



## Riley Culberg

Ph.D. Student in Electrical Engineering, admitted Autumn 2019

 Curriculum Vitae available Online

### Bio

---

#### BIO

My research focuses on resolving the near-surface and internal structure of the continental ice sheets in Greenland and Antarctica using airborne ice penetrating radar systems. I am particularly interested in understanding the coupling between firm structure and near-surface hydrology in Greenland, the evolution of this system in a warming climate, and its influence on the large scale ice sheet mass balance and hydrology. Additionally, I am interested in deep englacial structure as a reflection of past climate processes and ice sheet age structure. My approach to these questions involves the synthesis of electromagnetic theory, radar signal and system constraints, and in-situ observations to develop both forward and inverse methods that link physical conditions of interest within the ice sheets to their expression in radar sounding data. Applying these tools to the analysis of radar sounding data allows me to place observational constraints on state of the englacial system at scales and resolutions that bridge the gap between field measurements and numerical models. In addition, I have applied some of these same techniques to study the optimal system design parameters for future high altitude or satellite-based radar systems.

#### HONORS AND AWARDS

- Best Student Poster, West Antarctic Ice Sheet Workshop (2019)
- Best Student Oral Presentation, IGS Symposium on Five Decades of Radioglaciology (2019)
- Fellow, National Defense Science and Engineering Graduate Fellowship (2019)
- Steel Order of the De Fleury Medal, Army Engineer Association (2014)
- Award for the Highest Composite Standing in Applied Science and Engineering, United States Military Academy (2012)
- U. S. Grant Memorial Award for Excellence in Computer Science, United States Military Academy (2012)
- Excellence in Geospatial Information Science Award, United States Military Academy (2012)

#### PROFESSIONAL AFFILIATIONS AND ACTIVITIES

- Member, International Glaciological Society (2019 - present)
- Member, IEEE Geoscience and Remote Sensing Society (2018 - present)
- Member, American Geophysical Union (2018 - present)

#### EDUCATION AND CERTIFICATIONS

- M.S., Stanford University , Electrical Engineering (2019)
- B.S., United States Military Academy , Computer Science and Geospatial Information Science (2012)

#### STANFORD ADVISORS

- Dustin Schroeder, Doctoral Dissertation Advisor (AC)
- Howard Zebker, Doctoral Dissertation Reader (AC)

- Gordon Wetzstein, Doctoral (Program)

## LINKS

- Google Scholar: <https://scholar.google.com/citations?user=x4825e4AAAAJ&hl=en>

## Research & Scholarship

---

### LAB AFFILIATIONS

- Dustin Schroeder, Stanford Radio Glaciology (9/24/2018)

## Professional

---

### WORK EXPERIENCE

- Engineer Officer - United States Army (5/26/2012 - 9/1/2017)
- Associate Research Analyst - Antennas and Radio Frequency Systems Division, Toyon Research Corporation (6/18/2018 - 9/15/2018)

## Publications

---

### PUBLICATIONS

- **Firn Clutter Constraints on the Design and Performance of Orbital Radar Ice Sounders** *IEEE Transactions on Geoscience and Remote Sensing*  
Culberg, R., Schroeder, D. M.  
2020: 1-18
- **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
- **RADAR SCATTERING IN FIRN AND ITS IMPLICATIONS FOR VHF/UHF ORBITAL ICE SOUNDING**  
Culberg, R., Schroeder, D. M., IEEE  
IEEE.2019: 4137-40