D. Michael Senter

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Research Objective

PhD candidate in applied mathematics seeking to leverage computer vision and machine learning techniques to generate accurate immersed boundary meshes from image data for biological and medical applications.

Education

University of North Carolina at Chapel Hill **Chapel Hill**
Doctor of Philosphy (PhD) in Mathematics (anticipated) *2015–2020*

University of North Carolina at Chapel Hill **Chapel Hill**
Graduate Certificates (anticipated) *2015–2020*
NIH Big Data to Knowledge (BD2K)
Bioinformatics and Computational Biology (BCB)

University of Utah **Salt Lake City**
Bachelor of Science in Mathematics. Cumulative GPA: 3.64 *2012–2015*

Experience

SAS Analytics **Cary, NC**
Data Science Intern *2019–Present*
Created training materials incorporating both open-source based **Python** code with **SAS** and **SAS Viya** technology to solve data science and machine learning problems.

UNC Chapel Hill **Chapel Hill, NC**
Miller Lab Group *2015–Present*
Executed fully-coupled fluid-structure interaction simulations using the immersed boundary (IB) technique with software written in **Python**, **Matlab**, and **C++** on HPC clusters running Red Hat Enterprise Linux. Analyzed large data sets generated by simulations using custom **Python**, **Matlab**, and **Julia** scripts to interact with data in VTK and HDF5 formats. Visualized results from simulations using Visit and Paraview. Developed **Python** software package to semi-automate the creation of 2D finite difference meshes for IB software simulation from image data using image recognition and optimization techniques. Mentored several undergraduate students and helped train other graduate students.

SAMSI **Chapel Hill, NC**
Neuromechanics Working Group *2015–2016*
Assisted in development and implementation of an ODE model in **Matlab**.

University of Utah **Salt Lake City, UT**
Mathematics Department REU *2013–2015*
Developed **Matlab** scripts that implemented a novel, statistically exact covariance based algorithm for mean first passage time in complex fluids. Implemented a parallel version of algorithm in **C++** that was more than 20x faster than the Matlab version.

Computing Skills

Scripting Languages: Python, Matlab, SAS, Julia

Compiled Languages: C/C++
Typesetting: LaTeX, Markdown, Texmacs
Operating Systems: Linux, Windows, Mac OS
Other Skills: Git, VIM, Bash

Teaching Experience

University of North Carolina at Chapel Hill
Instructor on Record *2019–2020*
Classes taught include Introduction to Math Modeling (MATH 119), Calculus III (MATH 233), and First Course in Differential Equations Lab (MATH 383L). Devised course and exam schedule, developed all exams.

University of North Carolina at Chapel Hill
Recitation Instructor *2015–2019*
Led recitations for Calculus I and II (MATH 231 & 232). Recitation sessions required answering student questions on current class material, as well as preparing practice problems and summaries of lecture material. Out-of-class duties included grading exams as well as developing exams.

University of North Carolina at Chapel Hill
Teaching Assistant *2016, 2018*
Math Modeling in the Life Sciences (MATH 564). Duties included having weekly meetings with students going over course material.
Math Modeling Lab (BCB 718). Duties included advising students on model design and supporting student model development in Python and Matlab. Debugged student code.

Friday Center for Continuing Education
Instructor on Record *2016*
Taught inmates at the North Carolina Correctional Institution for Women. Designed and prepared course materials, developed all course exams.

University of North Carolina at Chapel Hill
Grader *2015*
Graded all homework for Introduction to Numerical Analysis (MATH 566). Homework consisted predominantly of Matlab code.

Publications

C Hohenegger, R Durr, and DM Senter. Mean first passage time in a thermally fluctuating viscoelastic fluid. *Journal of Non-Newtonian Fluid Mechanics*, 242:48–56, 2017.

D Michael Senter, Dylan Ray Douglas, W Christopher Strickland, Steven G Thomas, Anne M Talkington, Laura Miller, and Nicholas A Battista. A semi-automated finite difference mesh creation method for use with immersed boundary software ib2d and ibamr. *Bioinspiration & Biomimetics*, 2020.

Talks

SMB General Meeting 2018: "Flexible Clap and Fling".

SIAM CSE15: Undergraduate Research Symposium, March 2015

University of Utah Undergraduate Research Symposium: Math department REU symposium, Fall 2013, Spring & Fall 2014

Poster Presentations

SMB General Meeting 2017: "MeshmerizeMe".

Utah Math Bio Alumni Conference 2017: "MeshmerizeMe".

BAMM! 2017: "Aerodynamics of parachuting in tiny insects".

Tulane Winter Workshop on Neuromechanics 2017: "Aerodynamics of parachuting in tiny insects".

FACM 2016: "A Model of Muscle Response to Neuronal Spike Activity."

University of Utah Science Day: Poster Presentation, Fall 2014

Foreign Language Skills

German: Native

Hebrew: Intermediate