

Michael McCourt

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- EDUCATION**
- Doctor of Philosophy*, Cornell University, 2013
 - Major: Applied Mathematics, Advisor: Charles Van Loan
 - Master of Science*, Cornell University, 2009
 - Major: Applied Mathematics, Minor: Computational Science
 - Bachelor of Science*, Illinois Institute of Technology, 2007
 - Major: Applied Mathematics, Minor: Physics
- RESEARCH EXPERIENCE**
- Argonne National Laboratory, Argonne, IL
 - *Short Term Appointment* with Hong Zhang 2012-2013
 - Developed scalable, sparse matrix-matrix algorithms.
 - *Lab Grad Associate* with Lois Curfman McInnes 2010-2012
 - Studied nonlinear solvers for multiphysics simulations.
 - *Research Associate* with Hong Zhang 2007
 - Developed interface for legacy codes to access high performance libraries.
 - Illinois Institute of Technology, Chicago, IL
 - *REU Advisor* with Greg Fasshauer 2012-2013
 - Mentored summer research students during REU projects
 - Democratic National Committee, Washington, DC
 - *Graduate Research Fellow* with Mike Conlow 2009
 - Analyzed election data statistically to study early voting patterns.
 - Hong Kong Baptist University, Hong Kong SAR, China
 - *Research Associate* with Graeme Fairweather 2008
 - Assisted with collocation research, and students in REU.
 - *Undergraduate Research Fellow* with Tao Tang 2006
 - Studied nonlinear solvers for multiphysics simulations.
- TEACHING EXPERIENCE**
- University of Colorado Denver, Denver, CO
 - Visiting Assistant Professor* 2013-present
 - Differential Equations, Linear Algebra, Probability, Statistics, Problem Solving with Matlab
 - Illinois Institute of Technology, Chicago, IL
 - Research Assistant Professor / Adjunct Faculty* 2010-2013
 - Meshfree Approximation Methods (Co-instructor), Modern Geometry, Matrix Algebra, Complex Variables, Statistical Methods and Models, Business Math I/II
 - Advanced Scientific Computing (Co-instructor)
 - Cornell University, Ithaca, NY
 - Instructor* 2008
 - Introductory UNIX

- PUBLICATIONS** *The Method of Fundamental Solutions in Solving Coupled Boundary Value Problems for M/EEG*, G. Ala, G. Fasshauer, E. Francomano, S. Ganci, M. McCourt. submitted
- Approximating Derivatives Stably Using Gaussian Eigenfunctions*, M. McCourt, G. Fasshauer. submitted
- A Fast QR Method for Gaussian Eigenfunction Approximation*, M. McCourt. submitted
- An Introduction to the Hilbert-Schmidt SVD using Iterated Brownian Bridge Kernels*, R. Cavoretto, G. Fasshauer, M. McCourt, Numerical Algorithms. accepted
- Efficient Sparse Matrix-Matrix Products Using Colorings*, M. McCourt, B. Smith, H. Zhang, SIAM Journal on Matrix Analysis and Applications. accepted
- Using Gaussian eigenfunctions to solve boundary value problems*, M. McCourt, Advances in Applied Mathematics and Mechanics, 5:569–594, 2013.
- Multiphysics Simulations: Challenges and Opportunities*, D. Keyes, L. C. McInnes, C. Woodward, et al. International Journal of High Performance Computing Applications, 27(1):4–83, 2013.
- Improving parallel scalability for edge plasma transport simulations with neutral gas species*, M. McCourt, T. D. Rognlien, L. C. McInnes, H. Zhang, Computational Science and Discovery, 5:014012, 2012.
- Stable evaluation of Gaussian RBF interpolants*, G. Fasshauer, M. McCourt, SIAM Journal of Scientific Computing, 34(2):A737–A762, 2012.
- Pseudorandom numbers for conformal measures*, M. Denker, J. Duan, M. McCourt, Dynamical Systems, 24(4):439-457, 2009.
- Spectral methods for resolving spike dynamics in the Geirer-Meinhardt model*, M. McCourt, N. Dovidio, M. J. Gilbert, Communications in Computational Physics, 3:659-678, 2008.

RESEARCH INTERESTS

- Numerical analysis, including numerical linear algebra
- Kernel-based approximation methods
- High-performance scientific computing
- Statistics and statistical modeling

HONORS & AWARDS

- NSF graduate research fellow Fall 2007-Fall 2010
- Karl Menger award for achievement in Mathematics May 2007
- First Place - undergraduate research at IIT April 2007
- NSF Grant DMS-0453600: REU in Hong Kong Summer 2006
- Camras/NEXT scholarship through IIT Fall 2003-Fall 2007

COMPUTER SKILLS

Languages: C/C++, Python, Unix, HTML, Fortran.
Software: Matlab, SPSS, JMP, Blackboard, Canvas, Excel, HDF5, Mercurial.

SELECTED *Mathematics Colloquium - National University of Singapore* Jan 2014
CONFERENCES, Singapore
WORKSHOPS & Presented - *Stable Gaussian Computations in Numerical Analysis and Statistics*
TALKS

Midwest Numerical Analysis Day - University of Chicago May 2013
Chicago, IL
Using a Hilbert-Schmidt SVD for Stable Kernel Computations (with G. Fasshauer)

Mathematics Colloquium - CSU Fullerton Feb. 2013
Fullerton, CA
Presented - *Kernel-based Methods for Scientific Computing*

International Conference on Scientific Computing and Applications April 2012
Las Vegas, NV
Special Session in Honor of Graeme Fairweather's 70th Birthday
Presented - *Stable Gaussians for Boundary Value Problems*

AMS Western Section Meeting March 2012
Honolulu, HI
Special Session: Kernel Methods for Approximation on Manifolds
Presented - *Stable Gaussians: Approximation and Collocation*

International Conference on Numerical Simulation of Plasma September 2011
Long Branch, NJ
Presented - *Scalable Preconditioners for Coupled Plasma/Neutral Boundary Transport Simulations* (poster) (with T. Rognlien, L. C. McInnes, H. Zhang)

Institute for Computing in Science August 2011
Park City, UT
Scribe for the Workshop - Multiphysics Simulations: Challenges and Opportunities

SIAM Computational Science and Engineering March 2011
Reno, NV
Presented - *Improving Scalability for Edge Plasma Transport with Neutral Gas Species* (poster) (with T. Rognlien, L. C. McInnes, H. Zhang)

American Physical Society: Division of Plasma Physics November 2010
Chicago, IL
Presented - *Progress in Parallel Implicit Methods for Tokamak Edge Plasma Modeling* (with L. C. McInnes, H. Zhang, B. Dudson, S. Farley, T. Rognlien, M. Umansky)

Positive Definite Functions in Numerical Analysis and Statistics September 2008
Göttingen, Lower Saxony, Germany
Workshop

International Conference on CMMSE June 2007
Chicago, IL
Presented - *Maximum Likelihood Estimation for Radial Basis Functions* (poster)

SIAM Computational Science and Engineering February 2007
Costa Mesa, CA
Presented - *Spectral Methods for Resolving Spike Dynamics* (with N. Dovidio and M. J. Gilbert)