Xinting Yu

Postdoctoral Fellow, Department of Earth and Planetary Sciences
UC Santa Cruz, 1156 High Street, Santa Cruz, CA 95064 – USA

xintingyu@ucsc.edu • www.xintingyu.com • JonesKuma

Appointments

University of California, Santa Cruz — **Santa Cruz, CA, USA**
51 Pegasi b Postdoctoral Fellow — *2019–present*

Johns Hopkins University — **Baltimore, MD, USA**
Visiting Scientist — *2019–present*

Education

Johns Hopkins University — **Baltimore, MD, USA**
PhD in Planetary Sciences — *2014-2019*

University of Science and Technology of China — **Hefei, Anhui, China**
BS in Space Physics with honors — *2010-2014*

Research Experience

University of California, Santa Cruz — **Santa Cruz, CA**
51 Pegasi b Postdoctoral Fellow (*Supervisor: Xi Zhang*) — *2019–present*
Laboratory characterization of planetary and exoplanetary aerosol analogs and primordial organics, modeling cloud-haze interactions and cloud formation on Titan and exoplanets

Johns Hopkins University — **Baltimore, MD**
Graduate Research Assistant (*Advisor: Sarah Hörst*) — *2014–2019*
Laboratory production and characterization of Titan aerosol analogs ("tholins") and the effect on sediment transport and dune formation on Titan

NASA Ames Research Center — **Mountain View, CA**
Visiting Student (*Collaborators: Nathan Bridges, Devon Burr, James Smith*) — *2015 & 2016 Summer*
Sediment transport on Titan using the Titan Wind Tunnel

Key Laboratory of Solar Activity, National Astronomical Observatories — **Beijing, China**
Undergraduate Research Assistant (*Advisor: Jun Zhang*) — *2013–2014*
Investigation of cyclones in the quiet Sun using SDO/AIA and HMI data

Honors and Awards

- Co-I, NASA Cassini Data Analysis Program (CDAP), "Understanding Surface Material on Titan" (3 yrs, $131,646 to Co-I Yu at UCSC) (PI: Julie Brisset), 2021–2023

- 51 Pegasi b Postdoctoral Fellowship, Heising-Simons Foundation, 2019–2022
- Stephen E. Dwornik Award at the 49th Lunar and Planetary Science Conference – Best Graduate Oral Presentation, 2018
- JHU EPS Journal Club Long Presentation Award ($2,000), 2018
- 50th DPS Hartmann Travel Grant ($500), 2018
- Johns Hopkins University 2018-19 Technology Fellowship ($5,000)
- Johns Hopkins University 2018-19 Dean's Teaching Fellow ($11,500)
- Titan Surface Meeting travel grant, 2018
- Johns Hopkins University J. Brien Key Fund ($500), 2017
- Women in Astronomy IV travel grant, 2017
- Johns Hopkins University Shark Tank Education Innovation Competition ($3,000), Winner, 2016
- Johns Hopkins University Owen Scholars Award ($6,000/yr, 3yrs), 2014
- University of Science and Technology of China (USTC), Outstanding Bachelor Thesis, 2014
- USTC, Outstanding Award in Undergraduate Research Program, 2013
- USTC Outstanding Student Scholarship (Grade 1), 2013
- USTC Outstanding Student Scholarship (Grade 2), 2012
- USTC Outstanding Student Scholarship (Grade 3), 2011

Teaching and Mentoring Experience

Instructor

Johns Hopkins University (Dean's Teaching Fellowship) — Baltimore, MD
AS.270.328 Planetary Exploration: Techniques and Data Analysis (*New Course*) — *Fall 2018*

Guest Lecturer

Johns Hopkins University — Baltimore, MD
AS.270.114 Guided Tour of the Planets (*2 lectures*) — *Spring 2019*
AS.270.335 Planets, Life and the Universe (*1 lecture*) — *Fall 2018*
AS.270.114 Guided Tour of the Planets (*1 lecture*) — *Spring 2018*
AS.270.410 Planetary Surface Processes (*1 lecture*) — *Fall 2017*
AS.270.366 Spacecraft Instrumentation Project (*1 lecture*) — *Spring 2017*
AS.270.114 Guided Tour of the Planets (*1 lecture*) — *Spring 2017*
AS.270.114 Guided Tour of the Planets (*1 lecture*) — *Spring 2016*

Teaching Assistant

Johns Hopkins University — Baltimore, MD
AS.270.114 Guided Tour of the Planets — *Spring 2019*
AS.270.114 Guided Tour of the Planets — *Spring 2018*
AS.270.335 Planets, Life and the Universe — *Fall 2017*
AS.270.114 Guided Tour of the Planets — *Spring 2017*
AS.270.103 Introduction to Global Environmental Change — *Fall 2016*
AS.270.114 Guided Tour of the Planets — *Spring 2016*

Teaching Grants

Johns Hopkins University — Baltimore, MD

Dean's Teaching Fellowship: new designed course AS.270.328 Planetary Exploration — *Fall 2018*

Restructure AS.270.114 Guided Tour, Shark Tank Education Innovation Competition — *Winter 2017*

Restructure AS.270.114 Guided Tour, Shark Tank Education Innovation Competition — *Spring 2019*

Mentored Undergraduate Students

University of California Santa Cruz (2019–present) — Santa Cruz, CA

- Yue (Yuna) Yu (*5th year, EPS*): Aerosol-Cloud-Lake Interactions on Titan
- Julia Garver (*4th year, astrophysics*): Cloud formation on Titan
- Taylor Duncan (*4th year, EPS*): Outgassing experiments of carbonaceous chondrites: implications on the formation of Titan's atmosphere
- Jialin Li (*3rd year, astrophysics*): Comparison study on the surface energies of Titan haze analogs
- Austin Dymont (*2nd year, physics*): Trends in haziness of sub-Neptune exoplanets

Research Proposal Involvement

PI on NASA Solar System Workings (SSW) Proposal 2021
Material properties of Titan aerosol analogs "tholins": a cross-laboratory comparison study

Co-I on NASA Solar System Workings (SSW) Proposal 2020
The fate of hydrolyzed and non-hydrolyzed sediments on Titan

Co-I on NASA Cassini Data Analysis Program (CDAP) Proposal, Funded 2021-2023 2020
Understanding Surface Material on Titan

Co-I on NASA Planetary Data Archiving, Restoration, and Tools (PDART) Proposal 2020
Measuring and Archiving the Material Properties of Aerosol Analogs for Icy Bodies

Collaborator on NASA Exoplanets Research Program (XRP) Proposal 2020
Towards a Holistic Understanding of Exoplanet Aerosols using Microphysical Modeling

Collaborator on NSF Astronomy and Astrophysics Research Grants 2019
Experiment-Driven Modeling of Haze and Clouds on Exoplanets

Referred Publications

*Mentored Undergraduate Student

[15]: *Jialin Li, **Xinting Yu**, Ella Sciamma-O'Brien, Chao He, Joshua Sebree, Farid Salama, Sarah M. Hörst, and Xi Zhang, "A Cross-Laboratory Comparison Study of Surface Energies for Titan's Haze Analogs "Tholins" ", *with coauthors*.

[14]: **Xinting Yu**, Julianne I. Moses, Jonathan J. Fortney, and Xi Zhang, "Atmospheric Trace Species Abundances as Proxies for Identifying Exoplanet Surfaces", *under review*.

[13]: **Xinting Yu**, Chao He, Xi Zhang, Sarah M. Hörst, *Austin H. Dymont, Patricia McGuiggan, Julianne I. Moses, Nikole K. Lewis, Jonathan J. Fortney, Peter Gao, Eliza M.-R. Kempton, Sarah Moran, Caroline V. Morley, Diana Powell, Jeff A. Valenti, and Véronique Vuitton, "Haze Evolution in Temperate Exoplanet Atmospheres Through Surface Energies Measurements", *accepted by*

Nature Astronomy, 2021.

[**12**]: **Xinting Yu**, Sarah M. Hörst, Chao He, Patricia McGuiggan, Kai Kristiansen, and Xi Zhang, "Surface Energy of the Titan Aerosol Analog 'Tholin'", *Astrophysical Journal*, **905**, 88, https://doi.org/10.3847/1538-4357/abc55d, 2020.

[**11**]: Ellen Czaplinski, **Xinting Yu**, Katherine Dzurilla, Vincent Chevrier, "Experimental Investigation of the Acetylene-Benzene Co-crystal on Titan", *Planetary Science Journal*, **1**, 76, https://doi.org/10.3847/PSJ/abbf57, 2020.

[**10**]: Chao He, Sarah M. Hörst, Nikole K. Lewis, **Xinting Yu**, Julianne I. Moses, Patricia McGuiggan, Mark S. Marley, Eliza M.-R. Kempton, Caroline V. Morley, and Véronique Vuitton, "Haze Formation in Warm H2-rich Exoplanet Atmospheres", *Planetary Science Journal*, **1**, 51, https://doi.org/10.3847/PSJ/abb1a4, 2020.

[**9**]: Chao He, Sarah M. Hörst, Nikole K. Lewis, **Xinting Yu**, Julianne I. Moses, Patricia McGuiggan, Mark S. Marley, Eliza M.-R. Kempton, Sarah E. Moran, Caroline V. Morley, and Véronique Vuitton, "Sulfur Promotes Haze Formation in Warm Exoplanet Atmospheres", **1**, *Nature Astronomy*, https://doi.org/10.1038/s41550-020-1072-9, 2020.

[**8**]: **Xinting Yu**, Sarah M. Hörst, Chao He, and Patricia McGuiggan, "Single Particle Triboelectrification of Titan Sand Analogs", *Earth and Planetary Science Letters*, **530**, 115996, https://doi.org/10.1016/j.epsl.2019.115996, 2020.

[**7**]: **Xinting Yu**, Sarah M. Hörst, Chao He, Bryan Crawford, and Patricia McGuiggan, "Where does Titan Sand Come From: Insight from Mechanical Properties of Titan Organic Analogs", *Journal of Geophysical Research - Planets*, **123**, 2310, https://doi.org/10.1029/2018JE005651, 2018. (**Featured article in *JGR-planets* and article on *Universe Today***).

[**6**]: Chao He, Sarah M. Hörst, Nikole K. Lewis, **Xinting Yu**, Julianne I. Moses, Eliza M.-R. Kempton, Mark S. Marley, Patricia McGuiggan, Caroline V. Morley, Jeff A. Valenti, and Véronique Vuitton, "Photochemical Haze Formation in the Atmospheres of Super-Earths and Mini-Neptunes", *The Astronomical Journal*, **156**, 1, https://doi.org/10.3847/1538-3881/aac883, 2018.

[**5**]: Chao He, Sarah M. Hörst, Nikole K. Lewis, **Xinting Yu**, Julianne I. Moses, Eliza M.-R. Kempton, Patricia McGuiggan, Caroline V. Morley, Jeff A. Valenti, and Véronique Vuitton, "Laboratory Simulations on Haze Formation in Cool Exoplanet Atmospheres: Particle Color and Size Distribution", *Astrophysical Journal Letters*, **865**(1), L3, https://doi.org/10.3847/2041-8213/aab42b, 2018.

[**4**]: **Xinting Yu**, Sarah M. Hörst, Chao He, Patricia McGuiggan, and Nathan T. Bridges, "Direct Measurement of Interparticle Forces of Titan Aerosol Analogs ("Tholin") Using Atomic Force Microscopy", *Journal of Geophysical Research - Planets*, **122**(12), 2610, doi:10.1002/2017JE005437, 2017.

[**3**]: **Xinting Yu**, Sarah M. Hörst, Chao He, Nathan T. Bridges, Devon M. Burr, Joshua A. Sebree, and James K. Smith, "The Effect of Adsorbed Liquid and Material Density on Saltation Threshold: Insight from Laboratory and Wind Tunnel Experiments", *Icarus*, **297**, 97, doi:10.1016/j.icarus.2017.06.034, 2017.

[**2**]: **Xin-Ting Yu**, Jun Zhang, Ting Li, and Shu-Hong Yang, "Case Studies of EUV Cyclones and Their Associated Magnetic Fields", *Res. Astron. and Astrophys.*, **15**, 1525, doi.org/10.1088/1674-

4527/15/9/009, 2015.

[**1**]: **Xinting Yu**, Jun Zhang, Ting Li, Yuzong Zhang, and Shuhong Yang, "Homologous Cyclones in the Quiet Sun", *Astrophysical Journal Letters*, **782**(2), L15, doi.org/10.1088/2041-8205/782/2/L15, 2014.

Selected Conference Proceedings

*Mentored Undergraduate Student

[**29**]: **Yu X.**, *Yu Y., *Garver, J., and Zhang X., Cloud-Haze and Cloud-Lake Interactions on Titan, *LPSC*, 2021.

[**33**]: *Dymont A., **Yu X.**, and Zhang X., Cleaning Our Hazy and Cloudy Lens on sub-Neptune Exoplanets, *237th AAS meeting*, 2021.

[**32**]: *Garver, J., *Yu Y., **Yu X.**, and Zhang X., Cloud formation on Titan, *237th AAS meeting*, 2021.

[**31**]: **Yu X.**, J. Moses, J. Fortney, and Zhang X., Atmospheric Trace Species Abundances as Proxies for Identifying Exoplanet Surfaces, *237th AAS meeting*, 2021.

[**30**]: *Dymont A., **Yu X.**, and Zhang X., Cleaning Our Hazy and Cloudy Lens on sub-Neptune Exoplanets, *AGU Falling Meeting*, 2020.

[**29**]: *Yu Y., *Garver, J., **Yu X.**, and Zhang X., Aerosol-Organic Condensates-Lake Interactions on Titan, *AGU Falling Meeting*, 2020.

[**28**]: *Duncan T., **Yu X.**, Thompson M., and Kim K., Outgassing experiments on carbonaceous chondrites to understand the formation of Titan's atmosphere, *AGU Falling Meeting*, 2020.

[**27**]: *Li J., **Yu X.**, Sciamma-O'Brien E., He C., Sebree J.A., Salama F., Hörst S.M., & Zhang X., Measurement and Implications of Surface Energies of Titan's Haze Analogs "Tholins", *AGU Falling Meeting*, 2020.

[**26**]: **Yu X.**, Zhang X., Hörst S.M., He C., and McGuiggan P., The surface energies and lifetimes of cool exoplanet haze analogs: insight from laboratory experiments, *AGU Falling Meeting*, 2020.

[**25**]: *Garver, J., *Yu Y., **Yu X.**, and Zhang X., Cloud formation on Titan, *DPS*, 411.01, 2020.

[**24**]: **Yu X.**, Hörst S.M., He C., McGuiggan P., Zhang X., Surface energy of the Titan aerosol analog 'tholin': implications on cloud formation and aerosol-lake interactions, *DPS*, 411.05, 2020.

[**23**]: *Yu Y., *Garver, J., **Yu X.**, and Zhang X., Aerosol-Organic Condensates-Lake Interactions on Titan, *Bay Area Planetary Science Meeting*, 2020.

[**22**]: *Li J., **Yu X.**, Zhang X., Hörst S.M., He C., Sciamma-O'Brien E., Sebree J.A., Measurement and Implications of Surface Energies of Titan's Haze Analogs "Tholins", *Bay Area Planetary Science Meeting*, 2020.

[**21**]: **Yu X.**, Zhang X., Hörst S.M., He C., McGuiggan P., The surface energy and life cycle of cool exoplanet haze analogs, *Exoplanet III*, 2020.

[**20**]: **Yu X.**, Hörst S.M., He C., McGuiggan P., and Zhang X., Material Properties of Tholin: Implications for Aeolian Processes on Titan, *6th International Dune Workshop*, 3016, 2020.

[**19**]: **Yu X.**, Hörst S.M., He C., McGuiggan P., and Zhang X., Integrating Materials Science Techniques into the Study of Planetary Hazes, *AGU Falling Meeting*, 2019, ***Invited***.

[18]: **Yu X.**, Hörst S.M., He C., McGuiggan P., and Zhang X., The Surface Energy of "Tholin" and its Implication on Haze-Liquids Interactions on Titan, *AGU Falling Meeting*, 2019.

[17]: **Yu X.**, Hörst S.M., He C., McGuiggan P., and Zhang X., Characterization of Cloud-Haze Interactions in Cool Exoplanets Atmospheres, *Bay Area Exoplanet Meeting*, 2019.

[16]: **Yu X.**, Hörst S.M., He C., McGuiggan P., and Zhang X., Integrating Materials Science Techniques into the Study of Planetary Hazes, *Bay Area Planetary Science Meeting*, 2019.

[15]: **Yu X.**, Hörst S.M., He C., McGuiggan P., and Zhang X., Material properties of Titan Aerosol Analogs "Tholin", *EPSC-DPS*, 398-2, 2019.

[14]: **Yu X.**, Hörst S.M., He C., McGuiggan P., and Zhang X., Characterization of Cloud-Haze Interactions in Cool Exoplanets Atmospheres, *EPSC-DPS*, 775-1, 2019.

[13]: **Yu X.**, Hörst S.M., He C., and McGuiggan P., Direct Measurement of Single Particle Electrostatic Forces Between Titan Sand Analogs Using Atomic Force Microscopy, *LPSC*, 2042, 2019.

[12]: **Yu X.**, Hörst S.M., He C., McGuiggan P., and Crawford B., Interpreting Sand Formation on Titan: Insight from Interparticle Forces and Mechanical Properties of Titan Organic Analogs, *DPS*, 203.07D, 2018.

[11]: **Yu X.**, Hörst S.M., He C., McGuiggan P., and Crawford B., Where Does Titan Sand Come From: Insight from Interparticle Forces and Mechanical Properties of Titan Organic Analogs, *Titan Surface Meeting*, 2018.

[10]: **Yu X.**, Hörst S.M., He C., Crawford B., and McGuiggan P., Where Does Titan Sand Come From: Insight from Mechanical Properties of Titan Organic Analogs, *LPSC*, 1786, 2018, **Stephen E. Dwornik Award–Best Graduate Oral Presentation.**

[9]: Radebaugh, J., Barnes, J. W., Mackenzie S., Hörst S. M., **Yu X.**, Lorenz, R. D., ... Bishop, B., The importance of Sand for Understanding Dune Processes and Surface Conditions of Titan, *LPSC*, 2083, 2018.

[8]: **Yu X.**, Hörst S.M., He C., McGuiggan P., and Bridges N.T., Direct Measurements of Surface Energy, Elastic Modulus and Interparticle Forces of Titan Aerosol Analog ("Tholin") Using Atomic Force Microscopy, *AGU fall meeting*, 221907, 2017.

[7]: He C., Hörst S.M., Lewis, N., **Yu X.**, McGuiggan P., and Moses J.I., Laboratory Simulations on Haze Formation in Cool Exoplanet Atmospheres, *DPS*, 300.01, 2017.

[6]: **Yu X.**, Hörst S.M., He C., McGuiggan P., and Bridges N.T., Direct Measurement of Interparticle Adhesion of Titan Aerosol Analogs ("Tholin") Using Atomic Force Microscopy, *5th International Dune Workshop*, 3048, 2017.

[5]: Stephen L.F. Sutton, Devon M. Burr, Nathan T. Bridges, James K. Smith, Sarah M. Hörst, **Xinting Yu**, Jasper F. Kok, Francis A. Turney, J.R. Marshall, and D.A. Williams, The Titan Wind Tunnel in the NASA Planetary Aeolian Laboratory: Facility Improvements, *LPSC*, 1964, 2017.

[4]: **Xinting Yu**, Sarah M. Hörst, Chao He, Nathan T. Bridges, Devon M. Burr, and Joshua A. Sebree, Quantifying Water Content and Equilibration Properties of Wind Tunnel Materials, *DPS-EPSC*, 425.03, 2016.

[3]: Devon M. Burr, Emily Nield, Joshua Emery, Nathan T. Bridges, James K. Smith, John Marshall, Jasper Kok, **Xinting Yu**, and Sarah M. Hörst, Experimental (wind tunnel) investigations into aeolian entrainment: application to extraterrestrial environments, *32nd IAS International Meeting*

of Sedimentology, 2016.

[**2**]: **Xinting Yu**, Sarah M. Hörst, Chao He, Nathan T. Bridges, and Devon M. Burr, Quantifying Density, Water Adsorption and Equilibration Timescale of Wind Tunnel Materials, *LPSC*, 2683, 2016.

[**1**]: NT Bridges, DM Burr, J Marshall, JK Smith, SM Hörst, E Nield, and **X Yu**, New Titan Saltation Threshold Experiments: Investigating Current and Past Climates, *AGU*, P12B-05, 2015.

Skills

Language: Chinese (native), English (fluent), Japanese and Spanish (conversational)

Programming: Matlab, IDL, C++, Fortran, Python, Mathematica

Computer: Windows, Linux, Mac OS, MS Office, LaTeX

Laboratory Instruments: RGA-MS, SEM, EDS, AFM, Nanoindenter, Pycnometer, TGA/DSC

Laboratory Skills: Vacuum Techniques, Photochemistry Synthesis, Low/High Temperature and Low-Pressure Gas Reactions, Material Characterization with Environmental Control

Invited Seminars and Colloquia

- NASA Ames Research Center, Astrophysics Branch *March 2020*
- University of California Berkeley, Astronomy, CIPS seminar *Feb 2020*
- University of California Santa Cruz, Earth and Planetary Sciences, WES seminar *Feb 2020*
- University of Central Florida, Florida Space Institute *Feb 2020*
- University of California Santa Cruz, Physics, Condensed Matter seminar *Jan 2020*
- University of California Santa Cruz, Earth and Planetary Sciences, IGPP seminar *Feb 2019*

Additional Training

- EON-ELSI Winter School in Earth–Life Science *Winter 2018*
- JHU Teaching Academy–Teaching Institute Certificate Program *Summer 2016*

Outreach

- UCSC 2nd Annual Undergrad-Grad STEM Mixer *Jan 2020*
- 50th LPSC microblogger *Spring 2019*
- 49th LPSC microblogger *Spring 2018*
- 15th Annual Physics Fair organizer, Johns Hopkins University *Spring 2018*

Professional Affiliations

- Division for Planetary Sciences of the American Astronomical Society
- American Geophysical Union

Professional Activities

- Network for Ocean Worlds Steering Committee, 2020–current
- External grant review for NASA Solar System Workings program, NASA Habitable Worlds program
- Review panel member for NASA FINESST program, NSF Astronomy & Astrophysics program
- Reviewer for ApJ (1), ApJL (1), Energies (2), Minerals (1), Advances in Space Research (1), Applied Sciences (1)
- LPSC Dwornik best student presentation award judge

Other Experiences

- ACE certified personal trainer, 2019–present
- Active Animal Interpretation and Animal Handling Volunteer Volunteer in the Maryland Zoo in Baltimore, 2017–2019
- Yelp Elite Member, 2017–present
- Active Education Volunteer in the Maryland Zoo in Baltimore, 2016–2019
- Volunteer Translator (adding English subtitles and translate English to Chinese) for Educational Videos, Youzimu Subtitle Team, 2016–2017
- Completed Full Marathon in 2016 Chicago, 2015 Honolulu, 2015 Philadelphia, 2015 Marine Corps, 2014 Baltimore, 2014 Honolulu, 2013 Beijing, 2013 Shanghai, 2014 Xiamen
- Women's 3rd place, IFC Anhui Stair Climb Competition, 2014 Hefei
- Completing Half Marathon in 2012 Beijing, 2012 Yangzhou, 2013 Yangzhou, 2014 Kangbao, 2015 Xiamen