PETER KAIROUZ

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CURRENT POSITION

Stanford University Stanford, CA
Postdoctoral Research Fellow Sep. 2016 - Present
Hosts: Ayfer Ozgur and Ram Rajagopal

EDUCATION

University of Illinois at Urbana-Champaign Champaign, IL
Ph.D. in Electrical and Computer Engineering May 2016
Advisors: Pramod Viswanath and Sewoong Oh
Dissertation Title: The Fundamental Limits of Statistical Data Privacy

University of Illinois at Urbana-Champaign Champaign, IL
Master of Science in Applied Mathematics: Optimization and Algorithms May 2016

University of Illinois at Urbana-Champaign Champaign, IL
Masters of Science in Electrical and Computer Engineering Dec. 2012

American University of Beirut Lebanon
Bachelor of Engineering in Electrical and Computer Engineering Jun. 2010

RESEARCH EXPERIENCE

Information Systems Laboratory, Stanford University Stanford, CA
On-device Intelligence and Context-Aware Privacy Sep. 2016 – Present

Coordinated Science Laboratory, University of Illinois Champaign, IL
Privacy-Preserving Learning and Anonymous Communication Jan. 2013 – Aug. 2016

Google Research, Google Seattle, WA
Privacy Preserving Machine Learning Algorithms May 2015 – Sep. 2015

Qualcomm Research, Qualcomm San Diego, CA
Interference-Aware Rate Control for Small Cells May 2013 – Sep. 2013

Coordinated Science Laboratory, University of Illinois Champaign, IL
Multi-Input Multi-Output Communications over Optical Networks Aug. 2010 – Dec. 2012

Qualcomm Research, Qualcomm San Diego, CA
Variable Block Length Coding for LTE Systems May 2012 – Sep. 2012

Center for Automation Research, University of Maryland College Park, MD
Face Recognition Algorithms for Large Datasets Jun. 2009 – Sep. 2009

HONORS AND AWARDS

International Machine Learning Society
International Conference on Machine Learning 2016 Travel Grant (Jun. 2016)

University of Illinois at Urbana-Champaign
Harold L. Olesen Award for Excellence in Undergraduate Teaching (Jan. 2016)

Association for Computing Machinery
Best Paper Award at ACM SIGMETRICS 2015 (Jun. 2015)
SIGMETRICS 2015 Travel Grant (Jun. 2015)

Qualcomm Incorporated
Qualcomm Innovation Fellowship Finalist Award (Dec. 2014)
The 2012 Roberto Padovani Scholarship (Dec. 2012)

American University of Beirut
Distinguished ECE Graduate Award (Jun. 2010)
Graduated with High Honors (May 2010)
Dean's Honor List for outstanding academic performance (Aug. 2006 – May 2010)
Benjamin Franklin Scholarship from the US Agency for International Development (Aug. 2006)

PUBLICATIONS

Journal Papers:

1. Chong Huang*, Peter Kairouz*, Xiao Chen, Lalitha Sankar, and Ram Rajagopal. Context-aware generative adversarial privacy. *To appear in Entropy*, 2017. [arXiv:1710.09549]

2. Peter Kairouz, Sewoong Oh, and Pramod Viswanath. The composition theorem for differential privacy. *IEEE Transactions on Information Theory*, 2017

3. Giulia Fanti*, Peter Kairouz*, Sewoong Oh, Kannan Ramchandran, and Pramod Viswanath. Hiding the rumor source. *IEEE Transactions on Information Theory*, 2017

4. Peter Kairouz, Sewoong Oh, and Pramod Viswanath. Extremal mechanisms for local differential privacy. *Journal of Machine Learning Research (JMLR)*, 2016

5. Giulia Fanti*, Peter Kairouz*, Sewoong Oh, Kannan Ramchandran, and Pramod Viswanath. Metadata-conscious anonymous messaging. *IEEE Transactions on Signal and Information Processing over Networks*, 2016

6. Quan Geng, Peter Kairouz, Sewoong Oh, and Pramod Viswanath. The staircase mechanism in differential privacy. *IEEE Journal of Selected Topics in Signal Processing*, 2015

Conference Papers:

1. Inan Huseyin, Peter Kairouz, and Ayfer Ozgur. Sparse group testing codes for low-energy massive random access. *Allerton Conference on Communications, Control, and Computing*, 2017

2. Kabir Chandrasekher, Kangwook Lee, Peter Kairouz, Ramtin Pedarsani, and Kannan Ramchandran. Asynchronous and noncoherent neighbor discovery for the IoT using sparse-graph codes. *IEEE International Conference on Communications (ICC)*, 2017

3. Peter Kairouz, Sewoong Oh, and Pramod Viswanath. Differentially private multi-party computation. *Private Multi-Party Machine Learning, (NIPS)*, 2016

4. Peter Kairouz, Keith Bonawitz, and Daniel Ramage. Discrete distribution estimation under local privacy. *International Conference on Machine Learning (ICML)*, 2016

5. Giulia Fanti*, Peter Kairouz*, Sewoong Oh, Kannan Ramchandran, and Pramod Viswanath. Metadata-conscious anonymous messaging. *International Conference on Machine Learning (ICML)*, 2016

6. Giulia Fanti*, Peter Kairouz*, Sewoong Oh, Kannan Ramchandran, and Pramod Viswanath. Rumor source obfuscation on irregular trees. *ACM SIGMETRICS Performance Evaluation Review*, 2016

7. Peter Kairouz, Sewoong Oh, and Pramod Viswanath. Differentially private multi-party computation. *Conference on Information Sciences and Systems (CISS)*, 2016

8. Peter Kairouz, Sewoong Oh, and Pramod Viswanath. Secure multi-party differential privacy. *Advances in Neural Information Processing Systems (NIPS)*, 2015

9. Giulia Fanti*, Peter Kairouz*, Sewoong Oh, and Pramod Viswanath. Spy vs. spy: Rumor source obfuscation. *ACM SIGMETRICS Performance Evaluation Review*, 2015. [**Best Paper Award**]

10. Peter Kairouz, Sewoong Oh, and Pramod Viswanath. The composition theorem for differential privacy. *International Conference on Machine Learning (ICML)*, 2015

11. Peter Kairouz, Sewoong Oh, and Pramod Viswanath. Extremal mechanisms for local differential privacy. *Advances in Neural Information Processing Systems (NIPS)*, 2014

12. Peter. Kairouz, Ahmed Sadek, and Tamer Kadous. Interference aware rate control for bursty interference channels. *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, 2013

13. Peter Kairouz, Aolin Xu, Naresh Shanbhag, and Andrew Singer. A sphere decoding approach for the vector viterbi algorithm. *Asilomar Conference on Signals, Systems and Computers*, 2012

14. Andrew Bean, Peter Kairouz, and Andrew Singer. Convergence rates for cooperation in heterogeneous populations. *Asilomar Conference on Signals, Systems and Computers*, 2012

Manuscripts:

1. Huseyin A. Inan, Peter Kairouz, and Ayfer Ozgur. Sparse combinatorial group testing for low-energy massive random access. *Submitted to IEEE Transactions on Information Theory.* [arXiv:1711.05403]

PATENTS

1. Peter Kairouz, Ahmed Kamel Sadek, Kambiz Azarian Yazdi, and Nachiappan Valliappan. Interference management in a bursty-interference environment, February 4 2016. US Patent 20,160,037,363

2. Peter Kairouz, Ahmed Kamel Sadek, Kambiz Azarian Yazdi, and Nachiappan Valliappan. Bursty-interference-aware interference management, February 4 2016. US Patent 20,160,037,364

3. Peter Kairouz, Ahmed Kamel Sadek, and Tamer Adel Kadous. Variable block length and superposition coding for hybrid automatic repeat request, September 12 2013. US Patent App. 14/025,713

SELECTED TALKS

1. *Embracing Uncertainty*, Stanford SystemX IoE Workshop (May 2017)

2. *Scaling Wireless Networks to the Next Trillion Devices*, Stanford SystemX IoE Workshop (Nov. 2016)

3. *The Fundamental Limits of Statistical Data Privacy*, University of Southern California (Apr. 2016)

4. *Metadata-Conscious Anonymous Messaging*, ICML 2016 (Jun. 2016)

5. *Discrete Distribution Estimation Under Local Privacy*, ICML 2016 (Jun. 2016)

6. *The Fundamental Limits of Differential Privacy*, Information Theory & Applications Workshop (Feb. 2016)

7. *The Composition Theorem for Differential Privacy*, ICML 2015 (Jun. 2015)

8. *Spy vs. Spy: Rumor Source Obfuscation*, SIGMETRICS 2015 (Jun. 2015)

9. *Extremal Mechanisms for Local Differential Privacy*, Google (Jun. 2015)

10. *Spy vs. Spy: Rumor Source Obfuscation*, Qualcomm (Mar. 2015)

CONTRIBUTIONS TO PROPOSALS

1. *Generative Adversarial Privacy: A Data-driven Approach to Guaranteeing Privacy and Utility*, NSF CCF, Program Solicitation Number: NSF 17-571, PI: Lalitha Sankar (under review)
2. *Massive Wireless Random Access: Principles and Protocols*, NSF CNS, Program Solicitation Number: NSF 17-570, PI: Ayfer Ozgur (under review)
3. *HeimdalNet: a Radio Frequency Machine Learning System*, DARPA RFMLS program, BAA HR001117S0043, PI: Rockwell Collins (under review)
4. *Statistical Data Privacy: Fundamental Limits and Efficient Algorithms*, NSF CCF, Award Number: 1422278, PI: Pramod Viswanath ($500,000)

TEACHING EXPERIENCE

Courses Co-developed
ECE Department, University of Illinois

- Making Sense of Big Data (Spring, Fall 2014 & Spring 2016)
- Digital Signal Processing Lab (Summer 2011)

Courses Taught
ECE Department, University of Illinois

- Probabilities with Engineering Applications (Fall 2015)
- Digital Signal Processing (Summer 2011)

Teaching Assistant
ECE Department, American University of Beirut

- Computer Networks (Spring 2010)
- Communication Systems (Fall 2009)
- Introduction to Programming (Spring 2008)

SUPERVISORY EXPERIENCE

Mr. Huseyin Inan Jan. 2017 – Present
PhD student at Stanford University
Project: Energy-Efficient Protocols for Massive Wireless Random Access

Mr. Chong Huang Jan. 2017 – Present
PhD student at Arizona State University
Project: Generative Adversarial Privacy

Mr. Xiao (Mark) Chen Dec. 2016 – Present
PhD student at Stanford University
Project: Privacy-Preserving Algorithms for Smart Meter Data

Miss Hawraa Salami Jun. 2012 – Sep. 2012
PhD student at University of California, Los Angeles
Project: Low Complexity Algorithms for MIMO Communication Systems

Mr. Rohan Bali Sep. 2011 – Dec. 2011
Research Engineer at Oculus Research
Project: Detection Algorithms for Multi-Mode Optical Fiber Communication

Mr. Zhiyuan Zheng Sep. 2011 – Dec. 2011
Software Engineer at Yahoo!
Project: Detection Algorithms for Multi-Mode Optical Fiber Communication

PROFESSIONAL SERVICES

Conferences Organized

- General Chair for the 10th Annual CSL Student Conference (Spring 2015)
- Media Chair for the 6th Annual CSL Student Conference (Spring 2011)

Reviewer

- Symposium on Theory of Computing (STOC)
- Neural Information Processing Systems (NIPS)
- Journal of Machine Learning Research (JMLR)
- Theory of Computing (ToC)
- ACM Transactions on Economics and Computation (TEAC)
- IEEE Information Theory Workshop (ITW)
- IEEE Transactions on Information Theory (TIT)
- IEEE Transactions on Knowledge and Data Engineering (TKDE)
- IEEE International Symposium on Information Theory (ISIT)

Memberships

- IEEE Member
- IEEE Information Society Santa Clara Valley Chapter, Treasure

REFERENCES

Pramod Viswanath
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