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CONTACT

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ScopeM: `www.scopem.ethz.ch`
IDA: `www.let-your-data-speak.com`
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Twitter: @*SimonFlyvbjerg*

EDUCATION

PhD (bio-physics); MSc (econo-physics); BS (mathematics & physics)

NIELS BOHR INSTITUTE, University of Copenhagen, Denmark — PHD, PHYSICS/BIOPHYSICS: 1999–2002
Supervisors: Profs. L. Oddershede and K. Berg-Sørensen.
Thesis: *A Single-Molecule Study of RNA Polymerase and TATA-box Binding Protein.*

BRANDEIS UNIVERSITY, Department of Biochemistry, Waltham, MA, USA — 2000–2001
Research visit in group of prof. Jeff Gelles.

NIELS BOHR INSTITUTE, University of Copenhagen, Denmark — MSC, PHYSICS/ECONO-PHYSICS: 1997–1999
Grade average: 12 (∼top 1%).
Thesis supervisor: Prof. Per Bak (late).
Thesis: *The Dynamics of Money and a New Class of Self-Organized Critical Systems.*

AARHUS UNIVERSITY, Denmark. — BSC, PHYSICS & MATHEMATICS: 1993–1997

OXFORD UNIVERSITY, St. Edmund Hall, Oxford, UK — 1995–1996
Erasmus Exchange Student.

WORK EXPERIENCE

Research: Theory and experiments in physics and biology

ETH ZÜRICH, D-ITET — LECTURER: 2015–
ETH ZÜRICH, ScopeM — HEAD OF IMAGE AND DATA ANALYSIS GROUP: 2014–
ETH ZÜRICH, LMSC — HEAD OF DATA ANALYSIS UNIT: 2012–2013
SELF-EMPLOYED — 2011–2012
PRINCETON UNIVERSITY, Department of Molecular Biology — VISITING FELLOW: 2007–2010
MAX-PLANCK INSTITUTE for the Physics of Complex Systems — VISITING SCIENTIST: 2004–2007
EUROPEAN LABORATORY FOR NON-LINEAR SPECTROSCOPY — POSTDOCTORAL RESEARCHER: 2003–2004

FELLOWSHIPS, AWARDS, GRANTS

funding received: ∼$1,125,000

Novartis FreeNovation, research grant, Neural-Networks in Single-Particle Cryo-EM — 2019–2021
ETH Scientific Equipment Program, grant, Virtualization, Analysis, and Data Storage — 2018–2023
ETH Scientific Equipment Program grant, screening-data analysis software — 2016–2019
ETH D-CHAB and ScopeM, research funding for postdoctoral researcher — 2016–2017
ScopeM, grant to create online image analysis course — 2016–
ScopeM, grant for image analysis software development — 2016
Lundbeck Foundation, fellowship, for research at Princeton University, USA — 2008–2010
Carlsberg Foundation, fellowship, for research at Princeton University, USA — 2007–2008
Julie Damms Studiefond, travel award — 2006
European Commission, Improvement of Human Potential Access to Research Infrastructure — 2004
Danish National Science Foundation, fellowship, for research at LENS, Italy — 2003
Leon Rosenfeld Scholarship for research at the Niels Bohr Institute, Denmark — 2002
Frederikke Lørup, født Helms, Mindelegat, award for M.Sc. studies — 1999
Erasmus Tuition Waiver, for studies at Oxford University, UK — 1995

TEACHING, SELECTED

link to details of current and recent courses

Deep Learning for Image Analysis [EMBL Course] EMBL Heidelberg, Germany 2020
Zurich Image and Data Analysis School ETH Zurich, Switzerland 2017–2019
International summerschool. Established, organized, and taught.
Image Processing PhD Course University of Copenhagen, Denmark 2014–2017
Summerschool. Organized (content and teachers) and taught.
Introduction to Image Analysis using Fiji/ImageJ ETH Zurich, Switzerland 2013–ongoing
Bi-annual block course. Established, organized, and taught.
EXCITE Summer and Winter Schools ETH Zurich, Switzerland 2013–ongoing
Biomedical imaging and advanced microscopy. Lectures and hands-on teaching.
EMBL Master Class in BioImage Analysis EMBL Heidelberg (teacher) 2013–2017
Classical Physics (Fysik Am), University of Copenhagen (TA) 2002
Statistical Physics (Fysik 3), University of Copenhagen (TA) 1999

SUPERVISION

Machine Learning Postdoctoral work of Nelly Hajizadeh, Ph.D., ETH Zurich 2019–ongoing
Machine Learning Student work of Gabriela Evrova, B.Sc., ETH Zurich 2018–2019
Image and Data Analysis Staff scientist Andrzej Rzepiela, Ph.D., ETH Zurich 2016–ongoing
Image analysis Postdoctoral work of Javier Montoya, Ph.D., ETH Zurich 2016–2017
Spatial Statistics and Image analysis M.Sc. thesis work of Alvaro Gomariz, ETH Zurich 2016–2017
Image and Data Analysis Staff scientist Szymon Stoma, Ph.D., ETH Zurich 2013–ongoing
Biology, Cell Migration senior year thesis work of Craig Schindewolf, Princeton University 2009
Biophysics, Single Molecule M.Sc. thesis research of Mette Rasmussen, Niels Bohr Institute 2001–2002

EXPERIMENTAL SKILLS

Optical microscopy: Differential interference contrast, phase contrast, bright-field, fluorescence, automated time-lapse recordings with image-analysis feedback-controlled motorized stage
Single-molecule: Optical tweezers (construction and calibration), tethered-particle-motion microscopy, RNAP transcription, TBP-DNA interaction
Molecular biology: Bacterial cloning, PCR, ligation, restriction enzymes, DNA end-labeling, polyacrylamide/-agarose DNA gels, site-directed mutagenesis, primer design
Primary cell cultures: Fish epidermal keratocytes, *Dictyostelium Discoideum*

PROFESSIONAL SERVICES

Referee for Professional Journals
Journal of Optics; Nature Scientific Reports; Optics Express; Physical Biology (IOP publishing); Physical Review E; Physical Review Letters; PLoS Computational Biology; PLoS ONE; Quantitative Finance
Professional Affiliations
IEEE; American Physical Society; Deutsche Physikalische Gesellschaft; Dansk Fysisk Selskab, Biophysical Society
Professional Posts
Member of steering committee: Zurich Center for Experimental and Clinical Imaging Technologies (EXCITE)
Founding member of NEUBIAS: Network of European BioImage Analysts, COST action CA15124

EXTRACURRICULAR ACTIVITIES

Sports : Fencing (US A-rated, bronze Danish nationals); Running (marathons, PR 3h 29min)
Others : Scuba-diving, motorcycling, trekking, sailing
Supporting : The Thin Green Line; WHO

LANGUAGES

Danish : Mother tongue
English : Fluent
German : Conversational ($\geq$B2)
Spanish, Italian : Basic knowledge

COLLABORATORS, RECENT

1. **Arnold von Eckardstein**, Professor Dr. med.
   Institute of Clinical Chemistry, University Hospital Zurich
2. **César Nombela-Arrieta**, Professor, Hematology Lab
   Department of Experimental Hematology, University Hospital Zurich
3. **Cornelia Halin**, Professor of Pharmaceutical Immunology
   Institute of Pharmaceutical Sciences, Department of Chemistry and Applied Biosciences, ETH Zurich
4. **Gábor Székely**, Professor emeritus of Biomedical Image Computing
   Department of Information Technology and Electrical Engineering, ETH Zurich
5. **Michael Detmar**, Professor of Pharmacogenomics
   Institute of Pharmaceutical Sciences, Department of Chemistry and Applied Biosciences, ETH Zurich

REFERENCES

In addition to the above mentioned collaborators, please consider also

1. **Terence Hwa,** Presidential Chair Professor, Co-Director
   Department of Physics, University of California, San Diego, CA, USA
2. **Frank Jülicher,** Professor of Physics, Director
   Max Planck Institute for the Physics of Complex Systems, Dresden, Germany
3. **Edward C. Cox,** Professor Emeritus of Biology
   Department of Molecular Biology, Princeton University, Princeton, NJ, USA
4. **Sebastian Kozerke,** Professor of Biomedical Imaging
   Institute for Biomedical Engineering, ETH, Zurich, Switzerland
5. **Lene Oddershede,** Professor of Physics
   Niels Bohr Institute, University of Copenhagen, Denmark

UNDER REVIEW/IN REVISION

1. Hella A. Bolck, Sara Przetocka, Christina Walker, Kay Hänggi, Christine von Aesch, Adrian Thalmann, Antonio Porro, Reihaneh Zarrizi, Peter Horvath, Simon F. Nørrelykke, Michael Stebler, Claus Storgaard Sørensen, Roger Meier, and Alessandro A. Sartori (2017).
   CtIP and BARD1/BRCA1 cooperate to prevent genome instability arising as a consequence of aberrant DNA replication.
   (Genes and Development)

MANUSCRIPTS IN PREPARATION

1. Kota Miura, Bernd Pulverer, and Simon F. Nørrelykke.
   The EMBO-NEUBIAS Guide to Reproducible Image Analysis
   (EMBO Journal)

2. Javier A. Montoya-Zegarra, Catharina Commenford, Szymon Stoma, Simon F. Nørrelykke, Cornelia Halin, Michael Detmar and Lothar Dieterich (2017).
   Staining Distribution Analysis in Tumor-associated Lymphatic Vessels.

3. Simon F. Nørrelykke and Edward C. Cox.
   Individual amoebae perform self-avoiding random walks while foraging for bacteria.

4. Simon F. Nørrelykke and Frank Jülicher.
   Cell Motility as a Self-Propelled Stochastic Process.

5. Simon F. Nørrelykke and Frank Jülicher.
   Block & Spring Model for Cell Migration.

PUBLISHED [Google Scholar] citations: 1'200+, h-index: 13

STEM-CELL/CANCER/VASCULAR/MYCELIAL BIOLOGY

1. Samia Bachmann, Denise Gsponer, Javier A. Montoya-Zegarra, Martin Schneider, Felix Scholkmann, Carlotta Tacconi, Simon F. Nørrelykke, Steven T. Proulx, Michael Detmar (2019).
   A distinct role of the autonomic nervous system in modulating the function of lymphatic vessels under physiological and tumor-draining conditions.
   Cell Reports (accepted)

2. Stefanie S. Schmieder, Claire E. Stanley, Andrzej Rzepiela, Dirk van Swaay, Jerica Sabotic, Simon F. Nørrelykke, Andrew J. deMello, Markus Aebi, and Markus Künzler (2019).
   Bidirectional Propagation of Signals and Nutrients in Fungal Networks via Specialized Hyphae.
   Current Biology, 29, 1–12.
   https://doi.org/10.1016/j.cub.2018.11.058

3. Catharina D. Commerford, Lothar C. Dieterich, Yuliang He, Tanja Hell, Javier Montoya-Zegarra, Simon F. Nørrelykke, Erica Russo, Martin Röcken, and Michael Detmar (2018).
   Mechanisms of Tumor-Induced Lymphovascular Niche Formation in Draining Lymph Nodes.
   Cell Reports, 25, 3554–3563.
   https://doi.org/10.1016/j.celrep.2018.12.002

4. Javier A. Montoya-Zegarra, Erica Russo, Peter Runge, Maria Iolyeva, Ann-Helen Willrodt, Szymon Stoma, Simon F. Nørrelykke*, Michael Detmar*, and Cornelia Halin* (2019).
   AutoTube: A Novel Software for the Automated Morphometric Analysis of Vascular Networks in Tissues.
   Angiogenesis, 22(2), 223–236. Open Access.
   https://doi.org/10.1007/s10456-018-9652-3

5. Alvaro Gomariz, Patrick M. Helbling, Stephan Isringhausen, Ute Suessbier, Anton Becker, Andreas Boss, Takashi Nagasawa, Grégory Paul, Orcun Göksel, Gábor Székely, Szymon Stoma, Simon F. Nørrelykke, Markus G. Manz, and César Nombela-Arrieta (2018).
   Quantitative spatial analysis of haematopoiesis-regulating stromal cells in the bone marrow microenvironment by 3D microscopy.
   Nature Communications, volume 9, Article number: 2532.
   https://doi.org/10.1038/s41467-018-04770-z

6. Srividya Velagapudi, Mustafa Yalcinkaya, Antonio Piemontese, Roger Meier, Simon F. Nørrelykke, Damir Perisa, Andrzej Rzepiela, Michael Stebler, Szymon Stoma, Paolo Zanoni, Lucia Rohrer, and Arnold von Eckardstein (2017).
   VEGF-A Regulates Cellular Localization of SR-BI as Well as Transendothelial Transport of HDL but Not LDL.
   Arteriosclerosis, Thrombosis and Vascular Biology, Vol. 37, Issue 5, 794–803.
   https://doi.org/10.1161/ATVBAHA.117.309284

DATA-ANALYSIS

7. Simon F. Nørrelykke in co-authored book (2016).
   Bioimage Data Analysis. Edited by Kota Miura.
   Wiley. Print ISBN: 978-3-527-34122-1.

8. Simon F. Nørrelykke and Henrik Flyvbjerg (2011).
   Harmonic Oscillator in Heat Bath: Exact Simulation of Time-Lapse-Recorded Data and Exact Analytical Benchmark Statistics.
   Phys. Rev. E 83, 41003.

9. Simon F. Nørrelykke and Henrik Flyvbjerg (2010).
   Power Spectrum Analysis with Least-Squares Fitting: Amplitude Bias and its Elimination, with Application to Optical Tweezers and Atomic Force Microscope Cantilevers.
   Rev. Sci. Instrum. 8, 075103.

CELL-MIGRATION

10. Liang Li, Simon F. Nørrelykke, and Edward C. Cox (2008).
Persistent Cell Motion in the Absence of External Signals: A Search Strategy for Eukaryotic Cells.
PLoS ONE 3(5): e2093.

11. David Selmeczi, Liang Li, Lykke I. I. Pedersen, Simon F. Nørrelykke, Peter H. Hagedorn, Stephan Mosler, Niels B. Larsen, Edward C. Cox, and Henrik Flyvbjerg (2008).
Cell Motility as Random Motion: A Review.
European Physical Journal, Special Topics, 157, 1–15

12. David Selmeczi, Simon F. Tolić-Nørrelykke, Erik Schäffer, Peter H. Hagedorn, Stephan Mosler, Kirstine Berg-Sørensen, Niels B. Larsen and Henrik Flyvbjerg (2007).
Brownian Motion after Einstein and Smoluchowski: Some New Applications and New Experiments.
Acta Physica Polonica B 38(8), 2407–2431.

13. David Selmeczi, Simon F. Tolić-Nørrelykke, Erik Schäffer, Peter H. Hagedorn, Stephan Mosler, Kirstine Berg-Sørensen, Niels B. Larsen and Henrik Flyvbjerg (2007).
Brownian Motion after Einstein: Some New Applications and New Experiments.
In Linke, J. and Mansson, A. (Eds.) Controlled Nanoscale Motion, Nobel Symposium 131, Lecture Notes in Physics, Vol. 711 (Springer-Verlag, Heidelberg).

OPTICAL TWEEZERS & SINGLE-MOLECULE BIO-PHYSICS

14. Erik Schäffer, Simon F. Nørrelykke, and Jonathon Howard (2007).
Surface Forces and Drag Coefficients of Microspheres near a Plane Surface Measured with Optical Tweezers.
Langmuir 23, 3654–3665.

15. Simon F. Tolić-Nørrelykke, Erik Schäffer, Jonathon Howard, Francesco S. Pavone, Frank Jülicher, and Henrik Flyvbjerg (2006).
Calibration of Optical Tweezers with Positional Detection in the Back-Focal-Plane.
Rev. Sci. Instrum. 77, 103101.

16. Simon F. Tolić-Nørrelykke, Mette B. Rasmussen, Francesco S. Pavone, Kirstine Berg-Sørensen, and Lene B. Oddershede (2006).
Stepwise Bending of DNA by a Single TATA-Box Binding Protein.
Biophys. J. 90, 3694–3703.

17. Simon F. Tolić-Nørrelykke, Anita Engh, Robert Landick, and Jeff Gelles (2004).
Diversity in the Rates of Transcript Elongation by Single RNA Polymerase Molecules.
J. Biol. Chem. 279(5), 3292–3299.

18. Lene Oddershede, Sonia Grego, Simon F. Nørrelykke, and Kirstine Berg-Sørensen (2001).
Optical Tweezers: Probing Biological Surfaces.
Probe Microscopy 2, 129–137.

ECONO-PHYSICS AND SELF-ORGANIZED CRITICALITY

19. Simon F. Nørrelykke and Per Bak (2002).
Self-Organized Critical System with no Stationary Attractor State.
Phys. Rev. E 68, 036147.

20. Per Bak, Simon F. Nørrelykke, and Martin Shubik (2001).
Money and Goldstone Modes.
Quantitative Finance 1, 186–190.

21. Per Bak, Simon F. Nørrelykke, and Martin Shubik (1999).
Dynamics of Money. Phys.
Rev. E 60, 2528–2532.

POPULAR SCIENCE

22. Joshua Shaevitz and Simon F. Nørrelykke (2010).
The Cytoskeleton: I-Beams of the Cell.
Physics Today 63(2), 60–61.