13. Mingrui (Ray) Zhang, Advisor, Information Science, 2017-2022. *First position at Meta NYC.*
14. Anne Spencer Ross, Co-advisor with James Fogarty, Computer Science, 2017-2021. *First position as assistant professor at Bucknell University.*
15. Abdullah X. Ali, Advisor, Information Science, 2016-2020. *First position at Amazon Web Services.*
16. Alex Mariakakis, Co-advisor with Shwetak N. Patel, Computer Science, 2015-2019. *First position as postdoctoral researcher at the University of Washington and Sage Bionetworks.*
17. Martez Mott, Advisor, Information Science, 2012-2018. *First position as postdoctoral researcher at Microsoft Research.*
18. Katie O'Leary, Co-advisor with Wanda Pratt, Information Science, 2012-2017. *First position at Google.*
19. Jessica J. Tran, Co-advisor with Eve Riskin and Richard E. Ladner, Electrical Engineering, 2011-2014. *First position at Thomson Reuters.*
20. Jeff Huang, Co-advisor with Susan Dumais, Information Science, 2011-2013. *First position as assistant professor at Brown University.*
21. Abigail Evans, Co-advisor with Katie Davis, Information Science, 2010-2018. *First position at Google.*
22. Shiri Azenkot, Co-advisor with Richard E. Ladner, Computer Science, 2009-2014. *First position as assistant professor at Cornell Tech.*
23. Kristen Shinohara, Co-advisor with Wanda Pratt, Information Science, 2008-2017. *First position as assistant professor at Rochester Institute of Technology.*
24. Parmit K. Chilana, Co-advisor with Amy J. Ko, Information Science, 2008-2013. *First position as assistant professor at University of Waterloo.*
25. Shaun K. Kane, Co-advisor with Richard E. Ladner, Information Science, 2006-2011. *First position as assistant professor at University of Maryland—Baltimore County.*
26. Susumu Harada, Co-advisor with James Landay, Computer Science, 2006-2010. *First position at IBM Tokyo Research Lab.*
27. Krzysztof Z. Gajos, Co-advisor with Daniel S. Weld, Computer Science, 2006-2008. *First position as assistant professor at Harvard University.*

Postdoctoral Scholars

1. Leah Findlater, The Information School, 2009-2011. *First position as assistant professor at University of Maryland—College Park.*

External Ph.D. Committees

1. Nathan Magrofuoco, dissertation committee, Computer Science, Université catholique de Louvain, Belgium, 2021. *First position at unanim.studio.*
2. Eugene M. Taranta II, dissertation committee, Computer Science, University of Central Florida, 2017-2020. *First position at Northrop Grumman.*
3. Aakar Gupta, dissertation committee, Computer Science, University of Toronto, 2017. *First position as postdoctoral researcher at the University of Waterloo.*
4. James Clawson, dissertation committee, Human-Centered Computing, Georgia Institute of Technology, 2008-2012. *First position as postdoctoral researcher at Georgia Institute of Technology.*

Internal Ph.D. Committees (non-advisees)⁴

1. Bertan Kursun, general exam GSR, Speech & Hearing Sciences, 2024 – present.
2. Richard Li, dissertation GSR, Computer Science, 2024 – present.
3. Ishan Chatterjee, dissertation GSR, Computer Science, 2023-2024. *First position at Google.*
4. Lotus Zhang, dissertation GSR, Human-Centered Design & Engineering, 2022 – present.
5. Dhruv Jain, dissertation GSR, Computer Science, 2020-2022. *First position as assistant professor at University of Michigan.*
6. Xiaoyi Zhang, dissertation committee, Computer Science, 2018. *First position at Apple Research.*
7. Dun-Yu Hsiao, dissertation GSR, Electrical Engineering, 2016-2017. *First position at Zillow.*

⁴ At the University of Washington, a “GSR” is a “Graduate School Representative,” which is required for every doctoral dissertation defense. The GSR’s role is to ensure both a *rigorous* and a *fair* examination of the student.

8. Charlie Matlack, dissertation GSR, Electrical Engineering, 2013-2014. *First position at PotaVida.org.*
9. Nicola Dell, dissertation committee, Computer Science, 2012-2015. *First position as assistant professor at Cornell Tech.*
10. Hao Lü, dissertation committee, Computer Science, 2012-2014. *First position at Google.*
11. Morgan Dixon, dissertation committee, Computer Science, 2012-2014. *First position at Adobe Research.*
12. Suporn Pongnumkul, dissertation proposal GSR, Computer Science, 2011. *First position at National Electronics and Computer Technology Center, Thailand.*
13. Michael Toomim, dissertation proposal committee, Computer Science, 2010-2013. *Did not graduate.*
14. Jaehong Chon, dissertation GSR, Electrical Engineering, 2009-2011. *First position at Qualcomm.*
15. Chandrika Jayant, dissertation committee, Computer Science, 2009-2011. *First position at Nokia Research.*
16. Colin Birge, dissertation proposal committee, Human-Centered Design & Engineering, 2008-2013. *First position as business analyst at the University of British Columbia.*
17. Craig M. Prince, dissertation committee, Computer Science, 2007-2011. *First position at Google.*
18. Alan L. Liu, dissertation committee, Computer Science, 2007-2010. *First position at Kiha Software.*
19. Anna Cavender, dissertation committee, Computer Science, 2007-2010. *First position at Google.*
20. Neva Cherniavsky, dissertation committee, Computer Science, 2008-2009. *First position as postdoctoral researcher at INRIA, France.*
21. Jeffrey Bigham, dissertation committee, Computer Science, 2006-2009. *First position as assistant professor at University of Rochester.*
22. Jerrod A. Larson, dissertation GSR, Technical Communication, 2008-2009. *First position at Boeing.*
23. Jon DeShazo, dissertation GSR, Biomedical & Health Informatics, 2007-2009. *First position as assistant professor at Virginia Commonwealth University.*

Other Research Advising

1. Melanie Wells, M.Des. in Interaction Design, 2022-2023. *First position at gotomedia.*
2. Anastasia Schaadhardt, Ph.D. in Information Science, 2019-2021. *Switched advisors.*
3. Lara Hattatoglu, Research Assistant, Human-Centered Design & Engineering major, 2020-2021. *First position at Deloitte Digital.*
4. Ying-Chao “Tony” Tung, Advisor, Ph.D. in Computer Science, 2016-2019. *Departed with M.S. in Computer Science. First position at Asana.*
5. Erin McAweeney, Research Assistant, MSIM, 2016-2018. *First position at Google News.*
6. Anya K. Hsu, Informatics Capstone and Research Assistant, 2016-2017. *First position at Aerotek.*
7. Dimitra Anastasiou, European Union Programme Horizon 2020, Luxembourg Institute of Science and Technology, 2017-2019.
8. Chinmay Nirkhe, Research Assistant, Lakeside Upper School, 2012. *Enrolled as undergraduate, California Institute of Technology.*
9. Phillip Pasqual, Research Assistant, Informatics major, 2011-2013.
10. Katie O’Leary, Research Assistant, 2010-2012. *Enrolled in Information Science Ph.D. program, University of Washington.*
11. Nelson Nogales, Research Assistant, 2010-2011. *First position at ZAAZ.*
12. Alex Jansen, Advisor, Ph.D. in Information Science, 2010-2013. *Departed with M.S. in Information Science. First position at Revolv.*
13. Tressa Johnson, Research Assistant, MLIS, 2009-2010.
14. Alex Jansen, NSF REU Scholar, Informatics major, 2009-2010. *Enrolled in Information Science Ph.D. program, University of Washington.*
15. Peter Kamb, NSF REU Scholar, Informatics major, 2009-2010. *First position at Swype.*
16. Eun Kyoung Choe, Ph.D. in Information Science, 2008-2009. *Switched advisors.*

SERVICE

University of Washington

University Committees

Member, Provost’s Information School Dean Review Committee: 2024.

The Information School

Lead, HCID Expertise Group (EG): 2023 – present.
 Member, Joint Data Science and HCI Teaching-Track Search Committee: 2022-2023.
 Chair, HCI Faculty Search Committee: 2020-2021.
 Ad hoc Reviewer, Open Search Committee: 2019.
 Past-Chair, Elected Faculty Council (EFC): 2018-2019.
 Chair, Elected Faculty Council (EFC): 2017-2018.
 Chair-Elect, Elected Faculty Council (EFC): 2016-2017.
 Chair, HCI for Social Good Faculty Search Committee: 2016-2017.
 Faculty Lead, MSIM User Experience (UX) Specialization: 2013 – present.
 Chair, MSIM Information Architecture & Organization Subcommittee: 2013-2014.
 Member, Elected Faculty Council: 2011-2012.
 Member, Ph.D. Admissions Committee: 2006-2011.
 Member, Ph.D. Program Committee: 2007-2011.
 Member, HCI Jr. Faculty Search Committee: 2007-2008.
 Member, Recognition & Nomination Committee: 2006-2008.
 Member, Social Committee: 2006-2007.

Center for Research and Education on Accessible Technology and Experiences (CREATE)

Associate Director: 2023 – present

Founding Co-Director: 2020-2023.

Master of Human-Computer Interaction + Design (MHCI+D)

Chair, Interdisciplinary Faculty Group (IFG): 2013-2016, 2024 – present.

Member, Interdisciplinary Faculty Group (IFG): 2020-2023.

Member, Associate Director Search Committee: 2021-2022.

Member, Admissions Committee: 2013, 2022-2023.

Chair, Admissions Committee: 2014-2017.

Co-Founder: 2009-2012.

DUB Group (design: use: build:)

Co-Chair, DUB Interdisciplinary Faculty Committee: 2013-2015.

Presenter, DUB State of the Union Address: 2012.

Co-Chair, DUB Annual Retreat: 2012.

Member, DUB CHI Reception Planning Committee: 2009, 2011.

Member, DUB Annual Retreat Planning Committee: 2008, 2011.

CoMotion (tech transfer)

Invited Member, CoMotion Commercialization Committee for Software/IT: 2015-2016.

Invited Judge, Shobe Startup Prize: 2015.

Carnegie Mellon University

Co-Creator, HCI 15-291: HCI for Computer Scientists: 2003.

Member, Admissions Committee for Ph.D. in Human-Computer Interaction: 2002.

Industry Boards

Board Observer, AnswerDash: 2016-2020.

Chairman of the Board, AnswerDash: 2013-2015.

Advisor, Seattle InfoCamp Advisory Board: 2008-2012.

Advisor, Statewide Website Advisory Group, Washington State Access to Justice Board: 2007-2009.

Other Service

Volunteer, Laurelhurst Elementary School Library: 2012-2013.

Service to My Field

External Tenure & Promotion Reviewer

Seven (7) external T&P cases reviewed from 2016-2024:

- University of Michigan
- Cornell Tech
- University of Florida
- Stanford University
- Cornell University
- Cornell Tech
- University of Waterloo

Federal Grants Reviewer

Panelist, National Science Foundation, IIS Human-Centered Computing: 2023.

Panelist, National Science Foundation, IIS Cyber-Human Systems: 2015.

Journal Associate Editor

ACM Transactions on Computer-Human Interaction (ACM Press): 2012-2022.

Foundations and Trends in Human-Computer Interaction (Now): 2012-2015.

International Journal of Human-Computer Studies (Elsevier): 2010-2012.

Advances in Human-Computer Interaction (Hindawi): 2007-2010.

Conference Committees

ACM SIGCHI Research Awards (CHI Academy, Lifetime Research Award) (3 years): 2022-2024.
 General Co-Chair, ACM User Interface Software and Technology (UIST): 2022.[†]
 Conference Co-Chair, ACM Human Factors in computing Systems (CHI): 2020.[‡]
 Program Co-Chair, ACM User Interface Software and Technology (UIST): 2016.
 Workshops Co-Chair, ACM Human Factors in Computing Systems (CHI): 2010.

[†]Service period was from January 2020 – November 2022.

[‡]Resigned with Co-Chair after 12 months of service.

Program Committees (PCs)

ACM Human Factors in Computing Systems (CHI) (5 years): 2008-2009, 2011-2012, 2017.
 ACM Computers and Accessibility (ASSETS) (5 years): 2008, 2010-2011, 2018, 2024.
 ACM User Interface Software and Technology (UIST) (3 years): 2007, 2009, 2011.
 ACM User Interface Software and Technology Visions track (UIST Visions): 2018.
 Information Schools' Conference (iConference): 2011.
 Pervasive Computing (Pervasive): 2007.

Doctoral Symposia

Faculty Mentor, ACM Conference on Mobile Human-Computer Interaction (MobileHCI): 2024.
 Faculty Mentor, ACM Conference on Computers and Accessibility (ASSETS): 2007.

Conference Session Chair

ACM Human Factors in Computing Systems (CHI):

- 2017: Improving touch interfaces
- 2009: Pointing and cursor techniques
- 2008: Tangibles: Input & output

ACM User Interface Software & Technology (UIST):

- 2017: Phones & watches
- 2016: Interaction techniques
- 2011: Pointing
- 2009: Mobile magic

ACM Computers and Accessibility (ASSETS):

- 2017: Memory impairments & motor impairments

ACM Hypertext & Social Media (HT):

- 2019: Search & browsing

Journal Peer-Reviewer

ACM Transactions on Computer-Human Interaction (TOCHI): 2006, 2008-2009, 2012-2017, 2019-2022.
 PACM Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT): 2017.
 ACM Transactions on Accessible Computing (TACCESS): 2007-2008, 2011-2013.
 ACM Transactions on Mathematical Software (TOMS): 2014-2015.
 ACM Computing Surveys: 2008-2009.
 Human-Computer Interaction Journal: 2003-2006, 2009.
 IEEE Transactions on Human-Machine Systems (THMS): 2014-2015.
 International Journal of Human-Computer Studies (IJHCS): 2007-2008, 2010-2011.
 International Journal of Human-Computer Interaction (IJHCI): 2012.
 Foundations and Trends in Human Computer Interaction: 2011.
 Mathematics and Social Sciences: 2012.
 Ergonomics: 2012.
 Behaviour and Information Technology: 2009-2010.
 Interacting with Computers (IwC): 2009.
 RESNA Assistive Technology Journal: 2008.
 Universal Access in the Information Society (UAIS): 2007, 2011.
 Journal of the American Society for Information Science & Technology (JASIST): 2006.
 Advances in Human-Computer Interaction: 2008-2009.
 IEEE Computer: 2003.

Conference Peer-Reviewer

ACM Human Factors in Computing Systems (CHI) (22 years): 2003-2019, 2021-2025.

ACM User Interface Software & Technology (UIST) (13 years): 2004-2012, 2014-2017.
ACM Computers and Accessibility (ASSETS) (5 years): 2008, 2010-2011, 2018, 2024.
ACM Human-Computer Interaction with Mobile Devices and Services (MobileHCI): 2012, 2022.
ACM Engineering Interactive Computing Systems (EICS): 2018.
ACM Designing Interactive Systems (DIS): 2012.
ACM Interactive Tabletops and Surfaces (ITS): 2011.
ACM Computer-Supported Cooperative Work (CSCW): 2008.
ACM Intelligent User Interfaces (IUI): 2008.
ACM International Conference on Multimodal Interfaces (ICMI): 2006.
ACM Workshop on Human Factors in Hypertext (HUMAN): 2020.
World Wide Web (WWW): 2012.
IFIP TC13 Human-Computer Interaction (INTERACT): 2011.
IEEE Virtual Reality: 2022.
IEEE Tabletops and Interactive Surfaces: 2008.
IEEE Wearable Computers (ISWC): 2005, 2008.
IEEE Pervasive Computing (Pervasive): 2007, 2012.
Graphics Interface (GI): 2006-2007, 2012, 2018.
British HCI Group Annual Conference: 2002.

Student Volunteer

ACM User Interface Software & Technology (UIST): 2002, 2004.

PROFESSIONAL MEMBERSHIPS

Association for Computing Machinery (ACM)
Special interest group on Computer-Human Interaction (SIGCHI)
Special interest group on Accessible Computing (SIGACCESS)