Colin Roberts

Fort Collins, CO

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PROFESSIONAL SUMMARY

Mathematical physicist with a diverse background interested in using geometric, topological, algebraic, and analytic tools to build novel computational methods for models that incorporate real world data. I am eager to explore new content and improve my technical skills and collaborative abilities in order to solve challenging problems.

RELEVANT SKILLS

Applied math: Data assimilation, dimension reduction, geometric algebra, tensors, multiscale modeling
Communication: Teaching, delegation, research presentations, technical writing, remote collaboration.
Programming and software: Python, Matlab, Java, Git, LaTeX, Linux
Packages: Parallel computing toolbox, Numpy, Pandas, Matplotlib, TensorFlow

RELEVANT EXPERIENCE

Graduate Student | Collbarotation, Research, and Teaching **08/2017 – Present**

Colorado State University, Fort Collins, CO

- **Thesis:** Using Clifford Analysis to Study Inverse Tomography
- Author of *A Gelfand Transform for Spinor Fields on Embedded Riemannian Manifolds.* [Preprint]

Ongoing collaboration with NASA

- Writing a paper describing the practical reasons for using of Clifford algebras in (co)homology which include providing new proofs and new results.
- Writing a paper describing the topological properties of electrical components and measurement devices.

Ongoing collaboration in Data Assimilation

- Furthering development of our code base and apply our code to ocean-atmosphere models to analyze our algorithm's performance, probe non-Gaussian behavior, and explore the coupling in the sea-surface. [Github]

Teaching Background

- Taught 10 semesters, taught 7 different courses, and developed the content of 4 courses. [Materials]
- Developed an open source textbook with Matlab tools catered to the applied mathematics for chemists course sequence at Colorado State University. [Github]

NASA: Internship Program | Topological Plasmas **06/2021 – 08/2021**

NASA Glenn Research Center, Cleveland, OH (Remote)

- Brought together topological electromagnetism and topological fluid dynamics to develop a framework for the Vlasov equation for application in plasma physics in group collaboration and presented our work.

AIM: Summer Program on COVID-19 Modeling | Multiscale Modeling **06/2020 – 07/2020**

American Institute of Mathematics, San Jose, CA (Remote)

- Developed a multiscale epidemic model to predict the spread of COVID-19 in communities with schools. Presented our group's work and interviewed with American Institute of Mathematics [Github] [Link]
- Provided our codebase and insight for JBS Foods in Greeley, CO.

AIM: Engagement Program with MCRN | Data Assimilation **07/2019 – Present**

Raleigh, NC & Remote

- Worked collaboratively to develop novel data assimilation software for high dimensional nonlinear systems and presented this work at numerous conferences. [Publication]

EDUCATION

Colorado State University, Fort Collins, CO, USA **08/2012 – Present**

Doctor of Philosophy, Mathematics *Expected May 2022*
Bachelor of Science, Mathematics & Physics *May 2017*

Hobbies

Outside of my professional experience, I am an avid hiker and mountain biker. I also aspire to be a better chef, baker, and equity trader.