

Curriculum vitae

Amy M. Keesee

Employment: Associate Professor, 2018- , Department of Physics and Space Science Center, UNH
Research Associate Professor, 2016-2018, Department of Physics and Astronomy, WVU
Research Assistant Professor, 2010-2016, Department of Physics and Astronomy, WVU
Research Associate (0.53 FTE), 2007-2010, Department of Physics, WVU

Education: Ph.D. in Plasma Physics, 2006, West Virginia University
M.S. in Physics, 2003, West Virginia University
B.S. in Mathematics, 2000, Davidson College, Magna Cum Laude with Honors

Awards: Eberly College Outstanding Public Service Award, 2017-2018
Mary Catherine Buswell Award, 2012
Heliophysics Summer School, 2007.
William E. Vehse Endowment Award, 2006.
Jayne Armstrong Women's Leadership Program, 2005.
National Science Foundation East Asia and Pacific Summer Institute, 2004.
U. S. Department of Energy Fusion Energy Sciences Graduate Fellow, 2001-04.
Sigma Pi Sigma, 2001.
Department of Physics Teaching Assistant of the Year, 2001.
Phi Beta Kappa, 2000.
Omicron Delta Kappa, 2000.
Davidson College Department of Mathematics Bernard Society, 1998.
C. F. Meyers Jr. - Burlington Honor, 1999.
Davidson College Friends of the Arts, 1997-99.
James E. Casey Scholarship, 1996-2000.

Professional

Memberships: American Physical Society, American Geophysical Union, Association for Women in Science, Earth Science Women's Network

Invited Talks:

Understanding ion heating in Earth's magnetosphere using energetic neutral atom imaging, University of New Hampshire, Space Science Center Seminar, 7 December 2017.

Novel Techniques for Measuring Particles in Space, University of New Hampshire, Department of Physics Colloquium, 6 December 2017.

Novel Techniques for Measuring Particles in Space, University of Iowa, Department of Physics and Astronomy Seminar, 21 February 2017.

Understanding ion heating in Earth's magnetosphere using energetic neutral atom imaging, University of Iowa, Department of Physics and Astronomy Colloquium, 20 February 2017.

Novel Techniques for Measuring Particles in Space, Virginia Tech, Department of Aerospace and Ocean Engineering Seminar, 16 February 2016.

Understanding ion heating in Earth's magnetosphere using energetic neutral atom imaging, Davidson College Physics Seminar, 18 Sept. 2014.

Using ENA-Derived Ion Temperatures to Study Ion Dynamics in the Magnetosphere, University of Michigan, Department of Atmospheric, Oceanic, and Space Sciences Seminar, 13 May 2014.

Storms in Space, Pulsar Search Collaboratory Capstone Seminar, WVU NRCCE, 23 May 2011.
Argon neutral LIF measurements are consistent with no energetic electron population, APS-Division of Plasma Physics, Helicon Source Mini-conference, Nov. 2007.
Neutral density profile determination by comparison of spectroscopic measurements and a collisional-radiative model, High Temperature Plasma Diagnostics, 10 May 2006.
Ions and neutral atoms in a prototype high density plasma thruster, Institute for Scientific Research, 15 Sept. 2005.
Easy Rocket Engines: Just Add Ions!, Davidson College Physics Seminar, 14 Feb. 2005.
Laser-Induced Fluorescence Measurements at West Virginia University and Australian National University, Australian National University, 17 Aug. 2004.

Patents: Ultra-Compact Plasma Spectrometer, U.S. Patent No. 9,502,229

Teaching Experience:

Optics 708, UNH, Fall 2018. Upper level undergraduate elective with lab.
Senior Capstone 496, WVU, Fall 2017. Guided students in writing a science research paper.
Introductory Physics 101, WVU, Spring 2017; Fall 2016; Spring 2005. Utilized interactive classroom response system (clickers).
Orientation to STEM Research (Arts and Sciences 199), WVU. Developed and taught an interdisciplinary course for science majors to prepare them to conduct research as undergraduates, Spring 2014.
General Physics II 112, WVU, Fall 2013. Utilized interactive classroom response system (clickers) and worked with Learning Assistant Program.
Directed Study on The Sun and Space Weather, West Virginia Youth Science Camp, Summer 2013.
“The Sun and Space Weather,” developed and taught summer course (graduate credit available) for middle and high school educators, incorporated data access and reporting with iPads and a variety of solar telescopes, NASA IV&V Educator Resource Center, 2012; 2014.
Literacy Volunteers of West Virginia, 2001-05. Tutored English as a Second Language and Adult Basic Learning.
Graduate Teaching Assistant, 2000-01. Taught Introductory Physics Laboratories with Pasco Interface.
Tutor, 1998-2006. Tutored middle school through undergraduate math and physics in group and individual settings.

Publications:

Thompson, D. S., Steinberger, T. E., **Keesee, A. M.**, & Scime, E. E. (2018). Laser induced fluorescence of Ar-I metastables in the presence of a magnetic field. *Plasma Sources Science and Technology*, 27(6). <http://doi.org/10.1088/1361-6595/aac963>
Keesee, A. M., Dugas, M., Ellison, S., Neal, L., Scime, E. E., Thompson, D. S., Tersteeg, J., and Tucker, C. J. (2018). Micro-spectrometer for fusion plasma boundary measurements. *Review of Scientific Instruments*, 89(10), 10J116. <http://doi.org/10.1063/1.5035365>
Keesee, A. M., Katus, R. M., and Scime, E. E. (2017), The effect of storm driver and intensity on magnetospheric ion temperatures, *J. Geophys. Res. Space Physics*, 122, doi:10.1002/2017JA023973.

- Keesee, A. M.**, A Review of Dawn-Dusk Asymmetries Observed Using the TWINS Mission of Opportunity (2017), *Dawn-Dusk Asymmetries in Planetary Plasma Environments, Geophysical Monograph 230, American Geophysical Union/Wiley*.
- Katus, R. M., **A. M. Keesee**, E. Scime, and M. W. Liemohn (2017), Storm-time equatorial magnetospheric ion temperature derived from TWINS ENA flux, *J. Geophys. Res. Space Physics*, 122, 3985–3996, doi:10.1002/2016JA023824.
- Scime, E. E., **A. M. Keesee**, M. Dugas, S. Ellison, J. Tersteeg, G. Wagner, A. Barrie, A. Rager, and D. Elliott (2016), A micro-scale plasma spectrometer for space and plasma edge applications (invited), *Rev. Sci. Instrum.*, 87, 11D302, doi:10.1063/1.4960145.
- Katus, R. M., M. W. Liemohn, **A. M. Keesee**, T. J. Immel, R. Ilie, D. T. Welling, N. Y. Ganushkina, N. J. Perlongo, and A. J. Ridley (2016), Geomagnetic disturbance intensity dependence on the universal timing of the storm peak, *J. Geophys. Res. Sp. Phys.*, 121, 7561–7571, doi:10.1002/2014JA020737.
- Scime, E. E., A. Barrie, M. Dugas, D. Elliott, S. Ellison, **A. M. Keesee**, C. J. Pollock, A. Rager, and J. Tersteeg (2016), Key elements of a low voltage, ultracompact plasma spectrometer, *J. Geophys. Res. Space Physics*, 121, 1452–1465, doi:10.1002/2015JA022208.
- Gross, Jason N., **Amy M. Keesee**, John A. Christian, Yu Gu, Earl Scime, Attila Komjathy, E. Glenn Lightsey, and Craig J. Pollock, The CuSPED Mission: CubeSat for GNSS Sounding of the Ionosphere-Plasmasphere Electron Density, *presented at the 54th AIAA Aerospace Sciences Meeting, AIAA Science and Technology Forum and Exposition 2016*.
- Katus, R. M., D. L. Gallagher, M. W. Liemohn, **A. M. Keesee**, and L. K. Sarno-Smith (2015), Statistical storm time examination of MLT-dependent plasmopause location derived from IMAGE EUV, *J. Geophys. Res. Sp. Phys.*, 120, 5545–5559, doi:10.1002/2015JA021225.
- Chen, M. W., C. L. Lemon, T. B. Guild, **A. M. Keesee**, A. Lui, J. Goldstein, J. V. Rodriguez, and P. C. Anderson (2015), Effects of modeled ionospheric conductance and electron loss on self-consistent ring current simulations during the 5–7 April 2010 storm, *J. Geophys. Res. Space Physics*, 120, 5355–5376, doi:10.1002/2015JA021285.
- Keesee, A. M.**, and Scime E. E. (2015), Database of ion temperature maps during geomagnetic storms, *Earth and Space Science*, 2, 39–46, doi:10.1002/2014EA000061
- Keesee, A. M.**, C. Coryea, T. Ensign (2015), Engaging Students in West Virginia in the Science of the Sun and Space Weather, *The Earth Scientist*, XXXI (1), 18-22.
- Scime, E. E., P. A. Keiter, M. M. Balkey, J. L. Kline, X. Sun, **A. M. Keesee**, R. A. Hardin, I. A. Biloiu, S. Houshmandyar, S. Chakraborty Thakur, J. Carr, Jr., M. Galante, D. McCarren and S. Sears (2015), The hot hELicon eXperiment (HELIX) and the large experiment on instabilities and anisotropy (LEIA), *Journal of Plasma Physics*, 81, 345810103, doi: 10.1017/S0022377814000890.
- Keesee, A. M.**, M. W. Chen, E. E. Scime, and A. T. Y. Lui (2014), Regions of ion energization observed during the Galaxy-15 substorm with TWINS, *J. Geophys. Res.*, 119, doi:10.1002/2014JA020466.
- Keesee, A. M.**, J. G. Elfritz, M.-C. Fok, D. J. McComas, and E. E. Scime (2014), Superposed epoch analyses of ion temperatures during CME- and CIR/HSS-driven storms, *J. Atmos. Solar-Terrestrial Phys.*, 115-116, 67–78, doi:10.1016/j.jastp.2013.08.009.
- Walsh, A. P., Haaland, S., Forsyth, C., **Keesee, A. M.**, Kissinger, J., Li, K., Runov, A., Soucek, J., Walsh, B. M., Wing, S., and Taylor, M. G. G. T. (2014), Dawn–dusk asymmetries in the coupled solar wind–magnetosphere–ionosphere system: a review, *Ann. Geophys.*, 32, 705-737, doi:10.5194/angeo-32-705-2014.
- Elfritz, J. G., **A. M. Keesee**, N. Buzulukova, M. -C. Fok, and E. E. Scime (2014), First results using TWINS-derived ion temperature boundary conditions in CRCM, *J. Geophys. Res. Space Physics*, 119, 3345–3361, doi:10.1002/2013JA019555.
- Carr, J., P.A. Cassak, M. Galante, **A.M. Keesee**, G. Lusk, R.M. Magee, D. McCarren, E.E. Scime, S. Sears, R. Vandervort, N. Gulbrandsen, M. Goldman, D. Newman, and J.P.

- Eastwood, Spontaneous Ion Beam Formation in the Laboratory , Space , and Simulation, *Physics of Plasmas*, 20, 072118 (2013).
- Keesee, A.M.**, Fusion: Harnessing the Power of the Stars, Winter 2013 issue of AWIS Magazine.
- Keesee, A. M.**, J. G. Elfritz, D. J. McComas, and E. E. Scime, Inner magnetosphere convection and magnetotail structure of hot ions imaged by ENA during a HSS-driven storm (2012), *J. Geophys. Res.*, 117, A00L06, doi:10.1029/2011JA017319.
- Keesee, A. M.**, N. Buzulukova, J. Goldstein, D. J. McComas, E. E. Scime, H. Spence, M.-C. Fok, and K. Tallaksen (2011), Remote observations of ion temperatures in the quiet time magnetosphere, *Geophys. Res. Lett.*, 38, L03104, doi:10.1029/2010GL045987.
- Scime, E.E., I. A. Biloiu, J. Carr Jr., S. Chakraborty Thakur, M. Galante, S. Houshmandyar, **A.M. Keesee**, D. McCarren, S. Sears, C. Biloiu, and X. Sun (2010), Time-Resolved Measurements of Double Layer Evolution in Expanding Plasma, *Phys. Plasmas*, 17, 055701.
- Keesee, A. M.**, E. Scime, and M. Moldwin, Remote measurements of ion temperatures in the terrestrial magnetotail (2008), *J. Geophys. Res.*, 113, A00A03, doi:10.1029/2008JA013130.
- Sciamma, E., R. Bengtson, W. Rowan, **A. Keesee**, C. Lee, D. Berisford, K. Lee, and K. Gentle (2008), Method to estimate the electron temperature and neutral density in a plasma from spectroscopic measurements using argon atom and ion collisional-radiative models, *Rev. Sci. Instrum.*, 79, 10E324, doi:10.1063/1.2953577.
- Scime, E.E., **A.M. Keesee**, and R.W. Boswell (2008), Mini-conference on Helicon Plasma Sources, *Phys. Plasmas*, 15, 058301, doi:10.1063/1.2844795.
- Keesee, A. M.** and E. E. Scime (2007), Neutral density profiles in argon helicon plasmas, *Plasma Sources Sci. Technol.* 16 742-749.
- Scime, E., R. Hardin, C. Biloiu, **A.M. Keesee**, and X. Sun (2007), Flow, flow shear, and related profiles in helicon plasmas, *Phys. Plasmas*, 14, 043505.
- Keesee, A.** and E. Scime (2006), Neutral density profile determination by comparison of spectroscopic measurements and a collisional-radiative model, *Rev. Sci. Instrum.* 77, 10F304.
- Keesee, A.**, E. E. Scime, C. Charles, A. Meige, and R. W. Boswell (2005), The ion velocity distribution function in a current-free double layer, *Phys. Plasmas* 12, 093502.
- Sun, X., C. Biloiu, **A. Keesee**, E. E. Scime, A. Meige, R. Boswell, and C. Charles (2005), Observations of ion-beam formation in a current-free double-layer, *Phys. Rev. Lett.* 95, 025004.
- Keesee, A. M.**, R. Boivin, and E. Scime (2004), LIF measurements of three plasma species with a tunable diode laser, *Rev. Sci. Instrum.* 75, 4091.
- Zweben, S.J. , R. Maqueda, D. Stotler, **A. Keesee**, C. Bush, S. Kaye, B. LeBlanc, J. Lowrance, V. Mastracola, R. Maingi, G. Renda (2004), High speed imaging of edge turbulence in NSTX, *Nuc. Fusion*, 44, 134.
- Kline, J.L., M.M. Balkey, P.A. Keiter, E.E. Scime, **A.M. Keesee**, X. Sun, R. Hardin, C. Compton, R.F. Boivin, M.W. Zintl (2003), Ion dynamics in helicon sources, *Phys. Plasmas*, 10, 2127.
- Kline, J.L., E.E. Scime, R.F. Boivin, **A.M. Keesee**, X. Sun (2002), Slow wave ion heating in the HELIX helicon source, *Plasma Sources Sci. Technol.*, 11, 413.
- Scime, E.E., **A.M. Keesee**, R.S. Spangler, M.E. Koepke, C. Teodorescu, E.W. Reynolds (2002), Evidence for thermal anisotropy effects on shear modified ion acoustic instabilities, *Phys. Plasmas*, 9, 4399.
- Scime, E., **A.M. Keesee**, J.-M. Jahn, J.L. Kline, C.J. Pollock, M. Thomsen (2002), Remote ion temperature measurements of Earth's magnetosphere: Medium energy neutral atom (MENA) images, *Geophys. Res. Lett.*, 29, 80.
- Kline, J., E. Scime, R. Boivin, **A.M. Keesee**, X. Sun, and V. Mikhailenko (2002), RF absorption and ion heating in helicon sources, *Phys. Rev. Lett.*, 88, 195002.
- Smith, A.** (née) (2000), 'Basins of roots and periodicity in Newton's Method for cubic polynomials,' *Rose-Hulman Undergrad. Math Journal*.

Professional Development:

- Developing a Liberatory Consciousness for Transformative Action: An Introductory Course for Social Justice Change Agents in Academia, WVU, 2017-2018.
- Collaboration: How to Work With Others Webinar, National Center for Faculty Development and Diversity, 5 August 2014.
- How to Seek and Get Foundation Funding Webinar Series, National Center for Faculty Development and Diversity, May 2014.
- Writing Through Writer's Block Webinar, National Center for Faculty Development and Diversity, 14 May 2014.
- Ideas for Successful Clicker Use in the Classroom, WVU Faculty Development, 7 March 2013.
- The Nuts and Bolts of a Faculty Career, Part III: Managing Service Requests, WVU ADVANCE Center, 21 February, 2013.
- 5 Active Learning Strategies for the College Classroom, WVU Faculty Development, 12 February 2013.
- The Nuts and Bolts of a Faculty Career, Part I: Managing Large Classes, WVU ADVANCE Center, 24 October 2012.
- Faculty Success Program, National Center for Faculty Development and Diversity, Fall 2012.
- NSF CAREER Award Proposal Workshop, National Science Foundation, West Virginia University, 23 February 2012.
- Every Semester Needs A Plan Webinar, National Center for Faculty Development and Diversity, 17 January 2012.
- NASA Heliophysics Proposal Writing Workshop, AGU Fall Meeting, 7 December 2011.
- Navigating the NSF Workshop, Earth Science Women's Network, AGU Fall Meeting, 6 December 2011.
- Science: Becoming the Messenger, National Science Foundation, West Virginia University, 11 October 2011.
- Improving Work-Life Satisfaction, Association for Women in Science, West Virginia University, 30 November 2010.
- Professional Skills Development Workshop for Women in Physics, American Physical Society, Pittsburgh, PA, 26 February 2009.
- Write Winning Grants Seminar, Grant Writers' Seminars and Workshops, LLC, West Virginia University, 18 June 2008.

Synergistic Activities:

- Referee:** Rev. Scientific Instruments, Plasma Sources Sci.Tech., Phys. Plasmas, J. Geophysical Research, Geophysical Research Letters, J. Plasma Phys., AGU Books, Rev. Geophys., Frontiers in Physics, IEEE Trans. Plasma Sci.
- Reviewer:** NSF, NASA, DOE
- Professional**
- Service:** IUGG GIFT Workshop International Organizing Committee, 2018-2019
UNH Physics Graduate Program Committee, 2018-
AGU SPA Education and Public Outreach Committee, 2014-

Secretary, 2016-
AGU SPA Nomination Task Force, Spring 2018-
Chair, Fall 2018-
Frontiers in Plasma Physics, Review Editor, 2015-
Association for Women in Science:
Chapters Committee, 2008-2017
Chair, 2016-2017
Vice-Chair, 2013-2015
President, West Virginia Chapter, 2007-2014
WV STEM+ Family Travel Initiative, Advisory Board, 2014-2016
Faculty Associate, WVU Women's and Gender Studies, 2011-2016
Session co-chair, AGU Meeting of the Americas, May 2013
WVU Colloquium Committee, 2011-2012; 2012-2013
WVU Undergraduate Research Symposium Judge, 2012
WVU Science Development Team for The Summit Bechtel Reserve, 2011-2012
Committee for Women in Plasma Physics, 2008-2011
Program Committee, APS-Division of Plasma Physics, 2009, 2017

Outreach: Association for Women in Science:

Expanding Your Horizons workshops for middle school girls, 2004-2016
Boys and Girls Clubs of Charleston and St. Albans, 2011
The Clarksburg Children's House Montessori School
Organized "Physics Phamily Phun Day," March 21, 2014
Taught Kindergarten class about the Sun, Fall 2012
MentorNet Mentor: 2011-2013
Club PiSCES (Program to Stimulate Careers in Engineering and Science):
Program Director, 2011-2012
Transit of Venus Public Event, Co-organizer, 2012
Science Day at Children's Discovery Museum of WV, MMS and Solar
Telescope Booths Organizer, 2012
Exploration Station, MMS Booth Co-organizer, AGU Fall Meeting, 2012
FIRST Robotics:
Jr. FIRST Lego League Coach, 2014
Pittsburgh Regional Website Evaluator Advisor, 2010-2012
Pittsburgh Regional Website Evaluator, 2005-2012

Funding History:

External Funding:

1. Extended Mission: Data analysis for TWINS mission, Subcontract from SwRI on NASA mission, \$120,000, 2010-2013, Co-Investigator.
2. Remote Thermal Ion Measurements and Integrated Magnetospheric Modeling, NASA-EPSCoR, \$748,994, 2010-2014, Science PI.
3. Microsatellite Collaboration Development, NASA EPSCoR Travel Fund, \$2,500, 2012, Principal Investigator.
4. Ion Heating in the Magnetotail: Understanding Geomagnetic Storms, NSF Magnetospheric Physics, \$398,186+\$20,369 (supplement), 2012-2016, Principal Investigator.

5. Dawn-Dusk Asymmetries in the Coupled Solar Wind-Magnetosphere-Ionosphere System, International Space Science Institute, Accommodation, subsistence, and meeting space in Bern, Switzerland for 2 team meetings, 2013-2014, Team Member.
6. WVU Undergraduate Student Instrument Project, NASA USIP, \$48,769, 2013-2015, Co-Investigator.
7. Data-Model Comparisons Using TWINS and SWMF, NASA SMD High End Computing, 1,200,048 processing hours (equivalent to \$273,984), 2014-2015, Principal Investigator.
8. Extended Mission: Data analysis for TWINS mission, Subcontract from SwRI on NASA mission, \$45,000, 2014-2016, Co-Investigator.
9. West Virginia STEM+ Family Travel Initiative, Elsevier New Scholars, \$58,000, 2015-2016, Co-Investigator.
10. Extended Mission: Data analysis for TWINS mission, Subcontract from SwRI on NASA mission, \$60,000, 2015-2016, Co-Investigator.
11. Low Voltage, Ultra-compact Spectrometers for Heliophysics, NASA H-TIDeS, \$719,717, 2014-2017, Co-Investigator.
12. Understanding ion heating and convection using TWINS and SWMF, NASA SMD High End Computing, 184,321 processing hours (equivalent to \$42,082), 2016, Principal Investigator.
13. Extended Mission: Data analysis for TWINS mission, Subcontract from Princeton on NASA mission, \$30,000, 2016-2017, Co-Investigator.
14. Understanding ion heating and convection using TWINS and SWMF, NASA SMD High End Computing, 147,457 processing hours (equivalent to \$33,666), 2016-2017, Principal Investigator.
15. Bringing the Magnetospheric Multiscale Satellite (MMS) to the Public, NASA E/PO, \$13,125, 2016-2018, Co-Investigator.
16. Understanding Ion Heating and Convection using TWINS and SWMF, NASA Heliophysics-Supporting Research (H-SR), \$378,679, 2016-2019, Principal Investigator.
17. Magnetospheric Ion Temperature Derived from TWINS ENA-Data Upgrade, Subcontract from EMU on NASA H-DEE, 2017-2019, \$15,910, Institutional PI.
18. Solar Eclipse Teacher Professional Development, NASA West Virginia Space Grant Consortium, \$12,345, 2017-2018, Co-Investigator.
19. Micro Faraday Cup for Low Energy Ion Detection Channels, DOE Measurement Innovations for Magnetic Fusion Systems, \$25,081 UNH subaward, 2018-2019, Principal Investigator.

Total External: \$3,046,407

Significant Internal Funding:

1. Microsatellite Payload Development, WVU ADVANCE Sponsorship (internal competition for NSF funds), \$10,000, 2012-2013, Principal Investigator.
2. Ion Temperatures in the Magnetosphere: A Comparison of Satellite-Based Measurements and Global Modeling, WVU ADVANCE Sponsorship (internal competition for NSF funds), \$10,000, 2013-2014, Principal Investigator.
3. The WVU STEM TRaC: Target, Retain, and Career Program, ECAS ARTS, \$39,982, 2013-2014, Principal Investigator.

4. CubeSat Mission Proposal Development, PSCoR, \$21,324, 2017-2018, Principal Investigator.
5. Constructing an Experiment for Fusion-Relevant Plasma Science, WVU Energy Institute O'Brien Energy Research Fund, \$30,394, Co-Investigator.
6. Bringing the Great American Solar Eclipse to West Virginia, WVU Community Engagement Grant, \$9,995, 2017-2018, Co-Investigator.

Total Internal: \$121,695