

# Dylan Hickson

Ph.D. Candidate/Graduate Research Assistant  
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## EDUCATION

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- **York University** Toronto, Canada  
*Ph.D., Earth & Space Science* *2014 - present*
  - SUPERVISOR: Dr. Michael G. Daly
  - PHD THESIS: Characterizing the Dielectric Behaviour of Asteroid Regolith Analogue Materials for 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
    - UNDERGRADUATE 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

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- **Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA)** Guelph, Canada  
*Agricultural Geomatics Assistant* *2013 - 2014*
  - Performed ground truthing of remote sensing data throughout Southern Ontario to correlate with field classification schemes
  - Aided in development of methodology for ground truthing surveys

## PROJECTS AND COLLABORATIONS

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- **Austrian Space Forum: OEWf AMADEE-18 Mars Analog Mission**  
*Remote Science Support Coordinator* *2017-2018*
  - Support successful execution and analysis of ScanMars and Field Spectrometry experiments
- **Western University/CSA: 2015 CanMars MSR Analogue Mission**  
*LiDAR Instrument Science Team* *November, 2015*
  - Analysis and processing of LiDAR point cloud data, participation in planning rover operations
- **McMaster University: Stelida Naxos Archaeological Project**  
*Database Developer / Field Worker* *August, 2014*
  - Implemented database structure for artifact metadata, cartographic/geologic interpretation

## PEER REVIEWED PUBLICATIONS

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**Hickson, D.**, Boivin, A., Daly, M.G., Ghent R., Nolan, M.C., Tait, K., Cunje, A., 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.

**Hickson, D.**, Sotodeh, S., Daly, M., Ghent, R., Nolan, M.C. (2017) Improvements on effective permittivity measurements of powdered alumina: Implications for bulk permittivity properties of asteroid regoliths. *Advances in Space Research* 59.1, 472-482.

## RELEVANT CONFERENCE ABSTRACTS

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**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. Abstract presented as a poster at *Women in Planetary Science and Exploration (WPSE) 2018*, Toronto, ON, 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. Abstract [P13B-2555] presented as a poster at *2017 Fall Meeting, AGU*, New Orleans, LA, 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. Abstract [P13B-2556] presented as a poster at *2017 Fall Meeting, AGU*, New Orleans, LA, 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. Abstract [P51C-2148] presented as a poster at *2016 Fall Meeting, AGU*, San Francisco, Calif., USA, 12-16 Dec.

**Hickson, D.**, Sotodeh, S., Daly, M., Ghent, R. (2016) Boundary Conditions Modelling of Permittivity Measurements of Powders in Coaxial Airline. Abstract [2137] presented as a poster at *47th Lunar and Planetary Science Conference (LPSC)*, The Woodlands, TX, 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. Abstract [1041] presented as a poster at *47th LPSC*, The Woodlands, TX, 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. Abstract [2025] presented as a poster at *47th LPSC*, The Woodlands, TX, USA, 21-25 Mar.

**Hickson, D.**, Daly, M., Ghent, R., Boivin, A., Cunje, A., Tsai, C-A. (2015) Complex Permittivity Measurements of Powders. Poster presented at *9th OSIRIS-REx Science Team Meeting*, John Hopkins Applied Physics Laboratory, Laurel, MD, USA, 20-22 Oct.

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

## ORAL PRESENTATIONS

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*Interpreting Planetary Radar with Complex  
Permittivity Measurements for the Study of Asteroids*

*November 2, 2017*

Department of Earth and Space Science Colloquium Talk

York University, Toronto, ON, Canada

*Using Radar to Probe the Inner Solar System*

*June 3, 2017*

Solar System Social (Outreach) Talk

Burdock, Toronto, ON, Canada

*Radar observations and experimental validation  
constraining regolith properties of planetary bodies*

*January 26, 2017*

Department of Earth and Space Science Colloquium Talk

York University, Toronto, ON, Canada

*Complex Permittivity Measurements of Planetary  
Analogue Mixtures in Vacuum*

*June 8, 2015*

NSERC CREATE Annual Meeting Talk

Technologies and Techniques for Earth & Space Exploration

Queens University, Kingston, ON, Canada

*Improved Radar Interpretations: Applications to Asteroids*

*June 12, 2014*

NSERC CREATE Annual Meeting Talk

Technologies and Techniques for Earth & Space Exploration

University of Toronto Institute for Aerospace Studies (UTIAS), Toronto, ON, Canada

## TECHNICAL SKILLS

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### Programming Experience

MATLAB, Python, IDL, HTML/CSS, L<sup>A</sup>T<sub>E</sub>X

### Software Proficiency

ArcGIS, JMARS, Microsoft Office, Git

### Laboratory/Field Experience

- Geophysical surveying: GPR, gravimetric, seismic
- Geologic mapping and GPS point acquisition
- Experimental design/implementation of process control (vacuum chamber) and material measurements (dielectric characterization with VNA/coaxial transmission line, cylindrical resonant cavity)
- Experience with SEM/EDS, XRD, petrographic microscope, geologic sample processing/characterization

## AWARDS, GRANTS & HONOURS

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Mensa Canada Scholarship . . . . .	2017 - 2018
Ontario Graduate Scholarship (OGS) . . . . .	2017 - 2018
The Carswell Scholarship . . . . .	2016 - 2017
York Graduate Scholarship . . . . .	2016 - 2017
NSERC CREATE Graduate Student Fellowship . . . . .	2014 - 2016
McMaster Deans Honour List . . . . .	2013 - 2014

## MEMBERSHIPS

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Association of Professional Geoscientists of Ontario . . . . .	2013 - present
American Geophysical Union . . . . .	2017 - present

## VOLUNTEER & EXTRACURRICULAR

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- **St. Felix Centre** Toronto, Canada  
*Community Dinner Volunteer* 2018 - present
  - Contribute to successful operation of Community Dinner program
  - Kitchen maintenance, meal preparation and serving
- **MacBEAT: McMaster's Music Community** Hamilton, Canada  
*Club President* 2013 - 2014
  - Oversaw weekly operation of club executive committee
  - Engaged with McMaster's student community with open meetups and performances
- **Hamilton Out of the Cold** Hamilton, Canada  
*Dinner Program Volunteer* 2012
  - Contributed to successful operation of dinner program
  - Serving guests, kitchen cleanup, dining room cleanup