

DOCKET NO: 440200US

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD**

PATENT: 8,059,015

INVENTOR: Liu Hua et al.

TITLE: CAPACITANCE SENSING MATRIX FOR KEYBOARD
ARCHITECTURE

TRIAL NO.: IPR2014-_____

DECLARATION OF DR. DANIEL J. WIGDOR

1. I, Dr. Daniel J. Wigdor, make this declaration on behalf of BlackBerry Corp. (“BlackBerry” or “Petitioner”) in connection with the petition for *inter partes* review of U.S. Patent No. 8,004,015 (“the ‘015 patent,” attached as Exhibit 1001 to the petition). I am over 21 years of age and otherwise competent to make this declaration. Although I am being compensated for my time in preparing this declaration, the opinions herein are my own, and I have no stake in the outcome of the *inter partes* review proceeding.

I. QUALIFICATIONS

2. A detailed record of my professional qualifications, including a list of publications, awards, and professional activities, can be found in my *curriculum vitae*, which is attached as Ex. 1009 to the concurrently filed the petition for *inter*

partes review. My *curriculum vitae* also lists each matter in which I have provided testimony, either through declaration, deposition or trial, in the last 5 years.

3. I am an Assistant Professor of Computer Science at the University of Toronto, where I have joint appointments at the Department of Computer Science and the department of Mathematical and Computational Sciences.

4. Before joining the faculty at the University of Toronto in 2011, I was a researcher at Microsoft Research, the user experience architect of the Microsoft Surface Tablet, and a company-wide expert in user interfaces for new technologies.

5. While studying to obtain my Ph.D. degree at the University of Toronto, which pioneered much of the early work on touch sensitive devices and, in particular, multi-touch devices, I was a fellow at the Initiative in Innovative Computing at Harvard University and conducted research for Mitsubishi Electric Research Labs (MERL). While at MERL, I was part of the DiamondSpace project that developed the DiamondTouch multi-touch device. DiamondTouch is a multi-input touch sensitive device that allows multiple people, simultaneously, to interact with the display.

6. In particular, I was responsible for conducting research regarding user interfaces for use on the DiamondTouch. More particularly, I was responsible for the design and development of user interface software that ran on the

DiamondTouch display, and that responded to user input as detect by changes in capacitance measurements of the touch sensor.

7. My work regularly involved designating areas of the display to correspond to buttons and other user interface elements, and writing software to map the sensed capacitance variations of each sensor area or element to a user interface object, including pre-processing and filtering of input. My work further included the creation of applications, as well as general-purpose tools that would process input and enable application software.

8. In my work at MERL, I developed such software not only for the DiamondTouch, but for several other touchscreen technologies as well, such as the FingerWorks iGesture Pad, mobile phones, and digital whiteboards, among others. I was also responsible for the design of hardware devices, such as a two-sided DiamondTouch, and mobile devices.

9. I hold Hon. B.Sc., M.S., and Ph.D. degrees in computer science, and have published extensively, with about 70 technical publications. Of these, approximately 16 are peer-reviewed, technical papers which relate directly to the design of touch sensitive devices and implementation of the same into electronic

devices.¹ I have also written multiple conference short papers on this topic. I have given over 70 invited talks, including multiple keynote lectures.

II. MATERIALS CONSIDERED

10. In forming my opinions, I read and considered the '015 patent and its prosecution history, the exhibits listed in the Exhibit Appendix filed with the '015 petition, as well as any other material referenced herein.

III. UNDERSTANDING OF THE LAW

11. For the purposes of this declaration, I have been informed about certain aspects of patent law that are relevant to my analysis and opinions, as set forth in this section of my declaration.

A. A Person Having Ordinary Skill in the Art

12. I understand that the disclosure of patents and prior art references are to be viewed from the perspective of a person having ordinary skill in the art at the time of the alleged invention (“POSITA”). Unless I state otherwise, I provide my opinion herein from the viewpoint of a POSITA at the earliest alleged priority date for the '015 patent, which I have been informed is May 25, 2006.

¹ This includes papers numbered C.7, C.9, C.11, C.13, C.15, C.16, C.17, C.18, C.24, C.26, C.29, C.32, C.33, C.39, C.41, C.44 in my *curriculum vitae*.

13. The '015 patent pertains to the field of user interface devices and, in particular, touch sensitive devices, such as a touchscreen for a computer, tablet, or other computing device.

14. In determining whom a POSITA would be, I considered the '015 patent, the types of problems encountered in designing touch sensitive devices, the prior art solutions to those problems, the rapid pace of innovation in this field, the sophistication of touch sensitive computing devices, and the educational level of workers active in the field.

15. Based on these factors, I have concluded that a POSITA was sufficiently skilled in the design and manufacture of touch sensor devices for use in computing device user-interfaces (*e.g.*, notebook computer displays, PDA and other mobile handset displays, consumer electronics, appliances, embedded systems, and the like). More particularly, the ordinarily skilled artisan would have been well-versed in a number of different algorithms and methods for applying signals to a capacitance sensor matrix and sensing capacitance variations responsive to a conductive object, for example, to detect discrete keyboard keys in a configuration in which the keyboard keys displayed on the touch sensor device outnumber the number of sensor elements in the touch sensor device. (*See, e.g.*, Ex. 1001, Fig. 6A, Fig. 6B, 4:14-25, Ex. 1002, Fig. 7, 6:66-7:6, Ex. 1004, Fig. 7, 7:6-

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