

LEAD SOFTWARE ENGINEER

CAE Platforms Engineering & Advocacy | HPC Simulation | Technical Leadership & Strategic Partnership

Innovative, detail-oriented software engineer with 9 years of experience leading CAE simulation platforms and integrating ML to optimize workflows. 7 years of expertise in managing end-to-end software product development and consistently delivering results in fast-paced, dynamic environments. Analytical, data-driven professional skilled in anticipating needs, solving complex business challenges, and driving technological advancements. Articulate leader with proven success in fostering collaboration, managing stakeholder relationships, and effectively communicating complex information to diverse audiences.

Core Competencies & Technical Skills:

CAE Platforms & Product Development • Technical Community Advocacy • SDK/API Deployment • Distributed Systems & HPC Cloud Infrastructure • ML/AI Integration • Data Analytics & Model Validation • Software Testing, Maintenance, & Launch C/C++ • Python • CUDA (basic) • JavaScript • SQL • MPI • OpenMP • Kokkos • Git • PyTorch • Docker • Kubernetes • CI/CD SolidWorks • Pointwise • MATLAB/Simulink • OpenFOAM • Ansys/Fluent • Abaqus • Comsol • ParaView • Warp • Modulus

PROFESSIONAL EXPERIENCE

NASA Ames Research Center, CA: Entry Systems & Technology Division

2015 – Present

LEAD SOFTWARE ENGINEER – AMA, Inc. (Jan 2024 – Present)

Drive strategic initiatives by leading development of CAE products and promoting adoption through ecosystem collaboration.

- **Strategic Leadership:** Shape and execute strategic roadmaps for 5 complex NASA projects, ensuring alignment with organizational objectives and stakeholder expectations while optimizing resource allocation for timely delivery.
- **Product Lifecycle Management:** Lead the complete lifecycle of 6 simulation products from conception through launch. Manage feature integration, code optimization, rigorous testing, and transitioning to open-source platforms to enhance product quality and performance. Drive impactful large-scale complex simulations that provide critical insights for NASA.
- **Tech Ecosystem Engagement:** Streamline simulation workflows to foster collaboration with 100+ external partners and developers. Integrate GPU platforms and ISV cloud solutions to drive CAE tool adoption and enable efficient analyses.
- **Innovation and R&D:** Lead applied science projects in physics-based material modeling with machine learning integration, driving the development of next-generation simulation tools to support cutting-edge NASA missions and technologies.

SENIOR SOFTWARE ENGINEER – AMA, Inc. (Nov 2020 – Jan 2024)

Led technical team developing physics-based CAE simulation tools for critical NASA missions, delivering innovative software, enhancing UX, and building open-source infrastructure to support large-scale simulations and foster strategic partnerships.

- **Leadership and Collaboration:** Led 12 NASA projects with 8 engineers, directing code development, research, milestones, and long-term planning. Secured \$3M in research funding. Coordinated with leadership, managed team administration, organized 30 annual visits for professors and students, and established 2 international agreements with research institutes.
- **CAE Tools Engineering & Advocacy:** Led development of [PATO](#), R&D platform in C/C++ for entry systems, coordinating with 100+ developers and 200+ users. Released PATO as open-source by collaborating with cross-functional teams and navigating government paperwork. Expanded testing to ensure ongoing software integrity. Improved UX by adding conda packages, NASA Supercomputer modules, user guides, Google Cloud integration, and SQL web database using Django and JavaScript.
- **Machine Learning (ML):** Supervised development of deep learning segmentation tools for video ([arcjetCV](#)) and 3D imaging data ([PuMA](#) | [TomoSAM](#)). Trained physics-informed neural networks to create surrogate models for statistical analysis. Fine-tuned generative AI model GPT-NeoX (1.3B) to enhance knowledge management systems. Participated in ML trainings and industry conferences. Facilitated collaborative sessions with external experts, enhancing team proficiency in ML.
- **Verification and Validation:** Leveraged petabytes of experimental data from NASA facilities equipped with advanced sensors to validate simulation outputs, ensuring tool reliability and providing critical insights for NASA mission decisions.
- **Innovation and R&D:** Published 19 journal papers and presented at 20 leading conferences using large-scale simulation data to drive scientific advancements. Developed novel multiscale models to address critical NASA challenges such as micro-tomography analysis, material response, particle tracking, turbulence, hypersonic CFD, radiation, and plasma physics.

SOFTWARE ENGINEER – STC & UIUC (Jan 2016 – Oct 2020)

Led development of 2 CAE simulation software in C/C++ from scratch, including feature integration, testing frameworks, and model validation through rigorous experiments. Managed an engineering team, delivering high-quality, scalable solutions.

- **Software Development:** Designed and implemented PATO and [ARChES](#) (arc heater digital twin) for NASA's entry systems. Created Python tools for enhanced visualization, optimization, and multi-physics integration. Optimized ARChES with GPU acceleration using CUDA and Kokkos during NVIDIA hackathon, enhancing 3D radiation model performance by 100x.
- **Software Testing:** Developed a tailored testing framework integrated with CI/CD, ensuring high-quality, automated tests. Created unit and regression tests while supporting developers by maintaining code integrity and promptly addressing issues.
- **Statistical Analysis and Validation:** Optimized and analyzed experimental and Martian flight data to validate simulations. Performed uncertainty quantification, ensuring accurate predictions to support NASA missions with data-driven decisions.
- **Large-Scale HPC Simulations:** Debugged extensive MPI simulations on NASA Supercomputer, totaling over 10M core-hours.
- **Leadership:** Managed a team of 4 engineers, setting goals and milestones and securing funding to ensure project success.

SOFTWARE ENGINEER INTERN – UIUC (Jun 2015 – Dec 2015)

Executed projects on CubeSat constellation for solar observation and developed critical software for space weather missions.

- **Software Development:** Implemented embedded flight software in C/C++ to manage CubeSat science data during flight. Developed Python ground control interface, used successfully in an Antarctica balloon test to calibrate high X-ray detector.
- **Research Analysis:** Authored a detailed document on small satellites for solar observations, including large science matrix summarizing CubeSat instrument options, presented to Heliophysics experts at NASA for further space weather analysis.

INDEPENDENT PROJECTS

Drone Club

2016 – 2018

- **Leadership:** Founded 5-member club to design and build drones using CAD tools, 3D printer, and commercial components.
- **Software Development:** Created C/C++ flight software. Tested drones in field and debugged and fixed drones in real time.

Mars Desert Research Station

2013 – 2015

- **Leadership:** Established analog mission club and secured \$15K in funding to send 6 members to Utah Desert station.
- **Technical Design:** Designed and 3D-printed drone for studying communication relay in Utah desert for future Mars mission.
- **Software Development:** Developed C/C++ flight software utilizing open-source libraries and tested at drone facility.

CubeSat Design

2013 – 2015

- **Software Development:** Developed embedded flight software in C/C++ for IMU of QB50 CubeSat in collaboration with ONERA & CNES, contributing to successful deployment from ISS and transmission of flight data during atmospheric reentry.

EDUCATION

Master of Science, Aerospace, ISAE-Supaero

Bachelor & Master of Science, Electro-Mechanics, UCLouvain-EPL

LEADERSHIP

Led technical section for \$40M ESTRAD contract proposal, securing competitive positioning. (2023)

Member of AMA Awards Panel. (2023-Present)

Wrote proposals, securing 4 NASA-funded projects totaling \$3M in grants. (2017-Present)

Published [19 journal/conference papers](#) and presented at 20 scientific conferences. (2015-Present)

President of 4 student associations. (2009-2015)

AWARDS

[NASA Software of the Year Winner \(2022\)](#) | [NASA Early Career Public Achievement Medal \(2020\)](#)