UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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APPLE INC.,
Petitioner,

v.

CALIFORNIA INSTITUTE OF TECHNOLOGY,
Patent Owner.

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IPR2017-00219
Patent No. 7,116,710

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**DECLARATION OF DR. MICHAEL MITZENMACHER**

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I, Michael Mitzenmacher, declare as follows:

## I. ENGAGEMENT

1. I have been retained by counsel for the California Institute of Technology as an expert witness in the above-captioned proceeding. I have been asked to provide my opinion about the state of the art of the technology described in U.S. Patent No. 7,116,710 (the "'710 patent," Ex. 1201) and on the patentability of the claims of this patent, specifically with regard to the grounds of institution in the case IPR2017-00219. The following is my written testimony on these topics.

## II. QUALIFICATIONS

2. I am currently employed as a Professor of Computer Science at Harvard University. Specifically, I am the Thomas J. Waston, Sr. Professor of Computer Science in the School of Engineering and Applied Sciences. I joined the faculty of Harvard as an Assistant Professor in January 1999. I was promoted to Associate Professor in 2002 and to Professor in 2005. In 2010, I began a three-year term as Area Dean, which is essentially equivalent to what other schools call Department Chair, of Computer Science, and held that position through June 2013. My work address is 33 Oxford Street, Cambridge, MA 02138. My primary research interests include design and analysis of algorithms, networks and data transmission, and information theory.



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3. I received my undergraduate degree in Mathematics and Computer Science from Harvard College in 1991. I received a Certificate of Advanced Study in Mathematics from Cambridge University in 1992. I received a Ph.D. in Computer Science from the University of California at Berkeley in 1996. From August 1996 to January 1999, I was employed as a Research Scientist at Digital Systems Research Center, where my work included projects on algorithms for the Internet and error-correcting codes.

4. I am listed as an inventor or co-inventor on 19 issued patents, and am the co-author of a textbook entitled "Probability and Computing" published by Cambridge University Press. I am a Fellow of the Association for Computing Machinery, and currently serve as the Chair of the ACM Special Interest Group on Algorithms and Computation Theory (SIGACT).

5. The fields of endeavor at issue in this case are error-correction coding methods, including repeat-accumulate codes, Turbo codes, and low-density parity-check codes. I have published over 200 research papers in computer science and engineering conferences and journals, many of which have explored algorithms and data structures for error-correction codes, including both mathematical analysis and applications.



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