Gabriel Guidarelli

gcguidarelli@gmail.com | 585.857.2392 | gcg3642@g.rit.edu
Website: guidarellig.github.io | Linkedin: in/gabriel-guidarelli-00202896

Mathematical Modeling • Machine Learning/Artificial Intelligence • High Performance Computing

EDUCATION

PHD, ASTRO-INFORMATICS AND COMPUTATIONAL ASTROPHYSICS—GENERAL RELATIVITY

Rochester Institute of Technology || Expected: June 2021

MS, ASTROPHYSICAL SCIENCES AND TECHNOLOGY

Rochester Institute of Technology || Received: May 2018 || Total GPA: 3.7 / 4.0

BA, PHYSICS & MATHEMATICS DOUBLE MAJOR

SUNY Geneseo || May 2016 || Total GPA: 3.5 / 4.0 || Major GPA: 3.8 / 4.0

RESEARCH

CENTER FOR COMPUTATIONAL RELATIVITY AND GRAVITATION | Graduate Research Assistant

Aug 2016 – present || Rochester, NY

With **Dr. Jason Nordhaus** and **U of R Astrophysics Department**, I create 3D Magneto-Hydrodynamic (MHD) simulations of post-main-sequence stellar interactions to refine and extend current theories about various object formation. Simulations are done with the multi-physics code **Astrobear** and the output is reduced with the visualization software **Visit** as well as Python.

EXPERIENCE

NEW SCALE TECHNOLOGIES | Software Engineer/ Laboratory Technician

May 2016 - Sept 2016 || Victor, NY

- Designed and programmed control systems to optimize efficiency of piezoelectric motor modules.
- Created LabView GUIs to control various products.
- Tested and analyzed new products for research and development.

PROJECTS

CONNECT4 AI

I wrote an efficient recursive game tree search algorithm with alpha-beta pruning. This was written in LabVIEW and interfaced with a robot arm and camera to physically play Connect4.

HYDROSTATIC SOLVER FOR 3D NUMERICAL GRIDS

I created an RK4 numerical integrator that shoots mass consistent solutions to modified hydrostatic equations. This was used in publications to map large scale 1D profiles to under-resolved 3D numerical grids.

2D BOLTZMANN LATTICE ON GPU

I applied Boltzmann Lattice Method for Computational Fluid Dynamics to a 2D numerical grid simulating a wind tunnel. This simulation was accelerated with an Nvidia GPU. The code was written in C++ with the CUDA library.

PROGRAMMING

Experienced: Python• C++ • C • Java • Mathematica • LaTeX• LabView • FORTRAN
Familiar: MATLAB • Javascript • IDL• HTML
Source Control: Git

COURSEWORK

GRADUATE

Advanced General Relativity
Fluid Dynamics
Electrodynamics I&II
Computational Methods
Mathematical Methods
Stellar Astrophysics I&II

UNDERGRADUATE

Real Analysis
Vector Analysis
Complex Analysis
Abstract Algebra
Classical Mechanics
Quantum Mechanics
Instrumentation & Interfacing

AWARDED COMPUTATIONAL GRANTS

2019 XSEDE Computation Time AST180039 Renewal:
TACC Dell/Intel Knights Landing, Skylake System (Stampede2): 41,856.4 Nhrs
TACC Long-term tape Archival Storage (Ranch): 20,000.0 GB

2018 XSEDE Computation Time AST180039:
TACC Dell/Intel Knights Landing, Skylake System (Stampede2): 34,394.0 Nhrs
TACC Long-term tape Archival Storage (Ranch): 20,000.0 GB

PUBLICATIONS

[1] **Guidarelli, G.**, J. Nordhaus, J. Carroll-Nellenback, L. Chamandy, Z. Chen, E. G. Blackman, and A. Frank. The Formation of Discs in the Interior of AGB Stars from the Tidal Disruption of Planets and Brown Dwarfs. , In Prep:, Apr. 2021.

[2] **Guidarelli, G.**, J. Nordhaus, L. Chamandy, Z. Chen, E. G. Blackman, A. Frank, J. Carroll-Nellenback, and B. Liu. Hydrodynamic simulations of disrupted planetary accretion discs inside the core of an AGB star. , 490(1):1179–1185, Nov. 2019.