FORESIGHT INSTITUTE ANNOUNCES 2021 FEYNMAN PRIZE WINNERS

THE PRESTIGIOUS NANOTECHNOLOGY AWARD GOES TO DUWEZ, HOUK & FENG

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Foresight Institute, a leading think tank, research, and public interest organization focused on molecular manufacturing and other transformative technologies, announces the 2021 winners for the prestigious Feynman Prizes, awarded since 1993. The prizes in Theory and Experiment are named in honor of pioneer physicist Richard Feynman for the construction of atomically-precise products through the use of productive nanosystems. The Foresight Institute also announces its Distinguished Student Award, recognizing a student whose work is considered notable in advancing the development and understanding of nanotechnology.

2021 Prize winners

Feynman Prize in Experiment:
Anne-Sophie Duwez, University of Liège

Feynman Prize in Theory:
Kendall N. Houk, UCLA

Distinguished Student Award:
Yuanning Feng, Northwestern University

Professor Anne-Sophie Duwez of the University of Liège receives the 2021 Foresight Institute Feynman Prize for Experimental work
Professor Anne-Sophie Duwez develops tools and technologies to interface synthetic functional molecules with AFM to study their operation, one molecule at a time, and was the first to succeed in applying AFM-based single-molecule force spectroscopy to a small molecule just a few nanometers long. Over the past decade, she pioneered single-molecule mechanics on synthetic molecular machines in a series of high impact and influential studies. Her achievements have highlighted the importance of molecular design in the synthesis of efficient molecular machines and have provided unprecedented insights into their operation.

Professor Duwez obtained her PhD in chemistry in 1997 at the University of Namur, Belgium. In 2006, she was appointed associate professor at the University of Liege and obtained an Incentive Grant for Scientific Research from the FNRS to create a new laboratory for advanced AFM techniques. She is currently a full professor in the Department of Chemistry.

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Professor Kendall N. Houk receives the 2021 Foresight Institute Feynman Prize for Theory
Kendall N. Houk is a computational organic chemist whose quantum mechanical and molecular dynamics simulations have elucidated structural and dynamical features ofsynthetic nanomachines. Dynamic simulations of Donald Cram's container molecules – nanoscale molecules that encapsulate smaller guest molecules – revealed dynamical features that control constrictive binding and release. Houk's group predicted computationally, and verified experimentally, how guest encapsulation can be achieved by irradiation of a nanocapsule outfitted with a photosensitive gate with different uv wavelengths. With Fraser Stoddart, studies of rotaxane structures and dynamics laid the groundwork for the construction of Stoddart's marvelous nanomachines. Houk recently combined forces with molecular nanoarchitect Miguel Garcia-Garibay to simulate computationally the dynamic motions of molecular gears and of amphidynamic crystals containing rapidly spinning nanorotors.

Professor Houk received undergraduate and PhD degrees at Harvard, working with R. B. Woodward. He then became the Saul Winstein Chair in Organic Chemistry in 2009 and is now Distinguished Research Professor at UCLA. He is an elected member of the American Academy of Arts and Sciences, the International Academy of Quantum Molecular Sciences, and the US National Academy of Sciences. He is a Fellow of the AAAS, the ACS, the WATOC and the Royal Society of Chemistry.

Yuanning Feng is announced as the 2021 winner for the Distinguished Student Prize
Yuanning Feng works on the design and synthesis of artificial molecular machines — particularly molecular pumps — which is an intellectually challenging and contemporary area of nanoscience and nanotechnology. He has come to terms with the physics behind how biological and artificial molecular machines work, based on energy and information ratchets. He has designed and synthesized artificial molecular pumps that can pump rings from and back into solution in response to chemical fuel, electrochemical potential and light. He has also investigated a polyrotaxane synthesizer as a textbook example of how an artificial molecular machine can produce precisely exotic compounds with far-from equilibrium properties that cannot be obtained by traditional synthetic approaches.

Mr. Feng carried out research in the area of supramolecular chemistry under the supervision of Professors Mei-Xiang Wang and Xi Zhang (Thesis Advisor) as an Undergraduate Student at the prestigious Tsinghua University in Beijing. In 2016, he joined Nobel Laureate Sir Fraser Stoddart's Group at Northwestern University. He graduated with a PhD Degree in August 2021 and is continuing his research as a Postdoctoral Research Fellow in the Stoddart Group.

About Foresight Institute
Foresight Institute advances technologies of fundamental importance to the long-term future of life and the biosphere focusing on molecular machine nanotechnology, biotechnology, and computer science. We reward excellence, restrain recklessness, and create community to promote beneficial uses of these technologies and reduce misuse and accidents potentially associated with them.

Press contact: Beatrice Erkers, beatrice@foresight.org

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