June 05th 2009

Photonic Force Nanospectroscopy (PFN)

by

NON INVASIVE NANOSCOPIC ANALYSIS & RESEARCH TECHNOLOGIES

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Sylvia Jeney

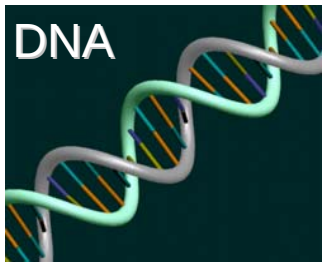
Business Opportunity

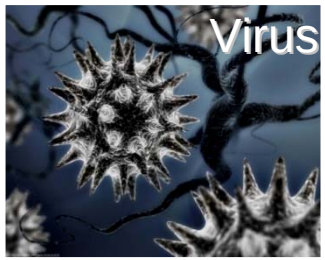
Considerable growth of nano- and biotech industry expected

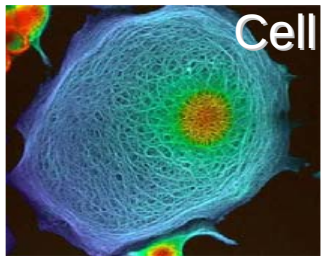
➡ **Adequate tools and equipment will be needed**

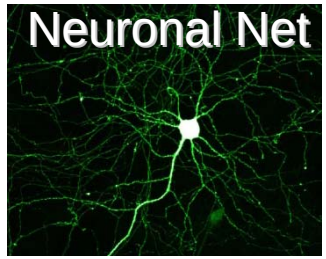
Goals and challenges in Nano-Biotech

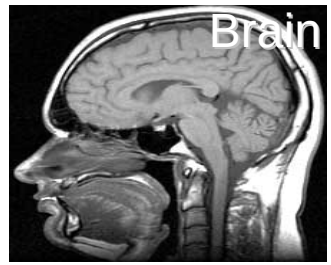
Learn at the molecular level to understand, modify, manipulate, or mimic interactions and organization in a complex organism







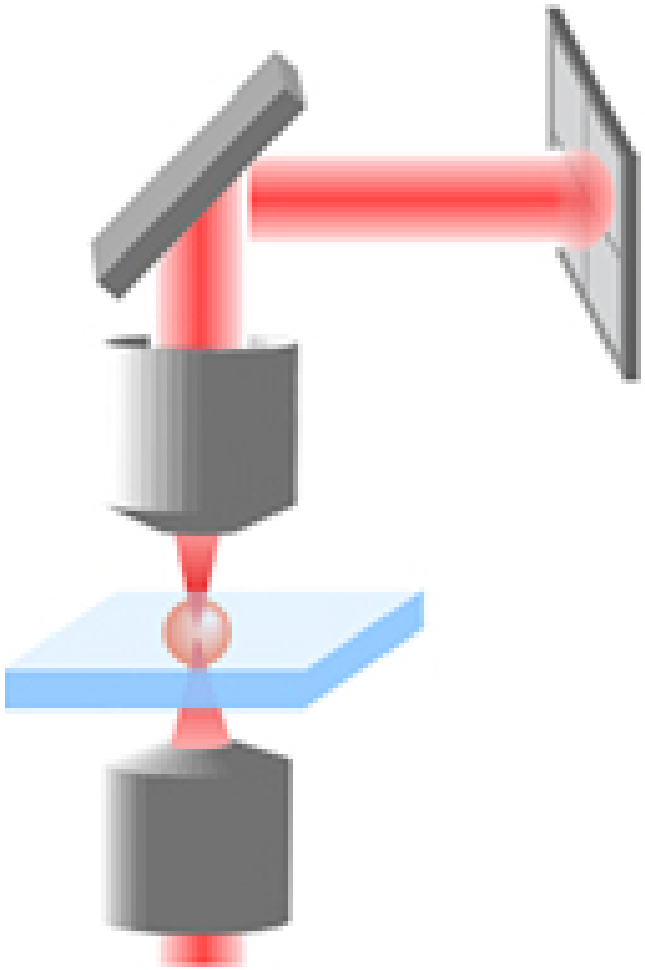




Observing such molecular processes will open up

new possibilities for diagnostics

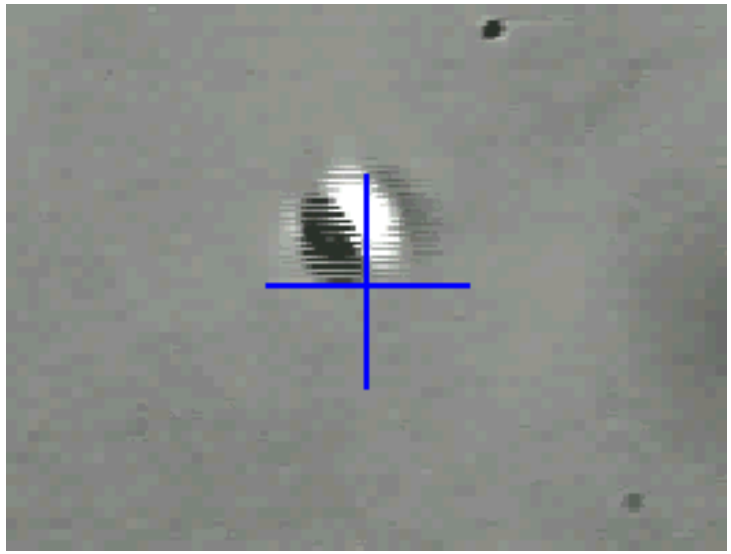
New ‘Nanotool’



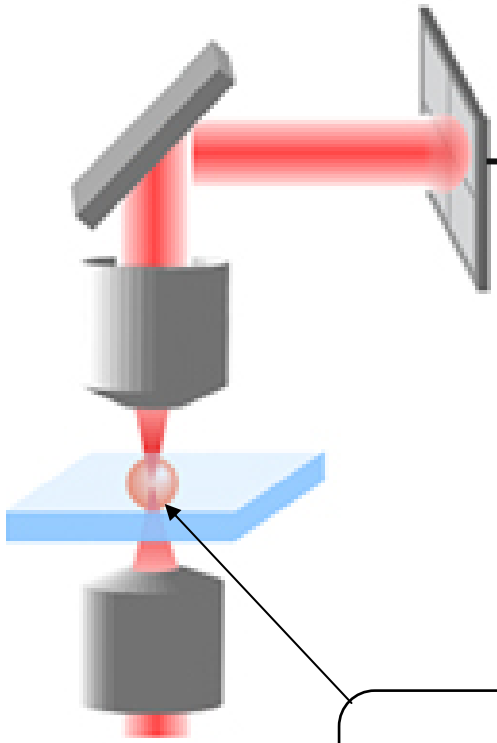
PFN

Photonic Force Nanospectroscope based on Optical Trapping (OT)

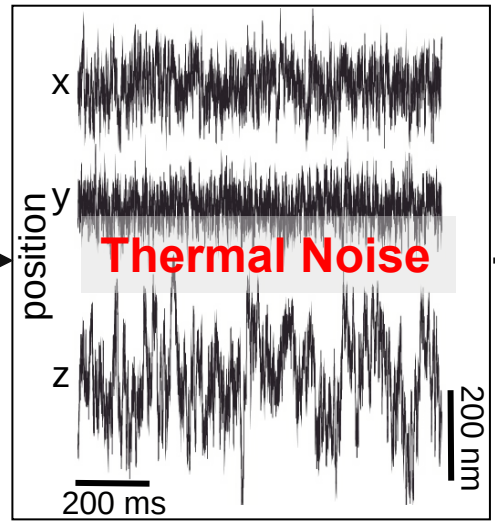
3D manipulation and positioning of small objects, like cells, viruses, micro- and nanoparticles

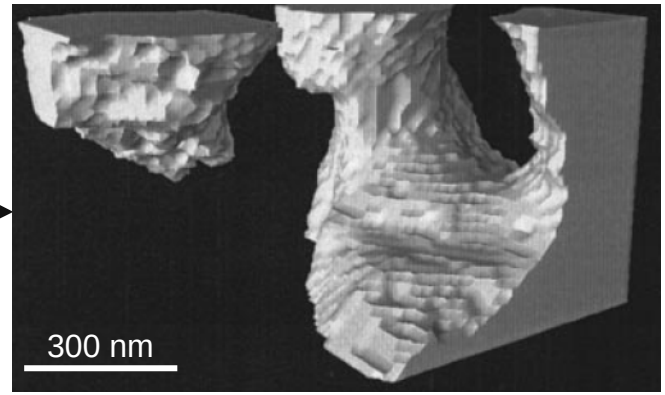


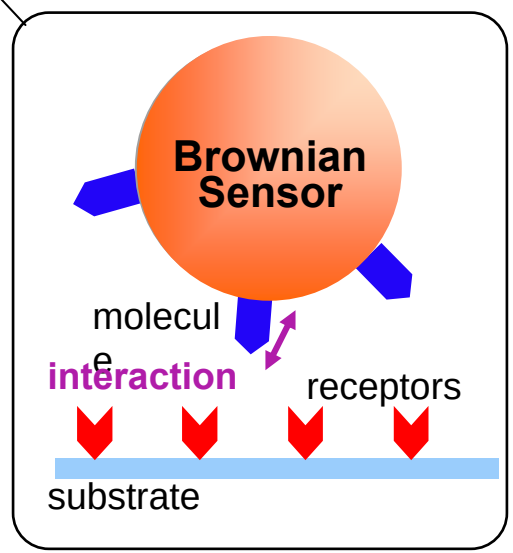
Solution: PFN



Detection → Signal Processing → Imaging/Spectroscopy

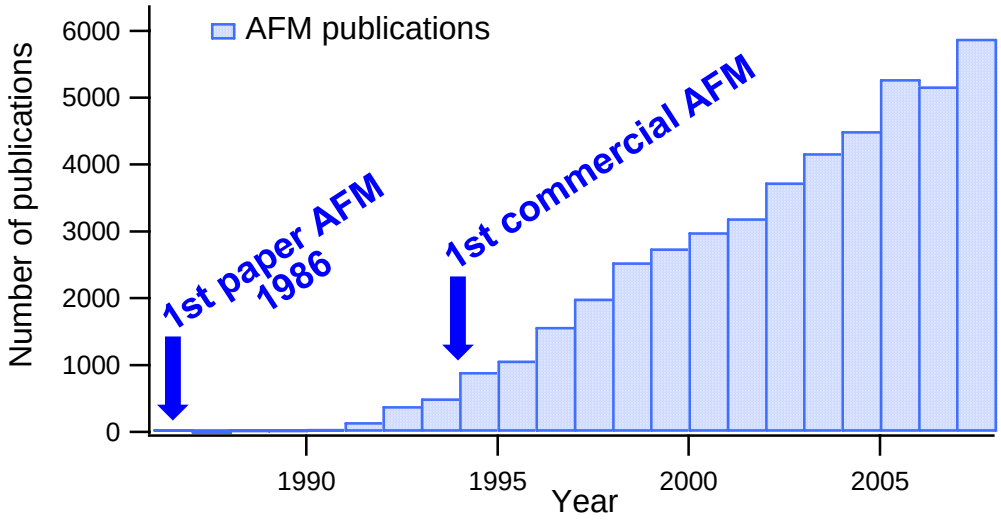




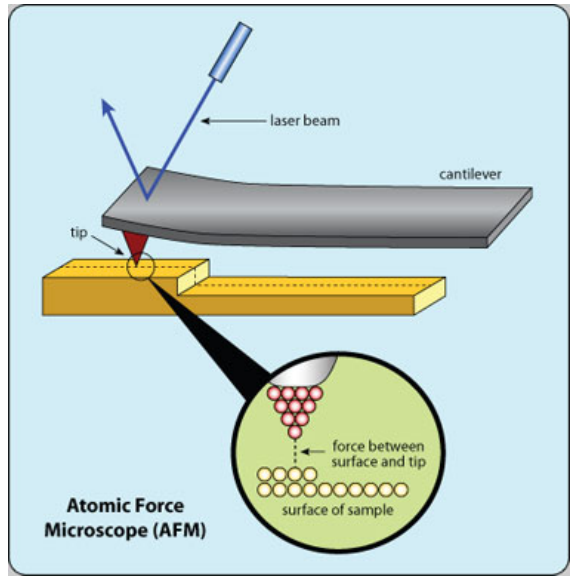


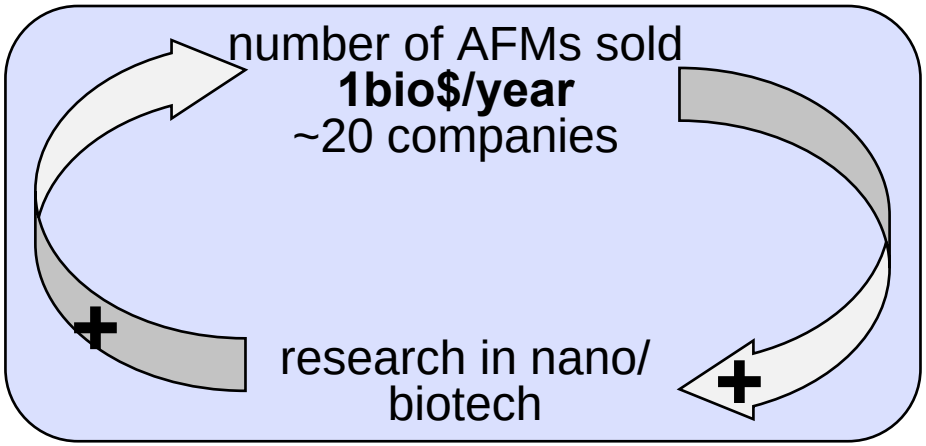
Characteristic features in the 3D dynamic behavior of the trapped object, and any interaction with its environment can be detected and quantified

Market potential by means of AFM

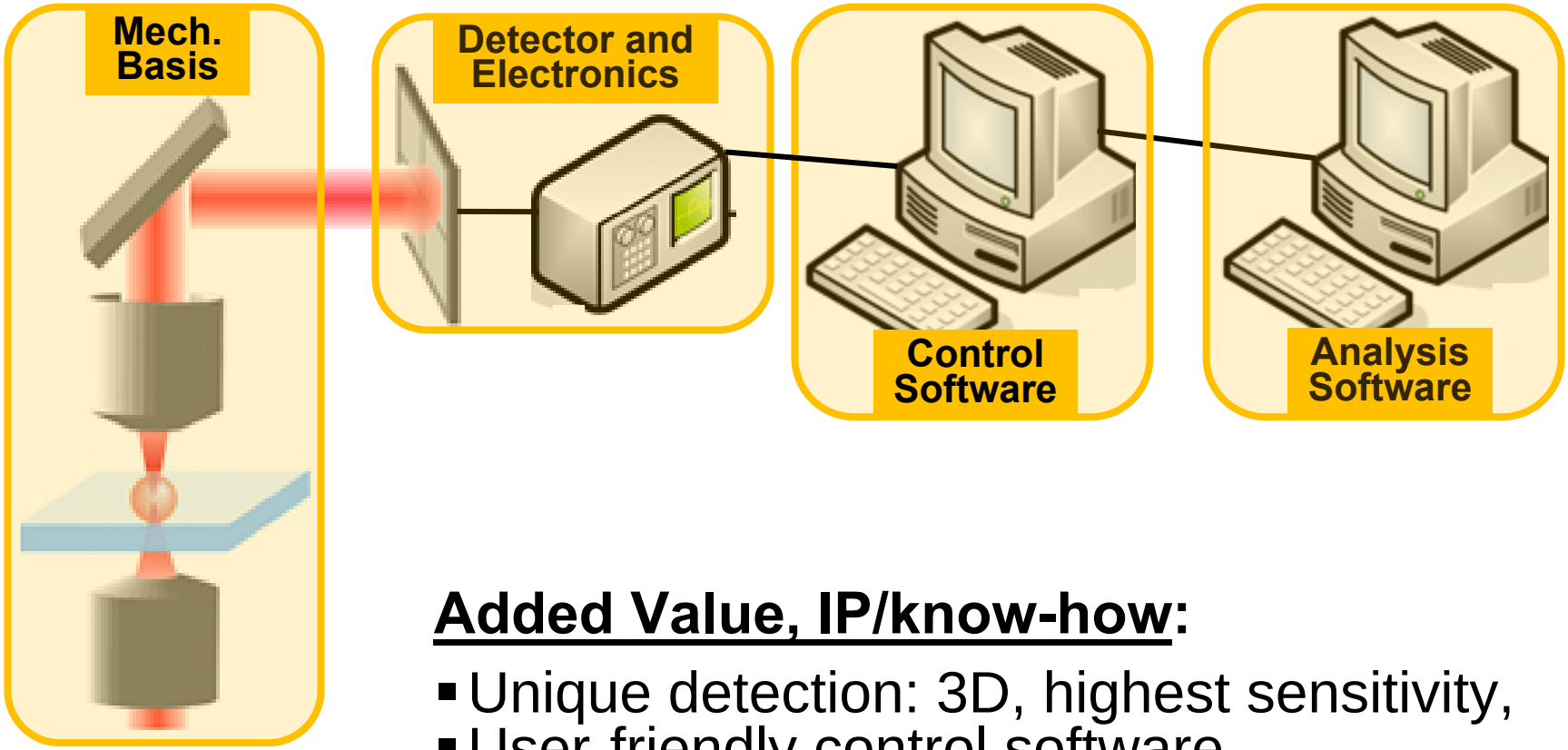


Atomic Force Microscope:
(AFM) first **"nanotool"**





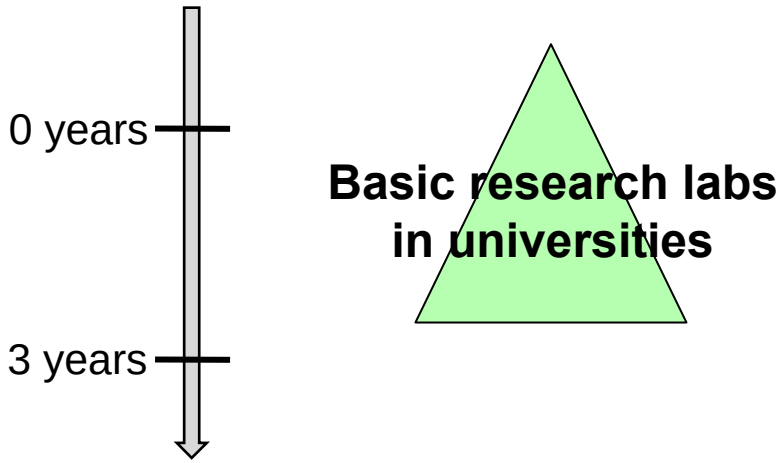
Product, USP

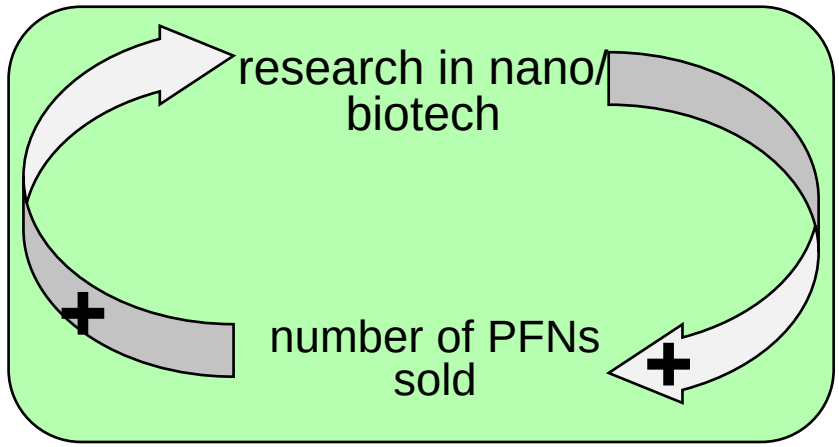


<u>Added Value, IP/know-how</u>:

- Unique detection: 3D, highest sensitivity,
- User-friendly control software
- Data analysis through own algorithms
- **Visualization of results in real-time**, during the experiment.

First Customers

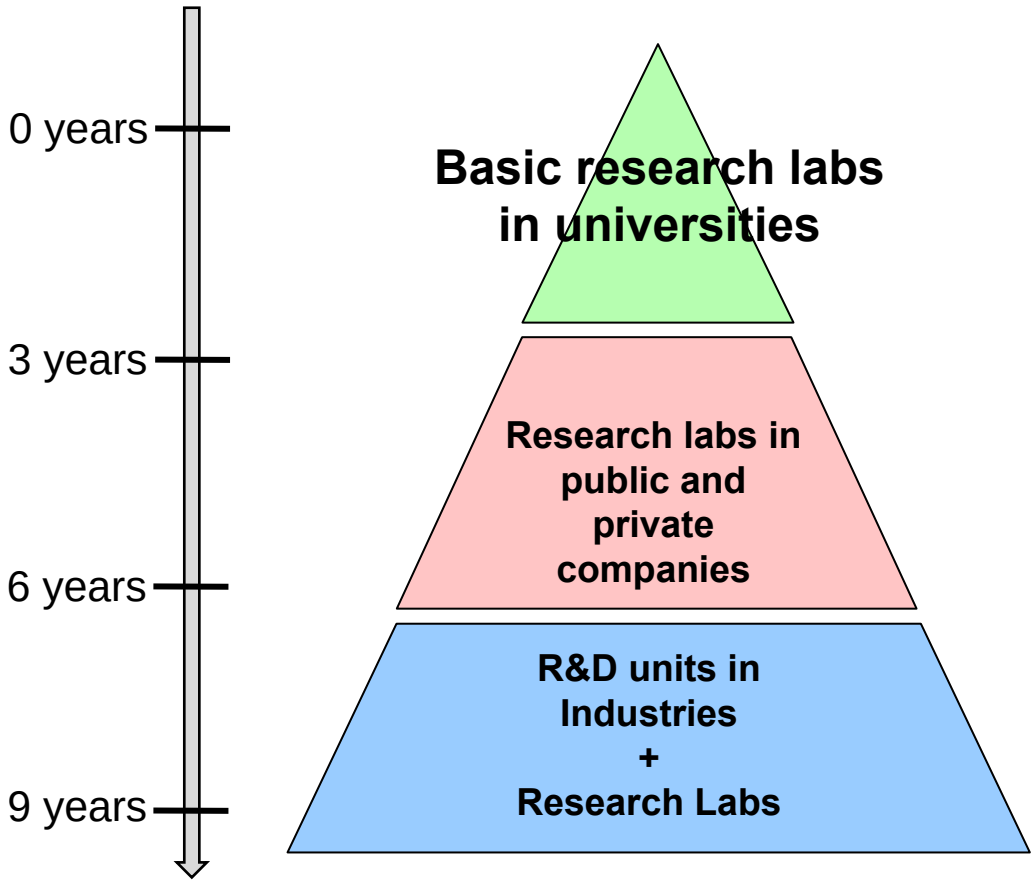




<u>Customer's profile</u>:

- Funded through public grants, ~ 6-18 months
- Very demanding on the state-of-the-art of components
- Want to do pioneering experiments, and publish fast
- Expect versatility, robustness, pedagogical value
- Price is secondary, when no other system on the market

Customers


0 years
3 years
6 years
9 years
Basic research labs in universities
Research labs in public and private companies
R&D units in Industries + Research Labs

Team and Network

Roland Koszali: Software engineer, 3D Representation, PFN software development since 2006, Swiss Engineering Award 2007, HEIG-VD start-up grant 2007

Sylvia Jeney: PhD in Biophysics on PFN, R&D in NanoBiotech, AFM, OT, PFN since 1994, trained more than 20 students on PFN

EMBO fellowship 1995, SSOM award 2005

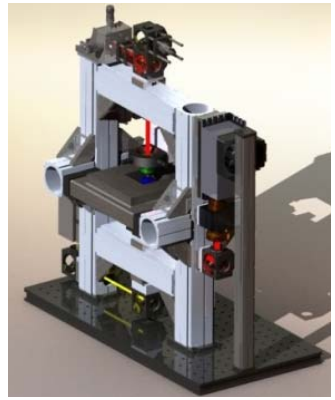
heig-vd

Institute for Industrial Automation

Detection an data acquisition

High-precision opto-mechanics

Prototype I design



PFN Prototype I

Institute for Information and Communication Technologies

Software engineering

3D modeling

Thank you for your attention!

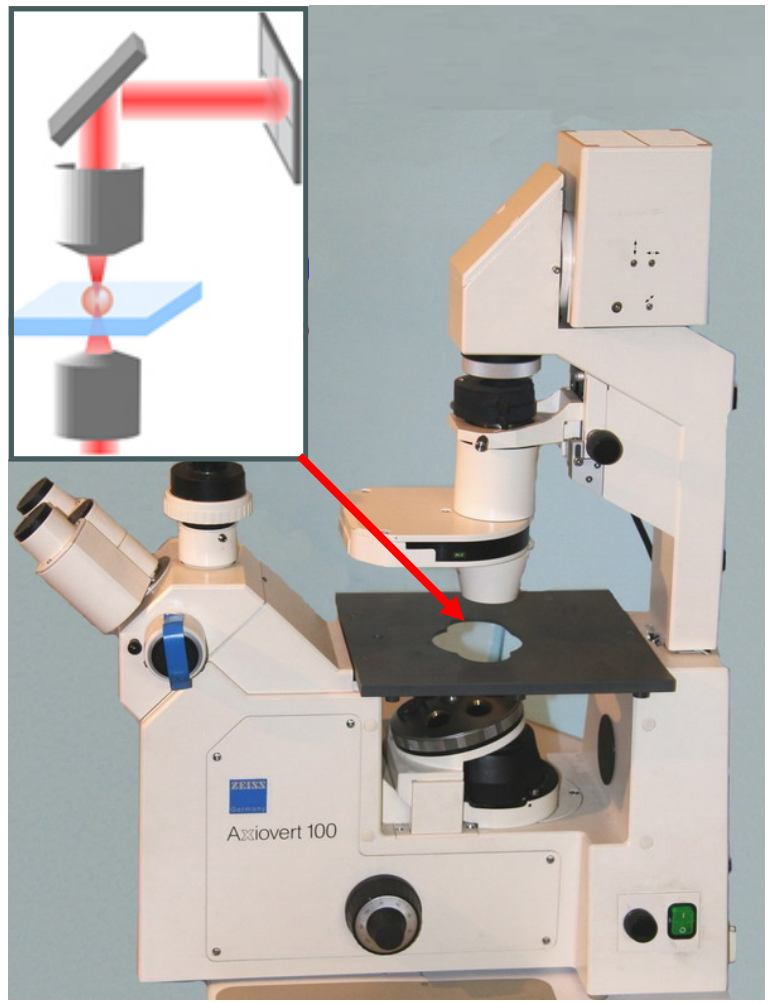
Competitors

<u>Companies with R&D in Optical Traps</u>:

Arryx, Inc. (USA)
Elliot Scientific (UK)
~~Cell Robotics, Inc. (USA)~~
PALM Microlaser AG (Zeiss, D)
MMI (CH)
JPK Instruments (D)

Potentially other AFM companies

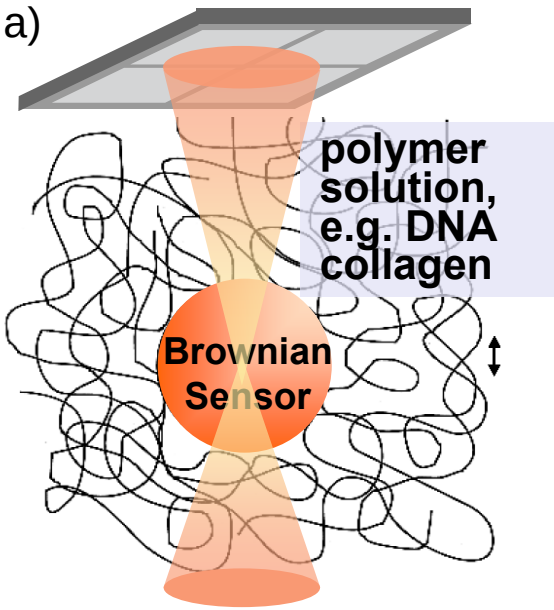
Prices: **250-400 kCHF**



Fields of Applications

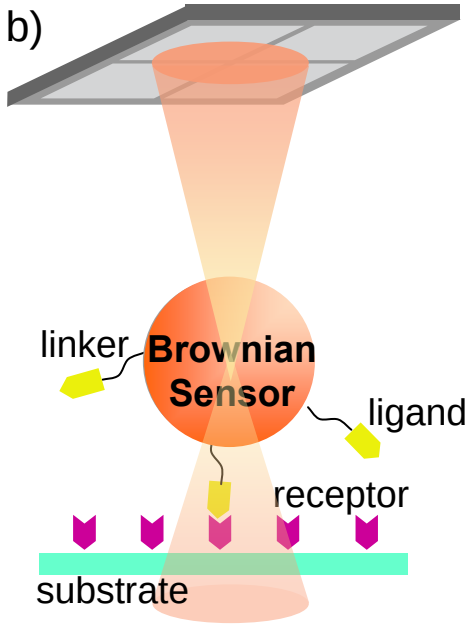
Microrheology in Complex Fluids

a)



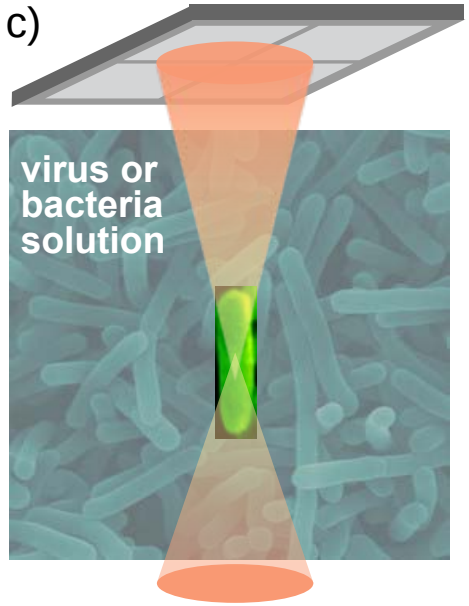
Molecular Recognition Biosensing

b)



Biophysics of bacteria / virus

c)



Comparison to AFM