Erica L. Fogerty

Curriculum Vitae
Sept 1, 2017

Center for Theoretical Astrophysics
Los Alamos National Laboratory
TA 3-200, Room 278
Los Alamos, N.M. 87545

Office: 505-667-3553
Mobile: 585-216-5851
Email: efogerty@lanl.gov
URL: http://www.pas.rochester.edu/∼erica

Citizenship

United States

Research Interests

I am broadly interested in MHD/hydrodynamics, with a focus on astrophysical contexts. My work primarily explores the formation and evolution of molecular clouds and stars, but I am also interested in the dynamics of supernova engines, protoplanetary disks, exoplanetary atmospheres/climates, and astrochemistry.

Appointments

2017 – Postdoctoral Research Associate, Los Alamos National Laboratory
2011 - 17 Graduate Research Assistant, University of Rochester, Astronomy
2010 - 11 Graduate Teaching Assistant, University of Rochester, Physics
2008 - 09 Take Five Scholar, University of Rochester, Physics

Education

2017 PH.D. in Physics & Astronomy, University of Rochester
2013 M.A. in Physics, University of Rochester
2008 B.S. in Neuroscience, University of Rochester, *cum laude*

Publications

Refereed Journal Articles

2017 Haig, C., Heitsch, F., **Fogerty, E.**, "A 2D Parameter Study of the Effects of Shear on Flow-Driven Molecular Cloud Formation", *submitted*.

2017 **Fogerty, E.**, Carroll-Nellenback, J., Frank, A., Heitsch, F., Pon, A. (2017), "Reorienting MHD Colliding Flows: A Shock Physics Mechanism for Generating Filaments Normal to Magnetic Fields", *Monthly Notices of the Royal Astronomical Society (MNRAS)*, 470:2938F.

2016 **Fogerty, E.**, Frank, A., Heitsch, F., Carroll-Nellenback, J., Haig, C., Adams, M. (2016), "Molecular Cloud Formation in High-Shear, Magnetized Colliding Flows", *MNRAS*, 460:2110.

2014 **Kaminski. E**, Frank, A., Carroll, J., Myers, P. (2014), "On the Role of Ambient Environments in the Collapse of Bonnor-Ebert Spheres", *Astrophysical Journal (ApJ)*, 790:70.

Conference Proceedings

2013 **Kaminski, E.**, Frank A., Carroll, J., Myers, P. (2013), "Simulating Bonnor-Ebert Sphere Collapse in Realistic Environments", Protostars and Planets VI Posters, Poster *#1Bo86*.

Fellowships, Grants, & Awards

2016 Tamor Grant, University of Rochester. Grant supported a trip to Australia to work on computational star formation at the Australian National University.

2014 Visualization contest 1st place winner for work on molecular cloud formation and evolution. Center for Integrated Research and Computing, Rochester, NY.

2010 Graduate Assistance in Areas of National Need (GAANN) Fellowship in Physics & Astronomy. Three year fellowship funded by the Department of Education.

2010 Frank J. Horton Graduate Research Fellowship. Three year research fellowship funded by the University of Rochester's Laboratory for Laser Energetics.

2009 Take-Five Scholarship, University of Rochester. Scholarship funded a tuition-free year of study at the University in quantum mechanics.

Conference Activity

Posters Presented

2016

"Molecular Cloud Formation and Reorientation in High Shear, Magnetized Colliding Flows", VIALACTEA 2016: The Milky Way as a Star Formation Engine, Rome, Italy, Sept. 26-30

2016 "Molecular Cloud Formation and Reorientation in High Shear, Magnetized Colliding Flows", Star Formation 2016, University of Exeter, Exeter, England, Aug. 21-26

2014 "Colliding Flows with AstroBEAR: The Effects of Shear and Magnetic Fields on the Formation and Evolution of Molecular Clouds", Filaments 2014, National Radio Astronomy Observatory, Charlottesville, VA, Oct. 10-11

2014 "Colliding Flows with AstroBEAR: The Effects of Shear and Magnetic Fields on the Formation and Evolution of Molecular Clouds", Center for Integrated Research Computing, Rochester, NY, May 16

2013 "Simulating Bonnor-Ebert Sphere Collapse in Realistic Environments", Protostars and Planets VI, Max Planck Institute for Astrophysics, Heidelberg, Germany, July 15-20

Additional Conferences Attended

2015 Dynamics of the Interstellar Medium and Star Formation, International Max Planck Research School of Astronomy, Heidelberg, Germany, Sept. 21-25

2014 Fire Down Below: The Impact of Feedback on Star and Galaxy Formation, Kavli Institute for Theoretical Physics, Santa Barbara, CA, April 14-18

2013 Star Formation Jamboree, McMaster University, Hamilton, Canada May 6-7

Invited Talks

2018 "The Dynamics of Magnetized Clouds and Filaments in Relation to Star Formation," University College London, January (upcoming)

2017 "Cloudy with a Chance of Star Formation", Department of Physics & Astronomy, University of Nebraska @ Kearney, February 17

2017 "From Clouds to Cores: Modeling Star Formation with Astrobear2.0", Research School of Astronomy & Astrophysics, Australian National University, January 31

2015 "Supernova in a Box: Computational Science as a Means to Study the Cosmos", Laboratory for Laser Energetics, Rochester, Feb. 28

2015 "Modeling molecular cloud formation with Astrobear2.0", Research Computing Symposium, Center for Integrated Research and Computing, Rochester, February 20

2014 "Supernova in a Box: Computational Science as a Means to Study the Cosmos", Laboratory for Laser Energetics, Rochester, Feb. 23

Selected Internal Talks

2015 "Molecular Cloud Formation in High Shear, Magnetized Colliding Flows", University of Rochester, Dec. 9

2013 "On the Role of Ambient Environments in the Collapse of Bonnor-Ebert Spheres", University of Rochester, Dec. 5

Code Contributions to AstroBEAR

Sink Particle Radiative Feedback
The accretion luminosity is computed for each sink particle and injected into a spherical volume surrounding the sink. It then diffuses through the grid via flux-limited diffusion.

Cylindrical Self-Gravity Solver
Self-gravity routines solve the cylindrical Poisson equation for the gravitational potential when running simulations in cylindrical geometry.

Bonnor-Ebert Sphere Module
Numerical solution of the Lane-Emden equation allows a 'Bonnor-Ebert' sphere to be initialized on the grid and perturbed into collapse.

Polytrope Pressure Profiles
Numerical solution of the generalized Lane-Emden equation allows arbitrary polytropes to be initialized on the grid.

Outflow Feedback
Sink particles inject a collimated jet and wide angle wind into the grid, following Federrath et al. 2014.

Code Optimization
Optimization enhancements include MPI threading, parallelized I/O processing, automatic restarts on supercomputer queuing systems.

AstroBEAR Test Suite
Analytical test of the self-gravity solver (c.f. Kaminski et al. 2014) and various problem modules comprise a standard test suite for AstroBEAR development.

Mentoring Experience

2015 Supervised Marissa Adams, a graduate student in physics & astronomy. Ms. Adams is a co-author on a paper that was published in the Monthly Notices of the Royal Astronomical Society on molecular cloud formation.

2014 Supervised Erini Lambrides, an undergraduate in physics & astronomy. Mentored Ms. Lambrides on algorithm development for AstroBEAR. Ms. Lambrides is now

a graduate student at Johns Hopkins University.

Educational Outreach

General Public

2015 Speaker at Rochester's chapter of 'Astronomy on Tap', a national outreach program designed for advancing public awareness of astronomy. Talk title: "Bones, Tombs, and Planets: The Mysterious Origins of Prehistoric Astronomy", Boulder Cafe, Rochester, NY, Oct. 16

Urban Youth

2016 Delivered a presentation on research opportunities in astrophysics for visiting city high school students, University of Rochester, Nov. 7

2016 Discussed current astrophysics research topics with visiting city high school students, University of Rochester, Feb. 28

2014 Developed and taught an astrophysics summer camp for Rochester urban youth (K-12) through the Warner School of Education, University of Rochester, June-August

2013 Was invited to give the opening address for the Rochester City School District's Science Day, University of Rochester, Oct. 18

2013 Was invited to speak to science students on my research and experiences in academia. Talk title:"Supernova in a Box: Computational Science as a Means to Study the Cosmos", Monroe Community College, Rochester, NY, April 20

Women-in-Science

2016 Organized a round-table discussion and luncheon with visiting seminar speaker, Dr. Alexandra Zidovska, for female physics graduate students, University of Rochester, Oct. 26

2016 Wrote a departmental proposal for women-in-science career development. This proposal outlined the workload of a fellow that would build and maintain an active women-in-science program in the department and wider campus community, University of Rochester, Feb. 15

2015 Organized and moderated a public forum on science policy with Dr. Gabrielle Tepp. This was an interdepartmental women-in-science career development event, University of Rochester, April 29

Teaching Experience

2015 AST 104: The Solar System *(lecturer)*. Spring semester. Classes include: solar structure, Kirchoff's laws of radiation, spectral classification. University of Rochester.

2015 PHY 114: Electricity and Magnetism *(workshop leader)*. Spring semester. Guided students in solving physics problem sets during weekly workshops, graded homework and exams, tutored students. University of Rochester.

2014 AST 105: Intro to the Milky Way Galaxy *(lecturer)*. Fall semester. Classes include: the history of astronomy, orbital motion, stellar spectra, and gravity. University of Rochester.

2014 AST 106: Cosmic Origins of Life *(lecturer)*. Spring semester. Lectures on habitability and sustainability. Moderated student discussion on humanity's role and responsibility in climate change. University of Rochester.

2011 PHY 114: Electricity and Magnetism *(workshop leader)*. Spring semester. Guided students in solving physics problem sets during weekly workshops, graded homework and exams, tutored students. Held exam review sessions. University of Rochester.

2010 PHY 113: Mechanics *(workshop leader)*. Fall semester. Guided students in solving physics problem sets during weekly workshops, graded homework and exams, tutored students. University of Rochester.

Departmental Service

2015 Initiated a weekly 'Astro-ph' coffee meeting for the astrophysics group, and led the group in discussion of new literature during the academic year.

2014-present 'VoxCharta' administrator. VoxCharta provides an online listing of new and recent astrophysics journal articles, and fosters communication between researchers across many institutions.

2014 Organized bi-weekly seminar lunches for visiting speakers and the astronomy group during the academic year.