ALMMII | American Lightweight Materials Manufacturing Innovation Institute

Position: Senior Engineer, AI-Enabled Materials Modeling
Department: Technology
Reporting To: Engineering Director, Modeling and Simulation
Job Location:

LIFT ALMMII Headquarters
1400 Rosa Parks Blvd
Detroit, MI 48216

Scope of Work & Purpose:

LIFT is seeking a senior engineer who brings depth in either materials science and engineering or artificial intelligence and is motivated to grow into the complementary field. This individual will combine materials knowledge, multiscale simulation, scientific machine learning, and experimental validation to accelerate materials and process development. Candidates are not expected to be experts in every area; success requires strong fundamentals, curiosity, collaboration, and a willingness to learn. Experience with Industrial Internet of Things (IIoT) technologies is welcome but optional.

RESPONSIBILITIES

- Develop models that connect material composition, processing, microstructure, properties, and performance across multiple length scales.
- Apply scientific machine learning methods, including FNOs, PIKANs, PINNs, and related physics-guided approaches.
- Couple AI with DFT, molecular dynamics, CALPHAD, phase field, crystal plasticity, FEA, CFD, and reduced-order models.
- Use AI surrogates for prediction, inverse problems, uncertainty quantification, and materials or process optimization.
- Curate materials data, define validation experiments, and assess model accuracy, uncertainty, and generalization.
- Translate physical mechanisms into computational features, constraints, and interpretable model outputs.
- Collaborate with materials scientists, AI specialists, test engineers, and manufacturing teams.
- Build reusable, well-documented software, APIs, visualization tools, and computational workflows.
- Expand expertise in the complementary discipline through mentoring, training, and hands-on project work.
- Contribute to IIoT-enabled data collection or digital twin projects when relevant; prior IIoT experience is not required.
- Plan and execute projects, and support proposals, reports, presentations, and stakeholder communications.

PREFERRED QUALIFICATIONS

- A Ph.D. or Master's degree in Materials Science, Engineering, Computer Science, Applied Mathematics, Physics, or a related field with three to five years of experience, or a bachelor's degree with eight or more years of experience.
- Materials pathway: experience in materials science, materials modeling, characterization, or manufacturing, with a strong interest in developing AI skills.
- AI pathway: experience in machine learning, scientific computing, numerical methods, or software engineering, with a strong interest in developing materials expertise.
- Candidates are not expected to enter with equal depth in both fields, but must demonstrate curiosity and the ability to learn across disciplines.
- Experience with multiscale modeling or process-structure-property-performance relationships is preferred for materials-focused candidates.
- Experience with FNOs, PIKANs, PINNs, neural operators, differentiable programming, or physics-guided machine learning is preferred for AI-focused candidates.
- Proficiency in Python and experience with PyTorch, JAX, TensorFlow, or comparable frameworks; C++ or Fortran is a plus.
- Strong software engineering skills, including modular design, code review, automated testing, documentation, and maintainable scientific software development.
- Experience with version control, continuous integration, containers, APIs, model registries, or production monitoring.
- A record of technical execution, multidisciplinary collaboration, clear communication, and stakeholder engagement in an R&D or manufacturing environment.
- IIoT, industrial data systems, edge computing, OPC UA, MQTT, or manufacturing historian experience is a plus, but is not required.

BEHAVIORAL COMPETENCIES

Customer Focus, Learning on the Fly, Intellectual Horsepower, Action Oriented, Ethics and Values, Integrity and Trust, Functional and Technical Skills, and Forward Thinking.

About LIFT:

LIFT, operated by the American Lightweight Materials Manufacturing Innovation Institute (ALMMII), is a nonprofit, public-private partnership and national advanced manufacturing innovation institute. As the national advanced materials manufacturing innovation institute, LIFT convenes and connects government, industry, and academia in advanced materials, manufacturing processes, systems engineering, and talent development to enhance America's manufacturing competitiveness, national economy, and national security.

Created utilizing AI, with direction and review by a human.