

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ORACLE CORPORATION,

Petitioner

v.

JOSEPH L. DE BELLIS

Patent Owner

Case: IPR2024-00221

Patent No. 6,760,720

SECOND DECLARATION OF DR. JOSEPH L. DE BELLIS, M.D.

Exhibit 2003

I Joseph L. De Bellis, M.D., hereby declare as follows:

I. INTRODUCTION

1. I am the inventor and owner of U.S. Patent No. 6,760,720 (720).
2. I am presenting my opinions in defense of this proceeding before the United States Patent and Trademark Office (“USPTO”).
3. Erez Zadok, PhD. Was retained by Oracle Corporation (“Oracle” or “Petitioner”) as an independent expert consultant to consider whether various references teach or suggest the features recited in certain claims of U.S. Patent No. 6,760,720, and whether those references render those claims obvious.
4. My opinions and the bases for my opinions are set forth below.
5. In formulating my opinions, I have relied on my knowledge, training, and experience in the relevant fields, which I will summarize below. A more detailed summary of my background, education, and experience is set forth in my curriculum vitae (CV), which is submitted as EX2004.
6. I have personal knowledge of the facts and opinions set forth in this declaration and believe them to be true. If called upon to do so, I will testify competently thereto. I am aware that willful false statements and the like are punishable by fine or imprisonment, or both.

7. I am not being compensated for my time. I have personal, professional and financial interest in the outcome of this matter or in any litigation involving the '720 Patent.

8. I am not traditionally educated in the areas of Computer Science or Electrical Engineering, however my personal background, education and professional endeavors in the areas of Medicine and Software Development have given me expertise to speak authoritatively on the subject of dynamic search (aka "Faceted Search").

9. As disclosed and claimed in the '720 Patent, I understand the relevant statutory basis for determining the priority date for a U.S. Patent. I am familiar with the terms "conception," "diligence," and "reduction to practice." I am familiar with the basis for establishing a prior art date for a reference, and application of prior art references generally in determining the validity of a U.S. Patent.

10. I also understand the concept of "swearing behind a reference." Finally, I understand the notions of novelty and non-obviousness when determining the validity of a U.S. Patent.

II. QUALIFICATIONS

11. I am a Plastic and Reconstructive Surgeon and an Inventor, and I have owned and operated three software development companies based on my inventions.

12. My Plastic Surgery practice was focused primarily on the Reconstructive aspect of Plastic Surgery with specialization in Trauma, Craniofacial Reconstruction and Hand Surgery. My clinical practice was balanced between New York City and Southampton, New York. I am currently retired from private medical practice and limit my involvement to emergency and third world relief efforts.

13. My software experience is based on twenty-five years of developing and selling commercial embodiments of my inventions through my companies, Virtual Logistix, and Vilox.

14. I graduated from Boston College, Magna cum Laude in 1982 with a B.S. in Biology. I subsequently studied Medicine at Georgetown University getting a Doctorate in Medicine in 1986. I went on to complete a five-year General Surgery and Trauma residency at St. Vincent's Hospital of NYC, a Level I Trauma Center in Downtown Manhattan from 1986 to 1991. From there I completed a Plastic Surgery Residency at New York Hospital, Memorial Sloan Kettering and Hospital for Special Surgery in NYC until 1993. My specialty fellowships in Craniofacial Reconstruction and Hand Surgery were completed in Paris, France until 1994.

15. Upon my return from France, I began a private practice in Manhattan. As I was raised on the East End of Long Island, I was aware of the high incidence of trauma associated within the resort community and the working-class population that maintained it. I opened a second practice there in mid-1995.

16. I have personal knowledge of the facts and opinions set forth in this declaration and believe them to be true. If called upon to do so, I would testify competently thereto. I have been warned that willful false statements and the like are punishable by fine or imprisonment, or both.

17. I am not traditionally educated in the areas of Computer Science or Electrical Engineering, however my personal background, education and professional endeavors in the areas of Medicine and Software Development have given me expertise to speak authoritatively on the subject of dynamic “Faceted Search”.

18. There was a wide variety of patient types and circumstances that I was exposed to through my two practices, and this became germane to my endeavors to explore and ultimately solve a practical problem through my invention of “faceted search”.

19. As a child growing up, I had extreme difficulty in grammar school often doing very poorly on all types of standardized testing. No amount of studying would help and my performance on written tests was superior only to my even more dismal results at oral testing. In sharp contrast, my ability to correctly explain ideas was so out of alignment with my testing results that I was subjected to a battery of testing and while it is not directly relevant to this discourse, suffice to say that it was not until early 1998 that I underwent extensive brain mapping and neurological testing. What was discovered was that I had some cognitive learning and reading issues and

a rather severe form of ADHD. I was treated with medication and my world changed. What the diagnosticians found difficult to understand was how I was able to master the massive amounts of information that was required to achieve my level of academic success despite having profound difficulty reading and absorbing information. I was already in private practice, and I began to realize from the testing that my view of information was highly unusual.

20. This led to my earnest search for software that could make my searching of information more fluid and natural.

21. My previous struggle with taxonomy was overcome with brute memorization. This was labor intensive, and I developed over the years synesthetic relationships that not unlike many popular apps now available aid memorization with association with imagery, mnemonics, heuristics and experience.

22. In the Spring of 1991 as I was preparing for the General Surgery Board Exams, I began to catalog the several thousand cases I was involved in over my five-year residency. The cataloging of cases was generally done by hand with index cards and ledgers. They would be collated and submitted for review, and the American Board of Surgery would require the candidate to present a collection of cases selected by the review committee and to defend your diagnosis and management of those cases. I had been given a Macintosh computer for Christmas and was eager to use it to organize my cases. What was not obvious to me at that time was that organization

and taxonomy were integral to my ability to keep information straight. My intelligence had been documented on numerous occasions, but it never translated into being able to “learn” like my classmates and how colleagues did. I purchased a copy of Claris Filemaker Pro and proceeded to “play” with the database and read the manual. As I had difficulty with comprehension, it was quickly becoming an overwhelming task. I was creating data fields, and I wanted to create nested subsets like Kidney, left versus right. Pituitary, anterior or posterior. Mastectomies, left, right or bilateral, with or without axillary dissection(s). I read about reporting and custom reporting without success. I enlisted the help of a college roommate who was working in IT. I asked him how to get the data to “rotate” and change direction.

23. I still remember the example I asked him about. I presented a real case in the hypothetical. I can still see the patient in my mind’s eye. She had curly blond hair. When I went to change her dressing, I had to slip between the wall and the left side of her bed. The drains were attached to her gown and caused her significant discomfort as I took off the dressing. The left side of her bed was against the wall and only axillary dissections required drain placement. That meant it was a Left Mastectomy with Axillary Dissection. I remember when I went into the room to change her dressing, I could feel a warm breeze coming through the window. The Spellman building didn’t get A/C until the renovation in 1990. The Yankee game was on the TV and there were no medical students on rotation, so I had to do the

dressing change without assistance. That meant it was late May or June of 1988 or 1989. She told me about a short cut getting to Newark airport; she was from New Jersey. I remember she spoke English very well but had an slight accent. I wanted to find the left mastectomies with axillary dissections that I was involved in during May or June of 1988 or 1989 who lived in NJ. I imagined that when I asked the database, it would give me a list of the women that filled those , which over a span of five years and several thousand cases might be just a few. I would surely recognize her name when I saw it, Madeline Handwerk. She was Dutch and lived in Short Hills, NJ.

24. I am well aware that to swear before a particular reference one must practice the art diligently and without gaps. I am pointing out that this “search” for a solution had an organic and early origin for me.

25. Throughout my remaining residency, I frequently thought of the problem and was certain that it was a matter of just coming across the technology that would suit my needs.

26. I opened my office in 1995 and immediately began to attempt to organize my office and patient records along these lines.

27. Plastic Surgery is the largest and most comprehensive field in Medicine. It involves care of newborns with congenital defects (clefts) to treatment of the elderly with acquired problems (decubitus ulcers); it involves major reconstruction after

cancer surgery and severe burns but also involves revision of scars and minor skin irregularities, as well as Cosmetic Surgery.

28. A plastic surgeon that practices the entire spectrum of his field has an incredible variety of patients types as well as clinical circumstances. Let's look at them from a nested perspective. There are Reconstructive cases and Cosmetic Cases.

29. Reconstructive can be broken down into Emergency reconstructive and elective (non-emergent) reconstruction. A Breast Reduction can possibly be considered reconstructive (elective) if greater than 500 grams of tissue is removed from each side otherwise if that threshold is not met then it will be rejected by the insurance company as cosmetic in nature. Cosmetic Surgery is generally broken down by body part. Rhytidectomy (Facelift) with or without Neck Lift, Breast Augmentation with or without Mastopexy (Breast Lift). Then there is where the procedure is performed. Many emergency procedures are performed directly in the Emergency Room (ER) or the Operating Room (OR) of a hospital. Some Reconstruction can be performed in a doctor's office or in an ambulatory surgery center, but most are performed in a hospital setting. Then there is a matter of payment. Cosmetic Surgery is not covered by insurance and therefore can be paid with Cash, Credit Card, or Check. Insurance covered procedures are covered with the exception of deductibles and co-pays. If you cut your finger peeling an apple and have private insurance it will likely be covered depending on your policy.

However, if you are in the break room at work it may be considered a work related injury (especially if you are a prep cook) and then must be submitted to Worker's Compensation. If you are sitting in your car and peeling that apple then it's covered under No Fault, unless of course it's a company car and you are on the clock, then it's back to No Fault. Each of these circumstances has their own protocols and pay scales.

30. When adding a second office to the scenario the dimensions grow. Insurance companies reimburse based on geographic area (zip code). Southampton, Long Island (11968) is considered a Rural Community by Insurance Companies and therefore has a dramatically lower reimbursement rate than the Upper East Side of Manhattan (10021).

31. In 1995, trying to understand the cost and profit margin on any given procedure was a painful task. At this point, I began to investigate using Intuit Quicken and Microsoft Money, however they quickly disappointed.

32. In 1997, after attending a medical conference, I purchased a server and several workstations after being assured by the salesman that the database that came packaged with the server could deliver all the granularity that I required. I received a letter from the head of sales of the company I purchased the system from, apologizing for the lack of flexibility. I again abandoned the "search" out of

frustration and realized that much of my limitation came from being unable to articulate my needs.

33. It was the weekend before Thanksgiving 1998 that the light went on and I realized what I was looking for. I was called to the emergency room at Southampton Hospital late one evening to see a 5-year-old boy that had a second degree burn on the left palm of his hand. He had already been seen by the Emergency Room Physician and the pediatrician. They had already determined that the burn, while significant was not severe. They ordinarily would not have called me to see a relatively minor burn were it not for the strange history. The story as related by the ER nurse was that the family had just arrived for the Thanksgiving vacation. The father was carrying the child off the plane when suddenly the child began to scream uncontrollably and began clutching his hand. They immediately noticed that the child had a red thermal burn on the palm of his hand in the shape of an obelisk. The mother and stewardess looked frantically for some source of the burn but could not identify one. They came to the hospital immediately for treatment and by the time I saw him large blisters had begun to form. The differential diagnosis worked up by the ER included severe contact dermatitis, some kind of pathogen or toxic material (possible cleaning agent on the plane), infectious erasipelas, all the way down to rare congenital skin disorders like Epidermolysis. I examined the boy, and then asked to speak to the parents. The father was very tall, like 6'6". The mother was impeccably

dressed, and both spoke with very proper British accents. They had just arrived on holiday from London. The mother explained that the child was fine up until disembarking the plane. They stressed that they came immediately to the hospital. Which led me to ask why they didn't go to a hospital closer to the airport. My natural assumption and starting point were that they arrived from JFK. The father pointed out that Southampton Hospital *was* the closest to the airport. At that moment, it all came together. They flew into a local airport on a private plane. I asked them what kind of plane and immediately knew what had happened. The father was exceptionally tall and as they exited the airplane the child instinctively reached up and grabbed what appeared to be a handle above the door, normally out of reach. The auxiliary pitot, which provides critical airspeed data to the planes computers is heated on descent from altitude to 80 degrees C (176 degrees F) to prevent it from clogging with ice. The shape of the pitot tube is like a monument or obelisk.

34. It was at this point; I realized that the differential diagnosis is a quality particular to medicine that requires the diagnostician to keep several possible theories alive while dynamically adding and subtracting constraints.

35. What is critical to making a diagnosis is the granularity of the information and the absence of constraints on the way in which pieces of clinical history, physical exam and circumstances are layered. This was what I was looking for and this realization renewed my interest in pursuing a solution as it was clear that one did not

exist. My intention was to design a database management product that would be intuitive and flexible, and that I could use in my medical practice. I began efforts to design such a software tool in that month. I initially focused development on icon manipulation, faceted search, truncation, and related database tools.

36. There is an important aspect to the practice of medicine that was in part the inspiration for my invention. Search-on-the-fly is a byproduct of my search for a technology that could mimic the centerpiece of the medical practitioner's armamentarium, namely the differential diagnosis.

37. It is an important concept that is not readily apparent or required in other fields of endeavor and at the time of my training as a physician was an entirely analog experience.

38. In an analog environment the traditional physician would be faced with learning the basics in the first and second year of medical school. There is a combination of lectures, labs and clinical skill lessons in areas of Anatomy, Physiology, Pharmacology, Biochemistry, Pathophysiology and Microbiology, and Infectious Disease (The study of bacterial, viral, fungal and parasitic mediated disease processes). These studies are combined into clinical organ-based systems that follow the processes of normal function and deterioration in a diseased state. Physical Diagnosis is the course that begins to tie all the academic and clinical processes together. The second two years of medical school is dedicated to clinical

rotations. Much of the exposure is seeing what has been learned in theory applied in practical environments.

39. One of the critical experiences in clinical tours is mastery, through repetitive application, of the Differential Diagnosis (DD) and the role of Rules-Based Medicine (RBM).

40. Differential Diagnosis: Involves developing a list of potential diagnoses based on the unique combination of symptoms, history, and physical findings for each patient. This process considers variations in individual cases, such as atypical presentations or comorbidities, and often requires clinical intuition and experience. Physicians must adapt and pivot as new information arises. For example, if a patient presents with chest pain, the initial differential diagnosis might include myocardial infarction, pulmonary embolism, or gastroesophageal reflux disease. As test results come back, the physician refines the differential and may change their diagnostic path. Physicians must tolerate ambiguity and work through complex cases with limited information. They often must consider rare diseases or atypical presentations of common diseases, which requires in-depth knowledge and experience. It requires a blend of knowledge, clinical intuition, and the ability to recognize patterns. Experienced clinicians can sometimes make accurate diagnoses based on subtle cues or atypical symptom presentations, even if they don't strictly follow a specific protocol. The rapid, dynamic assessment is essential in complex, uncertain, or high-

stakes situations, such as emergency medicine, trauma, and internal medicine, where patients often present with a broad range of nonspecific symptoms that need to be carefully narrowed down.

41. Rules-Based Medicine: Relies on standardized protocols and algorithms, often based on population-level data and evidence-based guidelines. These rules are designed to cover common presentations and are highly effective for straightforward cases, but they may not account for individual variations or rare conditions. RBM follows a more linear and predictable path. It typically has clear decision points based on “if-then” logic. For example, if a patient has a specific score on a screening test, the algorithm might direct the physician to take a particular action. This can be less adaptable to unique or complex cases. Works well in scenarios with clear and predictable pathways, such as following standard protocols for vaccination schedules or chronic disease management. It is effective in situations where there is less ambiguity and complexity, but it may struggle with unusual cases that fall outside typical patterns. Relies less on individual intuition and more on data-driven decisions. It is often used in environments like urgent care or primary care, where standardized treatments can help ensure consistency and reduce variability in patient care. Highly effective in routine or repetitive scenarios, such as preventive care or chronic disease management, where guidelines can improve efficiency, minimize errors, and enhance the quality of care.

42. DD: This skill/art is the cornerstone of medical care, though with recent changes in healthcare, it has been replaced by rules-based medicine which is generally taught to Nurses, Nurse Practitioners and Physicians Assistants.
43. Even today, Technology, such as decision-support software, can assist but not replace the nuanced judgment needed. These tools can offer suggestions but usually are not definitive. RBM more easily integrates technology, like clinical decision support systems (CDSS) and electronic health records (EHRs), which can automatically guide providers through standardized protocols.
44. Search on the fly was created in the spirit of the DD. The requirements being able to navigate large sets of data with the ability to flexibly narrow and expand the data set based on the dynamic iterative application of constraints.
45. While DD is a unique skill set and characteristic of the practice of medicine, it is not without analogous skills in other fields like Forensic Science, Criminal Investigation, Failure Mode and Effects Analysis (FMEA) in Manufacturing and Case Analysis in Law.
46. As I note above, I have operated software companies that made and sold commercial embodiments of my inventions as disclosed and claimed in the '720 Patent. Following is an example of some of these commercial implementations:
47. Early implementations of Vilox search on the fly (SOTF).
48. In 2001- 2002, a pilot program was designed for the Nikko Hotel in San

Francisco. The project was designed to merge data from the guest registry normally limited to the front desk and provide reports for housekeeping staff to permit them to be able to see check-outs and check-ins viewed by floor and updated in real time. The results allowed the housekeeping managers to provide the maid service with real time lists of rooms organized by the layout of each individual floor and sorted and prioritized by checkout/check-in. According to my programmer, who was sent to San Francisco to assist with the implementation; upon seeing the first report compiled and organized for the maid staff, the head of housekeeping became visibly emotional with excitement.

49. In 2002, the University of Minnesota School of Business, implemented SOTF to assist in dynamically merging database information about student applications for admission. They were able to link applicant demographic information with grades and associated information about possible former students and faculty that could act as interviewers based on their geography and areas of interest. The test run was a great success and the programmer from Minnesota who implemented the solution for UofM moved to Kentucky when we relocated there and began working for Vilox. The program allowed recruiters and non-technical personnel in the field to organize lists of candidates from application materials and easily follow up and or put them in touch with alumni who were in their area or in their area of interest. They credited the technology

with improving their standing among business schools in the nation.

50. In 2005-2006, Vilox began a proof of concept with the IT department of UBS. The project was to devise dynamic heat maps with data from disparate databases. At the time the data had to be exported from each separate data source then recompiled into spreadsheets or a separate database for generation of the heat maps to provide various analytics to, in this POC, to a research group in equities. The initial results were very encouraging and the POC was generally considered a great success among the end users.

51. In 2007 various solutions were created for local businesses in the area around Louisville, KY. A chain of pizzerias used SOTF to consolidate inventory and run granular sales reports among its 6 locations.

52. The city of Louisville Metro Animal Control used an implementation to keep track of dogs and cats in the various shelters around the city and used SOTF to optimize the routing schedules for the Animal Control Officers.

53. Churchill Downs used a SOTF embodiment to keep an equine genealogy database and was in the process of organizing their concession sales data with SOTF.

54. A chain of regional nursing homes was very successful using SOTF to create very granular real time reporting that helped keep track of the highly variable and fluid allocation of empty beds.

55. ANALYSIS OF ASSERTED REFERENCES

56. As a general matter, Petitioner has described the references asserted in the present IPR while ignoring sections of the disclosures that teach away from the subject matter of the challenged claims. These sections, once reviewed by a PHOSITA, would have made clear that a PHOSITA would have had no motivation to combine any of the references. The sections of this Patent Owner's Response that follow immediately hereafter describe the defects in each reference.

57. EX1005: *Cochran*

58. *Cochran* is directed to a system and a method for managing the presentation of search terms on a computer terminal. that allow an end user 8 access to a database “without having to understand the physical database schema.” EX1005, Abstract. To this end, *Cochran* discloses that it “is a particular object of the invention to enable a user to view different lists of choices or search terms, that are available in a unique situation.” *Id.*, 4:20-22. However, *Cochran* explicitly discloses that its “search system ... is used to acquire travel information ... [from a] database, known by its trade name ‘TRAVEL SEARCH’TM ... [which] consists of database records of more than 13,000 hotels, resorts and inn in the United States.” *Id.*, 6:58-64. *Cochran* goes on to explain that a user accesses the TRAVEL SEARCHTM database using a series of predefined search templates, list identifiers, pull-down menus, and pick boxes. *See, generally, id.*, 7:9 – 8: 68; Figs. 3a – 4d. In other words, *Cochran* provides a

fixed database accessible through fixed search menus. *Cochran* certainly does not provide a dynamic, or search-on-the-fly, search system, and *Cochran's* search system does not determine a database schema, or a list of data fields coincident with execution of a search; rather, in *Cochran*, the schema is pre-defined as are the various tables and list identifiers being searched as well as the various available filters and available search terms. See, for example, *id.*, 10:66 – 11:8 (“Here there are five search terms 211 to choose from: January-March, April-June, July-September, October-December and Disregard Start of Travel.”). Furthermore, Petitioner’s expert admits the deficiencies in *Cochran*. In paragraph 179 of his Declaration, Dr. Zadok states “Cochran discloses that it ‘display[s] a list of all available choices’ to ‘inform the user of available options before any search is initiated.’” Thus, Petitioner’s expert admits that *Cochran* uses a preconfigured menu system and thus is capable only of a static search. In paragraph 184, Dr. Zadok describes static indications such as Location, Lodging Type, Lodging Name, etc. In paragraph 185, Dr. Zadok describes *Cochran's* “pick boxes.” These pick boxes are preconfigured and only allow a static view of *Cochran's* Travel Search database.

59. As a further example, *Cochran* preconfigures terms such as start of travel, search regions (e.g., Atlantic States), and Lodging Type, just to name a few. Thus a user is constrained to search using only preconfigured “list identifiers.”

60. EX1006: *HyperSQL*

61. Just as with *Cochran*, *HyperSQL* describes a preconfigured database search menu. In the case of *HyperSQL*, the database being searched related to biologic subject matter. As can be seen comparing *HyperSQL* Figures 2 (Bacterium) and 5 (Algae), the selection of a particular genus changes the preconfigured search interface to one designed for the specific biologic matter. Thus, *HyperSQL* is little different from *Cochran* in that all search queries, menus, and choices are preconfigured and are known in advance of a search query. Accordingly, *HyperSQL* suffers from all the infirmities that afflict *Cochran*.

62. More specifically, *HyperSQL* uses an interoperability layer that allows a database administrator to rapidly construct browser-based queries for searching remote databases. *HyperSQL* can be used to create forms and hyper-text based database interfaces. However, these interfaces are static templates for searching a database, and are not capable of dynamic search. A query menu serves as a starting point for users, presenting introductory information about the database and displaying a list of queries organized by subject. Selecting a specific query brings up a query form. The query form is specific to the database and is preconfigured.

63. Furthermore, each field has a drop-down menu that has relevant values populated from the database. The presence of wild cards makes it clear that all the fields indicates that all the preselected fields or dimensions offered must have values

present to run the query. The result is a list of relevant Query links that when selected take the user to more specific information.

64. In one example, the form is created with drop down menus that are auto populated by the database. This query-by-example (QBE) permits dynamic composing of SQL code based on the user's selection, a technique that a PHOSITA would recognize as well established since the 1970s. However, because all the constraints are compiled and requested from the database at once, there is the possibility of errors that *HyperSQL* addresses with a debugging feature. "The core of the *HyperSQL* software is the *HyperSQL gateway*, comprised of an interpreter and a communications back end." "Each database transaction (submitting a query form or clicking on a querylink) invokes a new copy of the gateway, which terminates automatically after processing the query results."

65. As Dr. Zadok points out, "Figure 2, annotated above, shows that the querylist for "Genus" contains several values that a user can choose from including "Agrobacterium," "Bacillus," "Clavibacter," "Escherichia," "Pseudomonas," and other values that are obscured and accessible using the scroll bar or buttons on the right side of the querylist. *HyperSQL* had received a search selection for the database field "Genus" where the "allowed" values from the database start with "Agrobacterium." If *HyperSQL* had *not* received such a search selection, *HyperSQL*

would be unable to retrieve the values from the database to populate the list of values in Genus.

66. The taxonomy of all living things breaks down into seven nested (hierarchical) classifications: Kingdom>Phylum>Class>Order>Family>Genus>Species. The standard binomial classification of Bacteria uses Genus and Species. There are tens of thousands of Species of Bacteria. They are further classified based on their reaction to Gram staining (Gram-positive or Gram-negative), their shape (cocci, bacilli, or spirilla), their oxygen requirements (aerobic, anaerobic, or facultative) and more recently by their genetic makeup (there are currently over 1000 species of bacteria that have had their gene sequencing mapped).

67. *HyperSQL* represents a very limited and rudimentary attempt at classifying bacteria and its practical limitations distinct from a dynamic search would become apparent. In bacterial taxonomy, different genera can have species with the same species name. This happens because the species name refers to a specific characteristic or description of the bacterium that can be found in more than one genus. As an example, *Streptococcus pyogenes* is a gram-positive cocci. *Arcanobacterium pyogenes* is a gram-positive rod. If the species alone was placed in *HyperSQL* and the ability to “sort” the results by Genus and morphology of the bacteria (cocci versus rod) would be limited

68. EX1007: Zellweger

69. *Zellweger* has a filing date of July 15, 1999. As discussed herein, *Zellweger*, based on this July 15, 1999 filing date is not prior art to the '720 Patent.

70. Even though it is not prior art, *Zellweger* does not cure the defects in *Cochran* and *HyperSQL* noted above.

71. *Zellweger* is directed to a hierarchical menu structure that implements a “tab menu” feature that aims to limit the number of search terms displayed to a user in an interactive configuration window. EX1007, Abstract. *Zellweger* likens its “tab menu” feature to “a thumbnail tab in a book, its paper counterpart. *Id.*, 2:16-17. Patent Owner notes that such “thumbnail tabs” are a common feature of dictionaries, for example. *Zellweger* describe a process for generating its “tab menu” in which a user “navigates content menu 21 in window 76 to select a menu entry that points to a target list menu.... Each time an entry is highlighted, the number of items in its successor or offspring list is displayed ... [and then the user] selects a radio button in 78 to designate the source for the tab list menu.” *Id.*, 4:11-19; Figure 6a. *Zellweger* does not disclose that this process of converting menu selections in content menu continues until all menu selections are converted to tab menus. However, what is clear from *Zellweger*’s disclosure is a process of converting one static menu (i.e., the “content menu”) into another static menu (“the tab menu”). Thus, *Zellweger*’s “tab menus” are created in advance of any search, the “tab menus”

are static, albeit more finely-grained than the original “content menu,” and the “tab menus” are not created dynamically as part of any search or query of a database. Thus, *Zellweger’s* “tab menus” suffer from many of the defects inherent in the original, and static, “content menus,” namely *Zellweger’s* “tab menus” (1) do not and cannot account for changes in the structure and content of the database being searched, and (2) constrain the user to employ static search options (*i.e.*, the “tab menus”).

72. *Zellweger* cannot be combined with *Cochran* because, while they may be analogous, neither teach dynamic iterative search. The menu have hierarchal structure but the taxonomy is hard coded by the developer. While this may afford the user, the ability to navigate with increased intuition, it requires the structure to be established behind the scenes by programmers with a set structure. It is the application of this structure that constrains the search to a degree and it’s absence in Search-on-the-fly/Sort-on-the-fly (SOTF) that creates added power and granularity. *Zellweger* also cannot be combined with *Cochran* because the key points of “analogousness” as Dr. Zadok put it that are contained in the final application are missing from the provisional application. The final application does not contain the necessary teachings.

73. It is my opinion that a POSITA would *NOT* have considered HyperSQL and *Zellweger* to be within the scope of the prior art and irrelevant to the patentability of

the 720 Patent's claims. It is my opinion that HyperSQL in view of Zellweger is moot, regarding Claims 1-5, 7, 15-19, and 27-30. The basis for my opinion is set forth in more detail below. A POSITA could not have successfully combined the teachings of HyperSQL and Zellweger, while they are prior art that is analogous to each other, they cannot teach on the 720 patent, as detailed below.

74. Dr. Zadok suggests that simply because Zellweger and HyperSQL both facilitate intuitive navigation of a database and involve hierarchal nesting and truncation that they are analogous to SOTF in spite of the fact that SOTF operates on a completely different premise and provides expanded utility. A POSITA may have understood this as being an advance in the sense that it removed the requirement of understanding SQL from the user however HYPERSQL still requires hard coding of the original menu which is both confining in its structure and limiting in its ability to assay the contents of the database without limitations of the menu. What is important is that these fields are "selected" and configured. The 720 patent places no limitation or requirement of such configuration.

75. The 720 patent determines the schema dynamically such that if at any point additional fields of data were added to the database, those fields and their contents would be displayed upon the very next search-on-the-fly. This provides a whole "next level improvement in the concept of real-time search". The fundamental concept to understand is that the user is searching forensically (deductively) for

information that may not be obvious or valuable or even apparent to the programmer designing the interface. That level of programming in HyperSQL, Zellweger and Cochran are absent from Search-on-the-fly and are what provides an order of magnitude in dynamicism. At this point it would be clear to a POSITA that this is a case of apples and oranges in that these fields are predetermined by the database administrator or programmer designing this search functionality. There is the important distinction. When this interface is created for a user to navigate it admittedly is an improvement, but it is also intrinsically limited by the construct of the fields by the programmer. Since SOTF compiles the lists dynamically at every iterative application to the database, no such limitation exists.

76. HyperSQL introduces a special style of link called a querylink (marked with a yellow ‘query’ icon as shown in Figure 4), which activates a pre-formulated query to obtain more information from the database. Since all querylinks on a results screen are statically associated with the same set of SQL procedures, the code is pre-stored in the database’s procedure cache to improve response time.” Except that this is dynamic truncation which involves taking the assorted results and iteratively reducing the number of characters until the entire spectrum of results are represented in a single view. Depending on the number of entries and the size of the display this may result in for example the field of Last Names to be reduced to a Single Letter or

possibly two or three letters. This form of truncation permits even spacing of truncated results and allows the user to cognitively assess the range of the data set. Firstly, to provide a “count” the querying engine would have to know what it was looking for. Secondly, if no author had a last name beginning with, for example, the letter Q then no Q would be represented. The inherent limitation of this is that the letter Q would have to be coded to run against the data set in advance to register “hits”. When dealing with large unknown data sets or merged data that is unknown even to the developer, as in a forensic analysis, there is no practical way that the developer could predict what will populate the data set in advance.

77. Conclusion

78. In my capacity as a physician, I have had the opportunity to use search technology beginning in the early 1990s with my Macintosh and copy of Filemaker Pro, followed by exploration of Microsoft Access, Quickbooks, Microsoft Money and a variety of aftermarket report generators such as Business Objects and Crystal Reports. I also had the opportunity to access web-based search engines very similar to HyperSQL. I will agree with Dr. Zadok that Cochran, Zellweger and HyperSQL represent incremental improvements in search technology they lacked, as all my research and experimental investigation confirmed, the dynamic flexibility and granularity necessary to satisfy the needs of a truly deductive model.

79. Looking at HyperSQL as a physician, there are clear examples why it does not teach SOTF and also why it cannot be combined with Cochran in a meaningful way. “HyperSQL is an interoperability layer that enables database administrators to rapidly construct browser-based query interfaces to remote Sybase databases.” “HyperSQL can be used to create forms and hypertext-based database interfaces for non-computer experts (e.g. scientists, business users).” At the time, a PHOSITA would be aware of the status of search within the scientific community. By that time I had already been familiar with database search since my residency as a source for various research projects. I was very familiar with the daunting task of accessing and organizing compiled data, whether it originated at our facility as part of a research project or original scientific paper or compiled from other sources as in a multi-center retrospective study. The process was onerous and required database administrators to access archives and medical records, a time and resource consuming task. The reports would then be manually transcribed into a spread sheet with very little ability to manipulate or even report on the data.

80. Newsome, et al correctly and similarly identify several factors attributing to the difficulty associated with scientific search. Knowledge of the database structure, ascertaining the meaning of often cryptic naming conventions, SQL query building skills, and lack of meaningful feedback during the query process. It is at this point that the similarities end. “The query menu serves as a starting point for users,

presenting introductory about the database and displaying a list of queries organized by subject” Selecting a specific query brings up a query form. The query form is specific to the database and preconfigured. Each field has a drop-down menu that has relevant values populated from the database. The presence of wild cards makes it clear that all the fields indicates that all the preselected fields or dimensions offered must have values present to run the query. The result is a list of relevant Query links that when selected take the user to more specific information. In one embodiment, the form is created with drop down menus that are auto populated by the database. This query-by-example (QBE) permits dynamic composing of SQL code based on the user’s selection, a technique that a PHOSITA would recognize as well established since the 1970s. Because all the constraints are compiled and requested from the database at once, there is the possibility of errors that HyperSQL addresses with a debugging feature. “The core of the HyperSQL software is the *HyperSQL gateway*, comprised of an interpreter and a communications back end.” “Each database transaction (submitting a query form or clicking on a querylink) invokes a new copy of the gateway, which terminates automatically after processing the query results.” Dr. Zadok points out, “Figure 2, annotated above, shows that the querylist for “Genus” contains several values that a user can choose from including “Agrobacterium,” “Bacillus,” “Clavibacter,” “Escherichia,” “Pseudomonas,” and other values that are obscured and accessible using the scroll bar or buttons on the

right side of the querylist. HyperSQL had received a search selection for the database field “Genus” where the “allowed” values from the database start with “Agrobacterium.” If HyperSQL had *not* received such a search selection, HyperSQL would be unable to retrieve the values from the database to populate the list of values in Genus.

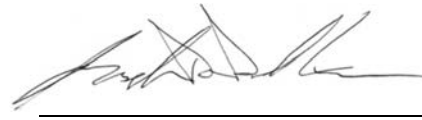
81. The taxonomy of all living things is broken down into seven nested (hierarchal) classifications.

Kingdom>Phylum>Class>Order>Family>Genus>Species. The standard binomial classification of Bacteria uses Genus and Species. There are tens of thousands of Species of Bacteria. They are further classified based on their reaction to Gram staining (Gram-positive or Gram-negative), their shape (cocci, bacilli, or spirilla), their oxygen requirements (aerobic, anaerobic, or facultative) and more recently by their genetic makeup (there are currently over 1000 species of bacteria that have had their gene sequencing mapped).

82. HyperSQL represents a very limited and rudimentary attempt at classifying bacteria and its practical limitations distinct from an embodiment of SOTF would become apparent. In bacterial taxonomy, different genera can have species with the same species name. This happens because the species name refers to a specific characteristic or description of the bacterium that can be found in more than one genus. As an example, *Streptococcus pyogenes* is a gram-positive cocci.

Arcanobacterium pyogenes is a gram-positive rod. If the species alone was placed in HyperSQL and the ability to “sort” the results by Genus and morphology of the bacteria (cocci versus rod) would be limited. SOTF would allow the user to start at any point. And since the data is read dynamically, the filters could be applied in any sequence with neither the user nor the developer being required to create the relationships.

83. I declare that all statements made herein based on my own knowledge are true and correct to the best of my knowledge and that I made all statements with the knowledge that willful false statements are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

A handwritten signature in black ink, appearing to read 'Joseph L. De Bellis', is written above a solid horizontal line.

Date October 14, 2024

Dr. Joseph L. De Bellis, M.D.