U.S. DEPARTMENT OF ENERGY | Office of Science

BER Update:
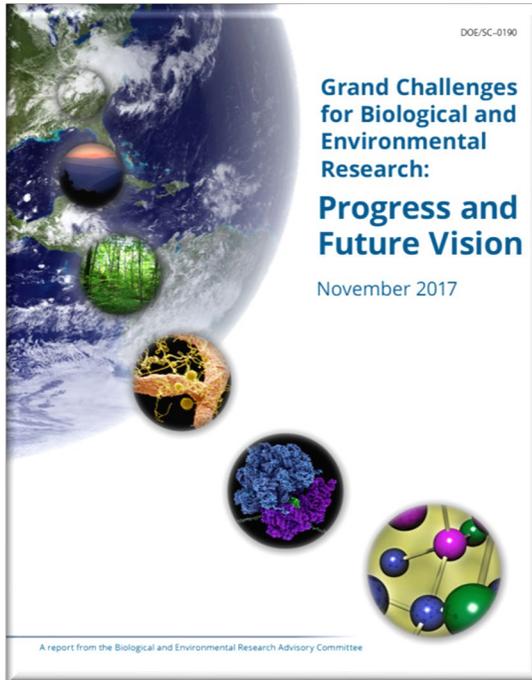# Urban Integrated Field Laboratories (UIFL)

ASR/ARM Principal Investigators meeting

October 25, 2022

Jennifer Arrigo, Sally McFarlane, Bob Vallario, Program Managers

What are Urban IFLs – Defining Characteristics

▸ Large ($2M - $5M / yr) multi-disciplinary, multi-institutional projects that emphasize the basic sciences of climate, environmental, ecological, and urban change affecting heterogeneous urban regions, yet with a view towards informing sustainable, resilient, and equitable solutions.

▸ Integrate research across three focus areas: spatial variabilities leading to microclimates and micro-environments, atmospheric composition and biogeochemical cycling, and quantifying equitable climate solutions

▸ Research combines new observations with high resolution and highly detailed urban modeling, where data generated by observations and models are used for scientific analysis.

▸ Provides opportunities to inspire, train, and support leading scientists from a variety of institutions, including minority-serving institutions, who have an appreciation for the global climate and energy challenges of the 21st century.

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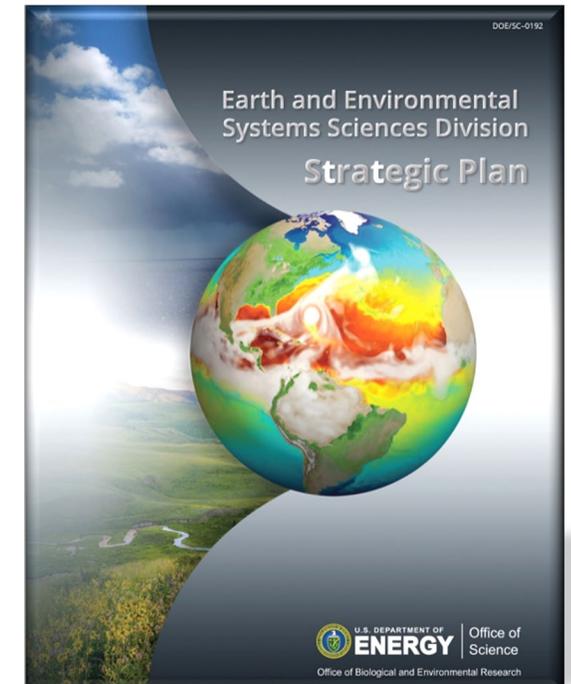
Developing the Urban IFL Concept

"Create **new integrated field laboratories** that target biogeochemical, energy, and water flows between urban areas and surrounding ecosystems." (EESS Action Item, p. 6)

Research Need and Knowledge Gap: **Improve Human-Earth System Modeling Capabilities**: "human-Earth interactions at fine scales such as processes in urban population centers …are not well represented in the current generation of models" (p.42)

References and links to these (and other) reports available within FOA 2581, linked at https://ess.science.energy.gov/urban-ifls/

"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." (exec summary, p.iv)

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Urban Integrated Field Laboratories (IFLs) DE-FOA-0002581

▸ To improve our understanding of climate and environmental predictability across complex and variable urban regions in highly heterogenous, climate-sensitive locations with significant disadvantaged populations/neighborhoods (Justice40 communities)

▸ Projects must encompass interdependent environmental, ecological, infrastructure, and human components of their selected urban region.

▸ Three FY22 selections; totaling $66 million in funding across 5 years involving over 20 institutions

▸ Each Urban IFL represents different aspects of understanding urban systems, including diverse demographic characteristics, differing climate-induced pressures on people and infrastructures, and unique geographic and climatic settings.

▸ Each project will develop specific innovations in observing and modeling urban systems and will leverage DOE capabilities as well as those from 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.

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Urban Integrated Field Laboratories (IFLs)

▸ **Community Research on Climate and Urban Science (CROCUS),** led by Argonne National Laboratory, focuses on **Chicago, IL**, the 3rd largest city in the US, and will employ observations and modeling from street to regional scales to explore multiple issues, including mitigation via green roofs and blue spaces, and community-driven future scenarios for adaptation and decarbonization. (PI: Cristina Negri)

▸ **Southeast Texas Urban IFL (SETx)** led by the University of Texas at Austin in **Beaumont/Port Arthur TX**, addresses challenges of industrialized, medium sized port cities, their climate adaptation needs, population diversity and vulnerability, and ecological richness, and acute-on-chronic hazards of urban flooding and air quality. (PI: Paola Passalacqua)

▸ **The Baltimore Social-Environmental Collaborative (BSEC)** led by Johns Hopkins University, focuses on a metropolitan area (**Baltimore, MD**) facing interlinked challenges of aging infrastructure, increased heat and flood risk, and inequitable burdens of air and water pollution. Research begins with community and city government priorities and designs observation networks and models to deliver climate science capable of supporting those priorities.(PI: Benjamin Zaitchik)

Kick Off Events

- https://ess.science.energy.gov/urban-ifls/
  - Each project will also maintain a project website

- Virtual Kick Off Meeting for UIFL Teams (Nov 2022)

- AGU Fall Meeting Town Hall
  - TH53E - DOE's Expanded Engagement in Urban Climate Science
    - Friday, 16 December 2022, 13:45 - 14:45

Questions And Information

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