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**Research  
interest**

**Computational neuroscience**

General goal: To understand the biophysics of neural processing as a function of the single cell and small circuits.

**Positions**

**Goethe University and Ernst Strüngmann Institute (ESI) for Neuroscience in cooperation with Max Planck Society**

Frankfurt (Germany)

Since May 2011: Independent group leader (guest scientist) in the Institute of Clinical Neuroanatomy of the Goethe University.

**University College London**

London (UK)

2006 – 2011: Post-doc with Prof. Michael Häusser.  
Research topic: Devising a theory of neuronal branching and modeling the network dynamics in the Purkinje cell layer of the Cerebellum.

**Hebrew University**

Jerusalem (Israel)

2004 – 2005: Post-doc with Prof. Idan Segev. Research topic: Optimization principles of dendritic structure with topographically arranged input.

**Education**

**University of California at Berkeley (2000 - 2002)**

Berkeley (US)

**Max Planck Institute of Neurobiology (2002 - 2004)**

Munich (Germany)

2000 - 2004: Ph.D. with Prof. Alexander Borst. Thesis title: "Input organization of motion-sensitive interneurons in the fly" (magna cum laude).

**Eberhard Karls Universität Tübingen**

Tübingen (Germany)

**Friedrich Miescher Laboratory (Max Planck Society)**

1994 - 2000: Diploma degree in biology. Thesis with Prof. Alexander Borst. Thesis title: "Räumliche Verteilung von Membranparametern in Fliegenneuronen: eine Simulationsstudie" (eng.: Spatial distribution of membrane parameters in fly neurons: a modeling study).

**Publications in preparation:**

1. Forstner F, [Cuntz H](#), Schnell B, Raghu SV, Borst A. Preservation of dendrite function under extreme scaling.
2. Baltruschat L, Tavosanis G, [Cuntz H](#). A stretch-and-fill dendrite growth in insect da neurons.
3. [Cuntz H](#), Mathy A, Häusser M. A scaling law derived from optimal dendritic wiring, in press at [PNAS](#).

**published:**

4. [Cuntz H](#) (2012). The dendritic density field of a cortical pyramidal cell. Perspective article, invited submission for special issue in [Frontiers in Neuroanatomy](#) 6:2.
5. [Cuntz H](#), Forstner F, Borst A, Häusser M (2011). The TREES toolbox – probing the basis of neuronal branching. [Neuroinformatics](#) 9(1): 91-96. News Item, invited submission.
6. [Cuntz H](#), Forstner F, Borst A, Häusser M (2010). One rule to grow them all: A general theory of neuronal branching and its practical application. [PLoS Computational Biology](#) 6(8): e1000877. (featured image in August 2010 issue; selected by PLoS and kikim media for a prototype documentary film feature for the US Public Broadcasting Service)
7. Phoka E\*, [Cuntz H\\*](#), Roth A, Häusser M (2010) A new approach for determining phase response curves reveals that Purkinje cells can act as perfect integrators. [PLoS Computational Biology](#) 6(4): e1000768.
8. Watt AJ, [Cuntz H](#), Mori M, Nusser Z, Sjöström PJ, Häusser M (2009) Traveling waves in developing cerebellar cortex mediated by asymmetrical Purkinje cell connectivity. [Nature Neuroscience](#) 12:463-473. (cover in April 2009 issue; reviewed as “exceptional” in Faculty 1000 by Prof. Marla Feller)
9. [Cuntz H\\*](#), Forstner F\*, Haag J, Borst A (2008) The morphological identity of insect dendrites. [PLoS Computational Biology](#) 4(12):e1000251. (featured image in December 2008 issue; reviewed in Faculty 1000 by Prof. Eve Marder)
10. Weber F, Eichner H, [Cuntz H](#), Borst A (2008) Eigenanalysis of a neural network for optic flow processing. [New Journal of Physics](#) 10:015013.
11. [Cuntz H](#), Borst A, Segev I (2007) Optimization principles of dendritic structure. [Theoretical Biology and Medical Modelling](#) 4(1):21.
12. [Cuntz H](#), Haag J, Forstner F, Segev I, Borst A (2007) Robust coding of flow-field parameters by axo-axonal gap junctions between fly visual interneurons. [PNAS](#) 104(24):10229-10233.
13. [Cuntz H](#), Haag J, Borst A (2003) Neural image processing by dendritic networks. [PNAS](#) 100 (19): 11082-11085.

\* equal contributions

**Book**

Remme M, Torben-Nielsen B, [Cuntz H](#) (eds). Dendritic computations through morphology and connectivity. As part of a Series in Computational Neuroscience. To be published by [Springer](#) in 2013.

**Fellowships and awards**

February 2011: Wellcome Image Award 2011 (£200)  
May 2010: Guarantors of Brain, travel grant award  
April 2010 – 1<sup>st</sup> prize poster, UCL Neuroscience Symposium (£500)  
April 2008 – April 2011: Max Planck Fellowship  
April 2006 – March 2008: [Alexander von Humboldt, Feodor Lynen Fellowship](#)  
June 2004 – June 2005: [Minerva Fellowship](#)

**Selected media outreach**

May 2012: Coverage of my work at [Wired](#) magazine (June issue).

December 2011: 5-page article entitled „the dendrite code“ about my work in December Issue of [Gehirn und Geist](#) ([Spektrum der Wissenschaft](#), the German pendant to Scientific American)

May 2011: Full documentary about my newest work by [kikim media](#) funded by the [Alfred P. Sloan foundation](#) and available at [Public Broadcasting Service](#) (PBS, <http://video.pbs.org/program/1901621406/>) and at [www.sciencebytes.org](http://www.sciencebytes.org)

March 2011: Contribution to [University College London](#) brain awareness week video sequence (<http://www.ucl.ac.uk/news/news-articles/1103/11031401>)

March 2011: Interview by [BioTechniques](#)

February 2011: [Wellcome Image Award 2011](#), exhibition at the [Wellcome Collection](#) (24. February – 10. July)

April 2005: Interview by [Israel21c](#)

October 2003: Short interview by [National Geographic](#)

**Teaching**

**EU advanced course in computational neuroscience**

*Course tutor: supervision of individual projects of five students for four weeks each*

August 2008	Freiburg (Germany)
August 2005 and 2007	Arcachon (France)
August 2004	Obidos (Portugal)

**Other**

December 2006: Theory tutor, “Dendritic patching workshop”	London (UK)
May 2006: Guest lecturer, “Theoretical Neuroscience II”, at the Gatsby Computational Neuroscience Unit	London (UK)

**Selected invited talks**

April 2012: Max Planck Institute for Brain Research; invited by Prof. Gilles Laurent	Frankfurt (Germany)
December 2011: Imperial College London; invited by Prof. Ross Ethier	London (UK)
July 2011: Helmholtz Research Center; invited by Prof. Markus Diesmann	Jülich (Germany)
July 2011: MRC Laboratory of Molecular Biology; invited by Dr. Gregory Jefferis	Cambridge (UK)
July 2011: Microsoft Research; invited by Prof. Stephen Emmott	Cambridge (UK)
July 2011: Friedrich Miescher Institute; invited by Dr. Karl Farrow and Dr. Botond Roska	Basel (Switzerland)
May 2011: Hertie-Institut für klinische Hirnforschung; invited by Dr. Fahad Sultan	Tübingen (Germany)
March 2011: Invited talk at 2nd NeuroML workshop by Padraig Gleeson	London (UK)
November 2010: Brain Corporation, Qualcomm; invited by Dr. Eugene Izhikevich	San Diego (US)

	July 2010: Invited talk at FENS 2010 satellite meeting "Morphology and computations of single neurons"	Amsterdam (Holland)
	March 2010: Massachusetts Institute of Technology; invited by Prof. Sebastian Seung	Boston (US)
	January 2010: Ernst-Strüngman Institute and Max Planck Institute for Brain Research; invited by Prof. Pascal Fries and Prof. Wolf Singer	Frankfurt (Germany)
	January 2010: Neurosciences Institute; invited by Prof. Gerald Edelman	San Diego (US)
	July 2009: Goethe Center for Scientific Computing; invited by Prof. Gabriel Wittum	Frankfurt (Germany)
	June 2009: Goethe University, Clinical Neuroanatomy; invited by Prof. Thomas Deller	Frankfurt (Germany)
	March 2009: Okinawa Institute of Science and Technology; invited stay for three weeks with Prof. Erik de Schutter, incl. invited talk	Okinawa (Japan)
	May 2008: Invited talk at 47 <sup>th</sup> Tutzing Symposion "Modelling and engineering of complex systems - from molecular assemblies to biological networks"	Tutzing (Germany)
	February 2008: Invited talk at Joint meeting of Gatsby Computational Neuroscience Unit and Columbia University Center for Theoretical Neuroscience	New York (US)
	January 2004: Max Planck Institute for Mathematics in the Sciences "neural networks and cognitive systems" seminar series; invited by Prof. Jürgen Jost	Leipzig (Germany)
	June 2003: FU Berlin Neurobiology department; invited by Prof. Bernd Grünewald and Prof. Randolf Menzel	Berlin (Germany)
<b>Organized scientific events</b>	October 2012: Computational Neuroscience Social at SfN*2012. Invited chairman and organizer, expected attendance 200-300.	New Orleans (US)
	July 2011: Official workshop accompanying the annual conference of the organization for computational neurosciences (CNS*2011), "Dendrite function and wiring: experiments and theory" with Dr. Michiel Remme, Dr. Ben Torben-Nielsen and Prof. Jaap van Pelt	Stockholm (Sweden)
<b>Selected conference attendance</b>	<b>International</b> <i>SfN</i> : New Orleans 2012*, Washington 2011*, San Diego 2010*, Washington 2008*, New Orleans 2003*, Miami Beach 1999 <i>FENS</i> : Amsterdam 2010, Lisbon 2004* <i>CNS</i> : Stockholm 2011*, Berlin 2009, Edinburgh 2006, Chicago 2002*, Bruges 2000*; <i>Cosyne</i> : Salt Lake City 2010*, 2008* <i>Invertebrate Vision</i> : Lund 2001*	

**Local**

Annual meeting of the German anatomical society 2012\*  
 Morphology and computations of single neurons in Amsterdam 2010\*  
 Dendrites, Neurons and Networks in Warwick 2010\*  
 UCL Neuroscience Symposium 2010\*  
 Mathematical Neuroscience Meeting in Warwick 2007  
 Ein Gedi Meeting in Israel 2004, 2005\*  
 Meeting of the Israel Society of Neuroscience in Eilat 2004\*  
 Meeting of the German Neuroscience Society in Göttingen 1999, 2003\*  
 \*poster or oral presentation

**Summer schools**

Otto Loewi International Course in Eilat 2005  
 School of dendrites in Jerusalem 2005

**Supervision**

**PhD thesis**

since 2012: Marcel Beining. *With Dr. Stephan Schwarzacher and Prof. Thomas Deller.*

**PhD thesis**

since 2010: Hermina Nedeleescu. *With Prof. Erik de Schutter.*

**Master thesis**

2010 – 2011: Lothar Baltruschat. *With Prof. Gaia Tavosanis.*

**Master thesis**

2006 – 2007: Elena Phoka. Title of thesis: “The Phase response curves of cerebellar Purkinje cells”. *With Prof. Michael Häusser.*

**Diploma thesis and PhD thesis**

2005 – 2011: Friedrich Förstner. Title of Diploma thesis: “Modeling the neuroanatomy of interneurons in the visual system of the fly *calliphora vicina*”. Title of PhD thesis: “The morphological identity of insect dendrites”. *With Prof. Alexander Borst.*

**Review editor for**

PLoS Computational Biology, PLoS One, Frontiers in Neuroscience, Biological Cybernetics, Cerebral Cortex, Neuroinformatics, Scientific Reports (Nature Publishing Group), Journal of Neurophysiology, Current Biology  
 ERA-Net of the European Union, Air Force Office of Scientific Research, Dutch Research Council (NWO)  
 EU advanced course in computational neuroscience, CNS\*2012

**Languages**

English, French, German

**Service work**

2002: McKinsey award “start social” for a project to build an international house in München. München (Germany)

1993 – 1994: Terre des Hommes – Civil Service in a children’s home. Wiesbaden (Germany)

**Other activities**

Opera singing (student of Cilla Grossmeyer and Zvi Semel), Piano, Painting.