PEDAL POWER

A group of Yale professors are using bicycles
to measure heat stress in New Haven

BY JOSH ANUSEWICZ

Yichen Yang '20 M.E.Sc. (right page) is one of
several F&ES students who has equipped their
bicycle with a temperature sensor (above)
this semester.

New Haven serves as a perfect living laboratory each summer for Urban MODs, a weeklong part of the F&ES orientation program that teaches incoming students field skills related to urban ecosystems while familiarizing themselves with the local community. Students study local plant life, participate in greenspace restoration, and use GPS and GIS tools to gather and analyze data on streets across the city.

This summer, the GPS and GIS data collection was expanded to include new information on urban heat islands (UHI) — with help from the students' preferred mode of transportation.
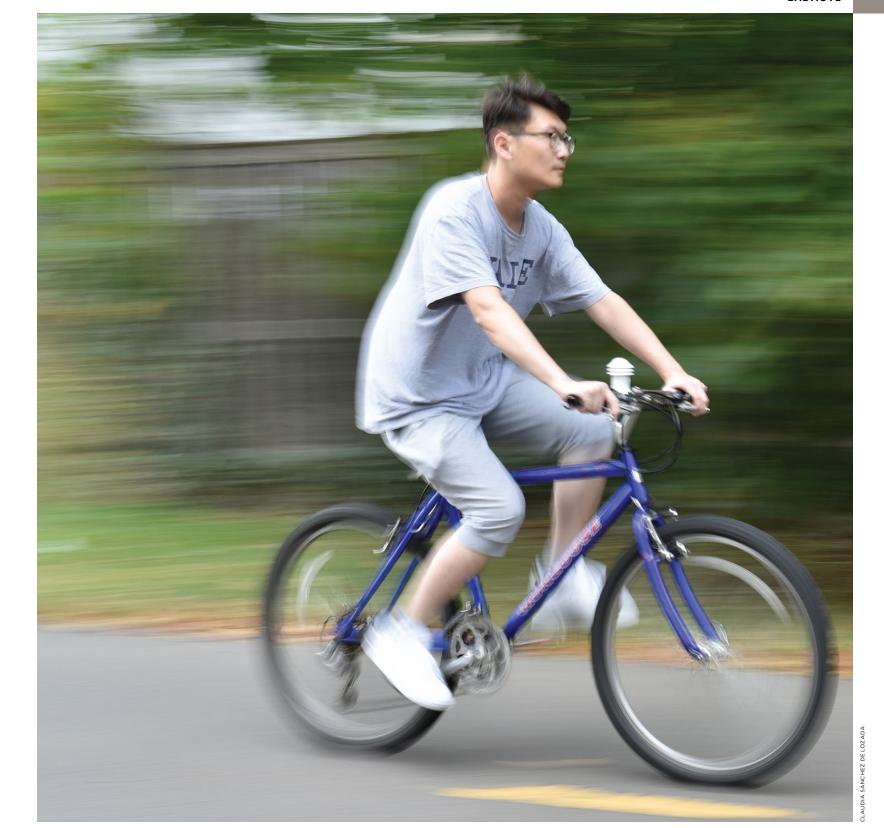
A research team led by F&ES professors Xuhui Lee and Justin Farrell designed the study, in which sensors were mounted to the bicycles students used to travel between field sites during the three weeks of MODs. The sensors — specially designed to shield direct sunlight in order to accurately log air temperature to within 0.1 degree and relative humidity to within two percent — relayed the data via a smartphone app, which allowed users to see hyperlocal current temperatures across New Haven.

The study aims to identify the city's urban heat islands, which are seen as a major contributor to urban warming. Identifying these problem areas could allow for mitigation through green architecture or more greenspace, and Lee hopes that the lessons learned from MODs could lead to adapting the technology for other cities across the country.

Estimates show F&ES students, collectively, biked more than 5,000 miles during the three-week orientation program, potentially securing a considerable amount of data. Lee said F&ES student volunteers will continue logging data throughout the academic year, using sensors mounted to their personal bicycles.

"This is an exciting project, where students get to expand their knowledge of data collection and analysis and learn how to use cutting-edge software programs," added Lee.

This study was made possible by the Leitner Awards for Uncommon Environmental Collaborations — funded by James Leitner '75 B.A. — that promote collaborations for environmental teaching and research across the Yale campus. Roman Kuc from the Yale School of Engineering & Applied Science and Zhong Shao of the Yale Department of Computer Science also contributed to this project. The project proposals were required to advance at least one of six objective outlines in the F&ES strategic plan: climate change, urban systems and the environment, environmental communications, environmental data science, environmental justice and environmental health, and interdisciplinary team teaching.

CLAUDIA SANCHEZ DE LOZADA