מכון ויצמן למדע
WEIZMANN INSTITUTE OF SCIENCE

Prof. Yuval Gefen
Department of Condensed Matter Physics

Born in Tel Aviv, Prof. Yuval Gefen's relationship with the Weizmann Institute began while he was still in high school, when he won second prize in the Institute-sponsored Israel Mathematics Olympiad. He went on to study at Tel Aviv University, where he completed his BSc (1978) and doctorate *summa cum laude* (1984). He conducted postdoctoral research at the Institute for Theoretical Physics at the University of California at Santa Barbara, and with 2016 Nobel Prize laureate, David J. Thouless, at the University of Washington in Seattle. In 1986 he joined the staff of the Weizmann Institute where he holds the Isabelle and Samuel Friedman Professorial Chair of Theoretical Physics.

Prof. Gefen's research concerns the movement and interaction of electrons in systems on the *"nano scale"* (which lays the foundations for the field of nano-electronics). He is one of the "founding father" of the field of mesoscopic physics. One of his predictions—that currents traveling through extremely small pieces of metal or semiconductor material can be measured in single electrons—helped establish the lower limit of what characterizes the flow of electricity, and eventually led to the experimental design of a *single-electron transistor.* Prof. Gefen moved on to study exotic "quasi" particles that arise in certain quantum systems, which defy the standard division of quantum particles into a class of fermions and another class of bosons. How to play quantum mechanics with such particles (which could be the building blocks to the long coveted *quantum computer*) is presently a hot topic of research.

He is also interested in understanding the concept of *measurement* within the framework of *quantum mechanics*, and how, by harnessing the rules of the latter, to obtain information that is not accessible employing "classical measurement tools".

Prof. Gefen is the recipient of many honors and fellowships, among them the Morris L. Levinson Award in Physics, the Alexander von Humboldt Award, and, in 2003, the prestigious Max Planck Award for Physics. He is a Fellow of the Institute of Physics and of the American Physical Society and, in 2015, was selected as an Outstanding Referee of the *Physical Review* and *Physical Review Letters*. He is presently a visiting Leverhulme

Professor at Cambridge University and the University of Birmingham in the UK, and has been appointed guest Leibnitz Professor for the 2019 Summer Semester.

Prof. Gefen has also held a number of other visiting professorships, including at the Isaac Newton Institute for Mathematical Science, Cambridge, UK, and at Princeton University, New Jersey.