

Tingjun Chen

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EDUCATION

Columbia University

Ph.D. Candidate in Electrical Engineering, Cumulative GPA: 4.12/4.00

Advisor: Prof. Gil Zussman

M.S. in Electrical Engineering (received Oct. 2015), Final GPA: 4.13/4.00

Edwin Howard Armstrong Memorial Award

New York, NY
Sept. 2014 - Present

Tsinghua University

B.Eng. in Electronic Engineering

Advisors: Prof. Zhisheng Niu and Prof. Sheng Zhou

Thesis: Power Control Policies for a Wireless Link with Energy Harvesting Transmitter and Receiver

Tsinghua University Outstanding Undergraduate Thesis Award

Beijing, China
Sept. 2010 - July 2014

RESEARCH INTERESTS

Internet-of-Things, energy harvesting networks, full-duplex networks, and 5G networks: Algorithms, optimization, MAC layer and system design.

HONORS AND AWARDS

- Qualcomm Innovation Fellowship Finalist, 2017
- ACM CoNEXT Best Paper Award, 2016
- Honorable Mention Award, demo at the NYC Media Lab's Annual Summit, 2016
Selected from about 140 presented demos
- Edwin Howard Armstrong Memorial Award, Columbia University Electrical Engineering, 2015
Awarded to one outstanding M.S. candidate, the highest recognition awarded by the department to an M.S. student
- Wei Family Private Foundation Fellowship, 2014 - 2017
Three-year fellowship granted to students of Chinese heritage. Only three fellowships were awarded in 2014 - 2017
- Tsinghua University Outstanding Undergraduate Thesis Award, 2014
- Tsinghua Scholarship for Academic Advancement, 2013
- Tsinghua Scholarship for Literature and Art Excellence, 2012

PUBLICATIONS

Conference Proceedings

- **T. Chen**, J. Ghaderi, D. Rubenstein, and G. Zussman, "Performance Evaluation of Energy-Constrained Broadcast (Econ-Cast) in Wireless Networks," in *Proc. IEEE WCNC'17 Workshop on Energy Harvesting and Remotely Powered Wireless Communications for the IoT*, Mar. 2017. **Invited Paper**
- **T. Chen**, J. Ghaderi, D. Rubenstein, and G. Zussman, "Maximizing Broadcast Throughput Under Ultra-Low-Power Constraints," in *Proc. ACM CoNEXT'16*, Dec. 2016. (acceptance rate: 17.6%) **Best Paper Award**
- H. Krishnaswamy, G. Zussman, J. Zhou, J. Marasevic, T. Dinc, N. Reiskarimian, and **T. Chen**, "Full-Duplex in a Hand-held Device - From Fundamental Physics to Complex Integrated Circuits, Systems and Networks: An Overview of the Columbia FlexICoN project," in *Asilomar Conference on Signals, Systems, and Computers*, Nov. 2016. **Invited Paper**

- J. Marasevic, **T. Chen**, J. Zhou, N. Reiskarimian, H. Krishnaswamy, and G. Zussman, "Full-Duplex Wireless: Algorithms and Rate Improvement Bounds for Integrated Circuit Implementations," in *Proc. ACM HotWireless'16*, Oct. 2016. **Invited Paper**
- R. Margolies, G. Grebla, **T. Chen**, D. Rubenstein, and G. Zussman, "Panda: Neighbor Discovery on a Power Harvesting Budget," in *Proc. IEEE INFOCOM'16*, Apr. 2016. (acceptance rate: 18.3%)
- **T. Chen**, S. Zhou, W. Chen, and Z. Niu, "Power Control Policies for a Wireless Link with Energy Harvesting Transmitter and Receiver," in *Proc. IEEE WiOpt'14*, May 2014. (acceptance rate: 28.7%)

Journal Publications

- **T. Chen**, J. Ghaderi, D. Rubenstein, and G. Zussman, "Maximizing Broadcast Throughput Under Ultra-Low-Power Constraints," *submitted*, 2017.
- J. Zhou, N. Reiskarimian, J. Marasevic, T. Dinc, **T. Chen**, G. Zussman, and H. Krishnaswamy, "Integrated Full Duplex Radios," *IEEE Communications Magazine*, vol. 55, no. 4, pp. 142-151, Apr. 2017. **Invited Paper**
- R. Margolies, G. Grebla, **T. Chen**, D. Rubenstein, and G. Zussman, "Panda: Neighbor Discovery on a Power Harvesting Budget," *IEEE Journal on Selected Areas in Communications, Series on Green Communications and Networking*, vol. 34, no. 12, pp. 3606-3619, Dec. 2016.
- S. Zhou, **T. Chen**, W. Chen, and Z. Niu, "Outage Minimization for a Fading Wireless Link with Energy Harvesting Transmitter and Receiver," *IEEE Journal on Selected Areas in Communications, Special Issue on Wireless Communications Powered by Energy Harvesting and Wireless Energy Transfer*, vol. 33, no. 3, pp. 496-511, Mar. 2015.

Demonstrations

- **T. Chen**, J. Zhou, M. Baraani Dastjerdi, J. Diakonikolas, H. Krishnaswamy, and G. Zussman, "Demo Abstract: Full-Duplex with a Compact Frequency Domain Equalization-based RF Canceller," in *Proc. IEEE INFOCOM'17*, Atlanta, GA, May 2017.
- **T. Chen**, J. Zhou, M. Baraani Dastjerdi, N. Reiskarimian, J. Diakonikolas, S. Alfano, H. Krishnaswamy, and G. Zussman, "Full-Duplex Wireless: A Two-Way Road to 5G," presented at *Columbia Data Science Day*, Columbia University, New York, Apr. 2017.
- **T. Chen**, G. Chen, S. Jain, R. Margolies, G. Grebla, D. Rubenstein, and G. Zussman, "Demo Abstract: Power-Aware Neighbor Discovery for Energy Harvesting Things," in *Proc. ACM SenSys'16*, Stanford, CA, Nov. 2016.
- **T. Chen**, J. Zhou, S. Holloway, J. Marasevic, H. Krishnaswamy, and G. Zussman, "Double-Talk: Full-Duplex Wireless for Next-Generation Communications," presented at *NYC Media Lab's Annual Summit*, Columbia University, New York, Sept. 2016. **Honorable Mention Award**
- **T. Chen**, J. Zhou, N. Grimwood, R. Fogel, J. Marasevic, H. Krishnaswamy, and G. Zussman, "Demo: Full-Duplex Wireless based on a Small-Form-Factor Analog Self-Interference Canceller," in *Proc. ACM MobiHoc'16*, Paderborn, Germany, July 2016.
- **T. Chen**, R. Fogel, N. Grimwood, J. Marasevic, J. Zhou, H. Krishnaswamy, and G. Zussman, "A Self-Interference-Cancelling Full-Duplex Enabling Next-Generation Wireless Communications," presented at *Columbia Data Science Day*, Columbia University, New York, Apr. 2016.

Technical Reports

- **T. Chen**, J. Ghaderi, D. Rubenstein, and G. Zussman, "Maximizing Broadcast Throughput Under Ultra-Low-Power Constraints," *arXiv preprint*: 1610.04203v2 [cs.NI], Apr. 2017.
- R. Margolies, G. Grebla, **T. Chen**, D. Rubenstein, and G. Zussman, "Panda: Neighbor Discovery on a Power Harvesting Budget," *arXiv preprint*: 1601.06474 [cs.NI], Jan. 2016.
- S. Zhou, **T. Chen**, W. Chen, and Z. Niu, "Outage Minimization for a Fading Wireless Link with Energy Harvesting Transmitter and Receiver," *arXiv preprint*: 1503.04255 [cs.IT], Mar. 2015.

Patents

- D. Rubenstein, G. Zussman, J. Ghaderi, R. Margolies, **T. Chen**, G. Grebla, "Systems and Methods for Throughput Enhancement Among Ultra-Low power Wireless Network Devices," *U.S. Patent Application* No.15/211,740, filed July 2016.
- D. Rubenstein, G. Zussman, J. Ghaderi, **T. Chen**, "Systems and Methods for Asynchronous Discovery and Throughput Maximization Among Ultra-Low Power Wireless Networked Devices," *U.S. Provisional Patent* No.62/288,330, filed Jan. 2016.
- D. Rubenstein, G. Zussman, R. Margolies, **T. Chen**, G. Grebla, "Systems and Methods for Asynchronous Discovery Among Ultra-Low Power Wireless Devices," *U.S. Provisional Patent* No.62/217,624, filed Sept. 2015.
- D. Rubenstein, G. Zussman, R. Margolies, **T. Chen**, G. Grebla, "Systems and Methods for Asynchronous Discovery Among Ultra-Low Power Wireless Devices," *U.S. Provisional Patent* No.62/193,501, filed July 2015.

ACADEMIC EXPERIENCE

Research Assistant, Columbia University, New York, NY Sept. 2014 - Present
Wireless & Mobile Networking (WiMNet) Lab

- Develop and analyze centralized and distributed algorithms for neighbor discovery and broadcast throughput maximization in ultra-low-power networks, in which devices are powered by energy harvesting. Applications include object tracking, manufacturing, and Internet of Things (IoT). Implement and evaluate algorithms using a testbed composed of solar energy harvesting transceivers. Papers and demonstration were published at *ACM CoNEXT'16 (Best Paper Award)*, *IEEE Journal on Selected Areas in Communications*, *IEEE INFOCOM'16*, and *ACM SenSys'16 (demo)*. Three U.S. provisional patents and one U.S. patent were filed. This work is within the Energy Harvesting Active Networked Tags (**EnHANTs**) project and in collaboration with Prof. Dan Rubenstein and Prof. Javad Ghaderi.
- Develop algorithms for full-duplex networks based on Radio Frequency Integrated Circuit (RFIC) implementation. Design an experimental testbed composed of USRP software defined radios for full-duplex networks that allows evaluating the algorithms. Lead a team of M.S. and undergrad students to fabricate a custom-designed full-duplex testbed. Papers and demonstration accepted to *IEEE Communications Magazine*, *ACM HotWireless'16 (invited)*, *Asilomar'16 (invited)*, *ACM MobiHoc'16 (demo)*, and *IEEE INFOCOM'17 (demo)*. This work is within the Full-Duplex Wireless: From Integrated Circuits to Networks (**FlexICoN**) project and in collaboration with Prof. Harish Krishnaswamy's group.

Research Assistant, Tsinghua University, Beijing, China Mar. 2013 - July 2014
Network Integration for Ubiquitous Linkage and Broadband (NiuLab)
Tsinghua National Laboratory for Information Science and Technology (TNList)

- Designed and analyzed optimal power control policies which minimize the outage probability for a wireless communication link with energy harvesting transmitter and receiver. Papers were published at *IEEE WiOpt'14* and *IEEE Journal on Selected Areas in Communications*.
- Developed a testbed which demonstrates signal splitting schemes in a hyper-cellular network for both GSM and GPRS protocols using USRP2 on OpenBTS platform.

Research Internship, Columbia University, New York, NY Summer 2013
Wireless & Mobile Networking (WiMNet) Lab

- Developed MSP430 microcontroller-based prototype for the Energy Harvesting Active Networked Tags (EnHANTs) project. Implemented serial data forwarding method and data transmission method on an ARM architecture-based Raspberry Pi gateway.

PROFESSIONAL ACTIVITIES

Technical Program Committee (TPC): ACM MobiCom 2016 S³ Workshop

Student Member: ACM SIGMOBILE and IEEE

Conference Presentations: IEEE WCNC 2017 Workshop, ACM CoNEXT 2016, IEEE WiOpt 2014

Conference Demonstrations: IEEE INFOCOM 2017, ACM SenSys 2016, ACM MobiHoc 2016

Journal and Magazine Reviews: IEEE Communications Magazine 2017, IEEE Communications Letters 2017, IEEE Microwave Magazine 2017, ACM Transactions on Embedded Computing Systems (TECS) 2016, ACM Transactions on Sensor Networks (TOSN) 2015

Conference Review: ACM MobiCom 2016, ACM MobiHoc 2015, 2016, 2017, ACM SIGMETRICS 2015, 2016, 2017, IFIP WD 2016, IEEE ICC 2015, 2016

Volunteer: ACM MobiCom 2016, ACM MobiHoc 2015 TPC Meeting, IEEE ICC 2012

Mentoring and Advising: Aishwarya Rajen (Visiting EE undergrad), Steven Alfano (EE M.S.), Gregory Chen (CS undergrad), Saahil Jain (CS undergrad), Nicole Grimwood (EE undergrad, now a Ph.D. student at Stanford EE), James Thompson (EE undergrad), Rel Fogel (EE M.S.), Rama Kompella (EE M.S.), Alexandre Simoes (Visiting EE undergrad)

Outreach: High school outreach at the Manhattan Center for Science and Mathematics (Oct. 2015)

TEACHING

Teaching Assistant, Columbia University, New York, NY

- Computer Networks (CSEE W4119), Spring 2017
- Wireless & Mobile Networking I (ELEN E6950), Fall 2016
- Wireless & Mobile Networking I (ELEN E6950, Columbia Video Network), Fall 2016
- Wireless & Mobile Networking II (ELEN E6951), Spring 2016
- Wireless Communications (ELEN E4703), Spring 2015
- Wireless Communications (ELEN E4703, Columbia Video Network), Spring 2015

TECHNICAL SKILLS AND LANGUAGES

Programming Skills: C/C++, Python, Java, Visual Basic, HTML, Verilog HDL, nesC

Development Environments: Shell Script, Eclipse, Visual C++, Visual Studio, XCode

Applications: MATLAB, Xilinx, L^AT_EX, Emacs, Vim, GNU Radio, NI LabVIEW, Multisim, Modelsim, Spice/PSpice, Visio, IAR Embedded Workbench, AutoCAD

Operating Systems: Microsoft Windows, Linux (Ubuntu), Apple Mac OS X

Databases: SQL

SELECTED COURSES

Columbia University

- Discrete Optimization (IEOR E8100, Spring 2017)
- Convex Optimization (EEOR E6616, Spring 2016)
- Learning and Optimization for Sequential Decision Making (IEOR E8100, Spring 2016)
- Topics in Networks Tags (COMS E6998, Fall 2015)
- Graph Models: Inference and Optimization (IEOR E8100, Fall 2015)
- Analysis of Algorithm II (COMS E6232, Spring 2015)
- Network Algorithms and Dynamics (ELEN E6909, Spring 2015)
- Optimization II (IEOR E6614, Spring 2015)
- Wireless and Mobile Networking I (ELEN E6950, Fall 2014)
- Analysis of Algorithms I (CSOR W4231, Fall 2014)
- Introduction to Deterministic Models (IEOR E4004, Fall 2014)

Tsinghua University

- Stochastic Network Optimization Theory (Graduate, Rank 1st)
- Diploma Projects (Bachelor Thesis, Rank 1st)