

# Adam J. Mihalik

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## Education

UC San Diego - Ph.D. Mathematics, Expected May 2014.

UC San Diego - M.A. Applied Mathematics, 2011.

University of Pennsylvania, The Wharton School - B.S. Economics, 2004.

University of Pennsylvania - B.S.E. Electrical Engineering, 2004.

## Research Experience

### *UC San Diego - PhD research, Computational Mathematics (2009-present)*

Currently working with Professor Michael Holst, developing adaptive algorithms for numerically solving PDE. We make use of the Finite Element Exterior Calculus framework in our analysis in order to prove convergence and optimality results for our algorithm. We then analyze the properties of geometrical maps in order to prove similar results for problems posed on surfaces. The research involves the areas of numerical analysis, partial differential equations, functional analysis, and differential geometry.

### *UC San Diego - Level Set Methods and Applications (2011)*

Worked with Professor Li-Tien Cheng using the level-set method to build a computational model for cell motion. Coded the algorithms and performed numerical computations using Matlab and C.

### *University of Pennsylvania - Sleep Apnea Detection Using Neural Networks (2003-2004)*

Collaborated with Professor Nabil Farhat and partner Jeff Katrencik, building a Neural Network model which scanned through sleep data and detected episodes of sleep apnea. The project received Grand Prize in the School of Engineering and Applied Science, competing against all graduating seniors. It also received recognition from the Electrical and Bioengineering departments as the top project.

## Work Experience

### *Constellation Commodities Group - Strategist (2004-2009)*

Constellation ranked as the top competitive power supplier in the US and the Strategies group was the financial quant group responsible for quantitative and analytical modeling in support of portfolio management, trading and deal origination teams. Some specific personal responsibilities included: developing and implementing a statistical simulation model to forecast wind speed and hourly wind generation; maintaining and improving a fundamental model for simulation of locational electricity prices; valuation of power plants and exotic options using both heuristics run through the fundamental model and calculations based on derivative pricing methods; pricing variable quantity wholesale energy contracts in deregulated power markets; and, maintenance and upgrades to the risk management system.

## Teaching Experience

### *UC San Diego - Associate Instructor (2013)*

Responsibilities included organizing the presentation of course material, coordinating the class, maintaining a course webpage, managing teaching assistants, writing exams and presenting lectures.

Courses: Math 10B(Calculus)

### *UC San Diego - Teaching Assistant (2009-present)*

Responsibilities include conducting discussion sections, holding office hours, and grading.

Courses: Math 10 series (Calculus), Math 20 series (Calculus), Math 20D (Differential Equations), Math 20E (Vector Calculus), Math 20F (Linear Algebra), Math 142 (Analysis), Math 170 (Numerical Analysis), Math 174 (Numerical Methods for Physical Modeling), Math 194 (Mathematics of Finance), Math 270 (Graduate Level Numerical Analysis).

## Publications

### *Submitted for Publication*

M. Holst, A. Mihalik and R. Szypowski. Convergence and Optimality of Adaptive Methods in the Finite Element Exterior Calculus Framework. Available as [arXiv:1306.1886v2](https://arxiv.org/abs/1306.1886v2).

### *In preparation*

M. Holst, A. Mihalik. Convergence and Optimality of Adaptive Mixed Methods on Surfaces.

## Conferences and Workshops

Local Organizer, Pacific Coast Gravity Meeting. San Diego, CA. March 2014.

Joint MAA-AMS Mathematics Meetings. San Diego, CA. January 2013.

## Talks

*Convergence and Optimality of an Adaptive Mixed Finite Element Method on Surfaces*. Center of Computational Mathematics Seminar. La Jolla, CA. February 2014.

*Convergence of Adaptive Methods in the Finite Element Exterior Calculus Framework*. Center of Computational Mathematics Seminar. La Jolla, CA. May 2013.

*Adaptive Methods, Nonlinear PDE, and Surface FEM in the FEEC Framework*. Computational Science and Mathematics Seminar. La Jolla, CA. October 2012.

## Computer Skills

MATLAB, Java, C, CUDA, R

## Extracurricular Activities

UCSD Masters Triathlon 2010 - Present