Andrew Hicks

PhD Candidate, Department of Mathematics, Louisiana State University

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Education

Louisiana State University, Baton Rouge, LA — Aug 2018–May 2024
Ph.D. in Mathematics
Concentration: *Computational Mathematics and Numerical Analysis*
Advisor: Shawn Walker (website)
GPA: 3.98

Louisiana State University, Baton Rouge, LA — Aug 2018–December 2020
M.S. in Mathematics
GPA: 3.96

Ave Maria University, Ave Maria, FL — Aug 2013–May 2017
B.A. in Mathematics, Economics, *summa cum laude*
GPA: 3.99

Employment

Sandia National Laboratories, Albuquerque, NM
NOMAD Research Institute Intern — Summer 2022, 2023
Researched interlocking metasurfaces (ILMs) — Summer 2023
Researched pressure vessel penetration — Summer 2022

D. Hicks Consulting, Lafayette, LA — Summer 2016, Aug 2017–Aug 2018
Administrative Assistant & Webmaster
Role: Developed AutoCAD standards, designed company website

Research

"Numerical Methods for Liquid Crystals and their Optimal Design" — Jan 2020–present
Advisor: Shawn Walker
NSF grant number: DMS-1555222 (link)
Summary: Study of the Landau-de Gennes continuum mechanics model for liquid crystals
Numerical methods: Finite element method, gradient descent, Newton's method

Publications

- A.L.H and Shawn Walker. **"Modeling and Simulation of the Cholesteric Landau-de Gennes Model."** Preprint submitted, 2023. (link)

Teaching

Louisiana State University, Baton Rouge, LA

Math 1553, Calculus II Honors (instructor)	Spring 2024
Math 1550, Calculus I (instructor)	Fall 2023
Math 1550, Calculus I (instructor)	Fall 2022
Math 1021, College Algebra (instructor)	Fall 2019
Math 1431, Business Calculus (recitation instructor)	Spring 2019
Math 1431, Business Calculus (recitation instructor)	Fall 2018

Mentoring experience

- *Directed Reading Program* (DRP) in the LSU Department of Mathematics. Participated as a research mentor for undergraduate student (Fall 2023).

Conferences attended

- *Scientific Computing Around Louisiana* (SCALA 2024), Tulane University, New Orleans, LA (Jan 19-20, 2023)
- *Joint Mathematics Meetings* (JMM24), San Francisco, CA (Jan 2-6, 2024)
- *SIAM TX-LA Sectional Meeting 2023*, University of Louisiana at Lafayette, Lafayette, LA (Nov 3-4, 2023)
- *Finite Element Rodeo* (FE Rodeo 2023), Texas A&M University, College Station, TX (Mar 24-25, 2023)
- *Scientific Computing Around Louisiana* (SCALA 2023), Tulane University, New Orleans, LA (Mar 10-11, 2023)
- *SIAM TX-LA Sectional Meeting 2022*, University of Houston, Houston, TX (Nov 4-6, 2022)
- *SIAM Annual Meeting* (AN22), Pittsburgh, PA (Jul 10-13, 2022)
- *Finite Element Rodeo* (FE Rodeo 2022), Southern Methodist University, Dallas, TX (Mar 4-5, 2022)
- *Scientific Computing Around Louisiana* (SCALA 2020), Louisiana State University, Baton Rouge, LA (Feb 7-8, 2020)
- ICERM workshop: *Numerical Methods and New Perspectives for Extending Liquid Crystaline Systems*, Brown University, Providence, RI (Dec 9-13, 2019)
- *Scientific Computing Around Louisiana* (SCALA 2019), Tulane University, New Orleans, LA (Feb 15-16, 2019)
- *Advancing Student Participation in Research Experiences* (ASPiRE 2017), Florida Gulf Coast University, Fort Myers, FL (Feb 11, 2017)

Presentations

- **"Euclid's *Elements* and the Quadrivium: A Friendly Introduction."** Talk, University of St. Thomas, Houston, TX (Mar 6, 2024).
- **"Modeling and Numerical Analysis of the Cholesteric Landau-de Gennes Model."** Talk, Florida Polytechnic University, Lakeland, FL (Feb 28, 2024).

- **"Modeling and Simulation of the Cholesteric Landau-de Gennes Model."** Talk, SIAM TX-LA 2023 (Nov 4, 2023).
- **"Dynamic Tailoring of Interlocking Metasurfaces."** Talk, NOMAD 2023 (for Sandia National Laboratories), Albuquerque, NM (Aug 1, 2023).
- **"Modeling and analysis of cholesteric shells."** Talk, FE Rodeo 2023, College Station, TX (Mar 25, 2023).
- **"Modeling and analysis of cholesteric shells."** Talk, SCALA 2023, New Orleans, LA (Mar 10, 2023).
- **"Modeling and analysis of cholesteric shells."** Poster session, SIAM TX-LA 2022, Houston, TX (Nov 5, 2022).
- **"Pressure Vessel Enclosure Penetration Energy Prediction."** Talk, NOMAD 2022 (for Sandia National Laboratories), Albuquerque, NM (Aug 2, 2022).
- **"Modeling and analysis of cholesteric shells."** Poster session, SIAM Annual Meeting 2022, Pittsburgh, PA (Jul 12, 2022).
- **"Python for Beginners."** Four part, 8 hour lecture series on the Python programming language. Baton Rouge, LA, via Zoom (Oct 18–Nov 8, 2021) (here, under "recent events")
- **"The History and Ideas Behind Monsky's Theorem."** Talk, ASPiRE 2017, Fort Myers, FL (Feb 11, 2017)

Programming/software experience

Programming

- Python (highly proficient, software written, 6 hour lecture given)
- C++
- MATLAB
- Linux shell scripting
- MPI
- High Performance Computing (HPC)
- NumPy, SymPy, MatPlotLib
- Git/GitHub/GitLab
- HTML/CSS
- LaTeX

Software

- Firedrake finite element (FE) package
- Abaqus for FE analysis
- LS-Dyna for FE analysis
- AutoCAD
- Microsoft Excel, Word, etc.

Software packages

- **Q-Tensor-3D** (GitHub) – Solves the Landau-de Gennes free energy problem using finite element package Firedrake (Python)
- **SymPyPlus** (GitHub) – Does calculus of variations using SymPy as a base (Python)

Websites designed

- www.dhicksconsulting.com
- www.grecorycc.com

Relevant coursework

Finite Element Methods, Numerical Linear Algebra, Partial Differential Equations, Nonlinear Optimization, Convex Optimization, Machine Learning, Ordinary Differential Equations, Intro to Applied Math, Differential Geometry, Real Analysis, Complex Analysis

Leadership roles

Society for Industrial and Applied Mathematics, LSU Student Chapter (website)

President	Jan 2022–Dec 2023
Webmaster	Jan 2021–Dec 2021
Treasurer	Jan 2020–Dec 2020

Awards/Certifications

- **Dale Carnegie Certificate**: *Effective Communications and Human Relations* (2018)
- **Mathematics Department Award**, Ave Maria University (May 2017)
- **Economics Department Award**, Ave Maria University (May 2017)

Academic interests

Computational mathematics, numerical PDEs, liquid crystals, applied analysis

Foreign languages

- Latin (advanced reading/writing, some conversational proficiency)
- Spanish (beginner/intermediate proficiency reading, writing, speaking)
- Mandarin Chinese (beginner/intermediate proficiency in reading/writing, some conversational proficiency)

Non-math publications

"The Descent of Orpheus." Translation of portion of Ovid's *Metamorphoses* into English. *Contraries* Journal, Fall 2014.