CURRICULUM VITAE – PROF. JONAS O. TEGENFELDT

OVERVIEW

Name: Jonas Tegenfeldt

Personal number: 650122-1474

Gender: Male

Citizenship: Swedish

Contact information:

Division of Solid State Physics

Department of Physics

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Current appointments

2014-present Professor in Nanophysics at the Division of Solid State Physics, Lund University, Lund, Sweden (tenured / Swe: "tillsvidareanställd")

Key research interests

Label-free particle sorting – Tegenfeldt's group pioneered a unique microfluidic cell-sorting scheme that fractionates cells based on not only size but also shape and deformability. This is useful for defining subpopulations of cells based on their inherent mechanical properties, a characteristic that is finding increased interest in cell biology.

DNA analysis in nanochannels – Tegenfeldt invented the usage of nanochannels to stretch DNA and further developed the concept in his group by introducing a simple labeling scheme that results in a barcode pattern that can be used to identify large-scale genomic structures in long DNA molecules.

Teaching

Development of course in Experimental Biophysics that is running since 2004 under my leadership. Main advisor for eight PhD students, two of whom have graduated as PhD and one as Licentiate. Host for six postdocs and senior researchers. Advisor for 21 master projects.

Grants

Project grants from VR, EU, VINNOVA, HFSP totaling more than 46 MSEK to Tegenfeldt.

2008-2014 VR-financed "Rådsforskare" (Eng: Senior Research Fellowship Award)

2003-2008 VR-financed "Forskarassistent" (Eng: Assistant Professor)

DETAILED INFORMATION

Education and degrees

2007 Docent in Solid State Physics (Lund University)

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

Pedagogical Training

2010 Course in lecturing, Lund University (2 weeks) (Swe: Den goda föreläsningen)

2010 Workshop on the pedagogical portfolio (1 week)
(Swe: Workshop – den pedagogiska portföljen, HT 2010)

2004 Lectureship course (Docentkursen), Lund University (1 week)
(Swe: Docentkurs på LTH)

2004 Course in research mentorship, Lund University (2 days)
(Swe: Forskarhandledning – ett utbildningsuppdrag med möjligheter)

2003 Introductory course in pedagogy for higher education, Lund University (2 weeks)
(Swe: Högskolepedagogisk introduktionskurs)

Past appointments

2013-2014 Associate professor (Docent/Universitetslektor) at the Division of Solid State Physics, Lund University, Lund, Sweden (tenured / Swe: “tillsvidareanställd”)

2008-2012 Associate professor (Docent/Forskare) at the Division of Solid State Physics, Lund University, Lund, Sweden (tenured / Swe: “tillsvidareanställd”) (40% part Dec 2008-Dec 2012; 100% Jan 2013-May2014)

2011-2012 Associate professor (Docent/Universitetslektor) at the Department of Physics, University of Gothenburg, Göteborg, Sweden (60% part time as of April 2011)

2008-2011 Associate professor (Docent/Forskare) at the Department of Physics, University of Gothenburg, Göteborg, Sweden (60% part time Dec 2008 – March 2011)

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)

Class-room teaching

My main teaching responsibility is an interdisciplinary course in experimental biophysics, which I been given each spring semester since 2004 for approximately 20 students each year:

Experimental Biophysics (Tegenfeldt's role: main lecturer, responsible for leadership) – upper undergraduate and introductory graduate level course running each spring and developed by Tegenfeldt (year 2004) at Lund University (codes FYST23, TEK265, FFFN20 and FAF010F), one semester, half speed (15hp) https://biokurs.ftf.lth.se/

In addition I give regular guest lectures, e.g. a yearly lecture in "Biology of the cell" (TEK295).

Research group leadership

PhD students

Active PhD students are listed above the black bar.

Name	Subject	Starting year	Status	Role of Tegenfeldt
Oskar Ström	DNA analysis in nanochannels	**2017**	**Start JULY 2017**	**main advisor**
Bao Dang Ho	Deterministic sorting based on shape and deformability	**2014**	**Start OCT 2014**	**main advisor**
Kushagr Punyani	Deterministic sorting based on shape and deformability	**2014**	**start OCT 2014**	**main advisor**
Hoai Trung Tran Si	Mechanical properties of cancer cells	**2014**	**start SEP 2014**	**main advisor**
Stefan Holm	Deterministic sorting devices for diagnostics	**2012**	**start OCT 2012**	**main advisor**
Feifei Peng	Hydrogels	**2014**	**Start SEP 2014**	**coadvisor**
Henrik Persson	Interactions between nanowires and cells	**2009**	**PhD 19 SEP 2014**	**main advisor**
Camilla Freitag	DNA analysis in nanochannels	**2009**	**Lic 7 JUNE 2013**	**main advisor**
Jason Beech	Microfluidics-Separation and Analysis of Biological Particles	**2006**	**PhD 22 NOV 2011**	**main advisor**
Cassandra Niman	Molecular ratchets	**2009**	**PhD 21 NOV 2014**	**coadvisor**
Gabriel Ohlsson	Small-Scale Sample Handling for Studies of Liquid Crystals and Lipid-Based Soft Matter	**2009 (as Lic)**	**PhD 4 MAY 2012**	**coadvisor**

Postdocs and senior guests

Current postdocs are listed above the black bar and former postdocs are listed below.

Name	Subject	Period	Current activity
Dr Elke Hebisch	STED microscopy (shared with Dr Christelle Prinz)	**July 2017 - present**	
Dr Jason Beech	DNA extraction from bacteria	**Jan 2012 - present**	
Dr Joachim Fritzsche	DNA analysis in nanochannels, nanofabrication	**Feb 2010 – Sep 2012**	Postdoc at Chalmers University (Ass Prof Fredrik Westerlund)
Dr Katarina Logg	Simulation of DNA barcode	**Oct 2010-Aug 2012**	Postdoc at The Swedish Institute for Food & Biotechnology
Dr Fredrik Westerlund	DNA analysis in nanochannels	**Sep 2009 – Aug 2010**	Assistant Professor at Chalmers University
Dr Fredrik Persson	DNA analysis in nanochannel	**Mar 2009 – Apr 2011**	Director of Engineering at Vanadis Diagnostics
Dr Walter W Reisner*	DNA analysis in nanochannel, polymer physics	**2006-2007**	Ass Prof at McGill University, Canada

(*) Walter Reisner was shared between my group at Lund University and Prof Henrik Flyvbjergs group at Risø/DTU.

Diploma Students (Tegenfeldt main advisor)

Name	Subject	Finished
Oskar Ström	Single-cell infection in RBC	**JAN 2017**
Alexandra Kühnlein	Handling of long DNA	**SEP 2016**
Stefano Scaramuzza	DNA analysis in nanochannels	**Jan 2015**
Anastasia Syntychaki	Hydrogel-based biosensors	**Aug 2014**
Susanne Norlén	Hollow nanowires as single-cell nanosyringes	**Feb 2013**
Stefan Holm	Shaped based sorting of blood and parasites	**July 2012**
Masoomeh Ghasemi	Shape and deformability in deterministic lateral displacement devices	**June 2012**
Eric Sandlund	Image processing of confined DNA molecules	**June 2012**
Farnaz Yadegari	Fluidics and Guidance in Hollow	**Dec 2011**

	Nanowires	
Kalle Adolphsson	Blood sorting using deterministic lateral displacement	**May 2011**
Mattias Törnqvist	Droplet generation in microfluidic channels for encapsulation	**Feb 2011**
Jon Lind	Cell Synchronization on a chip	**Oct 2008**
Marcus Jansson	Single-Molecule Diffusion Measurements in Lipid Bilayers	**Fall 2007**
Hanna Nicklasson	Synchronization by size-fractionation on a chip	**Aug 2007**
Anette Lundqvist	Deterministic separation of soft micro-spheres	**Aug 2007**
Anna Mölder	Single-Molecule Detection in Living Cells	**Dec 2006**
Pelle Sommansson	Deterministic Cell Separation	**Sep 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**

Research grants

Amount benefitting Tegenfeldt is given, and if Tegenfeldt is PI together with total amount in parenthesis for multipartner grants. Currently ongoing projects are listed above the black bar and completed projects are listed below.

Title	Funding source	Period	Amount (total)	Principal investigator
Portable diagnostics for disease and drug resistance with focus on malaria and bacterial infections 2016-05739	VR	2017-2019	3000kSEK	Tegenfeldt
Cellmechanics as a biomarker in oncology 2015-05426	VR	2016-2019	3600kSEK	Tegenfeldt
Genomic diagnostics beyond the sequence (BeyondSeq) 634890	EU/Horizon2020/HEALTH	2015-2019	799kEUR	Ebenstein

Nanofluidics for ultrafast diagnosis of bacterial infections (NanoDiaBac)	EU/Eurona nomed	2015-2017	1.8 MSEK	Westerlund
Label-Free Particle Sorting - Initial Training network with 15 partners (LAPASO) 607350	EU - FP7/PEOP LE	2013-2017	5 MSEK (33MSEK)	Tegenfeldt
Mechanical properties of cancer cells as a marker for diagnosis and prognosis MT2013-0031	Barncancer fonden	2013-2016	1796kSEK (2996kSEK)	Tegenfeldt
Sorting based on secretion using advanced microfluidics and bioresponsive hydrogels	Sten K Johnson Foundation	2015	100kSEK	Tegenfeldt
Denaturation mapping for physical mapping of genomes of key marine organisms	Hasselblad sstiftelsen	2013-2014	870kSEK (1034kSEK)	Tegenfeldt/Bl omberg/Johan nesson
Genetic studies of DNA with direct visualization using extremely high-resolution microscopy	Magnus Bergvalls Stiftelse	2013	60kSEK	Tegenfeldt
Project grant: “Enrichment of rare cells and parasites using label-free particle sorting” 2011-6035	VR	2012-2014	2.6 MSEK	Tegenfeldt
Senior Research Fellowship Award (rådsforskare): “Cellbiology and biophysics in microfabricated environments” 2007-584	VR	2008-2014	6 MSEK	Tegenfeldt
FoI miljöansökan Innovationer för framtidens hälsa: "Generic sensor devices for diagnostics and drug screening"	VINNOVA	2009-2013	2.3 MSEK (12 MSEK)	Fredrik Höök (Chalmers)
Project grant: “DNA in nanoscale confined environments” 2007-4454	VR	2008-2010	2.3 MSEK	Tegenfeldt
EU Integrated project: “Revolu-tionary Approaches and Devices for Nucleic-Acid Analysis / READNA” HEALTH-F4-2008-201418	EU/FP7	2008-2012	550 kEUR (12 MEUR)	Ivo Gut (CNG, Paris)
Young Investigators’ Grant: “The molecular mechanism of chromosome reorganization during sporulation of *Bacillus subtilis*” RGY0078/2007	HFSP	2008-2010	350 kUSD (1050 kUSD)	Tegenfeldt
Project grant: “Lab on a Chip for	Danish Research	2006-	N/A (*)	Henrik Flyvbjerg

ssDNA"	Council for Technology and Production Science	2008	(4 MDKK)	(Risø / DTU)
Project grant: "Microfabricated nearfield optical scanner for DNA, protein and cell studies"	VR	2003-2006	4 MSEK	Tegenfeldt
EU Integrated project: "NaPa - Emerging Nanopatterning methods"	EU/FP6	2004-2007	30 person months (**) (16 MEUR)	Jounni Ahopelto (VTT, Espoo, Finland)
Short project: "Industry related research in quantum materials"	SSF	2004	195 kSEK	Lars Samuelson

(*) Due to formal requirements from the research council no funding could be transferred outside Denmark. Experiments took place by postdoc Walter Reisner in my lab and at DTU in Denmark.

(**) Tegenfeldt not original co-PI of the project.

Other grants

Title	Funding source	Year	Amount (total)	Principal investigator
Equipment: "Super-resolution microscopy system for biophysics, biology and medicine" ref: 20150007	Crafoord	2015	5000 kSEK	Tegenfeldt
Equipment: "Autofocus system for fluorescence microscopy"	Crafoord	2012	250 kSEK	Tegenfeldt
Equipment: "Microfluidic tools for biomedical applications "	Crafoord	2008	350 kSEK	Tegenfeldt
Innovation grant (Fokus Verifiering II): "Streckkod för DNA-analys" ("Barcode for DNA analysis")	Innovations bron Syd AB	2010	100 kSEK	Tegenfeldt
Innovation grant (Fokus Verifiering I): "Streckkod för DNA-analys" ("Barcode for DNA analysis")	Innovations bron Syd AB	2008	100 kSEK	Tegenfeldt
Travel grant to give keynote lecture at ASME, Puebla, Mexico	VR	2007	27 kSEK	Tegenfeldt
Equipment: "Flow control unit and oxygen plasma unit"	Crafoord	2006	240 kSEK	Tegenfeldt
Equipment: "Experimental confocal microscope"	Crafoord	2005	350 kSEK	Tegenfeldt

Industrial connections

2011 – 2013: QuNano AB, Lund Sweden – collaborative projects on nanofluidics

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

Key patents on DNA analysis essential for startup of two companies: BioNanoGenomics (formerly known as Bionanomatrix; founder Dr Han Cao; capital raised >100MUSD; ~100 employees), and Pathogenetix (formerly known as USGenomics; founder Eugene Chan; capital raised ~100MUSD).

Service

Membership of PhD dissertation committees / opponent (Swe: betygskommitté/opponent)

Olov Wahlsten (Aug, 2017), thesis advisor Fredrik Höök, Chalmers

Muhammad Asim Faridi (Feb, 2017), thesis advisor Aman Russom, KTH **[JT opponent]**

Narges Mortezaei (May 2016), thesis advisor Magnus Andersson, Umeå Universitet

Fredrik Ejserholm (Mar 2016), thesis advisor Lars Wallman, Lunds Universitet

Lousie Fornander (Dec 2015), thesis advisor Bengt Nordén, Chalmers, Göteborg

Pattamon Teerapanich (Nov 2015), thesis advisor Thierry Leichle, LAAS – CNRS, Toulouse **[JT - rapporteur de thèse/opponent]**

Elin Forslund (May 2015), thesis advisor Björn Önfelt, KTH, Stockholm

Yajing Song (April 2014), thesis advisor Olof Emanuelsson, KTH, Stockholm **[JT opponent]**

Hainchun Liu (Mar 2014), thesis advisors Stefan Andersson-Engels and Thomas Laurell, Lunds Universitet

Niklas Bosaeus (Dec 2013), thesis advisors Bengt Nordén and Björn Åkerman, Chalmers University

Alar Ainla (Mar 2013), thesis advisors Owe Orwar and Aldo Jesorka, Chalmers University

Per Augustsson (DEC 2011), thesis advisors Thomas Laurell and Johan Nilsson, Lund University

Lucia Cinque (May 2011), thesis advisor Aaron Bensimon **[JT - rapporteur de thèse/opponent]**

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

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

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

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, Nature Communications, Macromolecules

Host for seminar series at Physics / University of Gothenburg "New Developments in Biological Physics" 2009-2011.

Grant reviewer for European Science Foundation, European Research Council, Danish Research Council for Technology and Production Sciences (FTP), Swiss National Science Foundation, DARPA, Israel Science Foundation, The Research Council of Norway, Health and Medical Research Fund (HMRF, Hong Kong); Swedish Research Council

Steering Committee and the Scientific Committee of *The Annual European Conference on Micro & Nanoscale Technologies for the Biosciences* (NanoBioTech Montreux) (2007-present); Chair for the conference for year 2014.

MicroTAS Technical Program Committee (2014, 2015, 2016)

MicroTAS Executive Technical Program Committee (2017)

Chair of MSW2016 (Micronano system workshop) ***www.delegia.com/msw2016***

Chair of European Workshop on label-Free Particle Sorting 2017 ***http://www.lapaso.org***

NMI (National Microscopy Infrastructure) steering committee 2016-present
http://nmisweden.se/

Management group at the Division of Solid State Physics at the Department of Physics at Lund University (2008-present)

Coordinator for the Nanobio/Neuronano division within the Lund University Center for Nanoscience (NanoLund) (2015-present)

Deputy coordinator for the Nanobio/Neuronano division within the Nanometer Consortium at Lund University (2010-2015)

Editorial board member of *Nanotechnology* (Institute of Physics, IOP) (2008-2009).

Editorial board member of *Biomicrofluidics* (American Institute of Physics, AIP) (2008-2009)

Postdoc fellowship for research at Princeton University during 1998 and 1999 (Wenner-Gren Center Foundation for Scientific Research, 2x100kSEK)

Miscellaneous

1984-1985 University of Pennsylvania: auditing Physics and Math; undergraduate project with Prof Greg Farrington, Philadelphia, PA, USA

1985-1986 Swedish Defense Institute of Language/Uppsala University, Sweden

1990-1991 Undergraduate studies at the Stockholm School of Economics (1st year), Stockholm, Sweden