

# CURRICULUM VITAE

## Michael R. Line

[mrline@asu.edu](mailto:mrline@asu.edu)

School of Earth & Space Exploration  
Arizona State University  
PO Box 871404  
Tempe, AZ 85281  
Office: PSF 548

### CURRENT POSITION

Assistant Professor (2016-present)  
School of Earth & Space Exploration  
Arizona State University

### EDUCATION

2013 Ph.D., Planetary Science, California Institute of Technology (advisor: Yuk L. Yung)  
Thesis: *Characterization of Exoplanet Atmospheres: Spectral Retrieval and Chemistry*  
2010 M.S., Planetary Science, California Institute of Technology  
2008 B.S., Physics/Astronomy-Physics, University of Wisconsin-Madison

### RESEARCH EXPERIENCE

2015-2016 Hubble Postdoctoral Fellow, NASA Ames Research Center (Mentor: Mark Marley)  
2013-2015 Postdoctoral Researcher, University of California-Santa Cruz (Mentor: Jonathan Fortney)  
2008-2013 Graduate Research Assistant, California Institute of Technology (Advisor: Yuk. L. Yung, Heather Knutson)  
2006-2008 Undergraduate Research, Physics Department, University of Wisconsin-Madison (Advisor: Edwin Mierkiewicz)  
2006-2008 NASA Summer Undergraduate Student Research Program, Jet Propulsion Laboratory (Advisor: Glen Orton)

### TEACHING/MENTORING EXPERIENCE

2009-2013 Teaching Assistant, California Institute of Technology  
*Introductory planetary science, Planetary atmospheres, Atmospheric radiative transfer*  
2009-2013 High School Summer Student Mentor—L. Wood, I. Chen, R. Zeng, E. Ellison  
2014-present Undergraduate Student Mentor—J. Lustig-Yeager (UCSC), D. Teal (UCSC), K. Luther (UCSC), J. Chapman (UCSC), C. Montero (UCSC), Laurence Tognetti (ASU), Jenna Robinson (ASU)  
Summer 2016 Kavli Summer Program in Astrophysics 2016: Exoplanet Atmospheres—N. Batalha, R. Garland  
Current Students: Joe Zalesky (PhD, 2<sup>nd</sup> year), Chuhong Mai (2<sup>nd</sup> project advisor), Laurence Tognetti (Ugrad), Ehsan Gharib (Co-mentor), Aisha Iyer (PhD, 1<sup>st</sup> year), Luke Tremblay (PhD, 1<sup>st</sup> year), Jenna Robinsen (Ugrad), Katherina Feng (UCSC, PhD, 3<sup>rd</sup> year, Co-Mentor)  
Current Post-docs: Taisiya Kopytova

### MAJOR FIELDS OF INTEREST

Atmospheres of extra solar planets and brown dwarfs, Bayesian statistics, radiative transfer, atmospheric chemistry, characterization of exoplanet atmospheres, lunar exosphere

## AWARDS

2015	NASA Hubble Postdoctoral Fellowship
2015	NSF Astronomy & Astrophysics Postdoctoral Fellowship (declined)
2015	Caltech/JPL Comparative Exoplanet/Planetary Postdoctoral Fellowship (declined)
2014	Nasa Astrobiology Early Career Collaboration Award
2010-2011	Jet Propulsion Laboratory Graduate Fellow, 2010-2011
2008	NSF Graduate Fellowship Honorable Mention
2007	Barry M. Goldwater Honorable Mention
2007	Wisconsin Space Grant Awardee (declined)
2007	Hilldale Undergraduate Research Scholarship
2004-2008	Phi Beta Kappa, University of Wisconsin-Madison

## INVITED TALKS

10/2017	Lunar & Planetary Laboratory Colloquium, University of Arizona
7/2017	CRAQ Exoplanet Summer School, University of Montreal
7/2017	Enabling Transiting Exoplanet Science with JWST Workshop, STScI
2/2017	Lowell Observatory Colloquium
9/2016	Linking Exoplanet and Disk Compositions, STScI
7/2016	Sagan Summer Workshop: Is there a planet in my data?, NExSci
7/2016	Exoplanets I, Davos Switzerland
4/2015	Frontiers of Stellar Spectroscopy in the Local Group and Beyond Conference, MPIA
3/2015	University of Bern, Center for Space and Habitability
12/2014	Remote Sensing of Exoplanets Winter School, University of Lethbridge
5/2014	University of California-Los Angeles, Department of Earth, Planetary, and Space Sciences
5/2014	University of Washington, Astrobiology Colloquium
5/2014	Northwestern, CIERA seminar
4/2012	University of California-Santa Cruz, Earth and Marine Sciences

## CONFERENCE TALKS

- Cool Stars 19*, 2016, Characterizing Physical Processes in Brown Dwarf Atmospheres
- American Astronomical Society Meeting*, #227, 2016, Global Abundance and Temperature Constraints via Joint Phase Curve Retrievals
- American Astronomical Society Meeting*, #225, 2015, Atmospheric Characterization of T-dwarfs via Bayesian Retrieval Methods
- American Astronomical Society-Division for Planetary Sciences Meeting*, #46, 2014, A Uniform Retrieval Analysis of Transit Transmission Spectra: Quantifying the detection of Clouds, Hazes and Water
- Cool Stars 18*, 2014, Determination of Temperatures and Abundances in Brown Dwarf Atmospheres
- Exoclimes III*, 2014, A Comparison of Exoplanet Retrieval Techniques
- American Astronomical Society Meeting*, #223, 2014, Retrieval of Temperatures and Abundances in Brown Dwarf Atmospheres
- American Astronomical Society-Division for Planetary Sciences Meeting*, #45, 2013, A Novel Diagnosis of Chemical Disequilibrium in Extrasolar Planet and Substellar Object Atmospheres
- American Astronomical Society Meeting*, #221, 2013, Characterization of Exoplanet Atmospheres: Spectral Retrieval and Chemistry
- American Astronomical Society-Division for Planetary Sciences Meeting*, #44, 2012, Secondary Eclipse Spectral Retrievals: Trends in Chemistry
- European Planetary Science Conference-Division of Planetary Science Joint Meeting*, #43, 2011, An Optimal Estimation Retrieval Approach for Exoplanet Atmospheres

*American Geophysical Union Meeting, 2010, Can the Solid State Greenhouse Effect Produce ~100 Year Cycles in the Mars South Polar Residual CO<sub>2</sub> Ice Cap?*  
*American Astronomical Society-Division for Planetary Sciences Meeting, #42, 2010, The Impact of UV Irradiance on the Composition of Exoplanets*  
*American Astronomical Society-Division for Planetary Sciences Meeting, #41, 2009, CO<sub>2</sub> Chemistry in the Atmosphere of HD189733b*

### **REFEREE/REVIEWER FOR:**

*Nature, Icarus, Astrophysical Journal (ApJ), Astronomy and Astrophysics (A&A), Monthly Notices of the Royal Astronomical Society (MNRAS), Publications of the Astronomical Society of the Pacific (PASP), NASA-Exoplanet Research Program (XRP), NASA-Origins, NASA-Astrophysical Theory Program (ATP), NASA-Keck TAC, NASA HST TAC*

### **NASA MISSION RELATED ACTIVITIES:**

2012-present Explorer and Small Explorer Class mission concept design and science implementation, site visit participation—Jet Propulsion Laboratory  
 2017-present NASA JPL FINESSE & CASE Explore Class Missions, Phase II  
 2014-present JWST NIRCам GTO program

### **SUCCESSFUL OBSERVING PROPOSAL INVOLVEMENT:**

2017 Co-Investigator *JWST* E.R.S. Program (78 hrs), PI: N. Batalha  
 “The Transiting Exoplanet Community Early Release Science Program”  
 2017 Co-Investigator *Spitzer* DDT Cycle 13 (69 hrs), PI: V. Parmentier  
 "Benchmarking GJ436b for JWST"  
 2017 Co-Investigator *Spitzer* DDT Cycle 13 (15 hrs), PI: K. Colon  
 "The Great Exoplanet Eclipse: Spitzer Observations of the Benchmark Sub-Saturn-Mass Planet KELT-11b"  
 2017 Co-Investigator *Spitzer* DDT Cycle 13 (29 hrs), PI: L. Kreidberg  
 "First Atmosphere Characterization of the Benchmark Exo-Neptune WASP107b"  
 2017 Co-Investigator *HST* Mid-Cycle-25 (10 orbits), PI: C. Hedges  
 “Sub-Neptune Atmosphere Characterization in a Multi-Planet System”  
 2017 Co-Investigator *HST* Cycle-25 (20 orbits), PI: J-M. Desert  
 “The First Near-Infrared Reflectance Spectrum of an Exoplanet”  
 2017 Co-Investigator *HST* Cycle-25 (9 orbits), PI: K. Colon  
 “The KELT-11b Opportunity: Measuring the Atmospheric Water Abundance for a Sub-Saturn-Mass Planet around a Metal-Rich Star”  
 2017 Co-Investigator *HST* Mid-Cycle-24 (5 orbits), PI: L. Kreidberg  
 “First Atmosphere Characterization of the Benchmark Exo-Neptune WASP-107b”  
 2016 Co-Investigator *Spitzer* Cycle-13 (660 hrs), PI: K. Stevenson  
 "The Ultimate Spitzer Phase Curve Survey"  
 2016 Co-Investigator *Spitzer* Mid Cycle-13 (131.9 hrs+3 *HST* orbits), PI: L. Kreidberg  
 "Clouds in the Forecast? A Joint Spitzer and HST Investigation of Clouds and Hazes for Two Exo-Neptunes"  
 2016 Co-Investigator *HST* Cycle-24 (10 orbits), PI: J. Bean  
 “Remastering the Classics: A thermal Inversion for the hot Jupiter Archetype HAT-P-7b”  
 2016 Co-Investigator *HST* Cycle-24 (20 orbits), PI: J. Bean

- 2016 “The First Precise Atmospheric Metallicity Measurement for a Sub-Jovian Exoplanet”  
Co-Investigator *HST* Cycle-24 (8 orbits+20hrs *Spitzer*), PI: K. Stevenson  
“A Preparatory Program to Identify the Single Best Transiting Exoplanet for JWST Early Release Science”
- 2015 Co-Investigator *Spitzer* Cycle-12 (52.4 hrs), PI: D. Dragomir  
"The Nature of 55 Cancri e"
- 2015 Co-Investigator *Spitzer* Cycle-12 (8.3 hrs), PI: K. Stevenson  
"The First Atmospheric Characterization of a Habitable-Zone Exoplanet"
- 2015 Co-Investigator *HST* Cycle-23 (40 orbits), PI: Z. Berta  
“The Atmospheres of Two Low-Mass, Low-Density Exoplanets Transiting a Young Star”
- 2014 Co-Investigator *Spitzer* Cycle-11 (134.3 hrs), PI: L. Kreidberg  
“Exploring the Frontier of Exoplanet Atmosphere Dynamics with NASA's Great Observatories”
- 2014 Co-Investigator *Spitzer* Cycle-11 (237.1 hrs), PI: N. Cowan  
“Rounding up the Misfits: Eclipses, Transits, and Phases of Three Peculiar Hot Jupiters”
- 2014 Co-Investigator *Spitzer* Cycle-11 (26.2 hrs), PI: K. Stevenson  
“The Newest Hot Jupiter Archetype Through the Eyes of NASA’s Great Observatories, Part 2 of 2”
- 2014 Co-Investigator *HST* Cycle-22 (10 orbits), PI: M. Zhao  
“Near-IR Spectroscopy of the Newly Discovered Benchmark Hot Jupiter WASP-103b”
- 2013 Co-Investigator *Spitzer* Cycle-10 (449.4 hrs), PI: H. Knutson  
"Exploring the Relationship Between Planet Mass and Atmospheric Metallicity"

#### **AWARDED GRANT PROPOSALS:**

- 2017 Principle Investigator: NASA-XRP  
“Testing Assumptions in Transiting Planet Atmospheric Retrievals: Preparatory Science for the James Webb Space Telescope and Beyond”
- 2016 Principle Investigator: NSF-AAG  
“A Systematic Data Driven Atmospheric Characterization of Brown Dwarfs”

## REFERENCES

Jonathan J. Fortney  
Associate Professor  
Department of Astronomy and Astrophysics  
University of California-Santa Cruz  
1156 High St.  
Santa Cruz, CA 95064  
jfortney@ucsc.edu  
(831)-502-7285

Jacob L. Bean  
Assistant Professor  
Department of Astronomy and Astrophysics  
University of Chicago  
5640 S. Ellis Ave.  
Chicago, IL 60637  
jbean@oddjob.uchicago.edu  
(773)-702-9568

Yuk L. Yung  
Smits Family Professor  
Division of Geological and Planetary Sciences  
California Institute of Technology  
1200 E. California Blvd

MS 150-21  
Pasadena, CA 91125  
yly@gps.caltech.edu  
(626)-234-5886

Mark S. Marley  
Staff Scientist  
Space Science and Astrobiology Division  
NASA-Ames Research Center  
Naval Air Station, Moffett Field  
Mountain View, CA 94035  
Mark.S.Marley@nasa.gov  
(650)-604-0805

Mark R. Swain  
Principal Scientist  
Origins of Stars and Planets Division  
NASA-Jet Propulsion Laboratory  
4800 Oak Grove Dr.  
Pasadena, CA 91109  
Mark.R.Swain@jpl.nasa.gov  
(818)-455-2396

# PUBLICATIONS

(13 First Author, 44 Total)

## REFEREED & SUBMITTED PAPERS:

1. Kredberg, L., **Line, M.R.**, Thorngren, D., Morley, C.V., Stevenson, K.B., 2017, Water, Methane Depletion, and High-Altitude Condensates in the Atmosphere of the Warm Super-Neptune WASP-107b, *ApJL*, *in revision*
2. Chapman, J.W., Zellem, R.T., **Line, M.R.**, Vasisht, G., Bryden, G. et al., 2017, Quantifying the Impact of Spectral Coverage on the Retrieval of Molecular Abundances from Exoplanet Transmission Spectra, *PASP*, 129
3. **Line, M.R.**, Marley, M.S., Liu, M.C., Burningham, B., Morley, C.V., Hinkel, N.R., Teske, J., Fortney, J.J., 2017, Uniform Atmospheric Retrieval Analysis of Ultracool Dwarfs II: Properties of 11 T-Dwarfs, *AJ*, 848
4. Zellem, R.T., Swain, M.R., Roudier, G., Shkolnik, E.L., et al. & **Line, M.R.**, 2017, Forecasting the Impact of Stellar Activity on Transiting Exoplanet Spectra, *ApJ*, 844
5. Brogi, M., **Line, M.R.**, Bean, J., Desert, J.-M., Schwarz, H., 2017, A Framework to combine Low-and High-resolution Spectroscopy for the Atmospheres of Transiting Exoplanets, *ApJL*, 839
6. Batalha, N.E., **Line, M.R.**, 2017, Information Content Analysis for Selection of Optimal JWST Observing Modes, *AJ*, 153
7. Morley, C.V., Knutson, H., **Line, M.R.**, Fortney, J.J., Thorngren, D., Marley, M.S., Teal, D., Lupu, R., 2017, Forward and Inverse Modeling of the Emission and Transmission Spectrum of GJ 436b: Investigating Metal Enrichment, Tidal Heating, and Clouds, *AJ*, 153
8. Stevenson, K.B., **Line, M.R.**, Bean, J.L., Desert, J.-M., Fortney, J.J., Showman, A.P., Kataria, T., Kredberg, L., Feng, Y.K., 2016, Spitzer Phase Curve Constraints for WASP-43b at 3.6 and 4.5 microns, *AJ*, 153
9. Schlawin, E., Rieke, M., Leisenring, J., Greene, T., Walker, L.M., Fraine, J., Kelly, D., Misselt, K., **Line, M.R.**, Stansberry, J., Lewis, N., 2016, Two NIRCcam channels are Better than One: How JWST Can Do More Science with NIRCcam's Short-Wavelength Dispersed Hartmann Sensor, *PASP*, 129
10. Cartier, K.M.S., Beaty, T.G., Zhao, M., Line, M.R., Ngo, H., Mawet, D., Staussun, K.G., Wright, J.T., Kredberg, L., Fortney, J., Knutson, H., 2017, Near-Infrared Emission Spectrum of WASP-103b Using Hubble Space Telescope/Wide Field Camera 3, *AJ*, 153
11. Lupu, R.E., Marley, M.S., Lewis, N., **Line, M.R.**, Traub, W.A., Zahnle, K., 2016, Developing Atmospheric Retrieval Methods for Direct Imaging Spectroscopy of Gas Giants in Reflected Light. I. Methane Abundances and Basic Cloud Properties, *AJ*, 152
12. **Line, M.R.**, Stevenson, K.B., Bean, J., Desert, J.-M., Fortney, J. J., Kredberg, L., Madhusudhan, N., Showman, A. P., Diamond-Lowe, H., 2016, No Thermal Inversion and a Solar Water Abundance for the Hot Jupiter HD209458b from HST WFC3 Emission Spectroscopy, *AJ*, 152
13. Moses, J. I., Marley, M. S., Zahnle, K., **Line, M. R.**, Fortney, J. J., Barman, T. S., Visscher, C., Lewis, N. K., Wolff, M. J., 2016, On the Composition of Young, Directly Imaged Planets, *ApJ*, 829
14. Feng, Y. K., **Line, M.R.**, Fortney, J.J., Stevenson, K.B., Bean, J., Kredberg, L., Parmentier, V., 2016, The Impact of Non-Uniform Thermal Structure on the Interpretation of Exoplanet Emission Spectra, *ApJ*, 829
15. Stevenson, K.B.+51 others (including **Line, M.R.**), 2016, Transiting Exoplanet Studies and Community Targets for JWST's Early Release Science Program, *PASP*, 128

16. Todorov, K.O., **Line, M.R.**, Pineda, J.E., Meyer, M.R., Quanz, S.P., Hinkley, S., Fortney, J.J., 2016, The Water Abundance of the Directly Imaged Substellar Companion Kappa And. b Retrieved from a NearInfrared Spectrum, *ApJ*, 823
17. **Line, M.R.**, Parmentier, V., 2016, The Influence of Nonuniform Cloud Cover on Transit Transmission Spectra, *ApJ*, 820
18. Stevenson, K. B., Bean, J. L., Seifahrt, A., Gilbert, G. J., **Line, M.R.**, Désert, J.-M., Fortney, J. J., 2016, A Search for Water in the Atmosphere of HAT-P-26b Using LDSS-3C, *ApJ*, 817
19. Greene, T. P., **Line, M.R.**, Montero, C., Fortney, J. J., Lustig-Yaeger, J., Luther, K., 2016, Characterizing Transiting Exoplanet Atmospheres with JWST, *ApJ*, 817
20. Morley, C.V., Fortney, J. J., Marley, M.S., Zahnle, K., **Line, M.R.**, Kempton, E.; Lewis, N., Cahoy, K., 2015, Thermal Emission and Reflected Light Spectra of Super Earths with Flat Transmission Spectra, *ApJ*, 815
21. Kreidberg L., **Line, M.R.**, Bean, J.L., Stevenson, K.B., Desert, J-M., Madhusudhan, N., Fortney, J.J., Barstow, J.K., Henry, G.W., Williamson, M., Showman, A.P., 2015, A Detection of Water in the Transmission Spectrum of the Hot Jupiter WASP-12b and Implications for its Atmospheric Composition, *ApJ*, 814
22. Kammer, J.A., Knutson, H.A., **Line, M.R.**, Fortney, J.J., Deming, D., et al., 2015, Spitzer Secondary Eclipse Observations of Three Cool Gas Giant Planets and Empirical Trends in Cool Planet Emission Spectra, *ApJ*, 810
23. **Line M.R.**, Teske, J., Burningham, B., Fortney, J.J., Marley, M., 2015, Uniform Atmospheric Retrieval Analysis of Ultracool Dwarfs I: Characterizing Benchmarks, Gl570D and HD3651B, *ApJ*, 807
24. Kataria, T., Showman, A.P., Fortney, J.J., Stevenson, K.B., **Line, M.R.**, Kreidberg, L., Bean, J.L., Desert, J.-M., 2014, The Atmospheric Circulation of the Hot Jupiter WASP-43b: Comparing Three-Dimensional Models to Spectrophotometric Data, *ApJ*, 801
25. Stevenson, K. Desert, J-M, **Line, M.R.**, Bean, J.L., Fortney, J.J., et al. 2014, Thermal Structure of an Exoplanet from Phase-Resolved Emission Spectroscopy, *Science*, 346
26. Diamond-Lowe, H., Stevenson, K.B., Bean, J.L., **Line, M.R.**, Fortney, J.J., 2014, New Analysis Indicates no Thermal inversion in the Atmosphere of HD209458b, *ApJ*, 796
27. Kriedberg, L., Bean, J.L., Desert, J-M., **Line, M.R.**, Fortney, J.J. et al., 2014, A Precise Water Abundance Measurement for the Hot Jupiter WASP-43b, *ApJL*, 793
28. Orton, G.S., Fletcher, L.N., Moses, J.I., Mainzer, A.K., Hines, D., Hammel, H.B., Martin-Torres, J., Burgdorf, M., Merlet, C., **Line, M.R.**, 2014, Mid-Infrared Spectroscopy of Uranus from the Spitzer Infrared Spectrometer: 1. Determination of the Mean Temperature Structure of the Upper Troposphere and Stratosphere, *Icarus*, 243
29. Orton, G.S., Moses, J.I., Fletcher, L.N., Mainzer, A.K., Hines, D., Hammel, H.B., Martin-Torres, J., Burgdorf, M., Merlet, C., **Line, M.R.**, 2014, Mid-Infrared Spectroscopy of Uranus from the Spitzer Infrared Spectrometer: 2. Determination of the Mean Composition Structure of the Upper Troposphere and Stratosphere, *Icarus*, 243
30. **Line, M.R.**, Fortney, J.J., Marley, M.S., Satoko, S., 2014, A Data-Driven Approach for Retrieving Temperatures and Abundances in Brown Dwarf Atmospheres, *ApJ*, 793
31. Swain, M., **Line, M.R.**, Deroo, P. , 2014, On the detection of molecules in the atmosphere of HD189733b using HST NICMOS transmission spectroscopy , *ApJ*, 784
32. **Line, M.R.**, Knutson, H., Wolf, A., Yung, Y.L. , 2014, A systematic retrieval analysis of secondary eclipse spectra. II. A uniform analysis of nine planets and their C to O ratios , *ApJ*, 783
33. **Line, M.R.**, Yung, Y.L. , 2013, A systematic retrieval analysis of secondary eclipse spectra. III. Diagnosing chemical disequilibrium in planetary atmospheres , *ApJ*, 779
34. **Line, M.R.**, Knutson, H., Deming, D., Wilkins, A., Desert, J-M. , 2013, A near-infrared transmission spectrum for warm Saturn HAT-P-12b , *ApJ*, 778

35. Moses, J. I., **Line, M.R.**, Visscher, C., Richardson, M.R., Nettelmann, N., Fortney, J. J., Stevenson, K. B., Madhusudhan, N. , 2013, Compositional diversity in the atmospheres of hot Neptunes, with application to GJ 436b , ApJ, 777
36. Deming, D., Wilkins, A., McCullough, P., Burrows, A., Fortney, J., Agol, E., Dobbs-Dixon, I., Madhusudhan, N., Crouzet, N., Desert, J-M., Gilliland, R., Haynes, K., Knutson, H., **Line, M.R.**, Magic, Z., Mandell, A., Ranjan, S., Charbonneau, D., Clampin, M., Seager, S., Showman, A. , 2013, Infrared Transmission Spectroscopy of the Exoplanets HD209458b and XO-1b Using Wide Field Camera-3 on the Hubble Space Telescope , ApJ, 774
37. **Line, M.R.**, Wolf, A., Zhang, X., Knutson, H., Kammer, J., Ellison, E., Deroo, P., Crisp, D., Yung, Y. , 2013, A Systematic Retrieval Analysis of Secondary Eclipse Spectra I: A Comparison of Atmospheric Retrieval Techniques , ApJ, 775
38. Swain, M., Deroo, P., Tinetti, G., Hollis, M., Tessenyi, M., **Line, M.**, Kawahra, H., Fuji, Y., Showman, A., Yurchenko, S., 2012, Probing the Extreme Planetary Atmosphere of WASP-12b, Icarus, 225
39. **Line, M.R.**, Zhang, X., Natraj, V., Vasisht, G., Chen, P., Yung, Y.L., 2012, Information Content of Exoplanetary Transit Spectra: An Initial Look, ApJ, 749
40. **Line, M.R.**, Mierkiewicz, E.J., Oliverson, R.J., Wilson, J.K., Haffner, L.M., 2012, Sodium Atoms in the Lunar Exotail: Observed Velocity and Spatial Distributions, Icarus, 219
41. **Line, M.R.**, Vasisht, G., Chen, P., Angerhausen, D., Yung, Y.L., 2011 Thermochemistry and Photochemistry in Cooler Hydrogen Dominated Extrasolar Planets: A Methane Poor GJ436b?, ApJ, 732
42. **Line, M.R.**, Liang, M.C., Yung, Y.L. ,2010, High-Temperature Photochemistry in the Atmosphere of HD189733b, ApJ, 717
43. Meadows, V.S., Orton, G.S., **Line, M.**, Liang, M.C., Yung, Y.L., VanCleve, J., Burgdorf, M. , 2008, First Spitzer Observations of Neptune: Detection of New Hydrocarbons, Icarus, 97
44. Mierkiewicz, E.J., **Line, M.**, Roesler, F.L, Oliverson, R.J., 2006, Radial Velocity Observations of the Extended Lunar Sodium Tail, Geophys. Res. Lett., 33