COVER PAGE

Project Title: Building a Regional AI Community Through Collaborative Research and Traineeship with Lawrence Berkeley National Laboratory	
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Principal Investigator Information: Dr. Guobin Xu	**Recipient Organization:** Morgan State University 1700 E. Cold Spring Lane Baltimore, MD 21251-0001 Country: USA **UEI:** KULSKCCZJT27

ACCOMPLISHMENTS

- What are the major goals and objectives of this project?

  The project aims to build a regional AI community across Morgan State University, Towson University, and Hood College. Its objectives are to (i) foster collaboration among the three institutions, (ii) provide students with training in AI and HPC, (iii) engage them in hands-on research, (iv) offer professional development opportunities, (v) create and enhance AI/HPC courses, (vi) recruit and support students from all backgrounds, and (vii) establish a foundation for long-term dissemination and research impact.

- What was accomplished towards these goals?

  The project's technical approach combines student-centered training with applied research engagement. Foundational AI instruction was delivered using cloud-based AWS Academy labs to ensure industry-aligned skill building. HPC concepts were introduced through shared repositories and teaching modules that will be expanded into full courses. Students applied what they learned in small-scale research projects guided by faculty mentors, ensuring early exposure to real-world problems. Cross-institution mentoring meetings and shared training created a consistent experience across Morgan, Towson, and Hood.
  During the first reporting period, the project recruited 15 students (six at Morgan, four at Towson, and five at Hood). Recruitment at all three institutions involved campus-wide announcements, application review, and structured interviews. Students across the partnership completed a pre-training assessment to evaluate their initial knowledge of AI and HPC. Over the summer, students at Morgan, Towson, and Hood participated in the AWS Academy Machine Learning Foundations program, gaining exposure to supervised and unsupervised learning, neural networks, generative AI, and ML workflows on AWS. In parallel, they were introduced to HPC through curated resources such as the awesome-high-performance-computing repository. Furthermore, students at Hood had the opportunity to enhance their computational skills through two public training programs offered by LBNL's National Energy Research Scientific Computing Center (NERSC) this summer. At Morgan, a new undergraduate course about the introduction to high-performance computing has been developed to establish a sustainable pathway for undergraduates to acquire practical HPC skills aligned with DOE workforce development objectives. At Towson, a new instructional module was developed, aiming at guiding students through the process of conducting scientific research.
  In addition to training, the project made tangible progress in engaging students with research. At Morgan State, the students initiated projects on AI in healthcare and public safety. At Towson, the students explored AI for cybersecurity, developing modules on intrusion detection for the Internet of Medical Things (IoMT), securing large language model multi-agent systems, and file fragmentation classification. At Hood, the students launched projects in environmental forecasting, cancer mortality disparities, and substance use risk prediction using national datasets. These research activities provided hands-on opportunities to translate classroom learning into applied problem-solving and demonstrated the potential of AI and HPC to address critical societal challenges.
  Beyond research, the partnership advanced collaboration and professional growth in ways that strengthen the long-term impact of the program. Regular cross-institutional meeting sessions and shared training resources created a unified experience across Morgan, Towson, and Hood, laying the foundation for a sustainable regional AI community. Students also gained valuable professional exposure through activities such as invited expert talks (e.g., Dr. Jayfus Doswell's webinar on AI applications in healthcare education) and participation in student competitions (e.g., the Capital One DSU Innovation Venture), which broadened their networks and built entrepreneurship, teamwork, and communication skills. In addition, students were introduced to DOE-relevant datasets, including environmental, healthcare, and societal resources, which enriched their projects and provided interdisciplinary perspectives. Collectively, these accomplishments extend beyond technical training to foster collaboration, professional development, and data-driven research capacity, ensuring alignment with DOE's mission and workforce development priorities.
  Overall, the project has made strong progress toward its goals. Cross-institutional shared training fostered collaboration among Morgan, Towson, and Hood, while a cohort of 15 students was successfully recruited and supported through transparent processes and tailored pre-training assessments. Foundational AI instruction through AWS Academy and HPC exposure via curated resources and NERSC programs equipped students with essential skills, supported by new course development that builds long-term capacity. Students applied these skills in hands-on research projects spanning healthcare, cybersecurity, environmental science, and public safety, demonstrating early research impact. Professional development was enhanced through invited talks and participation in innovation competitions, which broadened students' networks and strengthened their communication, teamwork, and entrepreneurship. Students also engaged with DOE-relevant datasets and embedded curricular content, establishing a foundation for sustained research and dissemination. Together, these accomplishments align closely with the project goals and DOE's workforce development priorities.

- What do you plan to do during the next reporting period to accomplish the goals and objectives?

  In the next reporting period, the project will build on its early progress by expanding student research, strengthening AI/HPC curricula, and preparing for dissemination. Students at Morgan, Towson, and Hood will continue their AI projects by refining models, collecting new datasets, and conducting evaluations, with faculty guiding them toward draft manuscripts for conference and journal submission.
  On the training side, Morgan will finalize and pilot the High-Performance Computing course and introduce Generative AI and Large Language Model training. Towson will formalize its research training module within an undergraduate research course, expanding case studies and collecting structured feedback. Hood will enrich three existing courses (AI, Deep Learning, and Data Mining) with applied datasets and move forward with its proposed course on Foundational Models and Generative AI.
  Professional development will be expanded through additional guest talks from DOE labs and industry, as well as student participation in competitions and hackathons. To strengthen cross-institution collaboration, the team will set up shared digital workspaces for code, data, and instructional materials. Preparations for dissemination will begin with the creation of educational artifacts, a project website, and guidance for students on conference and journal submissions.
  Finally, as the current cohort concludes, the project will conduct a structured reflection and feedback process to improve program delivery. Lessons learned will inform the recruitment of a new student cohort, ensuring continuity of training, research, and professional development aligned with DOE workforce development priorities.

- What opportunities for training and professional development were provided for participants?

  In this reporting period, students gained structured training in both AI and HPC. All participants completed the AWS Academy Machine Learning Foundations curriculum, which provided hands-on experience with supervised and unsupervised learning, neural networks, generative AI, and model deployment workflows. In parallel, students were introduced to HPC through curated resources on modern architectures, parallel programming, and job scheduling, while Hood students further expanded their skills through NERSC's HPC Fundamentals Training and Crash Course in Supercomputing. At Morgan, the development of a new high-performance computing course created a sustainable curricular pathway to ensure future cohorts continue to receive DOE-aligned training.
  Professional development was also emphasized through exposure to research practices and engagement with external experts. Students were introduced to the core steps of scholarly research, including problem identification, framing research questions, methodology design, and proposal preparation. They also benefited from invited talks and participated in student competition events. These activities helped students build entrepreneurship, communication, teamwork, and networking skills.
  In addition, students were introduced to DOE-relevant datasets such as the Environmental Impact Data Collaborative (EIDC), SEER cancer data, MIMIC-III, and the All of Us program, which enriched their research projects and provided practical experience with data-driven methods in health, environment, and security.

- How have the results been disseminated to communities of interest? In particular, provide details for any dissemination not reported in the research product section of this report.

  Because this is the first reporting period, no significant research results have yet been disseminated. However, the dissemination plan is in place: publications in conferences and journals, a project website for educational materials, and distribution of resources to partner institutions. As research results mature in the next period, dissemination will accelerate through student papers, faculty-led conference presentations, and shared curricular materials.

PRODUCTS

The products shown below include only Publications with a 'Published' status and Intellectual Properties with a 'Granted' status. Products with other statuses are not included in this report. The Revision Type indicates whether a product is New (newly added), Updated (existing product modified), or No Change (existing product reported without modifications) during the current budget period. Note that 'Updated' statuses may appear more frequently as products progress through the publishing process. All products listed have been reported for the current project period of this award.

PUBLICATIONS

There are no publications to report.

INTELLECTUAL PROPERTIES

There are no intellectual properties to report.

PARTICIPANTS AND OTHER COLLABORATING ORGANIZATIONS

The table below only contains participants who have identified an affiliation with the Awardee Institution. Participants from any associated subawards may not be included in this count.

PARTICIPANTS DETAIL

Project Role	Number of People	Total Person Months Worked
Co-Project Director	1	1
Principal Investigator/Project Director	1	1
Total Responses	**2**	**2**

PARTNERS DETAIL

Partner: Hood College, Frederick, MD, USA
Partner: Towson University, Towson, MD, USA

IMPACT

- What was the impact on the development of the principal discipline(s) of the project?

  This project strengthens the fields of AI and HPC by expanding educational pathways and creating opportunities for applied research. New courses at Morgan, AI modules at Towson, and planned offerings at Hood provide undergraduates with practical exposure to scalable computing, machine learning, and emerging AI approaches. These curricular efforts give students industry-relevant skills and establish a foundation for sustained DOE-aligned education.

  The project has also built a regional AI–HPC community that connects students and faculty across three institutions. Joint recruitment and shared training programs, such as AWS Academy, have created consistent learning experiences and encouraged collaboration. Students have started research in healthcare, cybersecurity, environmental science, and public safety, addressing societal challenges while demonstrating how AI and HPC can be applied across multiple domains.

  By recruiting students from all backgrounds and equipping them with advanced technical and professional skills, the project is broadening the workforce pipeline in these disciplines. Participants are developing the preparation needed to contribute to DOE mission areas in energy, environment, and national security, while adding to the growing body of knowledge in AI, HPC, and their applied subfields.

- What was the impact on other disciplines?

  Although the primary focus of this project is on advancing AI and HPC, the work is already creating impact across other disciplines. Student projects have applied these tools in healthcare, environmental science, cybersecurity, public safety, and the social sciences, showing how advanced computing can inform research and practice across different fields. By working with real-world datasets and interdisciplinary problems, the project is fostering collaboration beyond computer science and creating pathways for technology to address broader societal challenges.

- What was the impact on physical, institutional, and information resources that form infrastructure?

  Nothing to report.

- What was the impact on technology transfer?

  Nothing to report.

- What was the impact on society beyond science and technology?

  This project is making a broader impact on society by opening pathways into high-demand technology fields for students and preparing them with skills that translate directly into the workforce. Beyond technical training, the program promotes collaboration, entrepreneurship, and civic engagement, helping students connect innovation to real-world needs. These efforts contribute to developing a stronger and more resilient workforce while showing how federally funded education and research can improve quality of life and support community well-being.

- What was the impact on the development of human resources?

  Nothing to report.

- What percentage of the award's budget was spent in foreign country(ies)?

  No portion of the award's budget was spent in foreign countries.