

ANTHONY CRIDER

Campus Box 2625
Elon University
Elon, NC 27244

acrider@elon.edu
(336) 686-5073
www.elon.edu/acrider

EDUCATION

Rice University (Houston, TX)

1999 – Doctor of Philosophy - Space Physics and Astronomy

1998 – Master of Science - Space Physics and Astronomy

Bowling Green State University (Bowling Green, OH)

1993 – Bachelor of Science - Major in Physics, Minor in Mathematics

ACADEMIC AND RESEARCH APPOINTMENTS

Elon University

Associate Professor of Physics (2006-present) - Awarded multiple National Science Foundation grants for science education. Created and assessed both in-class and on-line games for education. Developed and taught courses for the General Studies, Honors, Physics, and iMedia programs.

Chair, Department of Physics (2008-2012) - Spearheaded the five-year physics department plan, with emphasis on science outreach. Organized a new on-campus robotics initiative. Created a new minor in astronomy.

Assistant Professor of Physics (2002-2006) - Developed and tested classroom pedagogies in astronomy and physics courses. Continued research in gamma-ray astronomy. Guided student construction of a robotic observatory.

American University

Interim Coordinator of Multimedia Design & Development Program (2001-2002) - Coordinated the efforts of departments in the interdisciplinary multimedia degree program. Collected data and calculated projections for enrollments.

Assistant Professor (2000-2002) - Instructed physics courses, using on-line homework, Just-in-Time Teaching, and workshop physics. Designed first Mac-based SCALE-UP classroom.

Naval Research Laboratory

National Research Council Associate (1999-2000) - Simulated the limitations of a gamma-ray calorimeter for NASA's Gamma-ray Large Area Space Telescope. Discovered that planned data-suppression would unacceptably degrade energy resolution below NASA specifications.

Los Alamos National Laboratory (1992-1996)

Research Assistant (1992-1996) - Processed data from Pioneer Venus Orbiter spacecraft to create a gamma-ray burst catalog. Ran simulations of atmospheric radiation transfer to optimize design of a remote-sensing satellite. Tested image analysis methods for X-ray satellite data. Upgraded neutron-scattering analysis code to use new version of commercial maximum entropy package.

PEER-REVIEWED GRANTS AND AWARDS - EXTERNAL

2014-2015 - Theoretical Modeling of Emission Line Regions in Star-Forming Galaxies

Grant for \$14,500 of computing time, Co-PI with Chris Richardson (Elon) Extreme Science and Engineering Discovery Environment (XSEDE), a National Science Foundation program.

2011-2016 - Elon University Noyce Scholars Program

Grant for \$1,199,448 to recruit and support high school STEM teachers, Co-PI with Jeff Carpenter (Elon) and Janice Richardson (Elon), National Science Foundation

2009-2013 - Collaborative Research: Reacting to the Past Pedagogy for Science Education

Grant for \$190,366 to create, assess, and disseminate educational STEM games, Co-PI with David Henderson (Trinity) and Hugh Daughtrey (James Madison), National Science Foundation

2004 - Best Pedagogical Paper

North Carolina Section of the American Association of Physics Teachers

GRANTS AND AWARDS – INTERNAL

Teaching the History of Astronomy through Role-Play: The 1920 Curtis-Shapley Debate and the 1961 Creation of the Drake Equation (Sabbatical)

Faculty Research and Development Committee, Elon University (2015)

Testing a "Quest-Points-Level" Game Structure in the Astronomy Classroom

Center for the Advancement of Teaching and Learning Scholar, Elon University (2006-2008)

Determining the Rate of Magnetar Flares in Nearby Galaxies, \$6,573

Faculty Research and Development Grant, Elon University (2005)

Simulating Maya Astronomy with Desktop Planetarium Software, \$2,575

Technology Course Enhancement Grant, Elon University (2004)

Desktop Planetarium Software for the Astronomy Classroom, \$702

Technology Course Enhancement Grant, Elon University (2003)

Science Education in a Studio Environment: Phase I, \$4,896

University Curriculum Development Support Award, American University (2001)

Filming and Editing "Street Physics" Films, \$810

General Education Faculty Assistant Program Award, American University (2001)

Gauging Student Utilization of Digitally Delivered Lectures, \$1,568

College of Arts & Sciences Mellon Award, American University (2000)

PUBLICATIONS - SCIENCE EDUCATION

Teaching Visual Literacy in Astronomy

Crider, A., in *Looking and Learning: Visual Literacy across the Disciplines*, New Directions for Teaching and Learning, ed. D. Little, P. Felten, & C. Berry, Wiley: New York (2015)

Experiential Education on the Edge: SETI Activities for the College Classroom

Crider, A. & Weston, A., *Astronomy Education Review*, Issue 11, Volume 2, (2012)

Debating Pluto: Searching for the Classroom of the Future and Ending up in the Past

Crider, T., *Astronomy Beat*, Number 74, p. 1-4 (2011)

PUBLICATIONS - SCIENCE EDUCATION [CONTINUED]

Space Science and Astronomy Destinations within Second Life

Crider, A., *Cosmos in the Classroom 2007 Handouts and Papers Volume*, Astronomical Society of the Pacific, p. 151-152, (2007)

Hot Seat Questioning: A Technique to Promote and Evaluate Student Dialogue

Crider, A., *Astronomy Education Review*, Issue 2, Volume 3: 137-147 (2004)

Model Fitting for a Non-Majors Astronomy Class Using Starry Night and Excel

Crider, A., *Cosmos in the Classroom 2004 Handouts and Papers Volume*, Astronomical Society of the Pacific, (2004)

Astronomy in the "Hot Seat"

Crider, A., *Cosmos in the Classroom 2004 Handouts and Papers Volume*, Astronomical Society of the Pacific, (2004)

CONFERENCE PRESENTATIONS - SCIENCE EDUCATION

Innovative Education with *Reacting to the Past* Games and Epic Final Exams

1st Congreso Internacional de Innovación Educativa, Mexico City, Mexico (2014)

Experiential Education on the Edge: Searching for the Classroom of the Future and Ending Up in the Past

Student Engagement: The View from their Seats, 11th Annual Teaching and Learning Conference, Elon, NC (2014)

Elon University Noyce Scholars Program

Ninth Annual NSF Robert Noyce Teaching Scholarship Program Conference, Washington, DC (2014)

Teaching Your First *Reacting* Class

14th Annual Summer Institute at Barnard College, New York, NY (2014)

Assessment of *Reacting to the Past* Role-Playing

International Society for the Scholarship of Teaching and Learning, Raleigh, NC (2013)

Teaching the Nature of Science with 'The Pluto Debate' Role-Playing game

American Association of Physics Teachers, Portland, OR (2013)

Community Forum: RTTP's Digital Face

13th Annual Faculty Institute at Barnard College, New York, NY (2013)

Learning Astronomy through Role-playing and Debate

221st Meeting of the American Astronomical Society, Los Angeles, CA (2013)

Role-playing The Pluto Debate in your Science Classroom

18th Fall Meeting of the NCS-AAPT, High Point University, High Point, NC (2012)

Experiential Learning in the Classroom: *Reacting to the Past* Games

Teaching, Learning, & Assessing in Traditional & Non-traditional Settings, 9th Annual Teaching and Learning Conference, Elon, NC (2012)

The Case for Chapter-Length *Reacting* Games

13th Annual Summer Institute at Barnard College, New York, NY (2012)

CONFERENCE PRESENTATIONS - SCIENCE EDUCATION [CONTINUED]

Reacting 2.0 Game Development Process

Annual Summer Institute at Barnard College, New York, NY (2012)

Exploring Games for Learning

Duke Center for Instructional Technology (CIT) Showcase, Durham, NC (2012)

Creating 3-D Virtual Environments for Education

Thresholds to Learning, 8th Annual Teaching and Learning Conference, Elon, NC (2011)

The Pluto Debate: Learning Astronomy Content and Process through Role-playing

Connecting People to Science, Astronomical Society of the Pacific, Baltimore, MD (2011)

The Future of Active Learning: RTTP, Simulations, Gaming, and More

Annual Summer Institute at Barnard College, New York, NY (2011)

Reacting to the Past: The Pluto Debate

Engaged STEM Learning: From Promising to Pervasive Practices, American Association of University Professors and Project Kaleidoscope, Miami, FL (2011)

Reacting to the Past and General Studies Classes

Reacting to the Past Regional Conference, Newman University, Wichita, KS (2011)

Reacting to the Past: Role-playing in the Science Classroom

NCS-AAPT Meeting, Davidson College, Davidson, NC (2010)

Galileo's Astronomy: Then and Now (pre-recorded)

Workshop Series at Eastern Michigan University, Ypsilanti, MI (2010)

"Reacting" and the Craft of Teaching

Annual Summer Institute at Barnard College, New York, NY (2010)

Including Science Labs in The Trial of Galileo

Annual Summer Institute at Barnard College, New York, NY (2010)

The Trial of Galileo: Aristotelianism, the "New Cosmology," and the Catholic Church, 1616-33

Annual Summer Institute at Barnard College, New York, NY (2010)

The NSF-CCLI Initiative: Acid Rain in Europe, 1984 and The Pluto Debate

Annual Summer Institute at Barnard College, New York, NY (2010)

A Debate on the Requirement of Great Texts in the RTTP Curriculum

Annual Summer Institute at Barnard College, New York, NY (2009)

Stepping Into Science

Alliance Library System and Learning Times (2009)

Assessment of Student Learning in Reacting to the Past Role-Playing Games

International Society for the Scholarship of Teaching and Learning, Edmonton, Alberta (2008)

Second Life Astronomy Outreach Projects by Undergraduate Non-majors

International Society for the Scholarship of Teaching and Learning, Edmonton, Alberta (2008)

CONFERENCE PRESENTATIONS - SCIENCE EDUCATION [CONTINUED]

Using "Reacting to the Past" as Role-Playing Pedagogy

Fifth Annual Innovations in Instruction, Elon, NC (2008)

Report on the Assessment of the "Reacting" Pedagogy

Annual Summer Institute at Barnard College, New York, NY (2008)

Science and the New Media [INVITED PLENARY]

AAAS Forum on Science & Technology Policy, Washington, DC (2008)

Physics and Astronomy Projects in Second Life

Fall NCS-AAPT Meeting, High Point, NC (2007)

Reacting to the Past: Role-play and Learning in the College Classroom

Lilly Conference on College and University Teaching, Greensboro, NC (2008)

Educational Opportunities in the Virtual World of Second Life

Fourth Annual Innovations in Instruction, Elon, NC (2007)

Exploring and Creating Astronomy Exhibits in the Virtual World of Second Life

Cosmos in the Classroom 2007, Pomona, CA (2007)

Space Science Outreach in the Virtual World of Second Life

AAS/AAPT Joint Meeting, Seattle, WA (2007)

Games as a Medium for Learning

Innovations in Instruction, Elon, NC (2006)

Living and Learning in Second Life: A Firsthand Exploration & Tour of a User-Created Virtual World

Games, Learning, and Society Conference, Madison, WI (2006)

Hypothesis Testing in Astrophysics

N. C. Academy of Science Undergraduate Research Workshop, Elon, NC (2005)

Astronomy in the "Hot Seat"

North Carolina Section of the American Association of Physics Teachers Meeting, Davidson, NC (2004)

The Pedagogy of Blackboard On-Line Assessments

Instructional Design and Development Technology Showcase, Elon, NC (2003)

Science Education in a Studio Environment

Anne Ferren Teaching Conference, Washington, DC (2002).

Is There a Correlation Between FCI and MCAT Normalized Gains?

124th American Association of Physics Teachers National Meeting, Philadelphia, PA (2002)

PUBLICATIONS AND PRESENTATIONS - GAMMA-RAY ASTRONOMY

A Magnetar in the *BATSE* Catalog?

Crider, A., *American Institute of Physics Conference Proceedings* 838, 64 (2006)

Elon University Robotic Observatory

Philips M. and Crider, A., *North Carolina Section of the American Association of Physics Teachers Meeting*, Wrightsville Beach, NC (2003)

PUBLICATIONS AND PRESENTATIONS - GAMMA-RAY ASTRONOMY [CONTINUED]

The Evolution of Synchrotron Self-Absorption Parameters in Prompt GRB Spectra

2003 *Gamma-Ray Burst Conference*, Santa Fe, NM (2003)

Results from the Beam Test of the Engineering Model of GLAST Large Area Telescope

do Couto e Silva, E. et al., *Nuclear Instruments and Methods in Physics Research, Section A*, Volume 474, Issue 1, p. 19-37 (2001)

An Analytic Function Fit to Monte Carlo X-Ray and g-Ray Spectra from Thomson Thick Thermal/Nonthermal Hybrid Plasmas

Böttcher, M., Saxena, R., Crider, A., Liang, E. P., Smith, I. A., & Kusunose, M., *The Astrophysical Journal Supplement Series*, 135, 1 (2001)

An Analytic Function Fit to Monte-Carlo X- and Gamma-ray Spectra from Thomson Thick Thermal/Nonthermal Hybrid Plasmas

Böttcher, M.; Saxena, R.; Crider, A. W.; Liang, E. P.; Smith, I. A., *Exploring the gamma-ray universe. Proceedings of the Fourth INTEGRAL Workshop*, 271 - 274 (2001)

Testing the Gamma-Ray Burst Blastwave Model: A Primer

Crider, A. & Liang, E. P., *The Astrophysical Journal Supp. Series*, 127 (2000)

Evaluating Spectral Functions Used to Test the Synchrotron Shock Model

Crider, A., *American Institute of Physics Conference Proceedings 526*, 475 (2000)

Time Profiles and Spectral Evolution of GRB Pulses

Liang, E. P., Crider, A., Böttcher, M., and Smith, I., *American Institute of Physics Conference Proceedings 526*, 446 (2000)

Testing for Synchrotron Self-Absorption in GRB 970111

Crider, A. & Liang, E. P., *Astronomy & Astrophysics Supp. Series*, 138, 405 (1999)

GRB990123: The Case for Saturated Comptonization

Liang, E. P., Crider, A., Böttcher, M., and Smith, I. A., *The Astrophysical Journal*, 519, L21 (1999)

The Hardness Evolution of Gamma-Ray Burst Pulses

Crider, A. et al., *Astronomy & Astrophysics Supp. Series*, 138, 401 (1999)

Multiwavelength Observations of GX 339-4 in 1996. I. Daily Light Curves and X-ray and Gamma-Ray Spectroscopy

Smith, I. A., Liang, E. P., Lin, D., Moss, M., Crider, A., Fender, R. P., Durouchoux, Ph., Corbel, S., and Sood, R., *The Astrophysical Journal*, 519, 762 (1999)

Spectral Hardness Decay with Respect to Fluence in BATSE Gamma-Ray Bursts

Crider, A., et al., *The Astrophysical Journal*, 519, 206 (1999)

Time-dependent Photoelectric Absorption, Photoionization and Fluorescence Line Emission in Gamma-Ray Burst Environments

Böttcher, M., Dermer, C., Crider, A., & Liang, E. P., *Astronomy & Astrophysics*, 343, 111 (1999)

The Spectral Evolution of Gamma-Ray Bursts

Crider, A.; Liang, E. P.; Preece, R. D.; Briggs, M. S.; Pendleton, G. N.; Paciesas, W. S.; Band, D. L.; Matteson, J. L., *Bulletin of the American Astronomical Society*, Vol. 30, p.1380 (1998)

Evaluation of Proposed Gamma-Ray Burst Spectral Evolution Trends

Crider, A., Liang, E., Preece, R., Briggs, M., Pendleton, G., & Band, D., *Bulletin of the American Physical Society*, Vol. 43, No. 2, 1086 (1998)

PUBLICATIONS AND PRESENTATIONS - GAMMA-RAY ASTRONOMY [CONTINUED]

Evidence for Saturated Inverse Compton Scattering in Gamma-Ray Bursts

Crider, A., Liang, E., & Smith, I., *Revista Mexicana de Astronomia y Astrofisica*, 7, 218 (1998)

Confronting Synchrotron Shock and Inverse Comptonization Models with GRB Spectral Evolution

Crider, A., Liang, E. P., & Preece, R. D., *American Institute of Physics Conference Proceedings* 428, 359 (1998)

Testing the Invariance of Cooling Rate in Gamma-Ray Burst Pulses

Crider, A., Liang, E. P., & Preece, R. D., *American Institute of Physics Conference Proceedings* 428, 63 (1998)

Saturated Compton Scattering Models for the Soft Gamma-Ray Repeater Bursts

Smith, I. A., Liang, E. P., Crider, A., Lin, D., & Kusunose, M., *American Institute of Physics Conference Proceedings* 410, v.2, 1512 (1998)

A Thermal-Nonthermal Inverse Compton Model for Cyg X-1

Crider, A., Liang, E. P., Smith, I. A., Lin, D., & Kusunose, M., *American Institute of Physics Conference Proceedings* 410, v.2, 868 (1997)

Evolution of the Low-Energy Photon Spectra in Gamma-Ray Bursts

Crider, A., et al., *The Astrophysical Journal*, 479, L39 (1997)

Physical Model of Gamma-Ray Burst Spectral Evolution

Liang, E. P., Kusunose, M., Smith, I. A., & Crider A., *The Astrophysical Journal*, 479, L35 (1997)

Hardness Ratio versus Duration for PVO compared to BATSE and PHEBUS

Smith, I. A., Crider, A., Liang, E. P., Dunne, B. C., Fenimore, E. E. & Li, H., *American Institute of Physics Conference Proceedings* 384, Part 1, 101 (1996)

A Search for March 5th-like Bursts in the PVO Database

Crider, A. & Fenimore, E. E., *American Institute of Physics Conference Proceedings* 384, Part 2, 926 (1996)

PUBLIC SCIENCE LECTURES AND DEMONSTRATIONS

Crider Family Maker Projects

Burlington Mini-Maker Faire and Science Expo, Burlington, NC (2014)

Are We Alone?

with Anthony Weston, *LIFE@ELON*, Elon, NC (2014)

2012: Exploitation of the Maya Calendar

Tectonic Plates: Alamance County's Science Café, Elon, NC (2012)

Science that Matters: A Nonpartisan Look at the Science Relevant to the 2012 Presidential Election

with Dave Gammon, Jennifer Uno, Amanda Chunco, Elon University, Elon, NC (2012)

2012: Exploitation of the Maya Long Count

Triad StarFest, Guilford Technical Community College, Greensboro, NC (2010)

It's the End of the World as We Know It

Triad StarFest, Guilford Technical Community College, Greensboro, NC (2003)

PROFESSIONAL ORGANIZATION LEADERSHIP ROLES AND MEMBERSHIPS

Reacting Consortium, *Board Member (2011-2017)*

North Carolina Section of the American Association of Physics Teachers, *Vice-President, President-Elect, President, and Past President (2006-2010), Member (2003-present)*

Astronomical Society of the Pacific, *Member*

American Association of Physics Teachers, *Member*

Sigma Pi Sigma Physics Honors Society, *Member*

COURSES TAUGHT AT ELON UNIVERSITY

- COM 563 Virtual Environments (2010-2012)
- GST 110 The Global Experience (2014)
- GST 201 Astronomy in Mexico: Maya to Modern (2005-2006)
- GST 364 Technology and Society
- HNR 237 Life in the Universe (2012-2014)
- PHY 102 Introduction to Astronomy (2002-2009)
- PHY 102L Astronomy Lab (2002-2013)
- PHY 111 General Physics (2002-2005)
- PHY 112 General Physics II (2003-2006)
- PHY 113 General Physics with Calculus (2004)
- PHY 205 Galactic Astronomy (2013)
- PHY 251 Numerical and Mathematical Methods in Physics (2004-2007)
- PHY 313 Modern Astrophysics (2003-2013)
- SCI 179 STEM Teaching and Learning (2013-2014)