

## **CV of Prof. Dr. Dr. h.c. Roland Wiesendanger**

Dept. of Physics, University of Hamburg

Date of birth: 05.10.1961

Place of birth: Basel, Switzerland

Nationality: German

Present position: University professor for experimental physics, University of Hamburg

**Researcher-ID: P-9726-2016**

URL for web site: [www.nanoscience.de](http://www.nanoscience.de)

### **Professional employment and academic education:**

2003-2012	Managing Director of the Institute of Applied Physics at Hamburg University
2003-2004	Vice-Dean of the Department of Physics at Hamburg University
Since 1993	Full Professor (C4) at the University of Hamburg
1990-1992	Private Lecturer at the University of Basel, Switzerland
1990	Habilitation in Experimental Physics at the University of Basel
1987	PhD in Experimental Physics at the University of Basel (summa cum laude)
1986	Diploma in Exp. Physics at the University of Basel (with highest distinction)
1981	Abitur in Baden-Württemberg, Germany (mark: 1,0)

### **Honours, distinctions, scholarships, awards:**

2019	Honorary Medal „De Scientia et Humanitate Optime Meritis“ of the Czech Academy of Sciences
2018	3 <sup>rd</sup> Advanced Grant of the European Research Council (ERC)
2016	Julius Springer Prize for Applied Physics (together with Prof. Xiang Zhang)
2016	Elected Member of the European Academy of Sciences (EURASC)
2015	Hamburg Science Prize of the Hamburg Academy of Sciences
2015	International Fellow of the Surface Science Society of Japan (SSSJ)
2015	Doctor Honoris Causa of Poznan University of Technology, Poland
2014	Heinrich Rohrer Grand Medal and Prize
2013	2 <sup>nd</sup> Advanced Grant of the European Research Council (ERC)
2013	Elected Member of the Polish Academy of Sciences
2012	Fellow of the American Vacuum Society (AVS)
2012	Honorary Professor of Harbin Institute of Technology, China
2010	Nanotechnology Recognition Award of the American Vacuum Society (AVS)
2008	1 <sup>st</sup> Advanced Grant of the European Research Council (ERC)
2008	Elected Member of the German Academy of Technical Sciences “acatech”
2005	Elected Founder Member of the Hamburg Academy of Sciences
2003	Philip Morris Research Prize (together with Dr. Matthias Bode)
2000	Elected Member of the German Academy of Sciences “Leopoldina”
1999	Karl Heinz Beckurts Prize
1992	Max Auwärter Prize
1992	Gaede Prize of the German Vacuum Society

### **Named Lectures:**

2019	Boltzmann Lecture (University of Vienna, Austria)
2019	Nicolás Cabrera Lecture (University of Madrid, Spain)
2015	cfaed Distinguished Lecture (TU Dresden, Germany)
2013	Distinguished iNANO Lecture (University of Aarhus, Denmark)
2011	Zernike Lecture (University of Groningen, The Netherlands)
2007	Kavli Lecture (Caltech, USA)
2001	Kronig Lecture (TU Delft, The Netherlands)
1998	Kepler Lecture (University of Tübingen, Germany)

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### **Selected professional leadership and memberships:**

2006-2017	Speaker and Scientific Coordinator of the DFG Collaborative Research Center SFB 668 "Magnetism from the Single Atom to the Nanostructure"
2013	Chairman of the Otto Stern Symposium in Hamburg with 7 Nobel Prize winners
2010-2013	Chairman of the International Committee for Nanoscience and Nanotechnology
2009-2012	Speaker and Scientific Coordinator of the Hamburg Cluster of Excellence "NANOSPINTRONICS"
Since 2001	Scientific Coordinator of the Interdisciplinary Nanoscience Center Hamburg
1998-2006	Coordinator of the German Center of Competence in Nanotechnology "Nanoanalytics" (1998-2003) and "HanseNanoTec" (2003-2006) funded by the German Ministry for Education and Research
1998-2001	Chairman of the Nanoscience and Technology Division of the International Union for Vacuum Science, Techniques and Applications (IUVSTA)
1996-2004	Chairman of the Nanoscience and Technology Division of the German Vacuum Society
2000	Chairman of the International NC-AFM and SPS Conferences in Hamburg
1997	Chairman of the International STM'97 Conference in Hamburg
Since 1993	Foundation and extension of the Microstructure Advanced Research Center Hamburg (MARCH); focus on Low-Temperature Scanning Probe Spectroscopy

### **Selected editorial activities:**

2015-2016	Guest Editor of "New Journal of Physics", Institute of Physics Publishing: Special Issue "Magnetic Skyrmions" (with A. Fert, N. Nagaosa, M. Thorwart)
2006-2010	Member of the Editorial Board of "Nanotechnology", Institute of Physics Publ.
2005	Guest Editor of "Microscopy Research and Technique", Wiley: Special Issue on "Spin-Polarized Scanning Tunnelling Microscopy"
1997-present	Co-Editor of the Springer Series in NanoScience and Technology (with P. Avouris, B. Bhushan, D. Bimberg, K. von Klitzing, H. Sakaki)
1995-2000	Member of the Editorial Board of "Applied Physics A", Springer
1994	2 Special Issues on "Scanning Probe Methods in Materials Science", Applied Physics A, Springer

### **Selected research topics and accomplishments:**

- demonstration of vacuum tunneling of spin-polarized electrons in STM;
- demonstration of atomic-resolution magnetic imaging by SP-STM and by Magnetic Exchange Force Microscopy;
- discovery of atomically sharp domain walls in ultrathin ferro- and antiferromagnetic films;
- development of single-atom magnetometry;
- detection of excitations and magnetization of individual magnetic dopants in a semiconductor;
- observation of oscillatory magnetic exchange coupling between individual adatoms;
- observation of thermally induced magnetization switching of nano-scale magnets and few-atom clusters;
- demonstration of spin-current induced magnetization switching across a vacuum gap by SP-STM;
- discovery of complex spin structures including chiral magnetic domain walls, spin spirals, and skyrmion lattices by SP-STM;
- demonstration of local writing and deleting of individual skyrmions by an SP-STM tip;
- observation of the spin-density distribution of individual adsorbed molecules;
- demonstration of artificially built nanomagnets and of atomic-scale all-spin logic operations;
- real-space visualization of Majorana end states in artificially constructed spin chains and chiral Majorana edge modes in magnetic 2D islands on s-wave superconductors.

## **CV of Prof. Dr. Dr. h.c. Roland Wiesendanger**

### **Since 1986:**

- ca. 600 publications, incl. 10 Science, 2 Science Adv., 3 Nature, 26 Nature sister journal articles (Nature Mater., Nature Nanotech., Nature Phys., Nature Commun.), 68 PRL, 112 PRB, 30 review papers and book chapters,
- author of 2 textbooks,
- editor/co-editor of 9 books and 7 conference proceedings,
- ca. 550 invited and plenary talks at international conferences, universities, research institutions, and industry laboratories,
- member of programme and advisory committees of 130 international conferences,
- member of numerous scientific societies (incl. APS, AVS, DPG, DVG, MRS),
- **h-index: 88, i10-index: 391, citations: 32.000 (Google Scholar),**

### **Ten selected publications (out of 600):**

A. A. Khajetoorians, B. Baxevanis, Ch. Hübner, T. Schlenk, S. Krause, T. Wehling, S. Lounis, A. Lichtenstein, D. Pfannkuche, J. Wiebe, and R. Wiesendanger  
*Current-driven spin dynamics of artificially constructed quantum magnets*  
Science 339, 55 (2013)

N. Romming, Ch. Hanneken, M. Menzel, J. E. Bickel, B. Wolter, K. von Bergmann, A. Kubetzka, and R. Wiesendanger  
*Writing and deleting single magnetic skyrmions*  
Science 341, 636 (2013)

A. A. Khajetoorians, J. Wiebe, B. Chilian, and R. Wiesendanger  
*Realizing all-spin based logic operations atom by atom*  
Science 332, 1062 (2011)

A. A. Khajetoorians, B. Chilian, J. Wiebe, S. Schuwalow, F. Lechermann, and R. Wiesendanger  
*Detecting excitation and magnetization of individual dopants in a semiconductor*  
Nature 467, 1084 (2010)

F. Meier, L. Zhou, J. Wiebe, and R. Wiesendanger  
*Revealing magnetic interactions from single-atom magnetization curves*  
Science 320, 82 (2008)

S. Krause, L. Berbil-Bautista, G. Herzog, M. Bode, and R. Wiesendanger  
*Current-induced magnetization switching with a Spin-Polarized Scanning Tunneling Microscope*  
Science 317, 1537 (2007)

U. Kaiser, A. Schwarz, and R. Wiesendanger  
*Magnetic Exchange Force Microscopy with Atomic Resolution*  
Nature 446, 522 (2007)

M. Bode, M. Heide, K. von Bergmann, P. Ferriani, S. Heinze, G. Bihlmayer, A. Kubetzka, O. Pietzsch, S. Blügel, and R. Wiesendanger  
*Chiral magnetic order at surfaces driven by inversion asymmetry*  
Nature 447, 190 (2007)

A. Wachowiak, J. Wiebe, M. Bode, O. Pietzsch, M. Morgenstern, and R. Wiesendanger  
*Direct observation of internal spin-structure of magnetic vortex cores*  
Science 298, 577 (2002)

S. Heinze, M. Bode, A. Kubetzka, O. Pietzsch, X. Nie, S. Blügel, and R. Wiesendanger  
*Real-space imaging of two-dimensional antiferromagnetism on the atomic scale*  
Science 288, 1805 (2000)

## ***CV of Prof. Dr. Dr. h.c. Roland Wiesendanger***

### **Major contributions to early careers of excellent researchers / supervisory work:**

Since 1993      Supervision of 125 Diploma/Master students, 87 PhD-students,  
34 PostDocs, and 17 Research Assistants, 7 Habilitations.

Excellent young students and researchers from all over the world have been attracted since many years by Bachelor-level courses (based on my textbook “Einführung in die Struktur der Materie, publisher: Teubner-Verlag 2003, together with Johann Bienlein) as well as advanced Master-level courses in nanoscience (my textbook on Scanning Probe Microscopy and Spectroscopy, publisher: Cambridge University Press 1994, with more than 2.000 citations has become the most widely used and most frequently cited textbook in the field). Furthermore, I am frequently giving lectures at international Summer and Winter Schools all over the world, thereby attracting many bright international students to come to Hamburg University. Currently, about 35 researchers from 10 different countries are working in my group on advances in nanoscience and novel applications in nanotechnology, as well as their theoretical understanding.

Several young researchers from my group have received prestigious science awards, e.g. Udo Schwarz (Gaede Prize of the DVG 1999), Mathias Getzlaff (Max Auwärter Prize 2000), André Kubetzka (Prof. Dr. Jürgen Geiger Prize of the DPG 2002), Matthias Bode (Philip Morris Research Prize 2003 and IEEE Distinguished Lecturer Award 2007), Markus Morgenstern (Walter Schottky Prize of the DPG 2004), Oswald Pietzsch (German Nanoscience Prize 2004), Elena Vedmedenko (Hertha Sponer Prize of the DPG 2005), Stefan Heinze (Gaede Prize of the DVG 2006), Uwe Kaiser (ThyssenKrupp PhD Award 2009), Stefan Krause (Prof. Dr. Jürgen Geiger Prize 2010), Matthias Menzel (ECOSS Prize 2011), Lihui Zhou (Chinese Government Award for Outstanding PhD Students Abroad 2011), Anika Schlenhoff (ECOSS Prize 2012), Yasuo Yoshida (Young Scientist Award by the Physical Society of Japan 2012), Alexander Khajetoorians (Gerhard Ertl Young Investigator Award 2012 and Nicholas Kurti European Science Prize 2014), Kirsten von Bergmann (Gaede Prize of the DVG 2013), Yingshuang Fu (National Thousand Talent Program China 2014), Maciej Bazarnik (First degree individual scientific Award of the President of Poznan University of Technology 2015), Sujit Manna (INSPIRE Faculty Award of the Government of India 2016), and Niklas Romming (Prof. Dr. Jürgen Geiger Prize of the DPG 2019).

21 former group members (listed below in alphabetical order) have already become professors all over the world:

Makoto Ashino (Kanazawa Institute of Technology, Japan), Jessica Bickel (Cleveland State University, USA), Matthias Bode (University of Würzburg, Germany), Yingshuang Fu (Huazhong University of Science and Technology, China), Mathias Getzlaff (University of Düsseldorf, Germany), Katsushi Hashimoto (Tohoku University, Sendai, Japan), Stefan Heinze (University of Kiel, Germany), Germar Hoffmann (National Tsing Hua University, Hsinchu, Taiwan), Pin-Jui Hsu (National Tsing Hua University, Hsinchu, Taiwan), Alexander Khajetoorians (Nijmegen, The Netherlands), Sujit Manna (Indian Institute of Technology Delhi), Giuseppe Maruccio (University of Salento, Lecce, Italy), Tomohiro Matsui (University of Tokyo, Japan), Markus Morgenstern (RWTH Aachen, Germany), Alexandra Palacio-Morales (University Paris-Sud, France), Shuheng Pan (Houston Center for Superconductivity, USA), Udo Schwarz (Yale University, USA), David Serrate (University of Zaragoza, Spain), Nobuki Tezuka (Tohoku University, Sendai, Japan), Shiro Yamazaki (Tokyo Institute of Technology, Japan), Yasuo Yoshida (Kanazawa Institute of Technology, Japan).