

# CV Alfred J. Meixner



## ADDRESS

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[www.uni-tuebingen.de/nanospectroscopy](http://www.uni-tuebingen.de/nanospectroscopy)

## PERSONAL INFORMATION

Date of birth: April 29, 1959  
Nationality: Swiss

## EDUCATION

1996 Habilitation in Experimental Physics, Institute of Physics, University of Basel, Switzerland  
1988 Dr. sc. nat., Physical Chemistry, Chemistry Department, Swiss Federal Institute of Technology (ETH) Zürich, Switzerland, Grade: summa cum laude  
1984 Diploma in Chemistry, Diplom Chemiker ETH, Chemistry Department, Swiss Federal Institute of Technology (ETH) Zürich, Switzerland

## CURRENT POSITION

Dec. 2004 - Full Professor of Physical Chemistry, Ordinarius, (C4), Faculty of Sciences, Department of Chemistry, Eberhard Karls University of Tübingen, Germany

## PREVIOUS POSITIONS

1998 – 2004 Full Professor of Physical Chemistry (C4), Faculty of Chemistry and Biology, University of Siegen, Germany  
1996 – 1998 Associated Professor of Physics (C3), Faculty of Sciences, Physics Department, Technical University of Dresden, Germany  
1992 – 1996 Junior Group Leader, Institute of Physics, University of Basel, Switzerland  
1990 – 1991 Postdoc. IBM Almaden Research Center, San Jose California, USA  
1984 – 1990 Research Assistant, Physical Chemistry Laboratory, Chemistry Department, Swiss Federal Institute of Technology (ETH) Zürich, Switzerland

## FELLOWSHIPS AND AWARDS

1996 Chaired Position: Eminent Chair called “Eckprofessur” awarded by the Ministry of Science of the State Nordrhein-Westfalen, Germany  
1992 – 1994 Scholarship: Fellow of the Treubel Foundation of the University of Basel, Switzerland  
1992 IBM-Almaden Invention Achievement Award, IBM-Research Laboratory, IBM – Corporation, USA  
1990 – 1991 Postdoctoral Fellowship, IBM World Trade Fellow, IBM-Corporation, USA

1988 ETH-Medal for excellent PhD-thesis, Swiss Federal Institute of Technology Zürich, Switzerland

### **SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS**

2005 – present Number of Postdocs: 23 / PhD Students: 23 / Master Students: 19  
Faculty of Sciences, Dept. of Chemistry, Eberhard Karls University of Tübingen, Germany

1998 – 2004 Number of Postdocs: 3 / PhD Students: 11 / Master Students: 13 Faculty of Chemistry and Biology, University of Siegen, Germany

1996 - 1998 Number of Postdocs: 1 / PhD: 4 / Master Students: 2  
Faculty of Sciences, Physics Department, Technical University of Dresden, Germany

### **TEACHING ACTIVITIES**

According to German regulations the teaching duties of a university professor are 9 hours per week during the semester including lectures, seminars and lab. courses. (in total 28 weeks per year)

2005 – Faculty of Sciences, Department of Chemistry, Eberhard Karls University of Tübingen,  
Topics for Master/Diploma Students: Advanced Physical Chemistry, Spectroscopy, Statistical Thermodynamics, Transport, Laser Spectroscopy, Nanooptics, Analytical Chemistry.  
Topics for Bachelor Students: Physical Chemistry III, Introduction to Spectroscopy

1998 – 2004 Faculty of Chemistry and Biology, University of Siegen, Germany  
Introduction to Chemistry, Thermodynamics, Electrochemistry, Chemical Kinetics, Introduction to Spectroscopy, Adv. Spectroscopy, Statistical Thermodynamics

1996 – 1998 Faculty of Sciences, Physics Department, Technical University of Dresden, Germany  
Laserphysics

### **ORGANISATION OF SCIENTIFIC MEETINGS**

2016 Co-Organizer (with Prof. Anlian Pan) of Second Sino-Germany Bilateral Symposium on Nano-Photonics and Nano-Optoelectronics, 80 participants, Univ. of Tübingen, Germany

2014 Co-Organizer (with Prof. Anlian Pan) of First Sino-Germany Bilateral Symposium on Nano-Photonics and Nano-Optoelectronics, 80 participants, Hunan University, China

2012 Organizer of “International Conference On Hole Burning, Single Molecule and Related Spectroscopies: Science And Applications”, 130 participants, University of Tübingen Germany

### **INSTITUTIONAL RESPONSIBILITIES**

Dec. 2004 – Faculty member, University of Tübingen, Germany

2006 – Director, Institute of Physical and Theoretical Chemistry, University of Tübingen, Germany

2010 – 2012 Member of the Science Faculty Executive Board, University of Tübingen, Germany

2010 – 2012 Member of the Science Faculty Council, University of Tübingen, Germany

2006 – 2012 Member, Research Network “*NANOLUM*” University of Tübingen and University of Lyon

2005 Member and head of several search committees for faculty positions, University of Tübingen, Germany

2001 – 2004 Member of the Senate, University of Siegen, Germany

1999 – 2004 Member and head of several search committees for faculty positions, University of Siegen, Germany

### **COMMISSIONS OF TRUST**

#### **Review Panel Member**

Evaluator panel member for the “Institute Lumière Matière, Université Lyon 1, France”, 2010.  
For the German Research Society for establishing and reviewing several Large Collaborative Research Centres years 2016, 2014,  
Canada Foundation of Innovation, Leading Edge Fund, Toronto, Canada, 2012

**Reviewer for grant proposals** for the German Research Society, Alexander v. Humboldt Foundation, ERC, National Science Foundation (USA).

**Reviewer for Journals** such as Nature, Nanolett, ACS nano, Small, Adv Matter, Angew Chem, JACS, Phys Rev Lett, Phys Rev, J Phys Chem, PhysChemChemPhys, Opt Lett, Opt Express, Apl Phys Lett, etc..

**Editorial board:** Co-Editor for Beilstein Journal of Nanotechnology and Journal of Raman Spectroscopy

## MEMBERSHIPS OF SCIENTIFIC SOCIETIES

German Physical Society (DPG), German Chemical Society (GDCh), European Optical Society (EOS), Optical Society of America (OSA), American Chemical Society (ACS), SPIE

## MAJOR COLLABORATIONS (proven by common peer reviewed publications)

Prof. Monika Fleischer: Spectroscopy of single plasmonic nanostructures, Institute of Applied Physics, Univ. of Tübingen, Germany

Prof. Frederik Huisken: Spectroscopy of single quantum dots, Institute of Solid State Physics, University of Jena, Germany

Prof Pierre Adam, Nonlinear optical spectroscopy of plasmonic nanostructures, Université de Technologie de Troyes, France

Prof. Christian Hafner, Simulation of metallic SNOM tips, Swiss Federal Institute of Technology (ETH), Zürich, Switzerland

Prof. Jazek Waluk, Optical single molecule spectroscopy, Institute of Phys. Chem., Polish Academy of Science, Warsaw, Poland

Prof. Anlian Pan, Spectroscopy of optical nanomaterials, Phys. Dept., Hunan Univ., Changsha, China

Prof. Peter Lu, Optical Single Molecule Spectroscopy, Chem. Dept., Bowling Green Univ., Ohio, USA

## RESEARCH FIELDS

In Tübingen I have established a very comprehensive research program on 1) optical single spectroscopy (fluorescence, Raman scattering), including also quantum dots and gold nanoparticles and 2) tip/plasmon enhanced near-field optical microscopy in the spectral and time domain, respectively.

1) Single molecule spectroscopy: Introduced radially and azimuthally polarized excitation to determine 3D orientation of transition dipole of single molecule from confocal excitation patterns. Introduced tunable  $\lambda/2$ -Fabry-Pérot resonators to single-molecule/particle spectroscopy to control radiative rate, Förster energy transfer and fluorescence quantum yield or localization with 10 nm precision.

### 10 important publications:

- Strong and Coherent Coupling of a Plasmonic Nanoparticle to a Subwavelength Fabry-Pérot Resonator, A Konrad, AM Kern, M Brecht, AJ Meixner, Nano Lett 15 (7), 4423-4428 (2015)
- Coupling single quantum dots to plasmonic nanocones: optical properties AJ Meixner, R Jäger, S Jäger, A Bräuer, K Scherzinger, J Fulmes, et al. Faraday Discuss 184, 321-337 (2015)
- Controlling the dynamics of Förster resonance energy transfer inside a tunable sub-wavelength Fabry-Pérot-resonator, A Konrad, M Metzger, AM Kern, M Brecht, AJ Meixner, Nanoscale 7 (22), 10204-10209 (2015)
- Measurement of Vibrational Modes in Single SiO<sub>2</sub> Nanoparticles Using a Tunable Metal Resonator with Optical Subwavelength Dimensions, AI Chizhik, AM Chizhik, AM Kern, T Schmidt, K Potrick, F Huisken, AJ Meixner, Phys. Rev. Lett. 109 (22), 223902 (2012)
- Probing the radiative transition of single molecules with a tunable microresonator, AI Chizhik, AM Chizhik, D Khoptyar, S Bär, AJ Meixner, J Enderlein, Nano Lett 11 (4), 1700-1703 (2011)
- Excitation isotropy of single CdSe/ZnS nanocrystals, AI Chizhik, AM Chizhik, D Khoptyar, S Bär, AJ Meixner, Nano Lett 11 (3), 1131-1135 (2011)
- Three-Dimensional Orientation of Single Molecules in a Tunable Optical  $\lambda/2$  Microresonator, R Gutbrod, D Khoptyar, M Steiner, AM Chizhik, AI Chizhik, S Bär, AJ Meixner, Nano Lett 10 (2), 504-508 (2010)
- Imaging and Spectroscopy of Defect Luminescence and Electron-Phonon Coupling in Single SiO<sub>2</sub> Nanoparticles, AM Chizhik, AI Chizhik, R Gutbrod, AJ Meixner, T Schmidt, J Sommerfeld, F Huisken, Nano Lett 9 (9), 3239-3244 (2009)
- Tuning the fluorescence emission spectra of a single molecule with a variable optical subwavelength metal microcavity, A Chizhik, F Schleifenbaum, R Gutbrod, A Chizhik, D Khoptyar, AJ Meixner, J Enderlein, Physical Rev Lett 102 (7), 073002 (2009)
- Orientational imaging of subwavelength Au particles with higher order laser modes, AV Failla, H Qian, H Qian, A Hartschuh, AJ Meixner, Nano Lett 6 (7), 1374-1378 (2006)

2) Tip enhanced near-field optical microscopy & spectroscopy with a spatial resolution down to four

nanometers: We have introduced a high NA parabolic mirror and radially polarized illumination for perfect diffraction limited excitation along the tip axis with the highest possible signal collection efficiency and minimum background.

### 10 important Publications:

- Revealing nanoscale optical properties and morphology in perfluoropentacene films by confocal and tip-enhanced near-field optical microscopy and spectroscopy, X Wang, K Broch, F Schreiber, AJ Meixner, D Zhang, PhysChemChemPhys 18 (23), 15919-15926 (2016)
- Enhancement of Radiative Plasmon Decay by Hot Electron Tunneling X Wang, K Braun, D Zhang, H Peisert, H Adler, T Chassé, AJ Meixner ACS Nano 9 (8), 8176-8183 (2015)
- Superluminescence from an optically pumped molecular tunneling junction by injection of plasmon induced hot electrons, K Braun, X Wang, AM Kern, H Adler, H Peisert, T Chassé, D Zhang, AJ Meixner, Beilstein J. Nanotech. 6, 1100 (2015)
- Au nanotip as luminescent near-field probe, S Jäger, AM Kern, M Hentschel, R Jäger, K Braun, D Zhang, H Giesen, AJ Meixner, Nano Lett 13 (8), 3566-3570 (2013)
- Simultaneous Spectroscopic and Topographic Near-Field Imaging of TiO<sub>2</sub> Single Surface States and Interfacial Electronic Coupling, PC Sevinc, X Wang, Y Wang, D Zhang, AJ Meixner, HP Lu, Nano Lett 11 (4), 1490-1494 (2011)
- High-Resolution Spectroscopic Mapping of the Chemical Contrast from Nanometer, Domains in P3HT: PCBM Organic Blend Films for Solar-Cell Applications, X Wang, D Zhang, K Braun, HJ Egelhaaf, CJ Brabec, AJ Meixner, Adv Funct Mater 20 (3), 492-499 (2010)
- Nanoscale spectroscopic imaging of organic semiconductor films by plasmon-polariton coupling, D Zhang, U Heinemeyer, C Stanciu, M Sackrow, K Braun, LE Hennemann, X Wang, R Scholz, F Schreiber, AJ Meixner, Phys. Rev. Lett. 104 (5), 056601 (2010)
- Tighter focusing with a parabolic mirror, J Stadler, C Stanciu, C Stupperich, AJ Meixner, Optics Lett. 33 (7), 681-683 (2008)
- Imaging Nanometre-Sized Hot Spots on Smooth Au Films with High-Resolution Tip-Enhanced Luminescence and Raman Near-Field Optical Microscopy, M Sackrow, C Stanciu, MA Lieb, AJ Meixner, ChemPhysChem 9 (2), 316-320 (2008)

### PUBLICATION RECORD

I am the first author or co-author of more than 200 peer reviewed papers, several review articles and book chapters with more than 5000 citations and an h-factor of 39 (Google Scholar, Aug. 28. 2016).

### CONFERENCE CONTRIBUTIONS

My group is invited about 8 times per year to present an invited talk at international recurring conferences or summer schools. The following conferences I have attended since 2010 and gave an invited talk:

- 2010 DPC10, Argonne Nat Lab / NFO 11, Beijing / TaCoNa-Photonics, Karlsruhe, Germany
- 2011 Photonics West, SPIE, San Francisco / TERS II, London / WE-Heraeus Seminar 488, Chemnitz
- 2012 FiO, OSA Annual Meeting, Rochester / EIOPTICS, International Summer School, Erice, Italy/NFO12, San Sebastian, Spain / WE-Heraeus Seminar 491, Bonn, Germany
- 2013 TERS III Zürich /SPIE Optics+Photonics, San Diego / FLAMN-13, St. Petersburg / OSI-10, Chemnitz
- 2014 COST Nanospectroscopy, Tübingen / EPIOPTICS, International Summer School, Erice, Italy / ICORS, Jena /NFO13, Snowbird, USA / TERSIV, Rio de Janeiro / SPIE-Photonics Europe, Brussels / FOP3, Xiamen, China
- 2015 CLEO, San Jose, USA / IMRC, Cancun, Mexico / HBSM 2015, Tartu, Estonia / UNO-4, Dürkheim, Germany / Faraday Discussions, London / IKSS 2015 International Summer School on Plasmonics, Krutyn, Poland; TERS V, Osaka

### SCIENTIFIC ADVISORY BOARD MEMBER, STEERING BOARD MEMBER

International Conference On Hole Burning, Single Molecule and Related Spectroscopies: (HBSM) years 2015, 2012, 2010, 2008, 2006, ...

International Conference on Near-Field Optics and Related Techniques (NFO), years 2014, 2012, 2010, 2008, 2006, ...

International Conference on Dynamical Processes in Condensed Matter (DPC), years 2016, 2013, 2011,

International Conference on Tip-Enhanced Raman Spectroscopy (TERS) years 2015, 2013.

### PATENTS

We have launched the following patent applications in the last 10 years:

- DE 10 2008 003 291.3, Vorrichtung zum Aufbau eines optischen Nahfeldmikroskops, basierend auf einer konfokal beleuchteten Antennenspitze in einem Parabolspiegelmikroskop, date 05.01.2008
- DE 10 2008 003 284.0, Vorrichtung zum Aufbau eines optischen Nahfeldmikroskops, basierend auf einer konfokal beleuchteten Antennenspitze in einem Parabolspiegelmikroskop, date 05.01.2008
- DE10 2014 011 146 und PCT/DE2015/000361, Kristalline Metallcyanurat-Verbindungen, Verfahren zu deren Herstellung sowie ihre Verwendung
- DE 10 2009 005 953.9, EP 107 004 99.6 and US13/144,729, Verfahren und System zur Charakterisierung einer Probe mittels bildgebender Fluoreszenzmikroskopie

### **SUPPORTING OUTSTANDING YOUNG RESEARCHERS**

I have contributed as supervisor to launching the careers of six young outstanding researchers who were junior professor or junior group leaders in my research team:

*(Name, present position, position in my group from – to)*

- Prof. Dr. Achim Hartschuh, Ludwig Maximilians University of Munich, Jun. Prof. 2003-2006
- Prof. Dr. Marc Brecht, Reutlingen University, Germany, Heisenberg-Fellow 2010-2013.
- PD. Dr. Frank Schleifenbaum, Habilitation 2012, Manager, Berthold Technologies, Germany, junior research group leader 2008-2013.
- PD. Dr. Dai Zhang, Habilitation 2012, permanent senior research staff member in my group, junior research group leader 2007-2012.
- Dr. Xiao Wang, has an offer as full professor of Physics, Hunan University, Changsha, China, junior research group leader 2012-2016.
- Dr. Marcus Scheele, Emmy Noether Fellow, junior research group leader, 2013 - present.

*Updated 11. Oct. 2016*