PARNIYAN NOROUZZADEH

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SUMMARY

Dedicated and highly motivated Ph.D. candidate working on quantitative ultrasound in "Ultrasonic Material Characterization Laboratory". Proven expertise in signal processing with a background in optimization. Demonstrated ability to conduct independent research. Skilled in using Verasonics and programming languages like MATLAB and Python. Seeking an internship position in quantitative ultrasound, and signal processing beginning Summer 2024. Open to relocation for the right opportunity.

EDUCATION

Ph.D., Mechanical Engineering | Anticipated December 2025
North Carolina State University (NC State), Raleigh, NC
GPA: 4/4

M.Sc., Electrical Engineering | Jan 2017
University of Tabriz, Iran

B.Sc., Electrical Engineering | July 2013
Sahand University of Technology (SUT), Iran

WORK EXPERIENCE

Research Assistant
Ultrasonic Material Characterization Laboratory | NC State | Aug 2023 – Present | 20 hrs./wk.

- Conduct data acquisition using a 128-element ultrasonic array connected to a Vantage Verasonics by sending ultrasonic waves to phantoms and recording the backscattered signals.
- Implement quantitative ultrasound assessment as opposed to conventional qualitative ultrasound imaging.
- Utilized MATLAB for signal processing on 135 raw rat data.
- Compared key parameters, including "mean free path" and "intensity decay rate" using MATLAB to discern differences between healthy and unhealthy rats.
- Investigated the impact of noise on the previously mentioned parameters using MATLAB.
- Applied statistical tools like "T-test" (student's test) and the "ranksum" in MATLAB to validate significant differences between healthy and unhealthy tissues, using findings to diagnose cancers, and tumors in tissue samples

Teaching Assistant
NC State | Jan – Apr 2022, Aug – Dec 2022, Jan – Apr 2023 | 20 hrs./wk.

- Served as a Teaching Assistant for the course "Mechanical Engineering Laboratory I".
- Provided guidance for 20 students on experiments and ensured adherence to safety protocols.
- Graded students' reports and maintained attendance records to support effective course management.

Instructor
NC State | May 2022 – June 2022 | 40 hrs./wk.

- Instructed the course "Engineering Statics" for 35 undergraduate students.
- Developed a comprehensive course syllabus and delivered engaging lectures.
- Designed and graded assessments to evaluate students' understanding of the subject.
- Conducted regular office hours, offering additional assistance to students as needed.

PROJECT EXPERIENCE

Ultrasonic wave propagation in random porous structures using SimSonic FDTD Package
- Employed SimSonic to simulate two mediums featuring water on the left and bone on the right.
- Conducted simulations of plane and spherical wave propagation within both water and bone mediums.
- Analyzed time responses from receivers in water and bone to determine reflection and transmission coefficients.
- Concluded that a significant portion of the signal is transmitted rather than reflected.

Wave propagation simulation using Kwave toolbox in MATLAB
- Investigated wave propagation in both homogeneous and heterogeneous mediums utilizing the Kwave toolbox.
- Determined reflection and transmission coefficients through comprehensive analysis.
- Conducted a comparative study of velocity and pressure plots, observing their in-phase relationship.

Finding an optimal path for a traveling salesperson using Simulated Annealing algorithm
- Executed Simulated Annealing algorithm in MATLAB.
- Developed various MATLAB functions for city generation and city path, integrating these functions into the main code.
- Optimized the city path to visit all cities in minimal time, focusing on achieving convergence in fewer iterations for enhanced efficiency.

Optimization using metamodels in MATLAB
- Obtained input and output data from a black box shared by the professor.
- Developed metamodels, including Polynomials and Radial Basis Function to assess their fit to the obtained data.

Solving unconstrained n-D problems using optimization methods like Steepest descent, Fletcher Reeves, and BFGS using MATLAB
- Developed MATLAB codes for optimization methods including Steepest Descent, Fletcher Reeves, and BFGS.
- Conducted a comparative analysis by running the code on various examples to evaluate the performance of each method.
- Determined the most effective method for different scenarios, assessing methods based on criteria such as convergence and cost.

Using FEniCS for inverse problem solving
- Employed the Finite Element method to discretize partial differential equations (PDEs) utilizing FEniCS in Python.

SKILLS

Programming: MATLAB, Python, Mathematica
Lab skills: Verasonics, Oscilloscope, Function generator, Multimeter
Miscellaneous: MS Word, MS Excel
Languages: English, Turkish, Persian, Azerbaijani

AWARDS

Rolan and Aileen Leon Memorial Scholarship | May – Aug 2023
NC State, Raleigh

RELEVANT COURSES

Applied Acoustics, Acoustic Radiation I, Machine Learning Specialization, Engineering Design Optimization, Inverse Problem Solving, System Identification, Optimal Control.