Computing @ CEE

From self-driving cars to 3D printed buildings and early warning systems for natural disasters, CEE researchers are enabling new frontiers in computing to build more sustainable, intelligent, and resilient cities.

1

Early tsunami warning

Patrick Lynett uses computational models to predict, respond to and reduce the impact from extreme natural events on the world's coastal regions.

2

Intelligent buildings

Burcin Becerik-Gerber leverages the power of computing and A.I. to improve human-building interactions by increasing occupant comfort, productivity, and health.

3

Resilient and efficient energy systems

Kelly Sanders eases tensions between human and natural systems, using computational modeling to quantify the environmental impacts of electricity generation.

4

Structural health monitoring

Audrey Olivier combines physics-based models and probabilistic data analytics to monitor a structure's behavior, detecting damage at its onset.

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New materials and structures

Qiming Wang uses bioinspired manufacturing and mechanics to develop unprecedented materials and structures that address grand engineering challenges in infrastructure, environment, energy, robotics, and healthcare.

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Smart construction sites

Lucio Soibelman and Burcin Becerik-Gerber conduct pivotal research applying emerging information and communication technologies, Big Data, smart buildings, smart infrastructure, and A.I. to transform the way humans build.

7

Seismic modeling

Chukwuebuka Nweke combines statistical analysis, machine learning, and database management to solve problems in geotechnical engineering, earthquake engineering, seismology, and geomorphology.

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Modeling uncertainty in complex systems

Roger Ghanem develops probabilistic and computational methods for risk mitigation and design optimization. He specializes in material and structural systems with multi-components, multi-physics, and multi-scale behavior, systems in harsh radioactive or hypersonic environments, and tipping points for complex systems.

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3D printed buildings

Berok Khoshnevis has invented a new method of 3D printing structures called Contour Crafting and is revolutionizing the field of automated construction, computer-animated fabrication, and robotics.

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Smart groundwater systems

Felipe De Barros develops integrated models for simulating and predicting large scale hydrogeological systems that capture uncertainties to create computationally efficient and accurate predictions of our underground water systems.

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High performance concrete and novel materials

Bora Gencturk uses high-fidelity computer models and mathematical theories to understand the performance of self-healing and high-performance materials and to improve the durability and resilience of reinforced concrete structures during extreme events.

12

Smart and sustainable water management

Amy Childress applies data analytics to improve desalination, water treatment, and wastewater reclamation. Adam Smith evaluates emerging environmental biotech to make water infrastructure more sustainable. Daniel McCurry applies environmental organic chemistry and analytical chemistry to improve our engineered water sources.

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Smart transportation and autonomous vehicles

Ketan Savla uses a variety of systems tools to characterize fundamental limits on efficiency and resilience of large-scale societal systems due to physical, behavioral and social constraints. He leverages technological and algorithmic advancements to overcome these limitations in civil infrastructure and autonomous systems.

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Air pollution control

Constantinos Sioutas develops technologies for measuring the physico-chemical characteristics of air pollutants applying novel computational methods for determining the toxic properties of matriculate matter (PM).