



Séminaire ISIR
Mercredi 27 Juillet 2016 à 10H

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Campus Jussieu, 4 place Jussieu, Paris
Salle de réunion H20

Highspeed Atomic Force Microscopy

Abstract : In this talk, we present our recent efforts aimed at enabling the atomic force microscope (AFM) to operate at speeds significantly higher than those offered by commercially available AFMs. This involves increasing bandwidths of all components of the AFM, including the scanner, the z-axis nanopositioner and its associated feedback control system, and the micro-cantilever dynamics. These advances, when combined with non-raster scanning techniques, enable 3D video-rate imaging of surfaces in contact mode. In addition, we will discuss other efforts aimed at extending these methods to enable videorate tapping-mode AFM, as well as multifrequency AFM.

Short bio : Reza Moheimani currently holds the James Von Ehr Distinguished Chair in Science and Technology in the Department of Mechanical Engineering at the University of Texas at Dallas. His current research interests include ultrahigh-precision mechatronic systems, with particular emphasis on dynamics and control at the nanometer scale, including applications of control and estimation in nanopositioning systems for high-speed scanning probe microscopy and nanomanufacturing, modeling and control of microcantileverbased devices, control of microactuators in microelectromechanical systems, and design, modeling and control of micromachined nanopositioners for on-chip scanning probe microscopy. Dr. Moheimani is a Fellow of IEEE, IFAC and the Institute of Physics, U.K. His research has been recognized with a number of awards, including IFAC Nathaniel B. Nichols Medal (2014), IFAC Mechatronic Systems Award (2013), IEEE Control Systems Technology Award (2009), IEEE Transactions on Control Systems Technology Outstanding Paper Award (2007) and several best paper awards in various conferences. He is the Editor-in-Chief of Mechatronics and has served on the editorial boards of a number of other journals, including IEEE Transactions on Mechatronics, IEEE Transactions on Control Systems Technology, and Control Engineering Practice. He currently chairs the IFAC Technical Committee on Mechatronic Systems, and has chaired several international conferences and workshops.