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▶ "Watching Dynamic Phenomena
Occurring in Liquids at the
Nanometer Scale by Using High-
speed Atomic Force Microscopy"

**Wednesday,
24 February, 2016**

12:00 refreshments
12:30 lecture

Wang Auditorium
The Dalia Maydan Building
Faculty of Materials Science and Engineering

RBNI
Monthly
Seminar
Series
2016



Watching Dynamic Phenomena Occurring in Liquids at the Nanometer Scale by Using High-speed Atomic Force Microscopy

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It has been a dream to directly watch dynamic phenomena occurring in liquids at the nanometer scale. To make this dream real, high-speed atomic force microscopy (HS-AFM) has been developed since 1993 (Prog. Surf. Sci. (2008) 83, 337–437). It is now established and used. HS-AFM can film on video protein and other molecules and even live cells in dynamic action at high temporal resolution, without disturbing their function. This capability was materialized by various techniques, including short cantilevers, fast scanners, active vibration damping techniques, a novel feedback control scheme and fast electronics. In this talk, first I will overview these techniques and describe the principle and limit of fast scanning. Then, I will show various application studies that have recently been conducted using HS-AFM (Annu. Rev. Biophys. (2013) 42, 393–414; Chem. Rev. (2014) 114, 3120–3188), especially on myosin V walking on actin filaments (Nature (2010) 468, 72–76). Finally, I will describe recent technical progress that makes HS-AFM more versatile and combinable with various techniques (Ultramicroscopy (2016) 160, 182–196).