

Min-Hsiu Hsieh

ARC Future Fellow and Associate Professor

EDUCATION

2003–2008	Doctor of Philosophy of Electrical Engineering	University of Southern California, USA
	Thesis Entanglement-assisted Coding Theory Supervisors Dr Todd Brun (Co-supervisor: Dr Igor Devetak) GPA 4.0/4.0 (in Major) Minor Mathematics	
1999–2001	Masters of Science of Electrical Engineering	National Taiwan University, Taiwan
	Supervisor Professor Kwang-Cheng Chen GPA 4.0/4.0	
1995–1999	Bachelor of Electrical Engineering	National Taiwan University, Taiwan

INTERESTS

Quantum information and computation, especially quantum coding theory; quantum Shannon theory; quantum entanglement; quantum machine learning; quantum cryptography; foundations of Physics.

EXPERIENCE

08/2014 – Now	Associate Professor	University of Technology Sydney
	School of Software Faculty of Engineering and Information Technology	
10/2013 – 08/2014	Senior Lecturer	University of Technology Sydney
	School of Software Faculty of Engineering and Information Technology	
03/2012 – 09/2013	Lecturer	University of Technology Sydney
	School of Software Faculty of Engineering and Information Technology	
03/2012 – 08/2014	Chancellor's Postdoctoral Research Fellow	University of Technology Sydney
	School of Software Faculty of Engineering and Information Technology	
03/2012 – Now	Core Member	University of Technology Sydney
	Centre for Quantum Computation and Intelligent Systems	
10/2010 – 02/2012	Postdoctoral Research Fellow	University of Cambridge, UK
	Department of Pure Mathematics and Mathematical Statistics	
11/2008 – 09/2010	Researcher	Japan Science and Technology Agency, JP
	Quantum Computation and Information Project (Affiliated with Dept. of Computer Science, the University of Tokyo)	

AWARDS

2014	Australian Research Council (ARC) Future Fellowship
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2013	UTS Vice-Chancellor's Awards for Research Excellence Early Career Research Excellence Highly Commended	
2012	UTS Chancellor's Postdoctoral Research Fellowship	
2009	Taiwanese National Science Council Postdoctoral Research Abroad Award	
2008	Academic Achievement Award	University of Southern California
	Best Student Paper Award with Honorable Mention	University of Southern California
2007	Best Student Paper Award	University of Southern California
2006	Best Teaching Assistant with Honorable Mention	University of Southern California

GRANTS

2017	US Army Research Office (CI, AUD \$190K) UTS/FEIT Blue Sky Research Grant (CI, AUD \$3K)
2015	UTS/FEIT Blue Sky Research Grant (CI, AUD \$7K) UTS/RIO DP supporting funding (CI, AUD \$20K) Taiwan-Australia Joint Research Collaboration Scheme (PI, NTD \$31K)
2014	ARC Future Fellowship (CI, AUD \$678K) NSF Career Award (Co-PI, USD \$200K)
2013	UTS Early Career Researcher Grant (CI, AUD \$25K)
2009	Taiwanese NSC Postdoctoral Research Abroad Grant (CI, NTD \$1.3M)

SERVICE

Editorial Board	Associate Editor of IEEE Transactions on Information Theory (12/2015-12/2018)
Program Committee	ITW 2017 (and invited session chair) CEQIP 2016 AQIS 2016 (Co-Chair) QIP 2015 AQIS 2015 AQIS 2014
Organizer	2016 Workshop to Celebrate Shannon's 100th Birthday, AU 2015 Sydney Quantum Information Processing Workshop, AU 2015 The 18th Conference on Quantum Information Processing (QIP15) 2014 Mini-Workshop on Quantum information processing, Taiwan 2011 Cambridge Summer Workshop, UK 2010 International Workshop on Quantum Information Science, Tokyo, Japan

Journal referee

Nature Physics, Nature Communications, Physical Review Letters, IEEE Transactions on Information Theory, IEEE Transactions on Communications, Physical Review A, Quantum Information and Computation, Journal of Mathematical Physics, and Quantum Information Processing, etc.

Conference referee

QIP, AQIS, ISIT, TQC

PUBLICATIONS

Total of 43 journal publications: Science (1x), Nature Communications (1x), Physical Review Letters (3x), IEEE Transactions on Information Theory (14x), Physical Review A (9x), Journal of Mathematical Physics (5x), New Journal of Physics (1x) and others¹.

Peer-reviewed journals

Round Complexity in the Local Transformations of Quantum and Classical States

Eric Chitambar, Min-Hsiu Hsieh

Nature Communications (accepted on 9 August 2017) (2017)

The learnability of unknown quantum measurements

Jihao Fan, Yonghui Li, Min-Hsiu Hsieh, Hanwu Chen

Quantum Information & Computation 17.13&14 (2017) pp. 1105–1122

Concavity of the Auxiliary Function for Classical-Quantum Channels

H. C. Cheng, M. H. Hsieh

IEEE Transactions on Information Theory 62.10 (Oct. 2016) pp. 5960–5965

Characterizations of matrix and operator-valued Φ -entropies, and operator Efron–Stein inequalities

Hao-Chung Cheng, Min-Hsiu Hsieh

Proceedings of the Royal Society of London A: Mathematical, Physical and Engineering Sciences 472.2187 (2016)

The learnability of unknown quantum measurements

Hao-Chung Cheng, Min-Hsiu Hsieh, Ping-Cheng Yeh

Quantum Information & Computation 16.7&8 (2016) pp. 615–656

Relating the Resource Theories of Entanglement and Quantum Coherence

Eric Chitambar, Min-Hsiu Hsieh

Phys. Rev. Lett. 117 (2 July 2016) p. 020402

The Private and Public Correlation Cost of Three Random Variables With Collaboration

Eric Chitambar, Min-Hsiu Hsieh, Andreas Winter

IEEE Transactions on Information Theory 62.4 (Apr. 2016) pp. 2034–2043

An upper bound on the second order asymptotic expansion for the quantum communication cost of state redistribution

Nilanjana Datta, Min-Hsiu Hsieh, Jonathan Oppenheim

Journal of Mathematical Physics 57.5, 052203 (2016)

Channel Simulation and Coded Source Compression

M. H. Hsieh, S. Watanabe

IEEE Transactions on Information Theory 62.11 (Nov. 2016) pp. 6609–6619

On the MacWilliams Identity for Classical and Quantum Convolutional Codes

C. Y. Lai, M. H. Hsieh, H. F. Lu

IEEE Transactions on Communications 64.8 (Aug. 2016) pp. 3148–3159

Compatibility of state assignments and pooling of information

Todd A. Brun, Min-Hsiu Hsieh, Christopher Perry

Phys. Rev. A 92 (1 July 2015) p. 012107

¹Due to the interdisciplinary nature of quantum information author ordering of my papers (especially prior to supervising my own students) is generally alphabetical, with a few exceptions when there were very strong discrepancies in author contributions.

Classical Analog to Entanglement Reversibility

Eric Chitambar, Ben Fortescue, Min-Hsiu Hsieh

Phys. Rev. Lett. 115 (9 Aug. 2015) p. 090501

Passive \mathcal{PT} -symmetric couplers without complex optical potentials

Yi-Chan Lee, Jibing Liu, You-Lin Chuang, Min-Hsiu Hsieh, Ray-Kuang Lee

Phys. Rev. A 92 (5 Nov. 2015) p. 053815

Catalytic Quantum Error Correction

Todd A. Brun, Igor Devetak, Min-Hsiu Hsieh

IEEE Transactions on Information Theory 60.6 (2014) pp. 3073–3089

When Do Local Operations and Classical Communication Suffice for Two-Qubit State Discrimination?

Eric Chitambar, Runyao Duan, Min-Hsiu Hsieh

IEEE Transactions on Information Theory 60.3 (2014) pp. 1549–1561

Asymptotic state discrimination and a strict hierarchy in distinguishability norms

Eric Chitambar, Min-Hsiu Hsieh

Journal of Mathematical Physics 55.11 (2014) p. 112204

Local \mathcal{PT} Symmetry Violates the No-Signaling Principle

Yi-Chan Lee, Min-Hsiu Hsieh, Steven T. Flammia, Ray-Kuang Lee

Phys. Rev. Lett. 112 (2014) p. 130404

Entanglement-Assisted Quantum Turbo Codes

Mark M. Wilde, Min-Hsiu Hsieh, Zunaira Babar

IEEE Transactions on Information Theory 60.2 (2014) pp. 1203–1222

Revisiting the optimal detection of quantum information

Eric Chitambar, Min-Hsiu Hsieh

Phys. Rev. A 88 (2013) p. 020302

One-Shot Entanglement-Assisted Quantum and Classical Communication

Nilanjana Datta, Min-Hsiu Hsieh

IEEE Transactions on Information Theory 59.3 (2013) pp. 1929–1939

Quantum Rate Distortion, Reverse Shannon Theorems, and Source-Channel Separation

Nilanjana Datta, Min-Hsiu Hsieh, Mark M. Wilde

IEEE Transactions on Information Theory 59.1 (2013) pp. 615–630

Quantum-to-classical rate distortion coding

Nilanjana Datta, Min-Hsiu Hsieh, Mark M. Wilde, Andreas Winter

Journal of Mathematical Physics 54.4 (2013) p. 042201

A Smooth Entropy Approach to Quantum Hypothesis Testing and the Classical Capacity of Quantum Channels

Nilanjana Datta, Milan Mosonyi, Min-Hsiu Hsieh, Fernando G.S.L. Brandao

IEEE Transactions on Information Theory 59.12 (2013) pp. 8014–8026

Quantum Rate-Distortion Coding With Auxiliary Resources

Mark M. Wilde, Nilanjana Datta, Min-Hsiu Hsieh, Andreas Winter

IEEE Transactions on Information Theory 59.10 (2013) pp. 6755–6773

The information-theoretic costs of simulating quantum measurements

Mark M. Wilde, Patrick Hayden, Francesco Buscemi, Min-Hsiu Hsieh

Journal of Physics A: Mathematical and Theoretical 45.45 (2012) p. 453001

Public and private resource trade-offs for a quantum channel

Mark M. Wilde, Min-Hsiu Hsieh

Quantum Information Processing 11.6 (2012) pp. 1465–1501

The quantum dynamic capacity formula of a quantum channel

Mark M. Wilde, Min-Hsiu Hsieh

Quantum Information Processing 11.6 (2012) pp. 1431–1463

New Class of Quantum Codes Constructed From Cyclic Difference Set

Sheng-Mei Zhao, Yu Xiao, Yan Zhu, Xiu-Li Zhu, Min-Hsiu Hsieh

International Journal of Quantum Information 10.01 (2012) p. 1250015

The apex of the family tree of protocols: optimal rates and resource inequalities

Nilanjana Datta, Min-Hsiu Hsieh

New Journal of Physics 13.9 (2011) p. 093042

NP-hardness of decoding quantum error-correction codes

Min-Hsiu Hsieh, François Le Gall

Phys. Rev. A 83 (2011) p. 052331

High Performance Entanglement-Assisted Quantum LDPC Codes Need Little Entanglement

Min-Hsiu Hsieh, Wen-Tai Yen, Li-Yi Hsu

IEEE Transactions on Information Theory 57.3 (2011) pp. 1761–1769

Undetermined states: how to find them and their applications

Min-Hsiu Hsieh, Wen-Tai Yen, Li-Yi Hsu

The European Physical Journal D 61.1 (2011) pp. 261–265

Universal coding for transmission of private information

Nilanjana Datta, Min-Hsiu Hsieh

Journal of Mathematical Physics 51.12 (2010) p. 122202

Entanglement-Assisted Communication of Classical and Quantum Information

Min-Hsiu Hsieh, Mark M. Wilde

IEEE Transactions on Information Theory 56.9 (2010) pp. 4682–4704

Trading Classical Communication, Quantum Communication, and Entanglement in Quantum Shannon Theory

Min-Hsiu Hsieh, Mark M. Wilde

IEEE Transactions on Information Theory 56.9 (2010) pp. 4705–4730

Multicasting homogeneous and heterogeneous quantum states in quantum networks

Yi-Chang Shih, Min-Hsiu Hsieh, Hung-Yu Wei

Nano Communication Networks 1.4 (2010) pp. 273–282

Entanglement-assisted quantum quasicyclic low-density parity-check codes

Min-Hsiu Hsieh, Todd Brun, Igor Devetak

Phys. Rev. A 79 (2009) p. 032340

Public and private communication with a quantum channel and a secret key

Min-Hsiu Hsieh, Mark Wilde

Phys. Rev. A 80 (2009) p. 022306

Entanglement-Assisted Capacity of Quantum Multiple-Access Channels

Min-Hsiu Hsieh, Igor Devetak, Andreas Winter

IEEE Transactions on Information Theory 54.7 (2008) pp. 3078–3090

Secret-key-assisted private classical communication capacity over quantum channels

Min-Hsiu Hsieh, Zhicheng Luo, Todd Brun

Phys. Rev. A 78 (2008) p. 042306

Classical enhancement of quantum-error-correcting codes

Isaac Kremsky, Min-Hsiu Hsieh, Todd Brun

Phys. Rev. A 78 (2008) p. 012341

General entanglement-assisted quantum error-correcting codes

Min-Hsiu Hsieh, Igor Devetak, Todd Brun

Phys. Rev. A 76 (2007) p. 062313

Correcting Quantum Errors with Entanglement

Todd Brun, Igor Devetak, Min-Hsiu Hsieh

Science 314.5798 (2006) pp. 436–439

Peer-reviewed conferences/proceedings (15)

A novel channel interference identification

Min-Hsiu Hsieh, Kwang-Cheng Chen

IEEE 55th Vehicular Technology Conference (VTC), 2002

General entanglement-assisted quantum error-correcting codes

Todd A. Brun, Igor Devetak, Min-Hsiu Hsieh

2007 IEEE International Symposium on Information Theory (ISIT), 2007, Nice, France

Entanglement-Assisted Quantum Error-Correcting Codes

Igor Devetak, ToddA. Brun, Min-Hsiu Hsieh

New Trends in Mathematical Physics, 2009

Entanglement generation with a quantum channel and a shared state

Mark M. Wilde, Min-Hsiu Hsieh

2010 IEEE International Symposium on Information Theory (ISIT), 2010, Austin, TX

Adaptively correcting quantum errors with entanglement

Yuichiro Fujiwara, Min-Hsiu Hsieh

2011 IEEE International Symposium on Information Theory (ISIT), 2011, St. Petersburg

Entanglement boosts quantum turbo codes

Mark M. Wilde, Min-Hsiu Hsieh

2011 IEEE International Symposium on Information Theory (ISIT), 2011, St. Petersburg

The MacWilliams identity for quantum convolutional codes

Ching-Yi Lai, Min-Hsiu Hsieh

2014 IEEE International Symposium on Information Theory (ISIT), 2014, Honolulu, HI

A complete MacWilliams theorem for convolutional codes

Ching-Yi Lai, Min-Hsiu Hsieh, Hsiao-feng Lu

2014 IEEE Information Theory Workshop (ITW), 2014, Hobart, Australia

Distributions Attaining Secret Key at a Rate of the Conditional Mutual Information

Eric Chitambar, Benjamin Fortescue, Min-Hsiu Hsieh

Advances in Cryptology – CRYPTO 2015, 2015

Fully Quantum Source Compression with a Quantum Helper

Min-Hsiu Hsieh, Shun Watanabe

2015 IEEE Information Theory Workshop (ITW), 2015, Jeju, Korea

Source Compression with a Quantum Helper

Min-Hsiu Hsieh, Shun Watanabe

2015 IEEE International Symposium on Information Theory (ISIT), 2015, Hong Kong

Moderate Deviations for Classical-Quantum Channels

Hao-Chung Cheng, Min-Hsiu Hsieh

2017 IEEE International Symposium on Information Theory (ISIT), 2017, Aachen, Germany

Moderate Deviations for Quantum Hypothesis Testing and a Martingale Inequality

Hao-Chung Cheng, Min-Hsiu Hsieh

2017 IEEE International Symposium on Information Theory (ISIT), 2017, Aachen, Germany

Sphere-Packing Bound for Symmetric Classical-Quantum Channels

Hao-Chung Cheng, Min-Hsiu Hsieh, Marco Tomamichel

2017 IEEE Information Theory Workshop (ITW), 2017, Kaohsiung, Taiwan

Sphere-Packing Bound for Symmetric Classical-Quantum Channels

Hao-Chung Cheng, Min-Hsiu Hsieh, Marco Tomamichel

2017 IEEE International Symposium on Information Theory (ISIT), 2017, Aachen, Germany