Marco T. Seidel

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Education

11/2003 **Ph.D. Chemistry**, Georg-August-University, Göttingen, Germany
Specialty in biophysical chemistry, *Summa cum laude*

05/2000 **M.S. Chemistry** (German Diplom), Georg-August-University, Göttingen, Germany
Specialty in physical chemistry, *Magna cum laude*

10/1997 **B.S. Chemistry** (German Vordiplom), University Kassel, Germany, *Summa cum laude*

09/2003 **Certificate Laser Technology**, Friedrich-Schiller-University, Jena, Germany
Summa cum laude

Experiences

10/2007 – Present **Senior Scientist, Boise Technology, Inc., Boise, ID**
Investigation of chemical kinetics at liquid/liquid and liquid/solid interfaces using surface sensitive specroscopies (SHG and SFG). Development of a multi-photon and second harmonic generation microscopy research project including the acquisition of a confocal laser scanning microscope.

09/2006 – 09/2007 **Chinese Language studies, Traveling in China and Southeast Asia**
Developed Chinese language skills and knowledge of Asian cultures.

08/2004 – 08/2006 **Postdoctoral Scholar, California Institute of Technology, Pasadena, CA**
Advisor: Prof. Ahmed H. Zewail (Nobel Laureate Chemistry 1999)
Pioneered the emerging field of ultrafast electron crystallography for the study of structural dynamics of Langmuir-Blodgett films of biological model systems, e.g., fatty acids, phospholipids.

01/2004 – 07/2004 **Postdoctoral Scholar in the framework of the Sofia Kovalevskaja award (Alexander-von-Humboldt foundation), Georg-August-University, Göttingen, Germany**
Advisors: Prof. Jürgen Troe, Dr. Kawon Oum, and Dr. Thomas Lenzer
Developed and supervised an ultrafast transient lens experiment and applied it to solutions of various carotenoids.

01/2001 – 12/2003 **Graduate Researcher (Ph.D. Chemistry)**
Max-Planck-Institute for Biophysical Chemistry, Göttingen, Germany
Advisors: Prof. Peter Vöhringer; Thesis: "*Solvation dynamics at biological interfaces*"
Investigated ultrafast solvation dynamics of water at biological interfaces such as lipid membranes and reverse micelles. Studied ultrafast primary events in Green Fluorescent Protein. Designed and performed various ultrafast spectroscopies, e.g., 3-pulse photon-echo peak-shift, transient grating spectroscopy, fluorescence up-conversion, time-correlated single-photon counting.

07/1999 – 12/2000 **Graduate Researcher (M.S. Chemistry)**
Georg-August-University, Göttingen, Germany
Advisors: Prof. Jürgen Troe, Prof. Jörg Schroeder, and Prof. Michael Buback
Thesis: "*Experimental and theoretical investigations on vibrationally hot CO_2 in solution*"
Expanded time and frequency resolved UV-pump-IR-probe spectroscopy to the study of peroxide decomposition and cooling of CO_2 in conventional and supercritical solutions under high pressure.
Industry collaboration with AKZO NOBEL, Netherlands.

10/1995 – 12/2003 **Undergraduate and Graduate Studies**,
Georg-August-University, Göttingen, Germany and University Kassel, Germany

Selected fields of study: Physical chemistry, technical and macromolecular chemistry, polymer chemistry, chemical engineering, analytical chemistry, biochemistry, organic chemistry, inorganic chemistry, physics of vibrations and waves, chaos theory.

10/2001 – 09/2003 **Laser Technology Correspondence Degree Course**
Friedrich-Schiller-University, Jena, Germany

Gained experience with a wide variety of laser systems from a theoretical and practical point of view, e.g., Ti:Sapphire-laser, excimer-laser, dye-laser, CO_2-laser, optical parametric amplifier. Familiar with laser material processing.

Qualified as a Laser Safety Officer.

Teaching Experience

01/2004 – 08/2006 Mentored several students on the undergraduate and graduate level in Germany and the United States.

09/1998 – 09/2000 Teaching assistant for physical chemistry and mathematics at the University Göttingen.

Instructed full-day lab courses in physical chemistry for chemistry, biology and geochemistry majors (typical class sizes around 60 students).

Taught weekly seminars in advanced mathematics for chemistry majors (typical class sizes around 20 students).

Private tutor for chemistry and mathematics.

Language Skills

English (fluent)
German (native speaker)
Mandarin Chinese, 普通话 (beginner)

Interests and Hobbies

Hiking, backpacking, rock climbing, skiing, long distance running,
guitar, photography, Chinese and Asian Culture

Scientific Experience

Mechanism and dynamics of decontamination reactions of pesticides at liquid/liquid and liquid/solid interfaces

Structural dynamics of Langmuir-Blodgett films of biological model systems (e.g., fatty acids, phospholipids) on silicon substrates

Ultrafast primary events in various biological model systems (e.g., Green Fluorescent Protein, carotenoids)

Solvation dynamics in the water pools of reverse micelles

Solvation dynamics of water at the interface of lipid-bilayers spanning time-scales from a few hundred femtoseconds up to tens of nanoseconds

Dynamics and formation of Twisted Intermolecular Charge Transfer (TICT) complexes of Laurdan in confined environments

Mechanisms of decomposition of organic peroxides used in polymerization

Vibrational cooling of CO_2 in organic and supercritical solvents

Experimental Experience

Confocal, SHG, and multi-photon laser scanning microscopy

Second harmonic generation (SHG) and sum frequency generation (SFG) spectroscopy

Ultrafast electron crystallography and diffraction (UEC, UED)

RHEED (reflection high energy electron diffraction)

Ultrafast transient lens spectroscopy

3-Pulse photon-echo peak-shift (3-PEPS) and transient-grating spectroscopy

Time- and frequency-resolved fluorescence spectroscopy: Fluorescence up-conversion and time-correlated single-photon counting (TCSPC)

Time- and frequency-resolved UV-pump-IR-probe spectroscopy

Experience with a wide variety of laser systems: High and low repetition Ti:Sapphire lasers, optical parametric amplifiers, excimer-lasers, dye-lasers, CO_2-lasers

Experience with a wide variety of none time-resolved spectroscopic methods: Steady-state absorption and fluorescence spectroscopy, FT-IR, NMR, Mass spectrometry

Experience with ultrahigh vacuum (UHV) equipment (down to 10^{-10} Torr)

Experience with investigations under high-pressure (up to 4000 bar) and in supercritical fluids (Xenon)

Experience in the preparation of biological model systems: Vesicles, reverse micelles, Langmuir-Blodgett films

Experience in the functionalization of silicon substrates

Publications

1. **Marco T. Seidel**, Songye Chen, and Ahmed H. Zewail, *Ultrafast Electron Crystallography. 2. Surface Adsorbates of Crystalline Fatty Acids and Phospholipids*, J. Phys. Chem. C **111**, (2007) 4920-4928.
2. Songye Chen, **Marco T. Seidel**, and Ahmed H. Zewail, *Ultrafast Electron Crystallography of Phospolipids*, Angew. Chem. Int. Ed. **45**, (2006) 5154-5158.
3. Thomas Lenzer, Kawon Oum, Jaane Seehusen, and **Marco T. Seidel**, *Transient Lens Spectroscopy of Ultrafast Internal Conversion Processes in Citranaxanthin*, J. Phys. Chem. A, **110**, (2006) 3159-3164.
4. Matthäus Kopczynski, Thomas Lenzer, Kawon Oum, Jaane Seehusen, **Marco T. Seidel**, and Vladimir G. Ushakov, *Ultrafast Transient Lens Spectroscopy of various C_{40} Carotenoids: Lycopene, β-Carotene, (3R,3'R)-Zeaxanthin, (3R,3'R,6'R)-Lutein, Echinenone, Canthaxanthin, and Astaxanthin*, Phys. Chem. Chem. Phys. **7**, (2005) 2793-2803.
5. Songye Chen, **Marco T. Seidel**, and Ahmed H. Zewail, *Atomic-Scale Dynamical Structures of Fatty Acid Bilayers observed by Ultrafast Electron Crystallography*, Proc. Natl. Acad. Sci. USA **102**, 25, (2005) 8854-8859.
6. **Marco T. Seidel**, Jaydev Jethwa, and Peter Vöhringer, *On the Origin of the Dynamic Stokes Shift of Laurdan Molecules in Lipid Membranes*, Russ. Chem. Bull., Int. Ed. **53**, 7, (2004) 1471-1476.
7. Kathrin Winkler, Jörg Lindner, **Marco T. Seidel**, and Peter Vöhringer, *Ultrafast Dynamics in the Excited State of Wild-Type Green Fluorescent Protein*, Femtochemistry and Femtobiology – Ultrafast Events in Molecular Science, Editors: Monique M. Martin, James T. Hynes, Elsevier, (2004) 433-436.
8. Kathrin Winkler, **Marco T. Seidel**, and Peter Vöhringer, *Ultrafast Elementary Events in the Excited State of Wild-Type Green-Fluorescent Protein*, Chemical Physics – Ultrafast Phenomena XIII, Editors: R.D. Miller, M. M. Murnane, N. F. Scherer, A. M. Weiner, Springer-Verlag Berlin Heidelberg, (2003) 611-613.
9. **Marco T. Seidel**, *Solvatationsdynamik an biologischen Grenzschichten*, Dissertation, Universität Göttingen, Niedersächsische Staats- und Universitätsbibliothek Göttingen (2003); URL: http://webdoc.sub.gwdg.de/diss/2003/seidel/
10. Michael Buback, Matthias Kling, **Marco T. Seidel**, Frank D. Schott, Jörg Schroeder, and Ulrich Steegmüller, *Picosecond IR Study of UV-Induced Peroxide Decomposition: Formation and Vibrational Relaxation of CO_2 in CH_2Cl_2 Solution*, Z. Phys. Chem. **215**, 6, (2001) 717-735.
11. **Marco T. Seidel**, *Experimentelle und theoretische Untersuchungen an schwingungsheißem CO_2 in Lösung*, Diplomarbeit, Universität Göttingen (2000).

References are available upon request.