PAUL T. SUMMERS

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EDUCATION

Stanford University, Stanford California *September 2018 - June 2024*
PhD 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

RESEARCH AND PROFESSIONAL EXPERIENCE

Sandia National Laboratories August 2026 - Present
Postdoctoral Researcher *Albuquerque, New Mexico*
Numerical modeling of gas and fluid flow through porous media.
Developing novel multi-component, GPU accelerated model for fluid flow, tracer transport, and reactive transport.

Tufts University & Rutgers University & Georgia Institute of Technology August 2024 - August 2026
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.

Dropbox Inc. August 2014 - July 2018
Software Developer *San Francisco, CA*
Designed, built and tested custom APEX solutions within Salesforce CRM to meet business requirements.

Stanford University Department of Geophysics June 2013 - June 2014
Researcher, M.S. Candidate *Stanford, CA*
Investigated mechanics of pre-explosive harmonic tremor in the 2009 Redoubt Volcano eruption.

PUBLICATIONS

Summers, P.T.; Robel, A.A.; Jackson, R.H.,; King, M.D.; Amundson, J.M.; Burton, J.C. "Sudden Collapse of Ice Mélange Under Increasing Submarine Melt at Tidewater Glaciers", *Nature Communications*, (2026), `https://doi.org/10.1038/s41467-026-78423-x`

Hoffman, A.O.★; **Summers, P.T.**★; Suckale, J; Christianson, K.; Catania, G.; Conway, H. "Late Holocene Stabilization of Conway Ice Ridge," *The Cryosphere*, (2026), `https://doi.org/10.5194/tc-20-3977-2026`

May, D.F.; Schroeder, D.M.; **Summers, P.T.**; Teisberg, T.O.; Broome, A.L.; Bienert, N.L.; Zak, J.; Young, T.J.; Karplus, M.S.; Tulaczyk, S. "Polarimetric Multi-Offset Radio-Echo Sounding with a Radio Frequency-Over-Fiber ApRES System," *Journal of Glaciology*, 2025, `https://doi.org/10.1017/jog.2025.10114`

Summers, P.T.; Jackson, R. H.; Robel, A. A. "Sub-grid Parameterization of Iceberg Drag in a Coupled Iceberg-Ocean Model", *The Cryosphere*, 2025, `https://doi.org/10.5194/tc-19-5135-2025`

Teisberg, T. O.; Schroeder, D. M.; **Summers, P.T.**; Morlighem, M. "Measurement of Englacial Velocity Fields With Interferometric Radio Echo Sounders," *Journal of Geophysical Research: Earth Surface*, 2025, `https://doi.org/10.1029/2025JF008286`

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; **et al.** , 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`

AWARDS & FUNDING

Assessing the Stability of Coupled Glacier-Melange-Ocean Systems Across Greenland *Under Review*
NSF Office of Polar Programs
Lead PI for $337,192 proposal to quantify the impact of mélange on ice mass loss and freshwater export from Greenland

Editor's Citation for Excellence in Refereeing June 2026
American Geophysical Union (AGU) Journal of Advances in Modeling Earth Systems (JAMES)

Department Citizenship Award June 2024
Stanford Department of Geophysics

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 2021-22 Antarctic field work.

TEACHING AND MENTORING

Mentor for Undergraduate Research September 2024 - August 2026
Mentor to multiple undergraduate researchers at Georgia Tech and Tufts University. Projects on idealized ice sheet modeling, mélange modeling, and ocean modeling. One student presenting research at AGU 2025.

JIRP Academic Faculty, Academic Lead July 2024 - 2026
Juneau Icefield Research Program
Lead lectures, discussions, mentored student lead projects, and in-field instruction for 32 Undergraduate and graduate students. As Academic Lead coordinated program for 8 instructors over 2 weeks each summer, including in-camp, in-field, and overnight trips.

Guest Lecturer September 2024 - December 2024
Lead guest lectures at Tufts University on Glacial Flow for a Cryosphere course and at Georgia Tech on Ice Streams for a Glaciology course.

Mentor Graduate Student October 2019 - June 2024
Peer Mentor for Stanford 1st year PhD students.

Tutor Graduate Student October 2022 - June 2023
1:1 tutor for masters students in upper level math and engineering courses.

SESUR Program Assistant April 2022 - October 2022
Stanford Doerr School of Sustainability
Coordinate Stanford Earth Summer Undergraduate Research Program including field trips, weekly seminars, various social events.

Mentor for Undergraduate Research June 2021 - August 2022
Stanford Department of Geophysics
Mentored Stanford undergraduates modeling various glaciology projects. One student presented work at AGU 2022.

Teaching Assistant April 2022 - June 2022
Stanford University Department of Geophysics
Undergraduate geophysical methods course for imaging and characterizing groundwater systems. Partnership with community decision makers to recharge ground water.

Teaching Assistant January 2019 - April 2019
Stanford University Department of Geophysics
Undergraduate and Graduate course. Continuum mechanics applied to ice sheets, water waves and tsunamis, and volcanoes.

PROFESSIONAL DEVELOPMENT

CIRTL@Stanford Teaching Certificate Program August 2023
Associate Level *Stanford, CA*
Center for the Integration of Research, Teaching, and Learning (CIRTL) Network.

Outdoor Leadership Apprenticeship March 2023 - June 2024
Apprentice *Stanford, CA*
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.

Preparing Future Professors November 2022 - Jan 2023
Mentee *West Valley College, Saratoga, CA*
10 week shadowing program gave the opportunity to experience faculty life first-hand at a comprehensive, teaching-focused university or community college.

Center for Teaching and Learning Course Design Institute June 2022 - July 2022
Student *Stanford, CA*
6 week summer course on drafting curricula using evidence-based frameworks. Developed framework of glacial dynamics course focused on mass balance methods.

FIELD EXPERIENCE

Juneau Icefield Research Program July 2024-2026
Academic Faculty, Academic Lead *Taku Glacier, Juneau Icefield*
Led week long research projects with 6-8 students. Worked with RTK GPS survey, tiltmeters, passive seismometers. Lead field trip based lectures and activities. As Academic Lead, coordinated with safety staff to design program for 8 Faculty.

Thwaites Interdisciplinary Margin Evolution Oct 2023 - Feb 2024
Field Scientist *Thwaites Glacier, West Antarctica*
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.

Near-Surface Geophysics: Imaging Groundwater Systems May 2022
Teaching Assistant *Coyote Valley, California*
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.

Thwaites Interdisciplinary Margin Evolution Oct 2021 - Jan 2022
Field Scientist *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.

TECHNICAL STRENGTHS

Computer Languages	Python, MATLAB, Fortan, Bash, JAVA, SQL, APEX, SOQL, Javascript
Tools	HPC, Git, MITgcm, vim, LaTeX, 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 (lapsed 2024), WFA (lapsed 2020)

OPEN SOURCE CODE REPOSITORIES

Zenodo For Publications

`https://doi.org/10.5281/zenodo.21827700` Model and data for (Summers, et al. 2026)
`https://zenodo.org/records/14721713` Model developed for (Summers, et al. 2025)
`https://zenodo.org/records/10783426` (Summers, et. al. 2024)
`https://zenodo.org/record/7106136` (Summers, et. al. 2023)

Github

`https://github.com/somonesummers` Ongoing research and personal projects
`https://github.com/somonesummers/demoMITgcm` Idealizde demo for running MITgcm and *iceberg* package

CONFERENCE ABSTRACTS

AGU OSM 2026 Feb, 2026
Summers, P. T.; Jackson, R. H.; Robel, A. A. (2026, Fed). Drivers of Seasonal Fjord Dynamics in a Coupled Glacier/Ocean/Mélange Model (GLACIOME)

AGU 2025 Dec, 2025
Summers, P. T.; Robel, A. A.; Jackson, R. H. (2025, Dec). Rapid Mélange Collapse and De-Buttressing in a Coupled Glacier/Ocean/Mélange Model (GLACIOME)

AGU 2025 Dec, 2025
Baker, J.; Robel, A. A.; **Summers, P. T.** (2025, Dec). Quantifying the Feedback Between Ice Mélange Buttressing Force and Glacier Calving.

WAIS 2025 Sept, 2025

Summers, P. T.; Robel, A. A.; Jackson, R. H. (2025, Dec). Glacier-Mélange Feedbacks as a Stabilization Mechanism for Classical Marine Ice Sheet Stability.

Kavli Institute for Theoretical Physics: The Future of Earth's Polar Regions Jun, 2025
Summers, P. T.; Jackson, R. H.; Robel, A. A. (2025, Jun). GLACIOME: The Coupled Glacier/Ocean/Melange Model. `https://online.kitp.ucsb.edu/online/polar-c25/`

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`

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.