Yeow-Khiang Chia

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Objective

Obtain a PhD level research and development position in the areas of Statistics, Optimization, Machine Learning and application of Mathematics to real world problems.

Research Interests

Information Theory, Machine Learning and Signal Processing, Operations Research, Wireless Communications and Networking

Education

Stanford University
Ph.D. in Electrical Engineering, January 2012
Thesis topic: Multi-terminal Secrecy and Source Coding
GPA: 4.0/4.0
Advisers: Profs. Abbas El Gamal and Tsachy Weissman
Thesis Committee: Profs. Thomas Cover and Ada Poon

Stanford University
M.S. in Electrical Engineering, January 2012, GPA: 4.0/4.0

Imperial College, London
M.Eng. (First Class Honours) in Electrical Engineering June 2001
Thesis topic: Lyapunov methods for adaptive gain control

Professional Experience

Scientist, Data Analytics Department, Institute for Infocomm Research, Singapore
April 2014 - Current. Working on the following projects

- Financial and Audit Analytics for DBS Singapore. Project is part of DBS-I2R Joint laboratory.
- Financial Analytics and Algorithms for commodity trading. Project is a joint project with Wealth Sciences Pte Ltd and Straits Financial LLC.
- Signal processing algorithms for Book Sequencing from RFID time series readings. Joint project with National Library Board of Singapore.

Scientist, Advanced Communication Department, Institute for Infocomm Research, Singapore. Feb 2012 - April 2014.
Worked on the following projects: i) Energy resource optimization in cellular networks with renewable energy resources; ii) Fundamental Information Theoretic limits of network communication systems.

Research Assistant, El Gamal Group,
September 2006 - December 2011. PhD thesis research on Network Information Theory

Visiting Research student, Prof. Zhang Lin's group, Tsinghua University, China
March 2010 - May 2010. Worked on Throughout and Delay scaling in wireless mobile networks

Summer Intern, Ji Research Group,
June 2007- September 2007. Worked with Profs. Hanlee Ji and Tsachy Weissman on signal processing for shotgun DNA sequencing

Research Attachment at Institute for Infocomm Research, Singapore
August 2005 - August 2006. Worked with on signal processing for localization

Strategic Planning Executive, Ministry of Home Affairs, Singapore
April 2003 - July 2005. Responsible for Manpower, Budget and planning policies.

Summer intern at Center for Imaging, Remote Sensing and Processing (CRISP)
July 2000 - September 2000. Worked on image processing algorithms for satellite images

Awards and Honors

Stanford Graduate Fellowship, 2009 - 2011

Singapore Agency for Science, Technology and Research (A*STAR) National Science Scholarship, 2006-2011

IEE prize for distinction (top performing student) in the four years degree course at Department of Electrical and Electronics Engineering, Imperial College. June 2001

Singapore Public Service Commission scholarship for undergraduate studies at Imperial College, 1997-2001

Skills

Masters and PhD level courses taken at Stanford University: **Information Theory, Probability Theory and Stochastic Systems**; **Machine Learning and Signal Processing**; **Mathematical Optimization and Discrete Algorithms**; **Control Theory, Game Theory and Economics**. A full list of courses taken is given in Appendix A.

I have also taken and completed (with statements of accomplishment) the following two online courses: **Machine Learning (Coursera), May 2014** and **Introduction to Statistical Learning with R (Stanford Online), April 2014**.

Programming skills and experience: Proficient in **Python**, **R**, **Matlab**, **C++**

Teaching Experience

Teaching Assistant, EE278A: Introduction to Statistical Signal Processing
Taught by Prof. Tsachy Weissman, Fall 2012.

Teaching Assistant for short course in Network Information Theory taught at Tsinghua University, China
Taught by Prof. Abbas El Gamal, March 2010-April 2010.

Publications

A full list of publications is given in Appendix B, or the following website:
`http://ykchia.github.io/publications.html`

Professional Activities

Reviewer for the following journals and conferences

- IEEE Transactions on Information Theory 2009 - Current
- IEEE Symposium on Information Theory 2009- Current
- Other IEEE Transactions: Communications, Wireless Communications, Information Security and Forensics

Member, IEEE and IEEE Information Theory Society

References

Available on request

Appendix A: Coursework

A short description of the course content is given for courses with somewhat vague titles. Only Masters and PhD level courses taken at Stanford University are included in this list.

Information Theory and Communications

- EE376A: Information Theory Part A
- EE376B Information Theory Part B
- EE478: Network Information Theory
- EE477: Universal Schemes in Information Theory (audit): Schemes for compression, prediction and denoising of sources with unknown distributions. Rate distortion theory for ergodic sources.
- EE387: Algebraic Error Control Codes
- EE388: Modern Coding Theory - Codes on graphs such as LDPC codes
- EE379A: Digital Communications

Mathematics: Probability, Stochastic Systems and Analysis

- Math 171: Fundamental concepts of Real Analysis
- Stats 310A: Theory of Probability Part A - Measure Theoretic treatment of probability
- Stats 310B: Theory of Probability Part B - Conditional Expectations, Discrete time Martingale and Renewal processes
- Stats 217: Introduction to Stochastic Processes - Part A of two part course on Markov Chains
- Stats 218: Introduction to Stochastic Processes - Part B of two part course on Markov Chains
- MS&E 321: Stochastic Systems - Markov Chains with general state space (Harris recurrence), Brownian Motion and Renewal Theory

Machine Learning and Signal Processing

- Stats 315A: Modern Applied Statistics: Elements of Statistical Learning.
- CS 228: Probabilistic Graphical Models.
- EE378A: Statistical Signal Processing - Spectral factorization, Wiener and Kalman Filters, Particle filters and denoising
- EE378B: Statistical Signal Processing (audit) Modern techniques for signal processing on graphs and matrices. Clustering, graph localization, fast methods for numerical linear algebra and collaborative filtering
- EE261: The Fourier Transform and its Applications
- EE278: Introduction to Statistical Signal Processing

Optimization and Discrete Algorithms

- EE364A: Convex Optimization
- MS&E 315: Discrete Mathematics and Algorithms
- MS&E 309: Randomized Algorithms

Dynamical Systems and Game Theory

- EE263: Introduction to Linear Dynamical Systems
- EE363: Linear Dynamical Systems - State space control methods and stability analysis using Lyapunov methods, Linear matrix inequalities and the S-procedure
- MS&E 246: Game Theory with Engineering Applications
- MS&E 336: Topics in Game Theory with Engineering Applications

Appendix B: Publications

Journal

1. Y.K. Chia, S.M. Sun and R. Zhang "Energy Cooperation in Cellular Networks with Renewable Powered Base Stations", *Accepted for publication in IEEE Transactions on Wireless Communications.*
2. X. Kang, Y. K. Chia, C. K. Ho and S.M. Sun "Cost minimization for fading channels with energy harvesting and conventional energy", *Accepted for publication in IEEE Transactions on Wireless Communications.*
3. J.G. Joung, Y.K. Chia and S.M. Sun, "Energy-Efficient, Large-scale Distributed-Antenna System (L-DAS) for Multiple Users", *Accepted for publication in IEEE Journal of Selected Areas in Signal Processing.*
4. L. Zhao, Y.K. Chia and T. Weissman, "Compression with Actions", *IEEE Transactions on Information Theory.* Feb 2014.
5. Y.K. Chia, R. Soundararajan and T. Weissman , "Estimation with a helper who knows the interference," *IEEE Transactions on Information Theory,.* Nov 2013.
6. Y.K. Chia, H. Asnani and T. Weissman, "Multiterminal Source Coding with Action Dependent Side Information", *IEEE Transactions on Information Theory,* June 2013.
7. Y.K. Chia and A. El Gamal, "Wiretap Channel With Causal State Information," *IEEE Transactions on Information Theory* vol.58, no.5, pp.2838-2849, May 2012
8. Y.K. Chia and A. El Gamal , "Three-Receiver Broadcast Channels With Common and Confidential Messages," *IEEE Transactions on Information Theory*, vol.58, no.5, pp.2748-2765, May 2012
9. Y.K. Chia, H. Permuter and T. Weissman, "Cascade, Triangular and Two Way Source Coding with degraded side information at the second user", *IEEE Transactions on Information Theory*, vol.58, no.1, pp.189-206, Jan. 2012.

Preprints

1. H. Kim, Y. K. Chia and A. El Gamal "A Note on Broadcast Channels with Stale State Information at the Transmitter", *In review for possible publication in IEEE Transactions on Information Theory.* Available on ArXiv.
2. X. Kang, Y. K. Chia, S.M. Sun and H.F. Chong, "Mobile Data Offloading through A Third-Party WiFi Access Point: An Operator's Perspective", *In review for possible publication in IEEE Transactions on Wireless Communications.*
3. K. Kittipong, Y.K. Chia, M. Skoglund, T. Oechtering and T. Weissman, "Secure Source Coding with a Public Helper", *In review for possible publication in IEEE Transactions on Information Theory.* Available on ArXiv.
4. Y.K. Chia and K. Kittipong, "On secure source coding with side information at the encoder", *In review for possible publication in IEEE Transactions on Information Theory.* Available on ArXiv.

Conferences

1. Y. K. Chia, C. K. Ho and S. Sun, "Data Offloading with Renewable Energy Powered Base Station Connected to a Microgrid", *To appear, IEEE Globecom 2014*
2. X. Kang, H. F. Chong, Y. K. Chia and S. Sun, "Sum-Rate Maximization for Spectrum-Sharing Cognitive Multiple Access Channels without Successive Interference Cancellation", *To appear, IEEE Globecom 2014*
3. Y. K. Chia, "On Multiterminal Source Coding with list decoding constraint", *To appear, IEEE International Symposium for Information Theory 2014.*
4. Y. K. Chia and H. F. Chong, "On lossy source coding with side information under the erasure distortion measure", *To appear, IEEE International Symposium for Information Theory 2014.*
5. X. Kang, Y. K. Chia, C. K. Ho and S.M. Sun, "Cost minimization for fading channels with energy harvesting and conventional energy", *IEEE Conference on Communications.*

6. X. Kang, Y. K. Chia and S. M. Sun, "Mobile Data Offloading through A Third-Party WiFi Access Point: An Operator's Perspective", *IEEE Global Communications Symposium Heterogeneous Networks Workshop 2013*
7. J.G. Joung, Y.K. Chia and S.M. Sun, "Energy Efficient Multiuser MIMO Systems with Distributed Transmitters", *IEEE Global Communications Symposium 2013*
8. L.H. Dong, S.M. Sun, X. Zhu and Y. K. Chia, "Power Efficient 60 GHz Wireless Communication Networks with Relays", *Personal, Indoor, Mobile and Radio Communications 2013*
9. K. Kittipong, Y.K. Chia, M. Skoglund, T. Oechtering and T. Weissman, "Secure Source Coding with a Public Helper", *International Symposium on Information Theory 2013*
10. Y.K. Chia and K. Kittipong, "On secure source coding with side information at the encoder", *International Symposium on Information Theory 2013*
11. Y.K. Chia, S.M. Sun and R. Zhang "Energy Cooperation in Cellular Networks with Renewable Powered Base Stations", *IEEE Wireless Communications and Networking Conference 2013*
12. Y.K. Chia, R. Soundararajan and T. Weissman , "Estimation with a helper who knows the interference," *International Symposium on Information Theory* 1-6 July 2012 pp.706-710
13. L. Zhao and Y.K. Chia, "The efficiency of common randomness generation", *49th Annual Allerton Conference on Communication, Control, and Computing* 28-30 Sept. 2011 pp. 944 - 950
14. L. Zhao, Y.K. Chia and T. Weissman, "Compression with Actions", *49th Annual Allerton Conference on Communication, Control, and Computing* 28-30 Sept. 2011 pp. 164 - 171
15. Y.K. Chia, H. Asnani and T. Weissman, "Multiterminal Source Coding with Action Dependent Side Information", *International Symposium on Information Theory*, July 31 2011-Aug. 5 2011 pp. 2035 - 2039
16. Y.K. Chia and T. Weissman, "Cascade and Triangular source coding with causal side information", *International Symposium on Information Theory*, July 31 2011-Aug. 5 2011 pp. 1683 - 1687
17. Y.K. Chia, H. Permuter and T. Weissman , "Cascade, Triangular and two way source coding with degraded side information at the second user," *48th Annual Allerton Conference on Communication, Control, and Computing* pp.760-767, Sept. 29 -Oct. 1 2010
18. Y.K. Chia and A. El Gamal, "Wiretap Channel With Causal State Information," *International Symposium on Information Theory* pp. 2548 - 2552, 13-18 June 2010
19. Y.K. Chia and A. El Gamal, "3-Receiver broadcast channels with common and confidential messages," *International Symposium on Information Theory* pp.1849-1853, June 28 2009-July 3 2009