CyberTraining: Broadening Adoption of Cyberinfrastructure and Geospatial Science Research and Workforce for Disaster Management

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ABSTRACT:

Disasters become prominent global issues that simultaneously pose a threat to multiple countries or regions around the globe. The dynamics of a multi-scale networked society are inextricably entangled with geographical and built environments, where human-environmental interactions shape community resilience under different disaster events. Disaster management is gradually empowered by increasing geospatial big data awareness and growing computing capabilities to produce spatial vulnerability and situational understanding for supporting timely decisions. This abstract shed light on high-performance geocomputational educational concepts important in understanding human-environment interactions in disaster management.

This project was funded by the National Science Foundation CyberTraining program (award number #2321069). In this project, we formed an International CyberTraining for Disaster Management (CTDM) network among academic institutions, governmental agencies, hazard research centers, industry, and educational organizations to leverage the expertise of pertinent communities in developing training materials for preparing the next-generation workforce in geospatial and disaster science. The presentation will demonstrate a novel training curriculum comprising various training modalities such as summer schools, workshop sessions, and online webinars, which utilize CI and scalable geospatial analytics for effective disaster management practice. A key approach introduces four interconnected training modules from basic to advanced learning levels: CI-Enabled Computing Module, Disaster Data Module, Geospatial Analytics Module, and Disaster Problem-Solving Module. The Disaster Data Module provides best practices of the FAIR (Findability, Accessibility, Interoperability, and Reusability) principles and cutting-edge geospatial data analysis and visualization techniques. The CI-Enabled Computing Module covers fundamental concepts and skills of CI and high-performance computing to lower the barriers to taking advantage of CI in disaster management research. Through the Geospatial Analytics Module, students will be equipped with advanced geospatial data analysis and visualization techniques to understand disaster patterns across various spatiotemporal scales better. Finally, the Disaster Problem-Solving Module serves as an integration framework to ensure that disaster management concepts and practices will be well connected with the other three modules for a holistic understanding of disaster management challenges enabled by geospatial technologies.

This CyberTraining project will broaden access to CI for disaster research communities and help enhance workforce development among diverse disciplines such as disaster science, GIScience, engineering, and social science. The project will help disaster research communities strengthen their CI-enabled disaster management and geospatial computing skills, thus improving decision-making capabilities for enhancing community resilience. The presentation will also announce funding opportunities (e.g., travel awards and scholarships) for students and educators to attend our training programs. The project will also provide a seed grant for a partnership to develop training material. We strive to provide disaster data, training

materials, and CI resources to underrepresented communities by partnering with Hispanic-Serving Institutions and Historically Black Colleges and Universities.

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