

# D. Michael Senter

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## Interests and Objective

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My primary academic interests are fluid dynamics modeling and simulations, data analysis, and machine learning. I utilize coding to solve computationally complex problems. I enjoy mentoring and teaching, and believe that a passion for math and computer science can be cultivated through active learning and emphasizing small victories.

## Education

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<b>University of North Carolina at Chapel Hill</b> <i>Doctor of Philosophy (PhD) in Mathematics (anticipated)</i>	<b>Chapel Hill</b> 2015–2021
<b>University of North Carolina at Chapel Hill</b> <i>Graduate Certificates (anticipated)</i> NIH Big Data to Knowledge (BD2K) Bioinformatics and Computational Biology (BCB)	<b>Chapel Hill</b> 2015–2021
<b>University of Utah</b> <i>Bachelor of Science in Mathematics. Cumulative GPA: 3.64</i>	<b>Salt Lake City</b> 2012–2015

## Experience

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<b>SAS Analytics</b> <i>Data Science Intern</i> Creating training materials incorporating both open-source based <b>Python</b> code with <b>SAS 9</b> and <b>SAS Viya</b> technology to solve data science and machine learning problems. Interfacing SAS and open source software through <b>API</b> application and presenting solutions using <b>Jupyter notebooks</b> . Utilizing <b>Git</b> version control with both <b>GitHub</b> and <b>GitLab</b> . Participation in testing of cloud-based analytical solutions and learning software platforms.	<b>Cary, NC</b> 2019–Present
<b>UNC Chapel Hill</b> <i>Miller Lab Group</i> Executing fully-coupled fluid-structure interaction simulations using the immersed boundary (IB) technique with software written in <b>Python</b> , <b>Matlab</b> , and <b>C++</b> on HPC clusters running Red Hat Enterprise Linux. Analyzing large data sets generated by simulations using custom <b>Python</b> , <b>Matlab</b> , and <b>Julia</b> scripts to interact with data stored in VTK and HDF5 formats. Visualization of results from simulations using VisIt and Paraview. Developing a <b>Python</b> 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.	<b>Chapel Hill, NC</b> 2015–Present
<b>SAMSI</b> <i>Neuromechanics Working Group</i> Assisted in development and implementation of an ODE based neuromuscular model in <b>Matlab</b> .	<b>Chapel Hill, NC</b> 2015–2016
<b>University of Utah</b> <i>Mathematics Department REU</i> Developed <b>Matlab</b> 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 <b>C++</b> that produced a more than 20x speed improvement compared to the Matlab version.	<b>Salt Lake City, UT</b> 2013–2015

## Computing Skills

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**Scripting Languages:** Python, Matlab, Julia

**Typesetting:**  $\text{\LaTeX}$ , Markdown, Texmacs

**Compiled Languages:** C/C++

**Operating Systems:** Linux, Windows, Mac OS

**SAS Certified Specialist:** Base Programming Using SAS 9.4

**Other Skills:** Git, VIM, Bash

## Teaching Experience

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### 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

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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.

DM Senter, DR Douglas, WC Strickland, SG Thomas, AM Talkington, L Miller, and NA Battista. A semi-automated finite difference mesh creation method for use with immersed boundary software ib2d and ibamr. *Bioinspiration & Biomimetics*, 2020.

## Talks and Workshops

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**SUDDEN Group:** Basics of Webscraping with Python, Summer 2020 (Workshop).

**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

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**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

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**German:** Native

**Hebrew:** Intermediate