

# Curriculum Vitae

## Personal Data

Name	Dr. rer. nat. Christian Dietz
Date of Birth	July 25 <sup>th</sup> , 1981
Place of Birth	Mellrichstadt, GERMANY

## Scientific Education / Positions

Since 05/2011	Supervisor Nanoanalytics Laboratory, Physics of Surfaces, Center of Smart Interfaces, Technische Universität Darmstadt, Group of Prof. Dr. Robert Stark
01/2009 – 04/2011	Postdoc Position, Instituto de Microelectrónica de Madrid (CSIC), Spain, Group of Prof. Dr. Ricardo Garcia
04/2005 – 11/2008	Completion of the PhD Thesis, Chemische Physik, Technische Universität Chemnitz, Group of Prof. Dr. Robert Magerle, Title: <i>Nanoscale Imaging of Mechanical Properties of Polymeric Materials Using Nanotomography and Scanning Force Microscopy Based Methods</i>
10/2004 – 03/2005	PhD Thesis, Lehrstuhl Physikalische Chemie II, Universität Bayreuth, Group of Dr. Robert Magerle
10/1999 – 09/2004	University of Applied Sciences Coburg Subject Area: Technical Physics Final Degree: Diplom-Ingenieur (FH) (Engineer) Diploma Topic: <i>Development and Optimization of Monocrystalline Actuators with Piezoelectric Excitation</i> at the Fraunhofer Institute (IPM) in Freiburg

## Education

1997 – 1999	Staatl. Fachoberschule Bad Neustadt (Specialized secondary school)
1993 – 1997	Staatl. Realschule Mellrichstadt (Secondary school)
1987 – 1993	Grund- und Teilhauptschule Bastheim (Primary school)

## Publications in Peer-Reviewed International Journals

1. C. Dietz  
*Sensing in-plane nanomechanical surface and sub-surface properties of polymers: local shear stress as function of the indentation depth*  
Nanoscale **10**, 460 (2018).
2. P. Ruff, C. Dietz, R. W. Stark, and C. Hess  
*Monitoring the Process of Nanocavity Formation on a Monomolecular Level*  
Z. Phys. Chem. **232**, 1227 (2018).
3. S. Flege, R. Hatada, A. Derepa, C. Dietz, W. Ensinger, and K. Baba  
*Note: Sample holder with open area for increased deposition rate in plasma immersion ion implantation and deposition*  
Review of Scientific Instruments **88**, 096106 (2017).
4. L. M. Riemer, K. V. Lalitha, X. Jiang, N. Liu, C. Dietz, R. W. Stark, P. B. Groszewicz, G. Buntkowsky, J. Chen, S.-T. Zhang, J. Rödel, and J. Koruza  
*Stress-induced phase transition in lead-free relaxor ferroelectric composites*  
Acta Materialia **136**, 271 (2017).
5. V. Rojas, J. Koruza, E. A. Patterson, M. Acosta, X. Jiang, N. Liu, C. Dietz, and J. Rödel  
*Influence of composition on the unipolar electric fatigue of  $Ba(Zr_{0.2}Ti_{0.8})O_3-(Ba_{0.7}Ca_{0.3})TiO_3$  lead-free piezoceramics*  
Journal of the American Ceramic Society **100**, 4699 (2017).
6. N. Liu, M. Acosta, S. Wang, B.-X. Xu, R. W. Stark, and C. Dietz  
*Revealing the core-shell interactions of a giant strain relaxor ferroelectric  $0.75Bi_{1/2}Na_{1/2}TiO_3-0.25SrTiO_3$*   
Scientific Reports **6**, 36910 (2016).
7. S. Schiwiek, T. Meckel, R. W. Stark, and C. Dietz  
*Evidence of a Rolling Motion of a Microparticle on a Silicon Wafer in a Liquid Environment*  
Journal of Applied Physics **119**, 194304 (2016).
8. M. F. Bekheet, I. Svoboda, N. Liu, L. Bayarjargal, E. Irran, C. Dietz, R. W. Stark, R. Riedel, and A. Gurlo  
*Ferroelectric  $InMnO_3$ : Growth of single crystals, structure and high-temperature phase transitions*  
Journal of Solid State Chemistry **241**, 54 (2016).
9. C. Rüttiger, M. Appold, H. Didzoleit, A. Eils, C. Dietz, R. W. Stark, B. Stühn, and M. Gallei  
*Structure Formation of Metallopolymer-Grafted Block Copolymers*  
Macromolecules **49**, 3415 (2016).
10. D. Scheid, D. Stock, T. Winter, T. Gutmann, C. Dietz, and M. Gallei  
*The Pivotal Step of Nanoparticle Functionalization for the Preparation of Functional and Magnetic Hybrid Opal Films*  
Journal of Materials Chemistry C **4**, 2187 (2016).

11. C. Rüttiger, S. Mehlhase, S. Vowinkel, G. Cherkashinin, N. Liu, C. Dietz, R. W. Stark, M. Biesalski, and M. Gallei  
*Redox-Mediated Flux Control in Functional Paper*  
Polymer **98**, 429 (2016).
12. S. Vowinkel, C. G. Schäfer, G. Cherkashinin, C. Fasel, F. Roth, N. Liu, C. Dietz, E. Ionescu, and M. Gallei  
*3D-Ordered Carbon Materials by Melt-Shear Organization for Tailor-Made Hybrid Core-Shell Polymer Particle Architectures*  
Journal of Materials Chemistry C **4**, 3976 (2016).
13. N. Liu, R. Dittmer, R. W. Stark, and C. Dietz  
*Visualization of Polar Nanoregions in Lead-Free Relaxors via Piezoresponse Force Microscopy in Torsional Dual AC Resonance Tracking Mode*  
Nanoscale **7**, 11787 (2015).
14. S. Schiwiek, L.-O. Heim, R. W. Stark, and C. Dietz  
*Manipulation of Polystyrene Nanoparticles on a Silicon Wafer in the Peak Force Tapping Mode in Water: pH-Dependent Friction and Adhesion Force*  
Journal of Applied Physics **117**, 104303 (2015).
15. C. Dietz, M. Schulze, A. Voss, C. Riesch, and R. W. Stark  
*Bimodal Frequency-Modulated Atomic Force Microscopy with Small Cantilevers*  
Nanoscale **7**, 1849 (2015).
16. A. Voss, C. Dietz, A. Stocker, and R. W. Stark  
*Quantitative Measurement of the Mechanical Properties of Human Antibodies with Sub-10-nm Resolution in a Liquid Environment*  
Nano Research **8**, 1987 (2015).
17. M. Acosta, N. Liu, M. Deluca, S. Heidt, I. Ringl, C. Dietz, R. W. Stark, and W. Jo  
*Tailoring Ergodicity Through Selective A-Site Doping in the  $Bi_{1/2}Na_{1/2}TiO_3$ - $Bi_{1/2}K_{1/2}TiO_3$  System*  
Journal of Applied Physics **117**, 134106 (2015).
18. C. G. Schäfer, T. Winter, S. Heidt, C. Dietz, T. Ding, J. J. Baumberg, and M. Gallei  
*Smart Polymer Inverse-Opal Photonic Crystal Films by Melt-Shear Organization for Hybrid Core-Shell Architectures*  
Journal of Materials Chemistry C **3**, 2204 (2015).
19. P. Hoffmann, M. Kosinova, S. Flege, J. Brötz, V. Trunova, C. Dietz, and W. Ensinger  
*Chemical and Physical Properties in Layers and Interfaces of Nanolayered  $Si(100)/Ni/BC_xN_y$  Stacks*  
X-Ray Spectrometry **44**, 48 (2015).
20. A. Voss, R. W. Stark, and C. Dietz  
*Surface versus Volume Properties on the Nanoscale: Elastomeric Polypropylene*  
Macromolecules **47**, 5236 (2014).
21. J. Pinto, M. Dumon, M. Rodriguez-Perez, R. Garcia, and C. Dietz  
*Block Copolymers Self-Assembly Allows Obtaining Tunable Micro or Nanoporous Membranes or Depth Filters Based on PMMA; Fabrication Method and Nanostructures*  
The Journal of Physical Chemistry C **118**, 4656 (2014).

22. R. Hatada, S. Flege, A. Bobrich, W. Ensinger, C. Dietz, K. Baba, T. Sawase, T. Watamoto, and T. Matsutani  
*Preparation of Ag-Containing Diamond-like Carbon Films on the Interior Surface of Tubes by a Combined Method of Plasma Source Ion Implantation and DC Sputtering*  
*Applied Surface Science* **310**, 257 (2014).
23. F. Krohm, H. Didzoleit, M. Schulze, C. Dietz, R. W. Stark, C. Hess, B. Stühn, and A. Brunsen  
*Controlling Polymerization Initiator Concentration in Mesoporous Silica Thin Films*  
*Langmuir* **30**, 369 (2014).
24. S. Hörner, S. Fabritz, H. D. Herce, O. Avrutina, C. Dietz, R. W. Stark, C. M. Cardoso, and H. Kolmar  
*Cube-Octameric Silsesquioxane-Mediated Cargo Peptide Delivery into Living Cancer Cells*  
*Organic & Biomolecular Chemistry* **11**, 2258 (2013).
25. A. M. Gigler, C. Dietz, M. Baumann, N. F. Martínez, R. García, and R. W. Stark  
*Repulsive Bimodal Atomic Force Microscopy on Polymers*  
*Beilstein Journal of Nanotechnology* **3**, 456 (2012).
26. S. Fabritz, S. Hörner, D. Könnig, M. Empting, M. Reinwarth, C. Dietz, B. Glotzbach, H. Frauendorf, H. Kolmar, and O. Avrutina  
*From Pico to Nano: Biofunctionalization of Cube-Octameric Silsesquioxanes by Peptides and Miniproteins*  
*Organic & Biomolecular Chemistry* **10**, 6287 (2012).
27. C. Dietz, E. T. Herruzo, J. R. Lozano, and R. Garcia  
*Nanomechanical Coupling Enables Detection and Imaging of 5 nm Superparamagnetic Particles in Liquid*  
*Nanotechnology* **22**, 125708 (2011).
28. D. Martínez-Martin, E. T. Herruzo, C. Dietz, J. Gomez-Herrero, and R. Garcia  
*Non-Invasive Protein Structural Flexibility Mapping by Bimodal Dynamic Force Microscopy*  
*Physical Review Letters* **106**, 198101 (2011).
29. C. Dietz, M. Zerson, C. Riesch, M. Franke, and R. Magerle  
*Surface Properties of Elastomeric Polypropylene Studied with Atomic Force Microscopy*  
*Macromolecules* **41**, 9259 (2008).
30. C. Dietz, M. Zerson, C. Riesch, A. M. Gigler, R. W. Stark, N. Rehse, and R. Magerle  
*Nanotomography with Enhanced Resolution Using Bimodal Atomic Force Microscopy*  
*Applied Physics Letters* **92**, 143107 (2008).
31. A. Yurtsever, A. M. Gigler, C. Dietz, and R. W. Stark  
*Frequency Modulated Torsional Resonance Mode Atomic Force Microscopy on Polymers*  
*Applied Physics Letters* **92**, 143103 (2008).
32. C. Dietz, S. Röper, S. Scherdel, A. Bernstein, N. Rehse, and R. Magerle  
*Automatization of Nanotomography*  
*Review of Scientific Instruments* **78**, 053703 (2007).
33. R. García, C. J. Gómez, N. F. Martínez, S. Patil, C. Dietz, and R. Magerle  
*Identification of Nanoscale Dissipation Processes by Dynamic Atomic Force Microscopy*  
*Physical Review Letters* **97**, 016103 (2006).

## Projects

- DFG-Sachbeihilfe DI 2176/2-1 (**Project leader**): “Subsurface Imaging von magnetischen Nanopartikeln und Quantifizierung nanomechanischer Eigenschaften von polymeren und biologischen Materialien mittels bimodaler Rasterkraftmikroskopie”
- DFG-Sachbeihilfe DI 2176/4-1 (**Project leader**): “Untersuchung des Einflusses von Defekten auf die nanomechanischen Eigenschaften von Graphen mittels Multifrequenz-Rasterkraftmikroskopie”

## Awards

- Prize Winner: Young Investigator Award, *International Scanning Probe Microscopy Conference 2016*, Grindelwald, Switzerland.

## Journal Referee

Nature Communications | Nanoscale | Macromolecules | Nanotechnology | Physical Chemistry Chemical Physics | Ultramicroscopy | RSC Advances | Journal of Applied Physics | Microscopy and Microanalysis | Polymer Bulletin

## Oral Contributions at International Conferences

1. VII Multifrequency AFM Conference.  
Hotel Eurostars Madrid Tower, Madrid, Spain, April 2018.  
Oral Contribution: *Sensing in-plane nanomechanical surface and sub-surface properties of polymers: local shear stress as function of the indentation depth.*
2. Materials Science and Engineering Congress.  
Technische Universität Darmstadt, Germany, September 2016.  
Oral Contribution: *Visualization of polar nanoregions in bismuth-alkali-based relaxor ferroelectrics revealed by high-resolution PFM and quantification of the relaxation behavior via high-speed PFM.*
3. International Scanning Probe Microscopy Conference.  
Sunstar Hotel Grindelwald, Grindelwald, Switzerland, June 2016.  
Oral Contribution: *Visualization of polar nanoregions in bismuth-alkali-based relaxor ferroelectrics revealed by high-resolution PFM and quantification of the relaxation behavior via high-speed PFM.*
4. V Multifrequency AFM Conference.  
Holiday Inn Hotel Bernabéu, Madrid, Spain, June 2014.  
Oral Contribution: *Surface and Volume Properties of Elastomeric Polypropylene Studied with Enhanced Atomic Force Microscopy Methods.*

5. MRS Spring Meeting & Exhibit 2013.  
Moscone West, San Francisco, USA, April 2013.  
Oral Contribution: *Surface Properties of Elastomeric Polypropylene Studied with Enhanced Atomic Force Microscopy Methods.*
6. IV Multifrequency AFM Conference.  
Ayre Gran Hotel Colon, Madrid, Spain, October 2012.  
Oral Contribution: *Repulsive Bimodal Atomic Force Microscopy on Polymers.*
7. IV International Meeting on AFM in Life Sciences and Medicine.  
Institut Curie, Paris, France, August 2011.  
Oral Contribution: *Nanomechanical Coupling Enables Detection and Imaging of 5 nm Superparamagnetic Particles in Liquid.*
8. III Multifrequency AFM Conference.  
Ayre Gran Hotel Colon, Madrid, Spain, March 2011.  
Local Organizer and Oral Contribution: *Nanomechanical Coupling Enables Detection and Imaging of 5 nm Superparamagnetic Particles in Liquid.*
9. II International Workshop on Advanced Atomic Force Microscopy.  
Karlsruhe Institute of Technology, Karlsruhe, Germany, March 2011.  
Oral Contribution: *Nanomechanical Coupling Enables Detection and Imaging of 5 nm Superparamagnetic Particles in Liquid.*
10. VIII Seeing at the Nanoscale International Conference.  
Congress Center, Basel, Switzerland, August/September 2010.  
Oral Contribution: *High-Resolution Imaging of Ferritin by Bimodal Magnetic AFM in Liquid.*
11. XII International Scanning Probe Microscopy Conference.  
Keio Plaza Hotel, Sapporo, Japan, May 2010.  
Oral Contribution: *High-Resolution Imaging of Ferritin by Bimodal Magnetic AFM in Liquid.*
12. XII Annual Linz Winter Workshop: Advances in Single-Molecule Research for Biology & Nanoscience.  
Johannes Kepler Universität, Linz, Austria, February 2010.  
Oral Contribution: *High-Resolution Imaging of Ferritin by Bimodal Magnetic AFM in Liquid.*
13. II Multifrequency AFM Conference.  
Holiday Inn Hotel, Madrid, Spain, June 2009.  
Local Organizer and Oral Contribution: *Bimodal Atomic Force Microscopy of Magnetic Samples.*
14. VI Seeing at the Nanoscale International Conference.  
Maritim proArte Hotel, Berlin, Germany, July 2008.  
Oral Contribution: *Three-Dimensional Microstructure and Micromechanics of Elastomeric Polypropylene.*

## Invited and Expert Talks

- AFM Workshop Featuring Video-Rate AFM (Invited).  
Institute of Physics, Technische Universität Chemnitz, Chemnitz, Germany, December 2017.  
*Nanoskalige Charakterisierung weicher Materie und funktionaler Materialien mittels höherer Schwingungsmoden des Rasterkraftmikroskops.*
- VII Multifrequency AFM Conference (Expert).  
Hotel Eurostars Madrid Tower, Madrid, Spain, April 2018.  
*Sensing in-plane nanomechanical surface and sub-surface properties of polymers: local shear stress as function of the indentation depth.*
- V Multifrequency AFM Conference (Expert).  
Holiday Inn Hotel Bernabéu, Madrid, Spain, June 2014.  
*Surface and Volume Properties of Elastomeric Polypropylene Studied with Enhanced Atomic Force Microscopy Methods.*

## Current Teaching Activities

Lecture: Scanning Probe Microscopy in Materials Science (2013 – now).

Exercise: Solid State Physics (2011 – now).

## Languages

German: Native

English: Fluent

Spanish: Working Knowledge