

Haitham Kanj

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EDUCATION

- **The Ohio State University** Columbus, Ohio, USA
Ph.D. Candidate in Electrical and Computer Engineering, Minor in Statistics
Advisors: Kiryung Lee and Vincent Vu, GPA: 3.93
Expected: Dec 2026
- **Lebanese American University** Beirut, Lebanon
B.E in Electrical Engineering, Magna Cum Laude
Research Advisor: Samer Saab, GPA: 3.93
May 2022

RESEARCH EXPERIENCE

- **Theoretical ML for Piecewise Linear Regression:**
Proposed an adaptive projected gradient descent algorithm as a solution to *piecewise linear regression*. Showed that this *computationally and data-efficient* algorithm converges linearly to the ground-truth solution given a sample size that scales linearly in the ambient dimension.
- **Reinforcement Learning for Traumatic Brain Injury Detection in Rats:**
Modeled rat *reward perception behavior* as a recursive learning strategy. The developed model accurately categorizes rats (brain-injured vs. control) with limited observations. The study successfully achieves the goal of minimizing experimentation frequency (by $\sim 80\%$) on rats to promote *ethical* progress in research.
- **Localization with Starlink Satellite Signals:**
Developed a state-of-the-art software-defined radio that collects radio signals, generates observations from dynamic filters, and estimates the receiver's location. This work was tested on Starlink signals and generated an *estimation error of 20 m* when initialized 100 km from the ground truth.
- **Solar Panel Fault Detection (Undergraduate Capstone):**
Proposed a *computer vision-based model* to detect faulty solar panels from thermographic images collected using a drone. The model was deployed on a Raspberry Pi and tested on several solar panel arrays where it successfully detected several faults causing unique thermal signatures.
- **LSTM Networks for Motion Prediction (Undergraduate Research):**
Conducted an analysis comparing the performance of *LSTM models and Kalman Filters* in predicting a moving object's future location. Several datasets confirmed the superiority of LSTM models for motion behavior.
- **Review Service:**
International Conference on Artificial Intelligence and Statistics (AISTATS), IEEE Transactions on Signal Processing (TSP), and IEEE Transactions on Information Theory (TIT).

TEACHING & MENTORING EXPERIENCE

- **Graduate Teaching Assistant:**
Served as a graduate teaching assistant for *Introduction to Digital Signal Processing* (ECE 5200; Autumn 2024) and *Introduction to Digital Logic Laboratory* (ECE 2060L; Spring 2025) and *Introduction to Digital Logic* (ECE 2060; Autumn 2025; Lecture portion).
- **Co-advising ECE Master's Student:**
Advising ECE MS student Ashton Keller with Prof. Kiryung Lee (ECE) in collaboration with Prof. Hiroki Taniguchi (Pathology) and postdoctoral researcher Yasufumi Hayano (Pathology). My role is guiding Ashton to mathematically formulate and implement advanced signal processing & machine learning techniques to improve the analysis of neuron-level calcium imaging for mice, which is provided by our collaborators. The project aims to identify pain disorders through neural activity.

INDUSTRY EXPERIENCE

- **Khatib and Alami** Beirut, Lebanon
Electrical Engineering Consultant Intern
May-August 2021
Completed electrical design work for a multi-story hospital project in Qatar, including power distribution, fire alarm, and circuit layouts. Delivered full electrical drawings for six floors of an eleven-story facility, ensuring compliance with international standards and safety codes. Collaborated with senior engineers to align designs with project requirements and gain hands-on experience in large-scale healthcare infrastructure development.

PUBLICATIONS

1. **H. Kanj** and K. Lee, "Nonlinear Regression: A Parametric Solution," *Submitted to 29th International Conference on Artificial Intelligence and Statistics (AISTATS 2026)*.
2. **H. Kanj**, S. Kim and K. Lee, "Sparse Max-Affine Regression," *Submitted to SIAM Journal on Mathematics of Data Science*.[\[PDF\]](#)
3. **H. Kanj**, S. Kim and K. Lee, "Max-Affine Regression via Sparse Gradient Descent," *2024 IEEE 13rd Sensor Array and Multichannel Signal Processing Workshop (SAM)*.[\[PDF\]](#)
4. **H. Kanj**, S. Kozhaya and Z. Kassas, "Acquisition and Tracking of Starlink LEO Satellite Signals in Low SNR Regime," *Proceedings of the 36th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2023)*.[\[PDF\]](#)
5. S. Kozhaya, **H. Kanj**, and Z. Kassas, "Blind Doppler Tracking and Positioning with NOAA LEO Satellite Signals," *Proceedings of the 36th International Technical Meeting of the Satellite Division of The Institute of Navigation (ION GNSS+ 2023)*.[\[PDF\]](#)
6. S. Kozhaya, **H. Kanj**, and Z. Kassas, "Multi-constellation blind beacon estimation, Doppler tracking, and opportunistic positioning with OneWeb, Starlink, Iridium NEXT, and Orbcomm LEO satellites," *2023 IEEE/ION Position, Location and Navigation Symposium (PLANS)*.[\[PDF\]](#)
7. Z. Kassas, S. Kozhaya, **H. Kanj**, J. Saroufim, S. Hayek, M. Neinavaie, N. Khairallah, and J. Khalife "Navigation with multi-constellation LEO satellite signals of opportunity: Starlink, OneWeb, Orbcomm, and Iridium," *2023 IEEE/ION Position, Location and Navigation Symposium (PLANS)*.[\[PDF\]](#)
8. Z. Kassas, S. Kozhaya, J. Saroufim, **H. Kanj**, and S. Hayek, "A Look at the Stars: Navigation with Multi-Constellation LEO Satellite Signals of Opportunity," *2023 Inside GNSS+, Autonomous Media LLC*.[\[PDF\]](#)

PATENT

- Patent Application No. 63/498,189, filed April 25, 2023, entitled, "First Multi-Constellation Blind Beacon Estimation Doppler Tracking, and Opportunistic Positioning with OneWeb, Starlink, Iridium Next, and Orbcomm LEO satellites". This invention was made with government support under Contract Numbers 69A3552047138, FA9550-22-1-0476, N00014-22-1-2242, and N00014-19-1-2511.

AWARDS

- Dr. Burn Lin Travel Grant Award, The Ohio State University 2024
- Best Student Paper Presentation Award, ION Global Navigation Satellite Systems Conference 2023
- 2nd place in the capital Beirut, Official Governmental General Sciences Exams. 2018

INVITED TALKS

- **NeuroTrauma Research In Progress Seminars (NTRIPS)**: H. Kanj and C. Conder Haar, "Novel machine learning approaches to understand perception of outcomes after TBI", October 2025.
- **IEEE Artificial Intelligence Club Seminars (IEEEAI)**: H. Kanj, "Optimization: An Engineer's Bread and Butter", November 2024.

FUNDING

- **National Science Foundation**: NSF CCF-1943201.
- **Office of Naval Research**: ONR N00014-19-1-2511 and N00014-22-1-2242.
- **Air Force Office of Scientific Research**: AFOSR FA9550-22-1-0476.
- **U.S. Department of Transportation**: USDOT 69A3552047138.
- **The Ohio State University**: 2 semesters of graduate teaching assistant funding.

MEMBERSHIPS

- **OSU Council of Graduate Students (CGS)**: elected electrical and computer engineering graduate delegate for the 2025 academic year.
- **IEEE Signal Processing Society (SPS)**: member since 2023.
- **IEEE Artificial Intelligence Club (AILAU)**: member since 2021.
- **Society for Industrial and Applied Mathematics to Industry (SIAM2I)**: member since 2024.

SKILLS & COURSES

- **Programming Languages**: Python, R, MATLAB, SQL
- **Frameworks**: TensorFlow, Keras, Scikit, CVX, Gurobi
- **Machine Learning/Statistics**: High Dimensional Probability and Statistics, Applied Regression Analysis, Machine Learning for Electrical and Computer Engineering
- **Natural Language Processing**: Completed *Natural Language Processing on Google Cloud* course. Covered topics: AutoML, Vertex AI, Pre-trained Models for Tokenization, and Advanced NLP Models