
Francesca D. Reale

1941 Trexler Ct, Raleigh, NC 27606 · (803) 312-3819 · fdreale@ncsu.edu · US Citizen

- Education**
- North Carolina State University, Raleigh, NC
Masters in Applied Mathematics
Graduation December 2009
GPA: 3.94/4.00
- Carnegie Mellon University, Pittsburgh, PA
Computational & Applied Mathematics, B.S. with an additional major in Statistics
Graduated with Mellon College of Science Honors
Graduated May 2005
GPA: 3.28/4.00
- Work**
- Sandia National Laboratories, Albuquerque, NM** Summer 2007
Technical Intern
• Worked on a robust optimization problem
- Johns Hopkins University Applied Physics Laboratory, Laurel, MD** Summer 2006
Technical Intern
• Utilized and studied optimization techniques including Nelder-Mead and SPSA
- University of South Carolina Mathematics Department** Fall 2005-spring 2006
Teaching Assistant
• Headed Maple labs and recitation for Calculus I and II
- Johns Hopkins University Applied Physics Laboratory, Laurel, MD** Summer 2005
Technical Intern
• Worked on an information optimization problem
- Carnegie Mellon University Mathematics Department** Spring 2003-spring 2005
Grader
• Graded for Matrix Algebra, Math Software, and Symbolic Programming Methods
- Key Bank, Fishkill, NY** Summer 2002
Client Relations Representative Intern
- Research**
- Research at North Carolina State University** Fall 2006 – present
Statistical Emulator Construction for Nonlinear Smart Systems
Advisor Dr. Ralph C. Smith
• Constructed efficient surrogates of the Homogenized Energy Model using the Kalman filter and nonlinear Gaussian Process emulators
• Presented work at March 2009 SPIE conference in San Diego, CA
- Research at Sandia National Laboratories** Summer 2007 – present
An Efficient Robust Design Strategy employing Surrogate Variance Minimization and Adaptive Mean Constraint Satisfaction
Mentors Vicente Romero and Laura Swiler
• Implemented algorithm for optimization under uncertainty on an auto part problem
• Wrote paper with mentors to present this highly efficient algorithm
• Presented work at April 2008 AIAA conference in Schaumburg, IL
- Academic Project in Advanced Data Analysis** Fall 2004 – spring 2005
Automobile Emissions Analysis via Remote Sensing
• Determined if a car would pass emissions test based on its characteristics
• Worked in a group of four from class of Dr. O. Meyer and Dr. J. McIntyre
• Won Meeting of the Minds 2005 research symposium Statistics competition
- Academic Project in Operations Research II** Fall 2004
Getting Around in a Wheelchair on Campus
• Formulated an all-pairs shortest path problem for wheelchair-accessible entrances
• Set up and solved problem in Excel with one other group member
• Presented this work with my three fellow group members
- NSF sponsored REU at University of Tennessee** Summer 2004 – spring 2005
A Model of Planetary Temperature Distributions based on Quantum Gravity

- Modeled planetary temperature distributions with a resonance model using Maple
- Presented results to undergraduate mathematics seminar in October 2004
- Presented at Meeting of the Minds 2005 symposium

Mathematics Research at Carnegie Mellon University Fall 2002 – spring 2005

Maximum Total Biomass Capacity Evolutionary Population Model

- Modeled population dynamics of system using MATLAB with Dr. John Tolle
- Awarded SURF fellowship from Carnegie Mellon University to continue this work
- Won 2004 Meeting of the Minds research symposium Mathematics competition
- Presented to undergraduate mathematics seminar in October 2003

Academic Project in Sampling, Surveys, & Society Spring 2004

Time versus Units: A Study of Workload

- Compared expected hours of workload (units) to actual hours of workload per class
- Performed and analyzed results of a campus-wide survey in a group of four
- Set up survey for Internet access using Survey Monkey
- Presented results to our client, the Eberly Learning Center for Teaching Excellence

Academic Project in Research in Discrete Mathematics Fall 2003

Finding Drawable Graphs on the Torus

- Determined drawable graphs of 4 nodes on a torus with another student
- Wrote JAVA program to determine possible graphs of 5 nodes drawable on a torus

Academic Project in Modeling and Simulation of Biological Systems Spring 2003

A Model of Balancing Blood pH using Buffers

- Used MATLAB to model a chemical reaction using partial differential equations

Skills

Foreign Language: Basic French reading, writing, and conversational skills

Software: MS Office, MATLAB, Mathematica, Maple, Minitab, SAS, S+, R

Programming Languages: BASIC, JAVA, some C, LaTeX, HTML, some C++

Operating Systems: Microsoft Windows, Macintosh X, Linux, UNIX

Activities

Carnegie Mellon University

Astronomy Club Secretary and Vice-President	Student Dormitory Council
Math and Physics Student Advisory Committees	CMU TV Station Anchor
Society of Physics Students Secretary	Tartan newspaper staff writer
Pioneers Club buggy and intramural sports	Physics Tutor

SC High School Math Competition Proctor	SC Science Fair judge (paid)
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North Carolina State University

President of the Mathematics Graduate Student Association (2 years)

Treasurer of the SIAM Student Chapter at NC State (2 years)

AMGS Seminar Website Administrator (Fall 2009 semester)

Taught SAMSI Undergraduate Workshop computer lesson in R/S+ in Spring 2007 (paid)

Awards

Summer Undergraduate Research Fellowship (SURF) from Carnegie Mellon University

Mellon College of Science Dean's List 4 of 8 semesters

Won the 2004 Meeting of the Minds mathematics competition

Won the 2005 Meeting of the Minds statistics competition with 3 fellow group members

Lord/Center for Research in Scientific Computing Distinguished Fellow

Coursework

Undergraduate

Operations Research	Sampling and Surveys
Experimental Physics	Fractals and Wavelets
Modeling & Simulation of Biological Systems	Cryptology
Advanced Data Analysis	Modern Regression

Graduate

Modeling including Parameter Estimation	Environmental Modeling
Optimal Control & Dynamical Systems	Numerical Analysis
Linear Algebra & Matrix Theory	Validation & Verification
Nonlinear Optimization	Partial Differential Equations
Model Calibration & Nonlinear Filtering	Continuum Mechanics