

Nano/Bio Interface Center



NBIC Award for
Research Excellence in Nanotechnology

CHRISTOPH GERBER

2007 Recipient

UNIVERSITY *of* PENNSYLVANIA



Christoph Gerber is Director for Scientific Communication of the National Center of Competence for Nanoscale Science at the Institute of Physics, University of Basel, Switzerland, and formerly a research staff member in nanoscale science at the IBM research laboratory in Rüschlikon. He has served as project leader on various programs of the Swiss National Science Foundation. For the past 25 years, his research has focused on nanoscale science as a pioneer in scanning probe microscopy, making major contributions to the invention of the scanning tunneling microscope and the atomic force microscope (AFM). He is a co-inventor of biochemical sensors based on AFM technology. He is author and co-author of over one hundred scientific papers and has been cited more than 14,500 times in cross-disciplinary fields placing him among the “one hundred worldwide most cited researchers in physical sciences.” Gerber is a fellow of the American Physical Society and a fellow of the Institute of Physics (UK). His IP portfolio contains 37 patents and patent publications.

Abstract: Since its invention in 1986, the atomic force microscope (AFM) has opened the door to the nanoworld and proved its suitability in various fields of application. First designed as an instrument to image the surfaces of nonconductive materials, the technique has been adapted for various environments like vacuum, fluidics, ambient, low temperatures and magnetic fields, as well as for chemistry and biology applications. The capability to investigate surfaces with unprecedented resolution using scanning probe microscopy introduced a wealth of related techniques using probes with local interaction. Recently, we have taken AFM technology beyond imaging, exploring new frontiers in bio-analyses and diagnostics. We report the detection of multiple unlabelled biomolecules simultaneously down to picomolar concentrations within minutes. Differential measurements including reference cantilevers on an array of eight sensors enables sequence-specific detection of unlabelled DNA and is suitable to detect specific gene fragments within a complete genome. Detection of inducible genes and total RNA fragments on an unspecific background will be shown. Ligand-receptor binding interactions, such as antigen recognition will also be presented. In addition, this technology offers a variety of receptor molecule applications such as membrane protein recognition, microorganism detection, and enantiomeric separation.

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Christoph Gerber

University of Basel, Switzerland

*AFM Technology: Beyond Imaging Applications,
Towards Personalized Medical Diagnostics*

Friday, February 23, 2007

3:00 PM

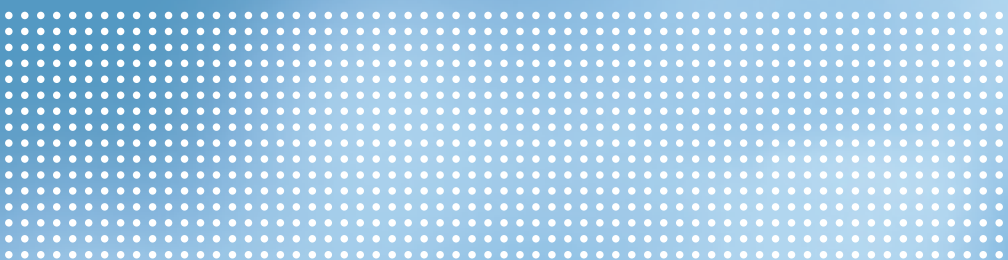
Berger Auditorium

Skirkanich Hall

210 South 33rd Street

Reception to follow

more information can be found at www.nanotech.upenn.edu/events.html



Nano/Bio Interface Center at the University of Pennsylvania is a Nanoscale Science and Engineering Center (NSEC) bringing together researchers from the Schools of Engineering and Applied Science; Arts and Sciences; and Medicine. The NBIC exploits Penn's internationally recognized strengths in design of molecular function and quantification of individual molecules. The study of the ethics of nano-bio technology is also an integral part of the program. The Center unites investigators from ten departments to provide, not only new directions for the life sciences, but also for engineering in a two-way flow essential to fully realizing the benefits of nano-biotechnology.