Monica M. Rizzo

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Research

Interests Multimessenger astrophysics, gravitational wave parameter estimation, neutron star astrophysics

Undergraduate Researcher, CIERA Northwestern, Evanston, IL   June 2017 - August 2017

Under Dr. Vicky Kalogera and Dr. Chris Pankow, I created a set of routines to calculate the amount of ejected matter and resulting kilonova light curve for neutron star-black hole and binary neutron star merger events. I then assessed the effect of different nuclear equations of state on the ejecta mass distributions and light curves.

Undergraduate Researcher, Center for Computational Relativity and Gravitation at RIT, Rochester, NY
May 2015 - Present

Worked with Dr. Richard OShaughnessy on a project where we compared the capabilities of two parameter estimation models - a tidally corrected T4 model and an effective one-body model which includes tides - for gravitational waves from binary neutron stars.
Under Dr. Joshua Faber I modeled inspiralling binary neutron stars using a smoothed-particle hydrodynamics code (Starcrash) to study how the amount of matter they eject is affected by their physical parameters.
Currently, I am scheduled to begin working on a project with Dr. Richard O'Shaughnessy where we will attempt to place constraints on a neutron star nuclear equation of state using hierarchical modeling techniques. Additionally, I have been a member of the LIGO Scientific Collaboration since June 2016, and contribute to improving and optimizing their rapid parameter estimation techniques.

Undergraduate Researcher, RIT Physics Department, Rochester, NY   March 2015 - June 2015

Under Dr. Mishkatul Bhattacharya, I assisted Dr. Brandon Rodenburg in his work involving the optical trapping of a nanoparticle. I solved several phonon dynamics equations to determine stable regimes of cooling, and generated several figures to illustrate these regimes.

Work Experience

Teaching Assistant, RIT Physics/Math Department, Rochester, NY   September 2015 - Present
- Assisted in teaching University Physics I to undergraduate students and graded weekly quizzes (September 2015-May 2016)
- Assisted in teaching and grading weekly workshops for Calculus A (September 2016-December 2016)
- Currently assist in teaching and grading for University Physics II

Cashier, Home Depot, Rochester, NY   July 2016 - December 2016
- Assisted customers at item checkout and operated point-of-sale system

Office Assistant RIT Physics Department, Rochester, NY   February - May 2015
- Performed duties of principal office assistant to aid in management of department affairs
- Helped set up and clean up after department events

IT Intern, Aurubis Buffalo Inc., Buffalo, NY   June 2014 - February 2015
- Helped office workers solve computer issues
- Made considerable progress on project to update worker incentive system

- Assisted IT employees in maintaining systems in the copper mill

Organizations

2015-Present	Society of Physics Students *Executive Board: Webmaster*
2015-Present	RIT Center for Computational Relativity and Gravitation
2015-Present	LIGO Scientific Collaboration
2014-2017	RIT Honors Program
2014-2016	RIT Computer Science House

Education

B.S. in Physics, Rochester Institute of Technology, Rochester, NY, Expected May 2018

Minor in Mathematics   GPA: 3.64/4.0

Undergraduate Coursework

Mathematical Methods in Physics (PHYS 320)
Classical Mechanics (PHYS 300)
Electricity and Magnetism (PHYS 411)
Numerical Linear Algebra (MATH 412)
Numerical Analysis (MATH 411)
Advanced Computational Physics (PHYS 377)
Advanced Laboratory in Physics (PHYS 316)
Boundary Value Problems (MATH 326)

Presentations

Talks

- *Constraining a Neutron Star Equation of State using Heirarchical Population Inference*, RIT Physics Capstone Prep Talks, Rochester, NY, May 2017
- *Measuring Ejecta from Inspiralling Binary Neutron Stars using Smoothed-particle Hydrodynamics*, Rochester Institute of Technology Undergraduate Research Symposium, Rochester NY, August 2016
- *Parameter Estimation of Binary Neutron Star Gravitational Wave Signals using Effective One Body Model*, Rochester Institute of Technology Undergraduate Research Symposium, Rochester NY, August 2015

Posters

- *Equation of State Effects on Binary Neutron Star and Neutron Star-Black Hole Merger Ejecta*, CIERA REU, Evanston, IL, August 2017
- *Measuring Ejecta from Inspiralling Binary Neutron Stars using Smoothed-particle Hydrodynamics*, APS April Meeting, Washington, DC, January 2017
- *Parameter Estimation of Binary Neutron Stars using an Effective One Body Model Including Tidal Interactions*, APS April Meeting, Salt Lake City, UT, April 2016

Community Service

Student Volunteer Western NY Future City Competition, Tonawanda, NY   January 2015, 2016

- – Judged and scored students' city model designs, presentations, essays, and SIM City models
- – Helped organize and run the competition

Assistant Science Olympiad Mentor, Buffalo Academy of the Sacred Heart   January 2015

- – Assisted students in preparing build projects for Science Olympiad competition
- – Tutored and communicated study skills to students participating in exam events

Computer Skills

Languages: **Proficient**: Python, C#, C++, Mathematica, Bash, LaTex, HTML/CSS
Familiar: Matlab, Visual Basic, Fortran

Software: Microsoft Office, Starcrash (J. Faber et. al.), Autodesk Maya, Photoshop, Gimp, Creo Parametric, MESA (B. Paxton et. al.), Gnuplot, SpecTECH