

Ian Ruchlin PhD

**Astrophysicist, Mathematician, & Developer
seeking Data Scientist position.**

Previous Employment

West Virginia University
Department of Mathematics

Postdoctoral Research Associate
Sept. 2015 – June 2018

Developed custom open source computer code to simulate and study gravitational phenomena which became 180 times more efficient than our competitors. This work has been presented at 5 conferences, lead to 2 publications in *Physical Review D*, and the creation of an Open Source Project named SENR/NRPy+.

Technologies and skills include: Python, C, C++, Mathematica, Jupyter, Einstein Toolkit, Git, Linux, Tensor Calculus, NonLinear Differential Equations, Numerical Analysis, Linear Algebra, Complex Analysis, Differential Geometry, Probability and Statistics.

Rochester Institute of Technology
Center for Computational Relativity and Gravitation

Graduate Research Associate
June 2011 – Aug. 2015

Created simulations of highly spinning black hole binary in-spirals and mergers using custom computer code. Simulations use nonlinear, full numerical relativity. Code and resulting research has lead to 4 publications in *Physical Review D*, 4 grants, 2 fellowships, and 18 conference presentations.

Technologies and skills include: C, C++, Einstein Toolkit, High Performance Computing, Maple, CVS, Linux, Tensor Calculus, Linear Algebra, Numerical Analysis, NonLinear Differential Equations, Differential Geometry.

Education

Rochester Institute of Technology

Graduated Aug. 2015

Ph.D. in Astrophysical Sciences and Technologies

Dissertation: *Puncture Initial Data and Evolution of Black Hole Binaries
with High Speed and High Spin*

Syracuse University

Graduated May 2010

Dual B.S. Degrees in Physics and Mathematics

Skills

C, C++, Python, Java, Mathematica, Maple, Matlab, Jupyter, GSL, Einstein Toolkit, TensorFlow, Keras, Pandas, LaTeX, Linux (Fedora, Ubuntu, and CentOS), bash, awk, gnuplot, Excel, HTML, CSS

Object Oriented Programming, Numerical Optimization, OpenMP, compiler intrinsics, automatic code generation, symmetry utilization, algorithm generalization, automatic boundary conditions

Skills cont'd

Numerical Relativity, General Relativity, Tensor Calculus, Nonlinear Differential Equations, Numerical Analysis, Linear Algebra, Differential Geometry, Complex Analysis, Probability and Statistics

Presenting to large audiences, written and oral communication skills, and able to explain complicated topics to experts and average median people, alike

Open Source Projects

SENr/NRPy+

https://bitbucket.org/zach_etienne/nrpy

Core Developer

A suite of tools for numerically solving partial differential equations using finite element methods in curvilinear coordinate systems with minimal computational resources.

NRPy+ provides a Python-based interface in which differential equations can be entered by the user in their natural form. The output is the equation in numerically optimized C code.

SENr provides the algorithmic framework that combines the differential equation C codes generated by NRPy+ into a highly efficient, fully functional numerical evolution code.

Publications

Select publications included. For a complete list, please see my website.

Title *SENr/NRPy+: Numerical relativity in singular curvilinear coordinate systems*
Authors Ian Ruchlin, Zachariah B. Etienne, and Thomas W. Baumgarte
Published In Physical Review D (97) 064036. Mar. 2018

Title *Puncture initial data for black-hole binaries with high spins and high boosts*
Authors Ian Ruchlin, James Healy, Carlos O. Lousto, and Yosef Zlochower
Published In Physical Review D (95) 024033. Jan. 2017

Title *Calculating a confidence interval on the sum of binned leakage*
Authors Ian Ruchlin and Richard W. Schnee
Published In Nuclear Instruments and Methods in Physics Research Section A. Volume 664, Issue 1, Pages 336–340. Feb. 2012

References available upon request