

Mathematics Department  
Tulane University  
6823 St Charles Avenue New Orleans, LA 70118

(504) 862-3438 (office)  
mnichol@tulane.edu

## Education

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**Ph.D. in Mathematics, Duke University 2007**

**Master of Science in Mathematics, Duke University 2003**

**Bachelor of Arts in Mathematics, University of Utah 2001**  
Graduated Cum Laude.

**Bachelor of Science in Physics, University of Utah 2001**  
Graduated Cum Laude.

## Teaching

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**Primary Instructor, Tulane University:**

- **Scientific Computing (Burden & Faires), Spring 2008**
- **Ordinary Differential Equations for Math Majors (Boyce & DiPrima), Fall 2007**

**Primary Instructor, Duke University:**

- **Integral Calculus (Hughes-Hallett), Spring 2007**
- **Ordinary and Partial Differential Equations for Engineers (Boyce & DiPrima), Summer 2006**
- **Differential Calculus (Hughes-Hallett), Fall 2005**
- **Integral Calculus (Edwards & Penny), Fall 2004**
- **Differential Calculus (Hughes-Hallett), Fall 2003**

Prepared lectures and handouts. Delivered lectures and guided students through worksheets. Assigned and supervised group work. Assigned and graded homework. Held office hours and review sessions. Wrote and graded exams and quizzes. Assigned final grades.

**Mathematics Department Teacher Training Program, 2002-2003**

Participated in the graduate student teacher training program run by Dr. Jack Bookman of the Duke Mathematics Department. Topics included classroom technique, course design, evaluation design, learning styles, active learning, student centered teaching, and current issues in calculus education. Gave practice lecture. Wrote practice exams.

**Help Room Staff, Calculus I & II, 2 Semesters 2003, 2005**

Helped calculus students with homework, review problems, and other questions.

**Math Department Tutor, 2001-2006**

Tutored Calculus I & II.

**Lab Instructor, Physics E&M Lab, University of Utah, Spring 2001**

Guided students through laboratory activities. Wrote and graded quizzes. Assigned and graded lab reports.

## Research

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### **Electromagnetic Scattering by 3D Periodic Scatterers, 2007**

PhD dissertation research developing a third order method for periodic electromagnetic scattering problems. The method involves smoothing singular periodic Helmholtz Green's functions and finding third order correction terms in order to numerically approximate the solution of the Müller integral equations. To be used to find photonic bandgaps in various scattering geometries. Code written in c.

### **Mathematics Problems in Industry (MPI) Workshop, Summer 2005**

Worked for one week with a team of applied mathematicians on a computer hard drive lubrication theory problem.

### **Research Intern at the Naval Surface Warfare Center, Summer 2003**

Worked on a CFD research team for 10 weeks. Project was a comparison of two CFD solvers, Fluent and CFX. Compared the performance of each solver to experimental data in a simple 2D canyon geometry with a single recirculation vortex. Became familiar with each solver and with grid generation software.

### **SAMSI Research Associate 2002-2003**

Worked with a team of mathematicians and statisticians on stochastic genomics problems. Primarily was involved in programming and testing methods. Appointment was for one year at the Statistical and Applied Mathematical Sciences Institute.

## Publications

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**A Third Order Method in Three Dimensional Periodic Electromagnetic Scattering**, Communications in Mathematics Sciences. Sept 2008. Vol 6. No. 3.

**A Third Order Method in Three Dimensional Periodic Electromagnetic Scattering**, Dissertation, 2007

### **Monte Carlo Algorithms for Hardy-Weinberg Proportions**

Huber, Mark; Chen, Yuguo; Dinwoodie, Ian; Dobra, Adrian; Nicholas, Mike. Biometrics. 62 (2006), no. 1. Provided an algorithm to test whether populations follow Hardy-Weinberg proportions. Previous algorithms had running times that grew linearly with the size of the population. Here, we provided an algorithm with running time independent of the population size.

## Talks

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**A Third Order Method in Three Dimensional Periodic Electromagnetic Scattering**, Tulane University Applied Mathematics Seminar. Sept 7, 2007.

## Awards

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### **L.P. and Barbara Smith Award for Teaching Excellence, 2006**

The award is presented annually to one or two graduate students who have demonstrated a long-term commitment to teaching and whose teaching has reached a consistent level of excellence. This award carries with it both the recognition by the Mathematics Department of the graduate student's teaching and also a substantial monetary prize.

## Mentoring

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### **Scientific Computing Class Projects, Spring 2008**

As part of the course, students did small research projects in groups on various topics in numerical analysis. I met with ten groups at least weekly to discuss progress and direction. Projects included topics in numerical differential equations, integral equations, image analysis, singular integrals, and the FFT.

### **Duke Summer Workshop on Undergraduate Research in Mathematics, Summer 2004**

Worked with two teams of undergraduate students through the duration of this two week program. Students did numerical research on a bouncing ball problem in dynamical systems. Experiments were designed to detect and analyze bifurcations in behaviour.

## **Professional Service**

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### **Graduate Teaching Committee, Department of Mathematics, 2006-2007**

Explored possible changes to the undergraduate mathematics classes and curricula and made suggestions to department faculty. Met with faculty to discuss issues of placement, course material, and expectations of outside departments.

### **Graduate and Professional Student Council Representative, Mathematics Department, 2002**

Functioned as liaison between department graduate students and the council. Helped plan and publicize events.