AAKANKSHA CHOWDHERY, PhD

Voice: (650) 395-7282 *E-mail:* achowdhery@alumni.stanford.edu *Website:* www.achowdhery.com

Education

Stanford University, Stanford, CA (GPA: 4.15/4.30) Sep. 2007-Apr. 2013
PhD and MS in Electrical Engineering
Indian Institute of Technology, Delhi, India (CGPA: 9.74/10.00) Jul. 2003-May 2007
Bachelor of Technology in Electrical Engineering

Awards & Honors

Paul Baran Marconi Young Scholar awarded to top three young researchers worldwide with potential to lead innovation toward advancement of both science and humanity 2012
DARE Doctoral Fellowship awarded to top 16 Stanford doctoral students with potential to diversify academia 2010-2012
IIT Delhi Institute Silver Medal awarded to the top student in Electrical Engineering 2007

Relevant Coursework

Machine Learning, Mining Massive Data Sets, Algorithms & Data Structures, Stochastic Modelling, Statistical Signal Processing, Convex Optimization

Programming Skills

Python, C++, Tensorflow, Java, C, Hadoop, web-design in HTML/CSS

Work Experience

Princeton University, Princeton, NJ (Associate Research Scholar) October 2015–Present
- Novel algorithms for video analytics (object detection, classification, pattern matching) on embedded IoT platforms in drone & traffic camera videos to manage energy consumption. Prototyped in C++.
- Built linear predictive models to adapt video quality from drone fleet based on wireless channels.
- Published 6 research papers on video analytics in top-notch conferences & filed 1 provisional patent.
- Co-supervised one graduate student, two undergraduate student theses, and two interns.

Microsoft Research, Redmond, WA October 2013–2015
- Hierarchical machine learning for wireless video surveillance systems to minimize data transmitted to cloud by using lightweight feature extraction on the video frames at/near camera nodes to rank their importance and then transmitting only prioritized content to the cloud (Hadoop) for further analysis. Test pilot in MSR campus.
- Novel algorithms to speed up large-scale machine-learning queries on videos by discarding irrelevant columns early, de-duplicating common modules, and parallelizing the processing in Microsoft cloud.
- Implemented machine learning and statistical modeling tools in C# to develop a novel goodness metric that allows first-time comparison of dynamic spectrum access opportunity in different spectrum bands between 30 MHz & 6 GHz based on Microsoft Spectrum Observatory data.
- Published 4 research papers on data analytics in top-notch conferences & filed 2 patents.
- Supervised two graduate student interns.

Stanford University, Stanford, CA (Research Assistant with Prof. J. M. Cioffi) 2008–2013
- Published 13 research papers on signal processing in multi-antenna systems for wireline & wireless broadband-access networks.
- Novel algorithms to enable Gbps Internet access speeds by numerical optimization, dynamic programming, and cross-layer CSMA protocols in Java using statistical data of channel, noise, & user-traffic.
- Led standardization of the proposed models in technical standards of UK & US Access Networks.

Assia Inc., Redwood City, CA (Technical Intern) Summer 2008
- Novel probabilistic models for intermittent noise effects in digital subscriber lines (DSLs).

Leadership Experience

ACM N2women Fellowship Co-Chair 2017-18
Director, Celestini Project India Jan–Sep 2017
- Designed & led a multi-phase project to increase road safety on Indian roads using data analytics from car sensors and dashboard camera videos with 10 teams in collaboration with IIT Delhi & Marconi Society and sponsorship from Google *(URL: www.celestiniprojectindia.com)*

Co-chair, IEEE Student Leadership Summit at Microsoft Research October 2014
- Designed a leadership training program for 34 IEEE student branch chairs from 14 US universities

Hobbies

Improvisational theater performance, rock climbing, hiking, and hacking gourmet food recipes

Patents

[1] **A. Chowdhery**, M. Zheleva, R. Chandra, A. Kapoor, and P. Garnett, "Spectrum sleuth," U.S. Patent App. 4/822,177, 2015
[2] **A. Chowdhery**, V. Bahl, and T. Zhang, "Bandwidth efficient video surveillance system," U.S. Patent App. 14/856,340, 2015
[3] M. Chiang, **A. Chowdhery**, and X. Wang, "Adaptive video streaming from networked UAV cameras," Provisional Patent App. 62/486,224, 2017

Publications (refereed)

Video analytics

[1] **A. Chowdhery**, M. Levorato, I. Burago and S. Baidya, "Urban IoT Edge Analytics," *book chapter in "Fog Computing in the Internet of Things (Intelligence at the Edge)," Springer,* 2017.
[2] I. Burago, M. Levorato, and **A. Chowdhery**,"Energy-Delay tradeoff for an Edge-Assisted Mobile Video Acquisition and Processing System," *IEEE International Conference on Sensing, Communication and Networking (SECON), 2017*.
[3] X. Wang, **A. Chowdhery**, and M. Chiang, "Networked Drone Cameras for Sports Streaming," *IEEE International Conference on Distributed Computing Systems (ICDCS),* 2017.
[4] N. Garg, I. Janveja, D. Malhotra, C. Chawla, P. Gupta, H. Bansal, **A. Chowdhery**, P. Mukherjee, and B. Lall, "DRIZY- Collaborative Driver Assistance Over Wireless Networks," *ACM MobiCom Poster*, Utah, USA, 2017.
[5] X. Wang, **A. Chowdhery**, and M. Chiang, "SkyEyes: adaptive video streaming from UAVs," *Third Workshop on Hot Topics in Wireless (HotWireless'16) (Invited Paper)*, New York, USA, 2016.
[6] Y. Lu, **A. Chowdhery**, and S. Kandula, "Optasia: A Relational Platform for Efficient Large-Scale Video Analytics," *ACM Symposium on Cloud Computing (SoCC)*, Santa Clara, CA, 2016.
[7] Y. Lu, **A. Chowdhery**, and S. Kandula, "VisFlow: A Declarative Platform for Parallelizing Large-Scale Vision Programs," *The 4th International Workshop on Large Scale Visual Recognition and Retrieval (CVPR Workshop)*, Las Vegas, USA, 2016.
[8] T. Zhang, **A. Chowdhery**, V. Bahl, K. Jamieson, and S. Banerjee "The Design & Implementation of a Wireless Video Surveillance System," *ACM MobiCom Conference,* Sep. 2015.
[9] D. Zhao, **A. Chowdhery**, S. Bahl, and A. Kapoor, "Demo Paper: Game of Drones: A cyberphysical game people play with physiology," *IEEE IPSN Demo,* 2015.

Wireless networks

[10] M. Zheleva, R. Chandra, **A. Chowdhery**, M. Valerio, P. Garnett, A. Kapoor, and A. Gupta, "Enabling a Nationwide Radio Frequency Inventory Using the Spectrum Observatory," *ACM Transactions on Mobile Computing*, 2017.
[11] M. Zheleva, R. Chandra, **A. Chowdhery**, A. Kapoor, and P. Garnett, "TxMiner: Identifying transmitters in real-world spectrum measurements," *IEEE DySpan*, Oct. 2015.
[12] **A. Chowdhery**, R. Chandra, P. Garnett, and P. Mitchell, "Characterizing Spectrum Goodness for Dynamic Spectrum Access," *IEEE Allerton (Invited paper)*, Oct. 2012.
[13] S. Mehryar, **A. Chowdhery**, and W. Yu, "Dynamic Cooperation Link Selection for Network MIMO Systems with Limited Backhaul Capacity," *IEEE International Conference on Communications (ICC)*, Jun. 2012.
[14] **A. Chowdhery**, W. Yu, and J. M. Cioffi , "Cooperative Wireless Multicell OFDMA Network with Backhaul Capacity Constraints," *IEEE International Conference on Communications (ICC)*, Jun. 2011.
[15] H. Dahrouj, W. Yu, and **A. Chowdhery**, "Achievable Rate Improvement Using Common Message Decoding for Multicell Networks," *Asilomar Conference on Signals, Systems and Computers*, Nov. 2010.
[16] **A. Chowdhery**, and R. K. Mallik, "Linear Detection for the Non-orthogonal Amplify and Forward Protocol," *IEEE Transactions on Wireless Communications*, vol. 8, no. 2, pp. 826-835, Feb. 2009.

Wireline copper-access networks

[17] K. Kerpez, J. M. Cioffi, S. Galli, G. Ginis, M. Goldburg, M. Mohseni, and **A. Chowdhery**, "Compatibility of Vectored and Non-Vectored VDSL2," *IEEE Conference on Information Sciences and Systems (CISS)*, Mar. 2012.
[18] **A. Chowdhery**, and J. M. Cioffi, "Dynamic Spectrum Management for Upstream Mixtures of Vectored & Non-vectored DSL," *IEEE Globecom*, Dec. 2010.
[19] J. M. Cioffi, H. Zou, **A. Chowdhery**, S. Jagannathan, and W. Lee, "Greening the Copper Access Network with Dynamic Spectrum Management," *International Journal of Autonomous and Adaptive*

Communications Systems, Vol. 3, No. 4, pp. 369-395, 2010.
[20] H. Zou, **A. Chowdhery**, and J. M. Cioffi, "A Centralized Multi-Level Water-Filling Algorithm for Dynamic Spectrum Management," *Asilomar Conference on Signals, Systems & Computers (Invited paper)*, Nov. 2009.
[21]**A. Chowdhery**, S. Jagannathan, J. M. Cioffi, and M. Ouzzif, "A Polite Cross-layer Protocol for Contention-based Home Power-line Communications," *IEEE International Conference on Communications*, Jun. 2009.
[22] H. Zou, **A. Chowdhery**, S. Jagannathan, J. M. Cioffi, and J. L. Masson, "Multi-user Joint Subchannel and Power Resource-Allocation for Powerline Relay Networks," *IEEE International Conference on Communications*, Jun. 2009.
[23] J. M. Cioffi, H. Zou, **A. Chowdhery**, W. Lee, and S. Jagannathan, "Greener Copper with Dynamic Spectrum Management," *IEEE Globecom*, Dec. 2008.