Arpad Attila Voros

*Curriculum Vitae May 28th, 2025*

**CONTACT INFORMATION**

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**EDUCATION**

**North Carolina State University** Raleigh, North Carolina

*Master of Science Electrical Engineering 2020 – 2021*

GPA: 3.96/4.00

**North Carolina State University** Raleigh, North Carolina

*Bachelor of Science Electrical Engineering Summa Cum Laude 2017 – 2020*

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
* **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
* **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
* **Hands-On Skills —** rapid prototyping, extensive electronics and physics laboratory experience, machining
* **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 using C++, Rust, and CUDA for latency-sensitive applications.
* 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 / DoD sponsors (Navy, Air Force, NASA, IARPA, NGA, other IC organizations)

*Technical Development, Integration, Testing, & Deployment*

* Developed performance-critical Rust / C++ systems for real-time sensor data on embedded platforms (ARM / x86), optimizing latency / memory.
* 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 code into memory-safe Rust / C++ using custom FFI for zero-overhead bindings.
* Architected GPU-accelerated algorithms (CUDA / cuBLAS) for processing, noise reduction, and pattern recognition.
* Spearheaded promotion of 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, working at NCSU and Duke under ORNL.
* Utilized multi-axis translational stage to displace position of a wavelength shifting fiber relative to SiPM to calculate 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*

* Nominated and 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