

# “ULTRAFAST DYNAMICS OF MOLECULAR, BIOLOGICAL AND NANO-SYSTEMS STUDIED FROM THE IR TO THE X-RAY RANGE”

## Lecturer:

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## University:

Ecole Polytechnique Fédérale de Lausanne, Switzerland

## Area:

Laboratory of Ultrafast Spectroscopy

## Abstract:

The advent of femtosecond (fs) laser technology some twenty five years ago opened a whole new era in Science because of its ability to probe in “real-time” nuclear motion in molecules, crystals, liquids and proteins. A full picture of the photoinduced physical and (bio)chemical dynamics requires interrogating different observables of the system under study. I will present different results obtained using tools as diverse as ultrafast visible spectroscopies (absorption and fluorescence), ultrafast X-ray spectroscopies, 2-dimensional Ultraviolet spectroscopy, and visible pump/infrared probe tools to probe the dynamics of molecular systems, proteins and metal oxide nanoparticles. I will also discuss the perspectives that are arising from the ultrafast methods developments of recent years for materials science, chemistry and biology.

## **Biography:**

Majed Chergui received his bachelor degree in Physics and Mathematics from Chelsea College (University of London) in 1977, then his Ph.D. in Molecular Physics from the Université Paris-Sud (Orsay) in 1981. He completed his habilitation in 1986 at the Université Paris-Nord. He was then for six years at the Free University of Berlin (Germany). In 1993 he was appointed full professor of condensed matter physics at the Université de Lausanne (Switzerland) and in 2003 he became Professor of Chemistry and Physics at the EPF-Lausanne.

Majed is most noted for his contribution to the development and pioneering of new ultrafast spectroscopic techniques, such as X-ray absorption spectroscopy, UV fluorescence up-conversion and 2-dimensional UV spectroscopy, with which he addressed fundamental questions in the photophysics of transition metal complexes, solvation dynamics, protein dynamics and the charge carrier dynamics in semiconductors and more recently, in metal oxides. His group has recently developed a novel experiment for ultrafast XUV photoelectron spectroscopy of liquid solutions and solids.

Majed is editor in chief of "Structural Dynamics" (AIP Publishing). He was awarded the Kuwait Prize for Physics (2009), the Humboldt Research Award (2010) and the 2015 Earle K. Plyler Prize for Molecular Spectroscopy & Dynamics of the American Physical Society.