Tonian R. Robinson

Curriculum Vitae

CONTACT

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GitHub: https://github.com/tonianr/ (computer code repository)

EDUCATION

2017-*present* Ph.D. Geology, University of South Florida (*expected Spring 2023*)
Thesis Titles:

- Evaluating the relationship between subsurface structures and ground motions related to sinkhole formation in west-central Florida using persistent scatterer interferometry (PSInSAR) from satellite data, terrestrial LiDAR, GIS, and near-surface geophysics including ground penetrating radar (GPR) and electrical resistivity tomography (ERT).
- Characterizing sinkhole-related subsidence patterns through statistical and time-series analysis of TerraSAR-X PSInSAR satellite datasets from sinkhole-prone areas in west-central Florida to assess the conditions under which sinkhole-related subsidence can be monitored by satellite
- Delineating flood susceptibility maps for the Tampa Bay region and better understanding the causes of coastal subsidence using vertical motions derived from the Sentinel-1A satellite and GNSS (GPS) datasets.

2017 B.S. Geology (major) & Environmental Science (minor), Rutgers State University – Newark, NJ

- Worked as Undergraduate Research Assistant in Hydrogeophysics for three years.

TEACHING EXPERIENCE

2019-*present* Teaching Assistant, University of South Florida - Tampa, FL

- Summer Field Geophysics Electrical Resistivity Instructor: Taught 80 students in groups of 4-5 how to conduct Electrical Resistivity surveys, process, and present results. Collaborated alongside three faculty members as part of a four-person teaching team.
- Created and graded materials for the following courses:
  - The Dynamic Earth (*first and second year students*)
  - Intro to Physical Geology (*first and second year students*)
  - Intro to Environmental Science (*first and second year students*),
  - Wetland Environments (*first and second year students*)
  - Near-Surface Geophysics (*upper level undergraduate and graduate students*),
  - Geology for Engineers (*upper level undergraduate students*)
- Developed, reviewed, and tested material for innovative teaching

modules aimed at broadening undergraduate participation in geophysics for the NSF-funded Introducing Geophysics for Urban and Near-surface Applications (IGUaNA) program. These modules are currently hosted on the Science Education Resource Center at Carleton College (https://serc.carleton.edu/iguana)

2022 Summer Geophysics Instructor, IRIS Consortium (now Earthscope Consortium)

- Implemented IGUaNA Geophysics teaching modules to train instructors at liberal arts and two-year institutions on incorporating field Geophysics into their classrooms

2022 Summer Geophysics Instructor for GNOMES program, Rutgers State University, Newark NJ

- GPR mentor and instructor for the Rutgers Geophysics of the Near-surface an Outdoor Motivational Experience for Students (GNOMES) program, which aims to diversify the geosciences by introducing minoritized students to critical zone geophysics.
- Led GPR instruction using the IGUaNA teaching modules
- Developed GPR field surveys and guided students through the data collection, processing, and interpretation in the Bear Meadows and Garner Run Catchments of the Susquehanna Shale Hills Critical Zone Observatory (Pennsylvania)
- Mentored students through research projects in the Fall semester; the students presented their findings at 2022 American Geophysical Union Conference

2021-2022 Summer Geophysics Instructor, Fort Valley State University & IRIS Consortium (now Earthscope Consortium)

- Lead instructor for the IGUaNA Ground Penetrating Radar (GPR) and Resistivity modules. Led labs to collect and process data for 12 Fort Valley State University undergraduates
- Developed GPR data processing module for IGUaNA
- Assisted students in presenting their experience and findings at the 2021 and 2022 Annual Technical Conference of The National Association of Black Geoscientists (NABG)

RESEARCH EXPERIENCE

2017-2019 Research Assistant, University of South Florida, Tampa, FL

- Analyzed subsidence of persistent scatterers identified in Interferometric Synthetic-Aperture Radar (InSAR) data to assess the reliability of using InSAR data to locate sinkhole-related subsidence in central Florida
- Collected and processed ground-penetrating radar data from the July 27, 2018, Ocean Pines Dr. Sinkhole, Land-o-Lakes, FL, to add subsurface structure to a 3D model of the sinkhole

2014-2017 Research Assistant, Rutgers State University, Newark, NJ
- Measured the surface area, pore size distributions, magnetic susceptibility, and mineral composition of sand- and mudstone samples. Interpretations were used to correlate the electrical properties of the sub-core samples to the hydraulic properties controlling fluid transport.

2011 Research Assistant, Roche program, William Paterson University**,** Wayne, NJ
- Identified and collected the Tetramorium Caespitum ant species
- Planned, developed, and implemented the procedure to measure the critical thermal maximum of the ant species
- Performed routine maintenance of laboratory equipment and ensured a safe research environment

PEER-REVIEWED PUBLICATIONS

2022 Oliver-Cabrera, T., Wdowinski, S., Kruse, S., **Robinson, T**., 2022. *Detection of sinkhole activity in West-Central Florida using InSAR time-series observations*. Remote Sensing of Environment. https://doi.org/10.1016/j.rse.2021.112793

2021 **Robinson, T**., Rodgers, B., Oliver-Cabrera, T., Downs, C., Kruse, S., Wdowinski, S., Zhang, B., Jazayeri, S., Esmaeili, S., Kiflu, H., 2021. *Complex relationships between surface topography, ground motion, and cover sediments in covered karst, west-central Florida, USA*. Geomorphology 392, 107927. https://doi.org/10.1016/j.geomorph.2021.107927

2018 Robinson, J., Slater, L., Weller, A., Keating, K., **Robinson, T**., Rose, C., et al. (2018). On permeability prediction from complex conductivity measurements using polarization magnitude and relaxation time. Water Resources Research, 54, 3436–3452. https://doi.org/10.1002/2017WR022034

HONORS, FELLOWSHIPS, & AWARDS

2022 Genshaft Family Doctoral Fellowship, University of South Florida
2022 & 2023 Karen D. Harro Scholarship in Geology, University of South Florida
2020 The Beck Scholarship, Sinkhole Conference
2017 NSF Florida-Georgia Louis Stokes Alliance for Minority Participation (FGLSAMP) Bridge to the Doctorate Fellowship
2017 Elmeryl Davies Memorial Scholarship (The New Jersey Licensed Site Remediation Professionals Association, LSRPA)
2016 Nominated Scholar – Research Experience for Undergraduates (REU) Symposium
2016 Best Presentation – Garden State-Louis Stokes Alliance for Minority Participation Conference
2016 Dean's list –Rutgers State University-Newark (Spring & Fall)

2015 Dean's list –Rutgers State University-Newark (Spring)

CONFERENCE PUBLICATIONS

2020 **Robinson, T**., C. Downs, T. Oliver-Cabrera, B. Zhang, S. Kruse, S. Wdowinski., 2020 Relationships between Sinkhole-Related Features and InSAR-Detected Subsidence Points in West Central Florida. Sinkhole Conference 2020 https://doi.org/10.5038/9781733375313.1005

Oliver-Cabrera, T., Wdowinski, S., Kruse, S., **Robinson, T.,** 2020. InSAR Detection of Localized Subsidence Induced by Sinkhole Activity in Suburban West-Central Florida, Proc. IAHS, 382, 155–159, https://doi.org/10.5194/piahs-382-155-2020

Downs C., **Robinson T.,** Speed G., Garcia J G., Garcia N., Collins L., Doering T., Landry S., Eilers D., Jazayeri S., Esmaeili S., Kruse S., Braunmiller J., Kiflu H., Spatial and temporal imaging of a cover-collapse sinkhole in west-central Florida through high-resolution remote sensing and geophysical techniques. Sinkhole Conference 2020 https://doi.org/10.5038/9781733375313.1034

Grobbe N., De Ridder S., Barde-Cabusson S., Robinson T., Jazayeri S., Kruse S., Xu Z., Otheim L., Mikesell D., 2020, *Electrokinetic geophysics for groundwater assessment and complex near-surface characterization.* Society of Exploration Geophysicists. Fifth International Conference on Engineering Geophysics (ICEG) p 92-95., https://doi.org/10.1190/iceg2019-023.1

2019 Keating, K., J. Robinson, Slater, L., **Robinson, T**., Parker, B., 2019. Improving pore-size distribution and permeability prediction from NMR using DT2 maps, SEG Technical Program Expanded Abstracts 2019, https://doi.org/10.1190/segam2019-3214831.1, (4809-4813)

2018 Robinson, J., Slater, L., Keating, K., **Robinson, T**., Rose, C., Parker, B., 2018. "On permeability estimation for mudstones using geophysical length scales," SEG Technical Program Expanded Abstracts: 4889-4893. https://doi.org/10.1190/segam2018-2985629.1

CONFERENCE ABSTRACTS

2022 **Robinson, T.**, T. Dixon, S. Kruse, 2022, Persistent Scatterer Time Series Analysis of Subsidence in the Tampa Bay Region. AGU Fall Meeting Abstracts 2022, EP55C-0828

Kruse, S., **Robinson, T.**, Parsekian, A., Slater L., Ormand, C., Taber J., Sumy D., McDaris J., 2022, The IGUaNA Modules: Teaching Geophysics with Societally Relevant Questions in Introductory-Level STEM Courses. AGU Fall Meeting Abstracts 2022, ED25C-0567

Mariya, Malayil A., Ntim, C., Jean Jacques D., **Robinson, T.**, Keating K., Hayes J., Mount G., Tarzona A., Donaldson Y., Estrada J., Caro Cano C., DiBiase R., Del Vecchio J., 2022, Understanding the Subsurface of Garner Run and Bear

Meadows through the eyes of Ground Penetrating Radar. AGU Fall Meeting Abstracts 2022, NS32B-0360

Estanus, A., Oti, C., Urday N., Dwanah M., Donaldson Y., Keating K., Hayes J., Mount G., Tarzona A., **Robinson, T.**, Estrada J., Caro Cano C., DiBiase R., Del Vecchio J., 2022, Imaging the Subsurface of the Critical Zone in Garner Run and Bear Meadows using Electrical Resistivity Tomography. AGU Fall Meeting Abstracts 2022, NS32B-0361

Lee, S., Kornegay C., Keating K., Hayes J., Mount G., Tarzona A., Donaldson Y., **Robinson, T.**, Estrada J., Caro Cano C., DiBiase R., Del Vecchio J., Charles S., 2022, Observations from Seismic Refraction Survey of Solifluction Lobes at Garner Run and Bear Meadows, Pennsylvania. AGU Fall Meeting Abstracts 2022, NS32B-0362

2021 Oliver-Cabrera, T., Wdowinski, S., Kruse, S., **Robinson, T.**, 2021, Using InSAR Time Series Observations to Detect Sinkhole Activity: West-Central Florida Case of study. NSF Convergence Workshop on Bringing Land, Ocean, Atmosphere and Ionosphere Data to the Community for Hazard Alerts.

2020 **Robinson, T.**, Rodgers, B., Oliver-Cabrera, T., Zhang, B., Kruse, S., Wdowinski S., 2020, Complex relationships between surface deformation, surface topography, and top-of-limestone surface in the covered karst Sandhill Reservation, West-central Florida. AGU Fall Meeting Abstracts 2020, NS011-03

Robinson T., C. Downs, T. Oliver-Cabrera, B. Zhang, S. Kruse, S. Wdowinski, 2020, Relationships between Sinkhole-Related Features and InSAR-Detected Subsidence Points in West Central Florida. The Sinkhole Conference 2020. Peer-reviewed.

2019 **Robinson T.**, C. Downs, T. Oliver-Cabrera, B. Zhang, S. Kruse, S. Wdowinski, 2019, Relationships between InSAR-detected Subsidence Points in West-Central Florida and Geomorphological features (such as wetlands, ponds, and swallets) of Sinkhole-related activity. AGU Fall Meeting Abstracts 2019, H41I-1805

Kruse, S., Braunmiller J., Malservisi R., Downs C., Jazayeri S., Varner L., McIlrath J., **Robinson, T**., P. Wetmore, Connor C., 2019, The University of South Florida Geophysics Field Camp: Experiences and Science Results from the Lost River Valley and Craters of the Moon, Idaho. AGU Fall Meeting Abstracts 2019, ED53E-0893

Hastings, M., Malservisi R., Connor C., Mack B., **Robinson, T.**, Connor L., Rodgers, M., La Femina, P., 2019, Gravity anomalies reveal volcano-tectonic interaction in an active distributed volcanic field, Blackfoot Reservoir volcanic field (ID). AGU Fall Meeting Abstracts 2019, H43H-2095

2018 **Robinson, T.**, Kruse, S., Wdowinski, S., Oliver-Cabrera T., Zhang, B., Hyun Nam, B., Shamet R., 2018, Comparison of Interferometric Synthetic Aperture Radar (InSAR)-derived subsidence time series with ground-based estimates of sinkhole activity, west-central Florida. AGU Fall Meeting Abstracts 2018, NH31E-1017

Zhang, B., Wdowinski, S., Oliver-Cabrera, T., **Robinson, T.**, Kruse, S., Perissin, D., 2018. Monitoring Surface Stability of Remediated Sinkholes in Western Central Florida using PSInSAR Technique and Sentinel-1 Observations. AGU Fall Meeting Abstracts 2018, G21C-0574

Braunmiller, J; Thompson, G; McNutt, S. R.; Dorn, K; Graybeal, D. B.; Farrell, A; Collins, L. D.; Doering, T; Eilers, D; Gonzales, J.; Kiflu, H G.; Kruse, S; Landry, S. M.; **Robinson, T.**, and Speed, G. T., Seismic Observations Following the July 2017 Pasco County, West Florida, Sinkhole Collapse. Seismological Society of America Annual Meeting 2018

2017 Robinson, J., Slater L., Keating K., Parker B.L, **Robinson, T.**, 2017, Relationship between pore geometric characteristics and SIP/NMR parameters observed for mudstones. AGU Fall Meeting Abstracts 2017, H21A-1430

Slater, L.D, Robinson J., Weller A., Keating K., **Robinson, T.**, Parker B.L., 2017, Permeability from Complex Conductivity: An Evaluation of Polarization Magnitude versus Relaxation Time Based Geophysical Length Scales. AGU Fall Meeting Abstracts 2017, H33I-05

Kiflu H., Oliver-Cabrera T., **Robinson, T.**, Wdowinski S., Kruse S., 2017, Monitoring and modeling of sinkhole-related subsidence in west-central Florida mapped from InSAR and surface observations. AGU Fall Meeting Abstracts 2017, NH31B-0222

Collins L.D., Kiflu H., **Robinson, T.**, T. Doering, D. Eilers, M. Rodgers, S. Kruse, S. Landry, J. Braunmiller, G. Speed, J. Gonzalez, R. McKenzie, 2017, A Multi-Sensor Approach to Documenting a Large Collapse Sinkhole in West-Central Florida. AGU Fall Meeting Abstracts 2017, NH31B-0226

2016 **Robinson, T.**, Keating K., Robinson J., Slater L.D., Parker B.L., Rose C., 2016, Magnetic susceptibility: correlations with clay content. Garden State Louis Stokes Alliance for Minority Participation Conference (October 8, 2016)

Robinson, J., Slater, L. D., Keating, K., Parker, B. L., Day-Lewis, F. D., **Robinson, T.**, 2016. Permeability prediction of high Spor samples from spectral induced polarization (SIP): limitations of existing models. AGU Fall Meeting Abstracts 2016, H43L-04

Robinson, T., Keating, K., Robinson, J., Slater, L., Parker, B., 2016, Magnetic Susceptibility: Correlations with Clay Content and Apparent Diffusion

Coefficients Controlling Electrical Double Layer Polarization. AGU Fall Meeting Abstracts, p. ED31B-0876

Robinson, T., Keating, K., Robinson, J., Slater, L., Parker, B., Rose C., 2016, Magnetic Susceptibility and its relationship to clay content and the petrophysical property of rocks. Research Experiences for Undergraduates Symposium (October 23, 2016)

2015 **Robinson, T.**, Keating, K., Robinson, J., Slater L., Parker B., Rose, C., Keating, K., 2015, Use of Geophysical measurements to estimate permeability and other pore geometry properties for complex resistivity measurements at two sedimentary rock sites. Garden State Louis Stokes Alliance for Minority Participation Conference (October 2015)

Robinson, T., Robinson J., Slater L.D., Parker B.L., Rose C., Keating K., 2015, Evaluating the performance of models for matrix permeability estimation from complex resistivity measurements at two sedimentary rock sites. Geological Society of America Abstracts with Programs. Vol. 47, No. 7 p.315,

Robinson, J, Slater, L, Parker, B. L., Keating, K, Day-Lewis, F, Johnson, Carole D., Rose, C, **Robinson, T.**, Meyer, Jessica R. And Pehme, P. E., 2015, Investigating geophysical technologies to characterize pore geometric properties controlling contaminant mass transport in fractured rock. Geological Society of America Abstracts with Programs. Vol. 47, No. 7, p.196

Robinson, J., Slater L.D., Kristina K., Parker B.L., Rose C., Meyer J.R., Johnson, C.D., Pehme, P.E., **Robinson, T.**, Chapman, S., and Day-Lewis, F., 2015, Evaluating petrophysical relationships in fractured rock using geophysical measurements. AGU Fall Meeting Abstracts, 2015, p. H14A-07

SHORT COURSES/TRAININGS

2022 NASA ARSET: Disaster Assessment Using Synthetic Aperture Radar
2022 NASA ARSET: Monitoring and Modeling Floods using Earth Observations
2022 C++ Programming from Beginner to Beyond (Udemy)
2021 GETSI Teaching in the field with SfM and RTK GPS/GNSS
2020 UNAVCO 2020 InSAR Processing and Time-Series Analysis for Geophysical Applications: InSAR Scientific Computing Environment (ISCE), ARIA Tools, and MintPy
2019 Seismic Surface Wave Short Course, Park Seismic LLC

CONFERENCE SESSION CO-CONVENER

2019 - 2020 American Geophysical Union

- NS43D (2019) & NS013 (2020): Near-Surface Geophysics General Contributions I Posters
- H43B (2019): Characterizing Hydrological Processes and Contaminant Migration in Fractured Rocks and Karst Systems: Combining Experimental, Field, and Modeling Approaches

INVITED TALKS

2022 Seminar, Rutgers State University-Newark, "Complex relationships between surface deformation, surface topography, and top-of-limestone surface in the covered karst Sandhill Reservation, West-central Florida."

2020 Near Surface Geophysics of the Critical Zone Session, American Geophysical Union, "Complex relationships between surface deformation, surface topography, and top-of-limestone surface in the covered karst Sandhill Reservation, West-central Florida."

OUTREACH, MENTORING, & DEPARTMENT SERVICE

2022-*present* Student Representative, AGU Near-Surface Geophysics Section

2019-*present* Social Media Coordinator and member of the Executive Committee, AGU Near-Surface Geophysics Section (@NSG_AGU)

2019-*present* Vice President of Outreach, Geoscience Graduate Student Organization (GGSO)

- Organized + presented orientation sessions for incoming School of Geosciences students
- Organized annual welcome events for incoming grad students to learn about department research and connect with returning students and faculty
- Organized regularly recurring networking and community building events for undergraduate and graduate students, faculty, staff, and alumni in the School of Geosciences
- Organized *Hidden Figures* movie night and discussion about DEI in STEM fields

2020-2021 Diversity in STEM Graduate Student Panel, University of South Florida - Geosciences

2020 Led Introduction to InSAR Training Course, University of South Florida - Geosciences

2019 Tampa Bay Cub scout Geology Pinning

2018 Panelist, "*Ask a Scientist*" panel for Tampa Bay LSAMP Bridge to the Baccalaureate (B2B) Students

2017 Student Mentor, Sandhill Boy Scout Reservation: STEAM Day

- Introduced scouts to geophysical methods
- Presentation on sinkhole research as means to educate scouts

2017 Garden State Louis Stokes Alliance for Minority Participation (GS-LSAMP)

- Assisted community college students in their transition to four-year institutes

2015 Undergraduate Research Mentor, Rutgers State University, Newark NJ

- Assisted with mentoring Newark high school students in SERDP research

SKILLS

SOFTWARE & PROGRAMMING

- MATLAB, Python, JavaScript, HTML
- ArcGIS
- StaMPS *(time-series interferometry processor)*
- ISCE2 *(interferometry processor)*
- LINUX/UNIX
- C++ *(familiarity via UDEMY course)*
- Agisoft Metashape *(digital image to 3D surface processor)*
- MintPy *(time-series interferometry processor)*
- High-performance computing (HPC)
- ReflexW *(seismic and electromagnetic wave processor)*
- Res2DinV and ResIPy *(electrical resistivity inversion processor)*
- GMT *(mapping tool)*
- Google Earth Engine

FIELD METHODS

- Experiment design and data acquisition for Ground Penetrating Radar *(electromagnetic wave imaging technique)*
- Electrical Resistivity *(electrical imaging technique)*
- Seismic *(compressional wave imaging technique)*
- Structure from Motion (SfM) *(creating surfaces from photogrammetry)*
- LiDAR *(familiarity with post-processing)*
- Gravimetry *(gravitational field measurement technique)*
- GPS

LABORATORY EXPERIENCE

- Spectral Induced Polarization *(multi-frequency electrical imaging)*
- Mercury Porosimetry *(quantifies pore structure)*
- Micromeritics ASAP 2020 B.E.T *(surface area and porosity measurement)*
- X-ray Diffraction *(crystal structure measurement)*

SOCIETY AND GROUP MEMBERSHIPS AND AFFILIATIONS

2019-*present* Black Graduate & Professional Student Association (BGPSA)
2018-*present* Outreach Coordinator, Geoscience Graduate Student Organization (GGSO)
2017-*present* Florida-Georgia Louis Stokes Alliance for Minority Participation (FG-LSAMP)
2015-*present* American Geophysical Union (AGU)
2014-2017 Garden State Louis Stokes Alliance for Minority Participation (GS-LSAMP)
2014-2017 Association of Environmental & Engineering Geologists (AEG) – NY
2014-2017 G.E.O Club – Rutgers State University – Newark