Arpad Attila Voros
Curriculum Vitae May 8th, 2025

CONTACT INFORMATION

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EDUCATION

North Carolina State University — Raleigh, North Carolina
Master of Science Electrical Engineering — *August 2020 – December 2021*
GPA: 3.96/4.00

North Carolina State University — Raleigh, North Carolina
Bachelor of Science Electrical Engineering Summa Cum Laude — *August 2017 – May 2021*
Major GPA: 3.97/4.00 Cum. GPA: 3.76/4.00

USG CLEARANCE(S)

TS / SCI — *June 2023 – Present*
Secret — *November 2022 – Present*

SUMMARY OF SKILLS

- **Programming Languages —** Rust, Python, C++, C, MATLAB, Haskell, Java, JavaScript, Perl, Verilog, R, SQL
- **Software Tooling / Skills —** Linux, ONNX, TensorRT, Python Libraries (PyTorch, TensorFlow, scikit-learn, pandas), Apache Airflow, LaTeX, KiCad, LTSpice, PSpice, 2-3D CAD
- **Hands-On Skills —** rapid prototyping, extensive electronics and physics laboratory experience, machining
- **Relevant graduate courses —** ECE 763: Computer Vision, ECE 558: Digital Imaging Systems, ECE 633: Individual Topics in ECE, ECE 542: Neural Networks, ECE 513: Digital Signal Processing, ECE 514: Random Processes, ECE 560: Embedded Systems Architecture, ECE 592: Introduction to Satellites, MA 405: Linear Algebra, ECE 498: Special Projects, ECE 574: Computer and Network Security, ECE 564: ASIC & FPGA Design
- **Interests —** image processing, computer vision, trading algorithms, signal processing, digital signal processing, deep learning, applied machine learning, information theory, data analytics & visualization, embedded systems, analog circuit design, radio, optics, acoustics, social engineering, human-computer interaction, brain-computer interface
- **Languages —** English (fluent), Hungarian (fluent), German (conversational proficiency)

PROFESSIONAL EXPERIENCE

The Johns Hopkins Applied Physics Laboratory — Laurel, Maryland
Advisor(s) — Dr. David Jansing, Dr. Alfred Mayalu, Dr. Chistopher Gifford, Dr. Myron Z. Brown — *April 2022 – Present*
AI / ML / Software Engineer II | Team Lead — Imaging Systems / Asymmetric Operations

Overview

- **Algorithms —** 1 / 2 / 3 / N-D signal processing + filtering, time-series analysis, computer vision (classification, detection), deformable registration, multi/hyperspectral re-identification, remote sensing, 2 / 3-D segmentation, path planning, task decomposition, pixel + world-space tracking, photogrammetric 3-D reconstruction, clustering algorithms
- **Data** — imagery (EO / IR / multispectral / hyperspectral / synthetic aperture radar), FMV (EO / IR / multispectral), satellite imagery (various modalities), radar, synthetic data generation (various modalities), pseudo-random walks
- **Engineering Practices** — hardware acceleration, algorithm optimization, benchmarking, low-level programming, memory-safe programming, unit testing, documentation, CI/CD, Dev Ops, ML Ops, fine-tuning, hyper-parameter sweeps, metrics analysis, trade-off analysis, low-latency / high-bandwidth communications, shared-resource constraint considerations, low size-weight-power constraint considerations, portability / scalability / reusability, software hardening, standardization, open-source contribution

Artificial Intelligence & Machine Learning

- Designed and oversaw end-to-end development from conception to deployment, which includes data curation, model design/selection, model training/finetuning, model pruning/optimization, and accounting for resource constraints (size, power draw, memory usage) on embedded devices.
- Developed custom deep-learning architectures (PyTorch, JAX, TensorRT) for super-spectral and super-spatial resolution satellite imagery, natural disaster damage assessment of EO / multispectral imagery, Fourier-neural operators for synthetic aperture radar image-formation, and geo-tempo-spatial data analysis of hyperspectral imagery.

- Applied state-of-the-art deep-learning models for detection & classification of data of various modalities (synthetic aperture radar imagery, EO / IR, signals), neural-radiance fields on sparse areas-of-interest, feature-extraction to aid in geo-spatial tracking, and deformable registration of satellite imagery.
- Worked with various USG sponsors (IARPA, Air Force, Navy, NGA, other IC organizations)

Technical Development, Integration, Testing, & Deployment
- Development lead and Rust SME on a modular-in-development, monolithic-in-execution autonomous system. Oversaw ~20 developers and advised government sponsors and industry partners.
- Refactored legacy codebases into modern, memory-safe architectures using Rust and C++, using custom FFI for safe, zero-overhead ABI bindings across languages.
- Familiar with both ARM and x86 architectures (including cross-compilation), decompilation, GPU programming and optimization (mainly Nvidia; CUDA / cuBLAS)**.**
- Promoted good software practices and automation (via CICD) of unit-testing, doc-testing, run-time scenario testing, thorough documentation, report generation, and automatic building with Docker / Podman containerization.

North Carolina State University Raleigh, North Carolina
Advisor(s) — Dr. Tianfu (Matt) Wu *August 2021 – December 2021*
Independent Study — Zero-Shot Learning
- Proposed a novel, dynamic deep-learning architecture for few-shot learning classification tasks using feature vectors.
- Analyzed and implemented ZSL dependency of said architecture with semantically meaningful latent space autoencoder.

North Carolina State University ECE Department Raleigh, North Carolina
Advisor(s) — Dr. Rachana Gupta, Jeremy Edmonson *August 2021 – December 2021*
Senior Design Lab TA — Troxler Design Center
- Aided, informed, and serviced students with their senior capstone design project as well as related electronic equipment, components, and tools. Worked in junction with NCSU's ECE Department for lab recommendations & renovations
- Responsible for tens of thousands of dollars' worth of laboratory equipment and upkeep of NCSU Troxler Design Center

North Carolina State University, U.S. Army Research Office Raleigh, North Carolina
Advisor(s) — Dr. Skip Scheifele, Dr. Rachana Gupta, Dr. Shephard Pitts, Paul Reid *August 2020 – May 2021*
Team Lead — Senior Capstone Project (VADER)
- Led a team of 5 in production of a directional acoustic device for deterring African elephants from farmland.
- Designed, simulated, and prototyped multiple device solutions for the U.S. Army Research Office.
- Optimized modulation techniques in minimizing harmonic distortion, developed predistortion-distortion spectrum mapping to further improve quality of sound, simulated various directional-sound propagation techniques in MATLAB.
- Simulated analog load characteristics & hysteresis in LTSpice, designed PCBs in KiCad

North Carolina State University Raleigh, North Carolina
Advisor(s) — None *September 2018 – May 2021*
Treasurer & Committee Member — NCSU PackHacks
- Led and helped organize the 2nd largest free hackathon in the state of North Carolina — https://ncsupackhacks.org/
- Developed budgets, acquired annual sponsorship, and managed & distributed all funds for the PackHacks event

Hochschule Reutlingen Reutlingen, Germany
Advisor(s) — Dr. Bernd Thomas *January 2020 – March 2020*
Undergraduate Researcher — **Hybrid Energy Modeling**
- Optimized Simulink and MATLAB simulations of a hybrid energy system, consisting of energy storage devices (batteries & TES) and energy transfer units (PVs & heat pumps), according to the Klucher weather model
- Ensured Simulink and MATLAB simulations were identical by finding mistakes of both models

Duke Energy Carolinas Charlotte, North Carolina
Advisor(s) — Glen Frix, Tracy Blackmon *May 2019 – August 2019*
Summer Intern — Transmission Engineering
- Created tool using VBA in MS Access which autogenerates SQL queries to find delta in external modeling data, consisting of 5 of the major neighboring energy distributors with thousands of line-connections each.
- Used said VBA tool to automate update of Duke's modeling system.
- Wrote a script in Perl which generated over 100 clean one-line displays for unmodeled 230kV-500kV lines.

Bravo Team LLC Charlotte, North Carolina
Advisor(s) — Dr. Joshua Tarbutton *December 2018 – January 2019*
Winter Break Intern — Engineering Consulting

- Worked on translating VB shot peening simulation for aerospace product manufacturer to Qt to be furthered in development on mobile platforms.
- Selected precision parts for pick-and-place SCARA robot, commissioned by same aerospace product manufacturer
- Constructed CAD models multiple variations of said SCARA robot in SolidWorks

North Carolina State University, Duke University Raleigh, North Carolina
Advisor(s) — Dr. Robert Golub, Dr. Vince Cianciolo *September 2017 – August 2018*
Undergraduate Researcher — nEDM Sensing Apparatus
- Worked on the nEDM intercollegiate experiment for the DOE. Worked at NCSU and Duke under ORNL.
- Utilized multi-axis translational stage to displace position of a wavelength shifting fiber relative to SiPM to determine precision installation requirement of "fiber-SiPM" coupling. Maximum tolerance of mounting to be used in Monte-Carlo simulation to estimate rigidity specifications of sensor containment unit used in the nEDM experiment at ORNL.

University of North Carolina at Charlotte Charlotte, North Carolina
Advisor(s) — Dr. Joshua Tarbutton *May 2017 – August 2017*
Team Member — Voluntary Summer Research
- Designed a desktop CNC milling machine for high-speed machining.
- Utilized polar coordinates as opposed to Cartesian in machine design. Precision rotary table was used to reduce bed size.
- Created CAD models, conducted stress tests using Autodesk Inventor, and partook in thousand-dollar decision-making.

Intel International Science and Engineering Fair Waxhaw, North Carolina
Advisor(s) — None; but special thanks to Dr. Faramarz Farahi *November 2016 – May 2017*
Team Lead & Independent Researcher — Muon Scattering Tomography
- Lead an independent research team of 3 to reduce the cost of conventional muon scattering tomography by 96%.
- Acquired provisional patent for novel approach, which utilizes volumetric scintillators and a trilateration algorithm.
- Built a semi-functional prototype. Sensing provided by SiPM arrays coupled with scintillating. Created Monte-Carlo and signal-processing simulations using Java, MATLAB, and LTSpice.
- Responsible for thousands of dollars' worth of equipment. No external funding was provided.

PROJECTS

For a full list of personal, academic, and professional projects with descriptions, figures, and interactivity, please see: https://arpadvoros.com/projects/

PRESENTATIONS

- Voros, Arpad. (2021, December). *Analysis and Implementation of a Semantic Auto-Encoder for Zero-Shot Learning*. North Carolina State University. Raleigh, North Carolina
- Voros, Arpad., Cook, Hunter., Alamro, Nwaf., Fitts, Greyson. Pyrtle, Morgan. (2020, November). *Senior Design Day Team 21 – Vectorized Acoustic Deterrence of Elephants Research*. North Carolina State University. Raleigh, North Carolina
- Voros, Arpad., Daino, Trevor., Kronovet, Michael. (2017, May). *PHYS024T – Muon Scattering Tomography: Utilizing Silicon Photomultiplier Arrays to Trilaterate Muon Multiple Coulomb Scattering Events.* Intel International Science and Engineering Fair. Los Angeles, California.

AWARDS & HONORS

Coin Award (x4), REDD Bravo Award *The Johns Hopkins U. Applied Physics Lab. – 2022 – 2025*
- Misc awards internal to JHU APL for leadership, initiative, and technical communication.

Semester Dean's List (x7) *North Carolina State University – 2017 – 2021*
- Earning a semester GPA of 3.5 or greater on 12 – 14 credit hours of coursework, or 3.25 or greater on 16 or more credits

1st, ECE Senior Design Day *North Carolina State University – April 2021*
- Senior design team received first place in NCSUs ECE Senior Design Day competition for outstanding project, prototype demonstration, and presentation

Perfect Pitch Award 1st Place Winner *North Carolina State University – November 2020*
- Senior design team received first place of over 140 students in having the best poster and best three-minute pitch in describing their project

ASPE 32nd Conference NSF Grantee *ASPE – September 2017*
- Received grant from National Science Foundation to cover attendance costs for the 32nd Annual ASPE (American Society for Precision Engineering) Conference at Charlotte, NC in November 2017

Third Award, Physics and Astronomy, Intel ISEF *Society for Science & the Public – May 2017*
- Third Award at Intel ISEF for $1,000 in the Physics and Astronomy category

Intel Excellence in Computer Science Award *Intel Foundation – February 2017*

- Received recognition and a prize of $200 for the original development of a Monte Carlo simulation in the Java and MATLAB languages to model the efficacy of a novel approach to conducting muon scattering tomography. The simulation modeled the propagation of muons, their angular distribution, through scintillating prisms, and through high-Z material cross-sections, real-time electronic signal read-out of SiPM, and thermal noise characteristics of SiPM

1st, UNC Charlotte Excellence in Physics *Physics Department at UNC Charlotte – February 2017*

- Received 1st place distinction and a prize of $100 on behalf of the demonstration of sound physics concepts in the design, construction, calibration, and simulation of a novel technique for conducting muon scattering tomography

Region 6 NCSEF 2017 1st Place Winner, ISEF Finalist *The Center for STEM Education – February 2017*

- Received a nomination and was named finalist for the Intel International Science and Engineering Fair 2017 in Los Angeles, California.

PROFESSIONAL ASSOCIATIONS

IEEE (Institute of Electrical and Electronics Engineers) *December 2024 – Present*
SPIE (Society of Photo-Optical Instrumentation Engineers) *March 2024 – Present*
ASPE (American Society for Precision Engineering) *October 2017 – October 2018*
Science National Honors Society *September 2014 – June 2017*
Mu Alpha Theta *August 2014 – June 2017*
German Honors Society *August 2013 – June 2017*

REFERENCES

Available upon request