UNIVERSITÀ DEGLI STUDI FIRENZE | Dipartimento di Ingegneria Civile e Ambientale

INDICEE
International Doctorate in Civil and Environmental Engineering

SEMINAR

FRONTIERS IN MECHANISTIC ECOHYDROLOGICAL MODELING

Simone Fatichi

Department of Civil and Environmental Engineering
National University of Singapore

WEDNESDAY
27 MAY 2026

TIME
3-4pm

LOCATION
Aula Caminetto S.Marta

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Understanding the complex interplay between the hydrosphere, pedosphere and biosphere is crucial for predicting the impacts of climate change on terrestrial ecosystems and associated water and carbon fluxes. This requires the use of diagnostic and prognostic numerical tools to investigate complex non-linear interactions within different ecosystems and climates.
Here, I highlight how a mechanistic terrestrial biosphere model can be instrumental in addressing these interactions. Examples where this approach has led to scientific insights not attainable through observational data alone include: (i) investigating how catastrophic wildfires and subsequent forest regrowth in one of the world's tallest forests in Australia affect evapotranspiration and water yield; (ii) analyzing how mountainous catchments in the European Alps have responded to extreme droughts; and (iii) exploring how plant water use efficiency varies across aridity gradients. By integrating mechanistic modeling and data, we can enhance the understanding of the response of terrestrial ecosystems to environmental change and improve our ability to predict the future of water and carbon cycles.

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Simone Fatichi received his BSc and MSc (cum laude) in Environmental Engineering at the University of Firenze (Italy). In 2010, he obtained an International PhD title joint between the T.U. Braunschweig (Germany) and University of Firenze (Italy). Subsequently, he was a researcher and lecturer at ETH Zurich (Switzerland), Institute of Environmental Engineering, before starting as associate professor at National University of Singapore in 2020, where he is full professor since 2024. He was recipient of the prestigious Antonio Feltrinelli Giovani prize in 2019, and of the Hydrologic Sciences Early Career award of the American Geophysical Union in 2020. He is mainly working on hydrology, biogeoscience, and climate change related topics addressing questions associated with global change and its impacts on vegetation functioning, water and soil resources, carbon cycle, and ecosystem services in natural and urban environments.