

Rujeko Chinomona

Department of Mathematics (038-16) ◇ 1805 N. Broad St. ◇ Philadelphia, PA, 19122
rchinomona@temple.edu

Education

Southern Methodist University (SMU) Ph.D. in Computational & Applied Mathematics Dissertation: High-Order, Flexible Multirate Integrators for Multiphysics Applications	May 2021
Rice University M.A. in Computational & Applied Mathematics Thesis: Black-oil Simulation Utilizing a Central Finite Volume Scheme	May 2016
Georgia College & State University B.S. in Mathematics & Physics	May 2014

Research Experience

Temple University Mathematics Department <i>Research Assistant Professor</i>	July 2021 - Present
<ul style="list-style-type: none">Expanding functionality and flexibility of the StaRMAP (Staggered grid Radiation Moment Approximation) software for solving spherical harmonic moment systems of radiative transfer.Implementing efficient numerical methods and exploring high-performance computing options for the Neuro-Visor project (real-time interactive signal processing in neurons with VR capabilities).	
SMU Mathematics Department <i>Research Assistant</i>	January 2018 - May 2021
<ul style="list-style-type: none">Developed new flexible and high-order numerical algorithms for multirate time integration to be used in multiphysics applications.	
Lawrence Livermore National Laboratory <i>Computing Intern</i>	June 2020 - August 2020
<ul style="list-style-type: none">Extended the MRISStep module within ARKode/SUNDIALS (a widely used open-source scientific computing software package developed at LLNL) by implementing recently developed multirate time integration techniques.Ran performance tests of new implementation on spatially serial and parallel test problems.	
Lawrence Livermore National Laboratory <i>Computing Intern</i>	June 2019 - August 2019
<ul style="list-style-type: none">Implemented multirate time stepping in an application problem in cloud microphysics.	
University of Wisconsin-Madison <i>Research Assistant</i>	May 2013 - July 2013
<ul style="list-style-type: none">NSF funded REU in Analysis and Differential Equations.	
Georgia College & State University <i>Research Assistant</i>	August 2012 - May 2014
<ul style="list-style-type: none">Worked in an atomic, molecular, optics lab; designing and constructing components of a cost effective setup for laser cooling experiments.	

Teaching Experience

Instructor

Mathematical Modeling & Simulation (<i>Temple University</i>)	Spring 2022
Calculus II (<i>Temple University</i>)	Fall 2021

Teaching Assistant

Introduction to Scientific Computing (<i>SMU</i>)	Fall 2017 - Spring 2018
Pre-Calculus (<i>Georgia College & State University</i>)	Spring 2014
Introductory Physics Lab (<i>Georgia College & State University</i>)	Spring 2012 - Fall 2013

Grader

Matrix Analysis (<i>Rice University</i>)	Fall 2014 - Fall 2015
--	-----------------------

Publications

- V.T. Luan, **R. Chinomona**, D.R. Reynolds. *Multirate Exponential Rosenbrock Methods*. (Submitted)
- **R. Chinomona**, D.R. Reynolds. *Implicit-Explicit Multirate Infinitesimal GARK Methods*. SIAM Journal on Scientific Computing 43, A3082–A3113. (2021)
- V.T. Luan, **R. Chinomona**, D.R. Reynolds. *A New Class of High-Order Methods for Multirate Differential Equations*. SIAM Journal on Scientific Computing 42, A1245–A1268. (2020)
- **R. Chinomona**, J. Lajeunesse, W. H. Mitchell, Y. Yao, and S.E. Spagnolie. *Stability and Dynamics of Magnetocapillary Interactions*. Soft Matter, 11:1828–1838. (2015)

Presentations

- *Multirate IMEX Integrators for PDEs*, ICERM Topical Workshop: Holistic Design of Time-Dependent PDE Discretizations, January 2021 (lightning talk)
- *Flexible and accurate multirate time-stepping methods for differential equations*, Applied Mathematics and Scientific Computing Seminar, Temple University, September 2021 (talk)
- *Highly Accurate and Flexible Multirate Time-Stepping Methods for Multiphysics Applications*, SIAM Annual Meeting, July 2021 (talk)
- *High-Order Implicit–Explicit Multirate Infinitesimal Methods for Multiphysics Applications*, SIAM CSE, March 2021 (talk).
- *Construction of High-Order Multirate IMEX Integrators for Large-Scale Complex Multiphysics Applications*, SIAM PP20, February 2020 (poster).
- *Comparison of High-Order Multirate Integrators*, SIAM TX-LA Section Meeting, November 2019 (poster).
- *Multirate Time Integration for Cloud Microphysics*, Lawrence Livermore National Laboratory, August 2019 (poster)
- *A New Class of High-Order Multirate Integrators for Multiphysics Applications*, SMU Research Day, March 2019 (poster).
- *A New Class of High-order, Flexible, IMEX Multirate Integrators for Multiphysics Applications*, SIAM CSE, February 2019 (talk).

Technical Skills

Programming: Proficient in Matlab, C. Experience with C++, Python, MPI, Fortran 90, OpenMP, CUDA.

Honors & Awards

SMU Dean's Dissertation Fellowship	August 2020 - May 2021
<i>Awarded to Ph.D. candidates in their dissertation-writing phase.</i>	
Haberman Fellowship	August 2020 - May 2021
<i>Awarded to top Ph.D. students within the Mathematics Department at SMU.</i>	
SMU University Ph.D. Fellowship	August 2017 - May 2021
<i>Awarded to supplement stipends of outstanding Ph.D. students over the course of their programs.</i>	
Exceptional graduating senior in STEM majors at Georgia College & State University	May 2014
Philanthropic Ventures Foundation Grace Scholarship	August 2010 - May 2014

Other Activities & Service

Math Graduate Student Seminar, Organizer	January 2020 - December 2020
Graduate Student Assembly, Mathematics Dept. Representative	January 2020 - May 2021
SMU Ph.D. Student Health Insurance Advisory Committee Member	March 2019
Judge at Dallas Regional Science & Engineering Fair	February 2019, February 2020
Treasurer of Rice University SIAM Student Chapter	August 2015 - May 2016
Payroll Student Assistant	August 2011 - May 2014