

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

In Re: U.S. Patent US 7,421,032 : Attorney Docket No. 082944.0102
Inventor: Hui Jin, *et. al.* :
Filed: Oct. 3, 2006 :
Claimed Priority: May 18, 2000 :
Issued: Sep. 2, 2008 : IPR No. 2015-00060
Assignee: California Institute of Technology
Title: Serial Concatenation of Interleaved Convolutional Codes Forming
Turbo-Like Codes

Mail Stop PATENT BOARD
Patent Trial and Appeal Board
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, Virginia 22313-1450

Submitted Electronically via the Patent Review Processing System

**CORRECTED PETITION FOR *INTER PARTES* REVIEW OF CLAIMS 1, 8,
10, 18, 19, and 22 OF U.S. PATENT NO. 7,421,032 UNDER 35 U.S.C. §§ 311-
319 AND 37 C.F.R. §§ 42.100 *ET SEQ.***

TABLE OF CONTENTS

I. MANDATORY NOTICES, STANDING, AND FEES..... 1

II. OVERVIEW OF CHALLENGE AND RELIEF REQUESTED.....2

 A. Publications Relied Upon2

 B. Grounds For Challenge3

III. OVERVIEW OF THE '032 PATENT4

 A. Summary of the Claimed Subject Matter4

 B. Prosecution History of the '032 Patent.....5

IV. SUMMARY OF PRIOR ART.....6

 A. State of the Art6

 B. Summary of References Relied Upon9

V. CLAIM CONSTRUCTION 11

 A. Level of Ordinary Skill in the Art.....12

 B. Claim 1 - The Generating Step12

 C. Claim 18 Tanner Graph13

 D. “Transmission”14

 E. “Data Stream”15

VI. A REASONABLE LIKELIHOOD EXISTS THAT THE CHALLENGED CLAIMS ARE UNPATENTABLE 15

 A. Ground 1: The '032 Patent Claim 1 is Obvious Under 35 U.S.C. § 103 over *Frey* in view of *Divsalar*.....16

 B. Ground 2: The '032 Patent Claims 1, 8, and 10 are Obvious Under 35 U.S.C. § 103 over *Frey* in view of *Divsalar* and in further view of the Luby '909 Patent.....23

Petition for *Inter Partes* Review of U.S. Patent No. 7,421,032

C. Ground 3: The '032 Patent Claim 1, 8 and 10 are Obvious Under 35 U.S.C. § 103 over *Frey* in view of *Divsalar* and in further view of the *Luby '909 Patent* and *Hall*.....28

D. Ground 4: The '032 Patent Claims 18, 19, and 22 are Obvious Under 35 U.S.C. § 103 Over *Frey* in View of *Divsalar* and in Further View of *Kschischang*.....29

E. Ground 5: The '032 Patent Claims 18, 19, and 22 are Obvious Under 35 U.S.C. § 103 Over *Frey* in View of *Divsalar* and *Kschischang* and in Further View of *Hall*.....41

F. Ground 6: The '032 Patent Claims 1 and 8 are Obvious Under 35 U.S.C. § 103 over *Divsalar* in view of the *Luby '909 Patent*42

G. Ground 7: The '032 Patent Claims 18 and 22 are Obvious Under 35 U.S.C. § 103 Over *Divsalar* in view of the *Luby '909 Patent* and in Further View of *Kschischang*49

H. Ground 8: The '032 Patent Claim 10 is Obvious Under 35 U.S.C. § 103 over *Divsalar* in view of the *Luby '909 Patent* and in further view of *Ping*53

I. Ground 9: The '032 Patent Claim 19 is Obvious Under 35 U.S.C. § 103 over *Divsalar* in view of the *Luby '909 Patent* and *Kschischang* and in further view of *Ping*.....55

VII. CONCLUSION.....56

LIST OF EXHIBITS

| | |
|------|---|
| 1001 | U.S. Patent No. 7,116,710 by Hui Jin, <i>et. al.</i> entitled “Serial Concatenation of Interleaved Convolutional Codes Forming Turbo-Like Codes.” (the “’710 Patent”) |
| 1002 | Prosecution History of the ’710 Patent |
| 1003 | U.S. Patent No. 7,421,032 by Hui Jin, <i>et. al.</i> entitled “Serial Concatenation of Interleaved Convolutional Codes Forming Turbo-Like Codes.” (the “’032 Patent”) |
| 1004 | Prosecution History of the ’032 Patent |
| 1005 | U.S. Patent No. 7,916,781 by Hui Jin, <i>et. al.</i> entitled “Serial Concatenation of Interleaved Convolutional Codes Forming Turbo-Like Codes.” (the “’781 Patent”) |
| 1006 | Prosecution History of the ’781 Patent |
| 1007 | U.S. Patent No. 8,284,833 by Hui Jin, <i>et. al.</i> entitled “Serial Concatenation of Interleaved Convolutional Codes Forming Turbo-Like Codes.” (the “’833 Patent”) |
| 1008 | Prosecution History of the ’833 Patent |
| 1009 | U.S. Provisional Application Ser. No. 60/205,095 by Hui Jin, <i>et. al.</i> (the “’095 Provisional Application”) |
| 1010 | Declaration of Henry D. Pfister, Ph.D. |
| 1011 | D. Divsalar, H. Jin, and R. J. McEliece, “Coding Theorems for “Turbo-like” Codes.” <i>Proc. 36th Allerton Conf. on Comm., Control and Computing</i> , Allerton, Illinois, pp. 201-210, Sept. 1998 (“ <i>Divsalar</i> ”) (published no later than April 30, 1999 at the University of Texas library) |
| 1012 | B.J. Frey and D.J.C. MacKay, “Irregular Turbocodes.” from the 37th Allerton Conference (“ <i>Frey</i> ”) (published no later than October 8, 1999 at the website of D.J.C. MacKay) |

Petition for *Inter Partes* Review of U.S. Patent No. 7,421,032

| | |
|------|--|
| 1013 | E.K. Hall and S.G. Wilson, “Stream-Oriented Turbo Codes.” <i>48th IEEE Vehicular Technology Conference</i> , pp. 71-76, 1998 (“Hall”) (published no later than June 23, 1998 at the Library of Congress) |
| 1014 | L. Ping, W. K. Leung, N. Phamdo, “Low Density Parity Check Codes with Semi-random Parity Check Matrix.” <i>Electron. Letters</i> , Vol. 35, No. 1, pp. 38-39, Jan. 7th, 1999 (“Ping”) (published no later than April 22, 1999 at the Library of Congress) |
| 1015 | M. Luby, M. Mitzenmacher, A. Shokrollah, D. Spielman, “Analysis of Low Density Codes and Improved Designs Using Irregular Graphs.” <i>STOC ’98 Proceedings of the Thirtieth Annual ACM symposium on Theory of Computing</i> , pp. 249-258, 1998 (“Luby”) (published no later than July 30, 1998 at the University of Washington) |
| 1016 | U.S. Patent No. 6,081,909 by Michael Luby, <i>et. al.</i> entitled “Irregularly Graphed Encoding Technique.” (“the Luby ’909 Patent”) (filed November 6, 1997 and issued June 27, 2000) |
| 1017 | F. R. Kschischang and B. J. Frey, “Iterative decoding of compound codes by probability propagation in graphical models.” <i>IEEE Journal on Selected Areas in Communications</i> , 16, 219-230. 1998. (“Kschischang”) (published no later than February 23, 1998 at the Library of Congress) |
| 1018 | U.S. Patent No. 7,089,477 by Michael Divsalar, <i>et. al.</i> entitled “Interleaved Serial Concatenation Forming Turbo-Like Codes .” (“the ’477 Patent”) |
| 1019 | RA.c code (including RA.c, and supporting files) |
| 1020 | J.L. Hennessy and D.A. Patterson, <u>Computer organization and design: the hardware/software interface</u> . 1994. (“Hennessy”) (published no later than November 8, 1994 at the Library of Congress) |
| 1021 | Complaint, <i>California Institute of Technology v. Hughes Communications, Inc. et. al.</i> , No. 13-CV-07245 (CACD) |
| 1022 | Amended Complaint, <i>California Institute of Technology v. Hughes Communications, Inc. et. al.</i> , No. 13-CV-07245 (CACD) |

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.