

Dylan C. Hickson

Arecibo Observatory/UCF
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RESEARCH INTERESTS

- Radar, VIS/NIR, and UV observations of planetary surfaces
- Surface properties, specifically structure and composition, of small bodies, planets, and moons
- Robotic space exploration missions to planetary bodies
- Electromagnetic properties of geologic materials

EDUCATION

York University Toronto, Canada
Ph.D., Earth & Space Science 2014 - 2019

- SUPERVISOR: Dr. Michael G. Daly
- THESIS: Characterizing the Dielectric Properties of Geologic and Asteroid Regolith Analogue Material for Improved Planetary Radar Interpretation

McMaster University Hamilton, Canada
B.Sc., Honours Earth and Environmental Science 2009 - 2014
B.Sc., Physical Science 2009 - 2014

- SUPERVISOR: Dr. Joseph Boyce
- THESIS: 3-D Ground Penetrating Radar (GPR) survey of a White Pine (*Pinus Strobus*) root system: comparison of grid-based versus radial survey methods
- Research Internship with the Environmental and Archaeological Geophysics Laboratory

PROFESSIONAL EXPERIENCE

Arecibo Observatory / The University of Central Florida Arecibo, Puerto Rico
UCF/AO Preeminent Postdoctoral Scholar 2019 - present

Planetary Instrumentation Laboratory, York University Toronto, Canada
Graduate Research Assistant 2014 - 2019

Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) Guelph, Canada
Agricultural Geomatics Assistant 2013 - 2014

PEER-REVIEWED ARTICLES

Hickson, D.C., Boivin, A.L., Tsai, C.-A., Daly, M.G., and Ghent, R.R. (2019) Modeling the Dielectric Properties of Minerals from Crystals to Bulk Powders for Improved Interpretation of Asteroid Radar Observations. Submitted to *Journal of Geophysical Research: Planets*.

Lalla, E., Cote, K., **Hickson, D.**, Garnitschnig, S., Konstantinidis, M., Such, P., Czakler, C., Schroder, C., Frigeri, A., Ercoli, M., Losiak, A., Gruber, S., and Groemer, G. (2019) Laboratory analysis of returned samples from the AMADEE-18 Mars analog mission. *Astrobiology*, In-press.

Boivin, A.L., Tsai, C.-A., **Hickson, D.C.**, Ghent, R.R., and Daly, M.G. (2019) MCMC-based Two-Port Transmission Line Permittivity and Permeability Determination. Submitted to *IEEE Trans. Microw. Theory Techn.*

Tsai, C., Ghent, R., Boivin, A., and **Hickson, D.** (2019) Discrimination of Dispersive Materials From Radar Signals Using Q^* . *Ground Penetrating Radar*, 2(1), 26-50.

Hickson, D., Boivin, A., Daly, M.G., Ghent R., Nolan, M.C., Tait, K., Cunje, A., and Tsai, C-A. (2018) Near surface bulk density estimates of NEAs from radar observations and permittivity measurements of powdered geologic material. *Icarus*, 306, 16-24.

Boivin, A., **Hickson, D.**, Cunje, A., Tsai, C-A., Ghent, R.R., and Daly, M. (2018) Broadband Measurements of the Complex Permittivity of Planetary Regolith Analog Materials. *Journal of Geophysical Research: Planets*, 123, 3088-3104.

Osinski, G.R., et. al (including **Hickson, D.**) (2018) The CanMars Mars Sample Return analogue mission. *Planetary and Space Science*, 166, 110-130.

Hickson, D., Sotodeh, S., Daly, M., Ghent, R., and Nolan, M.C. (2017) Improvements on effective permittivity measurements of powdered alumina: Implications for bulk permittivity properties of asteroid regoliths. *Advances in Space Research*, 59, 472-482.

NON-PEER-REVIEWED ARTICLES

Anish Roshi, D., et al (including **Hickson, D.**) (2019) Astro2020 Activities and Projects White Paper: Arecibo Observatory in the Next Decade. Submitted as an Activities and Projects White Paper for the *Astro2020 decadal survey*.

Carter, T., Contreras, D., Doyle, S., **Hickson, D.**, Mihailovic, D., Morgan, J., and Moutsiou, T. (2014) Stelida Naxos Archaeological Project - 2014 Report. Submitted to the Canadian Institute in Greece.

CONFERENCE ABSTRACTS

Hickson, D.C., Becker, T.M., Virkki, A.K., Venditti, F.C.F., Marshall, S.E., Zambrano-Marin, L.F., and McGilvray, A. (2020) Space Weathering Effects from UV to Radar Wavelengths (poster [1704]). *51st Lunar and Planetary Science Conference (LPSC)*, conference cancelled due to COVID-19.

Venditti, F., Virkki, A., Marshall, S., **Hickson, D.**, Taylor, P., Zambrano-Marin, L. (2020) Arecibo Observatory: a ground and space joint effort in support of small bodies exploration (talk). *Planets 2020*, Santiago, Chile, 2-6 Mar.

- Venditti, F., Virkki, A., Marshall, S., **Hickson, D.C.**, Taylor, P.A., and Zambrano-Marin, L.F. (2019) Arecibo Observatory: Supporting Planetary Defense (poster [NH51C-0784]). *2019 American Geophysical Union (AGU) Fall Meeting*, San Francisco, USA, 9-13 Dec.
- Boivin, A., Tsai, C-A., **Hickson, D.C.**, Ghent, R.R., and Daly, M.G. (2019) MCMC-Based Model Parameter Estimation from Measurements of the Complex Electromagnetic Characteristics of Planetary Regolith Analog Materials (poster [P31B-3436]). *2019 AGU Fall Meeting*, San Francisco, USA, 9-13 Dec.
- Hickson, D.C.**, Boivin, A.L., Tsai, C., Daly, M.G., Ghent, R.R. (2019) Quantifying Asteroid Regolith Porosity from Radar Data (poster [2480]). *50th LPSC*, The Woodlands, USA, 18-22 Mar.
- Hickson, D.C.**, Boivin, A., Daly, M.G., Ghent, R.R., C. Tsai, Tait, K. (2018) Measurement-based Modeling of the Dielectric Permittivity of Particulate Geologic Material for Improved Radar Interpretation (poster [P51G-2964]). *2018 AGU Fall Meeting*, Washington DC, USA, 10-14 Dec.
- Cunje, A.B., Ghent, R.R., Boivin, A., Tsai, C-A., **Hickson, D.** (2018) Dielectric Properties of Martian Regolith Analogs and Smectite Clays (poster [1805]). *49th LPSC*, The Woodlands, USA, 19-23 Mar.
- Hickson, D.C.**, Boivin, A., Daly, M.G., Ghent, R.R., Tait, K. (2018) Characterizing the Dielectric Behaviour of Asteroid Regolith Analogue Minerals for Planetary Radar Interpretation (poster). *Women in Planetary Science and Exploration (WPSE) 2018*, Toronto, Canada, 17-18 Feb.
- Hickson, D.**, Boivin, A., Daly, M.G., Ghent, R.R., Nolan, M.C., Tait, K., Cunje, A., Tsai, C-A. (2017) Constraining Bulk Densities of Near-Earth Asteroid Surfaces from Radar Observations Using Laboratory Measurements of Permittivity (poster [P13B-2555]). *2017 AGU Fall Meeting*, New Orleans, USA, 11-15 Dec.
- Boivin, A., **Hickson, D.**, Cunje, A., Tsai, C-A., Ghent, R.R., Daly, M.G. (2017) Measurements in Vacuum of the Complex Permittivity of Planetary Regolith Analog Materials in Support of the OSIRIS-REx Mission (poster P13B-2556]). *2017 AGU Fall Meeting*, New Orleans, USA, 11-15 Dec.
- Boivin, A., **Hickson, D.**, Cunje, A., Tsai, C-A., Ghent, R.R., Daly, M.G. (2016) Measurements in Vacuum of the Effect of Ilmenite on the Complex Dielectric Permittivity of Planetary Regolith Analog Materials (poster [P51C-2148]). *2016 AGU Fall Meeting*, San Francisco, USA, 12-16 Dec.
- Hickson, D.**, Sotodeh, S., Daly, M., Ghent, R. (2016) Boundary Conditions Modelling of Permittivity Measurements of Powders in Coaxial Airline (poster [2137]). *47th LPSC*, The Woodlands, USA, 21-25 Mar.
- Zylberman, W., **Hickson, D.**, Haid, T., Osinski, G.R. (2016) 2015 CanMars MSR Analogue Mission: The Key Role of LiDAR in Rover Navigation and Potential for Future Missions (poster [1041]). *47th LPSC*, The Woodlands, USA, 21-25 Mar.
- Boivin, A., **Hickson, D.**, Cunje, A., Ghent, R., Daly, M. (2016) Broadband Measurements of Dielectric Permittivity of Planetary Regolith Analogue Materials using a Coaxial Transmission Line in Vacuum (poster [2025]). *47th LPSC*, The Woodlands, USA, 21-25 Mar.
- Hickson, D.**, Daly, M., Ghent, R., Boivin, A., Cunje, A., Tsai, C-A. (2015) Complex Permittivity Measurements of Powders (poster). *9th OSIRIS-REx Science Team Meeting*, John Hopkins Applied Physics Laboratory, Laurel, USA, 20-22 Oct.
- Boivin, A., Tsai, C-A., **Hickson, D.**, Ghent, R., Daly, M. (2015) Preliminary Broadband Measurements of Dielectric Permittivity of Planetary Regolith Analogue Materials Using a Coaxial Transmission Line (poster [2487]). *46th LPSC*, The Woodlands, USA, 16-20 Mar.

Hickson, D., Nussli, E., Steckley, Z., Sweeney, S. (2014) Agricultural Landscapes of the City of Ottawa: Mobile Mapping Groundtruth Results 2014 (poster). *Canadian Association of Geographers-Ontario Division Annual Meeting (CAGONT)*, York University, Toronto, Canada, 24-25 Oct.

Nussli, E., Anwar, S., Gardner, S., **Hickson, D.**, Shaw, A., Steckley, Z., Vanthof, V., Sweeney, S. (2014) Leamington Townships Agricultural Landscape Pre and Post the Heinz Company Tomato Supply Era: A Detailed Field-by-Field Comparison of the 2013 and 2014 Cropping Seasons (poster). *CAGONT*, Toronto, Canada, 24-25 Oct.

Anwar, S., Goodfellow, S., Caldwell, J., Gardner, S., **Hickson, D.**, Smith, D., Steckley, Z., Sweeney, S. (2014) The Northern Bruce Peninsula Agricultural Landscape: Multi-temporal Observations with Mobile Mapping Technology (poster). *CAGONT*, Toronto, Canada, 24-25 Oct.

INVITED TALKS

Planetary Science at the Arecibo Observatory *Nov 2019*
Arecibo Observatory STAR Academy Arecibo, Puerto Rico

Radar Observing: Planetary Radar Astronomy *Aug 2019*
GBO-AO Single Dish Training Workshop Green Bank, USA

CONTRIBUTED TALKS

Interpreting Planetary Radar with Complex Permittivity Measurements for the Study of Asteroids *Nov 2017*
Department of Earth and Space Science, York University Toronto, Canada

Radar observations and experimental validation constraining regolith properties of planetary bodies *Jan 2017*
Department of Earth and Space Science, York University Toronto, Canada

Complex Permittivity Measurements of Planetary Analogue Mixtures in Vacuum *Jun 2015*
NSERC CREATE Annual Meeting Kingston, Canada

Improved Radar Interpretations: Applications to Asteroids *Jun 2014*
NSERC CREATE Annual Meeting Toronto, Canada

PUBLIC OUTREACH

Talk: Rocks in Space *Jun 2019*
Arecibo Observatory Asteroid Day Event Arecibo, Puerto Rico

Talk: Using Radar to Probe the Inner Solar System *Jun 2017*
Solar System Social Toronto, Canada

AWARDS, GRANTS & HONOURS

Ontario Graduate Scholarship (OGS)	2017 - 2019
York University ESS REC Conference Presentation 2nd prize	2017 - 2018
Mensa Canada Scholarship	2017 - 2018
Carswell Scholar	2016 - 2017
York Graduate Scholarship	2016 - 2017
NSERC CREATE Graduate Student Fellowship	2014 - 2016
McMaster Deans Honour List	2013 - 2014

MEMBERSHIPS

Association of Professional Geoscientists of Ontario	2013 - present
American Geophysical Union	2017 - 2019
Small Bodies Assessment Group	2016 - present

PROFESSIONAL & ACADEMIC SERVICE

Journal Reviewer

<i>Icarus</i>	2018
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Arecibo Observatory

Seminar Coordinator	2019 - present
Co-mentor of Undergraduate Intern	2019 - present

McMaster University

Science Society Representative	2011 - 2013
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