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# BJÖRN HÖGBERG – CV

YEAR OF BIRTH: 1975

## APPOINTMENTS AND PROFESSIONAL PREPARATION

*Aug 2015-*

- Associate professor (Docent), Dept. of Medical Biochemistry and Biophysics, Karolinska Institutet

*Aug 2010-2014*

- Assistant professor (FoAss). Swedish Medical Nanoscience Center, Dept. of Neuroscience, Karolinska Institutet, Stockholm

*Jan 2008-Jun 2010*

- Post-doctoral research fellow, Dr. William Shihs lab, Dana-Farber Cancer Institute Dept. of Cancer Biology, Harvard Medical School Dept. of Biological Chemistry & Molecular Pharmacology, Boston

*2004-2007*

- PhD (Tekn. Dr) Title: DNA-Mediated Self-Assembly of Nanostructures – Theory and Experiments, Advisor: Prof. Håkan Olin, Mid Sweden University, Sundsvall

*2000-2002*

- Licentiate of Engineering (Tekn. Lic.), Title: High-Tc Superconducting Junctions for Integrated Circuits, Advisor: Prof. Zdravko Ivanov, Chalmers University of Technology, Göteborg

*1998-1999*

- Pensionnaire étranger de l'ENS, various physics courses, Ecole Normale Supérieure, Paris

*1995-2000*

- Master of Science in Engineering Physics (Civ. Ing. Teknisk Fysik) Uppsala University, Uppsala

## RESEARCH INTERESTS

Nanoscale engineering using DNA. Using DNA nanostructures to create protein patterns to study cell-signaling. DNA nanostructures for drug delivery and imaging. Enzymatic production of small DNA oligonucleotides and other synthetic biology methods for production of molecular tools for biomedicine.

## GRANTS AND AWARDS

EU H2020 MSCA ITN, DNABot, 2017

ERC Consolidator, European Research Council, 2016

Wallenberg Academy Fellow, the Knut and Alice Wallenberg Foundation, 2014

Future Research Leader fellow, Swedish Foundation for Strategic Research, 2013

Swedish Research Council (VR) young researcher project grant, 2013

World Technology Awards Nominee, 2013

EU FP7 Marie Curie Initial Training Network (ITN): Beneficiary, EScoDNA, 2012

Swedish Research Council (VR) project grant 2010

Swedish Medical Nanoscience Center startup grant 2010

Swedish Research Council (VR) repatriation grant 2010

Swedish Research Council (VR) Post-doctoral Fellowship, 2007

## PEER REVIEW TASKS AND COMMISSIONS OF TRUST

- Review assignments from the following journals: [Nature] – [Nature Materials] – [Nature Nanotechnology] – [J. Am. Chem. Soc.] – [ACS Nano] – [Journal of Nucleic Acids] – [PLoS ONE] – [Lecture Notes in Computer Science (LNCS)] – [ChemPhysChem] – [RSC Chemical Science] – [PhysChemChemPhys] – [Small] – [Methods] – [Advanced Materials] – [Accounts of Chemical Research] – [Nano Letters]

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- 5x Opponent for PhD defences: [Tianqiang Liu, Advisor: Kurt Gothelf, Aarhus University (2016)] – [Anders Hauge Okholm, Advisor: Jørgen Kjems, Aarhus University (2016)] – [Camilla Russel, Advisor: Mats Nilsson, Uppsala University (2015)] – [Rasmus Schøler Sørensen (Aarhus), Advisor: Jørgen Kjems (2013)] – [Thomas Tørring (Aarhus), Advisor: Kurt Gothelf, Aarhus University (2011)]

- 7x PhD Committee member at: [Olof Gissberg (KI), Advisor: Edwards Smith] – [Jonas Eriksson (Stockholm Uni.), Advisor: Ülo Langel (2016)] – [Martina Jezowska-Herrera (KI), Advisors: Malgorzata Honcharenko, Roger Strömberg] – [Sylvain Geny (KI), Advisor: Edvard Smith (2015)] – [Jakob Woller (Chalmers), Advisor: Bo Albinson (2014)] – [Anke Dierckx (Chalmers), Advisor: Marcus Wilhelmsson (2014)] - [Saiful Islam (KI), Advisor: Sten Linnarsson (2013)]

- External grant reviewer for: [The European Research Council (ERC)] – [Hong Kong Research Grants Council] – [The International Graduate School of Science and Engineering at TU Munich] – [The U.S. Army Research Laboratory's Army Research Office] – [The Danish Council for Independent Research] – [The European Commission EU FP7 (FET ATMOL, also member of the review panel in Brussels)] - [Acting monitor for a H2020 FET OPEN project] – [Israel Science Foundation] – [Netherlands Organization for Scientific Research]

## ENTREPRENEURIAL ACHIEVEMENTS

2 patents and patent applications, Founder of the biotech start-up “BaseStack Labs AB”

## WORKSHOPS, EU-PROGRAMS, TALKS

- One of the initiators and beneficiary and supervisory board of the "DNA-Based Modular Nanorobotics (DNABot)" ITN, a 4-year Marie Curie Innovative Training Network, H2020 (2018-2021)

- One of the initiators and beneficiary of the "European School of DNA Nanotechnology", EScoDNA, a 4-year Marie Curie Initial Training Network, FP7 (2013-2016)

- At Chalmers, assisted in coordination of the project SUPER-ADC. At Mid Sweden University, assisted in application work and consortium set-up for two projects.

- Talks: Talks: Contributed talk at the FNANO 2005, Snowbird Utah, invited talk Lund University 2007, invited talk at Aarhus University 2007, talks at Linköping University in 2007 and 2011, contributed talk at DNATECH 2009, invited talk at LMU-Munchen 2010, contributed talk at the Statistical Mechanics and Computation of DNA self-assembly conference in Mariehamn 2010, invited seminar at the International Graduate School of Science and Engineering summer school Munich 2014, contributed talk at the Functional DNA Nanotechnology workshop in Rome 2014.

- **15x Invited speaker:** [Invited keynote 2017 Life Science Symposium, University of Pavia] - [Invited American Association for Cell Biology, San Francisco, 2016] - [Invited iNano seminars Aarhus university, 2016] - [Invited Kemiska Föreningen, Lund, 2016] - [Invited 10-years of DNA origami, Caltech, 2016] – [Invited Functional DNA Nanotechnology, Rome, 2016] - [Invited FNANO Foundations of Nanoscience conference 2015] – [Invited Nanoscience for Human Health Conference, Gothenburg, 2015] – [Invited keynote WCRM (World Conference on Regenerative Medicine) Leipzig, 2013] – [Invited plenary CLINAM (Clinical Nanomedicine Conference) Basel, 2013] – [Invited Seminar at Aalto University Helsinki, 2012] – [Invited Soft and Biological Matter Seminars Oxford University, 2012] – [Invited keynote MSW 2012 (Micronanosystems Workshop) Linköping, 2012] – [Invited FNANO Foundations of Nanoscience conference 2012 Snowbird Utah] - [Invited The LMU Munchen biophysics dept. winter school 2011]

- Organizer and main lecturer at PhD course Scientific Visualization and presentation in 3D

- Organizer and program chair of the “Emerging Methods for Medical Research Conference”, Nobel Forum, Stockholm, Sept. 2015 (see: [www.emergmed-conf.org](http://www.emergmed-conf.org))

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## EXPERIMENTAL EXPERTISE

Low-temp and low noise measurements, SEM, TEM of macromolecules, AFM of solid state materials and biological samples (dry and in liquid), evaporation, PLD of oxide thin films, optical and e-beam lithography, DNA- and protein protocols, cloning, protein expression, phage expression, electrophoresis, DNA nanostructure design and preparation, extensive programming experience, DNA-protein conjugation

## TEACHING

More than 450 hours of teaching at: first, second and third -cycle education.  
Has all required courses for higher education teaching.

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## BJÖRN HÖGBERG – PUBLICATIONS

1. Reuss M<sup>†</sup>, Fördös F<sup>†</sup>, Blom H, Öktem O, Högberg B, Brismar H (<sup>†</sup>equal) Measuring true localization accuracy in super resolution microscopy with DNA-origami nanostructures. *New Journal of Physics* 19; 025013 (2017) – JIF=3.57
2. Benson E, Mohammed A, Bosco A, Teixeira AI, Orponen P & Högberg B, Computer-Aided Production of Scaffolded DNA Nanostructures from Flat Sheet Meshes, *Angew. Chem. Int. Ed.*, 55 p. 8869 (2016) – JIF= 11.7
3. Benson E, Mohammed A, Gardell J, Masich S, Czeizler E, Orponen P and Högberg B, DNA rendering of polyhedral meshes at the nanoscale, *Nature*, 523 p. 441 (2015) - JIF = 41.5
4. Shaw A, Benson E and Högberg B, Purification of Functionalized DNA Origami Nanostructures, *ASC Nano*, 9 p. 4968 (2015) - JIF = 14.4
5. Ducani C, Bernardinelli G and Högberg B, Rolling circle replication requires single-stranded DNA binding protein to avoid termination and production of double-stranded DNA, *Nucleic Acids Research*, 42 p. 10596 (2014) – JIF = 9.1
6. Shaw A, Lundin V, Petrova E, Fördös F, Benson E, Al-Amin A, Herland A, Blokzijl A, Högberg B\* and Teixeira A\* (\*co-directed the work), Spatial control of membrane receptor function using ligand nanocalipers, *Nature Methods*, 11 p. 841 (2014) – JIF = 32.1
7. Terenzi A, Bonsignore R, Spinello A, Gentile C, Martorana A, Ducani C, Högberg B, Almerico AM, Lauria A and Barone G, Selective G-quadruplex stabilizers: Schiff-base metal complexes with anticancer activity, *RCS Advances*, 4 p. 33245 (2014) – JIF = 3.8
8. Nickels PC, Ke Y, Jungmann R, Smith DM, Leichsenring M, Shih WM, Liedl T and Högberg B, DNA Origami Structures Directly Assembled from Intact Bacteriophages, *Small*, 10, p. 1765 (2014) – JIF = 8.4
9. Ducani C, Kaul C, Moche M, Shih WM and Högberg B, Enzymatic production of 'monoclonal stoichiometric' single-stranded DNA oligonucleotides, *Nature Methods*, 10, p. 647 (2013) - JIF = 32.1
10. Zhao YX, Shaw A, Zeng X, Benson E, Nyström AM and Högberg B, DNA origami delivery system for cancer therapy with tunable release properties, *ASC Nano*, 6, p. 8684 (2012) - JIF = 14.4
11. T. Liedl, B. Högberg, J. Tytell, D. Ingber and W.M. Shih, Self-assembly of three-dimensional prestressed tensegrity structures from DNA, *Nature Nanotechnology*, 5, p. 520 (2010) - JIF = 34.0
12. B. Högberg, T. Liedl and W. M. Shih, Folding DNA Origami from a Double-Stranded Source of Scaffold, *J. Am. Chem. Soc.*, 131, p. 9154 (2009) - JIF = 12.1
13. S. Douglas, H. Dietz, T. Liedl, B. Högberg, F. Graf and W. Shih, Self-assembly of DNA into nanoscale three-dimensional shapes, *Nature*, 459, p. 414 (2009) - JIF = 41.5
14. B. Högberg and H. Olin, Anisotropically DNA-Functionalized Nanoparticle Dimers, *Eur. Phys. J. D*, 43 (1-3), (2007) - JIF = 1.3
15. B. Högberg and H. Olin, Programmable Self-Assembly – Unique Structures and Bond Uniqueness, *J. Comp. Theor. Nanosci.* 3(3), p. 391 (2006) - JIF = 1.3

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16. B. Högberg, J. Helmersson, S. Holm and H. Olin, Study of DNA coated nanoparticles as possible programmable self-assembly building-blocks, *Appl. Surf. Sci.*, **252**, p. 5538 (2006) - JIF = 2.7
17. P. V. Komissinski, B. Högberg, A. Y. Tzalenchuk and Z. Ivanov, Submicron YBa<sub>2</sub>Cu<sub>3</sub>O<sub>x</sub> ramp Josephson junctions, *Appl. Phys. Lett.*, **80**, p. 1022 (2002) - JIF = 3.3

## PEER-REVIEWED CONFERENCE CONTRIBUTIONS

18. B. Högberg and H. Olin, DNA-scaffolded nanoparticle structures, *J. Phys.: Conf. Ser.*, 61 p.458-462 (2007)
19. B. Högberg, M. Olsen and H. Olin, A Method for Automated Tile-Systems Design, *Proc. Foundations of Nanosci.* 3, p. 215, ScienceTechnica, Snowbird, Utah (2006)
20. B. Högberg, J. Helmersson, S. Holm and H. Olin, DNA Coated Nanoparticle Eight-mers as Programmable Self-Assembly Building Blocks, *Proc. Foundations of Nanosci.* 2, p. 219, ScienceTechnica, Snowbird, Utah (2005)
21. B. Högberg and H. Olin, Comparison Between Unique Addressing and Programmable Self-Assembly, *Proc. Foundations of Nanosci.* 2, p. 37, ScienceTechnica, Snowbird, Utah (2005)
22. B. Högberg and Z. Ivanov, Novel in-situ fabricated Josephson junctions: Trilayer on a substrate slope, *IEEE Trans. Appl. Supercond.*,13, p. 794 (2003)
23. M.-Q. Huang, P. V. Komissinski, A. Y. Kidiyarova-Shevchenko, M. Gustafsson, E. Olsson, B. Högberg, Z. Ivanov and T. Claeson, Small Scale Integrated Technology for HTS RSFQ Circuits, *IEEE Trans. Appl. Supercond.*, 11, p. 558 (2001)

## BOOK CHAPTERS

24. Ducani C, Högberg B, Enzymatic Synthesis of Single-Stranded Clonal Pure Oligonucleotides. In: *Synthetic DNA - Methods in molecular biology series*, Springer New York, (2017)
25. B. Högberg, J. Boo, J. Liu-Helmersson and H. Olin, Programmable self-assembly – Theoretical aspects and DNA linked nanoparticles, in: *Systems Self-Assembly: Multidisciplinary Snapshots*, Elsevier, (2007)

## PATENTS

26. H. Olin, B. Högberg and L. Glans, Method and computer program for the self-assembly of a nanostructure, WO2005102913 (2005)

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27. O. Söderberg, B. Koos, C. Ducani and B. Högberg, Proximity assay with detection based on hybridisation chain reaction (hcr), WO 2015118029 A1 (2013)