D. Michael Senter

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Education

University of North Carolina at Chapel Hill — **Chapel Hill**
Doctor of Philosophy (Ph.D.) in Mathematics — *2015–2021*
Advisor: Laura A. Miller.

University of North Carolina at Chapel Hill — **Chapel Hill**
Graduate Certificates — *2015–2021*
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**
Analytics Software Tester — *2021–Present*
Work with an agile, multinational team of testers, product managers, developers, and research statisticians to validate features of the SAS Solution for IFRS 17. Devise, implement, and execute independent tests and procedures to verify the numerical accuracy of the solution. Write and review technical documentation for both internal and external stakeholders. Automate testing through the creation of unit tests in a CI/CD framework. Write programs in SAS, SQL, Python, and Bash. Interact directly with product managers, industry experts, and developers to dest and demo new features.

UNC-CH School of Medicine — **Chapel Hill, NC**
Research Fellow — *2021–2022*
Provide statistical analysis and consultation for retrospective cohort studies with the SUDDEN group using SAS 9 (including SAS/STAT procedures) and Python. Mentor medical students on experimental design, data entry and validation, as well as appropriate interpretation of study results. Supervise a group of post-graduate, graduate, and undergraduate statisticians paired with medical students in the SUDDEN team.

SAS Analytics — **Cary, NC**
Data Science Intern — *2019–2021*
My internship within SAS Education is focused on integrating open source technologies with SAS' free academic software, developing supplemental tutorials and applied content for customers and establishing the SAS Academic GitHub. Leverage open-source offerings in Python, such as Pandas and Scikit, and integrating them with SAS 9 and SAS Viya technology via the SASPy package, to which I have contributed a new method, and the SWAT package. Develop tutorials for various academic cloud offerings, such as SAS OnDemand for Academics and SAS Viya for Learners.

UNC Chapel Hill — **Chapel Hill, NC**
Miller Lab Group — *2015–2021*
Execute fully-coupled fluid-structure interaction simulations using the immersed boundary (IB) method with software written in Python, Matlab, and C++ on HPC clusters running Red Hat Enterprise Linux. Analyzing the resulting large data sets using custom Python, Matlab, and Julia scripts to interact with data stored in VTK and HDF5 formats. Visualization of results from simulations using VisIt and Paraview as well as Matplotlib. Developed a 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*
Develop and implement an ODE based neuromuscular model in Matlab.

University of Utah **Salt Lake City, UT**

Mathematics Department REU *2013–2015*

Develop Matlab scripts that implement a novel, statistically exact covariance based algorithm for mean first passage time in complex fluids. Ported this code to a parallel version of the algorithm in C++ that produced a more than 20x speed improvement compared to the Matlab version.

Computing Skills

Scripting Languages: Python, Matlab, Julia, R

Compiled Languages: C++, Go

SAS Certified Specialist: Base Programming Using SAS 9.4

Typesetting: LaTeX, Markdown

Operating Systems: Linux, Windows, Mac OS

Other Skills: Git, SQL, Docker, Bash, Azure

Publications

D.M. Senter, N.A. Battista, B. Guy, C. Zhang, K. Ozalp, K. Ebke, V. Pasour, and L.A. Miller. The hydrodynamics of metachronal paddling in brine shrimp. *Bioinspiration & Biomimetics*, 2022 in preparation.

A. Kothari, E. Senter, D.M. Senter, A.P. Cesmat, S. Keen, and R.J. Simpson. Association of heart failure and food deserts with sudden death. In *The American Heart Association Annual Conference*, 2022 submitted.

A. Doshi, E. Senter, O. Queen, D.M. Senter, S. Keen, K. Shartle, and R.J. Simpson. Family history and chronic medical conditions associated with sudden death among working age adults. In *The American College of Preventive Medicine Annual Conference*, Denver, CO, June 2022.

S. Raghunathan, D.M. Senter, E. Senter, S. Keen, K. Shartle, and R.J. Simpson. Former incarceration as a risk factor for COVID-19 associated sudden death. In *American College of Cardiology Scientific Session*, Washington, DC, April 2022.

H. Vrooman, E. Senter, K. Shartle, S. Keen, C. Sauter, D.M. Senter, and R.J. Simpson. Housing insecurity: Effects on sudden death and interaction with mental illness. In *The American College of Cardiology Scientific Session*, Washington, DC, April 2022.

D. Michael Senter. *Immersed Boundary Simulations And Tools For Studying Insect Flight And Other Applications*. PhD thesis, University of North Carolina at Chapel Hill, 2021.

D.M. Senter, D.R. Douglas, W.C. Strickland, S.G. Thomas, A.M. Talkington, L. Miller, and N.A. Battista. A semi-automated finite difference mesh creation method for use with immersed boundary software IB2d and IBAMR. *Bioinspiration & Biomimetics*, 2020.

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

Select Talks and Workshops

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

Select 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."

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 college algebra (MATH 110) to inmates at the North Carolina Correctional Institution for Women. Designed and prepared course materials, developed all course exams.