Dustin M. Schroeder

Jet Propulsion Laboratory, California Institute of Technology
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EDUCATION

2014 **Jackson School of Geosciences, University of Texas**, Austin, TX
Doctor of Philosophy in Geophysics

2007 **Bucknell University**, Lewisburg, PA
Bachelor of Science in Electrical Engineering, *honors, magna cum laude*
Bachelor of Arts in Physics, *magna cum laude*
Minors in Mathematics and Philosophy

PROFESSIONAL EXPERIENCE

2014 – present **Jet Propulsion Laboratory, California Institute of Technology**, Pasadena, CA
Radar Geophysicist and Systems Engineer
- Develop radar sounder systems, science, and missions for icy moon exploration
- Create advanced radar sounding analysis techniques for geophysical glaciology

2008 – 2014 **Institute for Geophysics, University of Texas**, Austin, TX
Graduate Researcher, Advisor: D.D. Blankenship
- Studied subglacial hydrology of Thwaites Glacier using airborne radar sounding

2012 **Applied Physics Lab, Johns Hopkins University**, Laurel, MD
Graduate Researcher, Advisor: R.K. Raney
- Studied theoretical subglacial scattering functions for focused radar sounding data

2007 – 2008 **Freescale Semiconductor**, Austin, TX
Platform Hardware Engineer, Multimedia Applications Division
- Developed interface for debugging board and created university hiring strategy

2006 – 2007 **Department of Electrical Engineering, Bucknell University**, Lewisburg, PA
Undergraduate Researcher, Advisor: D.F. Kelley
- Optimized design of a dielectric rod antenna for ground penetrating radar

2005 **Lerner Research Institute, Cleveland Clinic Foundation**, Cleveland, OH
Undergraduate Researcher, Advisor: S. Roy
- Observed and modeled adult stem-cell kinetics on MEMS-fabricated surfaces

2004 **Harvard-Smithsonian Center for Astrophysics**, Cambridge, MA
Undergraduate Researcher, Advisor: P.B. Reid
- Produced the first profile of grazing-incidence optics for the IXO X-ray telescope

2002 **Department of Physics, Case Western Reserve University**, Cleveland, OH
Undergraduate Researcher, Advisor: D.S. Akerib
- Prepared, repaired, and improved experiments for Cryogenic Dark Matter Search II

AWARDS AND FELLOWSHIPS

2014 Best Graduate Student Paper Award, Jackson School of Geosciences
2014 National Science Olympiad Heart of Gold Award for Service
2013 Best Ph.D. Student Speaker Award, Jackson School of Geosciences
2013 Jackson School of Geosciences Research Symposium, 1st Place Late-Career Ph.D.
2012 NASA Group Achievement Award: Operation Ice Bridge
2012 Gale White Fellowship, University of Texas Institute for Geophysics

2012 David Brunton Jr. Fellowship, University of Texas Graduate School
2010 The Friar Society, The University of Texas
2009 – 2014 NSF Graduate Research Fellowship
2008 University of Texas Graduate School Recruiting Fellowship
2007 Thelma Johnson Showalter Prize, Bucknell University
2007 Phi Beta Kappa, Bucknell University
2006 Tau Beta Pi, Bucknell University
2006 Sigma Pi Sigma, Bucknell University
2005 COMAP Mathematical Contest in Modeling, Meritorious Winner

PUBLICATIONS

Refereed Papers

2014 **D.M. Schroeder,** D.D. Blankenship, D.A. Young, E. Quartini. Evidence for Elevated and Spatially Heterogeneous Geothermal Flux Beneath the West Antarctic Ice Sheet, *Proceedings of the National Academy of Sciences* (in press)
2014 A.E. Witus, C.M. Branecky, J.B. Anderson, W. Szczucinski, **D.M. Schroeder**, D.D. Blankenship, M. Jakobsson. Meltwater Intensive Glacial Reatreat in Polar Environments and Investigation of Associated Sediments: Example from Pine Island Bay, West Antarctica, *Quaternary Science Reviews*
2013 **D.M. Schroeder**, D.D. Blankenship, D.A. Young. Evidence for a Water System Transition Beneath Thwaites Glacier, West Antarctica, *Proceedings of the National Academy of Sciences*
2013 J.A. MacGregor, G.A. Catania, H.B. Conway, **D.M. Schroeder**, I.R. Joughin, D.A. Young, S.D. Kempf, D.D. Blankenship. Weak Bed Control of the Eastern Shear Margin of Thwaites Glacier. *Journal of Glaciology*
2012 A.P. Wright, D.A. Young, J.L. Roberts, **D.M. Schroeder**, J.L. Bamber, J.A. Dowdeswell, N.W. Young, A.M. Le Brocq, R.C. Warner, A.J. Payne, D.D. Blankenship, T.D. van Ommen, M.J. Siegert. Evidence for a Hydrological Connection Between the Ice Divide and Ice Sheet Margin in the Aurora Subglacial Basin Sector of East Antarctica, *Journal of Geophysical Research Earth Surface*
2011 D.A. Young, A.P. Wright, J.L. Roberts, R.C. Warner, N.W. Young, J.S. Greenbaum, **D.M. Schroeder**, D.E. Sugden, J.W. Holt, D.D. Blankenship, T. Van Ommen, M.J. Siegert. A Dynamic Early East Antarctic Ice Sheet Suggested by Ice Covered Fjord Landscapes, *Nature*

Papers in Preparation and Review

D.M. Schroeder, D.D. Blankenship, D.A. Young, A.E. Krishner, J.B. Anderson. Radar Sounding Evidence for Deformable Sediments and Outcropping Bedrock Beneath Thwaites Glacier, West Antarctica, *Geophysical Research Letters* (in review)
D.M. Schroeder, R.K. Raney, D.D. Blankenship. Detecting Subglacial Water Bodies from the Specularity of Radar Bed Echoes. *IEEE Geoscience and Remote Sensing* (in review)
C. Grima, **D.M. Schroeder,** D.D. Blankenship, D.A. Young. Planetary Landing Zone Assessment by Radar Sounder: Demonstration in Antarctica, *Planetary and Space Science* (in review)
M.G.P. Cavitte, D.D. Blankenship, D.A. Young, **D.M. Schroeder**, M.J. Siegert, E. Le Meur. Radar Stratigraphy Connecting Lake Vostok and Dome C, East Antarctica, Across the Last Two Glacial Cycles, *Journal of Glaciology*

Technical Reports

2014 **D.M. Schroeder**, C. Grima, G.W. Patterson, Y. Gim3, D.D. Blankenship, A. Moussessian. Topographic Imager Requirements for Clutter Rejection for the Europa Clipper IPR, Europa Clipper Project, NASA

2012 **D.M. Schroeder**, C. Grima, D.D. Blankenship. Assessing the Utility of the Europa Clipper Radar Sounder to Identify Potential Landing Sites, Europa Science Definition Team, NASA

INVITED PAPERS

2011 **D.M. Schroeder**, D.D. Blankenship, D.A. Young. Interpretation of Sub-resolution Bedform and Subglacial Hydrologic Network Geometries from Radar Echo Specularity: Application to Thwaites Glacier, West Antarctica, AGU Fall Meeting, San Francisco, CA, December 5th – 9th

INVITED TALKS

2014 Norwegian Polar Research Institute, Tromso, Norway, June 4th
2013 Bromery Seminar, Earth and Planetary Science, Johns Hopkins University, November 7th
2013 Radar Science and Engineering Section, Jet Propulsion Laboratory, Caltech, September 19th
2012 Space Research Group, Applied Physics Lab, Johns Hopkins University, May 3rd

CONFERENCE PARTICIPATION (Selected Abstracts)

2014 D.A. Young, E. Quartini, E.M. Powell, **D.M. Schroeder**, T.G. Richter, D.D. Blankenship, Structure of the Marie Byrd Land crustal province from GIMBLE aerogeophysics, SCAR Open Science Conference, Auckland, New Zealand, August 25th – 28th

2014 **D.M. Schroeder**, D.D. Blankenship, D.A. Young, E. Quartini, J.B. Anderson, A.E. Witus, Radar-sounding observations of basal water, sediments and geothermal heat flux and their implications for the past and future sea-level contribution of the Amundsen Sea sector of West Antarctica, IGS Symposium on the Contribution of Glaciers and Ice Sheets to Sea-Level Change, Chamonix, France, May 26th – 30th

2014 D.D. Blankenship, **D.M. Schroeder**. Airborne Studies of Subglacial Boundaries in West Antarctica, International Symposium on Polar Sciences, Incheon, South Korea, May 27th – 29th

2014 D.D. Blankenship, A. Moussessian, **D.M. Schroeder**, K.M. Soderlund, C.Grima, Y. Gim, J.J. Plaut, B.E. Schmidt. Flyby Sounding of Europa's Icy Shell: Radar Investigations, Analogs, and Instruments for the Europa Clipper Mission, Workshop on the Habitability of Icy Worlds, Pasadena, CA, February 5th – 7th

2013 **D.M. Schroeder**, D.D. Blankenship, D.A. Young. Quantifying Bedform Geometry, Water Configuration, and Melt Rate Beneath Thwaites Glacier from Radar Scattering Functions. AGU Fall Meeting, San Francisco, CA, December 9th – 13th

2013 C. Grima, **D.M. Schroeder**, D.D. Blankenship, D.A. Young. Planetary Surface Rougness Derived from Ice Penetrating Radar Data: Method and Concept Validation in Antarctica. AGU Fall Meeting, San Francisco, CA, December 9th – 13th

2013 C. Cura, E. Arnold, B. Karwoski, C. Grima, **D.M. Schroeder**, D.A. Young, D.D. Blankenship. Enhancing Europa Surface Characterization with Ice Penetrating Radar: A Comparative Study in Antarctica. AGU Fall Meeting, San Francisco, December 9th – 13th

2013 **D.M. Schroeder**, D.D. Blankenship, D.A. Young. What Can Radar Scattering Tell Us About Past and Future Retreats in the Amundsen Sea Embayment? WAIS Workshop, Sterling, VA, September 29th – October 2nd

2013 **D.M. Schroeder**, D.D. Blankenship, R.K. Raney, D.A. Young. Buried Information: Constraining Bed Geometry and Material from the Doppler-Dependent Radar-Scattering Function. International Symposium on Radioglaciology, Lawrence, September 9th – 13th

2013 M.G.P. Cavitte, D.D. Blankenship, D.A. Young, **D.M. Schroeder**, M.J. Siegert, E. LeMeur. Extending East Antarctic Ice-Core Chronology with Radar Layer Stratigraphy. IGS International Symposium on Radioglaciology, Lawrence, KS, September 9th – 13th

2012 **D.M. Schroeder**, D.D. Blankenship, D.A. Young, E.M. Powell. Configuration of Subglacial Water and Sediments Beneath Thwaites Glacier, West Antarctica: Context for a Potential Basal-Water-Triggered Grounding-Line-Retreat. AGU Fall Meeting, San Francisco, CA, December 3rd – 9th

2012 **D.M. Schroeder**, D.D. Blankenship, D.A. Young. Evidence for Ice-Flow-Coupled Subglacial Water Systems Beneath West Antarctica's Potentially Unstable Thwaites Glacier, WAIS Workshop, Eatonville, WA, September 19th – 22nd

2012 **D.M. Schroeder**, D.D. Blankenship, D.A. Young. Remote Sensing of Subglacial Water Networks with Ice Penetrating Radar, Chapman Conference on Remote Sensing of Terrestrial Water Cycle, Kona, HI, February 19th – 22nd

2011 **D.M. Schroeder**, D.D. Blankenship, D.A. Young. The Basal Boundary of the Thwaites Glacier Catchment: Characterizing and Anisotropic Hydrological Environment, International Symposium on Antarctic Earth Science, Edinburgh, UK, July 10th – 16th

2010 **D.M. Schroeder**, D.D. Blankenship, D.A. Young. The Subglacial Hydrology of Thwaites Glacier: Characterization and Interpretation of a Basin-Scale Specularity Map, SCAR Open Science Conference, Buenos Aires, Argentina, August 3rd – 6th

2009 **D.M. Schroeder**, D.D. Blankenship, D.A. Young. Improved Characterization of Subglacial Hydrology Using Multiple Radar Focusing Windows: Examples from Thwaites Glacier, West Antarctica, First Antarctic Climate Evolution Symposium, Granada, Spain, September 7th – 11th

DEPARTMENTAL TALKS

2013 Characterizing the Subglacial Hydrology of Thwaites Glacier, West Antarctica Using Focused Airborne Radar Sounding, Technical Sessions, Jackson School of Geoscience, University of Texas at Austin, April 16th

2013 Configuration of Subglacial Water and Sediments Beneath Thwaites Glacier, West Antarctica: Context for a Potential Basal-Water-Triggered Grounding-Line-Retreat, 2nd Annual Jackson School Research Symposium, February 2nd

TEACHING EXPERIENCE

2013 Guest Lecturer, The Cryosphere, Rice University, 1 Lecture
2013 Geophysical Glaciology: Ice Penetrating Radar, UT Institute for Geophysics, 10 Weeks
2010 Radar Principles Short Course, UT Institute for Geophysics, 4 Weeks

FIELD WORK

2010 – 2011 The ICECAP Project and Operation Ice Bridge, East Antarctica (2 Months)
2009 – 2010 The ICECAP Project, East Antarctica (3 Months)
2008 – 2009 The ICECAP Project, East Antarctica (3 Months)
Agencies: NSF (US), NASA (US), NERC (UK), AAD (AUS), IPEV (FR), PNRA (IT)
Bases: McMurdo (US), Casey (AUS), Terra Nova (IT), Cap Prud'homme (FR)
Targets: Aurora Subglacial Basin, Astrolabe, Byrd, Totten, and Wilkes Glaciers
Instruments: VHF Radar, HF Radar, GPS, Gravimeter, Magnetometer, Lidar
Role: Lead RF Engineer and Radar Operator

INSTRUMENT DEVELOPMENT

2013 – 2014 University of Texas MARFA Ice Penetrating Radar, Lead RF Engineer
2010 – 2011 University of Texas Dual Frequency Ice Penetrating Radar, Lead RF Engineer
2008 – 2011 University of Texas HiCARS II Ice Penetrating Radar, Lead RF Engineer

GRANTS

2014 Co-I, **Radar Surface Statistical Reconnaissance of Mars for Landing Site and Geological Characterization of Planetary Bodies** (Jackson School Seed Grant. PI: D.A. Young) $15,311
2013 Key Personnel, **Ice Penetrating Radar (IPR) for Europa Exploration** (NASA Instrument Concepts for Europa Exploration. PI: A. Moussessian) $1,546,860
2013 Collaborator, **Investigating Cryospheric Evolution by Constraining Antarctic geothermal Flux Estimates (ICECAFE)** (NASA Sea Level Rise, PI: D.A. Young) $1,072,227
2008 NSF GRFP Fellow, **Quantifying Sources of Uncertainty in Predicted Contributions of the West Antarctic Ice Sheet to Sea Level Rise** (NSF Graduate Research Fellowship Program. PI: D.M. Schroeder) $90,000

PROFESSIONAL SERVICE

2013 – 2014 Technical Assistant, RIME Radar Sounder, JUICE mission, ESA
2013 – 2014 Technical Assistant, Europa Assessment Group, NASA
2011 – 2012 Member, Working Group for Europa and Ganymede Radar Sounding
2010 – 2012 Technical Assistant, Europa Science Definition Team, NASA
Reviewer: Geophysical Research Letters, Journal of Geophysical Research, Journal of Glaciology, NASA Funding Panel

OUTREACH

2004 – 2014 Earth and Space Science Committee, National Science Olympiad
2013 – 2014 Planetary Science National Event Supervisor, National Science Olympiad
2014 Guest Speaker, Lakeway Men's Breakfast, Austin, TX
2007 – 2014 Science Olympiad Coach, Liberal Arts and Sciences Academy, Austin, TX
2003 – 2013 Astronomy National Event Supervisor, National Science Olympiad
2011 Onboard Science Lecture, Aurora Australis AAD Voyage: Casey to Hobart
2010 Guest Speaker, University Methodist Church, Austin, TX
2010 Guest Speaker, Solon High School, Solon, OH
2010 Tejas Club Life Raft Debate, Austin, TX
2009 Energy and Climate Facilitator, Clinton Global Initiative University, Austin, TX
2008 Science Olympiad Coaches Clinic, Dearborn, MI
2004 Space Science Workshop, Wright Center for Science Education, Tufts University

PROFESSIONAL AFFILIATIONS

American Geophysical Union
International Glaciological Society
IEEE Geoscience and Remote Sensing Society
IEEE Antennas and Propagation Society
Society for Industrial and Applied Mathematics