Casey Munk

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Education

M.Eng. Computer Science (Data Analytics and AI Concentration) **Expected May 2026**
Virginia Tech | Institute for Advanced Computing | Overall GPA: 3.98 *Alexandria, VA*

B.S. Biomedical Engineering **Aug 2021 – May 2025**
Virginia Tech | Overall GPA: 3.69 | In-Major GPA: 4.0 *Blacksburg, VA*

Skills and Relevant Courses

Languages: Python (Pandas, scikit-learn, Plotly, Seaborn, NumPy, NLTK), SQL, MATLAB, C++ (Arduino), LaTeX, git
Courses: Machine Learning, Information Visualization, Cloud Computing (used AWS EMR, SageMaker, EC2, IAM, S3, RDS, VPC, CloudFront, CloudWatch, Route53, Lambda)

Technical Experience

Software and Machine Learning Engineer **May 2025 – Aug 2025**
Rametrix Technologies Inc. *Blacksburg, VA*

- Designed and built an open-source Python toolkit, RametrixPyLITE, to enable biomedical researchers to preprocess, analyze, and model complex Raman signal data (https://github.com/SengerLab/RametrixPyLITE).
- Required complex implementation of data cleaning, analysis, visualization, and modeling techniques.
- Presented the software release as first author at the BMES 2025 Annual Meeting in San Diego, CA.

Sports Science Intern - Data Science **Aug 2024 – Dec 2024**
Virginia Tech Athletics | NCAA Division I Football Team *Blacksburg, VA*

- Conducted testing on players using ForceDecks, NordBord, and Catapult to characterize player health and readiness.
- Developed an exploratory machine learning model to predict players' WHOOP recovery scores and game-day readiness.
- Created dashboards to deliver understandable and actionable insights to coaches so they could update training plans.

Human Performance Systems Engineering Intern **Jun 2024 – Aug 2024**
Booz Allen Hamilton | Half NASA Client - Half BrightLabs Human Performance Team *Houston, TX*

- Developed XGBoost models predicting cognitive fatigue from smooth-pursuit eye-tracking signals; delivered high-level findings to leadership and directly accelerated the team's cognitive fatigue modeling effort.
- Performed comparative analysis of multiple ML models to achieve classification tasks including Decision Tree, KNN, SVM, Random Forest, Gradient Boosting, XGBoost, and Neural Network.
- Automated the document export function in the digital engineering tool suite by creating templates with embedded code.

Data Science & Human Performance Intern **May 2023 – May 2024**
KBR, Inc. — On-site at NASA JSC *Houston, TX*

- Automated metabolic rate predictions for EVA tasks in Python (˜6 hr → 15 min); standardized inputs and implemented validation to ensure reproducible results.
- Created a task-substitution methodology to certify crew for EVA readiness when historical data is missing; populated a PostgreSQL database supporting real-time risk prediction; Co-author on two NASA EVA workload studies that were presented at the ISS R&D Conference, 2024.
- Integrated and evaluated physiological sensors for EVA simulation testbeds; led analyses of astronaut metabolic demand using K-Means to cluster workload by task and environment; hands-on human subject testing to obtain data.
- Tested data acquisition at the Neutral Buoyancy Lab (USB-over-Ethernet, Bluetooth, Raspberry Pi) to improve reliability of heart-rate capture in constrained environments.

Data Analysis of Biomedical Samples | Undergraduate Research **Aug 2022 – May 2025**
Virginia Tech *Blacksburg, VA*

- Conducted data analysis on biomedical samples to accurately predict the occurrence of diseases (COVID-19; Lupus).
- Utilized SCRUM to build a prototype MATLAB GUI for Rametrix® analysis software for internal use.

Projects

Team Lead: Instrumented Uneven Walkway | *Senior Design Project* **Aug 2024 – May 2025**

- Led a team of five through a two-semester-long capstone project focused on constructing a portable, bi-directionally sloped walkway containing instrumentation (EMED) to support gait studies.
- FEA lead: in addition to being team lead, I took a technical role and designed >100 simulations in COMSOL to assess product safety; performed extensive validation testing beyond the class requirements.
- Organized deliverables, delegated tasks, and maintained clear team communication to meet project deadlines; adapted project strategies in response to technical challenges, ensuring project milestones were met despite shifting requirements.

Pale Blue Dot: Data Visualization Challenge | *Geospatial data analysis, Python* **Dec 2023 – Jan 2024**

- Utilized a publicly available MERRA-2 Ocean Surface Diagnostics dataset from NASA's GES DISC to create a visualization to support decision-making processes for addressing climate change issues in Alaska.