

Curriculum Vitae

Kynan H. G. Hughson [he/him]

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Education

University of California, Los Angeles (UCLA) , Los Angeles, California, USA	June 2019
<ul style="list-style-type: none">• PhD in Geophysics and Space Physics, concentrations in Planetary Science and Geophysics.• Dissertation title: <i>Mapping and Geophysical Modeling of the Cerean Surface: Insights into the Structure and Composition of the Solar System's Innermost Dwarf Planet.</i> Committee: Prof. Abby Kavner, Asst. Prof. Seulgi Moon, Prof. Gilles Peltzer, Prof. Christopher Russell (Chair)	
University of California, Los Angeles (UCLA) , Los Angeles, California, USA	June 2017
<ul style="list-style-type: none">• Master of Science in Geophysics and Space Physics, concentrations in Planetary Science and Geophysics.	
University of New Brunswick (UNB) , Fredericton, New Brunswick (NB), Canada	May 2014
<ul style="list-style-type: none">• Bachelor of Science: Honors in Geology, Major in Physics, Minor in Math.	

Research Experience

Assistant Professor	2024 – Present
<i>Department of Earth Sciences, University of New Brunswick</i>	
<ul style="list-style-type: none">• I use geophysical and structural-morphometric investigations of periglacial landforms, groundwater systems, and surface slopes to better understand their process history and response to various climate forcings• I undertake terrestrial analog research of periglacial and permafrost related landforms on Earth to better understand ice related processes in the solar system• I use geologic mapping, geomorphological, and remote sensing investigations to characterize potential ground ice related landforms on Earth and throughout the solar system• I teach geomorphology, applied remote sensing, planetary surface processes, field methods, and engineering geology for undergraduate and graduate students	
Assistant Professor	2021 – 2024
<i>Department of Geological Sciences, University of Alaska Anchorage</i>	
<ul style="list-style-type: none">• Conducted applied geomorphological research in periglacial terrain along the Arctic margin of North America to better understand rock glacier and pingo forming processes.• Performed geologic mapping, geomorphological, and remote sensing investigations to characterize potential ground ice related landforms on Earth and throughout the solar system• Taught geomorphology, applied geophysics, remote sensing, and geological data analysis for undergraduate and graduate students	
Research Scientist II	2020 – 2021
<i>School of Earth and Atmospheric Sciences, Georgia Institute of Technology</i>	
<ul style="list-style-type: none">• Conducted geologic mapping and geomorphological investigations of potential periglacial landforms in the solar system• Conducted geophysical modeling of periglacial groundwater systems and associated landforms on Earth and other planets• Conducted terrestrial analog research into periglacial and permafrost processes in the solar system using geophysical techniques in alpine and Arctic environments	

- Investigated into subsurface access and science planning for future ocean world robotic exploration missions
- Advised independent studies for graduate and undergraduate students in remote sensing.
- Assisted with, and review, grant proposals written by Georgia Tech professional scientists and graduate students

Postdoctoral Research Fellow

2019 – 2020

School of Earth and Atmospheric Sciences, Georgia Institute of Technology

- Conducted geologic mapping and geomorphological investigations of potential periglacial landforms in the solar system
- Performed geophysical modeling of periglacial groundwater systems and associated landforms on Earth and other planets
- Completed geophysical and geomechanical modeling of impact cratering and surface topography on Earth and Ceres
- Contributed to concept studies of subsurface access and science planning for future ocean world robotic exploration missions

Graduate Student Researcher

2014 – 2019

Department of Earth, Planetary, and Space Sciences, UCLA

- Designed and executed numerous numerical geophysical models attempting to understand the mechanical nature and composition of the near-surface of Ceres using Dawn spacecraft data
- Designed and executed geomorphological mapping campaigns of Ceres
- Processed and managed photometric data and designed and created Dawn based photomosaics
- Collaborated and coordinated with UCLA faculty, Dawn Science Team members, and fellow graduate students across institutions

Undergraduate Student Researcher

2013 – 2014

Department of Earth Sciences, UNB

- Designed and implemented shock recovery apparatuses to understand alumina phase transitions under hypervelocity impacting conditions
- Conducted analyses of Apollo 16 lunar regolith samples to characterize their physical properties and agglutination behavior

Field Assistant

Summer 2011

Department of Earth Sciences, UNB

- Assisted with geological field work and mapping pertaining to hydrothermal systems within the Manicouagan impact structure in central Quebec

Undergraduate Student Researcher

Summer 2010

Department of Physics, UNB

- Designed and helped implement NMR spectroscopy experiments pertaining to supersonic flow in water vapor and various fluorinated gases

Teaching and Mentoring Experience

Assistant Professor

01/2024 – Present

Department of Earth Sciences, University of New Brunswick

- Developed and implemented undergraduate/graduate level classes related to the fundamentals of remote sensing and applications in Earth, Environmental, and Planetary Science (ESCI 4421/4222)
- Re-developed and implemented undergraduate level classes related to the fundamentals of engineering geology (ESCI 2022)
- Co-developed and implemented undergraduate level classes in introductory field methods for Earth scientists and engineers (ESCI 1703)
- Principal advisor for 2 graduate students (1 MSc student at UNBF and 1 PhD student at the University of Alaska Fairbanks)

- Undergraduate program advisor for UNB's geological engineering program

Assistant Professor

08/2021 – 01/2024

Department of Geological Sciences, University of Alaska Anchorage

- Developed and implemented undergraduate/graduate level classes related to geologic data visualization, data analysis, remote sensing, planetary geology, and Geographic Information Systems (e.g. GEOL A315)
- Developed and implemented undergraduate level classes in geomorphology and Earth surfaces processes (GEOL A225)
- Instructs introductory Earth science (GEOL A111)

Assistant Instructor, Space Systems Design

08/2019 – 05/2021

School of Earth and Atmospheric Sciences, Georgia Institute of Technology

- Meet with student teams to review, discuss, and plan project specifics
- Lead students in designing and testing of thought-ice communications modules

Interim Laboratory Principal Investigator

10/2019 – 02/2020

School of Earth and Atmospheric Sciences, Georgia Institute of Technology

- Co-instructor for a space exploration systems design class (VERNE)
- Led weekly meetings for the Planetary Habitability and Technology Laboratory
- Advised independent studies for graduate and undergraduate students in remote sensing
- Assisted with and reviewed grant proposals written by graduate students

Teaching Assistant/Lecturer, Introduction to Earth Sciences

Fall 2014 and Winter 2018

Department of Earth, Planetary, and Space Sciences, UCLA

- Prepared lectures and laboratory activities related to introductory geological and geophysical topics for 90-100 freshman and sophomore level undergraduates
- Created and graded course assessments
- Contributions recognized with *Excellence in Teaching Award*, Sept. 2018

Funded Grants

University of New Brunswick

05/2024 – 07/2025

University Research Fund

- Project Title: Rock & Roll – Characterizing Rock Glacier Morphology and Structure in the Gaspé Peninsula
- Role: Principal Investigator
- Total award: \$6,500

New Brunswick Innovation Foundation

01/2024 – 12/2026

Talent Recruitment Fund

- Project Title Assistant Professor in Environmental Geoscience
- Role: Principal Investigator
- Total award: \$55,000

National Aeronautics and Space Administration

10/2023 – 09/2026

Earth Surface and Interior Program

- Project Title: Trajectories and mechanisms of surface deformation from thawing ice-rich permafrost
- Role: Co-Investigator
- Total award: \$509,000 USD

National Aeronautics and Space Administration

07/2022 – 07/2026

Discovery Data Analysis Program (DDAP)

- Project Title: Chill Hills: Exploring Ceres' Hydrology and Geology Through Pingo-like Morphologies

- Role: Principal Investigator
- Total award: \$665,000 USD

University of Alaska Anchorage

01/2022 – 12/2023

ConocoPhillips Arctic Science and Engineering Award

- Project Title: How Ground Ice Loss Affects Slope Stability and Groundwater Flow in Arctic Watersheds
- Role: Principal Investigator
- Total award: \$49,262 USD

National Aeronautics and Space Administration

Planetary Science and Technology through Analog Research (PSTAR)

07/2020 – 07/2026

- Project Title: Pingo SubTerranean Aquifer Reconnaissance and Reconstruction (Pingo STARR)
- Role: Science Principal Investigator
- Total award: \$2,100,000 USD

Natural Sciences and Engineering Research Council of Canada

Undergraduate Student Research Award

05/2013 – 08/2013

- Project Title: Numerical Modeling and Experimental Design for Hypervelocity Shock Recovery Systems
- Role: Researcher
- Total Award: \$5,600

Natural Sciences and Engineering Research Council of Canada

Undergraduate Student Research Award

05/2011 – 08/2011

- Project Title: Geological and Geochemical Sampling of the Manicouagan Impact Structure
- Role: Field Assistant
- Total Award: \$5,600

Project Experience

Exploring Arctic Rock Glaciers

2024 – Present

Co-Principal Investigator

- Exploring Arctic Rock Arctic glaciers is a remote sensing and geophysics based investigation of rock glacier features in northern Alaska sponsored by the United States Geological Survey
- The co-student led initiative use satellite-based radar observation, field geological and photogrammetric observations, and ground penetrating radar to better understand the composition and kinematics of these important landforms
- Results from this investigation are improving our understanding of Arctic warming, better constraining ice-rock flow physics, and providing insight into broader permafrost changes in the cryosphere

Follow the Water: Understanding River Discharge Dynamics in Rapidly Changing High Northern Latitudes

2024 – Present

Co-Investigator

- Follow the Water is an interdisciplinary landscape evolution and hydro-climatology research program sponsored by the National Science Foundation and led by the University of Alaska
- This program is monitoring ground and surface water discharge rates, geochemical tracers, and landscape parameters to help constrain the nature of ice sheet melt water and permafrost thaw contributions to everchanging high Arctic watershed
- This project will better inform our understanding of how climate change is affecting the polar regions and how this changes will impact the Earth system as a whole

Chill Hills: Exploring Ceres' Hydrology and Geology Through Pingo-like Morphologies

2022 – Present

Principal Investigator

- The Chill Hills project is a collaborative effort that I am leading between the University of Alaska, Cornell University, the Planetary Science Institute, and NASA's Jet Propulsion Laboratory that seeks to identify and characterize 100 m scale potential pingo analogs on the dwarf planet Ceres
- This program will form the most comprehensible database possible of potential periglacial-like features on the solar system's innermost dwarf planet and investigate the possibility of long lived hydrologic systems on this ancient world
- This project includes graduate and undergraduate student investigators

Pingo SubTerranean Reconnaissance And Reconstruction (Pingo STARR)

2020 – Present

Science Principal Investigator

- Pingo STARR is a multi-year field geological and geophysical field campaign to examine the deep subsurface structure of pingos in the North American Arctic
- It is also a test program for lander and astronaut scale technologies and strategies for detecting and characterizing ground ice rich environments on other worlds
- This project includes graduate and undergraduate student investigators

Alaska EPSCoR Fire & Ice

2021 – 2023

Boreal Fire and Coastal Margins Science Team Member

- *Fire & Ice* is a 5-year, \$20 million NSF sponsored effort to conduct research into changes to fire risk and behavior in Alaska's boreal forest, and changes to physical and chemical variables that influence biological communities in the nearshore Gulf of Alaska
- I am involved with utilizing remote sensing data to better characterize boreal fuel maps and coastal margin turbidity

NASA's Europa Clipper Mission

2019 – 2021

REASON radar experiment Affiliate Science Team Member

- A flagship class mission to characterize the geology and habitability of Jupiter's moon Europa
- REASON: Radar for Europa Assessment and Sound: Ocean to Near-surface is a multi-frequency, multi-channel ice penetrating radar system

Vertical Entry Robot for Navigating Europa (VERNE)

2019 – 2021

Science Investigator and Student Mentor

- VERNE is a NASA funded SESAME (Scientific Exploration Subsurface Access Mechanism for Europa) project headquartered at Georgia Tech developing a full-cycle architecture for penetrating the europa ice-shell, conducting ice and ocean science, and searching for life on Europa
- VERNE is a broad project that includes graduate student lead design elements and leadership from Postdoctoral Investigators, including myself

Enceladus Distributed Geophysical Experiment (EDGE)

2019 – 2021

Science Investigator

- EDGE is a JPL lead investigation exploring possible single and multi-node architectures for conducting surface geophysical surveys of Enceladus
- I am exploring the use of active and passive electromagnetic methods for use in understanding the detailed conductivity and stratigraphic structure of the ice-shell

Europa Seismic Package (ESP)

2019 – 2021

Science Investigator

- ESP is a JPL lead investigation designed to develop broadband seismic sensors for use on Europa and test these stations in various configurations in terrestrial analog deployments
- I am involved in instrument development and field testing

Project Oracle

2018 – Present

Co-Investigator

- Oracle is planetary mission concept headquartered at the University of Colorado, Boulder's Laboratory for Atmospheric and Space Physics

- Oracle is a Discovery class planetary mission concept to the suspected water-rich asteroid 24 Themis and an active main belt comet

NASA's Dawn Mission

2014 – 2020

Associate Science Team Member, Geologic Mapping Group Member, Ground Ice Working Group Co-Chair

- A NASA Discovery class mission to explore the asteroid 4 Vesta and dwarf planet 1 Ceres

Scholarships and Fellowships

• UCLA, Dissertation Year Fellowship, \$40,000 USD	2018 – 2019
• UCLA Department of Earth, Planetary, and Space Sciences, Graduate Dean's Scholarship, \$6,200 USD	Fall 2014
• UNB, Greenblatt Memorial Scholarship, \$1,000 CAD	2013 – 2014
• UNB Department of Physics, Dr. Haider R. Zaidi Memorial Scholarship, \$350 CAD	2013 – 2014
• UNB, Michael (Mike) McAloon Memorial Scholarship in Physics, \$1,500 CAD	2012 – 2014
• UNB Department of Earth Sciences, Sharon L.W. Bachinski Memorial Scholarship, \$1,100	2012 – 2013
• UNB, UNB-Fredericton Student Union Human Development Scholarship, \$1,100 CAD	2011 – 2012
• UNB Department of Earth Sciences, Robert Quartermain Geology Scholarship, \$5,000 CAD	2010 – 2012
• UNB, UNB Entrance Scholarship, \$20,000 CAD	2009 – 2013

Honors and Awards

• NASA Group Achievement Award as a contributing member of the Dawn Mission Science Team	2019
• UCLA Department of Earth, Planetary, and Space Sciences, Eugene B. Waggoner Prize for sustained superior academic achievement and demonstrated excellence in original research, \$2,000 USD	2018
• UCLA Department of Earth, Planetary, and Space Sciences, Excellence in Teaching Award, \$500 USD	2018
• Joint Japan Geophysical Union-American Geophysical Union Meeting, Outstanding Student Paper Award (Poster in Planetary Science; Abs. #PPS02-P18)	2017
• UCLA Department of Earth, Planetary, and Space Sciences Annual Student Symposium, Best Paper Award	2017
• American Geophysical Union Fall Meeting, Outstanding Student Paper Award (Poster in Planetary Science; Abs. #2172)	2015
• UNB Convocation, Lieutenant Governor's Silver Medal in Science	2014
• UNB Department of Earth Sciences, C.W. Argue Prize, \$2,000 CAD	2011
• Association of Professional Engineers and Geoscientists of New Brunswick, Prize for Excellence in Geology, \$2,000 CAD	2010
• UNB Department of Physics, Derek L. Livesey Memorial Prize in Physics, \$2,000 CAD	2010
• UNB, Berton C. Foster Memorial Prize, \$800 CAD	2010

Publications

- Follingstad, V., et al., (inc. **Hughson, K. H. G.**), 2025, Quantifying the Surface Deformation of Pingos on the Alaskan North Slope using Interferometric Synthetic Aperture Radar (InSAR). *Permafrost and Periglacial Processes, resubmitted*
- **Hughson, K. H. G.**, et al., 2024, Novel Landform Assemblages Near Mount Carleton Provincial Park Indicate a Complex History of Deglaciation in North-Central New Brunswick. *Information Circular: Geoscience Project Summaries and Other Activities, New Brunswick Geological Survey.* p.103-108. <https://dnr-mrn.gnb.ca/ParisWeb/FileAdmin.aspx>
- Micah, J. S., et al., (inc. **Hughson, K. H. G.**), 2024a, Chapter 1: The Astrobiology Primer 3.0. *Astrobiology* 24:S1, S-4-S-29. <https://doi.org/10.1089/ast.2021.0129>
- Micah, J. S., et al., (inc. **Hughson, K. H. G.**), 2024b, Chapter 3: The Origins and Evolution of Planetary Systems. *Astrobiology* 24:S1, S-57-S-75. <https://doi.org/10.1089/ast.2021.0127>

- Daubar, I.J., et al. (inc. **Hughson, K. H. G.**), 2024, Planned Geological Investigations of the Europa Clipper Mission. *Space Sci Rev* 220, 18. <https://doi.org/10.1007/s11214-023-01036-z>
- **Hughson, K. H. G.**, et al., 2024, How Geophysical Observations of Contrasting Pingos in Alaska and the Canadian Arctic can Inform the Search for Ground Ice Throughout the Solar System. 12th International Conference on Permafrost. 16-20 June 2024, Whitehorse, Canada: International Permafrost Association. <https://www.permafrost.org/wp-content/uploads/ICOP2024-Proceedings-Volume-II-Extended-Abstracts.pdf>
- Bradford, J., et al., (inc. **Hughson, K. H. G.**), 2024, Mapping the internal structure Arctic pingos using ground-penetrating radar: Results from the Pingo Canadian Landmark. Seventh International Conference on Engineering Geophysics, Al Ain, UAE. <https://doi.org/10.1190/iceg2023-023.1>
- Lawrence, J., et al., (inc. **Hughson, K. H. G.**), 2023. Subsurface Science and Search for Life in Ocean Worlds. *Planetary Science Journal*, 4, 22. 10.3847/PSJ/aca6ed
- Wynne, J., et al. (incl. **Hughson, K. H. G.**), 2022. Planetary Caves: A Solar System View of Processes and Products. *Journal of Geophysical Research: Planets*, 127, e2022JE007303. <https://doi.org/10.1029/2022JE007303>
- Castillo-Rogez, J., et al. (inc. **Hughson, K. H. G.**), 2022. Science Drivers for the Future Exploration of Ceres: From Solar System Evolution to Ocean World Science. *Planetary Science Journal*, 3, 3. DOI 10.3847/PSJ/ac502b
- **Hughson, K. H. G.**, et al., 2022. The case for pingo-like hills on Ceres from morphometric analysis and comparative planetology. *Geology*, 50, 522-527. <https://doi.org/10.1130/G49321.1>
- Landis, M. E., et al. (inc. **Hughson, K. H. G.**), 2022. The case for a Themis asteroid family spacecraft mission. *Planetary and Space Science*, 212, 105413. <https://doi.org/10.1016/j.pss.2021.105413>
- Marusiak, A., et al. (inc. **Hughson, K. H. G.**), 2021. Exploration of Icy Ocean Worlds Using Geophysical Approaches. *Planetary Science Journal*, 2, 150. <https://doi.org/10.3847/PSJ/ac1272>
- Schenk, P., et al. (inc. **Hughson, K. H. G.**), 2021. Compositional Control on Impact Crater Formation on Mid-sized Planetary Bodies: Dawn at Ceres and Vesta, Cassini at Saturn. *Icarus*, 359, 114343. <https://doi.org/10.1016/j.icarus.2021.114343>
- Schmidt, B. E., Sizemore, H.G., **Hughson, K. H. G.**, et al., 2020. Post-impact cryo-hydrologic formation of small mounds and hills in Ceres's Occator crater. *Nature Geoscience*, 13, 605-610. <https://doi.org/10.1038/s41561-020-0581-6>
- Park, R. S., et al. (incl. **Hughson, K. H. G.**), 2020. The crust of Ceres from Dawn's high-resolution gravity data. *Nature Astronomy*, 4, 748-755. <https://doi.org/10.1038/s41550-020-1019-1>
- Bryson, F. E., et al. (incl. **Hughson, K. H. G.**), 2020. Vertical Entry Robot for Navigating Europa (VERNE) Mission and System Design. *ASCEND 2020*. DOI: <https://doi.org/10.2514/6.2020-4061>
- Castillo-Rogez, J., et al. (incl. **Hughson, K. H. G.**), 2020. Science Motivations for the Future Exploration of Ceres. *Community White Paper for the Planetary Decadal Survey, 2023-2032*. <https://tinyurl.com/y3bjp6jt>
- Vance, S. D., et al. (incl. **Hughson, K. H. G.**), 2020. Distributed Geophysical Exploration of Enceladus and Other Ocean Worlds: A White Paper for the NRC Planetary Science and Astrobiology Decadal Survey.
- **Hughson, K. H. G.**, et al., 2019a. Fluidized appearing ejecta on Ceres: Implications for the mechanical properties, frictional properties, and composition of its shallow subsurface. *JGR: Planets*, 124, 1819-1839. <https://doi.org/10.1029/2018JE005666>
- **Hughson, K. H. G.**, et al., 2019b. Normal faults on Ceres: Insights into the mechanical properties and thermal history of Nar Sulcus. *Geophysical Research Letters*, 46, 80-88, <https://doi.org/10.1029/2018GL080258>
- Chilton, H. T., et al. (incl. **Hughson, K. H. G.**), 2019. Landslides on Ceres: Inferences into ice content and layering in the upper crust. *JGR: Planets*, 124, 1512- 1524. <https://doi.org/10.1029/2018JE005634>
- Duarte, K., et al. (incl. **Hughson, K. H. G.**), 2019. Landslides on Ceres: Diversity and geologic context. *Journal of Geophysical Research: Planets*, 124. <https://doi.org/10.1029/2018JE005673>
- Sizemore, H. G., et al. (incl. **Hughson, K. H. G.**), 2019. A Global Inventory of Ice-Related Morphological Features on Dwarf Planet Ceres: Implications for the evolution and current state of the cryosphere. *JGR: Planets*, 124, 1650-1689. <https://doi.org/10.1029/2018JE005699>
- Ermakov, A. I., et al. (incl. **Hughson, K. H. G.**), 2019. Surface roughness and gravitational slope distributions of Vesta and Ceres. *Journal of Geophysical Research: Planets*, 124, 13-30. <https://doi.org/10.1029/2018JE005813>
- Singh, S., et al. (incl. **Hughson, K. H. G.**), 2019. Mineralogy mapping of the Ac-H-5 Fejokoo quadrangle of Ceres. *Icarus*, 318, 147-169. <https://doi.org/10.1016/j.icarus.2018.08.025>
- Combe, J.-P., et al. (incl. **Hughson, K. H. G.**), 2019. Exposed H₂O-rich areas detected on Ceres with the Dawn visible and infrared mapping spectrometer. *Icarus*, 318, 22-41. <https://doi.org/10.1016/j.icarus.2017.12.008>
- **Hughson, K. H. G.**, et al., 2018. The Ac-5 (Fejokoo) Quadrangle of Ceres: Geologic map and geomorphological evidence for ground ice mediated surface processes. *Icarus*, 316, 63-83, <https://doi.org/10.1016/j.icarus.2017.09.035>

- Buczkowski, D. L., et al. (incl. **Hughson, K. H. G.**), 2018. Floor-Fractured Craters on Ceres and Implications for Interior Processes. *JGR: Planets*, 123, 3188-3204. <https://doi.org/10.1029/2018JE005632>
- Ottaviano, R., et al. (incl. **Hughson, K. H. G.**), 2018. Geology of Ceres' North Pole quadrangle with Dawn FC imaging data. *Icarus*, 316, 14-27. <https://doi.org/10.1016/j.icarus.2017.09.036>
- Scully, J.E. C., et al. (incl. **Hughson, K. H. G.**), 2018. Ceres' Ezinu quadrangle: a heavily cratered region with evidence for localized subsurface water ice and the context of Occator crater. *Icarus*, 316, 46-62. <https://doi.org/10.1016/j.icarus.2017.10.038>
- Platz, T., et al. (incl. **Hughson, K. H. G.**), 2018. Geological mapping of the Ac-10 Rongo Quadrangle of Ceres. *Icarus*, 316, 140-153. <https://doi.org/10.1016/j.icarus.2017.08.001>
- Schmidt, B. E., **Hughson, K. H. G.**, et al., 2017. Geomorphological Evidence for Ground Ice on Dwarf Planet Ceres. *Nature Geoscience* 10, 338-343, <https://doi.org/10.1038/ngeo2936>
- Sizemore, H. G., et al. (incl. **Hughson, K. H. G.**), 2017. Pitted terrains on (1) Ceres and implications for shallow subsurface volatile distribution. *Geophys. Res. Lett.*, 44, 6570-6578, <https://doi.org/10.1002/2017GL073970>
- Combe, J.-P., et al. (incl. **Hughson, K. H. G.**), 2016. Detection of local H₂O exposed at the surface of Ceres. *Science*, 353, 6303, <https://doi.org/10.1126/science.aaf3010>
- Buczkowski, D. L., et al. (incl. **Hughson, K. H. G.**), 2016. The Geomorphology of Ceres. *Science*, 353, 6303, <https://doi.org/10.1126/science.aaf4332>

Lead Author Conference Abstracts

- **Hughson, K. H. G.**, et al., 2024. High Variability Observed in the Internal Structure of Arctic Pingos: Implications for Hydrologically Derived Icy Landforms Across the Solar System, AGU Annual Meeting, Abs. #1456. (Poster Presentation)
- **Hughson, K. H. G.**, et al., 2023. A Tale of Two Tundras: How Geophysically Distinct Pingos in Alaska and the Canadian Arctic can Inform the Search for Ground Ice Throughout the Solar System, GSA Connects 2023, Abs. #132-3. (Oral Presentation)
- **Hughson, K. H. G.**, 2023. The Minto Lakes Region & Fire: A Comparative Analysis of Vegetation Moisture Proxy Indices in Summers 2021 & 2022. EPSCoR All Hands Meeting, 2023. (Poster Presentation)
- **Hughson, K. H. G.**, et al., 2022. Terrestrial Pingos as Morphometric and Geophysical Analogs for Small Hills on Ceres, GSA Connects 2022, Abs. #84-3. (Oral Presentation)
- **Hughson, K. H. G.**, et al., 2022. A Comparative Morphometric Analysis of Terrestrial Pingos and Potential Pingo Analogs on the Dwarf Planet Ceres, Alaska Geological Society Annual Meeting, 2022. (Oral Presentation)
- **Hughson, K. H. G.**, et al., 2021. Pingos and Planetary Analogs: The Geophysical Perspective, GSA Connects 2021, Abs. #77-13. (Oral Presentation)
- **Hughson, K. H. G.**, et al., 2021. The Fool on the Hill: Chasing Pingos with Pingo STARR, Workshop on Terrestrial Analogs for Planetary Exploration, Abs. #2595. (Oral Presentation)
- **Hughson, K. H. G.**, et al., 2020. A Comparative Morphological and Geospatial Analysis of Terrestrial Pingos and Anomalous Hills on Ceres, AGU Fall Meeting, Abs. #207-10. (Poster Presentation)
- **Hughson, K. H. G.**, et al., 2020. A quantitative morphometric analysis of terrestrial pingos and anomalous hills on Ceres. GSA Annual Meeting, Abs. #P032-0001. (Oral Presentation)
- **Hughson, K. H. G.**, et al., 2020. Geological mapping and geospatial analysis of possible pingos on Ceres. Planetary Geologic Mappers Meeting 2020, Abstract #7027. (Print Only Abstract)
- **Hughson, K. H. G.**, et al., 2020. A comparative morphological and geospatial analysis of possible pingos on Ceres. LPSC LI, Abstract #2107. (Print Only Abstract)
- **Hughson, K. H. G.**, et al., 2019. Putative Pingos may Populate Portions of Occator crater, Ceres. AGU Fall Meeting, Abs. #P54B-07. (Oral Presentation)
- **Hughson, K. H. G.**, et al., 2019. Frost heaves may exist in Occator crater, Ceres. GSA Annual Meeting, Abs. #144-6. (Oral Presentation)
- **Hughson, K. H. G.**, et al., 2018. Will it bend? Insights into the mechanical properties and thermal evolution of Ceres' Nar Sulcus. AGU Fall Meeting, Abs. #P33D-3862. (Poster Presentation)
- **Hughson, K. H. G.**, et al., 2018. Will it bend? Insights from flexurally supported topography on Ceres. GSA Annual Meeting, Abs. #238-7. (Oral Presentation)
- **Hughson, K. H. G.**, et al., 2018. Geophysical Modeling of Cerean Fractured Terrain: Insights into the structure and H₂O content of the Solar System's Smallest Dwarf Planet. 42nd COSPAR Assembly, Abs. #23296. (Poster Presentation)
- **Hughson, K. H. G.**, et al., 2018. Probing the composition of the near-surface Ceres from faulted terrains in its Nar Sulcus region. AOGS Annual Meeting 2018, Abstract #PS10-A006. (Oral Presentation)

- **Hughson, K. H. G.**, et al., 2018. Characterizing the composition and elastic properties of the near-surface of Ceres: Insights from flexural modeling of the Nar Sulcus fractures. LPSC XLIX, Abstract #2348. (Oral Presentation)
- **Hughson, K. H. G.**, et al., 2017. Layered/Pancake-like Ejecta on Ceres: Inferring the Composition and Mechanical Properties of the Cerean Surface through Modeling of Ejecta Emplacement. AGU Fall Meeting, Abs. #P53G-08. (Oral Presentation)
- **Hughson, K. H. G.**, et al., 2017. Inferring the composition and mechanical properties of the near-surface of Ceres from emplacement modeling of layered/pancake-like ejecta deposits. GSA Annual Meeting, Abs. # 178-4. (Poster Presentation)
- **Hughson, K. H. G.**, et al., 2017. Determining the effect of interstitial near-surface ground ice on the mobility of layered ejecta deposits on Ceres. JpGu-AGU Joint Meeting, Abs. #PPS02-P18. (Poster Presentation)
- **Hughson, K. H. G.**, et al., 2017. Layered and Low-Aspect-Ratio Ejecta on Ceres: Probing the Effect of Ground Ice on Fluidized Ejecta Deposits. LPSC XLVIII, Abs. # 1609. (Oral Presentation)
- **Hughson, K. H. G.**, et al., 2016. Ice under cover: Using bulk spatial and physical properties of probable ground ice driven mass wasting features on Ceres to better understand its surface. AGU Fall Meeting, Abs. #2117. (Poster Presentation)
- **Hughson, K. H. G.**, et al., 2016. Hidden ice: Using aggregate spatial and physical properties of likely ground ice driven flows on Ceres to better understand its surface composition. GSA Annual Meeting, Abs. #110-12. (Oral presentation)
- **Hughson, K. H. G.**, et al., 2016. Geologic mapping of the Ac-H-5 Fejokoo quadrangle of Ceres from NASA's Dawn mission. LPSC XLVII, Abs. #1556. (Poster Presentation)
- **Hughson, K. H. G.**, et al., 2016. Shedding light on Oxo crater: A detailed investigation of one of Ceres' youngest features using Dawn spacecraft data. LPSC XLVII, Abs. #2387. (Oral Presentation)
- **Hughson, K. H. G.**, et al., 2015. Scalloped and Degraded Craters as Geomorphological Evidence for Pervasive Ground Ice on Ceres as seen by the Dawn Spacecraft. GSA Annual Meeting 2015, Abs. #282-6. (Oral Presentation)
- **Hughson, K. H. G.**, et al., 2015. Initial Geologic Mapping of the Ac-H-5 Fejokoo Quadrangle of Ceres: An Integrated Mapping Study Using Dawn Spacecraft Data. GSA Annual Meeting, Abs. #308-5. (Poster Presentation)
- **Hughson, K. H. G.**, et al., 2015. Preliminary Geological Map of the Ac-H-5 Fejokoo Quadrangle of Ceres: An Integrated Mapping Study Using Dawn Spacecraft Data. AGU Fall Meeting, Abs. #2172. (Poster Presentation)
- **Hughson, K. H. G.**, et al., 2015. Vesta's "Ribbon": Exploring Potential Non-Radially Symmetric Flow Features Near Sossia. LPSC XLVI, Abs. #2057. (Poster Presentation)

Invited Talks

University of New Brunswick

- Department of Earth Sciences Seminar: "Ceres in the Light of Dawn"

February 2024

University of Alaska Fairbanks

- Department of Geoscience Seminar:
"Pingo Party: Insights from the North Slope, Mackenzie Delta, and Dwarf Planet Ceres"

April 2023

University of Alaska Anchorage

- Department of Geological Sciences Seminar:
"What Lies Beneath: How Landforms on Earth Inform us of Ice on Ceres"

February 2021

Georgia Institute of Technology

- School of Earth and Atmospheric Sciences Planetary and Astrobiology Seminar:
"The Final Harvest of Dawn: Spotlight on Occator Crater"

January 2021

Brown University

- Department of Earth, Environmental and Planetary Sciences: "Ceres After Dawn"

November 2020

Colorado School of Mines

- Department of Geology & Geological Engineering Seminar: "Buried Treasure: How Ceres Shifted the Paradigm on Water in the Asteroid Belt"

June 2020

Agnes Scott College

- Department of Physics Colloquium: "Ceres in the Light of Dawn"

April 2020

Emory University

- Department of Astronomy Public Observing Night: "Ceres in the Light of Dawn"

October 2019

Georgia Institute of Technology

- School of Earth and Atmospheric Sciences Colloquium: "Dawn at Ceres or: How I Learned to Stop Worrying and Love an Icy Dwarf Planet"

March 2019

Jet Propulsion Laboratory

- Planetary Science Group: "Will it Bend? Insights from Mechanical Analyses of the Nar Sulcus"

July 2018

- Fractures on Ceres”
- Planetary Science Group: “Layered and Low-Aspect Ratio Ejecta on Ceres: Probing the Effect of Ground Ice on Fluidized Ejecta Deposits”

June 2017

Industry Experience

Geophysical Intern at Southwestern Energy Company

Summer 2012

Houston, TX, USA

- Conducted a quality review of 3D seismic data gathered from multiple surveys in the Marcellus shale (PA).
- Produced synthetic 3D seismic data using the MESA software package in order to optimize geophone placement geometry for future surveys.

University, Professional, and Public Service

Session Convener

Geological Society of America Annual Meeting, Denver CO

October 2022

- Session convener and chair for T100, ‘Tiny Worlds with Big Potential: Exploring Small Bodies Throughout the Solar System’

Geological Society of America Annual Meeting, Portland OR

October 2021

- Session convener and chair for T112, ‘Friends of Hoth: Episode V – Small, Icy, and Ocean Worlds’

Geological Society of America Annual Meeting, Online

October 2020

- Session convener and chair for T122, ‘The Big Picture from Small Worlds: Dwarf Planets, Trans-Neptunian Objects, Asteroids, Comets, and More’

Geological Society of America Annual Meeting, Phoenix AZ

September 2019

- Session convener and chair for T90, ‘The Big Picture from Small Bodies: Dwarf Planets, Asteroids, and Comets’

Geological Society of America Annual Meeting, Indianapolis IN

November 2018

- Session convener and chair for T143, ‘The Age of Small World Exploration: Major Results from Minor Planets and Other Small Solar System Bodies’

Committee Experience

University of New Brunswick, Faculty of Engineering

2025 – Present

- Engineering curriculum committee member

University of New Brunswick, Department of Earth Sciences

2025 – Present

- Technical services committee member

University of New Brunswick, Department of Earth Sciences

2025 – Present

- Undergraduate affairs committee member

University of New Brunswick, Department of Earth Sciences

2025 – Present

- Space committee member

University of New Brunswick, Department of Earth Sciences

2024 – Present

- Geological Engineering program committee member

University of New Brunswick, Department of Earth Sciences

2024 – Present

- MSc in Environmental Science program development committee member

University of Alaska Anchorage, Department of Geological Sciences

2022 – 2023

- Scholarship committee member

Non-supervisory Graduate Student Committee Experience

University of New Brunswick, Department of Earth Sciences

2024 – Present

- Babak Ghane, PhD in Earth Science, in progress

University of Alaska Fairbanks, Department of Geosciences

2024 – Present

- Logan Wieland, PhD in Geoscience, in progress

University of New Brunswick, Department of Earth Sciences

2025

- Mary-Anne Fobert, PhD in Earth Science, graduated 2025
University of New Brunswick, Department of Physics 2025
- Basile Fayol, MSc in Physics, graduated 2025
University of Alaska Anchorage, Department of Geological Sciences 2021 – 2023
- Logan Wieland, MSc in Applied Geological Science, graduate 2023
University of Alaska Anchorage, Department of Geological Sciences 2021 – 2023
- Cameron Kuhle, MSc in Applied Geological Science, graduated 2023
University of Alaska Anchorage, Department of Geological Sciences 2021 – 2023
- Robin Van Auken, MSc in Applied Geological Science, graduated 2023

Reviewer

- NASA Postdoctoral Program - Reviewer* 2022
- NASA - Panelist* 2020
- NASA - Panel executive secretary* 2018
- Journal of Geophysical Research: Planets - Peer reviewer* 2018 – Present
- Icarus - Peer reviewer* 2019 – Present
- Journal of Structural Geology – Peer reviewer* 2021 – Present
- Nature Communications Earth & Environmet – Peer reviewer* 2025 – Present

Session Chair

- American Geophysical Union Fall Meeting, New Orleans LA* December 2017
- Session chair for P43A and P53G, 'Ceres and Vesta: Understanding the "Planets" of the Asteroid Belt I & II'

Public Outreach Volunteer

- University of Alaska Anchorage, Department of Geological Sciences* 2021 - Present
- Prepared demonstrations and conducted field trips for Anchorage area high school students related to the geological sciences and the geology of southcentral Alaska. Activities and demonstrations were focused on engaging Native Alaskans in partnership with the Alaska Native Science & Engineering Program (ANSEP).

UCLA, Department of Earth, Planetary, and Space Sciences

2015 – 2018

- Prepared and demonstrated physical models of natural phenomena such as magnetism, impact cratering, and tectonism to elementary school children at various public school in Los Angeles

Dawn Mission Science Team

2015 – 2017

- Participated in UCLA's annual 'Exploring Your Universe' Science Symposium with a focus on educating the public about NASA's Dawn mission, the asteroid Vesta, and the dwarf planet Ceres
- Given 7 public outreach lectures on the Dawn mission and Ceres aimed at elementary school children, undergraduates, and adults at UCLA and various public schools in California and Colorado

Vice President

UCLA, Earth, Planetary, and Space Sciences Student Organization

2015 – 2017

- Organized various graduate and undergraduate panels on how to be successful in academia
- Organized the annual 'Los Angeles Basin Student Research Symposium'
- Organized and supervised regular student networking events
- Organized and lead geological field trips for graduate students

Meeting Organizer

Dawn Science Team Meeting, Santa Monica, CA

May 2015

Technical Skills

- Canadian remote pilot certificate holder
- Programming languages and mathematical packages: Python (including SimPEG), Java, Maple
- Computer aided drafting/model building: AutoCAD, Trelis
- Geographic information systems: ArcGIS, QGIS, ENVI
- Image processing and spectral analysis: Python, ArcGIS, QGIS, ENVI, ISIS 3
- Computer aided graphic design: Adobe Creative Suite 6
- Productivity: Microsoft Office Suite
- Operating systems: Linux (Ubuntu), Mac OS, Windows OS
- Geological field skills (mapping and sampling)
- Geophysical field skills (deployment and operation of seismic, electric, and electromagnetic instruments)
- Drill core logging and geophysical data collection/interpretation
- Certified Unmanned Aerial Systems pilot for recreational and research purposes

Professional Memberships

- Geological Society of America
- American Geophysical Union