

Dr. Dai Zhang

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The Institute of Physical and Theoretical Chemistry
University of Tübingen,
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Personal Data:

Nationality: Chinese
Gender: Female
Date of Birth: 10. 07. 1977
Languages: English (excellent knowledge spoken and written), German (good), Chinese (native)

Working Experience:

- Oct. 2007- Habilitation (due to finish: March 2012), Junior group leader, Tübingen, Germany
The Institute of Physical and Theoretical Chemistry, University of Tübingen
(with Prof. Alfred J. Meixner)
Research area:
- *Classic and high-resolution optical (Raman and photoluminescence) microscopy and scanning probe microscopy*
 - *Electron transfer process at the organic solar cell blend film interfaces*
 - *Plasmonic properties of metallic nanostructures*
 - *Spectroscopic investigation of biological system*
- Sept. 2006- Sept.2007 Research Fellow, Southampton, UK
The School of Chemistry, Southampton University
(with Dr. Andrea E. Russell and Prof. Philip N. Bartlett)
Research Area:
- *Surface-enhanced IR spectroscopic (SEIRS) study of (sub)monolayer organic adsorbates on photonic crystal surfaces (Ag, Au, Pt, etc.)*
 - *Plasmon modulation by tailoring the photonic crystal structure*
 - *Electrochemical deposition of two- or three- dimensional metal photonic crystals*
- Sept. 2004-Aug. 2006 Postdoctoral Researcher, Berlin, Germany
The Department of Physical Chemistry, Fritz Haber Institute of the Max Planck Society
(with Dr. Bruno Pettinger, Prof. Dr. Gerhard Ertl)
Research Area:
- *STM tip-enhanced Raman spectroscopic (TERS) study of the orientations of DNA bases (adenine, thymine, guanine and cytosine) on Au (111) surfaces under different chemical environments*
 - *TERS study of the hydrogen bondings between adenine and thymine under different chemical environments*
 - *Single dye molecule detection by TERS*
 - *Fundamental studies of the near-field properties of TERS technique*

Education:

- Sept. 2001-July 2004 Ph. D, Nanjing, P. R. China
Chemistry Department, Nanjing University
(supervisors: Prof. Xinghua Xia and Prof. Hongyuan Chen)
Thesis: *The preparation and application of nanomaterials in biocatalysis and electrocatalysis*
- Sept. 1998-July 2001 M. Sc., Xinxiang, P. R. China
Chemistry Department, Henan Normal University
(supervisor: Prof. Zhenhui Wang)

Thesis: Electrochemically induced polymerization and its applications in trace neurotransmitter detections

Sept. 1994-July 1998 B. Sc., Xinxiang, P. R. China
Chemistry Department, Henan Normal University

Honors/Awards:

- 2010 Arbeitsgemeinschaft Deutscher Universitäts-Professoren für Chemie (ADUC)
Jahrespreis 2010 für Habilitanden und Habilitandinnen, Germany
- 2010 Helene-Lange-Preis, Germany
- 2004-2006 Max-Planck-Stipend, Fritz Haber Institute of the Max Planck Society, Germany
- 2003 The First-class Scholarship for Excellent Graduate at Nanjing University, P. R. China
- 2001 The Excellent Graduate of Henan Normal University, P. R. China
- 1995-1998 The First-class Scholarship of Henan Normal University, P. R. China

Grants:

- 2011 pending:
(Co-Principle Investigator) *Projektantrag beim Bundesministerium für Bildung und Forschung (BMBF): 'Zuverlässigkeit der organischen Photovoltaik (ZOPV)'*.
- 2011-2014 **(Co-Principle Investigator)** *Forschungsprogramm, Organische Photovoltaik & Farbstoffsolarzellen der BW-Stiftung: 'Nanostrukturierte organische Photovoltaik-Zellen'*.
- 2010 **(Host group)**: Chinese Scholarship Council (CSC) grant (twelve months, Ph. D program) with project *'The Exploration of Novel Optical Characteristics of Nanostructured Oxides Synthesized by the Supercritical Carbon Dioxide Technique'*.
- 2010 **(Host group)**: DAAD - K.C. Wong Postdoctoral Fellowship (nine months, visiting professor program) with project *'Non-destructive Analysis of Bacterial Biofilm by Parabolic Mirror-assisted Tip-enhanced Nanoscale Raman Microscopy'*.
- 2009-2012 **(Co-Principle Investigator)**: *DFG Schwerpunktprogramms 'Ultrafast Nanooptics' project: 'Tip-enhanced Ultrafast Spectroscopy and Microscopy of Exciton Generation, Diffusion and Dissociation in Organic Solar Cell Blend Film'*.
- 2010-2011 **(Principle Investigator)**: *Strukturfonds/Projektförderung für Nachwuchswissenschaftler/Innen, 'Nanometer Scale Spectroscopic Investigation of Polysaccharide Intercellular Adhesin Production during Bacteria Biofilm Formation'*.
- 2008 **(Personal)**: Travel grant, University Tübingen Equal Opportunity Office.

Teaching Experience:

- 'Laser' course for diploma students, winter semester, 2011
- Physical Chemistry 4b (*Struktur der Materie, Spektroskopie*)
Exercises seminar for diploma students, summer semester, 2011.
- Physical Chemistry 4a (*Struktur der Materie, Spektroskopie*)
Exercises seminar for diploma students, winter semester, 2010.
- 'Nano-optics' course for diploma students, summer semester, 2010, 2011
- Advanced Physical Chemistry (*Irreversible Prozesse, Transport*)
Exercise assistant for diploma students, summer semester, 2010.
- Lab courses (*UV-Vis spectroscopy and Polarography*),
Professor assistant for diploma students, winter semester, 2009

Invited talks:

- The 10th International Near-field Optics Conference, Buenos Aires, Argentina, **Keynote talk**, *Parabolic Mirror Assisted Near-field Optical Microscopy-Molecular Domains in Organic Semiconductor Films*, **30 min.**, 3 September, 2007.
- Prof. Peter Hildebrandt, Technical University, Berlin, *Near-field Optical Microscopy*, **60 min.**, June, 2008.
- Lawrence Berkeley National Laboratory's Molecular Foundry, USA, *Near-field Enhanced Spectroscopic Imaging and its Application in the Organic Solar Cell System*, **45 min.**, 27 July, 2009.
- Laser Scan Optical Microscopy Workshop, Tübingen, *High-resolution Raman Microscopy*, **45 min.**, 21 October 2009.

5. Prof. Xinghua Xia, Nanjing University, China, *Near-field Enhanced Spectroscopic Imaging*, **60 min.**, 18 December 2009.
6. NanoMatch Marie-Curie Research Training Network workshop, *High-resolution Optical Microscopy and its Application in Studying Organic Solar Cell Blend Film*, Tübingen, **45 min.**, 9 March 2010.
7. Goslar Female Scientist Workshop 'From the Witches Cauldrons in Material Science', *Correlations between the Morphology and the Local Photophysics of Organic Solar Cell Blend Films at Nanometer Scale*, **45 min.**, 30 April 2010.
8. „China-Woche“ der Universität Tübingen, *Alternative Energy*, **15 min.**, 17 May 2010.
9. NanoLum Workshop on Nanostructures, Nano-optics and Nano-technologies, Porquerolles, France, *Tip-enhanced Spectroscopy and Microscopy of Organic Solar Cell Blend Film*, **45 min.**, 30 June 2010.
10. Dr. Mohammadi, Institute of Microtechnique Mainz, *Applying Enhanced Raman Spectroscopy to Material Science*, **60 min.**, 12 July 2010.
11. Prof. Dr. Christoph Lienau, University of Oldenburg, *Tip-enhanced Spectroscopic Mapping*, **40 min.**, 22 Oct. 2010.
12. Prize awarding talk for the Habilitation prize of Die Arbeitsgemeinschaft Deutscher Universitäts-Professoren für Chemie (ADUC), Mainz, *High-resolution Gap-mode Optical Microscopy*, **25 min.**, 14 Mar. 2011.
13. Prof. Dr. S. Hashmi, University of Heidelberg, *High Resolution Optical Microscopy*, **45 min.**, 5 July 2011.
14. Prof. Dr. Christoph Lienau, University of Oldenburg, *Principle and Application of High Resolution Optical Imaging*, **45 min.**, 22 Oct. 2011.
15. Prof. Dr. H.-J. Werner, University of Stuttgart, *High-resolution Optical Microscopy and its Applications in Material Science*, **30 min.**, 16 Dec., 2011.
16. Prof. Richard Palmer, University of Birmingham, invited talk for 'The 13th International Conference on Desorption and Dynamics Induced by Electronic Transitions incorporating '12 AM, the meeting for Atomic Manipulation', Stratford-upon-Avon, UK, 2-6 July, 2012.

Publications:

Book Chapters:

42. *Tip-enhanced Near-field Optical Spectroscopy and Microscopy*, in *Handbook of Spectroscopy*, **Zhang, D.**, Meixner, A. J., Wiley-VCH, in progress, 2011.
41. *Parabolic Mirror Assisted Gap-Mode Optical Ultramicroscopy*, in *Handbook of Molecular Plasmonics*, **Zhang, D.**, Meixner, A. J. Pan Stanford Publishing Pte Ltd, 2011.
40. *Weak interaction in Chemistry*, in *Prospective of Analytic Chemistry*. Xia, X. H., Wang, K., **Zhang, D.**, Zhou, T., Eds: Wenping Liang, Qiankun Zhuang, Science Press, 2003.

Peer-reviewed Publications (corresponding author *, h-index: 12; 550 times citations (55 p.a.):)

39. Jiao, J. Q., Wang, X., Wackenhut, Horneber, A., F., Failla, A.V., Chen, L. P., Meixner, A.J.* , **Zhang, D.***, *Polarization-dependent Surface-enhanced Raman Spectroscopy at Differently Oriented Single Gold Nanorods*, *ChemPhysChem*, Revision, 2011. **(Invited)**
38. Wang, X., **Zhang, D.** (equal contribution to the first author), Wang, Y. M., Sevinc, P., Lu, H. P., Meixner, A.J.* , *Interfacial Electron Transfer Energetics Studied by High Spatial Resolution Tip-Enhanced Raman Spectroscopic Imaging*, *Angew. Chem. Int. Edit*, 50 (2011) A25-A29.
37. **Zhang, D.***, *High-resolution Optical Microscopy and Spectroscopy*, *Bunsen Magazin*, 5 (2011) 127-135. **(Invited 'Aspekte')**
36. Wang, X., Azimi, H., Morana M., Egelhaaf, H.-J., Meixner, A. J., **Zhang, D.***, *Additive Effects on the Phase Separation and Photo-oxidation Behaviors of Low Band-Gap Polymer: Fullerene Blend Film*, *Small*, 7 (2011) 2793-2800.
35. Löffler, R., Häffner, M., Visanescu, G., Weigand, H., Wang, X., **Zhang, D.**, Fleischer, M., Meixner, A.J., Fortágh J., Kern D.P.* , *Optimization of plasma-enhanced chemical vapour deposition parameters for the growth of individual vertical carbon nanotubes as field emitters*, *Carbon* 49 (2011) 4197-4203.

34. Fang, Z.Y.; Lin, C.F.; Fan, L.R.; **Zhang, D.**; Meixner, A.J., Zhu, X.* , *Plasmonic Coupling of Bowtie Antennae with Ag Nanowire*, Nano Lett., 11 (2011), 1676 – 1680.
33. Sevinc, P., Wang, X., Wang, Y. M., **Zhang, D.**, Meixner, A.J.* , Lu, H. P.* , *Simultaneous Spectroscopic and Topographic Near-Field Imaging of TiO₂ Single Surface States and Interfacial Electronic Coupling*, Nano Lett., 11 (2011), 1490 - 1494.
32. Meixner, A. J., Wang, X., **Zhang, D.**, *Super-resolution spectroscopic imaging of plastic solar cells*, SPIE Newsroom, 16 Feb. 2011, DOI: 10.1117/2.1201101.003418. **(Invited)**
31. **Zhang, D.***, Horneber, A., Mihaljevic, J., Heinemeyer, U., Braun, K., Schreiber, F., Scholz, R., Meixner, A. J.* , *Plasmon Resonance Modulated Photoluminescence and Raman Spectroscopy of Diindenoperylene Organic Semiconductor Thin Film*, J. Luminesc., 131 (2011) 502 – 505.
30. **Zhang, D.***, Heinemeyer, U., Stanciu, C., Sackrow, M., Braun, K., Hennemann, L. E., Wang, X., Scholz, R., Schreiber, F., Meixner A. J.* , *Nanoscale spectroscopic imaging of organic semiconductor films by plasmon-polariton coupling*, Phys. Rev. Lett. 104 (2010) 056601-056605.
29. Hennemann, L.E., Meixner, A. J., **Zhang, D.***, *Surface- and Tip-Enhanced Raman Spectroscopy of DNA*, Spectrosc. Biomed. Appl., 24 (2010) 119-124.
28. **Zhang, D.***, Domke, K. F., Pettinger, B., *Tip-enhanced Raman Spectroscopic Studies of the Hydrogen Bonding Between Adenine and Thymine Adsorbed on Au (111)*, ChemPhysChem, 11 (2010) 1662-1665.
27. **Zhang, D.***, Wang, X., Braun, K., Egelhaaf, H.-J., Fleischer, M., Hennemann, L., Hintz, H., Stanciu, C., Brabec, C. J., Kern, D. P., Meixner, A. J.* , *Parabolic mirror-assisted tip-enhanced spectroscopic imaging for non-transparent materials*, J. Raman Spectrosc. 40 (2009) 1371-1376. **(Invited)**
26. Fleischer, M.* , **Zhang, D.**, Braun, B., Jäger, S., Ehlich, R., Häffner, M., Stanciu, C., Hörber, J. K. H., Meixner, A. J., Kern, D. P., *Tailoring gold nanostructures for near-field optical applications*, Nanotechnol. 21 (2010) 065301.
25. Wang, X., **Zhang, D.***, Braun, K., Egelhaaf, H.-J., Brabec, C. J., Meixner, A. J.* , *High-resolution spectroscopic mapping of the chemical contrast from nanometer domains in P3HT:PCBM organic blend films for solar cell applications*, Adv. Func. Mater., 20 (2010) 492-450.
24. Wang, X., **Zhang, D.***, Braun, K., Egelhaaf, H.-J., Meixner, A. J., *Confocal and near-field spectroscopic investigation of P3HT:PCBM organic blend film upon thermal annealing*, Proc. SPIE 7395 (2009) 73950F.
23. Fleischer, M.* , Braun, K., **Zhang, D.**, Jäger, S., Meixner, A. J., Kern, D. P., *Plasmonic gold structures with individually designed geometries*, Proc. SPIE 7394 (2009) 73941Q.
22. Pettinger, B* , Domke, K. F., **Zhang, D.**, Picardi, G., Schuster, R., *Tip-enhanced Raman scattering: Influence of the tip-surface geometry on optical resonance and enhancement*, Surf. Sci. 603 (2009) 1335-1341.
21. **Zhang, D.**, Wang, C. H., Gao, W., Ding, Y., Chen, H. Y., Xia, X. H.* , *Ordered Macroporous Platinum/Ruthenium Nanocomposites for the Electrooxidation of Methanol*, J. Nanosci. Nanotech., 8 (2008), 979-985.
20. Domke, K. F.* , **Zhang, D.**, Pettinger, B., *Tip-enhanced Raman Spectra of Picomolar Quantities of DNA Nucleobases at Au(111)*, J. Am. Chem. Soc., 129 (2007) 6708-6709.
19. Domke, K. F.* , **Zhang, D.**, Pettinger, B., *Towards Raman Fingerprints of Single Dye Molecules at Atomically Smooth Au(111)*, J. Am. Chem. Soc., 128 (2006) 14721-14727.
18. Pettinger, B.* , Domke, K. F., **Zhang, D.**, Schuster, R., Ertl G., *Direct Monitoring of Plasmon Resonances in a Tip-surface Gap of Varying Width*, Phys. Rev. B. 76 (2007) 113409-113412.
17. Domke, K. F.* , **Zhang, D.**, Pettinger, B., *Enhanced Raman Spectroscopy - Single Molecules or Carbon?*, J. Phy. Chem. C. 111 (2007) 8611-8616.
16. **Zhang, D.**, Gao, W., Xia, X. H.* , Chen, H. Y., *Three-dimensional Ordered Macroporous Platinum-based Electrode for Methanol Oxidation*, Chinese Sci. Bul., 51 (2006) 19-24.

15. Song, Y. Y., **Zhang, D.**, Gao, W., Xia, X.H.*, *Nonenzymatic Glucose Detection by using a Three-dimensionally Ordered Macroporous Platinum Template*, Chem. Eur. J., 11 (2005) 2177-2182.
14. Wang, K., **Zhang, D.**, Zhou, T., Xia, X. H.*, *A Dual-Electrode Approach for Highly Selective Detection of Glucose Based on Diffusion Layer Theory: Experiments and Simulation*, Chem. Eur. J., 11 (2005), 1341-1347.
13. Yao, Y. L., **Zhang, D.**, Xia, X. H.*, *Study on Deposition Mechanism of Pt Nanoparticles on Carbon Nanotube*, Chin. J. Inorg. Chem., 20 (2004) 531-535.
12. **Zhang, D.**, Zhang, K., Yao, Y. L., Xia, X. H.*, Chen, H. Y., *Multilayer Assembly of Prussian Blue Nanoclusters and Enzyme-Immobilized Poly(toluidine blue) Films and its Application in Glucose Biosensor Construction*, Langmuir, 20 (2004) 7303-7307.
11. **Zhang, D.**, Chen, Y., Chen, H. Y., Xia, X. H.*, *Silica-nanoparticle-based Interface for the Enhanced Immobilization and Sequence-specific Detection of DNA*, Anal. Bioanal. Chem., 379(2004) 1025-1030.
10. Wang, Z. H.*, **Zhang, D.**, Zhou, S. P., *The Preparation of Poly (acridine red) film and its Applications in Medicine Detection*, Chin. J. Appl. Chem., 21 (2004) 566-570.
9. Wang, Z. H.*, **Zhang, D.**, Zhou, S. P., *The Electrochemical Behavior of Dobutamine on Poly (aminopyridine) Modified electrode*, Acta Pharm. Sin., 23 (2004) 9-13.
8. **Zhang, D.**, Wang, K., Sun, D. C., Xia., X. H.*, Chen, H. Y., *Ultrathin Layers of Densely Packed Prussian Blue Nanoclusters Prepared from a Ferricyanide Solution*, Chem. Mater., 15 (2003) 4163-4165.
7. **Zhang, D.**, Wang, K., Sun, D. C., Xia, X. H.*, Chen, H. Y., *Potentiodynamic Deposition of Prussian Blue from a Solution Containing Single Component of Ferricyanide and its Mechanism Investigation*, J. Solid State Electrochem., 7 (2003) 561-566.
6. Xia, X. H., **Zhang, D.**, Song, Y. Y., *Influence of Surface Structure of Platinum Electrodes on the Electrooxidation of CO*, Chem. Res. Chinese U., 19 (2003) 474-480.
5. Wang, Z. H.*, Liu, X. H., **Zhang, D.**, Zhou, S. P., *Voltammetric Behavior and Detection of Epinephrine at Poly (4-aminopyridine) Modified Electrodes*, Chinese J. Anal. Lab., 22 (2003) 54 - 58.
4. Xia, X. H.*, **Zhang, D.**, Zhang, K., *Novel Glucose Biosensor Based on Prussian Blue and Toluidine Blue Layer-by-layer Modification*, J. Guangxi Normal Univ. (Nat. Sci. Edi.), 21 (2003) 19-20.
3. Wang, Z. H.*, **Zhang, D.**, Zhang, Y., Zhou, S. P., *A Novel Poly(4-aminopyridine) Modified Electrode for Selective Detection of Uric Acid in the Presence of Ascorbic Acid*, Anal. Lett., 35 (2002) 1453-1464.
2. Wang, Z. H.*, **Zhang, D.**, Zhang, Y., Zhou, S. P., *Voltammetric Behavior and Detection of Dicyanum at Poly (4-aminopyridine) Film Modified Electrode and its Determination by Adsorptive Stripping Voltammetry*, Chin. J. Anal. Chem., 29 (2001) 83-86.
1. Wang, Z. H.*, **Zhang, D.**, Zhang, Y., Zhou, S. P., *Voltammetric Behavior and Detection of Dopamine at Poly (4-aminopyridine) Film Modified Electrode*, Acta Pharm. Sin., 35 (2000) 692-695.