Bassel Saleh

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Education

Doctor of Philosophy December 2023 (Expected)
Computational Science, Engineering, and Mathematics (CSEM)
The University of Texas at Austin, Oden Institute

Master of Science
Computational Science, Engineering, and Mathematics (CSEM) December 2020
The University of Texas at Austin, Oden Institute

Bachelor of Science, Physics
The University of Texas at Austin, College of Natural Sciences May 2018

Bachelor of Science, Computer Science
The University of Texas at Austin, College of Natural Sciences May 2018

Research Experience

Graduate Research Assistant, The University of Texas at Austin August 2018 - Present
Oden Institute for Computational Engineering and Sciences
Center for Computational Geosciences and Optimization
Advisor: Omar Ghattas, Ph.D.

Undergraduate Research Assistant, Cornell University June 2017 – August 2017
Laboratory for Accelerator-based Sciences and Education (CLASSE)
NSR Research Experience for Undergraduates
Advisor: Gennady Shvets, Ph.D.

Undergraduate Research Assistant, The University of Texas at Austin June 2016 – May 2018
Oden Institute for Computational Engineering and Sciences
Moncrief Summer Internship, Extended
Advisor: Omar Ghattas, Ph.D.

Undergraduate Research Assistant, The University of Texas at Austin. January 2015 – April 2016
Department of Computer Science
Advisor: Etienne Vouga, Ph.D.

Teaching Experience

Instructor, Activateen March 2019 – May 2019
Workshop on Machine Learning Basics for Teens

Instructor, Activateen June 2018 – July 2018
Workshop on Introduction to Python and Programming Basics

Instructor, GT Learning Academy July 2015 – August 2015
Summer courses on algebra II, precalculus, chemistry, and physics for high schoolers

Publications and Technical Reports

Preprint
B. Saleh, T. O'Leary-Roseberry, B. Keith, O. Ghattas. "DeepGW: A Goal-Oriented Parametric Surrogate Model for Gravitational Waves using Neural Networks." (2023)

Preprint
B. Saleh, A. Zimmerman, P. Chen, O. Ghattas. "Multifidelity Importance Sampling Using Tempered Posteriors for Gravitational Wave Inference." (2022)

Technical Report for Turing Honors Thesis
B. Saleh, O. Ghattas. "Scientific Machine Learning: A Neural Network-based Estimator for Forward Uncertainty Quantification." UTCS Technical Reports. (2018) Link to report

Technical Report for the CLASSE REU Summer Internship
B. Saleh, G. Shvets, V. Khudik, T. Wang. "Modeling Bubble Formation in Plasma-Based Particle Accelerators." Cornell CLASSE REU Final Reports. (2017) Link to report

Presentations and Posters

Oral Presentation April 2022
SIAM Conference on Uncertainty Quantification
Mini-symposium on Physics-Informed and Data-Driven Predictive Models with Quantified Uncertainty
B. Saleh, T. O'Leary-Roseberry, B. Keith, O. Ghattas. "Parametric Machine Learning Surrogates for Gravitational Wave Signals."

Poster November 2021
IPAM Workshop on Source Inference and Parameter Estimation in Gravitational Wave Astronomy
B. Saleh, A. Zimmerman, P. Chen, O. Ghattas. "Multifidelity Importance Sampling for Gravitational Wave Inference."

Oral Presentation March 2021
SIAM Conference on Computational Science and Engineering
Mini-symposium on Computational Strategies for High Dimensional Stochastic Problems
B. Saleh, A. Zimmerman, P. Chen, O. Ghattas. "Multifidelity Importance Sampling for Gravitational Wave Inference."

Oral Presentation March 2020
SIAM Conference on Uncertainty Quantification*
Mini-symposium on Reduced Order Methods for Uncertainty Quantification in CFD Parametric Problems
B. Saleh, T. O'Leary-Roseberry, O. Ghattas. "Neural Networks as Control Variates for UQ in Ice Sheet Flow."
**Cancelled due to Covid-19 pandemic*

Poster March 2017
SIAM Conference on Computational Science and Engineering
B. Saleh, U. Villa, O. Ghattas. "Neural Networks as Reduced Models for Physical Systems and Inverse Problems."

Oral Presentation August 2017
CLASSE REU
B. Saleh, G. Shvets, V. Khudik, T. Wang. "Modeling Bubble Formation in Plasma-based Particle Accelerators."

Poster August 2016
UT Summer Research Scholars Poster Session
B. Saleh, U. Villa, O. Ghattas. "A Neural Network Approach to Modeling Inverse Problems."

Awards and Honors

CSEM Graduate Student Fellowship 2018-2022
Turing Honors Scholar 2014-2018
Dean's Honors Scholar 2014-2018
Recipient, College of Natural Sciences Scholarship 2014
Recipient, Siemens Foundation Scholarship 2014
University Honors 2014-2018
College of Natural Sciences Honors 2015-2018
Regional Finalist at Siemens Competition in Math, Science, and Technology 2013

Professional Societies and Campus Organizations

Society for Industrial and Applied Mathematics (SIAM)
American Physical Society (APS)
Graduate Student Assembly (GSA) – *Department representative*: Fall 2022, Spring 2023
SIAM Applied Math Mentorship Program: Spring 2021, Fall 2021, Spring 2022

Community Involvement and Volunteering

Austin ECHO – Point in Time Count	2023
Community First! Village	2022
Texas Coalition for Human Rights	2022

Personal Technical Projects

Climbing the Giant - https://climbingthegiant.com/
- Developing and maintaining a website for science communication, including coding project tutorials and informal explanations of topics in physics and mathematics

CatGPT
- Created a Markov chain-based AI chat bot, developed in Python, for educational purposes

Bayesian SIR with Jax
- Developed a framework for solving Bayesian inverse problems with SIR epidemiological models, using Jax to allow GPU parallelization