

Lu Chou, Ph.D.

Research Physical Scientist

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Research Interest

Instrument development (chromatography and mass spectrometry), organic biosignatures detection and characterization, astrobiology of Mars and icy/ocean worlds, mission design, data science, and project management.

Education

- 2019 | **PhD in Earth and Environmental Sciences**
University of Illinois at Chicago, IL, USA
Dissertation: "The Organic Matter of Lake Vida, Antarctica: Biogeochemistry of an Icy Planetary World Analog" Advisor: Dr. Fabien Kenig
- 2013 | **BS in Microbiology**. Minor in Astronomy
University of Maryland, College Park, MD, USA

Research Experience

- Research Physical Scientist** 2023 - present
NASA Goddard Space Flight Center, Greenbelt, MD
- NASA Postdoctoral Program Fellow / Postdoctoral Research Associate** 2019-2023
NASA Goddard, Georgetown University, CRESST II & University of Maryland at Baltimore County
- NASA Earth and Space Science Fellow / Graduate Researcher** 2013-2019
University of Illinois at Chicago, Chicago, IL
- Undergraduate Research Intern.** 2011-2013
U.S. Food and Drug Administration

Professional Activities

1. **NASA Planetary Science Director's Council Member** 2023 - present
2. **NASA Review Panel, Group Chief, Panelist, External Panelist, and Executive Secretary** 2014 - 2023
 - Served on review panels for NASA Programs such as Exobiology, PICASSO, MATISSE, DALI, Habitable Worlds, FINESST, Small Business Innovative Research (SBIR) Program, and a Flagship-mission instrument panel
3. **NASA MSL Mission, Science Team Member** June 2021 - present
 - Lead Documentarian for MSL Science Discussion within in the SAM Team
4. **NASA GSFC Planetary Science Winter School, Participant** Nov 2020 - Feb 2021
 - Instrument design exercise for planetary missions in the Solar System Exploration Division (focused on lasers for LiDAR instruments)
5. **NASA Dragonfly Meeting Observer Program, Participant** 2020
6. **Network for Life Detection (Nfold) Early Career Council, Lead Team Member** Feb 2020 - present
7. **Santa Fe Institute, Visiting Scientist** Nov 2019, Dec 2021
8. **NASA JPL Planetary Science Summer Seminar (11 weeks), Project Manager** Aug 2017
 - Lead a team of 18 scientists and engineers for a mission design exercise for a Centaur Reconnaissance Mission

9. The History and Philosophy of Astrobiology Summer School (1 week) , <i>Attendee</i>	Jul 2015
10. Josep Comas i Solà International Summer School in Astrobiology (1 week) , <i>Attendee</i>	Jun 2014
11. Smithsonian Institution (12 weeks) , <i>Intern</i>	Jun-Aug 2010

Awards & Fellowships

NASA GSFC Science and Solar System Directorate Excellence in DEIA Award	Aug 2023
NASA GSFC Solar System Exploration Division Peer Award	Aug 2023
NASA GSFC Solar System Exploration Division Special Thanks And Recognition (STAR) award	Aug 2023
American Chemical Society CAS Future Leaders Top 100	March 2023
NASA Goddard Solar System Exploration Division - Diversity, Equity, & Inclusion - Group Award (x2)	2021
NASA Postdoctoral Program Fellowship. USRA/ORAU.	Mar 2020 - present
NASA Early Career Collaboration Award. *declined	Fall 2018
NASA Earth and Space Science Fellowship (NESSF). \$116,114.	Fall 2016 - Spring 2019
Chancellor's Graduate Research Fellowship. University of IL at Chicago. \$8,000.	Summer 2015-16
On To the Future Travel Award. Geological Society of America. \$500.	Fall 2015
LAS PhD Travel Award. University of Illinois at Chicago. \$250.	Fall 2015
Bodmer Science International Travel Award. University of Illinois at Chicago. \$750.	Summer 2015
Outstanding Teaching Assistant Award. National Association of Geoscience Teachers.	Spring 2015
Graduate Research Fellowship. Illinois Space Grant Consortium (ISGC). \$10,000.	Fall 2014
College of Computer, Mathematical, and Natural Sciences Scholarship. U of MD. \$2,000.	Spring 2012

Publications

*co-lead authors

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| 2024 | <ol style="list-style-type: none"> 1. Chou, L., *Grefenstette, N., Borges, S., Caro, T., Catalano, E., Harman, C., McKaig, J., Raj, C., Trubl, G. & Young, A. Searching for Life Beyond Earth. <i>Astrobiology, special issue in the Astrobiology Primer 3.0 24</i>, S-164–S-185 (2024). 2. Chou, L., *Grefenstette, N., Colón-Santos, S., Fischer, T., Mierzejewski, V., Nural, C., Sinhadc, P., Vidaurri, M., Vincent, L. & Weng, M. Life As We Don't Know It. <i>Astrobiology, special issue in the Astrobiology Primer 3.0 24</i>, S-186–S-201 (2024). 3. Da Poian, V., Lyness, E., Qi, J., Shah, I., Lipstein, G., Archer, P., Chou, L., Freissinet, C., Malespin, C., McAdam, A., <i>et al.</i> Leveraging open science machine learning challenges for data constrained planetary mission instruments. <i>RAS Techniques and Instruments</i> (2024). 4. Schaible, M. J., Szeinbaum, N., Bozdog, G. O., Chou, L., Grefenstette, N., Colón-Santos, S., Rodriguez, L. E., Styczinski, M., Thweatt, J. L., Todd, Z. R., <i>et al.</i> Chapter 1: The Astrobiology Primer 3.0. <i>Astrobiology 24</i>, S-4 (2024). |
| 2023 | <ol style="list-style-type: none"> 5. Ni, Z., Arevalo, R., Bardyn, A., Willhite, L., Ray, S., Southard, A., Danell, R., Graham, J., Li, X., Chou, L., Briois, C., Thirkell, L., Markarov, A., Brinckerhoff, W., Eigenbrode, J., Nunn, B. & Junge, K. Detection of Short Peptide Biosignatures of Psychrophiles via Laser Desorption Mass Spectrometry. <i>Astrobiology 23</i>, 6 (2023). |
| 2022 | <ol style="list-style-type: none"> 6. Theiling, B., Chou, L., Da Poian, V., Battler, M., Raimalwala, K., Arevalo, R., Neveu, M., Ni, Z., Graham, H., Elsila, J. & Thompson, B. Science Autonomy for Ocean Worlds Astrobiology: A Perspective. <i>Astrobiology 22</i>, 8 (2022). |

- 2021 | 7. **Chou, L.**, Mahaffy, P., Trainer, M., Eigenbrode, J., Arevalo, R., Brinckerhoff, W., Getty, S., Grefenstette, N., Da Poian, V., Fricke, G. M., Kempes, C. P., Marlow, J., Sherwood Lollar, B., Graham, H. & Johnson, S. S. Planetary Mass Spectrometry for Agnostic Life Detection in the Solar System. *Frontiers in Astronomy and Space Sciences* **8**, 173 (2021).
8. **Chou, L.**, Murray, A. E. & Kenig, F. Organic sulfones in the brine of Lake Vida, East Antarctica. *Geochimica et Cosmochimica Acta* **292**, 409–426 (2021).
9. Smith, H. H., Hyde, A. S., Simkus, D. N., Libby, E., Maurer, S. E., Graham, H. V., Kempes, C. P., Sherwood Lollar, B., **Chou, L.**, Ellington, A. D., Fricke, G. M., Girguis, P. R., Grefenstette, N. M., Pozarycki, C. I., House, C. H. & Johnson, S. S. The Grayness of the Origin of Life. *Life* **11** (2021).
- 2020 | 10. Carrier, B., Beaty, D., Meyer, M., Blank, J., **Chou, L.**, DasSarma, S., Des Marais, D., Eigenbrode, J., Grefenstette, N., Lanza, N., Schuerger, A., Schwendner, P., Smith, H., Stoker, C., Tarnas, J., Webster, K., Bakermans, C., Baxter, B., Bell, M., Benner, S., Bolivar Torres, H., Boston, P., Bruner, R., Clark, B., DasSarma, P., Engelhart, A., Gallegos, Z., Garvin, Z., Gasda, P., Green, J., Harris, R., Hoffman, M., Kieft, T., Koepfel, A., Lee, P., Li, X., Lynch, K., Mackelprang, R., Mahaffy, P., Matthies, L., Nellessen, M., Newsom, H., Northup, D., O'Connor, B., Perl, S., Quinn, R., Rowe, L., Sauterey, B., Schneegurt, M., Schulze-Makuch, D., Scuderi, L., Spilde, M., Stamenković, V., Torres Celis, J., Viola, D., Wade, B., Walker, C., Wiens, R., Williams, A., Williams, J. & Xu, J. Mars Extant Life: What's Next? Conference Report. *Astrobiology* **20**, 785–814 (2020).
- 2019 | 11. Kenig, F., **Chou, L.** & Wardrop, D. J. Comment on Evaluation of the Tenax Trap in the Sample Analysis at Mars Instrument Suite on the Curiosity Rover as a Potential Hydrocarbon Source for Chlorinated Organics Detected in Gale Crater by Miller et al. (2015). *Journal of Geophysical Research: Planets* **124**, 644–647 (2019).
- 2018 | 12. **Chou, L.**, Kenig, F., Murray, A. E., Fritsen, C. H. & Doran, P. T. Effects of legacy metabolites from previous ecosystems on the environmental metabolomics of the brine of Lake Vida, East Antarctica. *Organic Geochemistry* (2018).
13. Howell, S. M., **Chou, L.**, Thompson, M., Bouchard, M. C., Cusson, S., Marcus, M. L., Smith, H. B., Bhattaru, S., Blalock, J. J., Brueshaber, S., Eggl, S., Jawin, E. R., Miller, K., Rizzo, M., Steakley, K., Thomas, N. H., Trent, K., Ugelow, M., Budney, C. J., Mitchell, K. L. & Lowes, L. Camilla: A centaur reconnaissance and impact mission concept. *Planetary and Space Science*, 1–10 (2018).
14. Stelmach, K. B., Neveu, M., Vick-Majors, T. J., Mickol, R. L., **Chou, L.**, Webster, K. D., Tilley, M., Zacchei, F., Escudero, C., Flores Martinez, C. L., Labrado, A. & Fernández, E. J. Secondary Electrons as an Energy Source for Life. *Astrobiology* **18**, 73–85 (2018).
- 2016 | 15. Kenig, F., **Chou, L.**, McKay, C. P., Jackson, W. A., Doran, P. T., Murray, A. E. & Fritsen, C. H. Perchlorate and volatiles of the brine of Lake Vida (Antarctica): Implication for the in situ analysis of Mars sediments. *Journal of Geophysical Research-Planets* **121**, 1190–1203 (2016).
- 2015 | 16. Burall, L. S., Simpson, A. C., **Chou, L.**, Laksanalamai, P. & Datta, A. R. A novel gene, *lstC*, of *Listeria monocytogenes* is implicated in high salt tolerance. *Food Microbiology* **48**, 72–82 (2015).

Non-refereed Publications

17. ***Chou, L.**, *Grefenstette, N., Johnson, S. S., Graham, H., Mahaffy, P., Kempes, C., Elsila, J. E., Libby, E., Ellington, A., Anslyn, E., Hoehler, T., Girguis, P., Cronin, L., Brinkerhoff, W. & Lollar, B. S. Towards a more universal life detection strategy. *Bulletin of the AAS* **53** (1000).
18. Graham, H., Freeman, K. H., **Chou, L.** & Pasterski, M. J. Appeal for Improved Sample Selection, Preparation and Interpretation Standards for Organic Biosignature Experiments Performed by Flight Instruments. *Planetary Science and Astrobiology Decadal Survey 2023-2032 white paper e-id.* 520, 520 (1000).
19. Stoker, C., Blank, J. G., Boston, P., **Chou, L.**, DasSarma, S., Eigenbrode, J., Grefenstette, N., Northup, D., Schuerger, A., Schulze-Makuch, D., Stamenković, V. & Tarnas, J. We Should Search for Extant Life on Mars in this Decade. *Bulletin of the AAS* **53** (1000).
20. Theiling, B., Brinckerhoff, W., Castillo-Rogez, J., **Chou, L.**, Poian, V. D., Graham, H., Hosseini, S. S., Lyness, E., MacKinnon, J., Neveu, M., Raimalwala, K. & Thompson, B. Non-Robotic Science Autonomy Development. *Bulletin of the AAS* **53** (1000).

Conferences Organization

Astrobiology Graduate Conference 2022. (canceled)

- *Core Organizing Committee.* Coordinate, organize, plan, and co-chair the early-career focused conference in Astrobiology. Develop the scientific program, coordinate the logistics, and work to secure funding for 100+ attendees including domestic and international participants.

Astrobiology Science conference 2022

- *Session Organizer and Session Chair.* "General Principles of Life: Towards understanding universal biology"

American Geophysical Union 2020

- *Session Organizer and Session Chair.* "Detecting life through space and time: from geochemistry to biology"

Conferences & Abstracts

**oral presentation

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| 2024 | ** Chou, L. , S. Teinturier, J. Eigenbrode, A. Williams, A. McAdam, M. Millan, P. D. Archer, Jr., J. Lewis, C. Freissinet, C. Szopa, A. Buch, D. Boulesteix, B. Prats, M. Johnson, H. Rider, A. Siguelnitzky, W. Brinckerhoff, D. P. Glavin, S. S. Johnson, P. Mahaffy, C. Malespin, (2024) Preparing for the Final Thermochemolysis Experiment on the Mars Science Laboratory Mission Using the Sample Analysis at Mars Testbed. <u>55th Lunar and Planetary Science Conference 2020</u> . The Woodlands, Texas. <u>LPI Contribution No. 2245</u> . |
| 2023 | ** Chou, L. , Malespin, C., McAdam, A., Glavin, D., Millan, M., Freissinet, C., Szopa, C., Williams, A.J., Lewis, J., Eigenbrode, J., Teinturier, S., Bonnet, J.Y., Prats, B., Brinckerhoff, W., Johnson, S.S., and Mahaffy, P. (2023) Investigating organic molecules in MSL's SAM Wet Chemistry experiments using de novo mass spectrometry interpretation. <u>54th Lunar and Planetary Science Conference 2023</u> . The Woodlands, TX. <u>LPI Contrib. No. 2806</u> |
| 2022 | ** Chou, L. , Grefenstette, N., Da Poian, V., Graham, H., Li, X., Kempes, C., Wimp, G., Mahaffy, P., Johnson, S.S., Brinckerhoff, W. (2022) Leveraging Planetary Mass Spectrometry for Agnostic Life Detection. <u>Astrobiology Science Conference 2022</u> . Atlanta, GA. |

- 2020 ****Chou, L.**, Da Poian, V., Grefenstette, N., Graham, H., Kempes, C., Johnson, S.S., Mahaffy, P., Fricke, G.M., (2020) Agnostic Polymer Detection in Astrobiological Samples Using Mass Spectrometry and Data-driven Analysis. Goldschmidt 2020. (Virtual)
- Da Poian, V., **Chou, L.**, Grefenstette, N.M., Graham, H., Kempes, C., Mahaffy, P., Johnson, S.S. (2020) Agnostic Polymer Detection Using Mass Spectrometry for Astrobiological Samples. American Society for Mass Spectrometry Conference Reboot 2020. (Virtual)
- Chou, L.**, Grefenstette, N.M., Da Poian, V., Kempes, C., Graham, H., Roussel, A., Mahaffy, P., Johnson, S.S., (2020) Agnostic Polymer Detection Using Mass Spectrometry for Astrobiological Samples. 51th Lunar and Planetary Science Conference 2020. The Woodlands, Texas. LPI Contribution No. 2706.
- 2019 Johnson, S.S., Graham, H., Anslyn, E., Conrad P., Cronin L., Ellington, A., Elsilá J., Girguis, P., House, C., Libby, E., Mahaffy, P., Sherwood Lollar, B., Steele, A., **Chou, L.**, Grefenstette N., Da Poian, V., (2019) Agnostic Approaches to Extant Life Detection. Mars Extant Life: What's Next?. Carlsbad, NM. LPI Contr. No. 2108.
- **Chou, L.**, A. E. Murray, F. Kenig (2019). The nature of legacy biosignatures in cold-limited, slow-growing ecosystems. Astrobiology Science Conference 2019. Bellevue, WA. Paper 411-8.
- 2018 A. E. Murray, **Chou, L.**, F. Kenig, C. H. Fritsen, P. T. Doran. (2018). Forecasting Habitability Through the Ice-Sealed Lens of Antarctica's Lake Vida. American Geophysical Union 2018, Washington, D. C.
- Chou, L.** and F. Kenig (2018). Legacy metabolites and organic matter preservation in an Antarctic cryoencapsulated hypersaline brine. Astrobiology Graduate Conference 2018, Atlanta, GA.
- M.C. Bouchard, S.M. Howell, **Chou, L.**, et al. (2018). Flyby and Impact of Chariklo: A New Frontiers Class Centaur Reconnaissance Mission Concept from the 2017 NASA-JPL Planetary Science Summer Seminar. 49th Lunar and Planetary Science Conference 2018. The Woodlands, Texas. LPI Contribution No. 2083, id.2087.
- 2017 ****Chou, L.**, F. Kenig, W. A. Jackson (2017). Strategies for facilitating organic matter detection in subsurface perchlorate-rich brines of Earth and Mars. American Geophysical Union 2017, New Orleans, LA.
- Chou, L.**, Howell S., et al. (2017) Centaur Reconnaissance Mission: a NASA JPL Planetary Science Summer Seminar mission design experience. American Geophysical Union 2017, New Orleans, LA.
- **Chou, L.**, F. Kenig, W. A. Jackson (2017). Perchlorate Removal From the Brine of Lake Vida for Volatile Organic Matter Analysis in a Mars Analog. Astrobiology Science Conference 2017. Mesa, AZ.
- 2016 ****Chou, L.**, F. Kenig, A. E. Murray, C. H. Fritsen, P.T. Doran (2016). GC × GC-TOF MS of metabolites of Lake Vida brine (Antarctica). American Geophysical Union 2016. San Francisco, CA.
- 2015 ****Chou, L.**, The 2015 International Geobiology Course, et al. (2015). Coupled Stratigraphy, Petrography, and $\Delta 47$ of Ancient Walker Lake, Nevada Reveals Unique Analog for Studying Proterozoic Stromatolite Formation and Climatic Forcings. Geological Society of America 2015. Baltimore, MD.
- L. A. Zinke, J. Buongiorno, **Chou, L.**, L. M. van Maldegem, et al. (2015). Couple geochemical and microbiological characterization of non-carbonate firmgrounds from a modern soda lake, Walker Lake, Nevada. Geological Society of America 2015. Baltimore, MD.
- Chou, L.**, F. Kenig, A. E. Murray, P.T. Doran, C. H. Fritsen (2015). The Metabolomics of the Brine of Lake Vida (McMurdo Dry Valleys, Antarctica). American Geophysical Union 2015. San Francisco, CA.
- Chou, L.**, F. Kenig, A. E. Murray, P.T. Doran, C. H. Fritsen (2015). The Lipidomics of the Brine of Lake Vida (McMurdo Dry Valleys, Antarctica). Astrobiology Science Conference 2015. Chicago, IL.

Technical Skills

Organic Chemistry / Flight Instrumentation

Organic matter extraction, Mass Spectrometry (Q, ToF, IT), Laser Desorption Ionization (LDI)-MS, Gas chromatography (GC), pyrolysis-GC, Multidimensional GC×GC-ToF-MS, Solid-phase microextraction (SPME), Ion exchange chromatography (IX), GC-Flame Ionization Detector (GC-FID)

Molecular Biology

Growth Cultures Assays, CFU Study, DNA Extraction, PCR, Spectrophotometry, DNA cloning, Bacterial transformation

Programming & Other Software

Python, R, open-source mass spectrometry software, open-source bioinformatics software, ChemStation, ChromaTOF, XCalibur, Adobe (Illustrator, InDesign, Photoshop), Geographic Information System (ArcGIS)

Invited Lectures

- “Rock n’ Rover: Exploring Mars and Death Valley with Curiosity”** February 2024
Invited keynote lecture. Death Valley National Park.
- “Roving the Red Planet in Search for Life”** November 2023
Invited public lecture. William Miller Sperry Observatory.
- “Searching for life-as-we-don’t-know-it using Planetary Mass Spectrometry”** May 2023
Invited public lecture. Greenbelt Astronomy Association.
- “Searching for life-as-we-don’t-know-it using Planetary Mass Spectrometry”** April 2023
Earth Talks Seminar Series. Pennsylvania State University
- “Leveraging Planetary Mass Spectrometry for Agnostic Life Detection”** May 2022
Astrobiology Science Conference 2022. Invited talk for Session: Detecting Life-as-we-don’t-know-it
- “Signatures of Life in Cold, Subsurface Brines: An Astrobiology Analog for Icy Planetary Worlds”** Feb 2022
Georgia Institute of Technology, Astrobiology & Planetary Science Seminar
- “Signatures of Life in Cold, Subsurface Brines: An Astrobiology Analog for Icy Planetary Worlds”** May 2021
Woods Hole Oceanographic Institution, Department of Marine Chemistry & Geochemistry Seminar
- “Biosignatures of Life-as-we-don’t-know-it”** April 2021
University of Florida, Department of Geological Sciences, Astrobiology Course Seminar
- “Agnostic Biosignatures Detection using Mass Spectrometry”** March 2021
University of Maryland, College Park. Department of Geology Departmental Seminar
- “Universal Life Detection Strategies and applicability to Mars missions”** November 2020
NASEM Planetary Science & Astrobiology Decadal Survey Panel on Mars
- “Biosignatures, familiar and unfamiliar”** October 2020
Williams College, Geosciences Department, Astrobiology Course Seminar
- “Agnostic Biosignatures Detection using Mass Spectrometry”** July 2020
NASA Goddard Space Flight Center. Solar System Exploration Division Science Seminar for the Director
- “Environmental Geochemistry: Introduction to Organic Geochemistry.”** February 2017
University of Illinois at Chicago. Department of Earth and Environmental Sciences
- “Astrobiology: in search of who’s out there by looking at who we are.”** February 2016
University of Illinois at Chicago. Biology Colloquium

Teaching Experience

Fall 2013 - Spring 2016	Teaching Assistant. <i>University of Illinois at Chicago</i> <ul style="list-style-type: none">• Global Environmental Change• Earth, Energy, and Environment• Statistical Methods in Earth and Environmental Science
Summer 2013	Teaching Assistant. <i>Princeton University (John Hopkins Center for Talented Youth)</i> <ul style="list-style-type: none">• Epidemiology
Fall 2012, Spring 2013	Teaching Assistant. <i>University of Maryland, College Park</i> <ul style="list-style-type: none">• Principles of Microbiology (Post-baccalaureate degree-granting program)

Field Experience

Summer 2016	Biosignatures and the Search for Life on Mars Summer School. <i>2 weeks</i> <i>Nordic Network for Astrobiology</i> <ul style="list-style-type: none">• Studied several Mars analog sites in Iceland (Sample collection, analysis, geochemical characterization, ATP assay for biosignature detection)
Summer 2015	The International Geobiology Course. <i>5 weeks</i> <i>University of Southern California, Caltech, Agouron Institute</i> <ul style="list-style-type: none">• California, Nevada, and Catalina Island (Sample preparation and field collection. Geochemical, petrographic, clumped isotope, and microbiological analyses, and paleoenvironmental reconstruction of Walker Lake, NV)

Outreach Activities

Earth at the Crossroads II. *Georgetown University and SETI* April 2024
Served as a panelist on the "Habitability on Different Earths Through Space" panel to discuss Mars and ocean worlds habitability and the prospect of life in changing habitable conditions as it relates to (human) life on Earth.

Death Valley Dark Sky Festival. 2023-2024
– **2024:** Presented as the inaugural Death Valley Dark Sky Festival keynote virtual speaker on "Rock n' Rover: Exploring Mars and Death Valley with Curiosity" using the Distant Learning studio platform. The presentation provided an overview of the analog comparisons between locations in Death Valley and those visited by Curiosity in Gale Crater on Mars. [Link to presentation](#)
– **2023:** Served as a subject matter expert on the Sample Analysis at Mars (SAM) team, sharing NASA science with the public by helping run a middle school field trip, staffing the SAM Expo booth, and contributing to a weekend of various outreach activities in collaboration with NASA and NPS.

NASA Goddard Engage Session. *Mars Science Laboratory 10th Landing Anniversary* August 2022
Served as a panelist to discuss the Sample Analysis at Mars instrument suite and its scientific and technical achievements in studying Mars in the past decade. <https://video.ibm.com/recorded/131991189>

Interview with students from the Netherlands. November 2021
Interview to help students with research papers on Mars exploration, the ethics of space colonization, and astrobiology.

NASA Goddard CRESST II Undergraduate Interaction Day. October 2021
Gave an lecture to a number of undergraduate students on NASA research as part of the CRESST Internship program.

- NASA GSFC Early Career Scientist Spotlight.** May 2021
<https://science.gsfc.nasa.gov/600/ECSS/Luoth-Chou.html>
- Astrobiology Lecture at the Stone Ridge School of the Sacred Heart.** Bethesda, MD April 2021
 Gave an interactive lecture on bioorganic chemistry and how to search for life on Mars
- Interview with NASA Goddard SSED Science Exhibit Team.** NASA GSFC October, 2020
 Subject matter expert for content development for the new planetary exhibit at the Goddard Visitor Center
- Visits to Chicago Montessori School.** Chicago, IL April 2016, 2017, 2019
 Co-create lesson plans and in-class demonstrations of geology, and planetary science.
- Visit to Brentano Math and Science Academy** Chicago, IL Dec 2018
- SAGANet.org. Monthly newsletter organizer and Astrobiology “expert”** 2018 - 2019
- AbGradCon Outreach Event.** “An Evening of Wonder – Life and Art on Earth and Beyond”. GA Tech June 2018
 Volunteered as an astrobiologist to speak with the general public at
- Social Media Organizer and Science Marshal.** Chicago, IL February to April, 2017
 Part of the organizing group for the March for Science at Chicago event. On April 22nd, 2017, approximately 60,000+ people attended the march.
- UIC Today** April 2017
 “Marching for Science” Interview for article on The March for Science. <https://today.uic.edu/marching-for-science>
- Interview on The Show About Science.** April 2017
 A children’s podcast hosted by 6-years-old Nate Butkus. Episode title: Marching for Science and Extraterrestrials.
- (Honest) Conversations With (Real) Scientists.** June 2017
 Invited to speak on panel about life in the universe and astrobiology. Cafe Mustache, Chicago. Hosted by Jimmy Dagger and Joey Pasterski.

Services

Diversity, Equity, & Inclusion

1. **NASA Goddard Association of Postdoctoral Scientists (NGAPS+).** Member 2021 - present
Diversity, Equity, and Inclusion Subcommittee
2. **NASA Goddard SSED Diversity and Inclusion Working Group** Member 2021 - present
 Activities resulted in concrete action plans to address workplace disparities, reports that audit inequitable policies and climate culture, and ongoing surveys and deliverables that aim to enhance the diversity and equity of NASA
3. **NASA Mission Equity Request for Information** 2021
4. **Bystandard Awareness Training Workshop** 2021
5. **Unlearning Racism in Geosciences (URGE).** Member 2021
 - NASA Goddard Solar System Exploration Division
 - Georgetown University

Peer Reviewer. *Astrobiology, Icarus, Frontiers in Microbiology, Journal of Geophysical Research, Science Advances, ACS Chemistry*

Students Mentored

- Anjali Britto (Aug 2021 - May 2022). *Georgetown University.*
- Ulysse Prieto (Feb 2020 - Aug 2021). *NASA Goddard Space Flight Center.*
- Ruxandra Griza (Jan 2019 - August 2019). *University of Illinois at Chicago.*
- Kevin Englebert (April 2017 - March 2019). *University of Illinois at Chicago.*