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Zia Khan

Education

Ph.D. *Princeton University*, Princeton, NJ, 2006-current
Graduation Expected May 2010
Thesis Title: Algorithms for Quantitative Computational Proteomics
Advisors: Mona Singh & Leonid Kruglyak

B.S. *Carnegie Mellon University*, Pittsburgh, PA, 2002
Computer Science

B.S. *Carnegie Mellon University*, Pittsburgh, PA, 2002
Biological Sciences
Mellon College of Science Research Honors

Research Interests

Bioinformatics
Computational biology

Research Experience

October 2006 - current *Graduate Research Assistant*, Princeton University, Princeton NJ
Designed algorithms for the analysis of high-throughput short read sequencing data and the analysis of liquid chromatography tandem mass spectrometry (LC-MS/MS) proteomics data.

May 2005 - September 2006 *Algorithms Developer*, Sarnoff Corporation, Princeton, NJ
Conducted research in applied computer vision. Improved and optimized a real time algorithm for matching vehicles between non-overlapping cameras in a large camera surveillance network.

July 2002 - April 2005 *Research Scientist 1*, Georgia Institute of Technology, Atlanta, GA
Conducted research in computer vision and machine learning. Designed and implemented real time visual tracking systems.

Teaching Experience

Fall 2007 and Spring 2008 *Assistant in Instruction, Quantitative Integrated Introduction to the Natural Sciences*, Princeton University, Princeton, NJ
Prepared weekly lectures on course materials. Developed and graded programming and written assignments.

Spring 2004 *Guest Lecturer, Introduction to Probabilistic Graphical Models*,
Georgia Institute of Technology, Atlanta, GA
Conducted two guest lectures on the derivation of expectation maximization algorithms.

Spring 2000 and 2001 *Teaching Assistant Computational Biology*,
Carnegie Mellon University, Pittsburgh PA
Conducted weekly sessions to assist students with course assignments and prepare for exams. Graded programming and written assignments.

Publications - Computational Biology and Bioinformatics

Zia Khan, Joshua S. Bloom, Benjamin A. Garcia, Mona Singh, and Leonid Kruglyak. Protein quantification across hundreds of experimental conditions. *Proceedings of the National Academy of Science*, 106(37):15544-15548, 2009a. **Track II Direct Submission**.

Zia Khan, Joshua S. Bloom, Leonid Kruglyak, and Mona Singh. A practical algorithm for finding maximal exact matches in large sequence datasets using sparse suffix arrays. *Bioinformatics*, 25(13):1609–1616, 2009b.

Zia Khan, Joshua S. Bloom, Leonid Kruglyak, Mona Singh, and Amy A. Caudy. Measuring differential gene expression by short read sequencing: quantitative comparison to 2-channel gene expression microarrays. *BMC Genomics*, 10(1):221, 2009c.

Additional Publications

Journal

Tucker R. Balch, Frank Dellaert, Adam Feldman, Adam Guillory, Charles Isbell, **Zia Khan**, Stephen Pratt, Andrew Stein, and Hank Wilde. How multi-robot systems research will accelerate our understanding of social animal behavior. *Proceedings of the IEEE*, 94(7):1445–1463, July 2006.

Zia Khan, Tucker R. Balch, and Frank Dellaert. MCMC data association and sparse factorization updating for real time multitarget tracking with merged and multiple measurements. *IEEE Trans. Pattern Anal. Mach. Intell.*, 28(12):1960–1972, 2006.

Zia Khan, Rebecca A. Herman, Kim Wallen, and Tucker R. Balch. An outdoor 3-d visual tracking system for the study of spatial navigation and memory in *Rhesus* monkeys. *Behavior Research Methods, Instruments & Computers*, 37(3):453–463, August 2005.

Zia Khan, Tucker R. Balch, and Frank Dellaert. MCMC-based particle filtering for tracking a variable number of interacting targets. *IEEE Trans. Pattern Anal. Mach. Intell.*, 27(11):1805–1918, 2005.

Conference - Peer Reviewed

Magnus Egerstedt, Tucker R. Balch, Frank Dellaert, Florent Delmotte, and **Zia Khan**. What are the ants doing? vision-based tracking and reconstruction of control programs. In *IEEE Conference on Robotics and Automation (ICRA'05)*, pages 4182–4187, Barcelona, Spain, 2005.

Zia Khan, Tucker R. Balch, and Frank Dellaert. Multitarget tracking with split and merged measurements. In *Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'05)*, pages 605–610, San Diego, CA, 2005.

Zia Khan, Tucker R. Balch, and Frank Dellaert. An MCMC-based particle filter for tracking multiple interacting targets. In *Proceedings 8th European Conference on Computer Vision (ECCV'04)*, pages 279–290, Prague, Czech Republic, 2004.

Zia Khan, Tucker R. Balch, and Frank Dellaert. A Rao-Blackwellized particle filter for EigenTracking. In *Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR'04)*, pages 980–986, Washington, DC, 2004.

Zia Khan, Tucker R. Balch, and Frank Dellaert. Efficient particle filter-based tracking of multiple interacting targets using an MRF-based motion model. In *Proceedings of the 2003 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS'03)*, 2003.

Tucker R. Balch, **Zia Khan**, and Manuela M. Veloso. Automatically tracking and analyzing the behavior of live insect colonies.In *Autonomous Agents*, pages 521–528, 2001.

Technical Reports

Zia Khan and Frank Dellaert. Robust generative subspace modeling: The subspace t distribution. Technical Report GIT-GVU-04-11, Georgia Institute of Technology GVU Center, 2004.

Software

Princeton LC-MS/MS Proteomics Data Viewer
http://compbio.cs.princeton.edu/pview
Software for the analysis and visualization of high-throughput large scale LC-MS/MS proteomics data sets.

Finding maximal exact matches in large sequence data sets using sparse suffix arrays
http://compbio.cs.princeton.edu/mems
Software for finding maximal exact matches between sequence data sets for use within the MUMmer 3 system.

Professional Service

Reviewer
IEEE Transactions on Pattern Analysis and Machine Intelligence
Image and Vision Computing
IEEE Transactions on Image Processing
IEEE Transactions on Signal Processing
Advances in Bioinformatics
Bioinformatics
Pattern Recognition Letters
Journal of Mathematical Imaging and Vision

Media Coverage

Journal of Proteome Research, "Space-partitioning speeds up data processing," Quinn Eastman, Sep. 8, 2009.
Center for Behavioral Neuroscience Synapse, "Follow Every Move," Summer 2004.
Stanford Magazine, "Life in the Colonies," Mitchell Leslie, Feb, 2002.
New Scientist Magazine, "Follow that Ant," Catherine Zandonella, Feb., 2001.

References

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