

# PAUL T. SUMMERS

1186 Holly St NW APT 3, Atlanta, GA 30318 ◊ (650) · 804 · 5998

paul.summers@rutgers.edu ◊ [www.paultsummers.com](http://www.paultsummers.com)

## PUBLICATIONS

**Summers, P.T.**; Jackson, R. H.; Robel, A. A. “Sub-grid Parameterization of Iceberg Drag in a Coupled Iceberg-Ocean Model, *The Cryosphere*, (In Review), Preprint pending

Hoffman, Andrew O.; **Summers, P.T.**; Suckale, J; Christianson, K.; Catania, G.; Conway, H. “Late Holocene Stabilization of Conway Ice Ridge,” *The Cryosphere*, (In Review), Preprint: <https://doi.org/10.5194/egusphere-2025-1239>

Teisberg, T. O.; Schroeder, D. M.; **Summers, P.T.**; Morlighem, M. “Measurement of englacial velocity fields with interferometric ice-penetrating radar,” *Journal of Geophysical Research: Earth Surface*, (In Review)

**Summers, P.T.**; Schroeder, D. M.; May, D. F.; Suckale, J. “Evidence for and against temperate ice in Antarctic shear margins from radar-depth sounding data,” *Geophysical Research Letters*, 2024, <https://doi.org/10.1029/2023GL106893>

**Summers, P.T.**; Elseworth, C.W.; Dow, C.F.; Suckale, J. “Migration of the Shear Margins at Thwaites Glacier: Dependence on Basal Conditions and Testability Against Field Data,” *Journal of Geophysical Research: Earth Surface*, 2023, <https://doi.org/10.1029/2022JF006958>

Siegfried, M.; Venturelli, R; Patterson, M; Arnuk, W.; Campbell, T.; Gustafson, C.; Michaud, A.; Galton-Fenzi, B.; Hausner, M.; Holzschuh, S.; Huber, B.; Mankoff, K.; Schroeder, D.; **Summers, P. T.**; Tyler, S.; Carter, S.; Fricker, H.; Harwood, D.; Leventer, A.; Rosenheim, B.; Skidmore, M.; Priscu, J. and SALSA Science Team. “The life and death of a subglacial lake in West Antarctica,” *Geology* , 2023, <https://doi.org/10.1130/G50995.1>

Bienert, N.; Schroeder D. M.; **Summers, P.T.** “Bistatic Radar Tomography of Shear Margins: Simulated Temperature and Basal Material Inversions,” *IEEE Transactions on Geoscience and Remote Sensing*, 2022, <https://doi.org/10.1109/TGRS.2022.3213047>

**Summers, P.T.**; Dustin M. Schroeder, Matthew R. Siegfried. “Constraining Ice Sheet Basal Sliding and Horizontal Velocity Profiles Using a Stationary Phase Sensitive Radar Sounder,” *IEEE International Geoscience and Remote Sensing Symposium*, 2021, <https://doi.org/10.1109/IGARSS47720.2021.9554535>

## RESEARCH AND PROFESSIONAL EXPERIENCE

**Rutgers University & Georgia Institute of Technology** August 2024 - Present  
*Postdoctoral Researcher* Atlanta, Georgia

Numerical modeling of ice Mélange and interactions with ocean currents and glacial dynamics.  
Extending existing numerical modeling packages MITgcm and GLACIOME1D in fortran, python.

**Stanford University Department of Geophysics** September 2018 - June 2024  
*PhD Candidate* Stanford, CA

Physical processes controlling Antarctic Shear margin locations, applied to Thwaites Glacier and other ice streams.  
Thermomechanical ice flow modeling and ice sounding radar processing techniques focused on Antarctic shear margins.  
Physical modeling using finite element analysis in Matlab. Worked with satellite, atmospheric, radar sounding data sets.

**Dropbox Inc.** August 2014 - July 2018  
*Software Developer* San Francisco, CA

Designed, built and tested custom APEX solutions within Salesforce CRM for Sales, Finance and Product to meet business requirements.

**Stanford University Department of Geophysics** June 2013 - June 2014  
*Researcher, M.S. Candidate* Stanford, CA

Authored article investigating mechanics of pre-explosive harmonic tremor in the 2009 Redoubt Volcano eruption.  
Physical modeling using finite element analysis and PDEs in Matlab.

## EDUCATION

**Stanford University, Stanford California** September 2018 - June 2024  
PhD Candidate in Geophysics GPA: 3.94

**Stanford University, Stanford California** September 2010 - June 2014  
B.S in Physics, M.S. in Geophysics GPA: 3.81, 3.89

## TEACHING AND MENTORING

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<b>Mentor Graduate Student</b> Peer Mentor for Stanford 1st year PhD students (1 hours per week)	October 2019 - June 2024
<b>Tutor Graduate Student</b> 1:1 Tutor Master's student for upper level math and engineering courses (2 hours per week)	October 2022 - June 2023
<b>SESUR Program Assistant</b> <i>Stanford Doerr School of Sustainability</i> Coordinate Stanford Earth Summer Undergraduate Research Program including field trips, weekly seminars, various social events. (10 hours per week)	April 2022 - October 2022
<b>Mentor for Undergraduate Intern</b> <i>Stanford Department of Geophysics</i> Mentored Stanford undergraduate modeling subglacial meltwater routing at Thwaites Glacier, Antarctica. Student presented work at AGU 2022 (3 hours per week)	April 2022 - August 2022
<b>Teaching Assistant</b> <i>Stanford University Department of Geophysics</i> Undergraduate geophysical methods course for imaging and characterizing groundwater systems. Partnership with community decision makers to recharge ground water. (12 hours per week)	April 2022 - June 2022
<b>Co-Mentor for Undergraduate Intern</b> <i>Stanford University Department of Geophysics</i> Mentored Stanford undergraduate on processing ice sounding radar film archive. (3 hours per week)	June 2021 - August 2021
<b>Teaching Assistant</b> <i>Stanford University Department of Geophysics</i> Undergraduate and Graduate course. Continuum mechanics applied to ice sheets and glaciers, water waves and tsunamis, and volcanoes. (6 hours per week)	January 2019 - April 2019

## PROFESSIONAL DEVELOPMENT

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<b>CIRTL@Stanford Teaching Certificate Program</b> <i>Associate Level</i> Recognition of commitment to undergraduate education, demonstrated through independent and collaborative learning at Stanford University and through the multi-institution Center for the Integration of Research, Teaching, and Learning (CIRTL) Network.	August 2023 <i>Stanford, CA</i>
<b>Outdoor Leadership Apprenticeship</b> <i>Apprentice</i> Apprenticeship in Outdoor Leadership, focused on rock climbing skills through experiential learning. Co-instructed 2x week long, field-based traditional rock climbing courses for 8 students in Joshua Tree National Park, as well as multiple vertical self-rescue clinics on campus.	March 2023 - June 2024 <i>Stanford, CA</i>
<b>Preparing Future Professors</b> <i>Mentee</i> 10 week shadowing program gave the opportunity to experience faculty life first-hand at a comprehensive, teaching-focused university or community college.	November 2022 - Jan 2023 <i>West Valley College, Saratoga, CA</i>
<b>Center for Teaching and Learning Course Design Institute</b> <i>Student</i> 6 week summer course on drafting curricula using evidence-based frameworks. Developed framework of glacial dynamics course focused on mass balance methods.	June 2022 - July 2022 <i>Stanford, CA</i>

## FIELD EXPERIENCE

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<b>Thwaites Interdisciplinary Margin Evolution</b> <i>Field Scientist</i> Wide offset (up to 4 km) bistatic, polarimetric radar survey using wireless and fiber optic synchronization techniques using modified pRES radar. Assisted with 2-D and 3-D active seismic survey. Surveyed and Deployed seismic nodes with GPS, assisted in active seismic explosive sources. 7 weeks in the deep field in a team of 16 with 2 guides.	Oct 2023 - Feb 2024 <i>Thwaites Glacier, West Antarctica</i>
<b>Near-Surface Geophysics: Imaging Groundwater Systems</b> <i>Teaching Assistant</i> Co-lead a class of 20 undergraduates to completed a 100 m seismic (hammer and betsy gun), 200 m electrical resistivity tomography, and towed transient electromagnetic survey imaging ground water connectivity in the top 40 meters of the subsurface. Worked with community decision makers to inform development of newly acquired public lands.	May 2022 <i>Coyote Valley, California</i>

**Thwaites Interdisciplinary Margin Evolution***Field Scientist*

Oct 2021 - Jan 2022

*Thwaites Glacier, West Antarctica*

Completed a 5 km offset bistatic, polarimetric radar survey. Deployed and recovered seismic nodes in an active seismic survey using hammer source. Recovered passive seismic nodes and GPS stations. 3 weeks in the deep field in a team of 4 scientists and 2 guides.

**AWARDS****Department Citizenship Award**

June 2024

Stanford Department of Geophysics Award

**ARCS Scholar**

2022 - 2024

Northern California Chapter of the Achievement Rewards for College Scientists, 2x recipient for total of \$101,000

**Best Graduate Poster**

May 2023

*Research Review Symposium**Stanford Doerr School of Sustainability*

Radar Attenuation Signature of Temperate Antarctic Shear Margins

**Stanford Earth Graduate Student Research Grant**

Sept 2021

Grant of \$575 for field supplies for 2021-22 Antarctic field work.

**TECHNICAL STRENGTHS****Computer Languages**

MATLAB, Python, FORTRAN, JAVA, SQL, APEX, SOQL, Javascript

**Tools**HPC, Git, MITgcm, vim, MATLAB, L<sup>A</sup>T<sub>E</sub>X, Sublime IDE**Field Skills**

ApRES, Seismic Surveying (Ice and Land), ERT, GPS, Digging in Snow,

Roped Travel, Snowmobiling, Crevasse Rescue, Vertical Rock Rescue

**First Aid**

Red Cross AED, CPR, Basic First Aid Certified (exp March 2024), WFA (lapsed)

**OPEN SOURCE CODE REPOSITORIES****Zenodo**

For Publications

<https://zenodo.org/record/7106136> (Summers, et. al. 2023)<https://zenodo.org/records/10783426> (Summers, et. al. 2024)**Github**

Ongoing Research and Personal Projects

<https://github.com/somonesummers>**COMMUNITY BUILDING****Graduate Student Advisory Council Member**

2019 - 2020

Liaison between graduate students in the School of Earth and department and school level administration. (1 hour per week)

**School of Earth Social Czar**

2018 - 2019

Host weekly social events for the School of Earth. (2 hours per week)

**CONFERENCE ABSTRACTS****AGU 2024**

Dec, 2024

**Summers, P. T.**; Schroeder, D. M.; May, D. F.; Suckale, J. (2024, Dec). Constraints on the Thermal State of Antarctic Shear Margins from Integration of Thermodynamic Modeling and Airborne Ice Penetrating Radar Data.

**AGU 2024**

Dec, 2024

May, D. F.; Schroeder, D. M.; **Summers, P. T.**; Teisberg, T. (2024, Dec). Multi-Offset Fiber Optic-Based Radar Arrays For Time-Lapse Imaging of Englacial and Subglacial Processes.

**AGU 2024**

Dec, 2024

Teisberg, T.; Schroeder, D. M.; **Summers, P. T.**; Morlighem, M. (2024, Dec). Inferring Englacial Velocity from Interferometric Ice-Penetrating Radar Sounding: Opportunities and Challenges in Regions with Complex Internal Dynamics.

**WAIS 2024**

Nov, 2024

**Summers, P. T.**; Robel, A. A.; Jackson, R. H. (2024, Dec). Not Your Average Berg: Development of a Coupled Mélange/Ocean Model.

**EGU 2024**

Apr 18, 2024

Emma C. Smith; **et. al.** (2024, April). Icequakes beneath Thwaites Glacier eastern shear margin.

**EGU 2024**

Apr 19, 2024

Daniel May; **et. al.** (2024, April). Multi-Offset Radio-Echo Sounding for Estimation of Englacial and Subglacial Thermal Conditions and Material Properties.

**WAIS 2023 Meeting**

Sept 26, 2023

**Summers, P. T.;** Andrew Hoffman; et. al. (2023, May). Historic Shear Margin Migration at Conway Ice Rise: An Integrated Data-Model Approach.

**SDSS 2023 Research Review** May 26, 2023

**Summers, P. T.;** Schroeder, D.; Suckale, J. (2023, May). Radar Attenuation Signature of Temperate Antarctic Shear Margins.

**AGU 2022 Meeting** Dec 13, 2022

**Summers, P. T.;** et. al. (2022, Dec). Response of Thwaites Glacier's Shear Margins to Ice Sheet Thinning and Surface-Slope Steepening. In AGU Fall Meeting Abstracts.

**AGU 2022 Meeting** Dec 13, 2022

Cheng, C. et. al.. (2022, Dec). Sensitivity of Subglacial Streams to Bed Topography: Introducing Small-Scale Bed Roughness Suggests Large Water Routing Uncertainties for Thwaites Glacier. In AGU Fall Meeting Abstracts.

**AGU 2022 Meeting** Dec 13, 2022

Teisberg, T. et. al.. (2022, Dec). Methods for Constraining Englacial Velocity Fields using Airborne Ice-penetrating Radar Data. In AGU Fall Meeting Abstracts.

**WAIS 2022 Meeting** Sep 27, 2022

**Summers, P. T.;** Schroeder, D. (2022, Sep). Evidence for Temperate Ice in Shear Margins of Antarctic Ice Streams from Airborne Radar Surveys.

**AGU 2021 Meeting** Dec 14, 2021

Siegfried, M. R.; et. al. (2021, Dec). The life and death of a subglacial lake in West Antarctica. In AGU Fall Meeting Abstracts.

**AGU 2021 Meeting** Dec 14, 2021

Sandra, R.; et. al. (2021, Dec). Informing Bistatic Radar Experiments at Thwaites Glacier Using Bistatic Data from Greenland and West Antarctica. In AGU Fall Meeting Abstracts.

**WAIS Workshop 2021** Sep 22, 2021

**Summers, P.T.;** Elseworth, C.W.; Suckale, J.; TIME Science Team (2021, Sep). Inward Migration of the Shear Margins at Thwaites Glacier in Response to Thinning.

**WAIS Workshop 2021** Sep 23, 2021

**Summers, P.T.;** Schroeder, D ;Suckale, J(2021, Sep). Evidence for Temperate Ice in Shear Margins of Antarctic Ice Streams from Airborne Radar Surveys.

**IEEE International Geoscience and Remote Sensing Symposium 2021** July 11, 2021

**Summers, P.T.;** Schroeder, D.; Siegfried, M.R. (2021, July). Constraining Ice Sheet Basal Sliding and Horizontal Velocity Profiles Using A Stationary Phase Sensitive Radar Sounder.

**AGU 2020 Meeting** Dec 16, 2020

**Summers, P.T.;** Elseworth, C.W.; Suckale, J; TIME Science Team (2020, Dec). Processed-Based Models in the Wild: A Forward Model Approach to Constraining the Processes Governing Basal Strength at Thwaites Glacier. In AGU Fall Meeting Abstracts.

**WAIS Workshop 2020** Sep 29, 2020

**Summers, P.T.;** Elseworth, C.W.; Suckale, J; TIME Science Team (2020, Sep). Investigating Mechanisms of Basal Strength at Thwaites Glacier using a Forward Model Approach. Recording of talk on [waisworkshop.org](https://waisworkshop.org)

**AGU 2019 Meeting** Dec 13, 2019

**Summers, P.T.;** Elseworth, C.W.; Suckale, J (2019, Dec). Potential Formation of a New Shear Margin at Thwaites Glacier. In AGU Fall Meeting Abstracts.

**AGU 2019 Meeting** Dec 13, 2019

Liu, W.; Räss, L.; **Summers, P.;** Papula, A.; Suckale, J. (2019, Dec). Impact of Complex Topography on Thermomechanical Coupled Ice Flow Using the Immersed Boundary Method. In AGU Fall Meeting Abstracts.

**SSA 2014 Meeting** May 2, 2014

**Summers, P.T. &** Dunham, E. M.D. (2014, May). Conduit Processes Driving Pre-explosive Harmonic Tremor in the 2009 Redoubt Volcano Eruption. In SSA 2014 Annual Meeting Announcement.

**AGU 2013 Fall Meeting** Dec 2013

**Summers, P. &** Dunham, E. M. (2013, December). Conduit Processes Driving Pre-explosive Harmonic Tremor in the 2009 Redoubt Volcano Eruption. In AGU Fall Meeting Abstracts.