

# Rujeko Chinomona

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

## Education

---

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

## Research Experience

---

<b>Temple University Mathematics Department</b> <i>Research Assistant Professor</i>	July 2021 - Present
<ul style="list-style-type: none"><li>Expanding functionality and flexibility of the StaRMAP (Staggered grid Radiation Moment Approximation) software for solving spherical harmonic moment systems of radiative transfer.</li><li>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).</li></ul>	
<b>SMU Mathematics Department</b> <i>Research Assistant</i>	January 2018 - May 2021
<ul style="list-style-type: none"><li>Developed new flexible and high-order numerical algorithms for multirate time integration to be used in multiphysics applications.</li></ul>	
<b>Lawrence Livermore National Laboratory</b> <i>Computing Intern</i>	June 2020 - August 2020
<ul style="list-style-type: none"><li>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.</li><li>Ran performance tests of new implementation on spatially serial and parallel test problems.</li></ul>	
<b>Lawrence Livermore National Laboratory</b> <i>Computing Intern</i>	June 2019 - August 2019
<ul style="list-style-type: none"><li>Implemented multirate time stepping in an application problem in cloud microphysics.</li></ul>	
<b>University of Wisconsin-Madison</b> <i>Research Assistant</i>	May 2013 - July 2013
<ul style="list-style-type: none"><li>NSF funded REU in Analysis and Differential Equations.</li></ul>	
<b>Georgia College &amp; State University</b> <i>Research Assistant</i>	August 2012 - May 2014
<ul style="list-style-type: none"><li>Worked in an atomic, molecular, optics lab; designing and constructing components of a cost effective setup for laser cooling experiments.</li></ul>	

## Teaching Experience

---

### Instructor

Mathematical Modeling & Simulation ( <i>Temple University</i> ) <i>Created instructional videos for the College of Science and Technology.</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 &amp; State University</i> )	Spring 2014
Introductory Physics Lab ( <i>Georgia College &amp; State University</i> )	Spring 2012 - Fall 2013

## Grader

Matrix Analysis (*Rice University*)  
Numerical PDEs (*Rice University*)

Fall 2014 - Fall 2015  
Spring 2016

## 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 2022 (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 <i>Awarded to Ph.D. candidates in their dissertation-writing phase.</i>	August 2020 - May 2021
Haberman Fellowship <i>Awarded to top Ph.D. students within the Mathematics Department at SMU.</i>	August 2020 - May 2021
SMU University Ph.D. Fellowship <i>Awarded to supplement stipends of outstanding Ph.D. students over the course of their programs.</i>	August 2017 - May 2021
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