



U.S. DEPARTMENT OF
ENERGY

Office of
Science

Office of Biological and Environmental Research

DOE's Urban Integrated Field Laboratories: Improving Climate and Environmental Predictability for Urban Regions

AMS Annual Meeting; Feb 1, 2024

Convened by: Sally McFarlane, Bob Vallario, Gary Geernaert

U.S. Department of Energy Office of Science

Office of Biological and Environmental Research (BER)

Earth and Environmental Systems Sciences Division (EESD)

DOE Office of Science, Biological and Environmental Research (BER)

Understanding complex biological, Earth, and environmental systems

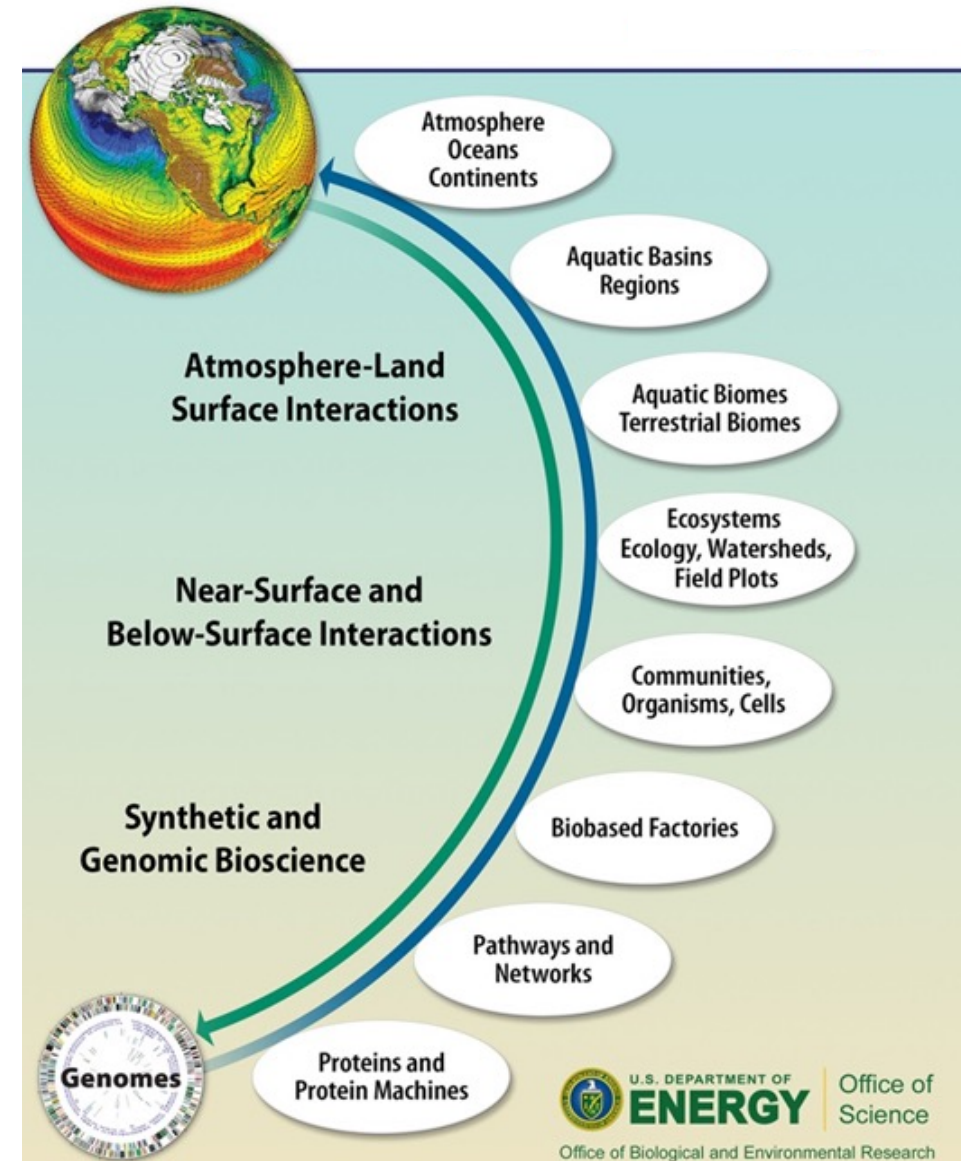
Explore frontiers of genome-enabled biology

Understand physical and biogeochemical Earth system processes

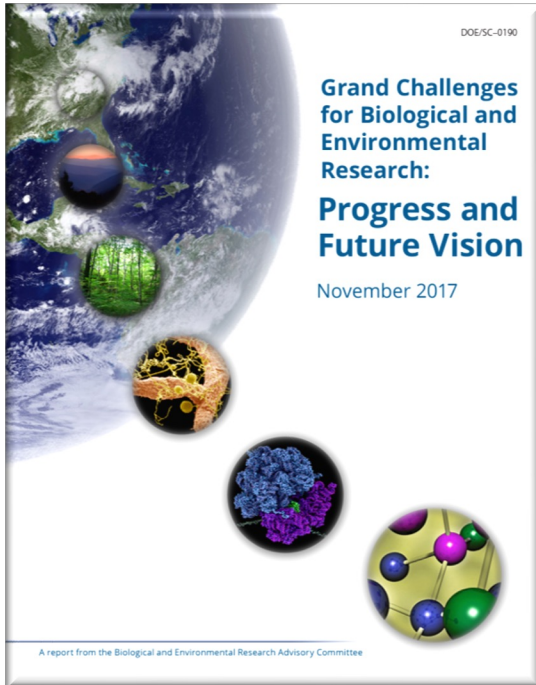
Enable innovation and discovery through user facilities



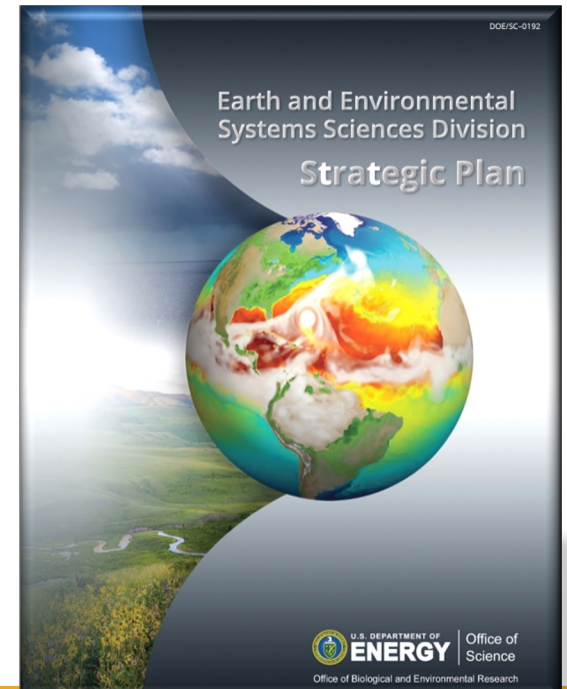
<https://science.osti.gov/ber>



BER's Interests in Predictability for Urban Regions

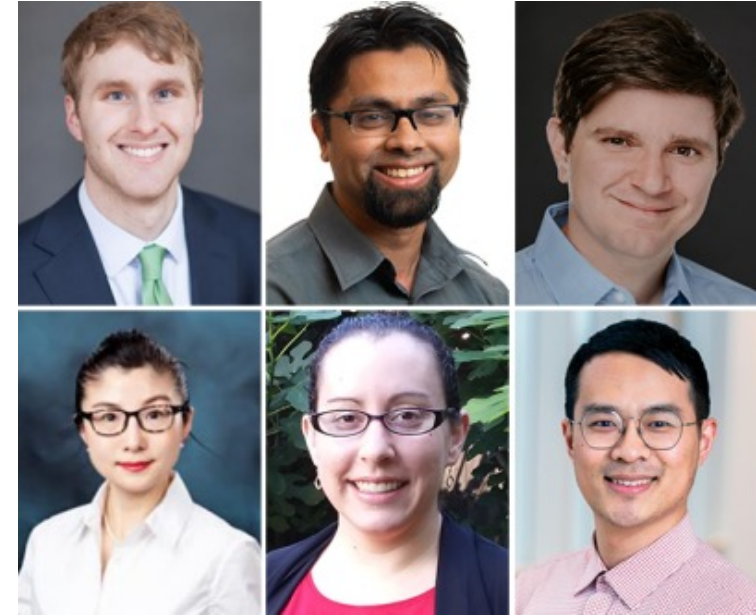


- Establish **integrated field laboratories** to understand and predict biogeochemical, energy, and water flows within and between populated urban areas and surrounding ecosystems, under a changing climate.
- Research Need and Knowledge Gap: **Improve Human-Earth System Modeling Capabilities:** Fine scale human-Earth system interactions and responses that can inform the process to improve equity and livelihoods in urban regions.
- BER is the intellectual home for fundamental research on the **interactions** and **interdependencies** of the atmospheric, terrestrial, subsurface, cryospheric, oceanic, and human-energy components of the Earth system.



Recent BER Urban-Related Investments/Activities

- Urban Integrated Field Laboratories – initiated in FY22
DOE PMs: Sally McFarlane, Bob Vallario
- Climate Resilience Centers
DOE PMs: Brian Benschoter, Bob Vallario
- Early Career awards
 - FY23 solicitation on Earth and Environmental System Modeling in Coastal-Urban Environments
 - 6 awardees from universities and DOE National Labs
DOE PMs: Xujing Davis, Renu Joseph
- CoURAGE – Coast-Urban-Rural Gradient Experiment
 - Atmospheric Radiation Measurement (ARM) User Facility deployment to Baltimore region – starting Dec 2024
 - In coordination with Baltimore IFL
DOE PM: Sally McFarlane
- USGCRP Urban Working Group recently initiated – Gary Geernaert co-chairing



2023 Early Career Awardees for urban-coastal modeling projects

Climate Resilience Centers (CRC)

VISION: A network of climate resilience centers at HBCUs, MSIs, and Emerging Research Institutions (ERIs) for two-way translation of basic climate science towards equitable solutions

MISSION AND SCOPE:

- ▶ Engage basic research from across the DOE complex to focus on local climate impacts, resilience, and equitable energy solutions
- ▶ Resource and representation for local-level climate research
- ▶ Leverages ongoing foundational investments in BER research
- ▶ Identify basic science needs to inform future research priorities
- ▶ Provides outreach, community engagement, training, and collaboration opportunities among participants and community level stakeholders



FY2023 CRC FOA

6 awards made:

North Carolina A&T University

San Jose State University

Northern Arizona University

Michigan Tech University

Morgan State University

University of California - Merced

<https://science.osti.gov/-/media/funding/pdf/Awards-Lists/2915-BER-Climate-Resilience-Centers-Awards-List.pdf>

FY2024 CRC FOA

Preapplications were due 12/15/2023



The Urban IFLs

- Four 5-year projects; total funding over \$90M.
- Each Urban IFL represents different aspects of understanding urban systems, including diverse demographic characteristics, differing climate-induced pressures, and unique geographic and climatic settings.
- IFLs will develop innovations in observing and modeling urban systems, digital twins, integrate with DOE's climate modeling, and leverage capabilities from DOE and other agencies.
- Each project is strongly connected to their city through local and Minority Serving Institutions, community organizations, and previous history working with the communities involved.



Chicago, IL: led by Argonne National Lab with 13 (6 MSI) collaborators.



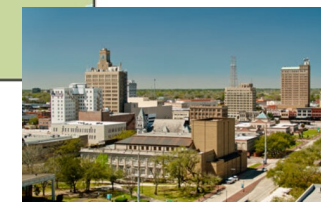
Baltimore, MD: led by JHU with 10 (3 MSI) collaborators



TX Gulf Coast: led by UT-Austin (MSI) with 4 (1 MSI) collaborators.



Tucson-Phoenix-Flagstaff, AZ: led by ASU with 4 (2 MSI) collaborators.



Presentations and Discussion

Urban Integrated Field Laboratories (~35 min)

- Community Research on Climate and Urban Science (CROCUS)
 - Scott Collis, Argonne National Laboratory
- Southeast Texas Urban IFL (SETx IFL)
 - Paola Passalacqua, University of Texas at Austin
- Southwest Urban Corridor IFL (SW IFL)
 - Dave Sailor, Arizona State University
- Baltimore Social Environmental Collaborative (BSEC)
 - Ben Zaitchik, Johns Hopkins University

Moderated Discussion and Q's & A's (~15 min)



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