It has been projected that by the year 2030, 6 out of every 10 people will live in a city and, by 2050, this proportion is expected to increase to 7 out of 10 people! Key issues concerning urban populations, such as public health, sustainable use of limited energy resources, emergency preparedness, and societal stability will rise to the forefront in the next two decades. Virginia Tech proposes the UrbComp NSF Research Traineeship (NRT) PhD Program focused on both foundational and applied aspects of data science to support the study of urban populations. UrbComp will train data scientists to help realize the promises of unprecedented urbanization.
Key educational innovations in UrbComp include i) a "tapestry" curriculum to support early weaving of interdisciplinary issues, ii) emphasis on ethical and societal issues for responsible data science, iii) community building through data analytics competitions, and iv) interactions with a broad range of urban city professionals, i.e., the end consumers of data science. In particular, the core curriculum for UrbComp students will be organized as a weaving of topics from "horizontal" (research methods) and "vertical" (applications) courses. Three key verticals will be emphasized in UrbComp: epidemiology, sustainability, and social science, all key ingredients of urban environments research. UrbComp will support 15 NRT trainees who will receive an NSF stipend and 35 NRT trainees who will not receive an NSF stipend for a total of 50 NRT trainees. All of these trainees will pursue PhD in one of eight home departments.

Sustainability of UrbComp is realized through the proposed Virginia Tech graduate certificate in Urban Computing which will benefit Virginia Tech graduate students beyond the lifetime of the proposed NRT funding. Furthermore, the creation of an Urban Living Laboratory at Virginia Tech will ensure that research ideas and educational innovations developed here will provide benefits to a broad range of our graduate student population, beyond the supported NRT trainees. Scalability will be addressed both within Virginia Tech and beyond. The investigators will participate in the NSF/ASEE funded I-Corps-L program to develop both curricular materials and lessons capturing best practices in implementing the educational innovations.

The goals of UrbComp are to:

1. Develop a sustainable and scalable infrastructure for interdisciplinary PhD research and graduate education/training in data science for urban computing that can be used as a model within and beyond Virginia Tech,
2. Deliver an integrative and contextual educational experience to a diverse cohort of PhD students,
3. Increase the presence of underrepresented doctoral students in science and engineering through recruiting and outreach activities emphasizing urban environments, and
4. Partner with industries, local city governments (Arlington, VA), and local health departments (Virginia Department of Health) via internships, practicums, data challenges, outreach, and research collaborations.
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