Winnie (Wing Yin) Chu

Contact Information

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School of Earth and Atmospheric Sciences
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Professional Appointments

Assistant Professor — August 2020 – present
School of Earth & Atmospheric Sciences
College of Sciences
Georgia Institute of Technology

Postdoctoral Researcher — July 2017 – July 2020
Department of Geophysics
School of Earth, Energy, and Environmental Sciences
Stanford University
Supervisor: Dr. Dustin M. Schroeder

Visiting Student Researcher — May – September 2015
Radar Science and Engineering Division
NASA Jet Propulsion Laboratory

Education

Ph.D. in Earth & Environmental Sciences — October 2017
Columbia University, New York, NY
Dissertation: *Variability of Subglacial Drainage Across the Greenland Ice Sheet: A Joint Model/Radar Study*
Advisor: Dr. Robin E. Bell

Master of Philosophy in Earth & Environmental Sciences — May 2015
Columbia University, New York, NY
Advisor: Dr. Robin E. Bell

Master in Sciences in Geophysics — June 2011
University College London, London, United Kingdom
1^{st} *class honors*
Thesis: *Assessment of CryoSat-2 radar altimetry performance on sea-ice extent retrieval*
Advisor: Prof. Seymour Laxon

Funded Grants

National Science Foundation
Solicitation: OPP Antarctic Sciences
Title: *Investigating Four Decades of Ross Ice Shelf Subsurface Change with Historical and Modern Radar Sounding Data*
Period: 08/2021 – 08/2024
PI: W. Chu
Co-Is: Matthew Siegfried (Mines), Dustin Schroeder (Stanford)
Funded Amount:$401,307 to Georgia Tech

Heising-Simons Foundation
Title: *Follow the Water: Hydrology of Helheim Glacier*
Period: 08/2020 – 07/2023
PI: W. Chu
Co-Is: Colin Meyer (Dartmouth), Kristin Poinar (University at Buffalo)
Funded Amount:$2,190,527 ($873,472 to Georgia Tech)

National Aeronautics and Space Adminstration
Solicitation: Earth and Space Science Fellowship

Period: 2015 – 2017
Funded Amount: $90,000

Honors and Awards

American Geophysical Union
Outstanding Student Paper Award 2016
United States Congress
Antarctica Service Medal 2015
University College London, United Kingdom
Old Student Association Trust Scholarship 2010
University College London, United Kingdom
Matthews Prize for Excellence in Geophysics 2010
University College London, United Kingdom
Chubb Prize for Works of Good Honours Standard 2009
University College London, United Kingdom
Alumni Scholarship 2007

Manuscript In Review or In Press

* indicates student or postdoctoral advisee

[19] Dawson, E.J.,* D. M. Schroeder., **W. Chu**, E. Mantelli., H. Seroussi., Basal Thaw Could Drive Widespread Mass Loss from the Antarctic Ice Sheet., *Nature Geoscience*, In Review.

[18] Livingstone, S., Y. Li., A. Rutishauser., R. Sanderson., K. Winter., J. Mikucki., H. Björnsson., J. Bowling., **W. Chu** and et al., (2021) Subglacial lakes and their changing role in a warming climate., *Nature Reviews Earth & Environment*, In Press.

Publications

[17] **Chu, W.**., A. M. Hilger*., D. M. Schroeder., R. Culberg, T. M. Jordan, H. Seroussi, D. A. Young and D. G. Vaughan (2021). Multisystem Synthesis of Radar Sounding Observations of the Amundsen Sea Sector From the 2004–2005 Field Season, *Journal of Geophysical Research: Earth Surface*, I126(10), 1–17. doi:10.1029/2021jf006296

[16] Schroeder, D. M., N. L. Bienert., R. Culberg, E. J. MacKie, T.O. Teisberg., **W. Chu.**, and D. A. Young (2021). Glaciological Constraints on Link Budgets for Orbital Radar Sounding of Earth's Ice Sheets. *2021 IEEE International Geoscience and Remote Sensing Symposium IGARSS*, 647–650. doi:10.1109/igarss47720.2021.9553237

[15] Culberg, R*., D.M. Schroeder, **W. Chu** (2021). Extreme melt season ice layers reduce firn permeability across Greenland. *Nature Communications*, 12(1), 1–9. doi:10.1038/s41467-021-22656-5

[14] Peters, S. T*., D. M. Schroeder, **W. Chu**, D. Castelletti, M. S. Haynes, P. Christoffersen A. Romero-Wolf (2021). Glaciological Monitoring Using the Sun as a Radio Source for Echo Detection. *Geophysical Research Letters*, 48(14), 1–11. doi:10.1029/2021GL092450

[13] Pitcher, L*., L. Smith, C. Gleason, C. Miège, J. Ryan, B. Hagedorn, D. Van As, **W. Chu**, R. Forster (2020), Direct observation of winter meltwater drainage from the Greenland Ice Sheet, *Geophysical Research Letters*, 47(9), 1–10, doi:10.1029/2019GL086521.

[12] Schroeder, D. M., J. A. Dowdeswell, M. J. Siegert, R. G. Bingham, **W. Chu**, E. J. MacKie, M. R. Siegfried, K. I. Vega, J. R. Emmons, and K. Winstein (2019), Multidecadal observations of the Antarctic ice sheet from restored analog radar records, *Proc. Natl. Acad. Sci*, 116(38), 18867–18873, doi:10.1073/pnas.1821646116.

[11] Bowling, J. S*., S. J. Livingstone, A. J. Sole, and **W. Chu** (2019), Distribution and dynamics of Greenland subglacial lakes, *Nature Communications*, 10(1), 281, doi:10.1038/s41467- 019-10821-w.

[10] Tinto, K. J., L. Padman, C.S. Siddoway, S.R. Springer, H.A. Fricker, I. Das, F.C. Tontini, D.F. Porter, N.P. Frearson, S. Howard, M.R. Siegfried, C. Mosbeux, M.K. Becker, C. Bertinato, A. Boghosian, N. Brady, B.L. Burton, **W.Chu** and et al. (2019), Ross Ice Shelf response to climate driven by the tectonic imprint on seafloor bathymetry, *Nat. Geosci.*, 12(6), doi:10.1038/s41561-019-0370-2.

[9] **Chu, W.**, D.M. Schroeder, and M.R. Siegfried (2018). Retrieval of Englacial Firn Aquifer Thickness from Ice-Penetrating Radar Sounding in Southeastern Greenland. *Geophysical Research Letters*, 45. doi:10.1029/2018GL079751

[8] Kendrick A.K.*, D.M. Schroeder, **W. Chu**, T.J. Young, P. Christoffersen, S.H. Doyle, J.E. Box, A. Hubbard, B. Hubbard, P.V. Brennan, K.W. Nicholls, L.B. Lok (2018). Seasonal Surface Meltwater Impounded by Seasonal Englacial Storage in West Greenland. *Geophysics Research Letters*, 45, 1–8. doi:10.1029/2018GL079787

[7] **Chu W.**, D.M. Schroeder, H. Seroussi, T.T. Creyts, and R.E. Bell (2018). Complex basal thermal transition near the onset of Petermann Glacier, Greenland. *Journal of Geophysical Research: Earth Surface*, 123(5), 985–995. doi:10.1029/2017JF004561

[6] Livingstone S.J., **W. Chu**, J.C. Ely, J. Kingslake (2017). Paleofluvial and subglacial channel networks beneath Humboldt Glacier, Greenland. *Geology*, 45(6), 551–554. doi:10.1130/G38860.1

[5] Bell, R.E., **W. Chu**, J. Kingslake, I. Das, M. Tedesco, K.J. Tinto et al. (2017). Antarctic ice shelf potentially stabilized by export of meltwater in surface river. *Nature*, 544(7650), 344–348. doi:10.1038/nature22048

[4] **Chu, W.**, D.M. Schroeder, H. Seroussi, T.T. Creyts, S.J. Palmer and R.E. Bell (2016). Extensive winter subglacial water storage beneath the Greenland Ice Sheet. *Geophysical Research Letters*, 43(24), 484–492. doi:10.1002/2016GL071538

[3] Schroeder, D.M., H. Seroussi, **W. Chu**, and D.A. Young (2016). Adaptively constraining radar attenuation and temperature across the Thwaites Glacier catchment using bed echoes. *Journal of Glaciology*, 62(236), 1075–1082. doi:10.1017/jog.2016.100

[2] **Chu, W.**, T.T. Creyts, and R.E. Bell (2016). Rerouting of subglacial water flow between neighboring glaciers in West Greenland. *Journal of Geophysical Research: Earth Surface*, 121(5), 925–938. doi:10.1002/2015JF003705

[1] Bell, R.E., K. Tinto, I. Das, M. Wolovick, **W. Chu**, T.T Creyts, N. Frearson, A. Abdi, J.D. Paden (2014). Deformation, warming and softening of Greenland's ice by refreezing meltwater. *Nature Geoscience*, 7(7), 497–502. doi:10.1038/ngeo2179

Invited Talks

Peering inside the Greenland Ice Sheet through airborne radar sounding
University of Edinburgh, Hutton Club Seminar 22 Oct. 2021

What more can we learn about glacial hydrology from radar sounding (with the help of ground-based traverse)?
U.S. Scientific Traverses on the Greenland Ice Sheet: a Planning Workshop 11 Jun. 2021

Four decades of radar-echo sounding: The past, present, & future of radar application for understanding subglacial environments
EGU General Assembly 27 Apr. 2021

Using radar sounding observations to improve numerical model estimates on ice sheet temperatures in West Antarctica
Computer Vision Seminar, University of Maryland, Baltimore County 4 Dec. 2020

Peering beneath the ice: Merging radar Sounding modeling to investigate subsurface hydrology in Greenland
Geophysics Seminar, Georgia Institute of Technology 16 Oct. 2020

Understanding Greenland subsurface hydrology through radar sounding
Climate Research Seminar, Heising-Simons Foundation 12 Feb. 2020

25 years of airborne radar sounding: Insights into the time varying changes in Greenland glacial hydrology
American Geophysical Union Fall Meeting, San Francisco 10 Dec. 2019

Merging radar with models: Getting new geophysical insights into the subsurface system of ice sheets
Department of Geology Seminar, University of Kansas 31 Oct. 2019

Merging radar with models: Getting new geophysical insights into the subsurface system of ice sheets
Glaciology Seminar, University of California, Irvine 26 Sept. 2019

Merging radar with models: Getting new geophysical insights into the subsurface system of ice sheets
Ice-Climate Research Seminar, NASA Jet Propulsion Laboratory 16 Sep. 2019

Merging radar with models: Getting new geophysical insights into the subsurface system of ice sheets
Ice/Climate Seminar, Geological Survey of Denmark and Greenland 29 Aug. 2019

Layer attenuation: Constraining ice sheet temperatures and hydrology from data assimilation
International Glaciological Society Meeting 10 Jul. 2019

Merging radar with models: Getting new geophysical insights into the subsurface system of ice sheets
Earth & Planetary Science Seminar, University of California, Santa Cruz 30 Apr. 2019

Merging radar with models: Getting new geophysical insights into the subsurface system of ice sheets
Department of Earth Sciences Seminar, University of Cambridge 11 Mar. 2019

Merging radar with models: Getting new geophysical insights into the subsurface system of ice sheets
Department of Geosciences Seminar, Penn State University 28 Feb. 2019

Merging radar with models: Getting new geophysical insights into the subsurface system of ice sheets
Department of Earth Sciences Seminar, Durham University 13 Feb. 2019

Merging radar with models: Getting new geophysical insights into the subsurface system of ice sheets
Department of Geosciences Seminar, University of Arkansas 28 Jan. 2019

Merging radar with models: Getting new geophysical insights into the subsurface system of ice sheets
Earth & Atmospheric Sciences Seminar, Georgia Institute of Technology 15 Jan. 2019

Peering beneath the ice: dynamic subsurface hydrology of the Greenland Ice Sheet
Department Seminar, New Mexico Institute of Mining and Technology 18 Nov. 2018

Imaging the Greenland and Antarctic ice sheet subsurface with radio-echo sounding
Geography Seminar, University of California, Santa Barbara 15 Nov. 2018

Combined radar sounding and ice-sheet modeling: a powerful tool to study dynamic meltwater drainage in the Greenland Ice Sheet
Glaciology Seminar, University of Exeter, United Kingdom 6 Jul. 2018

Dynamic meltwater drainage beneath the Greenland Ice Sheet: a joint radar sounding-modeling perspective
Glaciology Seminar, Newcastle University, United Kingdom 27 Jun. 2018

Dynamic meltwater drainage beneath the Greenland Ice Sheet: a joint radar sounding-modeling perspective
IGPP Seminar, Scripps Institution of Oceanography 26 Apr. 2018

Variability of subglacial and englacial drainage across the Greenland Ice Sheet: a joint model/radar study
Geophysics Brown Bag Seminar, California Institute of Technology 20 Oct. 2017

Understanding subglacial hydrology of Russell Glacier, Greenland using radar sounding data
Radar Science & Engineering Seminar, NASA Jet Propulsion Laboratory 21 Sep. 2015.

Investigating the influence of subglacial hydrologic conditions on glacier velocity in Greenland
Glaciology Seminar, University of California, Irvine 15 Mar. 2015

Influence of ice sheet geometry and supraglacial lakes on subglacial hydrology
Marine Geophysics Division Seminar, Lamont-Doherty Earth Observatory 4 Dec. 2013

Mentoring

Graduate Student Advising

Angelo Tarzona, 2021–present
Renée Clavette, 2020–present

Undergraduate Student Advising

Kiera Tran, Environmental Engineering major, 2021–present
Leah Hornsey, Earth & Atmospheric Sciences major, 2021–present
Rohaiz Haris, Mechanical Engineering major, 2021–present
Ella Stewart, Earth & Atmospheric Sciences major, 2020–present

Dissertation Committee Membership

Madeline Mamer, Earth & Atmospheric Sciences, 2021–present
Aminat Ambelorun, Earth & Atmospheric Sciences, 2021–present
Danielle Grau, Earth & Atmospheric Sciences, 2021–present
Estefania Garcia, Earth & Atmospheric Sciences, 2021–present
Shengjun Xi, Earth & Atmospheric Sciences, 2020–present
Syed Abdul Salam, University of Tasmania, Institute for Marine & Antarctic Studies, 2020

External Graduate Student Mentorship

Riley Culberg, Electrical Engineering, Stanford University, 2019–present
Eliza Dawson, Geophysics, Stanford University, 2018–present
Sean Peters, Electrical Engineering, Stanford University, 2019–2020
Alexander Kendrick, Geophysics, Stanford University, 2017–2018
Andrew Hilger, Electrical Engineering, Stanford University, 2017–2018
Jade Bowling, Geography, Lancaster University, 2018–2019

External Undergraduate Student Mentorship

Joanna Millstein, Earth Sciences, Dartmouth College, 2016

Teaching Experience

Georgia Institute of Technology, Atlanta, GA

Instructor

EAS 3610 Introduction to Geophysics — Fall 2021

Co-Instructor

EAS 4403/8803: Glacier and Ice Sheet Dynamics — Spring 2021

Guest Lecturer

EAS 4380/6380: Land Remote Sensing — Fall 2021

Stanford University, Palo Alto, CA

Co-Instructor

IGS Radar science course for early-career researchers — Summer 2019

Columbia University, New York, NY

Guest Lecturer

EESC 2100: Earth's Environmental System: The Climate System — Spring 2013

Teaching Assistant

EESC 2100: Earth's Environmental System: The Climate System — Spring 2013
EESC 2100: Earth's Environmental System: The Climate System — Fall 2013
EESC 4085: Geodynamics — Spring 2012

Professional Service

Referee Service

- **Journals**: *Nature, Nature Geoscience, Nature Communications, Sciences, Journal of Geophysical Research: Earth Surface, Geophysical Research Letters, Journal of Glaciology, Annals of Glaciology, IEEE J-STARS, IEEE Transactions on Geoscience and Remote Sensing*
- **Proposals**: *NASA Cryospheric Sciences (panel member)*, *NASA Solar System Working (panel member), NSF Faculty Early Career Development Program (reviewer), NSF Geoinformatics (reviewer)*

Conference Service

- **Organizing Committee**: Future of Greenland Ice Sheet Workshop (NASA Georgia Tech 2022); Five Decades of Radioglaciology (IGS Stanford University 2019);
- **Session Chair**: *Geophysical and in situ methods for snow and ice studies* (EGU General Assembly 2022); *Advances in Glacier Hydrology* (AGU Fall Meeting 2021); *Advances in Understanding Processes at the Beds of Glaciers and Ice Sheets* (AGU Fall Meeting 2018); *Beyond Ice Thickness: Using Radar Sounding to Understand the Dynamics of Glacier Systems* (AGU Fall Meeting 2018); *Mass and energy balance of snow and ice and drivers of Greenland ice sheet mass loss* (EGU General Assembly 2015);
- **Judge**: *AGU Outstanding Student Paper Award, New York City Science and Engineering Fair, EGU Student Poster, PICO Award*

Outreach

- Research highlighted in press releases from multiple institutions, including Georgia Institute of Technology, Stanford University, and Earth Institute of Columbia University.
- Panelist for The Students for a Progressive Society Outreach Summit, Georgia (20 Oct. 2021)
- Presented at Atlanta Science Festival, âĂIJImagining the Future", Georgia (11 Mar. 2021)
- Quoted in "Dozens of lakes discovered deep under the Greenland Ice Sheet" (NBC News, 29 Jun. 2019)
- Quoted in "Dozens of lakes discovered deep under colossal ice sheet"(EuroNews, 29 Jun. 2019)
- Quoted in "Scientists find missing piece in glacier melt predictions"(AGU Blog, 16 Oct. 2019)

- Quoted in "Radar reveals meltwater's year-round life under Greenland ice" (ScienceBlog, 5 Jan. 2017)
- Featured in "The Ice Detectives" (Columbia Magazine, Fall 2017)
- Featured in "New breakthroughs in the study of glacial meltwater" (Earth.com, 2017)
- Quoted in "Greenland Meltwater Study Seeks Answers" (NetNewsLedger, 7 Jan. 2017)
- Invited panelist for "Meeting early career scientists in STEM-related fields", hosted by PANTHER Academy of Earth and Space Science
- Exhibit organizer for the NASA Sun and Earth Day, hosted by American Museum of Natural History in New York
- Exhibit organizer for the Open house day, hosted by Lamont-Doherty Earth Observatory in Palisades
- Exhibit organizer for the World Science Festival, hosted by the World Science Foundation in New York
- Exhibit organizer for Women in STEM event at the Intrepid Air and Space Museum

University Services

Georgia Institute of Technology

Faculty advisor for Georgia Tech Science Olympiad Club, 2021 – present
Graduate Student Admission Committee, 2020 – present

Field Experience

West Antarctica, Airborne Geophysics (NASA Operation IceBridge)	2016
Gravity Team Leader	
Ross Ice Shelf, Antarctica, Airborne Geophysics	2014
Gravimeter Operator & Flight Planner	
Ross Ice Shelf, Antarctica, Airborne Geophysics	2013
Radar Sounder Operator	
West Greenland, Airborne Geophysics	2013
Radar Sounder Operator	
Disko Island, Greenland, Surface Geophysics	2013
Kennicott Glacier, Alaska, Surface Geophysics	2011
Naples, Italy, Surface Geophysics	2011
Pyrenees, Spain, Geodynamics	2009
Cornwall and Devon, United Kingdom, Geology	2008
Norfolk, United Kingdom, Geomorphology	2007
Dorset, United Kingdom, Geology	2007

Professional Affiliations

Institute of Electrical and Electronics Engineers, Member, 2019–present
American Geophysical Union, Member, 2012–present
International Glaciological Society, Member, 2012–present
European Geosciences Union, Member, 2014–present
New York Academy of Science, Member, 2011–present
Geological Society of London, Member, 2007–present

Conference Abstracts

*indicates student presentations

[50] Tarzona, A.*, **W. Chu**, K. Tran, T. Teisberg, and E. Dawson, 2021, Four-decades of Ross Ice Shelf changes: Part 2. Comparison using archival SPRI-NSF-TUD and modern ROSETTA-Ice and NASA/NSF IceBridge radio-echo sounding data, *AGU Fall Meeting*.

[49] Tran, K.*, **W. Chu**, Tarzona, A., T. Teisberg, and E. Dawson, 2021,Four-decades of Ross Ice Shelf Change: Part 1. Modern ice shelf basal conditions based on ROSETTA-Ice and NASA/NSF IceBridge radio-echo sounding observations, *AGU Fall Meeting*.

[48] Clavette, R.*, **W. Chu**, T. J. Young., P. Christoffersen., B. Hubbard., and S. Doyle, 2021,

Year-long observations of englacial and subglacial hydrology at Store Glacier based on autonomous phase-sensitive radio-echo sounding data, *AGU Fall Meeting*.

[47] **Chu, W.**, R. Culberg, and J. Paden, 2021, Distribution of subglacial channels beneath the Greenland Ice Sheet based on airborne radar sounding, *AGU Fall Meeting*.

[46] Haris, R.*, A. Robel and **W. Chu**, 2021, Exploring the relationship between subglacial hydrology and basal shear stress using independent radar and velocity inversion methods at Thwaites Glacier, West Antarctica, *AGU Fall Meeting*.

[45] Dawson, E.J.*, D. M. Schroeder., **W. Chu**, E. Mantelli., H. Serouss, 2021, Investigating basal thaw driven mass loss across Antarctica *AGU Fall Meeting*.

[44] Culberg, R.*, **W. Chu**, D. M. Schroeder, 2021, Meltwater Infiltration and Refreezing Beneath Ice Slabs in Northwest Greenland, *AGU Fall Meeting*.

[43] Sommers, A., C. Meyer., K. Poinar., **W. Chu**, 2021, Modeling the Influence of Meltwater Inputs on Subglacial Hydrology Downstream of a Perennial Firn Aquifer: The Dance of SHAKTI Below Helheim Glacier, East Greenland, *AGU Fall Meeting*.

[42] Livingstone, S., Y. Li., A. Rutishauser., R. Sanderson., K. Winter., J. Mikucki., H. Björnsson., J. Bowling., **W. Chu** and et al. 2021, Global synthesis of subglacial lakes and their changing role in a warming climate, *EGU General Assembly*.

[41] Pitcher, L., A. Boghosian., A. F. Banwell., M. J. Willis., J. Hansen., E. R. Heijkoop., A. L. LeWinter., **W. Chu**, D.R. MacAyeal., L.C. Smith., R.E. Bell, 2020, Impact of Ice-Shelf Estuaries on Ice-Shelf Surface Drainage Efficiency, *AGU Fall Meeting*.

[40] Dawson, E.*, D. M. Schroeder, **W. Chu**, E. Mantelli, H. L. Seroussi, 2020, Investigating Basal Thaw as a Mechanism of Ice Mass Loss in Antarctica, *AGU Fall Meeting*.

[39] Boghosian, A.*, L. H. Pitcher, A. F. Banwell, **W. Chu**, A. L. LeWinter, L. C. Smith, M. J. Willis, D. R. MacAyeal, R. E. Bell, 2020, Investigating longitudinal fractures along ice-shelf estuaries, *AGU Fall Meeting*.

[38] Culberg, R.*, D. M. Schroeder, **W. Chu**, 2020, Extreme Melt Season Ice Layers Reduce Firn Permeability in Greenland's Interior, *AGU Fall Meeting*.

[37] Dawson, E.*, D. M. Schroeder, **W. Chu**, E. Mantelli, H. L. Seroussi, 2020, Investigating basal thaw as a potential driver of ice flow acceleration in Antarctica, *EGU General Assembly*.

[36] Dawson, E.*, D. M. Schroeder, **W. Chu**, E. Mantelli, H. L. Seroussi, 2020, Investigating basal thaw as a mechanism of ice flow acceleration in Antarctica, 2020, *SCAR Open Science Conference*.

[35] **Chu, W.**. S. Vijay, M. King, D.M. Schroeder, and S. Livingstone, 2020, Decadal changes in Greenland subglacial hydrology from airborne radar sounding. *NASA Program for Arctic Regional Climate Assessment Meeting*.

[34] **Chu, W.**, D. M. Schroeder, S. J. Livingstone, S. Vijay, M. D King, R. Culberg, N.B. Karlsson, A. Messerli, 2019, 25 years of airborne radar sounding: Insights into the time varying changes in Greenland glacial hydrology, *AGU Fall Meeting*.

[33] Vijay, S., **W. Chu**, M. D. King, I. M. Howat, S. A. Khan, A. Solgaard, 2019, Seasonal ice velocity changes of Greenlandic glaciers: insights from new and dense remote sensing observations and hydrological modeling, *AGU Fall Meeting*.

[32] Peters, S.T.*, D. M. Schroeder, **W. Chu**, M. Haynes, A. Romero-Wolf, 2019, Passive radio sounding with ambient signals of opportunity to monitor cryospheric subsurface conditions, *AGU Fall Meeting*.

[31] Pitcher, L. H., L. C. Smith, C. J. Gleason, C. Miege, J. Ryan, B. Hagedorn, D. van As, **W. Chu**, R. R Forster, 2019, Meltwater export from the Greenland Ice Sheet observed during winter, *AGU Fall Meeting*.

[30] **Chu, W.**, D. M. Schroeder, H. Seroussi, M. Morlighem, and M. Siegert, 2019, Using radar sounding observations to improve numerical models' estimates on ice sheet temperatures in West Antarctica, *West Antarctic Ice Sheet Initiative*.

[29] Dawson. E.*, D.M. Schroeder, **W. Chu**, E. Mantelli, A. Miltenberger, H. Seroussi, 2019, Vulnerability of the Antarctic ice sheet to basal thermal regime change: Integrating observations and models, *West Antarctic Ice Sheet Initiative*.

[28] Peters, S. T.* D.M. Schroeder, **W. Chu**, M. Haynes, A. Romero-Wolf, 2019, Passive radio sounding using the Sun as a signal to monitor subsurface processes, *West Antarctic Ice Sheet Initiative*.

[27] **W. Chu**, 2019, Layer attenuation: Constraining ice sheet temperatures and hydrology from data as-similation, *IGS Symposium on Five Decades of Radioglaciology*.

[26] Peters, S. T.*, D.M. Schroeder, **W. Chu**, D. Castelletti, M. Haynes, A. Romero-Wolf, 2019, Passive radio sounding for glaciological investigations of subsurface processes, *IGS Symposium on Five Decades of Radioglaciology*.

[25] Creyts, T. T., **W. Chu**, C. Grima, D. M. Schroeder, 2018, Bed roughness as a control on the drainage of subglacial water, *AGU Fall Meeting*.

[24] Schroeder, D. M., A. M. Hilger, D. Castelletti, **W. Chu**, T. Jordan, H.L. Seroussi, D. A. Young, D. G. Vaughan, 2018, Multi-Instrument Synthesis of Radar Sounding Observations of the Thwaites Glacier and Pine Island Glacier Catchments, West Antarctica, *AGU Fall Meeting*.

[23] Bowling, J.*, S. Livingstone, A. Sole, **W. Chu**, 2018, Fifty-two new subglacial lakes discovered beneath the Greenland Ice Sheet, *AGU Fall Meeting*.

[22] **Chu, W.** and D.M. Schroeder, 2018, Quantifying Greenland Water Budget Variability from Top to Bottom using Radar Sounding Data and Modeling. *SCAR/IASC Polar Open Science Conference*.

[21] MacKie E. J.*, D.M. Schroeder, J.A. Dowdeswell, K.I. Vega, M.R. Siegfried*, **W. Chu**, R.G. Bingham, 2018, Digitization and Analysis of the SPRI-NSF-TUD Radar Data Archive, Scientific Committee on Antarctic Research,*SCAR/IASC Polar Open Science Conference*.

[20] **Chu, W.**, T. Jordan, D.M.Schroeder, Y.M. Martos and J. Bamber, 2018, Partitioning the geothermal component of basal melting beneath ice-sheets: lessons from Greenland, *Taking the Temperature of the Antarctic Continent Workshop*.

[19] Schroeder, D.M., **W. Chu**, 2018, Observationally Constraining Geothermal Heat Flux Using Ice Penetrating Radar, *Taking the Temperature of the Antarctic Continent Workshop*.

[18] **Chu, W.** and D.M. Schroeder, 2018, Quantifying Water Retention Within the Greenland Ice Sheet using Airborne Radar Sounder, *NASA Program for Arctic Regional Climate Assessment Meeting*.

[17] Schroeder, D. M., **W. Chu**, A. K. Kendrick, S.T. Peters, D. Castelletti, 2018, Constraining the Spatial and Temporal Evolution of Supraglacial and Englacial Meltwater Using Radar Sounding Data, *Workshop on Antarctic Surface Hydrology and Future Ice Shelf Stability*.

[16] **Chu, W.**, D.M. Schroeder, H. Seroussi, T.T. Creyts, R.E. Bell and J.D. Paden, 2017, Constraining Greenland basal water extent and drainage morphology from radar reflectivity and specularity analysis, *AGU Fall Meeting*.

[15] Ely, J., S. Livingstone, **W. Chu**, J. Kingslake, 2017, Hydrologically active palaeofluvial and subglacial channel networks beneath Humboldt Glacier, Greenland, *EGU General Assembly*.

[14] **Chu, W.**, Using Radar Sounding to Constrain Temporal Changes in Subglacial Hydrology across the Greenland Ice Sheet. 2017, *National Science Foundation Arctic Science Workshop*.

[13] **Chu, W.**, D.M. Schroeder, H. Seroussi, T.T. Creyts and R.E. Bell, 2017, Large Variability in Subglacial Drainage Processes Revealed by Airborne Radar Sounding Across the Greenland Ice Sheet, *International Glaciological Society Meeting*.

[12] **Chu, W.**, D.M. Schroeder, H. Seroussi, T.T. Creyts, S.J. Palmer and R.E. Bell, 2016, Distinct Subglacial Drainage Patterns Revealed in High-Resolution Mapping of Basal Radar Reflectivity across Greenland, *AGU Fall Meeting*.

[11] Bell, R.E., **W. Chu**, J. Kingslake, I. Das, M. Tedesco, K. J. Tinto, C. J. Zappa, M. Frezzotti, 2016, Persistent Surface River on Nansen Ice Shelf Drains Meltwater Preventing Collapse for Decades, *AGU Fall Meeting*.

[10] Millstein, J. D. *, **W. Chu**, I. Das, R. E. Bell, 2016, An Englacial Radar Attenuation Modeling Approach and Application to the Ross Ice Shelf, *AGU Fall Meeting*.

[9] Das, I., L. Padman, **W. Chu**, H. A. Fricker, M. K. Becker, R. E. Bell, K. J. Tinto, J. D. Millstein, 2016, Mass Balance and Structure of the Ross Ice Shelf, *AGU Fall Meeting*.

[8] Schroeder, D.M., H. Seroussi, **W. Chu**, D. Young, 2016, Signature of recent ice flow acceleration in the radar attenuation and temperature structure of Thwaites Glacier, West Antarctica, *EGU General Assembly*.

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