

Opportunity Title: Machine Learning and Its Role in Material Performance

Discovery

Opportunity Reference Code: 0023-NPP-NOV23-GRC-AeroEng

Organization: National Aeronautics and Space Administration (NASA)

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Application Deadline: 11/1/2023 6:00:59 PM Eastern Time Zone

Description Opportunity Restricted to US Citizens Only

The Integrated Computational Materials Engineering (ICME) paradigm envisions reducing costs and time to market for new, specially tailored fit-for-purpose, materials with enhanced efficiency and performance (e.g., composites). ICME is an 'integrated' approach to the design of products and the material that comprise them, in the sense that the engineering designs link material and structural models at multiple time and length scales. Significant effort and resources have been expended to accomplish this linkage via physics-based models, yet these efforts have been thwarted due to the fact that material structures span a multitude of length scales which in turn incorporates a diverse set of physics-based models with their own set of assumptions and approximations. Machine Learning (ML) has transformed many industries in recent years and shown itself to be a powerful technology for discovering new insights, finding non-obvious relationships, and modeling complex multifaceted responses. Consequently, a desire exists to combine physics-based modeling (expert domain knowledge) with Machine Learning (ML) to enable discovery of process-microstructure-property relationships at different length scales with limited experimental data availability. As such, LMS is looking for a faculty candidate to extract high-value information (e.g., processing-microstructure-property-performance relationships) from available compilations of materials datasets be they real or virtual. Materials and structural technologies of relevance to ARMD 2040 Vision (see NASA CR-2018-219771) and current and future NASA Exploration design and analysis needs are of most interest.

Location:

Glenn Research Center
Cleveland, Ohio

Field of Science: Aeronautics, Aeronautical or Other Engineering

Advisors:

Steven Arnold
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216-433-3334

Eligibility • Citizenship: U.S. Citizen Only



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Requirements • **Degree:** Doctoral Degree.