NSF Convergence Accelerator

NSF Convergence Accelerator's 2023 Cohort Phase 1 Award

Project Title
AI-driven Smart Low-cost Ammonia Sensor (AI-SLAMS)

Awardee
Georgia Tech Research Institute

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24C0009

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PROJECT ABSTRACT
It is projected that the global population will hit 9.3 billion by 2050. This growth demands an increase in food production. Broiler production stands out due to its cost-effectiveness and short production cycles compared to other meat production systems. Ammonia is a common byproduct of poultry waste and has detrimental effects on both birds and workers. Proper litter management and ventilation are key in reducing ammonia levels, enhancing productivity, minimizing respiratory disease among birds, ensuring their welfare, and creating a safe working environment for workers. However, many broiler producers/ farms have difficulty in measuring ammonia concentration in an affordable, reliable, and consistent way.

This Convergence Accelerator project assembles an interdisciplinary team together with the necessary expertise, resources, and infrastructure to develop an AI-driven, Smart Low-cost Ammonia Sensor (AI-SLAMS) and demonstrate its real-world applications on poultry farms. AI-SLAMS will bring together insights and advances in chemical sensing, material science/nanotechnology, poultry science, manufacturing, AI, and data science. AI-SLAMS will identify challenges and opportunities and develop technology concepts and workforce training plans for developing and deploying a smart poultry farm ammonia monitoring system. This will help ensuring health growth, adequate weight gain and welfare of birds, in association supportive worker safety on the farm.