

Melissa A. Morris

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Research Interests

Star and planet formation, meteoritics, astrobiology, asteroid hazards/mining. The use of astrophysical modeling, in conjunction with observations (both astronomical and meteoritical), to determine conditions during the formation of planetary systems. The use of planetary materials and astronomical spectra to search for signs of aqueous alteration of solids, exotic exoplanets, and habitable worlds. The use of astrophysical modeling, in conjunction with the determination of material properties of planetary materials, to determine hazards inherent to Near Earth Objects (NEOs) and targets of sample return missions and/or mining ventures.

Education

2009 Arizona State University Ph.D. in Astrophysics
2007 Arizona State University M.S. in Physics
2003 Missouri State University B.S. in Physics, Minor in Astronomy, Magna Cum Laude

Appointments

2015 - present	Associate Professor	State University of New York (SUNY)
2016 - present	Adjunct Faculty	Arizona State University
2014 - 2016	Research Associate	Arizona State University
2014 - 2015	Assistant Professor	State University of New York (SUNY)
2014 - 2014	Associate Research Professor	Arizona State University
2012 - 2014	Assistant Director, Center for Meteorite Studies	Arizona State University (ASU)
2011 - 2014	Faculty Research Associate	Arizona State University (ASU)
2011 - 2011	Adjunct Astronomy Faculty	Rio Salado College (RSC)
2011 - 2011	Postdoctoral Research Associate	Arizona State University (ASU)
2010 - 2011	SESE Exploration Postdoctoral Fellow	Arizona State University (ASU)
2009 - 2010	Visiting Assistant Professor	Missouri State University (MSU)
2004 - 2009	Graduate Research Assistant	Arizona State University (ASU)
2006 - 2009	Adjunct Astronomy Faculty	South Mtn. Comm. College (SMCC)
2007 - 2013	Adjunct Astronomy Faculty	Mesa Community College (MCC)
2003 - 2004	Teaching Assistant/Lab Instructor	Arizona State University (ASU)
2000 - 2003	Intern - NASA Space Grant	Missouri State University (MSU)
1999 - 2003	Teaching Assistant/Lab Assistant	Missouri State University (MSU)

Awards, Fellowships, and Honors

2015 Excellence in Research, Scholarship, and Outreach
2010 SESE Exploration Postdoctoral Fellowship (50K over 1 year)
2001 Goldwater Scholar in Mathematics, Science, and Engineering

Current (C) and Pending (P) Support

2015-2017	NASA	PI, Melissa Morris	\$330K (C)	<i>The Formation Environment of Chondrules in Planetesimal Impact Plumes</i>
2016-2018	NASA	PI, Melissa Morris	\$319K (C)	<i>Observational and Theoretical Investigations of the Formation of Igneous Rims around Chondrules</i>
2015	TACC	PI, Melissa Morris	130K SUs (C)	<i>Chondrule Formation in Impact Plumes</i>

Courses Taught

PHY 150	Introductory Astronomy	SUNY	(3 semesters)
PHY 155	Introductory Astronomy with Lab	SUNY	(1 semester)
PHY 550	Intermediate Astronomy	SUNY	(1 semester)
AST 111	Introduction to Solar System Astronomy	ASU	(1 semester)
AST 113	Astronomy Laboratory I	ASU	(1 semester)
AST 101	Survey of Astronomy	RSC	(1 semester)
AST 102	Survey of Astronomy Laboratory	RSC	(1 semester)
AST 112	Introduction to Stars, Galaxies, and Cosmology	ASU	(3 semesters)
AST 114	Astronomy Laboratory II	ASU	(1 semester)
SES 101	Earth, Solar System, and Universe I	ASU	(1 semester)
AST 114	Survey of Astronomy	MSU	(2 semesters)
AST 111	Introduction to Solar System Astronomy	MCC	(2 semesters)
AST 101	Survey of Astronomy	SMCC	(6 semesters)
AST 102	Survey of Astronomy Laboratory	SMCC	(6 semesters)

Undergraduate Research Project Faculty Mentor

Aron McCart, NASA Missouri Space Grant Consortium intern, Missouri State University.

Anthony Terzolo, Undergraduate Research Assistant, SUNY Cortland.

Mallory Macken, Undergraduate Research Assistant, SUNY Cortland.

Andrew Duval, Undergraduate Research Assistant, SUNY Cortland.

Theodore Neubauer, Undergraduate Research Assistant, SUNY Cortland.

Graduate Education and Public Outreach Project Faculty Mentor

Teresa Ashcraft, NASA Arizona Space Grant Consortium fellow, Arizona State University.

Postdoctoral Scholars Supervised

Mark L. A. Richardson

Nicolas Ouellette

Invited Talks, Addresses, and Colloquia

The current state of research into the formation of chondrules, invited address, The American Museum of Natural History, New York, NY, January 19, 2016 (scheduled).

The current state of research into the formation of chondrules, invited address, Astronomical Society of New York, Saratoga Springs, NY, November 7, 2015.

The current state of research into the formation of chondrules, invited address, University of Rochester, Rochester, NY, November 2, 2015.

The Importance of Dedication and Tenacity, invited keynote address, President's List Reception, SUNY Cortland, Cortland, NY, October 2, 2015.

The current state of research into the formation of chondrules, invited address, Cornell University, Ithaca, NY, April 27, 2015.

Phyllosilicate Emission from Protoplanetary Disks. Is the Indirect Detection of Extrasolar Water Possible?, invited address, Cornell University, Ithaca, NY, December 1, 2014.

Meteorites 101, invited address, Arizona Museum of Natural History, Mesa, AZ, October 4, 2013.

Meteorites 101, invited address, East Valley Astronomy Club, Mesa, AZ, April 19, 2013.

Which came first: The chondrule or the planet?, invited address, East Valley Astronomy Club, Mesa, AZ, July 20, 2012.

Which came first: The chondrule or the planet?, invited address, Jet Propulsion Laboratory, Pasadena, CA, December 12, 2011.

Forming Planetary Systems: Combining Astrophysics and Meteoritics, invited address, ASU Astronomy Open House, Arizona State University, Tempe, AZ, October 21, 2011.

Chondrule Formation - A New Approach to an Old Problem, colloquia talk at the Lunar and Planetary Laboratory, The University of Arizona, Tucson, AZ, September 14, 2010.

Transient Heating in the Early Solar Nebula, Formation of some of the Solar System's Oldest Solids, invited address, 40th Annual Mid-American Regional Astrophysics Conference, Kansas City, MO, April 10, 2010.

Phyllosilicate Emission from Protoplanetary Disks, colloquia talk at Missouri State University, Springfield, MO, March 25, 2010.

Phyllosilicate Emission from Protoplanetary Disks: Is the Indirect Detection of Extrasolar Water Possible?, invited address, University of Arizona, Tucson, AZ, December 8, 2008.

Indirect Detection of Water in Forming Planetary Systems, invited address, Phoenix Astronomical Society, Phoenix, AZ, October 4, 2007.

National, International, University, and Department Service

Panelist, ROSES Program Review Panels, NASA
Reviewer, ROSES Proposals, NASA
Reviewer, W.H. Freeman Publishers
Reviewer, NASA Postdoctoral Program
Reviewer, The Astrophysical Journal
Reviewer, Monthly Notices of the Royal Astronomical Society
Reviewer, Earth, Moon, and Planets
Reviewer, Meteoritics and Planetary Science
Reviewer, French National Research Agency (ANR)
Reviewer, *Geochimica et Cosmochimica Acta*
Curricula Committee, School of Arts & Sciences, SUNY Cortland
Curricula Committee Chair, Department of Physics, SUNY Cortland
Personnel Committee, Department of Physics, SUNY Cortland
Curricula Committee, Department of Physics, Astronomy, & Materials Science, MSU

Education and Public Outreach Activities

President's List Prestigious Faculty keynote address, SUNY Cortland
K-12 Student Project Interview(s)
Sandwich Seminar, SUNY Cortland
Tech Savvy Conference, SUNY Cortland
ASU's Center for Meteorite Studies, Outreach Director
Various Media Appearances (BBC Horizon, Science Channel, Discovery Science, local news)
Arizona Museum of Natural History, guest lecturer and frequent events participant
Arizona Science and Astronomy Expo, Meteorites panelist
ASU Astronomy Open House/Earth and Space Open House, guest lecturer
ASU Homecoming Block Party, Center for Meteorite Studies, organizer and volunteer
ASU Earth and Space Exploration Day, Center for Meteorite Studies, organizer and volunteer
ASU Night of the Open Door, Center for Meteorite Studies, organizer and volunteer
NASA Observing Night, Baker Observatory, MSU, Faculty volunteer
SMCC Observing Night, SMCC
ASU Astronomy Open House, Volunteer
NASA Observing Night, Baker Observatory, MSU, Volunteer

Publications

16. Cotto-Figueroa, D. et al. (including M. A. Morris), 2015 *Scale-Dependent Measurements of Meteorite Strength: Implications for the Fragmentation of Small Asteroids*, *Icarus*, in preparation.
15. Mann, C., Boley, A. C., & Morris, M. A., 2015, *Planetary Embryo Bow Shocks as a Mechanism for Chondrule Formation*, *The Astrophysical Journal*, in press.
14. Morris, M. A., Weidenschilling, S. J., & Desch, S. J., 2015, *The effect of multiple particle sizes on cooling rates of chondrules produced in large-scale shocks in the solar nebula*, *Meteoritics & Planetary Science*, in revision.
13. Garvie, L. A. J., Knauth, L. P., & Morris, M. A., 2015, *The Isheyevo meteorite: the Solar System's oldest layered sedimentary rock*, *Geology*, in revision.

12. Morris, M. A., Garvie, L. A. J., & Knauth, L. P., 2015, *New insight into the Solar System's transition disk phase provided by the metal-rich carbonaceous chondrite Isheyevo*, The Astrophysical Journal Letters, 801, L22.
11. Boley, A. C., Morris, M. A., Ford, E. B., 2014 *Overcoming the Meter Barrier and the Formation of Systems with Tightly Packed Inner Planets (STIPs)*, The Astrophysical Journal Letters, 792L, 27B.
10. Boley, A. C., Morris, M. A., Desch, S. J., 2013 *High-Temperature Processing of Solids through Solar Nebular Bow Shocks: 3D Radiation Hydrodynamics Simulations with Particles*, The Astrophysical Journal, 776, 101.
9. Morris, M. A., Boley, A. C., Desch, S. J., Athanassiadou, T., 2012, *Chondrule Formation in Bow Shocks around Eccentric Planetary Embryos*, The Astrophysical Journal, 752, 27.
8. Desch, S. J., Morris, M. A., Connolly Jr., H. C., and Boss, A. P., 2012, *The Importance of Experiments: Constraints on Chondrule Formation Models*, Meteoritics & Planetary Science, 47, 1139.
7. M. D. Reed et al. (including M. A. Morris), 2011. *Whole Earth Telescope Observations of the Subdwarf B Star KPD 1930+2752: A Rich, Short Period Pulsator in a Close Binary*, Monthly Notices of the Royal Astronomical Society, 412, 371.
6. Desch, S. J., Morris, M. A., Connolly Jr., H. C., and Boss, A. P., 2010. *A Critical Examination of the X-Wind Model for Chondrule and CAI Formation and Radionuclide Production*, The Astrophysical Journal, 725, 692.
5. Morris, M. A. and Desch, S. J., 2010. *Thermal Histories of Chondrules in Solar Nebula Shocks*, The Astrophysical Journal, 722, 1474.
4. Morris, M. A., 2009. *Thermal Histories of Chondrules in Solar Nebula Shocks, Including the Effect of Molecular Line Cooling*, Ph.D. Thesis, School of Earth and Space Exploration, Arizona State University.
3. Morris, M. A. and Desch, S. J., 2009. *Phyllosilicate Emission from Protoplanetary Disks: Is the Indirect Detection of Extrasolar Water Possible?*, Astrobiology, 9, 965.
2. Morris, M. A., Desch, S. J., and Ciesla, F. J., 2009. *Cooling of Dense Gas by H₂O Line Emission and an Assessment of its Effects in Chondrule-Forming Shocks*, The Astrophysical Journal, 691, 320.
1. Morris, M. A., 2007. *Phyllosilicate Emission from Protoplanetary Disks*, Masters Thesis, Department of Physics, Arizona State University.

Selected Conference Abstracts

28. Richardson, M. L. A., Morris, M. A., Ouellette, N., Asphaug, E., & Jutzi, M., 2015 *Chondrule Formation from Ejecta Melts with Adaptive Mesh Refinement*, 78th Annual Meeting of the Meteoritical Society held July 27-31, 2015 in Berkeley, California, USA. LPI Contribution No. 1856, p.5134.

27. Terzolo, A. J. & Morris, M. A., 2015 *The Indirect Detection of Liquid Water in Extrasolar Protoplanetary Disks*, Gordon Research Conference on the Origins of Solar Systems held June 28-July 2, 2015 in South Hadley, Massachusetts, USA.
26. Richardson, M. L. A., Ouellette, N., Morris, M. A., Asphaug, E., & Jutzi, M., 2015 *Modeling Collisional Ejecta in 3-D with Adaptive Mesh Refinement*, Gordon Research Conference on the Origins of Solar Systems held June 28-July 2, 2015 in South Hadley, Massachusetts, USA.
25. Cotto-Figueroa, D., Asphaug, E., Morris, M. A., & Garvie, L. 2015, *Scale-Dependent Studies of Meteorites*, AstroRecon 2015, Conference on Spacecraft Reconnaissance of Asteroid and Comet Interiors, Jan. 8-10.
24. Boley, A. C., Morris, M. A., & Ford, E. B. 2015, *The In Situ Formation of Systems with Tightly-packed Inner Planets*, American Astronomical Society Meeting Abstracts, 225, #257.22
23. Mann, C., Boley, A. C., & Morris, M. A. 2015, *Planetary Embryo Bow Shocks as a Mechanism for Chondrule Formation*, American Astronomical Society Meeting Abstracts, 225, #137.20.
22. Cotto-Figueroa, D., Asphaug, E., Morris, M. A., & Garvie, L. 2014, *Measuring Fracture Properties of Meteorites: 3D Scans and Disruption Experiments*, AAS/Division for Planetary Sciences Meeting Abstracts, 46, #304.05.
21. Boley, A. C., Morris, M. A., & Ford, E. B. 2014, *Overcoming the Meter Barrier and The Formation of Systems with Tightly-packed Inner Planets (STIPs)*, AAS/Division for Planetary Sciences Meeting Abstracts, 46, #504.09.
20. Morris, M. A. & Desch, S. J. 2014 *A Re-Evaluation of Chondrule Formation in Large-Scale Shocks*, 45th Lunar and Planetary Science Conference, held March 17-21, 2014, The Woodlands, Texas, LPI Contribution No. 1777, p.2577.
19. Morris, M. A., Garvie, L. A. J., Dock, M., Hiines, R. & Wadhwa, M. 2014 *The Fruitful Marriage of Art and Science*, 45th Lunar and Planetary Science Conference, held March 17-21, 2014, The Woodlands, Texas, LPI Contribution No. 1777, p.2832.
18. Morris, M. A. & Garvie, L. A. J. 2013 *New Constraints on the Formation of Igneous Rims Around Chondrules*, 44th Lunar and Planetary Science Conference, held March 18-22, 2013, The Woodlands, Texas, LPI Contribution No. 1719, p.2852.
17. Morris, M. A., Desch, S. J., & Garvie, L. A. J. 2012, *A Model for Accretion of CH/CB/Isheyevo Chondrites*, 75th Annual Meeting of the Meteoritical Society held August 12-17, 2012 in Cairns, Australia. Meteoritics and Planetary Science Supplement, 75, 5390.
16. Morris, M. A., Desch, S. J., Boley, A. C., 2012 *The Chemical Environment Experienced by Chondrules Formed in Planetary Embryo Bow Shocks*, 43rd Lunar and Planetary Science Conference, held March 18-23, 2012, The Woodlands, Texas, LPI Contribution No. 1659, p.2782.

15. Morris, M. A., Boley, A. C., Desch, S. J., Athanassiadou, T., 2011, *Chondrule Formation in Eccentric Planetary Embryo Bow Shocks*, Workshop on Formation of the First Solids in the Solar System, held November 7-9, 2011 in Kauai, Hawaii. LPI Contribution No. 1639, p.9082
14. Morris, M. A., Desch, S. J., 2011. *Thermal Histories of Chondrules: An Assessment of the Effect of a Size Distribution of Precursor Particles*, 74th Annual Meeting of the Meteoritical Society held August 8-12, 2011 in London, England, UK. Meteoritic and Planetary Science Supplement, 5202.
13. Desch, S. J., Morris, M. A., 2011. *Thermal Histories of Chondrules in Very Large Planetesimal Bow Shocks: Did Mars Make Chondrules?*, 74th Annual Meeting of the Meteoritical Society held August 8-12, 2011 in London, England, UK. Meteoritic and Planetary Science Supplement, 5414.
12. Morris, M. A., Janney, P. E., Hines, R., Wadhwa, M., 2011. *^{26}Al - ^{26}Mg Systematics of Selected Chondrules from Allende and Semarkona*, 42nd Lunar and Planetary Science Conference, held March 7-11, 2011, The Woodlands, Texas, LPI Contribution No. 2773.
11. Morris, M. A., Desch, S. J., Ciesla, F. J., 2010. *A Preliminary Assessment of Chondrule Cooling Rates in Planetesimal Bow Shocks, Including H₂ Recombination*, 73rd Annual Meeting of the Meteoritical Society, held July 26-30, 2010 in New York City, New York. Meteoritic and Planetary Science Supplement, 5215.
10. Wick, M. J., Jones, R. H., Morris, M. A., Desch, S. J., *Formation Conditions of Type I Chondrules: Comparison of Experimentally Determined Cooling Rates with the Shock Wave Model for Chondrule Formation*, 73rd Annual Meeting of the Meteoritical Society, held July 26-30, 2010 in New York City, New York. Meteoritic and Planetary Science Supplement, 5278.
9. Morris, M. A., Desch, S. J., Ciesla, F. J., 2010. *Preliminary Assessment of Chondrule Cooling Rates in Planetesimal Bow Shocks, Including the Heating Effects of H₂ Recombination*, 41st Lunar and Planetary Science Conference, held March 1-5, 2010, The Woodlands, Texas, LPI Contribution No. 1533, p.2393.
8. Morris, M. A., Desch, S. J., Ciesla, F. J., 2009. *Thermal Histories of Chondrules in Solar Nebula Shocks*, 72nd Annual Meeting of the Meteoritical Society, held July 13-18, 2009 in Nancy, France. Meteoritics and Planetary Science Supplement, 5423.
7. Morris, M. A., Desch, S. J., Ciesla, F. J., 2009. *Tying Up Loose Ends in Chondrule Formation by Shocks*, 40th Lunar and Planetary Science Conference, (Lunar and Planetary Science XL), held March 23-27, 2009 in The Woodlands, Texas, id.2300.
6. Morris, M. A., Desch, S. J., Ciesla, F. J., 2009. *Cooling of Dense Gas by H₂O Line Emission and an Assessment of its Effects In Chondrule-forming Shocks*, American Astronomical Society, AAS Meeting 213, 441.05; Bulletin of the American Astronomical Society, Vol. 41, p.318.
5. Morris, M. A., Desch, S. J., Ciesla, F. J., 2007. *The Effect of Line Cooling in Chondrule-Forming Shocks*, 70th Annual Meteoritical Society Meeting, held August

- 13-17, 2007, Tucson, Arizona. Meteoritics and Planetary Science Supplement, Vol. 42, p.5214, 42, 5214.
4. Desch, S. J., Ciesla, F. J., Morris, M. A., 2007. *The Effect of Line Cooling in Chondrule-Forming Shocks*, Lunar and Planetary Institute Conference Abstracts, 38, 1887.
 3. Morris, M. A., 2003. *Differential CCD Photometry of: HD 141186, 120651, 120753, 171955 (EW Sct), and GSC 3850-0662 (RV UMa)*, Missouri Space Grant Consortium Twelfth Annual Meeting, Conference Proceedings, 119, April 25-26, 2003.
 2. Morris, M. A., 2002. *Differential CCD Photometry of HD 142500, HD 148979, HD 161796 (V814 Her), HD 231195 (V1452 Aql)*, Missouri Space Grant Consortium Eleventh Annual Meeting, Conference Proceedings, 127, April 19-20, 2002.
 1. Morris, M. A., 2001. *Differential CCD Photometry of the Yellow Supergiant Stars: HD 161796 (V814 Her), HD 17306, HD 185061, HD 183791*, Missouri Space Grant Consortium Tenth Annual Meeting, Conference Proceedings, 165, April 20-21, 2001.