Devin Silvia

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EDUCATION

UNIV. OF COLORADO

MS & PhD, Astrophysics
2013 | Boulder, CO

UNIV. OF WASHINGTON

BS, Astronomy
Minor in Mathematics
Magna Cum Laude, College Honors
2007 | Seattle, WA

BS, Physics
Magna Cum Laude, College Honors
2007 | Seattle, WA

INTERESTS

STEM EDUCATION

Active engagement
Inquiry-based teaching and learning
Equity and inclusion
Diversity and retention

COMPUTATIONAL ASTROPHYSICS

Plasma ionization chemistry
Intergalactic & circumgalactic media
Galactic chemical evolution
Cosmological hydrodynamics

PROFESSIONAL DEVELOPMENT

Research-based methods
Inclusive practices
Effective assessment
High impact outreach

MENTORING

UNDERGRADUATE

Brendan Boyd
Physics and Astronomy
2019 - present

Bryan Brzycki
Astrophysics (Harvard)
2017

GRADUATE

Brian Crosby
Astrophysics (PhD)
2015 – 2016

PROFESSIONAL PREPARATION

MICHIGAN STATE UNIVERSITY

Director of Undergraduate Studies
Department of Computational Mathematics, Science, & Engineering | June 2019 – present

Teaching Specialist
Department of Computational Mathematics, Science, & Engineering | September 2017 – present

NSF Astronomy and Astrophysics Postdoctoral Fellow
Department of Physics and Astronomy | 2014 – 2017

JINA Postdoctoral Research Associate
National Superconducting Cyclotron Laboratory | 2013 – 2014

UNIVERSITY OF COLORADO

NSF Graduate Research Fellow & Graduate Research Assistant
Department of Astrophysical and Planetary Sciences | 2008 – 2013

TEACHING EXPERIENCE

"Tools & Techniques of Computational Modeling" (introductory)
Course Lead Instructor and Section Instructor
Michigan State University | 2017 - 2019

"Introduction to Computational Modeling" (introductory)
Couse Lead Instructor and Section Instructor
Michigan State University | 2017 - 2019

"Exploring the Universe through hands-on applications of astronomical tools" (introductory)
Instructor
Michigan State University | 2015 and 2016

"Explorations in Astronomy" (introductory)
Instructor for Mathematics, Science, and Technology summer school
Gifted and Talented Education | Michigan State University | 2015

"Transforming thoughts about Energy"
(inquiry-based physics lab activity)
Design Team Leader and Activity Facilitator
Lyman Briggs College | Michigan State University | 2014

AWARDS

MSU STEM Teaching and Learning Fellowship
Institutional | $3K per year for 2 years; 2018 - present
NSF Astronomy and Astrophysics Postdoctoral Fellowship
National | $89K per year for 3 years; 2014 - 2017
NSF Graduate Research Fellowship
National | $30K per year for 3 years; 2009 - 2012

EDUCATION TRAINING

MSU STEM Teaching and Learning Fellowship

The overarching goal of the program is to improve undergraduate STEM courses by engaging faculty in conversations about core ideas of the discipline and how students should be able to use those ideas combined with science practices and crosscutting concepts to explain phenomena and solve problems.

2018 - present

Institute for Scientist & Engineer Educators Professional Development Program (ISEE PDP)

Two intensive teaching workshops, design of an inquiry-based activity, and activity implementation and facilitation. In the fourth year, served as an apprentice instructor and helped run the workshops. In years five and six, returned as a staff instructor to help run workshops and train graduate students and postdocs inquiry-based teaching and learning.

2012, 2013, 2014, 2015, 2017, 2018, and 2019

Educational Coursework

"*An Introduction to Evidence-Based Undergraduate STEM Teaching*"

A 7-week online course offered via Coursera by the Center for the Integration of Research (CIRTL), Teaching and Learning. Received a Statement of Accomplishment with Distinction | **2014**

Faculty/professional development seminars and workshops

"*Understanding Implicit Bias*," by Jessica Garcia (3-part program; Office of Inclusion and Intercultural Initiatives) | **2018**
"*Learning Narratives from Students of Color in STEM Classrooms*," by Danielle Lopez and Kendra Pyle Kanaboshi (MSU STEM Teaching Essentials Workshop) | **2017**
"*Using Calibrated Peer-Reviewed Writing in the STEM Classroom*," by Chad Wayne (CIRTLcast seminar) | **2016**
"*Creating a More Inclusive Classroom Environment*," presented by Amanda Bayer (MSU FOD Workshop) | **2016**
"*Race Matters*," presented by David Asai (MSU STEM Teaching Essentials Workshop) | **2015**
"*Introduction to Cooperative Learning*," presented by Karl Smith (MSU Lilly Seminar) | **2014**
"*Designing your Course for More Significant Learning*," presented by Dee Fink (MSU Lilly Seminar) | **2013**
"*Real Work is Better than Homework*," presented by Brian Coppola (MSU Lilly Seminar) | **2013**

Teaching Certifications

Certificate in College Teaching - Graduate Teaching Program at the University of Colorado | **2013**
Certificate of Completion in Teaching Laboratory Experiences - Institute for Scientist & Engineer Educators | **2012**

GRANTS AWARDED

"Can thermal instabilities drive galactic precipitation and explain observed circumgalactic structure?"

Primary Investigator, HST Cycle 23 Archival or Theory Research Program, Grant #: AR-14315 | **$56K - 2015**

"The COS Cold Absorber Puzzle: Understanding the Metallicity and Phase of the Circumgalactic Medium"

Co-Investigator, HST Cycle 22 Archival or Theory Research Program, Grant #: AR-13917 | **$112K - 2014**

"MAST Interface to Synthetic Telescopes with yt (MISTY): Observing Simulations of the Intergalactic Medium"

Co-Investigator, HST Cycle 22 Archival or Theory Research Program, Grant #: AR-13919 | **$115K - 2014**

"Unlocking the secrets of absorption line complexes in the intergalactic medium"

Co-Investigator, HST Cycle 21 Archival or Theory Research Program, Grant #: AR-13261 | **$53K - 2013**

"Dust Destruction and SNR Ejecta"

Co-Investigator, NASA Astrophysics Theory Program, Grant #: 12-ATP12-0009 | **$50K - 2012**

COMPUTING TIME AWARDED

"Searching for the missing baryons: non-equilibrium chemistry and synthetic spectra"

Primary Investigator, NSF XRAC Program, Grant #: AST140065, 1.1 million CPU-hours | **2014**

"Probing galaxy formation at low and high redshifts."

Co-Investigator, NSF XRAC Program, Grant #: MCA08X028, Renewal, 6.6 million CPU-hours | **2017**

"Petascale adaptive mesh simulations of Milky Way-type galaxies and their environments"

Co-Investigator, NSF PRAC Program, Grant #: 1514580, 80 million CPU-hours | 2015

"Petascale adaptive mesh simulations of Milky Way-type galaxies and their environments"
Co-Investigator, Great Lakes Consortium for Petascale Computation Program, 12.8 million CPU-hours | 2015

"Probing galaxy formation at low and high redshifts."
Co-Investigator, NSF XRAC Program, Grant #: MCA08X028, Renewal, 6.6 million CPU-hours | 2014

"Understanding the Nature of the Missing Baryons and the Warm/Hot Intergalactic Medium"
Co-Investigator, NSF XRAC Program, Grant #: AST120009, Renewal, 2.2 million CPU-hours | 2013

OUTREACH

Astronomy on Tap -- Lansing (primary organizer)
Monthly publics events are held at local bars with talks by local astronomers, trivia-based raffle prizes, and informal Q&A sessions with local faculty, postdocs, and graduate students; ∼120 participants per event. | 2015 – present

MSU Science Festival Expo Days (primary astronomy organizer)
A two-day event public event with astronomy demos, trivia-based raffle prizes, and solar observing. | 2016 and 2017

Outreach talks at Abrams Planetarium
"Uncovering galaxies' hidden secrets" | 2019
"Unlocking the mysteries of the Cosmos through computation and scientific visualization" | 2014 and 2015

CU-STARS Astronomy Ambassadors Program
Members of CU-STARS visit local middle and high schools to give scientific presentations and run lab activities. Solar and night-sky observing sessions for students and the public are also held. | 2012 – 2013

University of Colorado Science, Technology, and Astronomy Recruits (CU-STARS)
Founded program in 2011 to recruit first-year students from diverse background into scientific careers. | 2011 – 2013

SERVICE

Member of the Undergraduate Learning Assistant Program working group
Michigan State University (campus-wide effort) | 2020 - present

Member of the Teaching Evaluation Committee
College of Natural Science, Michigan State University (campus-wide effort) | 2020 - present

Member of the NatSci Cultural Competency Training Team
College of Natural Science, Michigan State University | 2019 - present

Member of the Steering Committee for the Institute for Scientist and Engineering Educators (ISEE)
ISEE, University of California Santa Cruz | 2019 - present

Member of the Undergraduate Studies and Education Technology Committees
Department of Computational Mathematics, Science, and Engineering, Michigan State University | 2017 - present

Member of the Mission, Vision, Core Values working group
College of Natural Science, Michigan State University | 2019

Member of the CMSE Chair Search Committee
Department of Computational Mathematics, Science, and Engineering, Michigan State University 2019

Member of the Taskforce on Inclusive Initiatives
College of Natural Science, Michigan State University | 2018 - 2019

Vice Chair of the Council on Diversity and Community
College of Natural Science, Michigan State University | member 2016 – 2019, vice chair starting 2017

Journal Referee
High Power Laser Science and Engineering | 2018 - present
The Astrophysical Journal Letters | 2015 – present
Monthly Notices of the Royal Astronomical Society | 2013 – present

Conference Organizing Committees
"Forging connections: from nuclei to the cosmic web", Joint Institute for Nuclear Astrophysics, LOC | 2016 - 2017
"The 2016 NSF Astronomy and Astrophysics Postdoctoral Fellows Symposium", NSF, SOC | 2015 - 2016

Proposal Reviewer
National Science Foundation, Astronomy Division | 2015, 2017, 2020
Distributed Research utilizing Advanced Computing High Performance Computing Allocations | 2019

PUBLICATIONS

Comparing Academic and Industry Perspectives on Computational Modeling and Data Analysis Competencies

Hawkins, N. T., **Silvia, D. W.**, O'Shea, B. W., & Caballero, M. D. 2020. *in preparation; to be submitted to Computers and Education*

Informing Computational Modeling and Data Analysis Curricula Through Expert Interviews

Hawkins, N. T., **Silvia, D. W.**, O'Shea, B. W., & Caballero, M. D. 2020. *in preparation; to be submitted to Computers and Education*

The Impact of Enhanced Halo Resolution on the Simulated Circumgalactic Medium

Hummels, C. B., Smith, B. D., Hopkins, P. F., O'Shea, B. W., **Silvia, D. W.**, Werk, J. K., Lehner, N., Wise, J. H., Collins, D. C.; Butsky, I. S. 2019. *ApJ*, 882, 156

A Learner-Centered Approach to Teaching Computational Modeling, Data Analysis, and Programming

Silvia, D. W., O'Shea, B. W., & Danielak, B. 2019. In: Rodrigues J. et al. (eds) Computational Science – ICCS 2019. Lecture Notes in Computer Science, vol 11540.

Validating Semi-Analytic Models of High-Redshift Galaxy Formation using Radiation Hydrodynamical Simulations

Côté, B., **Silvia, D. W.**, O'Shea, B. W., Smith, B. D., & Wise, J. H. 2018. *ApJ*, 859, 1

Trident: a universal tool for generating synthetic absorption spectra from astrophysical hydrodynamical datasets

Hummels, C. B., Smith, B. D., & **Silvia, D. W.** 2017. *ApJ*, 847, 59

The Orion Fingers: Near-IR Adaptive Optics Imaging of an Explosive Protostellar Outflow

Bally, J., Ginsburg, A., **Silvia, D. W.**, & Youngblood, A. 2015. *A&A*, 579, A130

Numerical Simulations of Supernova Dust Destruction. II. Metal-Enriched Ejecta Knots

Silvia, D. W., Smith, B. D., & Shull, J. M. 2012. *ApJ*, 748, 12

Ejecta Knot Flickering, Mass Ablation, and Fragmentation in Cassiopeia A

Fesen, R. A., Zastrow, J. A., Hammell, M. C., Shull, J. M., & **Silvia, D. W.** 2011. *ApJ*, 736, 109

Numerical Simulations of Supernova Dust Destruction. I. Cloud-crushing and Post-processed Grain Sputtering

Silvia, D. W., Smith, B. D., & Shull, J. M. 2010. *ApJ*, 715, 1575

Extending the Model of KH 15D: Estimating the Effects of Forward Scattering and the Occulting Ring Edge

Silvia, D. W., & Agol, E. 2008. *ApJ*, 681, 1377

PRESENTATIONS

Conference talk: "A Learner-Centered Approach to Teaching Computational Modeling, Data Analysis, and Programming"

International Conference on Computational Science | 2019

Invited talk: "A Learner-Centered Approach to Teaching Computational Modeling, Data Analysis, and Programming"

Conference on Advancing the Integration of Interdisciplinary Computational Thinking in the Physical and Life Sciences, American Association of Physics Teachers | 2019

Invited talk: "Painting a more realistic picture of the circumgalactic medium via simulations of isolated galaxies"

Theoretical Astrophysics Center, Department of Astronomy, University of California Berkeley | 2018

Conference talk: "Painting a more realistic picture of the circumgalactic medium via simulations of isolated galaxies"

"Forging Connections: From Nuclei to the Cosmic Web", Joint Institute for Nuclear Astrophysics, Michigan State University | 2017

Invited Conference talk: "Moving Toward More Inclusive Science"

"JINA-CEE Frontiers in Nuclear Astrophysics", Joint Institute for Nuclear Astrophysics, Michigan State University | 2017

Conference Poster: "First light with Trident: multi-platform synthetic quasar spectra"

Silvia, D. W., Hummels, C. B., & Smith, B. D. 229th American Astronomical Society Meeting | 2017

Invited talk: "Simulating the intergalactic medium: non-equilibrium chemistry and synthetic spectra"
Flash Talk, Steward Observatory, University of Arizona | 2015
Astronomy Colloquium, University of Florida | 2014
Cosmology Seminar, Max Planck Institute for Astrophysics | 2014

Conference Poster: "Characterizing the non-equilibrium ionization state of the IGM"
Silvia, D. W., O'Shea, B. W., Smith, B. D., Shull, J. M., Turk, M. J., & Reynolds, D. R. 225th American Astronomical Society Meeting | 2015

Invited talk: "Investigating Chemical Evolution: Supernova Dust Destruction and Non-equilibrium Ionization Chemistry"
Astrophysics Seminar, Los Alamos National Laboratory | 2014
Astrophysics Seminar, University of Notre Dame | 2013

Conference talk: "Non-equilibrium modeling of IGM gas chemistry"
"The Impact of Gas Fueling, Quenching, and Feedback on the Growth of Galaxies", University of Notre Dame | 2014

Conference talk: "Investigating the Effects of Non-Equilibrium Ionization via Numerical Simulations"
Dissertation, 221st American Astronomical Society Meeting | 2013