

Nicole Bienert

Assistant Professor
Department of Electrical, Computer and Energy Engineering
University of Colorado, Boulder

EDUCATION

- 2022 **Stanford University**, Stanford, CA
Doctor of Philosophy (Ph.D.) in Electrical Engineering, Adviser: Dustin Schroeder
- 2020 **Stanford University**, Stanford, CA
Master of Science (M.S.) in Electrical Engineering
- 2018 **The Pennsylvania State University** Schreyer Honors College, University Park, PA
Bachelor of Science in Electrical Engineering (B.S.E.E.), Minor in Physics, cum laude
- 2017 **University College London**, London, UK
Semester abroad, Department of Physics and Astronomy

PROFESSIONAL EXPERIENCE

- 2024 – *present* **Univ. of Colorado, Boulder**, Dept. of Electrical, Computer and Energy Engineering
Assistant Professor: Researching & teaching radar remote sensing and computational imaging.
- 2023 – 2024 **Univ. of Southern California**, Microwave Systems, Sensors, and Imaging Lab
Postdoc: Tomographic retrieval methods for soil moisture and clay content from multistatic radar.
- 2022 – 2023 **Google**, Pixel Autofocus Team
Researcher: Invented adaptive equitable imaging algorithms and led Real Tone projects.
- 2018 – 2022 **Stanford University**, Radioglaciology Group
Graduate Researcher: Tomographically retrieved englacial temperature from multistatic radar.
- 2020 – 2022 **Jet Propulsion Laboratory**, Radar Science and Engineering Group
Visiting Graduate Researcher: Developed passive sync and orthogonal-wave beamforming.
- 2017 **Jet Propulsion Laboratory**, Radar Concepts and Formulation Group
Intern: Researched inversion method for estimating aquifer volume from resonant EM waves.
- 2016 – 2017 **Applied Research Laboratory**, Applied Electromagnetics Group
Intern: Investigated electromagnetic interference jamming methods.
- 2016 **Jet Propulsion Laboratory**, Spacecraft Antennas Group
Intern: Developed inflatable antenna to enable deep-space CubeSat missions.
- 2015 – 2016 **Applied Research Laboratory**, Applied Electromagnetics Group
Intern: Prototyped antenna concepts.

AWARDS

- 2020 Symposium Prize Paper Award, IEEE Geoscience and Remote Sensing Society
- 2019 – 2022 NSF Graduate Research Fellowship

PUBLICATIONS (* = student mentee)

- [14] 2024 B. Hills, T.J. Young, D. Lilien, E. Smith, T. Jordan, N. Holschuh, E. Babcock, **N. Bienert**, D. Blankenship, J. Bradford, G. Brighi, A. Brisbane, K. Christianson, J. Dall, M. Ershadi, T. Gerber, D. Jansen, J. Li, C. Martin, D. May, F. Oraschewski, J. Paden, N. Rathmann, N. Ross, M. Siegert, O. Zeising, R. Drews, N. Karlsson, D. Schroeder, O. Eisen, M. Siegfried, "Radar polarimetry in glaciology: Theory, measurement techniques, and scientific applications for radio-wave propagation through birefringent ice masses," *Reviews of Geophysics*, in review.
- [13] 2024 **N. Bienert**, M. Moghaddam, "A Concept for Multistatic Radar Tomography of Root Zone Soil Moisture," in IEEE International Geosci. Remote Sens. Symp., Athens, Greece, July 2024.

- [12] 2023 **N. Bienert**, D. Schroeder, and P. Summers, "Bistatic Radar Tomography of Shear Margins: Simulated Temperature and Basal Material Inversions," *IEEE Trans. Geosci. Remote Sens.*, Vol. 61, pp.1-16, Jan. 2023, doi: 10.1109/TGRS.2022.3213047.
- [11] 2022 **N. Bienert**, D. Schroeder, S. Peters, E. MacKie, E. Dawson, M. Siegfried, R. Sanda*, and P. Christoffersen, "Post-Processing Synchronized Bistatic Radar for Long Offset Glacial Sounding," *IEEE Trans. Geosci. Remote Sens.*, Jan. 2022, doi: 10.1109/TGRS.2022.3147172.
Accompanying datasets, manuals, and code:
- [11.a] **N. Bienert** et al., bienert/Bistatic_Radar_Public: v1.0.0. (v1.0.0., 2021), Zenodo. [Online] doi:10.5281/zenodo.5565362.
- [11.b] **N. Bienert** et al., "Bistatic Radar Sounding of Whillans Ice Stream, Antarctica and Store Glacier, Greenland," U.S. Antarctic Program Data Center, Columbia Univ, New York City, NY, USA, Sept 2021, doi: <https://doi.org/10.15784/601472>.
- [10] 2022 **N. Bienert**, "Distributed Ice Penetrating Radar Sounding Using Passive Synchronization," Ph.D. dissertation, EE Dept., Stanford University, Stanford, CA, USA, 2022. Available: <https://purl.stanford.edu/js381bq6260>
- [9] 2022 **N. Bienert**, M. Haynes, D. Schroeder, and R. Beauchamp, "SFM CW Orthogonal Wave Beamforming Concept for Distributed Orbital Sounding," in *IEEE International Geosci. Remote Sens. Symp.*, Kuala Lumpur, Malaysia, July 2022, pp. 84-87, doi: 10.1109/IGARSS46834.2022.9883236.
- [8] 2022 A. McLeod*, S. Peters, R. Culberg, D. Schroeder, **N. Bienert**, W. Chu, T. Young, and P. Christoffersen, "Processing and Detecting Artifacts in Multi-Input Multi-Output Phase-Sensitive ICE Penetrating Radar Data," in *IEEE International Geosci. Remote Sens. Symp.*, Kuala Lumpur, Malaysia, July 2022, pp. 3786-3789, doi: 10.1109/IGARSS46834.2022.9883837.
- [7] 2022 K. Rao, Y. Uloa, **N. Bienert**, N. Chiariello, N. Holtzman, G. Quetin, S. Peters, K. Winstein, D. Castelletti, D. Schroeder, and A. Konings, "Side-facing P-Band Radar System to Monitor Tree Water Status," in *IEEE International Geosci. Remote Sens. Symp.*, Kuala Lumpur, Malaysia, July 2022, pp. 5559-5562, doi: 10.1109/IGARSS46834.2022.9883620.
- [6] 2021 T. J. Young, D. M. Schroeder, T. M. Jordan, P. Christoffersen, S. M. Tulaczyk, R. Culberg, and **N. Bienert**, "Inferring ice fabric from birefringence loss in airborne radargrams: Application to the eastern shear margin of Thwaites Glacier, West Antarctica," *Journal of Geophys. Research.*, Vol. 126, no. 5., April 2021, doi: <https://doi.org/10.1029/2020JF006023>.
- [5] 2021 D. Schroeder, **N. Bienert**, R. Culberg, E. MacKie, T. Teisberg, W. Chu, and D. Young, "Glaciological Constraints on Link Budget for Orbital Radar Sounding of Earth's Ice Sheets" in *IEEE International Geosci. Remote Sens. Symp.*, Brussels, Belgium, July 2021, doi: 10.1109/IGARSS47720.2021.9553237.
- [4] 2021 M. Haynes, R. Beauchamp, A. Khazendar, R. Mazouz, M. Quadrelli, P. Focardi, R. Hodges, W. Bertiger, and **N. Bienert**, "DEBRIS: Distributed Element Beamformer Radar for Ice and Subsurface Sounding" in *IEEE International Geosci. Remote Sens. Symp.*, Brussels, Belgium, July 2021, doi: 10.1109/IGARSS47720.2021.9554746.
- [3] 2020 **N. Bienert**, D. Schroeder, S. Peters, and M. Siegfried. "Processing-Based Synchronization Approach for Bistatic Radar Glacial Tomography," in *IEEE International Geosci. Remote Sens. Symp.*, Waikoloa Village, HI, USA, Sept. 2020, doi:10.1109/IGARSS39084.2020.9323969.
- [2] 2018 **N. Bienert**, "Resonance Radar Imaging" Undergraduate Thesis, EE Dept, Pennsylvania State Univ, University Park, 2018. Available: <https://honors.libraries.psu.edu/catalog/5558nlb5224>.
- [1] 2017 A. Babuscia, J. Sauder, A. Chandra, J. Thangavelautham, L. Feruglio, and **N. Bienert**, "Inflatable Antenna for CubeSat: A New Spherical Design for Increased Gain at X-Band" in *IEEE Aerospace Conf.*, Big Sky, MT, 2017, doi: 10.1109/AERO.2017.7943897.

CONFERENCE ORAL PRESENTATIONS (* = student mentee)

- [C10] 2024 **N. Bienert**, M. Moghaddam, "A Concept for Multistatic Radar Tomography of Root Zone Soil Moisture," oral presentation at IEEE International Geosci. Remote Sens. Symp., Athens, Greece, July. 8 -12, 2024.
- [C9] 2023 **N. Bienert**, and D. Schroeder, "Bistatic Radar Inversions of 2D Thermal Structure inside Store Glacier, Greenland," oral presentation at IEEE Geoscience and Remote Sensing Symp., Pasadena, CA, USA, July. 17-21, 2023.
- [C8] 2023 **N. Bienert**, and M. Haynes, D. Schroeder, R. Beauchamp, "SFMCW Orthogonal Wave Beamforming Concept for Distributed Orbital Sounding," oral presentation at IEEE Geoscience and Remote Sensing Symp., Kuala Lumpur, Malaysia, July. 17-22, 2023.
- [C7] 2023 A. McLeod*, S. Peters, R. Culberg, D. Schroeder, **N. Bienert**, W. Chu, T. Young, and P. Christoffersen, "Processing and Detecting Artifacts in Multi-Input Multi-Output Phase-Sensitive Ice Penetrating Radar Data," oral presentation at IEEE Geoscience and Remote Sensing Symp., Kuala Lumpur, Malaysia, July. 17-22, 2023.
- [C6] 2021 **N. Bienert**, D. Schroeder, R. Sanda*, E. Dawson, E. Mackie, S. Peters, and M. Siegfried, "Passively Synchronized Bistatic Radar System for Subsurface Tomography of Glaciers," oral presentation at American Geophysics Union Fall Meeting., New Orleans, LA, USA, Dec. 13-17 17, 2021.
- [C5] 2021 T. Young, T. Jordan, C. Martin, D. Schroeder, P. Christoffersen, S. Tulaczyk, R. Culberg, and **N. Bienert**, "Polarimetric Radar-Sounding to Infer and Quantify Shear Margin Ice Fabric Anisotropy", EGU, April 19-30, 2021. Virtual.
- [C4] 2021 D. Schroeder, **N. Bienert**, R. Culberg, E. MacKie, T. Teisberg, W. Chu, and D. Young, "Glaciological Constraints on Link Budgets for Orbital Radar Sounding of Earth's Ice Sheets", West Antarctic Ice Sheet Workshop, Sterling, VA, Sept 20-23, 2021.
- [C3] 2021 M. Haynes, R. Beauchamp, A. Khazendar, R. Mazouz, M. Quadrelli, P. Focardi, R. Hodges, W. Bertiger, and **N. Bienert**, "DEBRIS: Distributed Element Beamformer Radar for Ice and Subsurface Sounding" in IEEE Geoscience and Remote Sensing Symp., Brussels, Belgium, July 11-16, 2021.
- [C2] 2020 **N. Bienert**, D. Schroeder, S. Peters, and M. Siegfried, "Processing-Based Synchronization Approach for Bistatic Radar Glacial Tomography," oral presentation at the IEEE Geosci. and Remote Sens. Symp., Waikoloa Village, HI, USA, Sept. 26-Oct. 2, 2020.
- [C1] 2019 M. Altenburg*, D. Schroeder, R. Culberg, and **N. Bienert**, "Testing the Feasibility of Orbital Altitude Radar Sounding using a Multi-frequency Radar System," AGU Fall Meeting, San Francisco, Dec 9-13. 2019.

CONFERENCE POSTERS (* = student mentee)

- 2021 **N. Bienert**, D. Schroeder, R. Sanda*, E. Dawson, E. MacKie, S. Peters, M. Siegfried, "Passively Synchronized Bistatic Radar System for Subsurface Tomography of Glaciers", AGU Fall Meeting, New Orleans, Dec. 13-17. 2021.
- 2021 R. Sanda*, D. Schroeder, **N. Bienert**, T. Young, P. Summers, S.M. Tulaczyk, P. Christoffersen, and the TIME Team, "Informing Bistatic Radar Experiments at Thwaites Glacier Using Bistatic Data from Greenland and West Antarctica", AGU Fall Meeting, New Orleans, Dec. 13-17. 2021.
- 2020 A. McLeod*, S. Peters, D. Schroeder, **N. Bienert**, T. Young, and P. Christoffersen, "An Automated Approach to Processing and Detection of Artifacts in Phase-Sensitive Ice Penetrating Radar Data", AGU Fall Meeting, Online, Dec. 1-17. 2020.
- 2020 **N. Bienert**, D. Schroeder, S. Peters, E. MacKie, M. Siegfried, and E. Dawson, "Design of a Direct Path Synchronized Bistatic Radar Technique for Long Offset Glacial Temperature Tomography", AGU Fall Meeting, Online, Dec. 1-17. 2020.

- 2020 **N. Bienert**, D. Schroeder, S. Peters, and M. Siegfried, "Processing-based synchronization approach for bistatic radar glacial tomography," IEEE Symposium on Geoscience and Remote Sensing, Online, Sept 26 - Oct. 2. 2020.
- 2019 H. Tran*, D. Schroeder, and **N. Bienert**, "Improvements to MIMO Radio Echo Sounder Array Design for Subsurface Imaging," AGU Fall Meeting, San Francisco, Dec. 9-13. 2019.
- 2019 **N. Bienert**, D. Schroeder, S. Peters, E. Dawson, E. MacKie, and M. Siegfried, "Inferring Temperature Distribution in Shear Margins from Large-Offset Bistatic Radar Sounding," AGU Fall Meeting, San Francisco, Dec. 9-13. 2019.
- 2019 **N. Bienert**, D. Schroeder, S. Peters, M. Siegfried, E. MacKie, and E. Dawson, "Inferring Temperature Distribution in Shear Margins using an ApRES and Software Defined Radio in a Bistatic Configuration", WAIS Workshop, Julian, Oct. 16-18. 2019.
- 2019 **N. Bienert**, D. Schroeder, S. Peters, and M. Siegfried, "Improving constraints on englacial temperature and water distribution using an autonomous phase-sensitive radio echo sounder (ApRES) and a bistatic software defined receiver", IGS Symposium on Five Decades of Radioglaciology, Stanford, July 8-12. 2019.
- 2019 **N. Bienert**, D. Schroeder, H. Tran*, and M. Murray*, "How to hack your ApRES", IGS Symposium on Five Decades of Radioglaciology, Stanford, July 8-12. 2019.
- 2018 **N. Bienert**, D. Schroeder, and S. Peters, "Multi-Static Observations Using a Stationary Phase Sensitive Ice Penetrating Radar to Constrain Temperature and Water-Content Anomalies Across Shear Margins", AGU Fall Meeting, Washington DC, Dec. 10-14. 2018.

TEACHING EXPERIENCE

- 2024 Instructor, **ECEN 5244: Stochastic Environmental Signal Processing**, CU Boulder
- 2021 Instructor, **Bistatic Radar Short Course**, Stanford Radioglaciology Group
- 2020 Teaching Assistant, **GEOPHYS110: Introduction to Geophysics**, Stanford
- 2019 Instructor, **REU Office Hours**, Stanford Radioglaciology Group
- 2019 Instructor, **Introductory Radar Workshop**, International Glaciological Society Conference
- 2019 Teaching Assistant, **GEOPHYS110: Introduction to Geophysics**, Stanford
- 2013-2015 Instructor, **Snowsports Instructor**, Tussey Mountain Ski Resort

LECTURES

- 2023 Google Tech Talks, "How Smartphone Autofocus Works," Google, Aug. 2023.
- 2022 Autofocus Group Lecture Series, "Advances in Edge Detection Image Processing," Google, Oct. 2022.
- 2021 Radioglaciology Group Lecture Series, "Link Budgets," Stanford Univ., Aug. 2021.
- 2021 Radioglaciology Group Lecture Series, "Beamforming," Stanford Univ., May 2021.
- 2020 Radioglaciology Group Lecture Series, "Navigating SNR Definitions," Stanford Univ., May 2020.
- 2019 GEOPHYS240 Class Lecture, "Radar Backprojection," Stanford Univ., 2019
- 2019 EE242 Class Lecture, "Rough Surface Scattering," Stanford Univ., 2019.
- 2018 Stanford Splash, "Electricity and Magnetism," Stanford Univ., 2018.
- 2018 EE430 Class Lecture, "Transmission and Reflection of EM Waves." Pennsylvania State Univ., 2018.

MENTEES

- 2020 – 2021 Rohan Sanda, 4th year student in EE at Stanford
- 2020 Akua McLeod, Stanford BS in EE, Now: Ph.D. Student in EPP at Carnegie Mellon
- 2019 Martin Altenburg, Stanford BS in EE, Now: McKinsey & Co.
- 2019 Ha Tran, Stanford BS in CS, Now: Masters Student at Stanford.
- 2019 Jon Bessette, SUNY Buffalo BS in ME, Now: Ph.D. Student in Mech.E. at MIT.
- 2019 Jasmine Jones, Stanford BS in EE, Now: Blue Origin.
- 2018 Michaela Murray, Stanford BS in CS, Now: Ph.D. Student in CS at UC Berkeley

ACTIVITIES

2023	Student Member , IUCRC: NSF Center for Soil Technologies
2023	Poster Session Judge , Univ. of Southern California ECE Research Festival
2020 – 2023	Reviewer for IEEE Transactions on Antennas and Propagation
2020	Reviewer for the Journal of Glaciology
2019	Organizing Committee Member , IGS Symposium on Five Decades of Radioglaciology
2018	Field Scientist , two-month expedition at Store Glacier, Greenland