

# 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

#### BRYAN BRZYCKI

Astrophysics (Harvard)  
2017

#### JACOB KNEIBEL

Astrophysics & Computer Eng.  
2013 – 2015

### GRADUATE

#### BRIAN CROSBY

Astrophysics (PhD)  
2015 – 2016

## PROFESSIONAL PREPARATION

### MICHIGAN STATE UNIVERSITY

#### 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 and 2018

#### "INTRODUCTION TO COMPUTATIONAL MODELING" (INTRODUCTORY)

Course Lead Instructor and Section Instructor  
Michigan State University | 2017 and 2018

#### "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

#### "METHODS OF COMPUTATIONAL SCIENCE" (UPPER-LEVEL)

Course Co-Instructor  
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

### **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, and 2018

### **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 public 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**

"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 STUDIES AND EDUCATION TECHNOLOGY COMMITTEES**

Department of Computational Mathematics, Science, and Engineering, Michigan State University | 2017 - present

### **MEMBER OF THE TASKFORCE ON INCLUSIVE INITIATIVES**

College of Natural Science, Michigan State University | 2018 - present

### **VICE CHAIR OF THE COUNCIL ON DIVERSITY AND COMMUNITY**

College of Natural Science, Michigan State University | member 2016 – present, 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

## PUBLICATIONS

### **PROBING NON-EQUILIBRIUM IONIZATION PROPERTIES OF SIMULATED IGM**

Silvia, D. W., O'Shea, B. W., Smith, B. D., Shull, J. M., Turk, M. J., & Reynolds, D. R. 2018. *in preparation; to be submitted to the Astrophysical Journal*

### **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, in press*

### **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

**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

## REFERENCES

**DR. J. MICHAEL SHULL**

PhD Advisor

Full Professor

Department of Astrophysical and Planetary Sciences

University of Colorado

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**DR. BRIAN W. O'SHEA**

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