

Julia Plummer
Assistant Professor of Education
Coordinator of Science Education

Arcadia University
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Education

- 2006** **Ph.D., University of Michigan**
Astronomy and Education (Student initiated, combined degree program)
Students' Development of Astronomy Concepts across Time
Committee: Dr. Joseph Krajcik (co-chair), Dr. Mario Mateo (co-chair), Dr. Scott Paris, Mr. Matthew Linke
- 1999** **M.S., University of Michigan**
Astronomy
- 1997** **B.S., Washington State University**
Physics, Magna Cum Laude, Minors: Math and Philosophy

Grants and Awards

- 2007** **Math and Science Partnership of Greater Philadelphia Sub-Award**, National Science Foundation, "Astronomy in the Greater Philadelphia Area: Teacher Preparation and the State Standards," \$18, 636
- 2007** **Ellington Beavers Faculty Award for Intellectual Inquiry**, Arcadia University, "Elementary students' development of apparent and actual celestial motion concepts," \$3000
- 2007** **Outstanding Doctoral Dissertation Award**, National Association for Research in Science Teaching
- 2006** **Dissertation Finishing Grant**, School of Education, University of Michigan (Tuition waiver)
- 2004** **Spencer Mini-Grant**, School of Education, University of Michigan, \$1140
Used to support transportation of students for my dissertation research
- 1997** **Distinguished Student Award**, College of Science, Washington State University

- 1996** **Sigma Xi Grants-in-Aid of Research, \$1000**
Observing run to Apache Point Observatory to study tidal stripping in interacting galaxies

Research Experience

- 2006-present** **Principle Investigator**, Education Department, Arcadia University
- Elementary teachers' understanding of celestial motion
 - A Learning Progression for Celestial Motion
 - Investigating an instructional sequence on the seasons for middle school students (with Co-PI Lori Agan)
 - Third Grade Students Learning to Explain Celestial Motion (with Co-PI Cyndie Slagle, Colonial School District, Pennsylvania)
 - State Coverage and Teacher Preparation in Astronomy at the Secondary Level
- 2003-2006** **Dissertation research**
School of Education, University of Michigan
- Comparison of 1st, 3rd, and 8th grade students understanding of the patterns of celestial motion
 - Analysis of kinesthetic learning techniques in the planetarium with 1st and 2nd grade students understanding of apparent celestial motion
- 1998-2003** **Graduate Research Assistant**
School of Education, University of Michigan (2000-2003)
- Participated on research examining the implementation of project-based curricula in Detroit public middle schools for the ROLE project
 - Developed assessments for an elementary science education and literacy project (Guided Inquiry supporting Multiple Literacies)
- Department of Astronomy, University of Michigan (1998-2000)
- Observed and processed images of nearby dwarf galaxies in optical band passes.
- 1995-1997** **Undergraduate Research Assistant**
Program in Astronomy, Washington State University (1995-1997)
Determined that a fraction of dwarf galaxies are still bound gravitationally to giant galaxies in the core of a rich galaxy cluster
Harvard-Smithsonian Center for Astrophysics (Summer 1996)
Measured the mass of high-red shift galaxy clusters using X-ray data.
Investigated the density parameter of the Universe
Lowell Observatory (Summer 1995)
Investigated the star formation history of dwarf irregular galaxy Sextans A

Teaching and Related Experience

2006-present Assistant Professor

Education Department, Arcadia University

Courses in science methods for pre-service teachers; science curriculum development; astronomy and astrobiology; advising culminating projects for Master of Education students

1997-2003, 2006 Graduate Student Instructor

Astronomy Department, University of Michigan

Instructor for introductory astronomy courses (*4 semesters*), TA for discussion sections and labs (*8 semesters*)

Trained new graduate students

School of Education, University of Michigan

Instructor for the elementary science methods course (*1 semester*)

2003-2006 Curriculum Developer

Center for Curriculum Materials in Science, University of Michigan

Lead developer for a 6th grade astronomy unit; member of a team that developed an 8th grade unit on energy for a comprehensive middle school science curriculum, to be published by *It's About Time*.

1994-2006 Planetarium Operator

Exhibit Museum of Natural History, University of Michigan

Presented live programs, program development, and trained new operators (1997-2006)

Program in Astronomy, Washington State University (1994-1997)

2001-2003 Instructor

Michigan Math and Science Scholars program, University of Michigan

Developed and co-taught summer astronomy program for high school students (*2 week programs*)

2000-2002 Astronomy Camp Instructor

Jackson County Mathematics & Science Center

Guided middle and high school students in observations and gave astronomy presentations (*1 week programs*)

1997 Research Associate

NASA Academy, Goddard Space Flight Center

Developed descriptive and educational text an astronomy website

1995 Undergraduate Teaching Assistant

Department of Mathematics, Washington State University

Lab TA for astronomy course for elementary education majors

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Publications

Julia D. Plummer (accepted). *Early Elementary Students' Development of Astronomy Concepts in the Planetarium*. *Journal of Research in Science Teaching*. Accepted.

Julia D. Plummer (in press). *A Cross-Age Study of Children's Knowledge of Apparent Celestial Motion*. *International Journal of Science Education*. In press.

Julia D. Plummer (2008). *Students' Development of Astronomy Concepts across Time*, *Astronomy Education Review*, 7(1). [This is an extended thesis abstract.]

Jeff Secker, William E. Harris, and **Julia D. Plummer** (1997). *Dwarf Galaxies in the Coma Cluster. II. Photometry and Analysis*. *Publications of the Astronomical Society of the Pacific*, 109, 1377-1393.

Deidre Hunter and **Julia Plummer** (1996) *Sextans A: A Case Study of Star Formation and Gas Densities in Irregular Galaxies*, *Astrophysical Journal*, 462,732

Manuscripts in review

Julia D. Plummer and Joseph S. Krajcik (2008). *An Empirical Validation of a Learning Progression for Apparent Celestial Motion*. Submitted to the *Journal of Research in Science Teaching*.

Presentations

Julia D. Plummer, Rebecca Rice, and Valerie Zahm (2008). *Inquiry and Astronomy: Investigations in Celestial Motion*. Paper presented at the National Association for Research in Science Teaching, March 30-April 2, Baltimore, Maryland.

Julia D. Plummer and Joseph S. Krajcik (2008). *A Learning Progression for Celestial Motion*. Paper presented at the National Association for Research in Science Teaching, March 30-April 2, Baltimore, Maryland.

Julia D. Plummer (July, 2007). *A Learning Progression for Astronomy: Assessing the Current State of Research*. Paper presented at the Center for Curriculum Materials in Science, Knowledge Sharing Institute, July 22-25, Washington, D.C.

Julia D. Plummer (2007). *Developing Students' Understanding of Astronomy in the Planetarium*. Paper presented at the National Association for Research in Science Teaching annual meeting, April 15-18, New Orleans, Louisiana.

Julia D. Plummer (2006). *Kinesthetic Learning Techniques in the Planetarium*. Presented at the Annual Meeting of the Association for Science and Technology Centers, October 28-30, Louisville, Kentucky.

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Julia D. Plummer (2005). *Kinesthetic Learning with Elementary Students in the Planetarium*. Presented at the 40th annual meeting of the Great Lakes Planetarium Association, October 19-22, Grand Rapids, Michigan.

Julia D. Plummer, Christine Jones, William Forman, R. Hank Donnally, and Ken J. Rines (1997). *Cosmological Implications of ROSAT Observations of Distant Galaxy Clusters*, Bulletin of the American Astronomical Society, 28, 1317

Julia Plummer and Deidre Hunter (1995). *Star Formation and Gas Densities in the Dwarf Irregular Galaxy Sextans A*, Bulletin of the American Astronomical Society, 27, 1296

Invited Talks

Julia D. Plummer (January, 2008). *Understanding Astronomy: Challenges in Teaching through Observation of the Sky*. Association of Women in Science, Philadelphia Chapter.

Julia D. Plummer (October, 2007). *The road from novice to expert: Application of the learning progression framework to astronomy education*. Astronomy Department, University of Pennsylvania, Philadelphia, PA.

Professional Service

Referee, Astronomy Education Review (2008)

Member, Astronomy Education Research Charter, Symposium held at Tufts University (2007)

Member, Association of American Colleges and University's (AAC&U) Shared Futures project (2006-present)

Referee, Cognition and Instruction (2005)

Member, Introductory Astronomy Course Committee (Fall 2003)
Department of Astronomy, University of Michigan

Docent Representative, Board of Directors (Fall 2002-Spring 2004, Present)
The Exhibit Museum of Natural History, University of Michigan

Member, Strategic Planning Committee (2003)
The Exhibit Museum of Natural History, University of Michigan

Professional Affiliations

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American Educational Research Association (2007-present)

Association of Women in Science (2008 – Present)

Astronomical Society of the Pacific (1992-present)

National Association for Research in Science Teaching (2006-present)

National Science Teachers Association (2006-present)

Last updated June 18, 2008