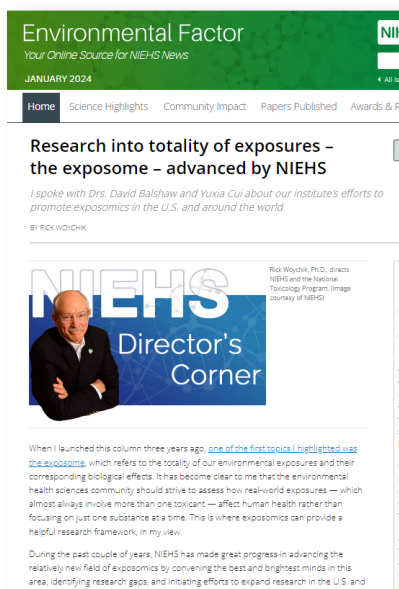


## Addressing Priorities in Precision Environmental Health: Real-Time Monitoring and Mixed Exposures

In a recent interview ([click here to access](#)), NIEHS Director Roy Woychik, PhD, stated, "It has become clear to me that the environmental health sciences community should strive to assess how real-world exposures – which almost always involve more than one toxicant – affect human health rather than focusing on just one substance at a time. This is where exposomics can provide a helpful research framework."



Toward that end, NIEHS aims to launch this summer the nation's first Center for Exposome Research Coordination. Other efforts to advance the study of mixed exposures and exposures in real-time include agency support for the development of wearable sensors and portable, low-cost air pollution monitors, and creation of the Human Health Exposure Analysis Resource (HHEAR).

CEG investigators have long been at the forefront of efforts to advance real-time exposure monitoring and more effective analysis of mixed exposures: In 2023, the CEG funded **Dr. Simone**

**Balachandran**, Assistant Professor of Environmental Engineering, for a pilot study that has distributed low-cost air quality monitors to Northside urban residents to measure citizen exposure to PM<sub>2.5</sub> fine particulate matter (*Spatiotemporal Monitoring Using Distributed Low-Cost Air Pollution Sensors for Community Engagement and Public Health*, 20K Translation and Community Engagement Award). In 2021-2022, the CEG supported a pilot study by **Dr. Pat Ryan**, Professor in the UC Department of Pediatrics, Cincinnati Children's Hospital Medical Center, to establish a network of monitors in a westside community likewise vulnerable to traffic-related and other air pollution (*Community Engaged Low-Cost Air Monitoring in Lower Price Hill*, 20K). Concomitantly, CEG Bioinformatics Core member **Roman Jandarov, PhD**, has developed novel methods and models for statistical dimension reduction and prediction for high-dimensional air pollution data. These methods solve the issues related to dimensionality and spatial misalignment in studies of exposure to air pollution mixtures and associated health effects. During the past decade, CEG Bioinformatics Core leader **Dr. Mario Medvedovic** has pioneered the development and refinement of Bayesian Infinite Mixture Models for unsupervised probabilistic machine learning from genomics data (cf. PMID: 12217911, PMCID: PMC1994961, PMCID: PMC2876132).

As NIEHS seeks to grow even more and larger "communities of practice" in the realm of exposomics research, the CEG is proud of its long record of collaborative, cross-disciplinary science toward the same strategic goals.



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## CEG Shared YouTube Equipment Yields Results

Resources available through the ITS shared equipment program include our confocal microscope, a new infrared imaging system; a state-of-the-art inhalation chamber and particle counter for study of aerosol exposure (ESCAPE chamber), Beckman ultracentrifuge and Seahorse analyzer, *et al.* For work leading to his [new R01 grant](#) and a [publication in CELL](#), CEG 2018 Pilot awardee Shouxiong Huang utilized the **Guava easyCyte 12-HT Flow cytometer** for advanced T cell phenotyping. To learn more about and to schedule CEG Shared Equipment, [click here](#).

## Pilots seed R01 funding

**Shouxiong Huang, PhD**; 2018 Affinity Group awardee. R01 1A1173245, National Institute of Allergy and Infectious Diseases: *M. tuberculosis metabolites to activate human mucosal-associated invariant T cells*, 06/01/23--5/31/28.

**Maria Czyzyk-Krzeska, PhD**; 2018 CEG Affinity Group awardee. R01 CA287260, NCI: *Metabolic effects of copper in renal cancer*, 9/20/23--8/31/28.

**Nalinikanth Kotagiri, PhD**; 2021 New to EHS award. R01 HL168588, National Heart, Blood and Lung Institute: *Siderophore based molecular imaging of pulmonary infections*, 7/1/23--6/30/28.