



Dustin Schroeder

Assistant Professor of Geophysics and, by courtesy, of Electrical Engineering and Center Fellow, by courtesy, at the Woods Institute for the Environment

 Curriculum Vitae available Online

Bio

BIO

My research focuses on advancing the scientific and technical foundations of geophysical ice penetrating radar and its use in observing and understanding the interaction of ice and water in the solar system. I am primarily interested in the subglacial and englacial conditions of rapidly changing ice sheets and their contribution to global sea level rise. However, a growing secondary focus of my work is the subsurface exploration of icy moons. I am also interested in the development and application of science-optimized geophysical radar systems. I consider myself an instrument scientist and strive to approach problems from both an earth systems science and a radar systems engineering perspective. I am actively engaged with the flow of information through each step of the observational science process; from instrument and experiment design, through data processing and analysis, to modeling and inference. This allows me to draw from a multidisciplinary set of tools to test system-scale and process-level hypotheses. For me, this deliberate integration of science and engineering is the most powerful and satisfying way to approach questions in Earth and planetary science

ACADEMIC APPOINTMENTS

- Assistant Professor, Geophysics
- Assistant Professor (By courtesy), Electrical Engineering
- Center Fellow (By courtesy), Stanford Woods Institute for the Environment

ADMINISTRATIVE APPOINTMENTS

- Assistant Professor, Department of Geophysics, Stanford University, (2016- present)
- Assistant Professor (by courtesy), Department of Electrical Engineering, Stanford University, (2017- present)
- Center Fellow (by courtesy), Stanford Woods Institute for the Environment, (2020- present)
- Faculty Affiliate, Stanford Woods Institute for the Environment, (2016-2020)
- Radar Systems Engineer, Jet Propulsion Laboratory, California Institute of Technology, (2014-2016)

HONORS AND AWARDS

- Senior Member, Institute of Electrical and Electronics Engineers (2019)
- CAREER Award, National Science Foundation (2018)
- LInC Fellow, Stanford Woods Institute for the Environment (2018)
- Fredrick E. Terman Fellowship, Stanford University (2016 - 2019)
- Science Team Member, Mini-RF Radar, Lunar Reconnaissance Orbiter, NASA (2016)
- Science Team Member, REASON Radar Sounder, Europa Mission, NASA (2015)
- JPL Team Award, Europa Mission Instrument Proposal (2015)

- Best Graduate Student Paper Award, Jackson School of Geosciences (2014)
- Heart of Gold Award for Service to Science Education, National Science Olympiad (2014)
- Best Ph.D. Student Poster Award, Jackson School of Geosciences (2013)
- Best Ph.D. Student Speaker Award, Jackson School of Geosciences (2013)
- NASA Group Achievement Award, Operation Ice Bridge (2012)
- David Brunton Jr. Fellowship, University of Texas Graduate School (2012)
- Gale White Fellowship, University of Texas Institute for Geophysics (2012)
- Antarctic Service Medal, National Science Foundation (2011)
- The Friar Society, University of Texas (2010)
- Graduate Research Fellowship Program, National Science Foundation (2009)
- Recruiting Fellowship, University of Texas Graduate School (2008)
- Thelma Johnson Showalter Prize, Bucknell University (2007)
- Phi Beta Kappa, Bucknell University (2007)
- Tau Beta Pi, Bucknell University (2006)
- Sigma Pi Sigma, Bucknell University (2006)
- Meritorious Winner, COMAP Mathematical Contest in Modeling (2005)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Council Member, International Glaciological Society (2019 - present)
- Scientific Editor, Journal of Glaciology (2019 - present)
- Senator, School of Earth, Energy, and Environmental Sciences, Stanford Faculty Senate (2018 - present)
- Member, Solid Earth Response and influence on Cryosphere Evolution Steering Committee, Scientific Committee on Antarctic Research (2016 - present)
- Member, Interiors Working Group, Europa Mission, NASA (2015 - present)
- Lead, Passive Sounding Working Group, Radar for Icy Moon Exploration, ESA (2015 - 2018)
- Chair, National Science Olympiad Earth and Space Science Committee (2014 - present)
- Member, Society of Exploration Geophysicists (2008 - present)
- Member, IEEE Antennas and Propagation Society (2008 - present)
- Member, International Glaciological Society (2008 - present)
- Member, IEEE Geoscience and Remote Sensing Society (2008 - present)
- Member, American Geophysical Union (2008 - present)

PROFESSIONAL EDUCATION

- Ph.D., University of Texas at Austin , Geophysics (2014)
- B.S., Bucknell University , Electrical Engineering (2007)
- B.A., Bucknell University , Physics (2007)

LINKS

- Stanford Radio Glaciology: <https://earth.stanford.edu/radio-glaciology/>

Teaching

COURSES

2019-20

- Frontiers of Geophysical Research at Stanford: GEOPHYS 101, GEOPHYS 201 (Aut)
- Ice Penetrating Radar: GEOPHYS 230 (Spr)
- Introduction to the Foundations of Contemporary Geophysics: EARTHSYS 110, GEOPHYS 110 (Spr)
- Radio Glaciology: GEOPHYS 385G (Aut, Win, Spr, Sum)

2018-19

- Frontiers of Geophysical Research at Stanford: GEOPHYS 101, GEOPHYS 201 (Aut)
- Introduction to the Foundations of Contemporary Geophysics: EARTHSYS 110, GEOPHYS 110 (Spr)
- Radio Glaciology: GEOPHYS 385G (Aut, Win, Spr, Sum)
- The Space Mission to Europa: GEOPHYS 54N (Aut)

2017-18

- Ice Penetrating Radar: GEOPHYS 165, GEOPHYS 230 (Spr)
- Radio Glaciology: GEOPHYS 385G (Aut, Win, Spr, Sum)
- The Space Mission to Europa: GEOPHYS 54N (Aut)

2016-17

- Hydrogeophysics: GEOPHYS 284 (Spr)
- Introduction to the foundations of contemporary geophysics: EARTHSYS 110, GEOPHYS 110 (Aut)
- Near-Surface Geophysics: GEOPHYS 190 (Spr)
- Radio Glaciology: GEOPHYS 385G (Aut, Win, Spr, Sum)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Roger Michaelides

Postdoctoral Faculty Sponsor

Winnie Chu, Gregor Steinbrügge

Doctoral Dissertation Advisor (AC)

Nicole Bienert, Anna Broome, Riley Culberg, Eliza Dawson, Sean Peters

Doctoral (Program)

Mickey MacKie

Publications

PUBLICATIONS

- **Assessing the detectability of Europa's eutectic zone using radar sounding** *Icarus*
Culha, C., Schroeder, D. M., Jordan, T. M., Haynes, M. S.
2020; 339 (0019-1035)
- **Layer optimized SAR processing and slope estimation in radar sounder data** *JOURNAL OF GLACIOLOGY*

-
- Castelletti, D., Schroeder, D. M., Mantelli, E., Hilger, A.
2019; 65 (254): 983–88
- **A subglacial hydrologic drainage hypothesis for silt sorting and deposition during retreat in Pine Island Bay** *ANNALS OF GLACIOLOGY*
Schroeder, D. M., MacKie, E. J., Creyts, T. T., Anderson, J. B.
2019; 60 (80): 14–20
 - **Subglacial roughness of the Greenland Ice Sheet: relationship with contemporary ice velocity and geology** *CRYOSPHERE*
Cooper, M. A., Jordan, T. M., Schroeder, D. M., Siegert, M. J., Williams, C. N., Bamber, J. L.
2019; 13 (11): 3093–3115
 - **A Polarimetric Coherence Method to Determine Ice Crystal Orientation Fabric From Radar Sounding: Application to the NEEM Ice Core Region** *IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING*
Jordan, T. M., Schroeder, D. M., Castelletti, D., Li, J., Dall, J.
2019; 57 (11): 8641–57
 - **Radar-Detected Englacial Debris in the West Antarctic Ice Sheet** *GEOPHYSICAL RESEARCH LETTERS*
Winter, K., Woodward, J., Ross, N., Dunning, S. A., Hein, A. S., Westoby, M. J., Culberg, R., Marrero, S. M., Schroeder, D. M., Sugden, D. E., Siegert, M. J.
2019
 - **Seismology with Dark Data: Image-Based Processing of Analog Records Using Machine Learning for the Rangely Earthquake Control Experiment** *SEISMOLOGICAL RESEARCH LETTERS*
Wang, K., Ellsworth, W. L., Beroza, G. C., Williams, G., Zhang, M., Schroeder, D., Rubinstein, J.
2019; 90 (2): 553–62
 - **Doppler-based discrimination of radar sounder target scattering properties: A case study of subsurface water geometry in Europa's ice shell** *Icarus*
Michaelides, R., Schroeder, D. M.
2019
 - **REVISITING THE LIMITS OF AZIMUTH PROCESSING GAIN FOR RADAR SOUNDING**
Schroeder, D. M., Castelletti, D., Pena, I., IEEE
IEEE.2019: 994–96
 - **RADAR SCATTERING IN FIRN AND ITS IMPLICATIONS FOR VHF/UHF ORBITAL ICE SOUNDING**
Culberg, R., Schroeder, D. M., IEEE
IEEE.2019: 4137–40
 - **TWO DIMENSIONAL IMAGE FORMATION WITH PASSIVE RADAR USING THE SUN FOR ECHO DETECTION**
Peters, S. T., Schroeder, D. M., Castelletti, D., Haynes, M. S., Romero-Wolf, A., IEEE
IEEE.2019: 10091–94
 - **Multidecadal observations of the Antarctic ice sheet from restored analog radar records.** *Proceedings of the National Academy of Sciences of the United States of America*
Schroeder, D. M., Dowdeswell, J. A., Siegert, M. J., Bingham, R. G., Chu, W., MacKie, E. J., Siegfried, M. R., Vega, K. I., Emmons, J. R., Winstein, K.
2019
 - **In Situ Demonstration of a Passive Radio Sounding Approach Using the Sun for Echo Detection** *IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING*
Peters, S. T., Schroeder, D. M., Castelletti, D., Haynes, M., Romero-Wolf, A.
2018; 56 (12): 7338–49
 - **Geometric Power Fall-Off in Radar Sounding** *IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING*
Haynes, M. S., Chapin, E., Schroeder, D. M.
2018; 56 (11): 6571–85
 - **A constraint upon the basal water distribution and thermal state of the Greenland Ice Sheet from radar bed echoes** *CRYOSPHERE*
Jordan, T. M., Williams, C. N., Schroeder, D. M., Martos, Y. M., Cooper, M. A., Siegert, M. J., Paden, J. D., Huybrechts, P., Bamber, J. L.
2018; 12 (9): 2831–54
 - **Resolving the internal and basal geometry of ice masses using imaging phase-sensitive radar** *JOURNAL OF GLACIOLOGY*
Young, T., Schroeder, D. M., Christoffersen, P., Lok, L., Nicholls, K. W., Brennan, P. V., Doyle, S. H., Hubbard, B., Hubbard, A.

2018; 64 (246): 649–60

- **Discovery of a hypersaline subglacial lake complex beneath Devon Ice Cap, Canadian Arctic** *Science Advances*
Rutishauser, A., Blankenship, D. D., Sharp, M., Skidmore, M. L., Greenbaum, J. S., Grima, C., Schroeder, D. M., Dowdeswell, J. A., Young, D. A.
2018: eaar4353
- **UNFOCUSED SAR PROCESSING FOR ENGLACIAL LAYER SLOPE ESTIMATION USING RADAR SOUNDER DATA**
Castelletti, D., Schroeder, D. M., Mantelli, E., Hilger, A., IEEE
IEEE.2018: 4150–53
- **FIRST IN-SITU DEMONSTRATION OF PASSIVE RADIO SOUNDING USING THE SUN AS A SOURCE FOR ECHO DETECTION**
Peters, S. T., Schroeder, D. M., Castelletti, D., Haynes, M., Romero-Wolf, A., IEEE
IEEE.2018: 4154–57
- **Retrieval of Englacial Firn Aquifer Thickness from Ice-Penetrating Radar Sounding in Southeastern Greenland** *Geophysical Research Letters*
Chu, W., Schroeder, D. M., Siegfried, M. R.
2018
- **Discovery of a hypersaline subglacial lake complex beneath Devon Ice Cap, Canadian Arctic.** *Science advances*
Rutishauser, A., Blankenship, D. D., Sharp, M., Skidmore, M. L., Greenbaum, J. S., Grima, C., Schroeder, D. M., Dowdeswell, J. A., Young, D. A.
2018; 4 (4): eaar4353
- **Surface Meltwater Impounded by Seasonal Englacial Storage in West Greenland** *Geophysical Research Letters*
Kendrick, A. K., Schroeder, D. M., Chu, W., Young, T. J., Christoffersen, P., Todd, J., Doyle, S. H., Box, J. E., Hubbard, A., Hubbard, B., Brennan, P. V., Nicholls, K. W., Lok, et al
2018
- **A Constraint Upon the Basal Water Distribution and Basal Thermal State of the Greenland Ice Sheet from Radar Bed-Echoes** *The Cryosphere*
Jordan, T. M., Williams, C. N., Schroeder, D. M., Martos, Y. M., Cooper, M. A., Siegert, M. J., Paden, J. D., Hyybrechts, P., Bamber, J. L.
2018
- **Geometric Power Fall-off in Radar Sounding** *IEEE Transactions in Geoscience and Remote Sensing*
Haynes, M., Chapin, E., Schroeder, D. M.
2018
- **Resolving the internal and basal geometry of ice masses using imaging phase-sensitive radar** *Journal of Glaciology*
Young, T., Schroeder, D. M., Christoffersen, P. V., Lok, L., Nicholls, K. W., Brennan, P. V., Doyle, S. H., Hubbard, B., Hubbard, A.
2018
- **In-Situ Demonstration of a Passive Radio Sounding Approach Using the Sun for Echo Detection,** *IEEE Transactions in Geoscience and Remote Sensing*
Peters, S. T., Schroeder, D. M., Castelletti, D., Haynes, M., Romero-Wolf, A.
2018
- **Complex Basal Thermal Transition Near the Onset of Petermann Glacier, Greenland** *Journal of Geophysical Research*
Chu, W., Schroeder, D. M., Seroussi, H., Creyts, T. T., Bell, R. E.
2018
- **Radar attenuation in Europa's ice shell: Obstacles and opportunities for constraining the shell thickness and its thermal structure** *JOURNAL OF GEOPHYSICAL RESEARCH-PLANETS*
Kalousova, K., Schroeder, D. M., Soderlund, K. M.
2017; 122 (3): 524-545
- **Bright prospects for radar detection of Europa's ocean** *ICARUS*
Aglyamov, Y., Schroeder, D. M., Vance, S. D.
2017; 281: 334-337
- **An Interferometric Approach to Cross-Track Clutter Detection in Two-Channel VHF Radar Sounders** *IEEE Transactions on Geoscience and Remote Sensing*
Castelletti, D., Schroeder, D. M., Hensley, S., Grima, C., Ng, G., Young, D., Gim, Y., Bruzzone, L., Moussessian, A., Blankenship, D. D.
2017

- **Ocean access beneath the southwest tributary of Pine Island Glacier, West Antarctica** *Annals of Glaciology*
Schroeder, D. M., Hilger, A. M., Paden, J. D., Young, D. A., Corr, H. F.
2017
- **Assessing the potential for measuring Europa's tidal Love number h2 using radar sounder and topographic imager data** *Earth and Planetary Science Letters*
Steinbrugge, G., Schroeder, D. M., Haynes, M. S., Hussmann, H., Grima, C., Blankenship, D. D.
2017
- **Mars radar clutter and surface roughness characteristics from MARSIS data** *Icarus*
Campbell, B. A., Schroeder, D. M., Whitten, J. L.
2017
- **Self-affine subglacial roughness: consequences for radar scattering and basal water discrimination in northern Greenland** *The Cryosphere*
Jordan, T. M., Cooper, M. A., Schroeder, D. M., Williams, C. N., Paden, J. D., Siegert, M. J., Bamber, J. L.
2017
- **Radar attenuation in Europa's ice shell: Obstacles and opportunities for constraining the shell thickness and its thermal structure** *Journal of Geophysical Research: Planets*
Kalousova, K., Schroeder, D. M., Soderlund, K. M.
2017
- **Extensive winter subglacial water storage beneath the Greenland Ice Sheet** *GEOPHYSICAL RESEARCH LETTERS*
Chu, W., Schroeder, D. M., Seroussi, H., Creyts, T. T., Palmer, S. J., Bell, R. E.
2016; 43 (24): 12484-12492
- **Assessing the potential for passive radio sounding of Europa and Ganymede with RIME and REASON** *PLANETARY AND SPACE SCIENCE*
Schroeder, D. M., Romero-Wolf, A., Carrer, L., Grima, C., Campbell, B. A., Kofman, W., Bruzzone, L., Blankenship, D. D.
2016; 134: 52-60
- **Prospects of passive radio detection of a subsurface ocean on Europa with a lander** *PLANETARY AND SPACE SCIENCE*
Romero-Wolf, A., Schroeder, D. M., Ries, P., Bills, B. G., Naudet, C., Scott, B. R., Treuhaft, R., Vance, S.
2016; 129: 118-121
- **Subglacial controls on the flow of Institute Ice Stream, West Antarctica** *ANNALS OF GLACIOLOGY*
Siegert, M. J., Ross, N., Li, J., Schroeder, D. M., Rippin, D., Ashmore, D., Bingham, R., Gogineni, P.
2016; 57 (73): 19-24
- **Evidence for Variable Grounding-Zone and Shear-Margin Basal Conditions Across Thwaites Glacier, West Antarctica** *Geophysics*
Schroeder, D. M., Grima, G., Blankenship, D. D.
2016; 81 (1)
- **Adaptively constraining radar attenuation and temperature across the Thwaites Glacier catchment using bed echoes** *JOURNAL OF GLACIOLOGY*
Schroeder, D. M., Seroussi, H., Chu, W., Young, D. A.
2016; 62 (236): 1075-1082
- **Rapid submarine ice melting in the grounding zones of ice shelves in West Antarctica** *Nature Communications*
Khazendar, A., Rignot, E., Schroeder, D. M., Seroussi, H., Seuchl, B., Mouginot, J., Sutterley, T. C., Velicogna, I.
2016
- **Deep radiostratigraphy of the East Antarctic plateau: connecting the Dome C and Vostok ice core sites** *JOURNAL OF GLACIOLOGY*
Cavitte, M. G., Blankenship, D. D., Young, D. A., Schroeder, D. M., Parrenin, F., Lemeur, E., MacGregor, J. A., Siegert, M. J.
2016; 62 (232): 323-334
- **Assessing the potential for passive radio sounding of Europa and Ganymede with RIME and REASON** *Planetary and Space Science*
Schroeder, D. M., Romero-Wolf, A., Carrer, L., Grima, C., Campbell, B. A., Kofman, W., Bruzzone, L., Blankenship, D. D.
2016
- **Radar signal propagation through the ionosphere of Europa** *PLANETARY AND SPACE SCIENCE*
Grima, C., Blankenship, D. D., Schroeder, D. M.

2015; 117: 421-428

- **Ocean access to a cavity beneath Totten Glacier in East Antarctica** *NATURE GEOSCIENCE*
Greenbaum, J. S., Blankenship, D. D., Young, D. A., Richter, T. G., Roberts, J. L., Aitken, A. R., Legresy, B., Schroeder, D. M., Warner, R. C., van Ommen, T. D., Siegert, M. J.
2015; 8 (4): 294-298
- **Estimating Subglacial Water Geometry Using Radar Bed Echo Specularity: Application to Thwaites Glacier, West Antarctica** *IEEE GEOSCIENCE AND REMOTE SENSING LETTERS*
Schroeder, D. M., Blankenship, D. D., Raney, R. K., Grima, C.
2015; 12 (3): 443-447
- **The distribution of basal water between Antarctic subglacial lakes from radar sounding** *Philosophical Transactions of the Royal Society A*
Young, D. A., Schroeder, D. M., Blankenship, D. D., Kempf, S. D., Quartini, E.
2015; 374 (2059)
- **Planetary landing-zone reconnaissance using ice-penetrating radar data: Concept validation in Antarctica** *PLANETARY AND SPACE SCIENCE*
Grima, C., Schroeder, D. M., Blankenship, D. D., Young, D. A.
2014; 103: 191-204
- **Airborne radar sounding evidence for deformable sediments and outcropping bedrock beneath Thwaites Glacier, West Antarctica** *GEOPHYSICAL RESEARCH LETTERS*
Schroeder, D. M., Blankenship, D. D., Young, D. A., Witus, A. E., Anderson, J. B.
2014; 41 (20): 7200-7208
- **Surface slope control on firn density at Thwaites Glacier, West Antarctica: Results from airborne radar sounding** *GEOPHYSICAL RESEARCH LETTERS*
Grima, C., Blankenship, D. D., Young, D. A., Schroeder, D. M.
2014; 41 (19): 6787-6794
- **Evidence for elevated and spatially variable geothermal flux beneath the West Antarctic Ice Sheet** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Schroeder, D. M., Blankenship, D. D., Young, D. A., Quartini, E.
2014; 111 (25): 9070-9072
- **Meltwater intensive glacial retreat in polar environments and investigation of associated sediments: example from Pine Island Bay, West Antarctica** *QUATERNARY SCIENCE REVIEWS*
Witus, A. E., Branecky, C. M., Anderson, J. B., Szczucinski, W., Schroeder, D. M., Blankenship, D. D., Jakobsson, M.
2014; 85: 99-118
- **Evidence for a water system transition beneath Thwaites Glacier, West Antarctica** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
Schroeder, D. M., Blankenship, D. D., Young, D. A.
2013; 110 (30): 12225-12228
- **Weak bed control of the eastern shear margin of Thwaites Glacier, West Antarctica** *JOURNAL OF GLACIOLOGY*
MacGregor, J. A., Catania, G. A., Conway, H., Schroeder, D. M., Joughin, I., Young, D. A., Kempf, S. D., Blankenship, D. D.
2013; 59 (217): 900-912
- **Evidence of a hydrological connection between the ice divide and ice sheet margin in the Aurora Subglacial Basin, East Antarctica** *JOURNAL OF GEOPHYSICAL RESEARCH-EARTH SURFACE*
Wright, A. P., Young, D. A., Roberts, J. L., Schroeder, D. M., Bamber, J. L., Dowdeswell, J. A., Young, N. W., Le Brocq, A. M., Warner, R. C., Payne, A. J., Blankenship, D. D., van Ommen, T. D., Siegert, et al
2012; 117
- **A dynamic early East Antarctic Ice Sheet suggested by ice-covered fjord landscapes** *NATURE*
Young, D. A., Wright, A. P., Roberts, J. L., Warner, R. C., Young, N. W., Greenbaum, J. S., Schroeder, D. M., Holt, J. W., Sugden, D. E., Blankenship, D. D., Van Ommen, T. D., Siegert, M. J.
2011; 474 (7349): 72-75