

Gabriel Guidarelli

my website | RIT website
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EDUCATION

ROCHESTER INSTITUTE OF TECHNOLOGY

PHD IN ASTROPHYSICAL SCIENCES
AND TECHNOLOGY
expected: May 2021 | Rochester, NY
MS IN ASTROPHYSICAL SCIENCES
AND TECHNOLOGY
May 2018 | Rochester, NY

SUNY GENESEO

BA IN PHYSICS & BA IN
MATHEMATICS
May 2016 | Geneseo, NY
Total GPA: 3.5 / 4.0
Major GPA: 3.8 / 4.0

LINKS

Personal:// guidarelli.github.io
RIT:// gabriel.guidarelli
Github:// guidarellig
LinkedIn:// gabriel-guidarelli

COURSEWORK

GRADUATE

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

UNDERGRADUATE

Real Analysis
Vector Analysis
Complex Analysis
Abstract Algebra
Classical Mechanics
Quantum Mechanics
Instrumentation & Interfacing
(Research Asst. & Lab instructor 3x)

SKILLS

PROGRAMMING

Over 5000 Lines:
Python • C++ • C • Java • Mathematica
L^AT_EX • LabView • FORTRAN
Familiar:
CSS • PHP • MATLAB • Javascript • IDL •
CUDA
Source Control:
Git

RESEARCH

RIT 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.

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.

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.

AWARDED GRANTS

- 2019 XSEDE Comutation 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 Comutation 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, 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.