

Curriculum vitae

Dr. Jonas O. Tegenfeldt

<http://nanobio.ftf.lth.se/~tegen>

Personal Information

Jonas Olof Jörgensson Tegenfeldt Date of birth: Jan 22nd, 1965
Lund University / Department of Physics / Solid State Physics
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Professional Experience

- 2008-present Associate professor (Docent/Forskare) at the Department of Physics, University of Göteborg, Göteborg, Sweden (60% part time as of Dec 2008)
- 2008-present Associate professor (Docent/Forskare) at the Division of Solid State Physics, Lund University, Lund, Sweden (tenured / Swe: "tillsvidareanställd") (40% part time as of Dec 2008)
- 2003-2008 Assistant professor (Forskarassistent) at the Division of Solid State Physics, Lund University, Lund, Sweden
- 2001-2003 Research Staff Member at the Department of Molecular Biology, Princeton University, Princeton, New Jersey, US (Postdoctoral research at Princeton University in the laboratories of Prof. E. C. Cox and Prof. R. H. Austin)
- 1998-2000 Research Associate at the Department of Molecular Biology, Princeton University, Princeton, New Jersey, US (Postdoctoral research at Princeton University in the laboratories of Prof. E. C. Cox and Prof. R. H. Austin)
- 1992-1997 Research associate (doktorandtjänst) at the Division of Solid State Physics, Lund University, Lund, Sweden (Graduate studies in the group of Lars Montelius)

Education - Degrees

- 2007 Docent in Solid State Physics – comparable to the German *Habilitation*.
- 1997 Doctor of Philosophy (Ph.D.) in Engineering, Lund University with thesis: "Nanofabrication and Characterization for Applications in Biochemistry and Molecular Electronics"
- 1991 Master of Science, Engineering Physics, Uppsala University with Masters thesis: "Atomic Force Microscopy" carried out at the Division of Solid State Physics Lund

Publication Summary

45 peer-reviewed published (or accepted) papers

4 book chapters and one invited review paper

18 invited talks (2002-2009)

> 70 conference contributions (1994-2009)

More than 1200 citations (h-index 19)

International and National Collaborations

Selection of collaborations that have resulted in joint publications.

2007 – present: Random motion (paper 40)

Prof. Heiner Linke, Department of Physics, University of Oregon, US
Prof Henrik Bruus, DTU nanotech, DTU, Denmark

2006 – present: Surface biophysics (papers 29, 31, 33, 36, 39, 43, 45)

Prof. Fredrik Höök, Department of Physics, Chalmers, Sweden

2007 – 2008: Confined polymers (Nano2Life supported) (paper 38)

Dr. Jan Eijkel, Mesa⁺ Institute of NanoTechnology, University of Twente

Prof. Albert van den Berg, Mesa⁺ Institute of NanoTechnology, University of Twente

*2006 – present: Confined polymers (Danish FTP grant, “Lab on a chip for ssDNA”)
(Polymer dynamics paper: 34, 41, 42)*

Senior Scientist, Dr. Henrik Flyvbjerg, DTU nanotech, DTU, Denmark

Prof. Niels B. Larsen, Risø National Laboratories, Risø, Denmark

Prof. Anders Kristensen, DTU nanotech, DTU, Denmark

2004 – present: Microfluidics (papers 26, 30):

Prof Anders Kristensen, DTU nanotech, DTU, Denmark

Prof Henrik Bruus, DTU nanotech, DTU, Denmark

2001 – 2005: Nanooptics (papers 12, 22, 25):

Prof Wunshain Fann, Academia Sinica, Taipei, Taiwan

Prof P. K. Wei, Academia Sinica, Taipei, Taiwan

Teaching

Graduate students

Jason Beech: Micro and NanoFluidic Separation Devices - (main advisor)

Henrik Persson: Hollow nanowires for biological applications - (main advisor)

Camilla Freitag: DNA analysis in nanochannels - (main advisor)

Niclas Bosaeus: DNA in small channels – (coadvisor)

Gabriel Ohlson: Microfluidics – (coadvisor)

Cassandra Niman: Ratchets - (coadvisor)

Diploma projects <http://nanobio.ftf.lth.se/~biokurs/exjobb.html>

I have supervised ten diploma projects in my lab since 2003.

Class-room teaching

My main teaching responsibility is an interdisciplinary course in experimental biophysics, which I have given each spring semester since 2004 for approximately 15 students each year:

Experimental Biophysics (main lecturer, responsible for leadership) – upper undergraduate and introductory graduate level course at Lund University (codes TNF060, FYS241, TEK265, and FAF010F) <http://nanobio.ftf.lth.se/~biokurs/>

In addition I give regular guest lectures.

Pedagogical Training

- 2004 Lectureship course (Docentkursen), Lund University (1 week)
(Swe: Docentkurs på LTH VT 2004)
- 2004 Course in research mentorship, Lund University (2 days)
(Swe: Forskarhandledning – ett utbildningsuppdrag med möjligheter VT 2004)
- 2003 Introductory course in pedagogy for higher education, Lund University (2 weeks)
(Swe: Högskolepedagogisk introduktionskurs, 15 dec 2003 till 26 jan 2004)

Grants and Scholarships

1kSEK~125USD (Dec 2008) Tegenfeldt is principal investigator (PI) unless otherwise stated.

- 2009 "Generic sensor devices for diagnostics and drug screening", VINNOVA *FoU miljöansökan Innovationer för framtidens hälsa*, PI is Prof. Fredrik Höök - total 12MSEK, my share 1.5MSEK over four years (2009-2013)
- 2008 "Microfluidic tools for biomedical applications", Crafoord Foundation – 350kSEK
- 2008 "DNA-analysis i små kanaler" ("DNA analysis in small channels"), intellectual property grant, *Fokus Verifiering*, from Innovationsbron Syd to support protection of ideas on melting mapping DNA analysis in nanoscale channels. Co-inventors are Walter Reisner and Henrik Flyvbjerg. 100kSEK
- 2007 "DNA in nanoscale confined environments", project grant from the Swedish Research Council (2007-4454) – 762kSEK per year during three years 2008-2010
- 2007 "Cellbiology and biophysics in microfabricated environments", Senior Research Fellowship Award, Swedish Research Council (2007-584) – 1053kSEK per year during 3 + 3 years 2008-2010(-2013)
- 2007 "Revolutionary Approaches and Devices for Nucleic-Acid Analysis", within FP7-HEALTH (European Union). 16 partners in the consortium with total EC contribution of 12MEUR. Co-ordinator: Ivo Gut, CNG, Paris. – Our share is 549 986 EUR over four years.
- 2007 "Sample Purification for Analysis of Cyclone-Collected Samples", Project grant from DSTL (UK Department of Defense) – 191kSEK (not used)
- 2007 Travel grant to give keynote lecture at ASME, Puebla, Mexico, June 18-20 – 27kSEK

- 2007 “The molecular mechanism of chromosome reorganization during sporulation of *Bacillus subtilis*”, Young Investigators’ Grant from Human Science Frontiers Program – 1050kUSD shared among three groups over three years.
- 2006 “Flow control unit and oxygen plasma unit”, Crafoord Foundation – 240kSEK
- 2006-08 “Lab on a Chip for ssDNA”, grant from the Danish Research Council (FTP), Principal Investigator Henrik Flyvbjerg, Risø - one PhD student and one postdoc both based in Denmark due to formal requirements from the research council. Measurements took place in my lab and at DTU in Denmark.
- 2005 “Experimental confocal microscope “, Crafoord Foundation – 350kSEK
- 2004-07 “NaPa - Emerging Nanopatterning methods”, IP within FP6 (Co-ordinator Jounni Ahopelto) - approx 30 person months worth of salary for development of biomedical devices by nanoimprintlithography.
- 2004 “Industry related research in quantum materials”, SSF materials science grant (application together with Prof. Lars Samuelson) - 195kSEK
- 2002 “Microfabricated nearfield optical scanner for DNA, protein and cell studies”, Swedish Research Council for independent research during four years (2003-2006) in Sweden, 4050kSEK
- 1992-1996 Various travel and research totaling 55kSEK (+ 134 kSEK unused travel funds)

Group grants

The following grants are applied for by the division of Solid State Physics with input from all affected researchers at the division.

- 2005-08 “Nanowires for fundamental materials science and quantum physics and for applications in electronics, photonics, and in Life-Sciences” (Main Applicant: Prof Lars Samuelson) 17.6 MSEK awarded from the Swedish Research Council (VR) to the division for hiring of postdocs and visiting professors during four years in.
- 2006-11 “Nanowires for emerging nanoelectronics and life-science applications” (Main Applicant: Prof Lars Samuelson) 34 MSEK awarded from the Foundation of Strategic Research (SSF) to the division mainly for supporting graduate students.
- 2005 “Focused support for nanoscience at Lund University”, Knut and Alice Wallenberg Foundation (Main Applicant: Prof Lars Samuelson) total 40MSEK for the division 2005-2009 - My share is 3.5MSEK for an advanced high-speed confocal microscopy setup.

Industrial Connections

2006 – 2007: Åmic, Uppsala Sweden – microfluidics in plastic substrates

2005 – 2007: Novo Nordisk A/S, Denmark – nanoparticle-based separation technologies

2004 – present: QuMat Technologies, Lund, Sweden – co-owner (nanowire technology)

Key patents on DNA analysis essential for startup of two companies: BioNanomatrix (founder Dr Han Cao; capital raised ~10MUSD), and USGenomics (founder Eugene Chan; capital raised ~100MUSD).

Service

Referee for journals such as: Nanotechnology, Biosensors&Bioelectronics, Electrophoresis, Applied Nanoscience, Analytical and Bioanalytical Chemistry, PRL, J of Micromechanics and Microengineering, IEEE Trans on Adv Packaging

Grant reviewer for European Science Foundation, Danish Research Council for Technology and Production Sciences (FTP) and Swiss National Science Foundation

Co-organizer of the 2nd Symposium on Semiconductor Nanowires, focus Life Science, Oct 1-2, 2006, Lund, Sweden <http://www.node-project.com/~nanosymposium>

Member of thesis committees:

Maria Millingen (May 2009), thesis advisor Prof. Owe Orwar

Simon Mitternacht (April 2009), thesis advisor Dr. Anders Irbäck

Oleg Mirzov (May 2008), thesis advisor Dr. Ivan Scheblykin, Lund University

Per Björk (December 2007), thesis advisor Prof Olle Inganäs, Linköping University

Michal Tokarz (January 2007), thesis advisor Prof Orwar / Björn Åkerman, Chalmers

Fredrik Westerlund (December 2006), thesis advisor Prof Nordén, Chalmers

Lennart Bitsch (May 2006), thesis advisor Prof Bruus, DTU

Charlotte Larsson (May 27, 2005), thesis advisor Prof Kasemo, Chalmers

Johan Pihl (May 18, 2005), thesis advisor Prof Orwar, Chalmers

Jon Sinclair (April 22, 2005), thesis advisor Prof Orwar, Chalmers

Honors and Awards

Member of editorial board of *Nanotechnology* (Institute of Physics, IOP) (2008-2009).

Member of editorial board of *Biomicrofluidics* (American Institute of Physics, AIP).

Member of the board of the division of Biological and Medical Physics within the Swedish Physical Society (Svenska Fysikersamfundet).

Member of the Steering Committee and the Scientific Committee of *The Annual European Conference on Micro & Nanoscale Technologies for the Biosciences* (NanoBioTech Montreux)

Wenner-Gren Center Foundation for Scientific Research, 100kSEK, for PostDoc studies at Princeton University during 1999

Wenner-Gren Center Foundation for Scientific Research, 100kSEK, for PostDoc studies at Princeton University during 1998

Teaching - Details

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Niclas Bosaeus: DNA in small channels – (coadvisor)

Gabriel Ohlson: Microfluidics – (coadvisor)

Cassandra Niman: Ratchets - (coadvisor)

Diploma projects <http://nanobio.ftf.lth.se/~biokurs/exjobb.html>

Stefan Holm: "Shape-based microfluidic sorting of particles"

Jon Lind: "Cell Synchronization on a chip." (October 2008)

Marcus Jansson: "Single-Molecule Diffusion Measurements in Lipid Bilayers" (co-advisor)
(fall 2007)

Hanna Nicklasson: "Synchronization by size-fractionation on a chip." (August 2007)

Anette Lundqvist: "Deterministic separation of soft micro-spheres" (August 2007)

Anna Mölder: "Single-Molecule Detection in Living Cells" (December 2006)

Pelle Sommansson: "Deterministic Cell Separation" (September 2006)

Jason Beech: "Elastic Deterministic Lateral Displacement Devices - Stretching the Limits of Separation" (Aug 2005)

Magnus Jonsson: "Integration of nanowires with microfluidics for bioapplications" (Sep 2005)

Jonas Berggren: "Fundamentals and Limits of DNA Nanotechnology" (Jan 2005)

Håkan Jönsson: "Microfluidics for lab-on-a-chip applications" (Jan 2005)

Tobias Melin: "A method for image reconstruction in AFM using a tip characterizer" (1997)

Thomas Takanen: "Electrochemical etching of STM tips and nm-wires" (co-advisor) (1997)

Tomas Svensson: "Single Electronics: Theory and possible fabrication methods" (co-advisor)
(1997)

Patrik Hallberg: "Development of a selective SPM-based etching method for micro- and nanostructuring of metal surfaces" (co-advisor) (1997)

Class-room teaching

My main teaching responsibility is an interdisciplinary course in experimental biophysics, which I give each spring semester for approximately 15 students each year.

2009 Experimental Biophysics (main lecturer, responsible for leadership) – upper undergraduate and introductory graduate level course at Lund University (codes TNF060, FYST23, TEK265, and FAF010F) <http://nanobio.ftf.lth.se/~biokurs/>

SPM course at Lund University (code TNF080) (one lecture)

2008

Experimental Biophysics (main lecturer, responsible for leadership) – upper undergraduate and introductory graduate level course at Lund University (codes TNF060, FYST23, TEK265, and FAF010F) <http://nanobio.ftf.lth.se/~biokurs/>

Undergraduate course at Lund University “Cellens biologi” (The biology of the cell) (code TEK295) (one lecture)

2007

Experimental Biophysics (main lecturer, responsible for leadership) – upper undergraduate and introductory graduate level course at Lund University (codes TNF060, FYS241, TEK265, and FAF010F) <http://nanobio.ftf.lth.se/~biokurs/>

Undergraduate course at Lund University “Cellens biologi” (The biology of the cell) (code TEK295) (one lecture)

SPM course at Lund University (code TNF080) (one lecture)

Project adviser for course at Lund University: Nanoscience and nanotechnology – an introduction (code FFF150) (one group)

2006

Experimental Biophysics (main lecturer, responsible for leadership) – upper undergraduate and introductory graduate level course at Lund University (codes TNF060 and FYS241) <http://nanobio.ftf.lth.se/~biokurs/>

Heleneholms Gymnasium (high school), Malmö, Athenaprojektet. Contact person Set Rooke. One lecture in nanotechnology, May

Summer school, PANAMA, in Toulouse organized within Nano2Life, a European Network of Excellence within FP6, Toulouse, France (lectures in nanofluidics and separation science, July)

Malmö Höskola (Malmö College). Contact person Peter Linde. One lecture on nanofluidics, April

Physics for Chemistry and Biotechnology at Lund University (code FAF062) (one lecture and one seminar)

SPM course at Lund University (code TNF080) (one lecture)

2005

Experimental Biophysics (main lecturer, responsible for leadership) – upper undergraduate and introductory graduate level course at Lund University (codes TNF060 and FYS241) <http://nanobio.ftf.lth.se/~biokurs/>

Summer school, PANAMA, in Toulouse organized within Nano2Life, a European Network of Excellence within FP6, Toulouse, France (lectures in nanofluidics and separation science, July)

Physics for Chemistry and Biotechnology at Lund University (code FAF062) (one lecture and one seminar) Joint Øresund regional course: Physics and Chemistry of Nanostructures, (one lecture 2005) <http://www.nano.ku.dk/pcn/>

Project adviser for course at Lund University: Nanoscience and nanotechnology – an introduction (code FFF150) (one group)

2004

Experimental Biophysics (main lecturer, responsible for leadership) – upper undergraduate and introductory graduate level course at Lund University (codes TNF060 and FYS241) <http://nanobio.ftf.lth.se/~biokurs/>

Physics for Chemistry and Biotechnology at Lund University (code FAF062) (one lecture and one seminar: 2004, 2005, 2006)

SPM course at Lund University (code TNF080) (one lecture: 2004 and 2006)

Project adviser for courses at Lund University: Nanoscience and nanotechnology – an introduction (code FFF150) (one group)

Analysuppgiften at Lund University (code ESS080) (three groups)

2003

nano2 given at MIC/DTU Denmark (one lecture)

2001

Introductory Physics during the fall semester (Princeton University) (Class room teaching Physics 103)

Joint supervision of one graduate student, Wanli Li (Princeton University)

Other teaching assignments

Setting up of the laboratory exercises in the graduate course “Scanning Probe Microscopy and related methods” given at the division of Solid State Physics, Lund University (1996)

60 teaching assistant hours in solid-state physics and general physics laboratory courses each semester during graduate studies (Lund University) (1992-97)