Eric Gagliano

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Education

The University of Texas at Austin *Austin, TX*

Bachelor of Science, Computational Engineering *08/2015 - 05/2020*

- **Certificate in Humanitarian Engineering**
- **GPA: 3.82/4.00**

Recent Coursework

Engineering	**Math**	**Programming**	**Interdisciplinary**
Computational Fluid Dynamics	Partial Differential Equations & Applications	Advanced Computational Engineering	Dynamics of Polar Systems
Computational Structural Analysis	Applied Regression Analysis	Software Engineering & Design	Remote Sensing for Geoscientists
Electromechanical Systems	Matricies and Matrix Calculations	Scientific Computing	Computational Modeling in Bioengineering
Linear System Analysis	Differential Equations & Linear Algebra	Engineering Computation	Nuclear Environmental Protection
Mechanics of Solids	Probability I	Numerical Analysis	Humanitarian Product Design

Research Experience

Center for Space Research *Austin, TX*

Radar Interferometry Group, Research Assistant *08/2018 - 05/2020*

- Researched under Dr. Ann Chen to model seasonal glacial flow in Western Greenland using Interferometry on Synthetic Aperture Radar (SAR) data from Sentinel-1.
- Built Digital Elevation Models (DEM) from ArcticDEM data and validated the advertised sensor resolutions using statistical methods.
- Constructed interferograms to measure glacier velocity and to conduct seasonal analysis to determine the spatial speedup during the warmer months.
- Gained familiarity with Computer Vision and Image Processing concepts by implementing cross-correlation, feature detection, texture analysis, and SIFT.

Sandia National Laboratories *Albuquerque, NM*

Autonomy for Hypersonics Group, Year Round Intern *08/2018 - 08/2019*

- Developed method for efficiently correlating SAR images to DEMs in real-time using Computer Vision techniques for use in navigation in GPS-Denied environments.
- Created a ridge detection algorithm in MATLAB for use on Digital Elevation Models to extract a peak and mountain range "skeleton".
- Improved cross correlation code run times from 3 hours to 12 seconds using a combination of FFTs, down-sampling, parallelization, and GPU based computations.
- Implemented SURF to perform rotation-invariant feature-based image registration between projections of radar images and gradients of elevation maps.

Center for Analysis Systems and Applications, R&D Intern *05/2018 - 08/2018*

- Added complexity to a cloud generation and atmospheric MATLAB model, focusing on clustering algorithms and global temperature profiles.
- Updated a proprietary sensor and signal processing library from Python 2 to 3, debugged relevant errors, and improved code testing capabilities.
- Modernized a large satellite modeling and simulation codebase for better compatibility with current capabilities and input formats.

Center for Mechanics of Solids, Structures, and Materials *Austin, TX*

Individual Project, Research Assistant *01/2018 - 05/2018*

- Researched under Dr. Ravi-Chandar to investigate crack propagation and fracture patterns in specific alloys of aluminum.
- Used ABAQUS (Finite Element Analysis software) to model fracture of AL6061-O using the Johnson-Cook Damage Model.
- Validated computational model of fracture by fatiguing and testing aluminum specimens in a hydraulic material test station.
- Speckled test specimen and used Digital Image Correlation software as a secondary source for strain measurements and visualization.

Applied Research Laboratories *Austin, TX*

Modeling and Simulation Group, Student Technician *06/2017 - 01/2018*

- Developed a prototype active sonar ontology to represent target properties during signal processing using TopBraid Composer.
- Supported the architecture design for the Army's next iteration of the Games for Training (GFT) program by evaluating proposed requirements.
- Performed trade studies and analysis on scenario generation, model interchange formats, and vehicle dynamics systems for GFT.

Teaching Experience

COE 301: Introduction to Computer Programming

Undergraduate Teaching Assistant *08/2019 - 12/2019*

- Hosted weekly interactive office hours for a class of 80 students to help them debug their C++ and MATLAB code and better understand concepts.

Department of Aerospace Engineering & Mechanics

First Year Interest Group Mentor *08/2016 - 12/2019*

- Mentored 60 first year students (over the course of four years) in their academic and social careers.
- Organized speakers and events and lectured on student requested topics to teach students about their major, time management, UT traditions, campus resources, etc.

Leadership & Volunteering

Camp Kesem

Volunteer Historical Data Intern (for the national organization) *09/2018 - 12/2018*

- Large-scale data collection and cleaning of alumni, volunteer, camper, and campsite contract information from various databases and imported them into Salesforce.
- Presented a gap analysis on vital campsite data, made data management recommendations, and suggested uses for newly acquired data to the CEO of Kesem.
- Recommendations to be implemented in the near future, such as regional contract data to be used to ensure fair campsite contract negotiations.

Unit Lead, Summer Counselor, & Active Member (for the UT chapter) *12/2017 - 08/2020*

- Ensured safety, managed schedule, and was responsible for 14 campers and 5 counselors as the unit leader of Yellow Unit in 2019 as well as in 2020 virtually.
- Summer Counselor for the UT Austin Chapter of Camp Kesem, a week-long camp for children whose parent has or had previously been diagnosed with cancer.
- During school year supported donation drives, wrote letters to the kids, volunteered regularly to raise money to send kids to camp, and personally raised over $2400.

Student Engineers Educating Kids (SEEK)

Vice President of Mentoring *05/2019 - 05/2020*

- Devised twenty STEM-related projects and lesson plans and oversaw their weekly implementation across 15 Austin area schools serving over 300 children.

Program Officer *01/2019 - 05/2019*

- Coordinated and managed a group of student mentors assigned to Barbara Jordan Elementary and facilitated the curriculum and faculty orientation.

Weekly Volunteer *08/2018 - 05/2020*

- Taught after-school STEM curriculum to elementary children through fun projects such as bottle rockets, marble roller coasters, and baking soda volcanoes.

Students Expanding Austin Literacy (SEAL)

Weekly Reading Buddy *08/2016 - 05/2020*

- Visited underprivileged elementary schools and community centers every week in East Austin to read with and mentor students who were identified as under-performing.

Theta Tau Professional Co-ed Engineering Fraternity

Not On My Campus (NOMC) Peer Educator *08/2018 - 05/2020*

- Attended extensive NOMC trainings in sexual assault prevention, gave comprehensive presentations to Theta Tau, and acted as a resource to members in need.

Weekly Math Tutor *08/2015 - 12/2017*

- Volunteered weekly for four semesters to tutor middle school students in math to prepare them for their STAAR exam.

Committee Positions

Department of Aerospace Engineering & Mechanics

Computational Engineering Curriculum Committee, Student Representative *1 semester*

- Served as the student representative and gave advice based on student feedback for the COE curriculum committee comprised of department faculty.

Camp Kesem

Make the Magic Committee *1 semester*

- Helped plan and organize a massive fundraising event for the UT Austin chapter of Camp Kesem, with an attendance count of over 200 donors, raising $44,000.

Theta Tau Professional Co-ed Engineering Fraternity

Pledge Committee *3 semesters*

- Worked to promote an inclusive and respectful culture among new pledges and provided advice, encouragement, and introductions, especially for the shyer pledges.

Rush Committee *6 semesters*

- Assisted in recruitment of new members by helping set up events and fostering a safe and comfortable environment.

Student Engineering Council Representative *1 semester*

- Represented Theta Tau in the Student Engineering Council and maintained communication between the two while providing feedback to the Cockrell School.

Other Memberships

UT Concert Chorale *5 semesters*

- Performed a variety of high-level choral literature as a Tenor I/II in one of UT's official ensembles. (7hrs/week)

Collegium Musicum *4 semesters*

- Practiced and performed in a student-run mixed ensemble focused on performing a cappela works. (4hrs/week)

The Leadershape Institute *1 semester*

- Selected for and participated in a week long camp focused on leadership, ethical decision making, emotional intelligence, and self-discovery.

Tau Beta Pi Engineering Honor Society *2 semesters*

- Worked fundraising shifts, attended professor chats, and volunteered at food banks and other Austin area opportunities with other members.

Projects

Improving Access to Feminine Hygiene Products in Syrian Refugee Camps *08/2019 - 05/2020*

- Collaborated with the Lebanese Red Cross on low-cost fabrication of menstrual pads by improving on a prototype and field study of a previous team.
- Raised $8000, purchased supplies, and built multiple prototypes of a device that would seal a super-absorbent polymer between a mesh and an impermeable layer.
- Navigated both a hygiene protocol and local social customs surrounding menstruation and hygiene to deliver both an effective and culturally sensitive solution.

Understanding Ice Melange in Greenland through Image Processing and Remote Sensing Methods *10/2019 - 05/2020*

- Created a novel method using image processing techniques and Landsat data to determine the spatial distribution of ice melange in the fjord of Rink Glacier in Greenland.
- Converted Landsat data to a Normalized Difference Snow Index and performed k-means clustering using Gabor filter bank responses to classify types of ice melange.

Designing a Low-Cost Ultrasonic Anemometer (Senior Design Project) *01/2019 - 05/2019*

- Tasked with designing a compact, drone mounted, two component anemometer by SeekOps, a methane detection company for the oil and gas industry.
- Iterated on all aspects of the design, from CAD and CFD models in SOLIDWORKS, to MATLAB models of the waveforms, to LTSpice models of the electronics.
- Design envelope delivered to SeekOps with technical recommendations and detailed instructions on how to build our modeled prototype.

Modeling Cardiopulmonary Resuscitation with Different External Pumping Techniques *02/2019 - 05/2019*

- Investigated the American Red Cross CPR 2018 Guidelines by computationally modeling the left ventricle's response to various CPR frequencies and pressures.
- Extended on work from a previous research team's attempt to abstract the left ventricle as a non-linear electrical circuit.
- Combined our adaptation of the circuit abstraction with input data from a SIMULINK model, and built an interactive Python model with variable CPR parameters.
- Confirmed best CPR practices by studying responses to changes in our model parameters and realized flaws in the previous team's circuit abstraction approach.

Web-Accessible Time Series Analysis of Prices from a Redis Database *01/2019 - 05/2019*

- Deployed a distributed, web-accessible cloud system using a Flask app and created an accompanying REST API to analyze time series price data of various goods.

Finite Element Code Creation and Validation *03/2019 - 05/2019*

- Created a 2D Finite Element Modeling code in MATLAB using triangular elements to analyze stresses and strains of plates with various meshes to test accuracy.

Study on Austin Animal Center (AAC) Adoption Rates *10/2018 - 12/2018*

- Investigated the effect of age on AAC adoption rates with R and multivariate logistic regression using data from the AAC's database of 93,000 animals since 2013.

Computational Study on the Effectiveness of Flettner Rotors *03/2018 - 05/2018*

- Evaluated the potential use of Flettner Rotors in modern day avionics using OpenFOAM CFD software and MATLAB to generate meshes.
- Simulated a Flettner Rotor in turbulent atmospheric conditions and visualized the velocity profiles and pressure fields using ParaView.
- Implemented a momentum analysis method to produce accurate estimations for real world specifications of required rotor dimensions and RPM.

Infectious Disease Model *11/2017 - 12/2017*

- Implemented the SIR variant of a Compartmental Disease Model in C++ and FORTRAN to simulate an outbreak of measles using human geographic data of the US.
- Ran large scale simulations and created accompanying visualizations using Texas Advanced Computing Center's STAMPEDE 2 supercomputer.

Brain Tumor Modeling and Prediction in Rats *03/2017 - 05/2017*

- Created and analyzed visual representations of tumor growth in rats using 768,000 experimental data points from brain slices in Python.
- Combined a Gompertz function and probability density functions to optimize a model for predicting future tumor growth with tolerable accuracy.

Reverse Engineering a Mechanical Timer *08/2016 - 12/2016*

- Deconstructed mechanical timer and modeled 27 individual parts in SOLIDWORKS.
- Improved timer by redesigning bell mechanism, fabricating rapid prototype using campus 3D printers, reconstructing timer, and testing performance.

Trajectory Simulator *11/2015 - 12/2015*

- Created a physics sandbox using MATLAB to simulate and visualize combined orbits of the sun, earth, moon, and potential satellites with an interactive GUI.

Skills

Programming: MATLAB, Python, R, C++, Julia, FORTRAN, Java.
Software: ENVI, FEniCS, ABAQUS, OpenFOAM, ParaView, SOLIDWORKS, AGI's STK, Protégé, Excel, PowerPoint, DIC Software, LaTeX.
Clearances/Other: Department of Defense Secret Clearance, Department of Energy L Clearance, Arduinos, Comfortable in Linux, CPR Certified.

Additional Info

Achievements: Honors R&D Program at ARL, National Speech & Debate Association Degree of Outstanding Distinction.
Interests: Cryosphere, Geophysics, Atmosphere & Climate, Humanitarian Applications of Engineering, Space, Modeling & Simulation.
Hobbies: Volunteering, Choir, Hiking, Curling, Board Games, Dodgeball (Fall 2019 UT Intermural Champion), Gaga Ball, Super Smash Bros.