

# Devin Silvia

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Biomedical & Physical Sciences Bldg, 567 Wilson Rd, Rm 3248, East Lansing, MI 48824

## 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

Non-equilibrium ionization chemistry  
Intergalactic & circumgalactic medium  
Galactic chemical evolution  
Cosmological hydrodynamics

### PROFESSIONAL DEVELOPMENT

Research-based methods  
Inclusive practices  
Effective assessment  
High impact outreach

## MENTORING

### UNDERGRADUATE

JACOB KNEIBEL  
Astrophysics & Computer Eng.  
2013 – 2015

ALEXANDER KREGER  
Physics and Astronomy  
2015 – 2016

### GRADUATE

BRIAN CROSBY  
Astrophysics  
2015 – 2016

## PROFESSIONAL PREPARATION

### MICHIGAN STATE UNIVERSITY

NSF ASTRONOMY AND ASTROPHYSICS POSTDOCTORAL FELLOW  
Department of Physics and Astronomy | September 2014 – present

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

"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

"VISIONS OF THE UNIVERSE" (INTRODUCTORY)

Guest Lecturer (3 lectures)  
Michigan State University | 2014 and 2016

"PHYSICS FOR THE LIFE SCIENCES -- MECHANICS" (INTRODUCTORY)

Guest Lecturer (2 lectures)  
Lyman Briggs College | Michigan State University | 2013

"SHINING LIGHT ON THE SUN"

(INQUIRY-BASED PREPARATION FOR RESEARCH EXPERIENCES PROGRAM)  
Design Team Leader and Activity Facilitator  
Laboratory for Atmospheric and Space Astronomy | 2012 and 2013

## AWARDS

NSF ASTRONOMY AND ASTROPHYSICS POSTDOCTORAL FELLOWSHIP  
National | \$267K per year for 3 years; 2014 - present

OUTREACH AWARD  
Departmental (MSU) | 2016

NSF GRADUATE RESEARCH FELLOWSHIP  
National | 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 the fifth year, returned as a staff instructor to help run workshops and train graduate students and postdocs in inquiry-based teaching and learning.

2012, 2013, 2014, 2015, and 2016

### 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

*"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

*"Improving the College Introductory Astronomy Survey Course for Non-Science Majors Through Active Engagement,"* presented by the Center for Astronomy Education | 2010

### 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

**"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, 1.5 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 open to the public with astronomy-themed demos, trivia-based raffle prizes, and solar telescope observing. | 2016

### **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

### **REFEREE**

Monthly Notices of the Royal Astronomical Society | 2013 – present

The Astrophysical Journal Letters | 2015 – present

### **CONFERENCE ORGANIZING COMMITTEES**

"The 2016 NSF Astronomy and Astrophysics Postdoctoral Fellows Symposium", NSF, SOC | 2015 – present

"Forging connections: from nuclei to the cosmic web", Joint Institute for Nuclear Astrophysics, LOC | 2016 – present

### **PROPOSAL REVIEWER**

National Science Foundation, Astronomy Division | 2015

## 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. 2016. *in preparation; to be submitted to the Astrophysical Journal*

### **TRIDENT: A UNIVERSAL TOOL FOR GENERATING SYNTHETIC ABSORPTION SPECTRA FROM ASTROPHYSICAL HYDRODYNAMICAL DATASETS**

Hummels, C. B., Smith, B. D., & **Silvia, D. W.** 2016. *in preparation*

### **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: "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

**CONFERENCE POSTER: "SIMULATIONS OF SUPERNOVA REVERSE SHOCK DUST DESTRUCTION IN METAL-ENRICHED CLOUDS"**

Silvia, D. W., Smith, B. D. & Shull, J. M. 217th American Astronomical Society Meeting | 2011

**CONFERENCE POSTER: "NUMERICAL SIMULATIONS OF DUST DESTRUCTION IN SUPERNOVA REMNANTS"**

Silvia, D. W., Smith, B. D. & Shull, J. M. 215th American Astronomical Society Meeting | 2010

## 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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