

Biosketch

Univ.-Prof. Dr. Peter Hinterdorfer

Position in CoE: Key Researcher

Personal Details

Place of birth	Bad Aussee, Austria
Nationality	Austrian
Children	–
Affiliation:	Johannes Kepler University Linz
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Profile	ResearcherID: C-4235-2013
List of publications	ORCID: 0000-0003-2583-1305
Academic age	30 years since PhD



Academic Career and Positions Held

I earned a **Master's degree in technical physics** in 1989 (Dipl. Ing. grade) from the **Johannes Kepler Universität (JKU) Linz** and received my **PhD** from the same institution in **1992** (Dr. tech. grade with distinction). Subsequently, I worked as a **PostDoc** in USA at the **University of Virginia**, financed by a **Schrödinger research fellowship** of the Austrian Science Fund (FWF), before I returned in 1993 to the JKU. I obtained my **habilitation** (*venia docendi*) in 2001 and was promoted to associate professor. In **2010**, I became **full professor in Applied Experimental Biophysics** with the position of a **Department Head** up to now. From 2011-2016 I was **part time CEO** of the research company “**Center for Advanced Bioanalysis (CBL)**”. Furthermore, I am serving as **Institute Head** of the **Institute of Biophysics at the JKU**.

Scientific Achievements and Scientific Contribution to the CoE

Scientific Achievements. The research of my **scanning probe microscopy group** is focused around nanoscopic techniques in life science, **bio-nano technology**, and **medical diagnostics**. Our research covers **molecular recognition and transport** in molecular and cellular systems, including molecular interactions of viruses and bacteria with antibodies, cellular receptors, cells, and abiotic surfaces at the single molecule level. We have previously measured molecular interactions of rhino viruses and influenza viruses, as well as Spike proteins with cellular receptors and living cells, and are also involved in the development of **nano-scale diagnostic and theragnostic platforms**. The lab is equipped with **10 atomic force microscopes (AFM)**, including 1 high speed AFM and 2 AFM/fluorescence microscope combinations. I have published **283 papers**, which have been **cited >10,000 times**, my h-factor is 54. I am member of the **ERC-Synergy grant panel** and editorial board member of several scientific journals and societies. Since 1999, I am organizing the Annual Linz Winter Workshop and School and since 2004, and I am member of the organizational board of the ISPM (International Scanning Probe Microscopy) conference series. I have been highly successful in the acquisition of funding, with >20 project grants, a **Christian Doppler laboratory for nanoscopic methods in biophysics**, and coordinator of the Doctorate College **Nanoanalytics of Cellular Systems, NanoCell**.

Scientific Contribution to the CoE. We will contribute to the project by measuring **interaction forces and dissociation energies** of single bacteria and viruses with cognitive molecules (cell receptors, antibodies, enzymes, proteases), but also with living cells, which provides valuable dynamic and structural information about the binding sites, such as **kinetic rate constants, affinity, energy, and binding length**. Additionally, we will provide **ultra-structural studies** and map and localize binding sites on cells and surfaces with viral and bacterial ligands.

10 Most Important Publications (*relevant for the CoE)

1. *Bauer, B. W.; Davidson, I. F.; Canena, D.; Wutz, G.; Tang, W.; Litos, G.; Horn, S.; **Hinterdorfer, P.**; Peters, J.-M. Cohesin Mediates DNA Loop Extrusion by a “Swing and Clamp” Mechanism. *Cell* **2021**, *184* (21), 5448–5464.e22. <https://doi.org/10.1016/j.cell.2021.09.016>.
2. *Hoffmann, D.; Mereiter, S.; (21 authors).; **Hinterdorfer, P.**; Penninger, J. M. Identification of Lectin Receptors for Conserved SARS-CoV-2 Glycosylation Sites. *EMBO J* **2021**, *40* (19). <https://doi.org/10.15252/emboj.2021108375>.
3. *Strnad, M.; Oh, Y. J.; Vancová, M.; Hain, L.; Salo, J.; Grubhoffer, L.; Nebesářová, J.; Hytönen, J.; **Hinterdorfer, P.**; Rego, R. O. M. Nanomechanical Mechanisms of Lyme Disease Spirochete Motility Enhancement in Extracellular Matrix. *Commun Biol* **2021**, *4* (1), 268. <https://doi.org/10.1038/s42003-021-01783-1>.
4. *Oh, Y. J.; Khan, E. S.; Campo, A. del; **Hinterdorfer, P.**; Li, B. Nanoscale Characteristics and Antimicrobial Properties of (SI-ATRP)-Seeded Polymer Brush Surfaces. *ACS Appl. Mater. Interfaces* **2019**, *11* (32), 29312–29319. <https://doi.org/10.1021/acsami.9b09885>.
5. *Oh, Y. J.; Hubauer-Brenner, M.; Gruber, H. J.; Cui, Y.; Traxler, L.; Siligan, C.; Park, S.; **Hinterdorfer, P.** Curli Mediate Bacterial Adhesion to Fibronectin via Tensile Multiple Bonds. *Sci Rep* **2016**, *6* (1), 33909. <https://doi.org/10.1038/srep33909>.
6. *Preiner, J.; Kodera, N.; Tang, J.; Ebner, A.; Brameshuber, M.; Blaas, D.; Gelbmann, N.; Gruber, H. J.; Ando, T.; **Hinterdorfer, P.** IgGs Are Made for Walking on Bacterial and Viral Surfaces. *Nat Commun* **2014**, *5* (1), 4394. <https://doi.org/10.1038/ncomms5394>.
7. *Zhu, R.; Howorka, S.; Pröll, J.; Kienberger, F.; Preiner, J.; Hesse, J.; Ebner, A.; Pastushenko, V. Ph.; Gruber, H. J.; **Hinterdorfer, P.** Nanomechanical Recognition Measurements of Individual DNA Molecules Reveal Epigenetic Methylation Patterns. *Nature Nanotech* **2010**, *5* (11), 788–791. <https://doi.org/10.1038/nnano.2010.212>.
8. *Rankl, C.; Kienberger, F.; Wildling, L.; Wruss, J.; Gruber, H. J.; Blaas, D.; **Hinterdorfer, P.** Multiple Receptors Involved in Human Rhinovirus Attachment to Live Cells. *Proc. Natl. Acad. Sci. U.S.A.* **2008**, *105* (46), 17778–17783. <https://doi.org/10.1073/pnas.0806451105>.
9. *Raab, A.; Han, W.; Badt, D.; Smith-Gill, S. J.; Lindsay, S. M.; Schindler, H.; **Hinterdorfer, P.** Antibody Recognition Imaging by Force Microscopy. *Nat Biotechnol* **1999**, *17* (9), 901–905. <https://doi.org/10.1038/12898>.
10. ***Hinterdorfer, P.**; Baumgartner, W.; Gruber, H. J.; Schilcher, K.; Schindler, H. Detection and Localization of Individual Antibody-Antigen Recognition Events by Atomic Force Microscopy. *Proc. Natl. Acad. Sci. U.S.A.* **1996**, *93* (8), 3477–3481. <https://doi.org/10.1073/pnas.93.8.3477>.