

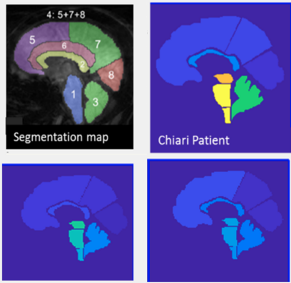
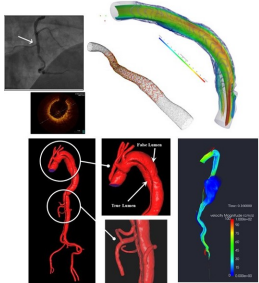
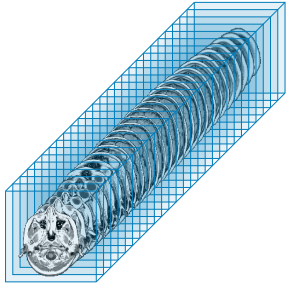
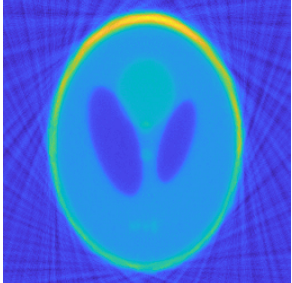
REU/RET Site: Computational Mathematics for Data Science

The Emory Research Experience for Undergraduates and Teachers site focuses on computational mathematics and its applications in data science, which impacts nearly every field of science and more and more of our daily lives. The REU/RET site will introduce undergraduate students and teachers to the mathematical theory and computational tools used in applications ranging from data assimilation to machine learning and enable them to advance these fields by solving research problems in teams. Thereby, participants actively contribute toward a mathematical understanding of data science and its applications. The site's activities are centered around a common theme that differs each year.

2021 Theme: Learning from Images

The amount of imaging data generated on a single day, let alone a year, exceeds human imagination. With their ability to statistically analyze such large datasets, computational algorithms can enhance our ability to discover patterns. Key advances in image classification, image segmentation, and object recognition have fueled applications like image search and self-driving cars. In the medical realm, computational approaches have led to efficient and accurate diagnostic tools, support of treatment decisions, and accelerated drug discovery.

This summer's theme sheds light on the mathematical methods behind the above success stories and our projects seek to bring similar advances to new applications. Some projects will develop machine learning (ML) approaches for analyzing image datasets, while others will develop partial differential equations (PDE) models for image processing. Our projects are interdisciplinary and involve leading experts from Emory's School of Medicine (SoM).

Image-Based Diagnosis of Chiari Disease	Images to Patient Specific Models in Cardiology	Tensors and Data Modeling in Neuroimaging	Point-of-Care Tomographic Imaging
			
Mentor: Lars Ruthotto	Mentor: Alessandro Veneziani	Mentor: Elizabeth Newman	Mentor: James Nagy

Prerequisites & Expectations: These research projects are accessible to teachers and undergraduate students with a strong background in Linear Algebra, Vector Calculus, Differential Equations and elementary programming experience. To help participants learn other project-specific materials, our site includes a comprehensive research training plan. Our activities include professional development, a weekly lunch seminar, and social excursions in Atlanta.

May 24 - June 11, 2021: Virtual pre-REU/RET phase

June 14 - July 30, 2021: On-campus phase (subject to COVID restrictions)

K-12 Teachers: For Eligibility, Stipend, and Application information please go to
https://www.ams.org/opportunities/view/listing?listing_id=492747

Students: For Eligibility, Stipend, and Application information please go to
https://www.ams.org/opportunities/view/listing?listing_id=492752



Department of
Mathematics

Application Deadline: Applications received by **March 1, 2021** will receive full consideration. Submit your application through mathprograms.org

Contact: CMDREURET@LISTSERV.CC.EMORY.EDU

More info: <http://www.mathcs.emory.edu/site/scicomp/REURET>



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