Julia D. Plummer

Associate Professor of Science Education
Pennsylvania State University
Department of Curriculum & Instruction
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EDUCATION

UNIVERSITY OF MICHIGAN, ANN ARBOR 2006
Ph.D. in Astronomy and Education (Student initiated, combined degree program)
Dissertation: *Students' Development of Astronomy Concepts across Time*
Committee: Joseph Krajcik (co-chair), Mario Mateo (co-chair), Scott Paris, Matthew Linke
NARST Outstanding Doctoral Dissertation Award for 2007

UNIVERSITY OF MICHIGAN, ANN ARBOR 1999
M.S. in Astronomy

WASHINGTON STATE UNIVERSITY, PULLMAN 1997
B.S. in Physics (magna cum laude)
Minors: Math and Philosophy

PROFESSIONAL EXPERIENCE

PENNSYLVANIA STATE UNIVERSITY (UNIVERSITY PARK) 2011 to present
Associate Professor of Science Education (2012 – Present)
Visiting Assistant Professor (2011-2012)

ARCADIA UNIVERSITY 2006 to 2012
Assistant Professor of Science Education

UNIVERSITY OF MICHIGAN 1997- 2006
Graduate Student Instructor, Department of Astronomy (1997-2003); School of Education (2006)
Curriculum Developer, Center for Curriculum Materials in Science (2003-2006)
Planetarium Operator at the Exhibit Museum of Natural History (1997-2006)

NASA GODDARD SPACE FLIGHT CENTER 1997
Research Associate, NASA Academy internship program

WASHINGTON STATE UNIVERSITY 1994-1997
Planetarium Operator and Undergraduate Teaching Assistant, Program in Astronomy

HARVARD-SMITHSONIAN CENTER FOR ASTROPHYSICS 1996
Research Assistant, NSF-funded REU

LOWELL OBSERVATORY 1995
Research Assistant, NSF-funded REU

FUNDING AND HONORS

ONGOING GRANTS AND PROJECTS

National Science Foundation - Discovery Research K-12 Award 2015-2018
Thinking Spatially about the Universe: A Physical and Virtual Laboratory for Middle School Science
Co-Principal Investigator $1,387,378 (PI: Alyssa Goodman, Harvard University)

National Science Foundation - Informal Science Education Award 2012-2017
My Sky Tonight: Early Childhood Pathways to Astronomy
Co-Principal Investigator, $2,499,917 (PI: Suzanne Gurton, Astronomical Society of the Pacific)

National Science Foundation – Targeted Math and Science Partnership 2010-2016
Middle Grade Earth and Space Science Education
Senior Researcher (2013-present), Director of Research (2012-2013); $9,181,723 (PI: Tanya Furman, Penn State)

Penn State Center for Online Innovation in Learning – Research Initiation Grant 2015-2016
Development of a Web-Platform to Engage Local and Global Communities of Learners around the Science of Human-Environment Interactions
Co-Principal Investigator, $37,516 (PI: Neil Brown, Department of Geography)

COMPLETED GRANTS AND PROJECTS

National Science Foundation – Developing Assessments to Validate and Study Learning Progressions 2011
A workshop on developing learning progressions for astronomy education researchers
Sub-award from project PIs (R. Duncan & J. Krajcik, PIs), $2500

Arcadia University – Steve Goldberg Award 2010
Scientific reasoning and attitudes towards science: Girls participating in an aerospace and technology program
Principal Investigator; $1300

Arcadia University – Ellington Beavers Faculty Award for Intellectual Inquiry 2007-2009
Elementary Students' Development of Apparent and Actual Celestial Motion Concepts
Principal Investigator, $3000

National Science Foundation – Math and Science Partnership of Greater Philadelphia 2007-2008
Astronomy in the Greater Philadelphia Area: Teacher preparation and the state standards
Senior Researcher; $18,636

University of Michigan – Spencer Mini-grant for Dissertation Research 2004
Kinesthetic learning techniques in the planetarium
Principal Investigator, $1140

HONORS

NSTA SUMMER READING LIST FOR TEACHERS 2010
Plummer (2009). Early elementary students' development of astronomy concepts in the planetarium. One of three articles from the Journal of Research in Science Teaching (from 2009) selected to be promoted by the National Science Teacher Association (NSTA); nominated by the National Association for Research in Science Teaching (NARST)

EARLY CAREER RESEARCHER CONSORTIUM 2010
Participant, NSF-funded competitive workshop, International Conference of the Learning Sciences (ICLS)

OUTSTANDING DOCTORAL DISSERTATION AWARD 2007
National Association for Research in Science Teaching (NARST)

DISTINGUISHED STUDENT AWARD 1997
College of Science, Washington State University

PUBLICATIONS

(*Student collaborators; **K-12 teacher and planetarium collaborators)

REFEREED JOURNAL ARTICLES

**Plummer, J.D., ***Bower, C.A., & Liben, L.S. (in press). The role of perspective taking in how children connect reference frames when explaining astronomical phenomena. International Journal of Science Education.

Plummer, J.D. (2015). Embodying the Earth's place in the Solar System: Students investigating seasonal constellations. *Science and Children*, 53 (4), 52-61.

Plummer, J.D. & *Tanis Ozcelik, A. (2015). Preservice teachers developing coherent inquiry investigations in elementary astronomy**.** *Science Education, 99*(5), 932-957.

Plummer, J.D., Palma, C., *Flarend, A., *Rubin, K., *Ong, Y.S., *Botzer, B., McDonald, S., & Furman, T. (2015). Development of a learning progression for the formation of the Solar System. *International Journal of Science Education, 37*(9), 1381-1401.

Price, C.A., Lee, H.-S., **Plummer, J.D.**, SubbaRao, M., & Wyatt, R. (2015). Position paper on use of stereoscopy to support science learning: Ten years of research. *Journal of Astronomy & Earth Science Education,* 2(1), 17-26.

Plummer, J.D. & **Maynard, L. (2014). Building a learning progression for celestial motion: An exploration of students' reasoning about the seasons. *Journal of Research in Science Teaching, 51*(7), 902-929.

Plummer, J.D. (2014). Spatial thinking as the dimension of progress in an astronomy learning progression. *Studies in Science Education,* 50, 1-45.

**Plummer, J.D., ***Kocareli, A., & **Slagle, C. (2014). Learning to explain astronomy across moving frames of reference: Exploring the role of classroom and planetarium-based instructional contexts. *International Journal of Science Education*, 36, 1083-1106.

*Rubin, K., **Plummer, J.D.,** Palma, C., *Flarend, A., Spotts, H., McDonald, S., & *Ong, Y.S. (2014). Assessing student progress along a Solar System learning progression. *Science Scope,* 38, 27-33.

*Rubin, K., **Plummer, J.D.,** Palma, C., Spotts, H., & *Flarend, A. (2014). Planetary properties: A systems perspective. *Science Scope,* 37, 68-72.

Small, K.J. & **Plummer, J.D. (2014). A longitudinal study of early elementary students' understanding of lunar phenomena after planetarium and classroom instruction. *The Planetarian.* 43(4), 18-21.

Plummer, J.D. & **Small, K. (2013). Informal science educators' pedagogical choices and goals for learners: The case of planetarium professionals. *Astronomy Education Review,* 12 (1), 010105-1–010105-16.

Plummer, J.D., *Wasko, K., & **Slagle, C. (2011). Children Learning to Explain Daily Celestial Motion: Understanding Astronomy across Moving Frames of Reference. *International Journal of Science Education*. 33(14), 1963-1992.

Plummer, J.D. & Krajcik, J.S. (2010). Building a Learning Progression for Celestial Motion: Elementary Levels from an Earth-Based Perspective. *Journal of Research in Science Teaching*, 47(7), 768-787.

**Plummer, J.D., ***Zahm, V. & *Rice, R. (2010). Inquiry and astronomy: Preservice teachers' investigations in celestial motion. *Journal of Science Teacher Education*. 21, 471-493.

Small, K.J. & **Plummer, J.D. (2010). Survey of the goals and beliefs of planetarium professionals regarding program design. *Astronomy Education Review,* 9(1), 010112-1–010112-10. http://dx.doi.org/10.3847/AER2010016

Plummer, J.D. & *Zahm, V. (2010). Covering the standards: Astronomy teachers' preparation and beliefs. *Astronomy Education Review*, 9(1), 010110-1–010110-28. http://dx.doi.org/10.3847/AER2009077

Plummer, J.D. (2009). Early elementary students' development of astronomy concepts in the planetarium. *Journal of Research in Science Teaching*, 46(2), 192-209.

Plummer, J.D. (2009). A cross-age study of children's knowledge of apparent celestial motion. *International Journal of Science Education*, 31(12), 1571-1606.

Secker, J., Harris, W.E., & **Plummer, J.D.** (1997). Dwarf galaxies in the Coma Cluster. II. Photometry and analysis. *Publications of the Astronomical Society of the Pacific*, 109, 1377-1393.

Hunter, D. & **Plummer, J.D.** (1996). Sextans A: A case study of star formation and gas densities in irregular galaxies, *Astrophysical Journal*, 462, 732.

REFEREED BOOK CHAPTERS AND CONFERENCE PROCEEDINGS

Plummer, J.D. (2012). Challenges in developing and validating an astronomy learning progression. In A. Alonzo and A.W. Gotwals (Eds.), *Learning progressions in science: Current challenges and future directions*, pp. 77-100, Sense Publishers: Rotterdam, The Netherlands.

Mohan, L., & **Plummer, J.D.** (2012). Exploring challenges to defining a learning progression. In A. Alonzo and A.W. Gotwals (Eds.), *Learning progressions in science: Current challenges and future directions*, pp. 139-150, Sense Publishers: Rotterdam, The Netherlands.

Plummer, J.D. & **Agan, L. (2010). Reasoning about the seasons: Middle school students' use of evidence in explanations. *Proceedings of the eighth international conference of the learning sciences: Learning in the disciplines,* Chicago, IL, Mahwah, NJ: Erlbaum.

CURRICULA

Starr, M., **Plummer, J.D.,** Smith, D., Holt, L., Best, S., Krajcik, J., & Linke, M. (2009). Astronomy. In *Project-based inquiry science* (J. Kolodner, J. Krajcik, D. Edelson, B. Reiser, and M. Starr, Eds.). It's About Time: Armonk, NY.

Starr, M. L., Casella, F., Fortus, D., Krajcik, J., Nordine, J., **Plummer, J**., Rogat, A., & Switzer, A. (2009). Energy. In *Project-based inquiry science* (J. Kolodner, J. Krajcik, D. Edelson, B. Reiser, and M. Starr, Eds.). It's About Time: Armonk, NY.

MANUSCRIPTS IN PROGRESS

Plummer, J.D. (in review). Chapter 10. The Earth's place in the Universe. In Duncan, R., Krajcik, J. & Rivet, A. (Eds.), *Disciplinary Core Ideas: Reshaping Teaching and Learning*. Washington, D.C.; NSTA Press.

Plummer, J.D. & Small, K.J. (in review). Supporting young children's engagement in three-dimensional learning through a combination of planetarium fieldtrip and classroom lessons.

NON-REFERRED PAPERS AND PROCEEDINGS

Plummer, J.D. (2015). Methods of engaging preschool-age children in science practices during astronomy activities. In G. Schultz, S. Buxner, L. Shore, and J. Barnes, Eds. Celebrating Science: Putting Education Best Practices to Work. ASP Conference Series, 500, 61-66.

Plummer, J.D., Schmoll, S., Yu, K.C., & *Ghent, C. (2015). A guide to doing educational research in the planetarium. *The Planetarian*, 44(2), 8-24, 30.

Plummer, J.D. & **Small, K.J. (2014). Integrating planetarium and classroom instruction to engage children in the practices of science. In J.G. Manning, J.B. Jensen, M.K. Hemenway, and M.G. Gibbs (Eds.) Ensuring STEM literacy: A national conference on STEM education and public outreach ASP conference series, Vol. 483, pp. 407-410.

Small, K.J. & **Plummer, J.D. (2014, Summer). Impact on children's conceptual constructs regarding observational features of the Moon: A look at elements of program and instruction design for early elementary-aged students. *Constellation*, 2-4, 7.

Plummer, J.D. (2012, Fall). Opportunities for inquiry: Engaging students in participating productively in the science of astronomy, *Universe in the Classroom*, http://astrosociety.org/publications/universe-in-the-classroom/

Massachusetts Department of Elementary and Secondary Education (**J. Plummer** one of 6 contributors to the white paper) (2010, November 15). Earth and space science: Concept and skill progressions. Retrieved July 16, 2011 from: http://www.doe.mass.edu/omste/ste/default.html

Plummer, J.D. (2008). Students' development of astronomy concepts across time, *Astronomy Education Review*, 7(1), 139-148. [Extended dissertation abstract.] http://dx.doi.org/10.3847/AER2008013

Price, A., et al. (**J. Plummer** included in list of 18 authors) (2007). Astronomy education research charter and symposium report, *Astronomy Education Review*, 6(2).

Plummer, J.D., (2006). *Students' development of astronomy concepts across time,* Unpublished doctoral dissertation, University of Michigan, Ann Arbor, MI.

CONFERENCE PAPERS, PRESENTATIONS, AND WORKSHOPS

Peer-reviewed conference presentations

Plummer, J.D. (2015). Preschool-age children engaged in science practices through astronomy experiences at a museum. Presented at the *National Association for Research in Science Teaching* annual conference, Chicago, IL.

*Crowl, M. & **Plummer, J.D.** (2015). Informal science educators' enactment of goals with preschool audiences. Presented at the *National Association for Research in Science Teaching* annual conference, Chicago, IL.

Palma, C., **Plummer, J.D.,** *Rubin, K., *Flarend, A., *Ong, Y.S., McDonald, S. (2015). Have astronauts visited Neptune? Student ideas about how astronomers study the Solar System. Presented at the *National Association for Research in Science Teaching* annual conference, Chicago, IL.

Plummer, J.D. & Small, K.J. (2014). Elementary students engaged in science practices through a planetarium field trip. Presented at the *National Association for Research in Science Teaching* annual conference, Pittsburgh, PA.

*Bower, C., **Plummer, J.D., &** Liben, L. (2014). The role of perspective taking skills in children's explanations of astronomical phenomena. Presented at the *National Association for Research in Science Teaching* annual conference, Pittsburgh, PA.

*Crowl, M. & **Plummer, J.D.** (2014). Informal science education professionals' goals for and beliefs about working with preschool audiences. Presented at the *National Association for Research in Science Teaching* annual conference, Pittsburgh, PA.

McDonald, S., **Plummer, J.D.**, Rivet, A., Delgado, C., Kastens, K., *Flarend, A., *Rubin, K., Bembenic, M., Pickard, M., & Anderson, C. (2014). Integrating crosscutting themes, practices, and core ideas: Learning progressions in Earth and space sciences. Presented at the *National Association for Research in Science Teaching* annual conference, Pittsburgh, PA.

Plummer, J.D. (2013). Spatial reasoning as the dimension of progress in an astronomy learning progression. Presented at the *American Education Research Association*, San Francisco, CA.

*Bower, C., **Plummer, J.D.,** Liben, L., & **Small, K. (2013). The role of perspective-taking skills in children's learning of astronomical phenomena. Presented at *the Society for Research in Child Development,* Seattle, WA.

Plummer, J.D., Palma, C., *Flarend, A., *Rubin, K., & *Botzer, B. (2013). Development of a learning progression for the formation of the solar system. Presented at the *National Association for Research in Science Teaching* annual meeting, Rio Grande, PR.

*Ozcelik, A.T. & **Plummer, J.D.** (2013). Preservice elementary science teachers' reflections on teaching extended inquiry investigations. Presented at the *National Association for Research in Science Teaching* annual meeting, Rio Grande, PR.

Plummer, J.D. & *Ozcelik, A.T. (2013). Elementary students designing investigations in astronomy. Presented at the *National Association for Research in Science Teaching* annual meeting, Rio Grande, PR.

Plummer, J.D., Palma, C., *Flarend, A., & Petula, J. (2012). Dimensions of a learning progression for the formation of the solar system. Poster presented at the *Physics Education Research conference,* Philadelphia, PA.

Plummer, J.D. & *Ozcelik, A.T. (2012). Preservice elementary teachers' pedagogical content knowledge of inquiry-based astronomy education. Paper presented at the *National Association for Research in Science Teaching* annual meeting, Indianapolis, IN.

Plummer, J.D. & *Kocareli, A. (2012). Children learning to explain astronomy across moving frames of reference: Kinesthetic and visualization strategies. Poster presented at the *National Association for Research in Science Teaching* annual meeting, Indianapolis, IN.

Plummer, J.D. & *Kocareli, A. (2011). Learning to reason across moving frames of reference:

Children navigating counterintuitive explanations in astronomy. Presentation was part of a symposium at the *Biennial Meeting of the Cognitive Development Society*, Philadelphia, PA.

**Plummer, J.D., ***Kocareli, A., & **Slagle, C. (2011). Children developing an ability to move between frames of reference in astronomy: Towards a learning progression in celestial motion. Paper presented at the Annual Meeting of the *Jean Piaget Society*, Berkeley, CA.

Plummer, J.D. & **Small, K. (2011). Informal Science Educators' Pedagogical Choices and Goals for Learners: The Case of Planetarium Professionals. Paper presented as part of a symposium at the *American Educational Research Association* annual conference, New Orleans, LA.

Plummer, J.D. (Presider), Krajcik, J., Bell, P., Duncan, R., Kenyon, L., & Songer, N. (2011). Examining learning progressions beyond content: Strands of scientific proficiency. Symposium presented at the *National Association for Research in Science Teaching* annual conference, Orlando, FL.

Plummer, J.D. & *Kocareli, A. (2011). Exploring pedagogical content knowledge in astronomy: Impact of professional development on elementary teachers. Paper presented at the *Association for Science Teacher Education* annual conference, Minneapolis, MN.

Plummer, J.D. & **Agan, L. (2010). Towards a learning progression addressing the seasons: A comparison of two learning trajectories with middle school students. Paper presented at the *Annual Meeting of the National Association for Research in Science Teaching*, March 21-24, Philadelphia, PA.

Plummer, J.D. & **Slagle, C. (2009). A learning progression approach to teacher professional development in astronomy. Paper presented at the *Learning Progressions in Science* conference, June 24-26, Iowa City, IA.

Plummer, J.D. and **Slagle, C. (2009). Children explaining celestial motion: Development of a learning progression. Paper presented at the annual meeting of the National Association for Research in Science Teaching, April 20, Garden Grove, CA.

Howard, L., **Plummer, J.D.**, & Moore, G. (2008). Connecting science to the "real" world: General education for non-science majors. Presented at *Engaging Science, Advancing Learning: General Education, Majors, and the New Global Century*, November 6-8, Providence, Rhode Island.

**Plummer, J.D., ***Rice, R. & *Zahm, V. (2008). Inquiry and astronomy: Investigations in celestial motion. Paper presented at the *Annual Meeting of the National Association for Research in Science Teaching*, March 30-April 2, Baltimore, Maryland.

Plummer, J.D. & Krajcik, J.S. (2008). A learning progression for celestial motion. Paper presented at the *Annual Meeting of the National Association for Research in Science Teaching*, March 30-April 2, Baltimore, Maryland.

Plummer, J.D. (2007). Developing students' understanding of astronomy in the planetarium. Paper presented at the *Annual Meeting of the National Association for Research in Science Teaching*, April 15-18, New Orleans, Louisiana.

Plummer, J.D. (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.

INVITED TALKS

Plummer, J.D. (2015). Connecting field trips to classroom learning: Using the planetarium to support students' engagement in science practices. Annual conference of the *Great Lakes Planetarium Association*, Grand Rapids, MI.

Plummer, J.D. (with A. Enevoldsen, A. Hurst Schmit, and J. Jipson) (2014). Astronomy in Early Childhood. Presented as part of an online web seminar for CosmoQuest. Archived online: http://cosmoquest.org/x/educatorszone/learning-space/

Plummer, J.D. (with Shore, L., Cheung, C., & Carlson, J.) (2014). The Next Generation Science Standards: How to support students, teachers, and districts. Presented at the *Astronomical Society of the Pacific's Annual Education and Public Outreach Conference,* Burlingame, CA.

Plummer, J.D. (2013). NGSS core ideas: Earth's place in the universe. Presented as an online web seminar for the National Science Teacher Association. Archived online: https://sas.elluminate.com/p.jnlp?psid=2013-11-05.1339.M.2DD67B0B6EAEB914732D0D871BCE4B.vcr&sid=2256

Plummer, J.D. (2012). Methods of supporting student learning in the planetarium. American Association for Physics Teachers, Philadelphia, PA.

Plummer, J.D. (2012). Using spatial knowledge as a framework for a learning progression in astronomy. Michigan State University, East Lansing, MI.

Plummer, J.D. (2010). Challenges in obtaining empirical support for a learning progression: Exploring connections in observational astronomy. Pennsylvania State University, State College, PA.

Plummer, J.D. (2010). A Research-Based Approach to Teaching and Learning Astronomy in the Planetarium. Rittenhouse Astronomical Society, Franklin Institute, Philadelphia, PA.

Plummer, J.D. (2009). Covering the Standards: Astronomy Teachers Preparation and Beliefs. 21st Century Partnership for STEM Education, Conshohocken, PA.

Plummer, J.D. (2009). Students' Preconceptions in Astronomy. Philadelphia Chapter of Project Astro, West Chester University, West Chester, PA.

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

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

Workshops

Plummer, J.D. (2014). Developing astronomy instruction that supports the goals of the NGSS. Presented at the *Astronomical Society of the Pacific's Annual Education and Public Outreach Conference,* Burlingame, CA.

Plummer, J.D. & Gould, A. (2014). Publishing your research in the Journal and Review of Astronomy Education and Outreach. Presented at the *Astronomical Society of the Pacific's Annual Education and Public Outreach Conference,* Burlingame, CA.

Hurst Schmitt, A., **Plummer, J.D.**, White, V., Enevoldsen, A., Gurton, S., & Schultz, G. (2014). My Sky Tonight: Developmentally-appropriate activities for engaging preschool children in astronomy. Presented at the *Astronomical Society of the Pacific's Annual Education and Public Outreach Conference,* Burlingame, CA.

Enevoldsen, A., Hurst Schmitt, A., **Plummer, J.D.**, Jipson, J., Snider-Bryan, C., et al. (2013). Preschoolers in astronomy: Successful techniques for engaging in astronomy and in the planetarium. Workshop presented at the Astronomical Society of the Pacific annual educational and public outreach conference, San Jose, CA.

Plummer, J.D. & **Small, K.J. (July, 2012). Interacting with your audience using a modular planetarium program. Workshop presented at the International Planetarium Society meeting, Baton Rouge, LA.

Fraknoi, A., Hemenway, M., & **Plummer, J.D.** (August, 2011). *Publishing your research and ideas in Astronomy Education Review: A hands-on workshop for new and veteran authors*. Workshop presented at the Astronomical Society of the Pacific annual education and public outreach conference, Baltimore, MD.

Plummer, J.D. (May, 2011). *Developing learning progressions for astronomy education researchers.* Workshop presented at the Center for Astronomy & Physics Education Research (CAPER) retreat, Denver, CO.

Duncan, R. G., Krajcik, J., Fortus, D., McNeill, K.L., & **Plummer, J.D.** (April, 2011). Developing and assessing learning progressions in science. Workshop presented at the annual meeting of the *National Association for Research in Science Teaching*, Orlando, FL.

Plummer, J.D. & **Slagle, C. (March, 2010). Using children's observations to guide explanations in astronomy. Presented at the *Annual Meeting of the National Science Teachers Association*, March 18-20, Philadelphia, PA.

Non-Peer Reviewed Presentations

Plummer, J.D. & Palma, C. (2015). Engaging undergraduate education majors in the practice of astronomy through a coherent science content storyline course. Presented at the *International Astronomical Union* triennial conference, Honolulu, HI.

Palma, C., **Plummer, J.,** *Ghent, C., *Gleason, T., *Ong, Y.S., & McDonald, S. (2015, January). Have Astronomers Been to Neptune? Results of a Study of High School Students' Ideas about How Astronomers Study the Solar System. In *American Astronomical Society Meeting Abstracts* (Vol. 225), Seattle, WA.

Palma, C., Petula, J., **Plummer, J.**, *Flarend, A., & Goldsborough, G. (2012). First step in building an astronomy learning progression: Analyzing student conceptions of astronomical phenomena. Poster presented at the *219th Meeting of the American Astronomical Society*, Austin, TX.

Plummer, J.D. (2011). Evidence for the importance of interactive planetarium programs: Research on kinesthetic strategies with elementary students. Presented at the *Live Interactive Planetarium Symposium,* Bremerton, WA.

Plummer, J.D. (2011). Preservice teachers' first experiences teaching astronomy: Challenges in designing and implementing inquiry-based astronomy instruction for elementary students in after school programs. *Proceedings of the Astronomical Society of the Pacific's Annual Education and Public Outreach meeting: Connecting People to Science*, Baltimore, Baltimore, MD.

Sealfon, C. & **Plummer, J.D.** (2011). Improving the pipeline of women in STEM fields: Addressing challenges in instruction, engagement, and evaluation of an aerospace series for girl scouts. *Proceedings of the Astronomical Society of the Pacific's Annual Education and Public Outreach meeting: Connecting People to Science*, Baltimore, Baltimore, MD.

Plummer, J.D. & **Slagle, C. (2010). The influence of an observational-focused planetarium program on elementary students' mental models of celestial motion. Presented at the *Association for Science Teacher Education, North-East Region Meeting,* Dingmans Ferry, PA.

Small, K.J. & **Plummer, J.D. (2010). Motivating a new genre for the fulldome era: Perspective from planetarium professionals. Paper presented at the *Annual Meeting of the Middle Atlantic Planetarium Association,* May 19-22, Portland, ME.

Small, K. & **Plummer, J.D. (2009). Seeking field support for fulldome research project. Presented at the *Annual Meeting of the South Eastern Planetarium Association*, June 16-18, Nashville, TN and at the *Annual Meeting of the Middle Atlantic Planetarium Association*, May 13-16, Seabrook, MD.

Plummer, J.D. (2008). Astronomy in middle and high schools in the Greater Philadelphia Regionl Presented at the *3rd Annual Conference of the Math and Science Partnership of Greater Philadelphia*, November 15, West Chester, Pennsylvania.

Plummer, J.D. (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.

Plummer, J.D. (2006). Kinesthetic learning with celestial motion in the planetarium. Presented at the *Annual Meeting of the Philadelphia Area Planetarium Association*, October 27, Upper Dublin, Pennsylvania.

Plummer, J.D. (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.

Plummer, J.D., Jones, C., Forman, W., Donnelly, R. H. & Rines, K.J. (1997). Cosmological Implications of ROSAT Observations of Distant Galaxy Clusters, *Bulletin of the American Astronomical Society*, 28, 1317

Plummer, J.D. & Hunter, D. (1996). Star formation and Gas Densities in the Dwarf Irregular Galaxy Sextans A, *Bulletin of the American Astronomical Society*, 27, 1296

PARTICIPATION IN PROFESSIONAL ORGANIZATIONS

PROFESSIONAL SERVICE

INTERNATIONAL PLANETARIUM SOCIETY
- Education Committee member — 2014 – present

NATIONAL ASSOCIATION FOR RESEARCH IN SCIENCE TEACHING
- Early Career Research Award Co-Chair — 2014-2017
- Publications Advisory Committee member — 2011-2014
- Co-Strand Coordinator: Science Learning, Understanding and Conceptual Change — 2009-2011

ASTRONOMICAL SOCIETY OF THE PACIFIC
- Annual EPO Conference Planning Committee — 2011, 2014

EARTH AND SPACE SCIENCE PARTNERSHIP — 2010-2011
Advisory Board member (NSF targeted math and science partnership award)

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE – PROJECT 2061 — 2010
- Advisory panel member – Weather & Climate

MASSACHUSETTS DEPARTMENT OF ELEMENTARY & SECONDARY EDUCATION 2010
Research consultant to the revision panel for the MA Science and Technology/Engineering Curriculum Framework

MERCK INSTITUTE FOR SCIENCE EDUCATION 2006
Consultant on pedagogical content knowledge project

GRANT REVIEWS
Department of Education – Institute of Education Sciences
Principal member (2012-2015)
Rotating member (2011-2012)
NASA ROSES EPOESS (2011)

JOURNAL REVIEWS
Journal of Astronomy and Earth Science Education, Board of Reviewers (2014 – present)
Journal of Research in Science Teaching [Editorial Board (2010-2013)] (2010-present)
Science & Education (2015 – present)
Educational Psychology (2014-present)
Physical Review Special Topics – Physics Education Research (2014-present)
International Journal of Science Education (2013-present)
Journal of Science and Mathematics Education (2013-present)
Journal of Teacher Education (2012-present)
Science Education (2010-present)
Journal of Science Teacher Education (2010-present)
Journal and Review of Astronomy Education and Outreach, Editorial Board (2014 – 2015)
Astronomy Education Review (2007-2013)

CONFERENCE REVIEWS
National Association for Research in Science Teaching (Strand 1 & 2) (2006-present)
International Conference of the Learning Sciences (2009, 2013)
Association for Science Teacher Education (2010-2011)

PROFESSIONAL AFFILIATIONS
Astronomical Society of the Pacific (1992-present)
International Society of the Learning Sciences (2009-present)
National Association for Research in Science Teaching (2006-present)
National Science Teachers Association (2006-present)

CONTRIBUTIONS TO THE UNIVERSITY

PENNSYLVANIA STATE UNIVERSITY: COLLEGE & DEPARTMENTAL COMMITTEES AND SERVICE

STEM Museum Planning Committee - Member	2015 - present
Faculty Senate – Member	2015 - 2019
Faculty Council, College of Education – Member	2013 - 2015
Graduate Student Grants and Fellowships committee, College of Education – Member	2013 - present
Elementary Science Methods Coordinator	2012 - present
Center for Excellence in Science Education, College of Science, Advisory Board	2012 - present
Earth & Mineral Sciences Museum Advisory Board member	2011 - present
Elementary Math/Science Education Faculty Search, Behrend campus – Member	2013
Elementary Science Education Faculty Search – Co-Chair	2012-2013

DOCTORAL ADVISING at Pennsylvania State University

Michele Crowl – Dissertation chair, in progress
Yann Shiou Ong – Dissertation co-chair, in progress
Julianne Snider – Dissertation chair, in progress
Chrysta Ghent – Advisor, in progress
Abha Vaishampayan – Advisor, in progress

COURSES TAUGHT AT Pennsylvania State University (2011-present)

Undergraduate Education Courses:
SCIED 458 – Teaching Science in the Elementary School
ASTRO/SCIED 297 – Introduction to Astronomy for Educators

Graduate Education Courses:
SCIED 597C – Teaching and Learning about Spatial Reasoning
SCIED 597C – Engaging Children in the Practices of Science
SCIED 597B – Learning Sciences Research Frameworks and Methods

ARCADIA UNIVERSITY: ADVISOR FOR MASTERS DEGREE CULMINATING PROJECTS

Advised 23 Masters projects from 2006-2010.

COURSES TAUGHT AT ARCADIA (2006-2011)

Undergraduate Education Courses:
ED 324 – Elementary Science Methods
ED 341 – The Processes of Learning in the Classroom
ED 343 – Refining and Integrating Curricular Practices

Graduate Education Courses:
ED 552 – Science Methods for Elementary Teachers
ED 553 – Science Methods for Secondary Teachers
ED 555 – Instructional Materials for Teaching Science
ED 558 – Special Seminar for Science Educators
ED 561 – Summer Institute for Astronomy Educators
ED 561 – Project Based Learning in Math and Science

Undergraduate Science Courses
PH 224 – Frontiers in Astronomy
HN 309/US 213 – Astrobiology: Life in the Universe
FY 103 – The Night Skies of Pennsylvania