

# Samuel J. Van Kooten

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Curriculum Vitae  
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## Education

### **University of Colorado, Boulder**

Ph.D. Candidate, Astrophysical and Planetary Sciences  
M.S., Astrophysical and Planetary Sciences, 2016  
Research in solar physics  
Advisor: Steven R. Cranmer

### **Calvin College** (now Calvin University)

B.S., Physics, 2014  
Minors: Astronomy, Scientific Computation and Modeling

## Research

### **Motion of Photospheric Bright Points**

University of Colorado, Boulder, 2016–present  
I investigated in detail the role of bright points’ motion, both bulk and internal, in the excitation of MHD waves as a driver of coronal heating, involving both model development and data analysis.

### **Thermophysical Analysis of Martian Sand Dunes**

Southwest Research Institute, 2015–2016  
I used thermophysical models to interpret infrared measurements of the Martian surface and infer subsurface composition. I also maintained and expanded [marstherm.psi.edu](http://marstherm.psi.edu), a publicly-accessible web interface for the modeling tools.

### **Optimization of SWAMIS**

Southwest Research Institute, Summer 2014  
I added new algorithms and heavily optimized SWAMIS, software for tracking solar magnetic features, reducing processing time by 75% to support analysis of full-resolution SDO magnetograms.

### **Dynamical History of the Asteroid Belt**

Calvin College, 2011–2014  
I calculated refined asteroid collisional timescales accounting for differences between four zones in collision probabilities, collision velocities, and size-frequency distributions. I also used combined orbital, color and albedo catalogs to more accurately determine asteroid family membership.

## Publications

**Van Kooten, S. J.**, & Cranmer, S. R. 2017, “Characterizing the Motion of Solar Magnetic Bright Points at High Resolution”, *ApJ*, 850, 64. [\[ADS\]](#)  
Dykhuis, M. J., Molnar, L., **Van Kooten, S. J.**, & Greenberg, R. 2014, “Defining the Flora Family: Orbital properties, reflectance properties and age”, *Icarus*, 243, 111. [\[ADS\]](#)

Invited  
Talks

- “Tracking Photospheric Bright Points,” 2<sup>nd</sup> NCSP DKIST Data-Training Workshop, January 15, 2020.
- “Dark Lines and Bright Points: A Close Look at the Surface of the Sun,” Calvin College Physics & Astronomy Department colloquium, November 27, 2018.

## Presentations

- Van Kooten, S. J.**, Cranmer, S. R., “Toward a Better Understanding of Convectively-Driven Flicker in Kepler Light Curves,” Abstract 352.05, AAS Meeting 235, January 7, 2020. [[ADS](#)]
- Van Kooten, S. J.**, Cranmer, S. R., “Coronal Turbulence Driven from the Photosphere: Opportunities for DKIST,” SHINE 2019 Workshop, August 5-9, 2019, poster. [[ADS](#)]
- Van Kooten, S. J.**, Cranmer, S. R., “Why Is the Corona Hotter Than It Has Any Right to Be?” SHINE 2019 Student Day, August 4, 2019.
- Van Kooten, S. J.**, Cranmer, S. R., “Preparing for DKIST: Connecting the High-Resolution Sun to the Turbulent Corona,” Abstract 302.04, SPD/AAS Joint Meeting, June 10-13, 2019, poster. [[ADS](#)]
- Van Kooten, S. J.**, Cranmer, S. R., “Investigating the Complex Motions of Photospheric Bright Points as a Lower Boundary Condition for Coronal Magnetism,” Abstract SH23C-3318, AGU Fall 2018 meeting, December 10-14, 2018, poster.
- Van Kooten, S. J.**, Cranmer, S. R., “Characterizing the Motion of Photospheric Magnetic Bright Points at High Resolution,” 30th NSO Workshop, Sunspot, NM, August 7–11, 2017.
- Van Kooten, S. J.**, Cranmer, S. R., Rempel, M., “Characterizing the Motion of Photospheric Magnetic Bright Points at High Resolution,” SHINE 2017 Workshop, July 24–28, 2017, poster. [[ADS](#)]
- Van Kooten, S. J.**, Putzig, N., O’Shea, P., Fenton, L., “Investigating the Poleward Trend of Southern Dune Field Stabilization on Mars Using Thermophysical Observations,” Abstract 2528, 47th Lunar and Planetary Science Conference, March 21-25, 2016, poster. [[ADS](#)]
- Van Kooten, S. J.**, Putzig, N., Fenton, L., “Investigating the Poleward Trend of Southern Dune Field Stabilization on Mars Using Thermophysical Observations,” Abstract 8052, Fourth Annual International Planetary Dunes Workshop, Boise, Idaho, May 19-22, 2015, poster. [[ADS](#)]
- Lamb, D., DeForest, C., **Van Kooten, S. J.**, “Magnetic Feature Tracking in the SDO Era: Past Sacrifices, Recent Advances, and Future Possibilities,” Abstract SH34A-01, AGU Fall 2014 meeting, December 15-19, 2014. [[ADS](#)]
- Dykhuis, M. J., Molnar, L. A., **Van Kooten, S. J.**, Greenberg, R. J., “Defining the Flora Family: Reflectance Properties and Age,” 45th Meeting of the American Astronomical Society Division on Dynamical Astronomy, April 28, 2014. [[ADS](#)]
- Van Kooten, S. J.** and Molnar, L. A., “Refining Asteroid Collisional Timescales,” Michigan Space Grant Consortium Conference, Ann Arbor, MI, November 2, 2013.

Dykhuis, M. J., Molnar, L. A., **Van Kooten, S. J.**, *et al.*, “Reflectance Properties and Age of the Baptistina Family,” 45th Meeting of the American Astronomical Society Division for Planetary Sciences, October 8, 2013. [\[ADS\]](#)

**Van Kooten, S. J.**, Pagel, H. J., and Molnar, L. A., “Family Membership of Koronis Zone Asteroids,” Michigan Space Grant Consortium Conference, Ann Arbor, MI, October 6, 2012.

Molnar, L. A. and **Van Kooten, S. J.**, “Size and Age Dependence of Koronis Family Colors,” Joint Mtg. of the European Planetary Science Congress and the American Astronomical Society Division for Planetary Sciences, Nantes, France, October 6, 2011.

**Van Kooten, S. J.** and Molnar, L. A., “Asteroid Collisions”, Michigan Space Grant Consortium Conference, Ann Arbor, MI, November 12, 2011, poster.

Molnar, L. A. and **Van Kooten, S. J.**, “Testing Asteroid Collision Models,” Michigan Space Grant Consortium Conference, Ann Arbor, MI, November 12, 2011.

## Teaching

### University of Colorado, Boulder

Instructor of record, Introduction to Scientific Programming, 2018

Tutor, physics and astronomy classes, 2015–2019

Teaching assistant, Introductory Astronomy Lab, 2014

### Professional Development Program, ISEE, UC Santa Cruz

In 2018 I participated in seven days of workshops and, as part of a small team, developed and ran a full-day inquiry activity which taught the motions of the Sun and Moon to ~45 incoming undergraduates.

### Calvin College

Tutor, physics and astronomy classes, 2013–2014

Lab assistant and grader, physics and astronomy classes, 2011–2014

## Service

**APS/LASP Faculty Search Committee**, CU Boulder, 2019

**Graduate Admissions Committee**, CU Boulder, AY 2018–2019

**Standing Committee on Research Misconduct**, CU Boulder, 2017–present

**Summer APS Lunch Talks Coordinator**, CU Boulder, 2017

**CU/NSO Joint Faculty Search Committee**, CU Boulder, 2017

**Department Webmaster**, CU Boulder, 2017–present

**Course Fees Committee**, CU Boulder, AY 2016–2017

## Outreach

**Astronomy Day**, Sommers-Bausch Observatory, 2015–present

**Observatory Open House**, Sommers-Bausch Observatory, 2014–present

**Sci/Tech Writer**, *Calvin College Chimes*, 2011–2012

**Observatory Open House**, Calvin College, 2010–2012

- Grants,  
Awards and  
Honors
- Student Poster Contest Honorable Mention**, 2019 Solar Physics Division Meeting
  - 2013 Undergraduate Fellowship**, Michigan Space Grant Consortium, \$2500
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  - NSF Scientific Computing Scholarship**, Calvin College Integrated Science Research Institute, 2010–2014
  - Howard Hughes Medical Institute Scholarship**, Calvin College, 2010–2014
  - Debra Deur Scholarship**, Calvin College Science Division, 2013–2014
  - Harry and Lucille Brown Scholarship**, Grand Rapids Community Foundation, 2012–2014
  - Jack Family Scholarship**, Grand Rapids Community Foundation, 2011–2012
  - John and Lillian Van Oosten Scholarship**, Calvin College Science Division, 2011–2012
- Memberships
- American Astronomical Society**, 2016–present
  - AAS Solar Physics Division**, 2016–present
  - American Geophysical Union**, 2018–present