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

In re: Inter Partes Review of: :

U.S. Pat. No. 7,116,710   :

U.S. Pat. No. 7,421,032   :

U.S. Pat. No. 7,421,781   :

and U.S. Pat. No. 8,284,833   :

Inventor: Hui Jin, et al   :   IPR No. Unassigned

Assignee: California Institute of Technology

Common Title: **Serial Concatenation of Interleaved Convolutional Codes Forming Turbo-Like Codes**

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U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450

Submitted Electronically via the Patent Review Processing System

DECLARATION OF BRENDAN J. FREY

Declaration of Brendan J. Frey

I, Brendan J. Frey, declare as follows:

1.   I make this declaration based upon my own personal knowledge and, if called upon to testify, would testify competently to the matters contained herein.

2.   I have been informed that, for purposes of this declaration, the term "person of ordinary skill in the art" refers to person who, in May 18, 2001, had a formal educational level of at least a Ph.D. in a field related to coding or information theory. I have also been informed that the "person of ordinary skill in the art" would have been aware of all publications and other teachings related to the field of coding theory as of May 18, 2001.

3.   I am over the age of 18, have never been convicted of a felony or crime of moral turpitude and am legally competent to make this declaration.

I.   Background and Qualifications

4.   My qualifications are stated more fully in my curriculum vitae. Attached herewith. Here I provide a brief summary of my qualifications:

5.   I am currently a Professor at the University of Toronto in the Department of Electrical and Computer Engineering, and the Banting and Best Department of Medical Research, and the Department of Computer Science.

6.   I hold a Bachelor of Science Degree in Electrical Engineering from

the University of Calgary, a Masters of Science Degree in Electrical and Computer Engineering from the University of Manitoba, and Ph.D. in Electrical and Computer Engineering from the University of Toronto.

7.   I have authored a book entitled "Graphical Models for Machine Learning and Digital Communication." that is relevant to the subject matter of this case. In addition, I have authored or co-authored nearly 181 articles in peer-reviewed journals, conference proceedings, texts, industry trade publications, and monographs.

8.   I have been asked to provide a statement of certain facts related to the *inter partes* review of the following U.S. Patents: i) U.S. Patent No. 7,116,710 ("the '710 Patent"); ii) U.S. Patent No. 7,421,032 ("the '032 Patent"); iii) U.S. Patent No. 7,421,781 ("the '781 Patent"); and iv) U.S. Patent No. 8,284,833 ("the '833 Patent").

9.   I was an active contributor and collaborator in the community that included some of the inventors of the '710; '032; '781; and '833 patents around the time of the time of the alleged invention.   In particular, I attended talks given by Dr. Robert McEliece and Dr. McEliece attended talks that I presented around the time of the alleged invention. These talks included the 1998 and 1999 Allerton Conferences held by the University of Illinois Urbana-Champaign in Allerton, Illinois, as well as the 2000 Brest 2nd International Symposium on Turbocodes and

Related Topics and the 2000 Sorrento ISIT conferences. Dr. McEliece, Dr. MacKay, and I attended and made presentations at the 1999 Instituitive for Mathematics and its Applications (IMA) 1999 Summer Program: Codes, Systems and Graphical Models, which was held at the University of Minnesota on August 2-13, 1999.

10. I have been retained by the law firm of Baker Botts L.L.P., counsel for the petitioner Hughes Networks Systems, LLC and Hughes Communications, Inc. to provide my opinions as described below. For my efforts in connection with the preparation of this declaration I have been compensated at my standard rate of $500 per hour for this type of consulting activity. My compensation is in no way contingent on the results of these or any other proceedings relating to the above-captioned patent or matter.

B. Publications, Presentations, and Software

(i) "Irregular Turbocodes" - September 22-24, 1999 Allerton Conference

11. Beginning in 1998, I collaborated with Dr. David MacKay to show that turbocodes could benefit from being made irregular codes in a similar way that Michael Luby, Michael Mitzenmacher, M. Amin Shokrollahi, Daniel A. Spielman, and others had adapted LDPC codes "irregular." I used my software to simulate and test various irregular turbocodes. Additionally, I developed additional software to facilitate the simulation and testing of irregular turbocodes.

12.   The result of that collaboration was a presentation at the 1999 Allerton Conference on Communications, Control and Computing, and Computing in Allerton, Illinois ("1999 Allerton Conference") in September 1999. The 1999 Allerton Conference was held September 22-24, 1999.   The 1999 Allerton Conference was open to the public for attendance. Any person who wanted to attend and was able to pay the attendance fee could attend the 1999 Allerton Conference. The 1999 Allerton Conference was considered one of two primary conferences on the topic of iterative decoding during the time. The 1999 Allerton conference was publicized and those who were interested in topics of iterative decoding were aware of the conference.

13.   I presented a series of slides on my work to show how a turbocodes could be made irregular and the benefits of making the turbocodes irregular. This presentation was entitled "Irregular Turbocodes" and I believe I presented on the afternoon of the first day of the conference on September 22, 1999. A copy of this slide presentation is shown at Exhibit 1034.

14.   After the 1999 Allerton conference, Dr. MacKay and I submitted a paper for publication in the Proceeding of the Thirty-Seventh Annual Allerton Conference on Communications, Control and Computing. Exhibit 1012 is a true and correct copy of the paper we submitted for publication. Dr. MacKay and I submitted the paper for publication on, or no later than October 1999. I believe the

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