

MELISSA K. CARROLL  
35 Olden Street, Princeton, NJ 08540  
(609) 799-1934  
mkc@princeton.edu  
<http://www.princeton.edu/~mkc/>

## EDUCATION

**Doctoral Candidate in Computer Science and Neuroscience, Princeton University, Princeton, NJ** *May 2010 (ant.)*

Working thesis title: *Improving the Reliability of Predictive fMRI Models*

**Master of Arts in Computer Science, Princeton University, Princeton, NJ (GPA: 3.80)** *Jun. 2006*

**Master of Science in Computer Science, Pace University, White Plains, NY (GPA: 3.97)** *Jan. 2003*

Thesis: *A Comparison of Various Genetic and Non-Genetic Algorithms for Aiding the Design of an Artificial Neural Network that Learns the Wisconsin Card Sorting Test Task*

**Bachelor of Arts in Psychology, State University of New York at Binghamton, Binghamton, NY (GPA: 3.65)** *May 1999*

## RESEARCH EXPERIENCE

**Graduate Researcher, Princeton University, Princeton, NJ (Advisors: R. Schapire, K. Norman)** *2004 – Pres.*

- Developed Machine Learning and Signal Processing-based methods for predicting mental states from Functional Magnetic Resonance Imaging (fMRI) data
- Implemented AdaBoost in Matlab/C and applied to processing datasets with large feature sets
- Completed substantive course research projects in Computer Vision, Bayesian Graphical Modeling, and Genomics

**Research Intern, IBM T.J. Watson Research Center, Yorktown Heights, NY (Advisors: G. Cecchi, I. Rish)** *2007, 2008*

- Improved the reliability of predictive fMRI models using regularized sparse regression (Elastic Net)
- Designed and implemented parallel regression (LARS-EN) code in C/MPI for the IBM Blue Gene/L supercomputer
- Patent pending: *Method and System for Predictive Modeling of Brain Activity from fMRI data Using Dynamic Lasso*

**Graduate Researcher, Pace University, White Plains, NY (Advisors: M. Gargano, S. Cha)** *2001 – 2003*

- Performed research in Computational Biology and Evolutionary Artificial Neural Networks

**Research Data Manager/Analyst, Weill Medical College of Cornell University, White Plains, NY** *1999 – 2004*

- Managed data for 20 psychiatric studies (5 lead); designed, developed, and maintained SQL research databases
- Developed quality control procedures; provided data management consultation to outside research group
- Delivered presentation on issues in clinical data management to study investigators and clinicians
- Formulated data analysis strategies, implemented statistical procedures in SAS and SPSS, prepared results for publication
- Recruited, trained, and supervised 9 data clerks and 3 junior data manager/analysts

## TEACHING EXPERIENCE

**Assistant in Instruction, Princeton University, Princeton, NJ**

- COS 109, Computers in Our World (Instructor: B. Kernighan): hold office hours, perform grading *Fall 2009*
- COS 126, General Computer Science (Instructors: D. Clark, K. Wayne): taught twice-weekly precept to 30 students, presented review session, held office hours, graded, developed test material *Spring 2006*
- COS 402, Artificial Intelligence (Instructor: R. Schapire): held office hours, graded, presented material *Fall 2005*

**Mentor, Princeton Summer Programming Experience, Princeton, NJ** *2005, 2006*

- Advised two undergraduate students on designing and implementing a MySQL database with Perl/DBI front-end

**Teaching Transcript Program, Princeton McGraw Center for Teaching and Learning, Princeton, NJ** *2005 – Pres.*

## HONORS AND AWARDS

- Wu Prize for Excellence, Princeton Engineering (awarded to select final year graduate students) *2009*
- Princeton Program in Integrative Information, Computer and Application Sciences (PICASso) Fellowship *2006 – 2008*
- Organization for Human Brain Mapping (OHBM) Student Travel Award (merit-based) *2006*
- National Science Foundation Graduate Fellowship Honorable Mention *2005*
- Pace University Computer Science Distinguished Achievement Award for Academic Excellence *2003*

## MELISSA K. CARROLL

### PROFESSIONAL SERVICE

- NIPS Workshop on Statistical Learning for fMRI (international workshop): Co-Organizer 2008
- Princeton PICASso Colloquium for Women in Computational Science (local workshop): Organizer 2007
- Princeton Women in Science and Engineering Conference (regional conference): Co-Organizer 2006
- Northeast Student Colloquium on Artificial Intelligence (NESCAI): Reviewer 2007, 2008
- Princeton Computer Science Graduate Committee: Representative; liaison with faculty, organize events 2004 – Pres.
- Princeton Graduate Engineering Ambassadors: Secretary; authored FAQ for prospective students 2005 – 2007
- Princeton Graduate Engineering Council: Computer Science Representative 2005 – 2006

### COMPUTING SKILLS

Matlab, C, MPI, Java, Perl, SQL, VBA, SAS, SPSS

### PUBLICATIONS

- MK Carroll, GA Cecchi, I Rish, R Garg, AR Rao. (2009). *Prediction and Interpretation of Distributed Neural Activity with Sparse Models*. Neuroimage, 44(1): 112-122.
- MK Carroll, S Cha. (2003). *Application of Stacked Generalization to a Protein Localization Prediction Task*. Proceedings, Atlantic Symposium on Computational Biology and Genome Informatics, 7<sup>th</sup> Joint Conference on Information Sciences (JCIS 2003): 923-926.
- MK Carroll. (2003). *The Performance of Evolutionary Artificial Neural Networks in Unambiguous and Ambiguous Learning Situations*. Technical Report No. 189, Pace University School of Computer Science and Information Systems
- BS Meyers, JA Sirey, M Bruce, M Hamilton, P Raue, SJ Friedman, C Rickey, T Kakuma, MK Carroll, D Kiosses, G Alexopoulos. (2002). *Predictors of Early Recovery from Major Depression Among Persons Admitted to Community-Based Clinics: An Observational Study*. Archives of General Psychiatry, 59(8):729-35.

### SELECTED PRESENTATIONS

- I Rish, MK Carroll, GA Cecchi, R Garg, AR Rao, N Bani Asadi, K Scheinberg. (2009). *Sparse Modeling in fMRI Data Analysis*. Poster, Organization for Human Brain Mapping (OHBM).
- MK Carroll, GA Cecchi, I Rish, R Garg, AR Rao. (2008). *Increasing Robustness of Sparse Regression with the Elastic Net*. Presentation, NIPS 2008 Workshop on New Directions in Statistical Learning for Meaningful and Reproducible fMRI Analysis.
- GA Cecchi, MK Carroll, I Rish, R Garg, AR Rao. (2008). *Beyond Prediction: Discovering Distributed Patterns of Brain Activity from fMRI Data via Sparse Regression*. Poster, Society for Neuroscience (SFN).
- MK Carroll, M Dudik. (2007). *Feature Induction on fMRI Images Using Regularized Logistic Regression*. Poster, Organization for Human Brain Mapping (OHBM).
- MK Carroll, M Dudik, RE Schapire, KA Norman. (2006). *Feature Induction Using Boosting and Logistic Regression on fMRI Images*. Presentation, NIPS 2006 Workshop on New Directions on Decoding Mental States from fMRI Data.
- MK Carroll, KA Norman, JV Haxby, RE Schapire. (2006). *Exploiting Spatial Information to Improve fMRI Pattern Classification*. Poster, Organization for Human Brain Mapping (OHBM).
- MK Carroll, CF Murphy, DN Kiosses, GS Alexopoulos. (2001). *The Modified Card Sorting Test as a Measure of Executive Dysfunction in Geriatric Depression*. Poster presented at the 2<sup>nd</sup> Annual Aging Symposium, Cornell Center for Aging Research and Clinical Care.
- CF Murphy, GS Alexopoulos, MK Carroll, T Kakuma. (2001). *Concurrent prediction of depression and executive dysfunction: A longitudinal analysis*. The American Journal of Geriatric Psychiatry, (9:3, Summer Supplement 1): 83.