

# COLIN P. ROBERTS

Fort Collins, CO

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## PROFESSIONAL SUMMARY

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Mathematical physicist with a diverse background interested in developing 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

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**Applied math:** Data assimilation, dimension reduction, principal component analysis, differential equations, tensor algebra, geometric algebra, discrete differential geometry, Gaussian mixture models, multiscale modeling

**Communication:** Teaching, delegation, research presentations, technical writing, remote collaboration

**Programming and software:** Python, Matlab, Java, Git,  $\text{\LaTeX}$ , Linux, SQL

**Packages:** Parallel computing toolbox, Numpy, Pandas, Matplotlib, TensorFlow

## RELEVANT EXPERIENCE

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**Graduate Student** | Collaboration, Research, and Teaching

08/2017 – Present

Colorado State University, Fort Collins, CO

- **Thesis:** Using Clifford Analysis to Study Inverse Tomography
- Solo author of *A Gelfand Transform for Spinor Fields on Embedded Riemannian Manifolds*. [\[Preprint\]](#)

**Ongoing collaboration in Data Assimilation**


- Developing proprietary modular code base for projected particle filter algorithm. [\[Github\]](#)
- Optimizing algorithm performance through on-line dimension reduction while adding capability to probe for non-Gaussian behavior using time-varying Gaussian mixture models.

**Ongoing collaboration with NASA**

- Collaborating with experts in electromagnetics and plasmas to continue work on the Maxwell–Vlasov equation.

**Teaching Background**

- Taught 7 different courses over 10 semesters and developed the content of 4 courses. [\[Materials\]](#)
- Developed an open-source textbook and Matlab tools for an applied mathematics for chemists course. [\[Github\]](#)

**NASA: Internship Program**  | Topological Plasmas

06/2021 – 08/2021

NASA Glenn Research Center, Cleveland, OH (Remote)


- Worked with collaborators to develop a geometric framework for the Maxwell-Vlasov equation for plasmas.

**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 that incorporated real world data to predict the spread of COVID-19 in communities with schools.
- Presented our group's work and interviewed with American Institute of Mathematics. [\[Link\]](#)
- Provided our codebase and insight to JBS Foods in Greeley, CO. [\[Github\]](#)

**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

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**Colorado State University**, Fort Collins, CO, USA

08/2012 – Present

*Doctor of Philosophy, Mathematics*

*Expected June 2022*

*Bachelor of Science, Honors Student in Mathematics & Physics*

*May 2017*

## HOBBIES

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I am an avid hiker, trail runner, and mountain biker. I also aspire to be a better chef, baker, and equity trader.