

Anne Bennett Prize 2019
Citation for Dr Eva-Maria Graefe

Dr Eva-Maria Graefe of Imperial College London is awarded an Anne Bennett Prize in recognition of her outstanding research in quantum theory and the inspirational role she has played among female students and early career researchers in mathematics and physics.

Dr Graefe is a Royal Society University Research Fellow and Reader in Mathematical Physics at Imperial College London. She is a leading researcher in non-Hermitian PT-symmetric quantum dynamics and its connection to geometry. Her derivation (in collaboration with Professor H J Korsch) of a mean-field approximation to Bose-Einstein condensates (BECs) in the presence of PT-symmetry, published in 2008, predated the subsequent intense research interest in PT-symmetric BECs by several years. Her work with G Demange on the coalescences of eigenstates of non-Hermitian operators, known as exceptional points, is highly cited in the active field of exceptional-point physics, for which new experiments have been performed in recent years. Together with Dr R Schubert, she provided an answer to the basic question of the semiclassical limit of non-Hermitian quantum mechanics, a problem that had been open for decades. The result led to a new type of classical phase-space dynamics, which can be used to understand a variety of non-Hermitian quantum phenomena.

In acknowledgement of her path-breaking work in mathematical physics, Dr Graefe was awarded a highly prestigious L'Oréal UNESCO for Women in Science Fellowship and more recently a European Research Council grant "Universality and Chaos in PT-Symmetric Quantum Mechanics". Over the past five years, Dr Graefe has given more than fifty invited talks across the world and has been invited to speak at numerous international meetings on non-Hermitian quantum theory and other areas of mathematical physics. She is actively engaged in the organization of scientific meetings as well as outreach activities, delivering talks and workshops about mathematical physics to high school students.

As a female researcher in an area with low numbers of female academic staff members, Dr Graefe has acted as an inspiring role model for female students and early career researchers. In collaboration with the Postdoc and Fellows Development Centre at Imperial, she regularly runs workshops for female postdocs on fellowship applications, and she has mentored and advised a large number of postdocs. She recently ran a marathon in Edinburgh to raise awareness and funds for research on ICP (intrahepatic cholestasis of pregnancy).

Dr Graefe's outstanding accomplishments, achieved while bringing up two young daughters, are indeed inspirational.