Charlie Tran

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EDUCATION

University of Florida — Gainesville, FL
Ph.D. Candidate in Electrical Engineering — Fall 2021 - Present

University of Florida — Gainesville, FL
Bachelor of Science in Mathematics — August 2018 - May 2021

RESEARCH EXPERIENCE

SmartData Lab — University of Florida
Graduate Research Assistant — Summer 2023 - Present

- **Machine Learning for Assisted Defect Detection in Ultrasonic C-Scans**
  - Lead researcher for defect detection in aircraft wing sections using YOLO-based models.
  - Collaborative research with the Air Force Research Laboratory and Computational Tools
- **Physics Informed Machine Learning for Ultrasonic Non-Destructive Evaluation**
  - Embed partial differential wave-equation based regularization in non-destructive evaluation tasks
  - Developing a generalized theory for anisotropic waves with fractional partial differential equations.

US National Science Foundation International Research Experience for Students on Artificial Intelligence for Congenital Heart Diseases — Guangzhou, China
US NSF Funded Research Assistant — Summer 2024

- **Deep Learning for Whole Heart Segmentation**
  - Program funded by the US National Science Foundation (NSF Award #2106416) and administered by the University of Notre Dame.
  - Led five undergraduate researchers in a 12-week internship at the Guangdong General Hospital.
  - First place winner of the CARE2024 MICCAI CT-MRI Whole Heart Segmentation Challenge using MedNext/nnUNet based models.

Smart Medical Informatics Learning and Evaluation (SMILE) Lab — University of Florida
Graduate Research Assistant — Spring 2019 - Spring 2023

- **Deep Learning for Retinal Image Analysis**
  - Researcher in explainable classification models of Alzheimer's Disease and Parkinson's Disease in the UKBiobank dataset.
  - Conducted benchmarks for domain adaptation for optic cup and disc segmentation tasks.
- **Artificial Intelligence for tDCS Precision Dosing**
  - Attended discussions for MRI segmentation, tdCS modeling, and treatment outcome prediction
  - Worked with a team for manual whole-head MRI segmentation using SimpleWare software
- **Medical Image Unsupervised Representation Learning**
  - Studied applications of simCLR and momentum contrast (MoCO) for unsupervised segmentation.
  - Trained deep learning models for CT hemorrhage detection and fundus diabetic retinopathy detection
- **Deep Learning Models of Emotion**
  - Experimented with VGG-16 feature extraction for emotion regression (valence, arousal)
  - Studied cross-modal analysis of emotional AI models with fMRI data using representation similarity analysis (RSA) / representation dissimilarity matrices (RDM)

Veteran Affairs Medical Center — University of Florida
Undergraduate Research Assistant — Fall 2018

- **Cognitive GABA Studies in Veterans with PTSD/TBI**
  - Studied Hodgkin-Huxley models for understanding neuronal activity
  - Worked with GANNET and SPM12 software for j-edited spectroscopy quantification of GABA

PUBLICATIONS

1. Amanda Beck, Harsha Tetali, Michael MacIsaac, **Charlie Tran**, Woohyum Eum, Ghatu Subhash, Joel B. Harley. Spatial Thickness Mapping in Heterogeneous Plate Using Wave Physics-Informed Regression. *Structural Health Monitoring* [in submission]
2. **Charlie Tran**, Michael MacIsaac, Amanda Beck, Woohyun Eum, Ghatsu Subhash Joel B. Harley. Physics-Guided Filtering for Super-Elliptical Anisotropic Wave Propagation in Structural Material Characterization. *Mechanical Systems & Signals Processing* [in review]
3. Ghatu Subhash, Michael MacIsaac, **Charlie Tran**, Amanda Beck, Woohyun Eum, Joel B. Harley. Interpreting material anisotropy through the fractional wave equation. *Ultrasonics*, 2025.
4. **Charlie Tran**, Andy Li, Aaron Espinoza, Sayem Kamal, Anoushka Samuel, Charles Jiang, Jian Zhuang, Yiyu Shi, and Xiaowei Xu. Enhance Multi-modal and Multi-center Whole Heart Segmentation Using Data Augmentation and Model Calibration. *Comprehensive Analysis and Computing of Real-World Medical Images*, 2025.
5. Nooshin Yousefzadeh, **Charlie Tran**, Ruogu Fang, and My T. Thai. LAVA: Granular Neuron-Level Explainable AI for Alzheimer's Disease Assessment from Fundus Images. *Nature Scientific Reports*, March 2024.
6. **Charlie Tran**, Kai Shen, Kevin Liu, Ruogu Fang. Deep Learning Predicts Prevalent and Incident Parkinson's Disease From UK Biobank Fundus Imaging. *Nature Scientific Reports*, Feb 2024.
7. Joel B Harley, Suhaib Zafar, and **Charlie Tran**. Tips for Effective Machine Learning in NDT/E. *Materials Evaluation* 2023.
8. Peng Liu, **Charlie Tran**, Bin Kong, Ruogu Fang. Collaborative Adversarial Domain Adaptation for Unsupervised Optic Disc and Cup Segmentation. *Journal of Neurocomputing*, 2021.

CONFERENCES AND ACADEMIC PRESENTATIONS

1. **Charlie Tran**, Jesse Weber, Cameron Noriega, Jennifer Flores-Lamb, John C. Aldrin, Doyle Motes, Joel B. Harley. Deep Learning for Assisted Ultrasonic C-Scan Defect Detection in Aircraft Composites. *American Society for Nondestructive Testing.* July 2025, Indianapolis, IN. [**Oral Presentation**]
2. **Charlie Tran**, Michael MacIsaac, Amanda Beck, Woohyun Eum, Ghatu Subhash, and Joel B. Harley. Anisotropic Fractional Helmholtz Equations for Physics Informed Non-Destructive Evaluation. *American Society for Nondestructive Testing.* July 2025, Indianapolis, IN. [**Oral Presentation**]
3. **Charlie Tran**, Andy Li, Aaron Espinoza, Sayem Kamal, Anoushka Samuel, Charles Jiang, Jian Zhuang, Yiyu Shi, and Xiaowei Xu. Enhance Multi-Modal and Multi-Center Whole Heart Segmentation using Data Augmentation and Model Calibration. *MICCAI Satellite Event: ZMIC CARE2024 Real World Medical Image Analysis Challenge*, October 2024. [**Oral Presentation**]
4. Joel B. Harley, **Charlie Tran**, Woohyun Eum, Amanda Beck, Michael Maclsaac, Matthew Stormant, and Ghatu Subhash. Anisotropic Guided Wave Dispersion Curves for Physics-Informed Learning. *Quantitative Nondestructive Evaluation.* July 2024, Denver, CO.
5. Woohyun Eum, Austin Simon, **Charlie Tran** and Joel B. Harley. Lamb wave anomaly detection by ensembling spatial and wavenumber domains. *Quantitative Nondestructive Evaluation Conference.* July 2024, Denver, CO.
6. Joel B. Harley, Amanda Beck, Woohyun Eum, Michael MacIssac, Matthew Stormant, **Charlie Tran**, and Ghatu Subhash. Enabling High-Dimensional Wave Physics-Informed Learning. *Engineering Mechanics Institute Conference.* 2024.
7. Michael Maclsaac, Matthew Stormant, Woohyun Eum, Amanda Beck, **Charlie Tran**, Ghatu Subhash, and Joel Harley. A Novel NDE Method for On-line Evaluation of Manufacturing Defects Using Physics Informed Machine Learning. *International Conference and Expo on Advanced Ceramics and Composites*, Feb 2024, Daytona Beach, Florida.
8. Amanda Beck, Woohyun Eum, Michael Maclsaac, Matthew Stormant, **Charlie Tran**, Ghatu Subhash, Joel B. Harley. Defect Detection through Ultrasonic Wave-Informed Machine Learning, *American Society for Nondestructive Testing* Research Symposium , Pittsburg, PA, June 2024.
9. **Charlie Tran**, Jesse Weber, Jack Wardlaw, Ajay Shah, Jennifer Flores-Lamb, John Aldrin, Doyle Motes, and Joel B Harley. Accelerating Flaw Detection of Ultrasonic C-Scans with Enhanced Data Analytic. *The*

American Society for Nondestructive Testing. June 2024. [**Oral Presentation**]

10. Peng Liu, Ke Bo, Lihan Cui, Yujun Chen, **Charlie T. Tran**, Ruogu Fang, and Mingzhou Ding. A deep neural network model for emotion perception, *Society for Neuroscience*, Nov 2021.
11. Peng Liu, Ke Bo, Lihan Cui, Yujun Chen, **Charlie T. Tran**, Ruogu Fang, and Mingzhou Ding. Emergence of emotion selectivity in deep neural networks trained to recognize visual objects, *Society for Neuroscience*, Nov 2021.
12. **Charlie T. Tran**, Ruogu Fang. Graph Neural Networks for Alzheimer's Disease Classification From Retinal Imaging, *Florida Undergraduate Research Conference*, Feb 2021, Tallahassee, FL. [**Poster Presentation**]
13. **Charlie T. Tran**, Ruogu Fang. A Deep Learning Framework for Interpretable Linked Mechanisms between Alzheimer's Disease-TBI, *McNair Scholar Open House*, Dec 2020, Gainesville, FL [**Poster Presentation**]
14. **Charlie T. Tran**, Ruogu Fang. Advances in Unsupervised Representation Learning for Medical Imaging, *McNair Symposium*, July 2020, Gainesville, FL. [**Poster Presentation**]

PROFESSIONAL ACTIVITIES

UCL Medical Image Computing Summer School — University of London (Online)
Student — July 2022

- Studied topics on the intersection of medical imaging, devices, data science, and AI
- Top project and presentation for streamlined AI pipelines including image quality selection, segmentation, disease diagnosis, and quantified retinal biomarkers

Michigan NextProf Workshop — University of Michigan
Workshop Attendee — October 2021

- Professional development, networking, and preparation for becoming a future professor

Ad hoc Reviewer — 2019 - 2023

- Medical Image Analysis (MIA) Journal
- Biomedical Engineering Society (BMES) Conference

TEACHING EXPERIENCE

EEL5840 Fundamentals of Machine Learning — Spring 2025

- Grader and office hour assistant

EEL6935 Physics Informed Machine Learning — Fall 2024

- I presented lectures on spectral theory, eigendecomposition, and singular value decomposition
- Assistant for assignment creation and grading
- Co-writer for several sections of course notes in linear algebra and partial differential equations

EEL3135 Signals and Systems — Spring 2024

- I presented lectures on z-transforms, pole-zero plots, and stability
- Active assistant for solving flipped classroom assignments
- Created several short-form video lectures and exam preparation guides

MAP2302 Differential Equations — Fall 2019

- Exam grader

VOLUNTEER EXPERIENCE

Junior Science and Humanities Symposium — University of Florida
Graduate Reviewer — January 2025

- Served as an abstract and paper reviewer for eight high school students

Student Science Training Program — University of Florida
Graduate mentor — Summer 2023

- Mentor two high school students in machine learning for non-destructive evaluation
- Assisted in lectures, material guidance, and student presentations

Machen Florida Opportunity Scholar (MFOS) University of Florida
Alumni Volunteer 2022 - 2023

- Life-coach of two undergraduate students for graduate school and career evaluation
- Panel speaker for promoting graduate school applications in first-generation students

Florida McNair Scholar Program University of Florida
Alumni Volunteer 2022 - Present

- Conduct interviews for McNair student recruiting

HONORS AND TITLES

McNair Graduate Assistantship 2021 - Present
Florida McNair Scholar 2020 - 2021
Florida Machen Opportunity Scholar 2018 - 2021

CERTIFICATES

Coursera Machine Learning Specialization
Coursera Deep Learning Specialization

- Neural Networks and Deep Learning.
- Improving Deep Neural Networks: Hyperparameter Tuning, Regularization, and Optimization.
- Structuring Machine Learning Projects.
- Convolutional Neural Networks.
- Sequence Models.

NVIDIA Deep Learning Institute (DLI):

- Fundamentals of Accelerated Data Science with Rapids.
- Fundamentals of Accelerated Computing with CUDA/C++.
- Fundamentals of Deep Learning and Computer Vision.

SOFTWARE SKILLS

Python

- **PyTorch** proficiency for deep learning.
- Intermediate proficiency in other frameworks including **MONAI**, **Tensorflow**, **NVIDIA Rapids**, etc.

Linux

- Proficiency in Linux terminals and bash for SFTP, SSH, super-computer clusters (UF HiPerGator)
- Docker container experience

Matlab

- Proficiency for signal and image processing