

CAREER: Towards Reliable and Optimized Data-Driven Cyber-Physical Systems using Human-Centric Sensing

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Project Details

Lead PI:	Dong Wang
Performance Period:	09/01/19 - 08/31/24
Institution(s):	University of Notre Dame
Sponsor(s):	National Science Foundation
Award Number:	1845639

414 Reads. Placed 442 out of 803 NSF CPS Projects based on total reads on all related artifacts.

Abstract: Participatory science has opened opportunities for many to participate in data collection for science experiments about the environment, local transportation, disaster response, and public safety where people live. The nature of the collection by non-scientists on a large scale carries inherent risks of sufficient coverage, accuracy and reliability of measurements. This project is motivated by the challenges in data and predictive analytics and in control for participatory science data collection and curation in cyber-physical systems (CPS) experiments. This project focuses on data-driven frameworks to address these challenges in CPS-enabled participatory science that builds on statistics, optimization, control, natural language processing, CPS fundamentals, and coordination of participants, known as crowd steering. This framework, known as DCCDI for Data-driven Crowdsensing CPS Design and Implementation, tightly combines the underlying methods and techniques, especially focusing on physical sensors, mobility, and model-based approaches, to improve efficiency, effectiveness, and accountability. Validation of the DCCDI framework is conducted through simulations, case studies, and on real-world CPS-enabled experiments. This project closely integrates education and training with foundational research and public outreach that enhances interdisciplinary thinking about CPS systems, engages the public through participatory science, and broadens participation in science, technology, engineering, mathematics, and computer science.

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