

# COLETTE SALYK

## Assistant Professor

Department of Physics and Astronomy  
Vassar College  
124 Raymond Ave  
Poughkeepsie, NY 12604  
cosalyk@vassar.edu  
(845) 437-7075

## Education

California Institute of Technology, Ph.D., Planetary Science, June 2009

California Institute of Technology, M.S., Planetary Science, June 2005

Massachusetts Institute of Technology, B.S., Planetary Science, minor in Physics, June 2003

## Primary Research Interests

Circumstellar disks, star and planet formation, spectroscopy, infrared and millimeter astronomy

## Honors and Awards

NOAO Excellence Award, 2014

Leo Goldberg Fellowship recipient, 2011

Harlan J. Smith Fellowship recipient, 2009

Philanthropic Education Organization Scholar Award recipient, 2008-2009

## Research Experience

*National Optical Astronomy Observatory* Leo Goldberg Postdoctoral Fellow  
2011-2015

Studying the chemistry, structure and evolution of protoplanetary disks, with a focus on understanding the origins of planetary diversity

*University of Texas at Austin* McDonald Observatory Harlan J. Smith Postdoctoral Fellow  
2009-2011

Studied the structure and evolution of protoplanetary disks, with a particular focus on infrared spectroscopy with the Spitzer and Herschel Space Telescopes

*Caltech, Division of Planetary Sciences* Thesis work with Professor Geoffrey A. Blake  
2003-2009

Studied the structure, chemistry and evolution of protoplanetary disks with high-resolution infrared spectroscopy (using NIRSPEC on Keck II) and space-based infrared spectroscopy (using Spitzer-IRS)

*Caltech, Division of Planetary Sciences* Candidacy work with Professor Andrew P. Ingersoll  
2003-2005

Used Cassini images of a Jupiter flyby to study Jupiter's wind patterns and determine the contribution of the eddy momentum flux to the persistence of zonal winds

*Goddard Institute for Space Studies* Research assistantship with Dr. Gavin Schmidt  
summer 2003

Used the Goddard Institute for Space Studies Earth GCM to study the relative importance of climate and production-related changes to  $^{10}\text{Be}$  concentrations in ice cores

*MIT* Undergraduate research and thesis work with Professor James L. Elliot  
2001-2003

Analyzed stellar occultations by Jupiter and Pluto to determine atmospheric shape

*University of Hawaii Institute for Astronomy  
summer 2002*

REU internship with Dr. David Tholen

Analyzed spectra of MUSES-C target asteroid

*Cerro Tololo Interamerican Observatory  
winter 2002*

REU internship with Dr. Knut Olsen

Used photometric measurements of red clump stars in the Large Magellanic Cloud to determine its 3D structure

*Lowell Observatory  
summer 2001*

REU internship with Dr. Amanda Bosh

Analyzed a stellar occultation by Saturn's Rings, obtained with SpeX on the IRTF

### **Selected Accepted Observing Proposals**

PI: *Where is the water vapor in transition disk DoAr 44?* 2014, Gemini North, 3 hours

PI: *Locating the water vapor in protoplanetary disks.* 2013, Gemini North, 14 hours

PI: *Spectroscopic detection of hot debris disks around A stars.* 2013, KPNO Mayall, 2 nights

PI: *CO variability in H<sub>A</sub>eBe disks: A search for planet-disk interactions.* 2012, KPNO Mayall, 2 nights

co-I: *Towards spectro-astrometric calibration of ARIES in pursuit of a world-class spectro-astrometric program at the MMT.* 2012, MMT, 4 half nights

PI: *Discovery and characterization of disk winds from a newly-discovered class of protoplanetary disks.* 2011, ALMA, 1.5 hours

PI: *Observations of water vapor in planet-forming regions.* 2011, Gemini Observatory, 2 nights

co-I: *Cool Herschel/Hot Spitzer: The distribution of water in protoplanetary disks.* 2010, Herschel Space Observatory, 39 hours

co-I: *A New Method to Determine the Gas Mass in Protoplanetary Disks.* 2010, Herschel Space Observatory, 21.1 hours

PI: *Water vapor in planet-forming regions: A new ground-based window on disk chemistry.* 2010, Gemini Observatory, 14 hours

co-I: *Water and Organics in Disks.* 2009, Spitzer Space Telescope Infrared Spectrograph, 59.6 hours

PI: *Transitional Disk Veiling.* 2009, Palomar 200" with TripleSpec, 1 night

### **Accepted Grant Proposals**

co-I: *Earths in Other Solar Systems: Toward Forming and Discovering Planets with Biocritical Ingredients.* (PI: D. Apai) 2015, NASA NExSS, Total award: \$5,699,833

co-I: *A multi-wavelength database of water vapor in planet-forming regions.* (PI: K. Pontoppidan) 2012, NASA, Total award: \$450,000

### **Teaching Experience**

*Assistant Professor at Vassar College*

Astronomy 230: Planetary Science, 2016

Astronomy 240: Introduction to Observational Astronomy, 2016

Astronomy 101: Solar System Astronomy, 2015

Physics 113: Fundamentals of Physics I, 2015

*Adjunct Professor at Tohono O'odham Community College*

Astronomy 102: Stars and Galaxies, 2014

Astronomy 101: Solar System Astronomy, 2013

*Adjunct Professor at Pasadena City College*

Introduction to Planetary Science, 2007

*Teaching assistant at Caltech*

Formation and Evolution of Planetary Systems, 2005-2007

Introduction to the Solar System, 2005

*Teaching assistant at MIT*

Observational Techniques of Optical Astronomy, 2003

*Guest Lecturer at the University of Arizona*

Lecture about Planet Formation for *Astro 296: Topics in Astronomical Research*, 2013

*Guest Lecturer at the University of Texas*

Lecture/workshop about Spectroscopy for *A Practical Introduction to Research*, 2010

*Guest Lecturer, Cal State Northridge*

Two lectures about the formation of the solar system, 2007

*Co-instructor at McDonald Observatory*

Formation of Planetary Systems: 3-day workshop for middle- and high-school teachers, 2010

*Volunteer instructor with the Caltech Classroom Connection*

General Physics at La Salle High School, 2007

AP Physics B and C at Don Bosco Technical Institute, 2006

**Service**

Reviewer for NOAO Time Allocation Committee, 2013–2015

Co-organizer of NOAO FLASH Lecture Series, 2012–2015

Reviewer for the Astrophysical Journal and Astronomy & Astrophysics, ongoing

Grant review panelist for NASA, 2012, 2015

Grant review panelist for the National Science Foundation, 2012, 2014

Member of Scientific and Local Organizing Committees, Frank N. Bash Symposium at UT Austin, 2011

**Research Advising**

Advisor for Vassar undergraduates: Sean Sellers, Caitlin Rose, Liliana Frye, Sean Lu, 2015–present

Advisor for Keck Northeast Astronomy Consortium REU student: Sara Vannah, 2016

Co-advisor of Caltech graduate student Ke Zhang, 2009-2015

Co-advisor of University of Arizona graduate student Jordan Stone, 2013–2014

Advisor of Kitt Peak Research Experiences for Undergraduates (REU) student Jonathan Brown, 2012

Assistant advisor of University of Texas first year graduate student Sam Harrold, 2009

Co-advisor of Caltech Summer Undergraduate Research Fellowship student Jamie Tayar, 2009

**Mentoring**

Founder of Steward Observatory/NOAO Women's Science Forum mentorship program

Mentor for University of Arizona graduate students Megan Reiter and Kate Follette, 2012–present

Mentor for first year Caltech graduate student Gwen Rudie, 2007

**Invited Seminars and Colloquia**

University of Delaware Physics and Astronomy Colloquium, 2015

Wesleyan University Astronomy Colloquium, 2015

New Mexico State University Colloquium, 2014

University of Washington Colloquium, 2014

Academia Sinica Colloquium, Taipei, Taiwan, 2014

Lowell Observatory Colloquium, Flagstaff, AZ, 2012  
Steward Observatory-NOAO Joint Colloquium, Tucson, AZ, 2012  
The University of Texas at Austin Astronomy Colloquium, Austin, TX, 2012

### **Invited Conference Talks**

Earth Life Science Institute International Symposium, Tokyo, Japan, 2016  
ALMA and the Brazilian Community Workshop, Observatorio Nacional, Rio de Janeiro, Brazil, 2014  
Habitable Worlds Across Space and Time, Space Telescope Science Institute, 2014  
Protostars and Planets VI, Heidelberg, Germany, 2013  
Origins of Solar Systems Gordon Conference, Mt. Holyoke, MA, 2013  
AAS Special Session Cosmic Dawns: ALMA Early Science Commences, Long Beach, CA, 2013  
IAU Symposium: The Molecular Universe, Toledo, Spain, 2011

### **Public Outreach**

Guest writer for PlanetHunters blog, 2014  
365 Days of Astronomy podcast guest, 2013  
Featured in News-o-matic news app for kids, in “Real Jobs: Astronomer”, 2014  
Solar telescope viewing at Tohono O’odham Rodeo, 2013, 2014  
Guest Lectures and activities at Safford Elementary School, 2013  
UT Planetary Organization for Space Science and Exploration Guest Speaker, 2011  
UT-SAGE Continuum Education Program Speaker, 2011  
UT-NOVA Continuum Education Program Speaker, 2010  
McDonald Observatory Board of Visitors Speaker, 2010  
Consultant for University of Texas Department of Instructional Technology, 2010  
Proofreader/translator for the IAU Network for Astronomy School Education, 2010  
Guest Lecturer for SOFIA-EXES Teacher Program, 2010  
Science Night at Murchison Elementary School, 2009  
Career Day at Cedar Creek Elementary School, 2009  
Guest Lecturer at Helen Bernstein high school, Los Angeles, CA, 2009  
Guest Lecturer at Torrance West high school, Los Angeles, CA, 2008  
Guest Lecturer at New York City Public School 85, 2004

### **Research Enrichment**

Penn State Astrostatistics Summer School participant, 2014  
Institut de Radioastronomie Millimetrique (IRAM) Interferometry School participant, 2008  
Combined Array for Research in Millimeter Astronomy (CARMA) Summer School participant, 2007

### **Teaching Enrichment**

Re-Numerate: Restoring Essential Numerical Skills workshop participant, 2014  
Teaching Every Student: Astro 101 Approaches for Diverse Audiences participant, 2013  
Center for Astronomy Education: Special Topics in Technology participant, 2012  
AAAS Communicating Science participant, 2010  
Center for Astronomy Education: Astronomy 101 Instruction participant, 2008  
Caltech Project for Effective Teaching Pedagogy Series participant, 2003-2008

## Society membership

American Astronomical Society

## Refereed Publications (First or Second Author)

*Detection of Water Vapor in the Terrestrial Planet Forming Region of a Transition Disk.* Salyk, C., Lacy, J. H., Richter, M. J., Zhang, K., Blake, G. A., Pontoppidan, K. M. 2015, ApJ, 810, 24

*ALMA Observations of the T Tauri Binary System AS 205: Evidence for Disk Winds and/or Binary Interactions.* Salyk, C., Pontoppidan, K. M., Corder, S., Muñoz, D., Zhang, K. & Blake, G. A. 2014, ApJ, 792, 68

*Volatiles in Protoplanetary Disks.* Pontoppidan, K. M., Salyk, C., Bergin, E. A., Brittain, S., Marty, B., Mousis, O., Oberg, K. L. 2014, Protostars and Planets VI, University of Arizona Press

*DIGIT survey of Far-Infrared Lines from Protoplanetary Discs II: CO.* Meeus, G., Salyk, C., Bruderer, S., Fedele, D., Maaskant, K., Evans, N.J. II, van Dishoeck, E. F., Montesinos, B., Herczeg, G., Bouwman, J., Green, J. D., Dominik, C., Henning, T., Vicente, S. and the DIGIT Team 2013, A&A, 559, 84

*Measuring Protoplanetary Disk Accretion with H 1 Pfund  $\beta$ .* Salyk, C., Herczeg, G. J., Brown, J. M., Blake, G. A., Pontoppidan, K. M., van Dishoeck, E. F. 2013, ApJ, 769, 21

*Transitional Disks as Signposts of Young, Multiplanet Systems.* Dodson-Robinson, S. E. & Salyk, C. 2011, ApJ, 738, 131

*CO Rovibrational Emission as a probe of Inner Disk Structure.* Salyk, C., Blake, G. A., Boogert, A. C. A. & Brown, J. M. 2011, ApJ, 743, 112

*A Spitzer Survey of Mid-infrared Molecular Emission from Protoplanetary Disks. II. Correlations and LTE Models.* Salyk, C., Pontoppidan, K.M., Blake, G.A., Najita, J. & Carr, J. 2011, ApJ, 731,130

*Spectrally Resolved Pure Rotational Lines of Water in Protoplanetary Disks.* Pontoppidan, K.M., Salyk, C., Blake, G.A., & Käufel, H.U. 2010, ApJ, 722, L173

*A Spitzer Survey of Mid-infrared Molecular Emission from Protoplanetary Disks. I. Detection Rates.* Pontoppidan, K.M., Salyk, C., Blake, G.A., Meijerink, R., Carr, J., Najita, J. 2010, ApJ, 720, 887

*High-resolution 5 $\mu$ m spectroscopy of Transitional Disks.* Salyk, C., Blake, G.A., Boogert, A.C.A., & Brown, J.M. 2009, ApJ, 699, 330

*H<sub>2</sub>O and OH gas in the Terrestrial Planet-forming Zones of Protoplanetary Disks.* Salyk, C., Pontoppidan, K.M., Blake, G.A., Lahuis, F., van Dishoeck, E.F. & Evans, N.J. II 2008, ApJ, 676, L49

*Molecular Gas in the Inner 1 AU of the TW Hya and GM Aur Transitional Disks.* Salyk, C., Blake, G.A., Boogert, A.C.A. & Brown, J.M. 2007, ApJ, 655, L105

*Interaction between Eddies and Mean Flow in Jupiter's Atmosphere: Analysis of Cassini Imaging Data.* Salyk, C., Ingersoll, A.P., Lorre, J., Vasavada, A., DelGenio, A.D. 2006, Icarus, 185, 430

*A Warp in the Large Magellanic Cloud Disk?* Olsen, K.A.G. & Salyk, C., 2002, AJ, 124, 2045

## Other Refereed Publications

*Velocity-resolved hot water emission detected toward HL Tau with the Submillimeter Array.* Kristensen, L. E., Brown, J. .M., Wilner, D., Salyk, C. 2016, ApJ, 822, L20

*Measurements of Water Surface Snow Lines in Classical Protoplanetary Disks.* Blevins, S. M., Pontoppidan, K. M., Banzatti, A., Zhang, K., Najita, J. R., Carr, J. S., Salyk, C., Blake, G. A. 2016, ApJ, 818, 22

*Dimming and CO absorption toward the AA Tau Protoplanetary Disk: An Infalling Flow caused by Disk Instability?.* Zhang, K., Crockett, N., Salyk, C., Pontoppidan, K. M., Turner, N. J., Carpenter, J. M., Blake, G. A. 2015, ApJ, 805, 55

*Variable Accretion Processes in the Young Binary-Star System UY Aur.* Stone, J. M., Eisner, J. A., Salyk, C., Kulesa, C., McCarthy, D. 2014, ApJ, 792, 56

*DIGIT survey of far-infrared lines from protoplanetary disks I.* Fedele, D., Bruderer, S., van Dishoeck, E.F., Carr J., Herczeg, G.J., **Salyk, C.**, Evans, N.J. II, Bouwman, J., Meeus, G., Henning, T., Green, J., Najita, J.R., Guedel, M. 2013, A&A, 559, 77

*Embedded Protostars in the Dust, Ice and Gas In Time (DIGIT) Herschel Key Program: Continuum SEDs, and an Inventory of Characteristic Far-Infrared Lines from PACS Spectroscopy.* Green, J., Evans, N. J. II, Jorgensen, J.K., Herczeg, G.J., Kristensen, L.E., Lee, J.-E., Dionatos, O., Umut, Y., **Salyk, C.**, Meeus, G., Bouwman, J., Visser, R., Bergin, E. A., van Dishoeck, E. F., Rascati, M. R., Karska, A., van Kempen, T. A., Dunham, M. M., Lindberg, J. E., Fedele, D. and the DIGIT Team 2013, ApJ, 770, 123

*The HCN-Water Ratio in the Planet Forming Region of Disks.* Najita, J. R., Carr, J. S., Pontoppidan, K. M., **Salyk, C.**, van Dishoeck, E. F., Blake, G. A. 2013, ApJ, 766, 134

*Evidence for a Snow Line beyond the Transitional Radius in the TW Hya Protoplanetary Disk.* Zhang, K., Pontoppidan, K. M., **Salyk, C.** & Blake, G. A. 2013, ApJ, 766, 82

*An Old Disk That Can Still Form a Planetary System.* Bergin, E. A., Cleeves, I., Gorti, U., Zhang, K., Blake, G. A., Green, J. D., Andrews, S. M., Evans, N. J., II Henning, T., Öberg, K., Pontoppidan, K., Qi, C., **Salyk, C.** & van Dishoeck, E. F. 2013, Nature, 493, 644

*First Detection of Near-Infrared Line Emission from Organics in Young Circumstellar Disks.* Mandell, A. M., Bast, J., van Dishoeck, E. F., Blake, G. A., **Salyk, C.**, Mumma, M. J. & Villanueva, G. 2012, ApJ, 747, 92

*Multi-Epoch Observations of HD 69830: High Resolution Spectroscopy and Limits to Variability.* Beichman, C. A., Lisse, C. M., Tanner, A. M., Bryden, G., Akeson, R.A., Ciardi, D. R., Boden, A. F., Dodson-Robinson, S. E., **Salyk, C.** & Wyatt, M. C. 2011, ApJ, 743, 85

*The Molecular Composition of Comet C/20067 W1 (Boattini): Evidence of a peculiar outgassing and rich chemistry.* Villanueva, G. L., Mumma, M. J., Disanti, M. A., Bonev, B. P., Gibb, E. L., Magee-Sauer, K. Blake, G. A. & **Salyk, C.** 2011, Icarus, 216, 227

*Non-Detection of L-band Line Emission from the Exo-Planet HD189733b.* Mandell, A.M., Deming, L.D., Blake, G.A., Knutson, H.A., Mumma, M.J., Villanueva, G.L. & **Salyk, C.** 2011, ApJ, 728, 18

*First results of the Herschel key program Dust, Ice and Gas In Time (DIGIT): Dust and gas spectroscopy of HD 100546.* Sturm, B. et al. 2010, A&A, 518, 129

*Dust, Ice, and Gas In Time (DIGIT) Herschel program first results. A full PACS-SED scan of the gas line emission in protostar DK Chamaeleontis.* van Kempen et al. 2010, A&A, 518, 128

*The TEXES Survey for H<sub>2</sub> Emission from Protoplanetary Disks.* Bitner, M.A., Richter, M.J., Lacy, J.H., Herczeg, G.J., Greathouse, T.K., Jaffe, D.T., **Salyk, C.**, Blake, G.A., Hollenbach, D.J., Doppmann, G.W., Najita, J.R., & Currie, T. 2008, ApJ, 688, 1326

*Discovery of OH in Circumstellar Disks around Young Intermediate-Mass Stars.* Mandell, A.M., Mumma, M.J., Blake, G.A., Bonev, B.P., Villanueva, G.L., & **Salyk, C.** 2008, ApJ, 681, L25

*The c2d Spitzer spectroscopic survey of ices around low-mass young stellar objects II: CO<sub>2</sub>.* Pontoppidan, K.M., Boogert, A.C.A., Fraser, H., van Dishoeck, E.F., Blake, B.A. Lahuis, F., Oberg, K., Evans, N.J.II & **Salyk, C.** 2008, ApJ, 678, 1005

*The Volatile Composition of the Split Ecliptic comet 73P/Schwassmann-Wachmann 3: A Comparison of Fragments C and B.* Villanueva, G. L., Bonev, B. P., Mumma, M. J., Magee-Sauer, K., DiSanti, M. A., **Salyk, C.** & Blake, G. A., 2007, ApJ, 650, L87

*Modeling production and climate-related impacts on <sup>10</sup>Be concentration in ice cores.* Field, C.V., Schmidt, G.A., Koch, D. & **Salyk, C.** 2006, JGR, 111, D15107

*The recent expansion of Pluto's atmosphere.* Elliot, J.L. et al. 2003, Nature 424, 165