University of Rochester

Summer 2011 undergraduate research in Physics, Optics, and Astronomy

(Including a partial list of Journal articles and Conference Proceedings co-authored by the REU students, updated Dec. 17, 2011)

1. Scott Barenfeld, class of '12 at the University of Rochester, worked with Prof. Eric Mamajek and his post-doctoral student Eric Bubar on a detailed spectroscopic and kinematic study of the AB Doradus moving group, in order to determine the reality of the co-evolutionary nature of the group. He plans to apply to graduate school in astrophysics.()

1. **Analysis of GALFACTS Data for the Study of Variable Radio Sources** (RSPS 2011) Scott Barenfeld[1], T. Ghosh[2], and C. Salter[2] (1) NAIC/University of Rochester, (2) NAIC

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2. **Rachel Bierasinski, class of '13** at the University of Rochester, worked under the supervision of Prof. Steven Manly for the Pre-College Experience in Physics program for young women. This program exposes young women to physics and applied sciences through interactive lectures, labs and activities. Rachel is a mechanical engineering major and plans to attend graduate school at the University of Rochester.

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3. **Alexander Breindel, class of '13** at University of Rochester, worked with Professor Esther Conwell on hole transport in DNA. He plans to apply to graduate school for physics.

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4. **Sarah Carlus, class of '13** at Juniata College, investigated the properties of Airy-class beams with Professor Jannick Rolland. She plans on applying to graduate school in physics.

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5. **Jeffrey Citron, class of '13** at University of Rochester, worked with Prof. Bocko on measuring microphone response data in an anechoic chamber to discern quantifiable differences in responses for microphones offset from an oncoming signal. He plans on continuing work with music, physics, and engineering.

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6. **Mary Clark, class of '12** at the University of Edinburgh, worked with Dr. Gabe Perdue and Prof. Kevin McFarland on a new electronics timing simulation for the MINERvA Monte Carlo program. She also worked with Prof. Kevin McFarland on neutrino deep inelastic scattering. She plans to apply to graduate school in physics.

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7. **Mikhail Davydov, class of `12** at SUNY Binghamton, worked with the research group of Prof. Regina Demina on a Monte Carlo study on the measurement of the fraction [F_0] of longitudinally polarized W bosons in the +jets channel of events, using the matrix element analysis technique. This was conducted for the purpose of generation of simulated statistical data intended for a more accurate determination of F_0 from experimental data.

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8. **Karen Farbman, class of '13** at the University of Rochester, worked with Professor Mark Bocko to visualize the oscillations of the air jet in a flute using Schlieren photography and a high speed

camera. She plans to apply to graduate school for physics.

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9. **William Foreman, class of '12** at SUNY at Stony Brook, worked with the research group of Prof. A. Garcia-Bellido. He optimized the main election criteria for the measurement of the single-top cross section in the DZero experiment.

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10. **Julieta Gruszko, class of '12** at University of Rochester, worked with Lynne Orr on top quark production asymmetry at Fermilab. She plans on applying to graduate school for physics.

1. E.E. Mamajek and J. Gruszko, "A Complied Catalogue of Ca II H & K Chromospheric Activity Measurements for FGK-type HD and HIP
stars", Astrophysical J., p. , vol. , (2011). in preparation,

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11. Imran Hasan, class of '12 at the University of Rochester, studied the three body capture of binary planetesimals around planets with Professor Alice Quillen. He plants to apply to graduate school for astronomy.

1. 2011arXiv1112.0577Q Quillen, Alice C.; Hasan, Imran; Moore, Alexander Capture of Irregular Satellites via Binary Planetesimal Exchange Reactions in Migrating Planetary Systems (*)

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12. **Josh Kaisen, class of '13** at Ohio University, worked with Kevin McFarland on tracking pedestal values and removing crosstalk using Peirce's Criterion, a mathematical outlier removal method. He plans to apply to graduate school in applied mathematical physics.

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13. **Steven Keys, class of '12** at the University of Florida, diagnosed and repaired hardware malfunctions with the newly-installed veto wall of the MINERvA neutrino detector, characterized spare scintillator paddles via radioactive source mapping, and worked on an efficiency analysis of the veto wall.

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14. **Emily Lawson, class of '13** at the University of Rochester organized and taught the Pre-College Experience in Physics (PREP) Program for young women under the direction of Professor Steve Manly. PREP is a program designed for local high school girls in order to encourage them to pursue careers in physics-related fields. Emily plans to attend the Warner School of Education after earning her physics degree.

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15. **Bin Lin, class of '13** at the University of Rochester, worked with Prof. Adam Frank on studying the bipolar outflows of the proto-planetary nebula CRL 618 using a Fortran-based code environment AstroBEAR. She plan on applying to graduate school in astrophysics.()

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16**. Laura Maguire, class of '13** at Harvey Mudd College, worked in John Howell's lab on an imaging system to investigate compressive sensing of sparse images at low light levels. She plans on applying to graduate school for physics.()

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17. **Robert McKinley, class of '13** at the University of Rochester, studied the magnetic properties of the Imilac Pallasite meteorite with Professor John Tarduno. He is currently unsure about his post-graduate plans.()

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18. **Joseph D. Murphree, Class of 2012** at Kenyon College, worked with Prof. Nicholas Bigelow to create a model using Mathematica of a hybrid Magnetic/Optical-Dipole trap used to assist in the implementation of the trap in the lab. He plans to attend graduate school in Physics.

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19. **Ulascan Sarica, Class of 2013** at the University of Rochester, studied with Prof. Arie Bodek the low nu method at low energies to determine neutrino flux and compared various cross section model predictions to GENIE Monte Carlo simulations. He is planning on applying to graduate school in physics.

1. Investigation of the Low ν Method to Determine Neutrino Flux at Low Energies, Ulascan Sarica, (Advisor, Arie Bodek) - Rochester Academy of Science Fall 2011 Scientific Papers Day Saturday, October 29, 2011, Monroe Community College, Rochester, NY
2. Investigation of the Low ν Method to Determine Neutrino Flux at Low Energies, Ulascan Sarica, (Advisor, Arie Bodek), American Physical Society Meeting, Atlanta Geogria, April, 2012.
3. Investigation of the Low ν Method to Determine Neutrino Flux at Low Energies, Ulascan Sarica, (Advisor, Arie Bodek), NCUR (2012)

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2**0. Robert Siller, class of '12 a**t the University of Rochester, worked with Chuang Ren and Eric Blackman on energy analysis of perpendicular shocks in low mach number shocks. He plans on applying to graduate schools in plasma physics.

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21. **Marek Slipski, class of '11** at the University of Rochester, worked with Professor Eric Mamajek to create a list of dwarf stars within 130 parsecs using reduced proper motion diagrams. He will soon be applying to graduate school in astronomy.

1. Marek Slipski and Eric E Mamajek, "Improved Age Estimates for Solar-Type Main Sequence Stars Harboring Exoplanets Usng Chromospheric
Activity", Astrophysical Journal, p. , vol. , (2010). Submitted,

1. 2010AAS...21542301S Slipski, Marek; Mamajek, E. E. , Improved Ages Estimates for Extrasolar Planet Host Stars, American Astronomical Society, AAS Meeting #215, #423.01; Bulletin of the American Astronomical Society, Vol. 42, p.326, 1/2010. (*)

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22. **Mallory Smith, class of '12** at the University at Albany, worked with Prof. Jannick Rolland on the Hilbert Memorial Telescope to test aberrations of a misaligned system. She plans on entering the work field first and then applying to graduate school.

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23. **Rebecca Stabile, class of '13** at Carnegie Mellon University, worked with Prof. J. Rolland using data from a swept-source optical coherence tomography system to map the thickness profile of a multilayer gradient-refractive-index (GRIN) polymer composed of PMMA and SAN17.

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24. **Susanna Todaro, class of '12** at Harvey Mudd College, worked with Prof. N. Bigelow to build a tunable laser centered at 852nm with a power range of 5 mW - 250 mW that can be used for photoassociation of ultracold NaCs molecules. She plans to apply to graduate school for atomic, molecular, and optical physics.

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25. **Alexander Turinske, class of '12** at the University of Wisconsin, Oshkosh, worked with the research group of Prof. Yongli Gao. and studied the effects of vacuum annealing on an air-exposed layer of molybdenum oxide's (MoO_x) electronic structure through ultraviolet/x-ray photoemission spectroscopy (UPS/XPS).

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26. **Jeff VanKerkhove, class of 2011** at the University of Rochester, studied the evolution of dust species in the disks of T Tauri stars with professor Bill Forrest. He plans on applying to graduate school for physics or astronomy. ()

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27. **Vincent Yu, class of '14** at the University of Rochester, worked with Prof. Dan Watson and Dr. Manoj Puravankara. He analyzed spectral lines in far infrared spectra of protostars from the Herschel Orion Protostar Survey, and derived physical conditions for rotationally-excited carbon monoxide in protostars. He plans to apply to graduate school for astrophysics.()

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