

Sustainability Fellowship Sustainable Pavement Designs Using a Life Cycle Assessment with Climate Change Inputs – Durham, NH

The changing climate will have a significantly detrimental impact on the longevity of highway infrastructure due to increased frequency and intensity of storm events as well as long term changes in surface and sub-surface temperature and moisture conditions. The current pavement design processes are driven by economics and in-place policies for selection of construction materials and structure of roadways.

Researchers in the UNH Department of Civil and Environmental Engineering propose to enhance the current pavement design process by working with a UNHSI Fellow to conduct a dynamic and prognostic life cycle assessment to understand the economic and environmental tradeoffs of varied pavement designs, and to inform the pertinent roadway management and decision making. The project will use downscaled climate predictions generated through the current EPSCoR Track I Ecosystem and Society project.

Roadways in New England region will be used as a test-bed for the proposed project as the region is predicted to experience increased precipitation and temperature. The project scope will include evaluation of sustainable alternatives (such as recycling and alternative construction materials), pavement structural designs and maintenance strategies in order to improve the sustainability of transportation infrastructure.

The tasks of the Fellow will be the following:

- Develop a comprehensive pavement design approach that uses LCA and climate projections to develop sustainable pavement systems
- Apply above framework to pavement sites for demonstration of the approach
- Determine areas of future needs and research
- Write about the foregoing in an article, to be prepared in collaboration with the project supervisors, for publication in a peer-reviewed journal

This Fellowship offers an opportunity to add significant products to your research/ academic portfolio; gain an understanding of global climatic projection models, and how to access and extract climate forecast data; receive training in systems thinking and life cycle analysis as well as use of LCA software (e.g., SimaPro); develop expertise in pavement life-cycles, and use of pavement analysis and design software; and refine your ability to analyze datasets for quantitative and qualitative comparisons of results. In addition, the designs developed could have the potential to significantly lower the energy demand and carbon emissions as well as the costs imposed to road owners and users.

Location: Durham, NH

Time commitment: 40 hours per week, June 6-August 19, 2016

Compensation: \$6000 stipend

Desired Qualifications:

- Enrollment in an undergraduate or graduate degree program: civil engineering, environmental engineering, climate science, and/or related-fields
- Coursework in transportation engineering and/or pavement design courses desirable
- Experience in life cycle assessment
- Database management experience

UNHSI Sustainability program eligibility:

Graduate students, exceptional undergraduate students, and recent graduates are eligible. We will encourage, but not require, an academic sponsor or reference for each fellow, and where possible we will ask that course credits are awarded.

Supervision, Training, Mentoring and Evaluation

This fellow will receive day-to-day supervision from Prof. Eshan Dave and Prof. Weiwei Mo of the University of New Hampshire, and professional development offerings from UNHSI.

Fellows will be expected to participate in three MANDATORY events:

- A three-day, two-night orientation in Durham, NH, June 1-3rd. Lodging and food are provided; Fellows are responsible for any associated travel costs.
- Midterm project presentations to UNHSI staff, faculty and relevant project partners (can be done remotely).
- A summative evaluation and feedback session at the end of their placement.

Apply by February 21st at <http://www.sustainableunh.unh.edu/climatefellows>