UCI Distinguished Professor wins Dannie Heineman Prize for Mathematical Physics

Svetlana Jitomirskaya is second woman to receive award – and first to receive it alone
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Brian Bell
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“To say I am honored and humbled to receive this prize – to now be on the same list with so many of my absolute heroes – is a huge understatement,” says Svetlana Jitomirskaya, UCI Distinguished Professor of mathematics. “The prize is relatively rarely given to pure mathematicians like me; I see it as an indication of the physics community’s growing interest in the questions I’ve been working on.”

Picture Credit:
Tatiana Arizaga / UCI

The citation says Jitomirskaya was recognized “for work on the spectral theory of almost-periodic Schrödinger operators and related questions in dynamical systems. In particular, for her role in the solution of the Ten Martini problem, concerning the Cantor set nature of the spectrum of all almost Mathieu operators, and in the development of the fundamental mathematical aspects of the localization and metal-insulator transition phenomena.”

Established in 1959 by the Heineman Foundation for Research, Educational, Charitable and Scientific Purposes Inc., the prize is administered jointly by the American Physical Society and the American Institute of Physics. It was first awarded to Murray Gell-Mann, and other recipients include Stephen Hawking (1976), Edward Witten (1998) and Giorgio Parisi (2005).

“To say I am honored and humbled to receive this prize – to now be on the same list with so many of my absolute heroes – is a huge understatement,” Jitomirskaya said. “The prize is relatively rarely given to pure mathematicians like me; I see it as an indication of the physics community’s growing interest in the questions I’ve been working on – and perhaps math in general.”

The *Journal of Mathematical Physics* defines the field as “the application of mathematics to problems in physics and the development of mathematical methods suitable for such applications and for the formulation of physical theories.” An early example would be Sir Isaac Newton’s invention of calculus in order to solve physics problems, such as explaining Kepler’s laws of planetary motion. Some of the most significant modern advances have been in classical mechanics, quantum theory, special and general relativity, and statistical mechanics.

Jitomirskaya’s main accomplishments involve quasiperiodic operators. She is best known for creating the first nonperturbative methods of studying small denominators, influencing ongoing developments in this field. She has also solved – individually and collaboratively – several long-standing problems related to almost Mathieu operators.

“The work I do that this prize recognizes is in a rather narrow area, so it hasn’t had a fraction of the impact the work of some of my predecessors has had,” she said. “However, it did have a considerable impact in that area, and the field itself is getting more and more attention because of its relationship to the science of quantum materials.”

Jitomirskaya attended Russia’s Moscow State University, earning an undergraduate degree in 1987 and a Ph.D. in 1991, both in mathematics. She became a part-time lecturer at UCI in 1991 and has been professionally affiliated with the university ever since – her most extended leave being about half a year in 1996 when she was a visiting assistant professor at the California Institute of Technology with Barry Simon, 2018 winner of the Dannie Heineman Prize.

She is a member of the International Association of Mathematical Physics, serving as vice president in 2012-14, and was inducted into the American Academy of Arts and Sciences in 2018. Jitomirskaya is a recipient of fellowships from the Alfred P. Sloan Foundation and the Simons Foundation and was awarded the American Mathematical Society's Ruth Lyttle Satter Prize in 2005. She has also held an Aisenstadt Chair at Montreal's Centre de Recherches Mathematiques and received a Distinguished Mid-Career Faculty Award for Research from UCI and a UCI Chancellor's Fellowship.

About the University of California, Irvine: Founded in 1965, UCI is the youngest member of the prestigious Association of American Universities. The campus has produced three Nobel laureates and is known for its academic achievement, premier research, innovation and anteater mascot. Led by Chancellor Howard Gillman, UCI has more than 36,000 students and offers 222 degree programs. It's located in one of the world's safest and most economically vibrant communities and is Orange County's second-largest employer, contributing $5 billion annually to the local economy. For more on UCI, visit www.uci.edu.

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