doi:10.2533/chimia.2008.157 CHIMIA **2008**, *62*, No. 3

Chimia 62 (2008) 157–161

ISSN 0009–4293

Alumni Profiles

Peter Felder[a], René-Pierre Müller[b], Emil Roduner[c], Hans J. Rosenkranz[d], Herbert Stafast[e], and Thomas Walther[f]

Abstract: Six former students with close remaining ties to UZH have provided short profiles of their experience at UZH and in their later careers. Since their time at UZH, they have become professors, founders of companies, heads of industrial research in leading chemical companies, patent attorneys, among other careers. They clearly illustrate how personally beneficial a UZH training can be.

Keywords: Chemistry Institutes UZH

A large number of undergraduate and doctoral students, as well as post-doctoral and habilitation researchers, came and continue to come from all over the globe to study in Zurich and the alumni represent the UZH tradition as leaders of industry and academia worldwide. Their contribution to the UZH experience provides a strong history upon which current students can build.

As a tribute to our alumni and in celebration of the alumni tradition, several former students with close remaining ties to UZH have provided short profiles of their experience at UZH and in their later career. Since their time at UZH, they have become professors, founders of companies, heads of industrial research in leading chemical companies, patent attorneys, among other careers. They clearly illustrate how personally beneficial a UZH training can be.

*Correspondence:
[a] PD Dr. P. Felder, Schmauder & Partner AG, Zurich
E-mail: p.felder@schmauder-patent.ch
[b] Dr. R.-P. Müller, Quadrant AG, Zurich
E-mail: Rene.Mueller@gplas.com
[c] Prof. Dr. E. Roduner, Institute of Physical Chemistry, University of Stuttgart, Germany
E-mail: e.roduner@ipc.uni-stuttgart.de
[d] Prof. Dr. H. J. Rosenkranz, P.O.Box 201, St. Francis Bay 6312, South Africa
E-mail: hj-rosenkranz@intekom.co.za
[e] Prof. H. Stafast, Institute of Photonic Technology (IPHT), Jena, Germany
E-mail: herbert.stafast@ipht-jena.de
[f] Prof. Dr. T. Walther, Institut für Angewandte Physik, TU Darmstadt, Germany
E-mail: thomas.walther@physik.tu-darmstadt.de

Peter Felder, European Patent Attorney

After graduating in chemistry at ETH Zurich, I carried out a doctoral thesis in physical chemistry under the supervision of the late Professor *H. H. Günthard*. Subsequently, I spent a two-year post-doctoral stay in the group of Professor *Y.T. Lee* at the Lawrence Berkeley Laboratory of the University of California. In the summer of 1984, I joined Professor *J.R. Huber*'s group at the Institute of Physical Chemistry of the University of Zurich, where I spent ten exciting years doing basic research and teaching. In 1995 I took a bold decision and moved to a private firm of intellectual property counsels in Zurich. After several years of hard work I obtained the qualification to practice as a European patent attorney and recently took over the firm as managing partner. I still teach at the University of Zurich, but the topic of my lectures has changed from molecular reaction dynamics to the basics of patent protection, which I try to convey to young scientists in various fields.

Ever since my time as PhD student my research interest was directed to molecular beams. In the Berkeley group, the technology of supersonic beams had been developed to the highest levels of sophistication and was being applied with great success to study bimolecular reactions under single collision conditions. However, the use of continuous beams required very large pumping systems to maintain the necessary vacuum levels. Particularly in connection with the upcoming pulsed laser systems that opened the possibility to investigate photodissociation reactions, the use of a continuous molecular beam was definitely not the best approach! An obvious design improvement was to adopt a pulsed molecular beam running in synchrony with a pulsed laser, thus reducing the amount of gas to be handled by the vacuum system. But although several research groups worldwide had started doing photofragment translational spectroscopy with pulsed molecular beams in the mid-eighties, the technique still had severe drawbacks.

When I joined Professor Huber's group at the University of Zurich, they already had a pulsed molecular beam apparatus that was running very successfully for quantum beat spectroscopy, and a similar apparatus designed for photofragment translational spectroscopy was near completion. Very soon we started taking the first data, which eventually provided interesting new information on the photodissociation of alkyl nitrites. Although the fixed detection geometry severely limited the type of systems that could be studied, the initial results gave

us confidence that we could do much better if we built a variable geometry machine with a more sophisticated detector type and an improved molecular beam source. What followed is definitely a success story. In just about two years we were able to set up a high-performance apparatus that turned out to open new perspectives in photofragment translational spectroscopy. By virtue of its kinetic energy resolution, sensitivity and versatility the apparatus served as a workhorse for many investigators ranging from diploma students all the way to visiting professors. A partial review of this work is given in: P. Felder, 'Photofragment Translational Spectroscopy', *Chimia*, **1994**, *48*, 43.

One of the things I learnt from my time as a researcher at the University of Zurich is how much a comparatively small research team can achieve in a favorable academic environment. One key to success is to focus the available resources to a limited number of well-defined projects. In the Huber Group we had a very fruitful interaction between experimentalists and theoreticians, chemists and physicists, researchers and supporting staff. Everybody was well informed about what the other group members were doing, and an open attitude towards visitors from other institutions kept us in touch with current developments in our field.

As a patent attorney, I deal with other peoples' inventions, seeking to protect the client's innovations and advising them on how to avoid their competitors' patents. One of the challenges for a patent attorney is to quickly understand new developments in a variety of technical fields, which in my case range from biochemistry and medicine across pharma, chemistry and materials technology all the way to physics and software. This is fascinating and challenging, and perhaps it is not as difficult as it may sound: one simply needs to force the inventors to explain their invention until it is clear to everybody! Without any doubt, the time spent at the University of Zurich is an invaluable basis for my present professional activity.

Further details about current activities:
www.schmauder-patent.ch

René-Pierre Müller, Executive Board Member and CEO of Quadrant AG.

After graduating in chemistry at ETH Zurich in 1977, I carried out a doctoral thesis in physical chemistry (*Photochemistry and IR-Spectroscopy of Matrix-isolated Molecules*) under the supervision of Professor *J.Robert Huber* at the Institute of Physical Chemistry at the University of Zurich. Subsequently, I spent a one-year post-doctoral stay in the group of Professor *Richard Saykally* at the Lawrence Berkeley Laboratory of the University of California 1983.

Thereafter I left academe and graduated with an MBA in INSEAD, Fontainebleau, France.

With a background in technology and in business, I then joined Lonza AG (at that time part of the Alusuisse-Lonza Group) in Basel, doing corporate development for the Lonza Group. I could help Lonza in the field of strategy and M&A. In 1988 I started to work for Dr. *Tito Tettamanti*, who had come back from North America in order to do block-investments in mainly Swiss companies (*e.g.* Saurer, Sulzer *etc.*). In 1991 I joined the London- and Paris-based investment-banking group Rothschild's, where I advised corporations in mergers and acquisitions. Having done advisory work for six years, together with two Swiss colleagues from Rothschild's I incorporated an investment company. In 1997 we were able to found the company *Quadrant AG* with headquarters in Switzerland, which has in the meantime developed into a multinational company specialized in high-performance plastics and which is traded on the Swiss stock exchange (SWX). Based on our long-time experience in corporate advisory, mainly for industrial groups, and our M&A experience we were able to acquire companies worldwide for Quadrant in its core-business and make Quadrant a world leader. Quadrant has sites in Japan, Korea, Singapore, China, India, South Africa, Canada, USA, Mexico and several European countries (Switzerland, Germany, Italy, France, Belgium, Netherlands, UK, Poland, Hungary) and supplies semi-finished goods and components to a wide number of industrial customers.

Due to my experience in fundamental research I am happy to be of help also to our R&D teams in Quadrant, although I have to deal with many other things as one of the founders of the company and Executive Board Member and Chief Executive Officer.

I am also proud to have been able to launch the Quadrant prize that is awarded to completed PhD dissertations worldwide in the field of polymer research and its applications (see also *www.quadrant.ch*). The innovation prize is awarded every two years and the winners are chosen by a purely academic jury (Prof. *Jan-Anders Manson*, ETH Lausanne, Switzerland; Prof. *Martin Gruebele*, Univ. of Illinois at Urbana-Champaign; Prof. *Ignaas Verpoest*, Kath. Univ. Loeven, Belgium; Prof. *Volker Altstädt*, Univ. of Bayreuth, Germany). I am also happy that I can be of help to bridge the gap between academe and industry in Switzerland by sitting on the industrial board of the Materials Research Center of the ETH Zürich.

Emil Roduner, Professor of Physical Chemistry, University of Stuttgart

Starting from my background as an elementary school teacher with several years practical experience I obtained most of my training in chemistry at the University of Zurich, except for one year as an exchange student at the Rensselaer Polytechnic Institute in Troy, NY, from which I obtained a degree of MSc in Chemistry. My PhD work under the supervision of Prof. *Hanns Fi-*

scher and direct guidance by *Paul Percival* (now Simon Fraser University, Burnaby, Canada) focused on an exciting new topic: muonium chemistry – using short-lived elementary particles as polarized spin labels in free radical chemistry. The muonium atom is a hydrogen-like one-electron atom with a positive muon as its nucleus. It mass amounts to 1/9th the mass of H, so in a chemical sense it is an ultra-light isotope of hydrogen which reacts basically the same way as H or D, but often with unusually large kinetic isotope effects which are ideal to probe reaction rate theories. It was extremely inspiring to work in this new field that was wide open for creative ideas, and very unusual for a chemist to do experiments around the clock at the accelerator of the new large-scale user facility at PSI.

I believe that this exciting environment provided me with a key experience and with a good portion of creativity that influenced my later development. As a Chair holder in Physical Chemistry at the University of Stuttgart I still prefer to chose subjects for research which nobody has tackled before, for example building a fuel cell that runs inside the microwave resonator of an electron spin resonance spectrometer in order to directly monitor free radical degradation of the proton conducting polymer membrane, or measuring proton conductivity of the same membrane with a spatial resolution of 10 nm using the conductive tip of a scanning atomic force microscope as an electrode. Another project involves making 13-atom platinum clusters in zeolites. They turn out to display highly interesting magnetic properties, which are understood best if one regards the clusters as super-atoms (or pseudo-atoms) with overall cluster molecular orbitals that resemble the familiar atomic orbitals. Studying these tiny bits of platinum also revealed interesting nanosize effects, which eventually led me to write an advanced textbook on 'Nanoscopic Materials – Size Dependant Phenomena' (Royal Society Publishing, 2006). Trying to pass on curiosity to students has always been my passion; it probably traces back to my origin as an elementary school teacher.

Nevertheless, I never forgot my first love – the muons – and the most recent application of these interesting probes relates to a question that was initially posed by industry: what is the fate and location of fragrance molecules in the soft matter structure of a shampoo? Amazingly, this topic turns out to be highly analogous to problems of drug delivery (*i.e.* whether drug molecules prefer to reside within the lipid bilayer of a biological cell membrane or in the aqueous regime of the cell fluid).

Further details about current activities are found on the web:

http://ag-roduner.ipc.uni-stuttgart.de/AG-Roduner/index.html

Hans J. Rosenkranz, former Head of Central Research, Bayer AG

All Began at Rämistrasse

It was in March 1960, and I had freshly graduated as an 'Abiturient' at my hometown Hagen, Western Germany. I intended to study chemistry – I was sure about that – but at which University, that was still undecided. I could have enrolled at one of the universities in our region, for instance in Bonn, Cologne or Munster. But when I learned that I was welcome as a German also at Swiss Universities, the idea to begin my studies in Zurich became increasingly attractive.

I drove to Zurich to get some first-hand information, because my knowledge about the conditions I would meet at these two schools, Zurich University and ETH, were rather limited. I rather tended to join a 'real' than a Technical University, so my first address to go to was the University of Zurich. I entered the impressing main building, took my courage and went to the 'Kanzlei'. A friendly lady there confirmed that I was welcome as a student, and passed me a couple of sheets in A5 format describing the chemistry curriculum. She must have seen my disappointed face because I had really expected more detailed information. So she sent me to the Institute of Chemistry, located opposite to the Main Building, on the other side of Rämistrasse. "Why don't you go to Prof. Schumacher, he is in charge of the beginner's courses in Chemistry? He will explain everything in detail. Let me call and tell him that you are on your way." I could hardly believe my ears. Was there really a genuine professor who sacrifices his precious time to speak with an 'Abiturient', freshly baked in the German provinces? That is exactly what he did, and for almost an hour we talked about studies at Zurich University, the first courses in the Chemistry Laboratories, and about exciting research in his institute. That I had been thoroughly interviewed at the same time, I only realized much later. Anyway, after this meeting I was totally convinced that I would start my studies at this wonderful university. Only a few days later, back in Hagen, I sent my application to Zurich. With the beginning of May 1960, the start of the summer term, I was a proud student of chemistry at the University of Zurich.

The following years were full of challenges, but also we had a wonderful life as students in Zurich. I fondly remember the imposing personalities we had as teachers: Prof. *Hadorn*, Zoology, Prof. *Clusius*, Physical Chemistry, Prof. *Dreiding*, Organic Chemistry, just to name a few amongst many others. And most naturally, since I attained my PhD degree under his supervision, Prof. *Hans Schmid* left the strongest impression on me. He had a never failing sensitivity for interesting scientific topics, but was very meticulous and taught us to adhere to highest standards in the quality of our scientific work. Good laboratory results could always excite him, and he gave his PhD students much freedom to follow their own ideas. In spite of his sometimes aggressive and rough surface he was a caring teacher, and for many of us a real father figure.

After graduating with my PhD in 1967 I stayed on in Hans Schmid's group for another year as a scientific assistant. He had put me in charge of a small research group in photochemistry. We soon became incredibly successful and productive; quite a number of publications originate from this period of time. Those new photochemical reactions of heterocyclic compounds we found were investigated thoroughly during the following years, and became an important research field at the Institute of Chemistry.

When I joined Bayer's research organization in 1968 Hans Schmid certainly was disappointed. I should have stayed longer in scientific research, or at least should have followed his well-meaning advice and applied for a position at one of the chemical companies in Basel. But during my successful career at Bayer I never left chemical research completely. Hans Schmid's strong personality, and the excitement while working with him, must have had a lasting effect on me.

Zurich in the sixties was by far not the International Centre it is today. But the Chemistry Institute of the University was already quite international and very open to the scientific communities in other countries. Our colleagues and post docs came

from all over the world, we had guest professors, and many of our meetings at the institute were held in English. I remember the exciting events when prominent scientists, like for instance R. B. Woodward, gave their lectures, and we all had the feeling to be part of the worldwide chemical research community. It was also this attractive, international environment that influenced my future career at Bayer, a company that grew into a Global Enterprise after the 1980s.

When I look back, 40 years after I left Zurich University, I realize how important this phase of my life has been for everything that happened later in my career. Apart from professional skills I learned to value scientific originality, creativity in people, and the fact that it is always helpful to have a look across fences. Contacts to the Chemistry Institute of Zurich University and to my colleagues never ceased complete. I only can hope that today's chemistry students will remember their years at Zurich University with equal pride and pleasure.

Herbert Stafast, Professor for Applied Laser Technology, Friedrich Schiller University, Jena, and staff position for Scientific Coordination at the Institute of Photonic Technology (IPHT), Jena, Germany

My studies in chemistry at the University of Frankfurt finished with the diploma and doctoral theses in photoelectron spectroscopy under the supervision of Prof. *H. Bock*. During my post-doctoral year 1975/76 in the group of Prof. *K. L. Kompa* at Garching the application of lasers in chemistry and spectroscopy started to dominate my scientific work. In 1977 I joined Prof. *J. Robert Huber* at the University of Konstanz and followed him in 1979 to the Institute of Physical Chemistry of the University of Zurich. After my habilitation in 1985 I returned to Frankfurt, working at first at the University and then at the Battelle Institute. After the reunification of Germany the transformation of the former academy of sciences in the 'new states' represented a great challenge and adventure. In 1993 I was appointed to a professorship at the University of Jena and head of the *Division for Laser Technology at the Institut für Physikalische Hochtechnologie* (IPHT). In 2007 our institute was reorganized and renamed the *Institute of Photonic Technology* (IPHT). Now I am responsible for scientific coordination at IPHT, the largest non-university R&D institute of Thuringia with 250 co-workers, and continue to be professor at the University of Jena.

In retrospection three major decisions have determined most of my academic life, going to Prof. Kompa, to Prof. Huber and to Jena. Prof. Kompa introduced me into multiple IR laser photon excitation of molecules and subsequently supported my laser chemistry work at the University of Frankfurt in 1976/77.

My decision to join Prof. Huber at Konstanz was difficult in view of the poor perspectives for a university career in 1977. The great step into basic science was, however, considerably promoted by our move to Zurich. There we established laboratories in the newly constructed buildings at the Irchel site. The main items of our common work referred to frequency and time domain laser spectroscopy as well as selective photochemistry. Much progress was based on the supersonic molecular beam technique newly built up at Zurich. The collision-free conditions in the beam enabled us to enter the very new field of molecular quantum beat spectroscopy, first published in 1979. Within a year and a half – starting from scratch – we succeeded in 1981 to present new results, attracting prominent visitors to Prof. Huber, *e.g.* the 1999 Nobel Prize winner A.H. Zewail. This work was the beginning of a very successful research period of Prof. Huber and his group for about two decades (*cf. e.g.* R.T. Carter and J.R. Huber, 'Quantum Beat Spectroscopy in Chemistry', *Chem. Soc. Rev.* **2000**, *29*, 305–314). A second beam apparatus was devoted to photofragmentation chemistry ('state-to-state' chemistry) later on pushed particularly by Peter Felder.

My return to Germany guided me to applied research on the deposition and improvement of thin film systems (photovoltaic cells, high–temperature superconductors, ferroelectrics) by applying laser technology. Having established a laser chemistry laboratory at the University of Frankfurt to improve amorphous silicon for solar cells, I obtained the opportunity in 1987 to work in this field on an enlarged scale at the Battelle Institute. The capabilities in manpower, infrastructure and budgets further improved at Jena. Our team of 20 co-workers from the former academy institute grew to 30 co-workers due to successful project fund raising. Furthermore laser spectroscopy became again an important topic with applications in combustion research and high-quality lithography optics.

How can I express the benefit of my time at the University of Zurich? It had a great impact on my professional career and my personnel development. The scientific background, knowledge and experience gained at Zurich enabled me to successfully enter new fields of applied research and to develop programmes for increasing research groups at Frankfurt and at Jena. The Huber group was relatively small but extremely efficient. Its efficiency was mainly based on Prof. Huber's ability to focus on well selected (and repeatedly questioned) topics and to motivate and organize his scientific team and supporting staff. Moreover, his way of taking responsibility for all of his activities within and beyond teaching and science provided a valuable guideline for me. This guideline was particularly helpful when I proceeded to Jena. There research and development represented a minor challenge. It was more challenging to manage the human affairs inherent in the revolution of the political, social and economical conditions following the German reunification.

Thomas Walther, Professor of Physics, TU Darmstadt

After I had completed my studies in Physics at the Ludwig-Maximilians-University, Munich, in early 1990 two things had become quite clear to me: firstly I was fascinated by the working of nature and secondly I wanted to deepen my knowledge and pursue a PhD some place else in order to get to know other universities.

This was the situation when I met Prof. *Huber* from the Institute of Physical Chemistry of the University of Zurich for the first time. He explained the exciting research in his group in vivid terms and shortly after that a visit of his group in Zurich followed. I was immediately fascinated by the research topics, the excellent facilities to perform research and the productive atmosphere in the institute. The team was relatively small and the spirit among the group members intrigued me. I immediately felt welcomed by the group and so I enthusiastically accepted Prof. Huber's offer to join his group for my PhD thesis.

My specific PhD project was at the boundary between laser science, physics and physical chemistry. For a long time Prof. Huber's group had pursued molecular quantum beat spectroscopy. This purely quantum mechanical effect with its close relationship to Young's double slit experiment had not only been explored in atomic systems, but had also been transferred to the molecular regime. Here, Prof. Huber and his coworkers had successfully applied the technique to explore molecular dynamics. My task was to transfer the tool of quantum beat spectroscopy to the electronic ground state of molecules. The project delivered everything I had hoped for. It was very challenging experimentally in that it required making an optical parametric oscillator work on a single longitudinal mode. It was versatile since once in operation the various laser systems at hand could be used in many types of double resonance spectroscopy schemes. Thus, it became possible to implement several novel methods in the field. This included quantum beat spectroscopy in the electronic ground state of a polyatomic molecule (*Chem. Phys. Lett.* **1993**, *209*, 455) and fluorescence dip spectroscopy (*Chem. Phys. Lett.* **1994**, *231*, 64). Finally, the project was very rewarding since by interacting with the various group members as well as international visitors I was able to learn about molecules and their fascinating features – a topic which unfortunately often falls short in standard curricula of studies in physics.

Shortly after finishing my PhD thesis I accepted an offer to join Dr. *Ed Fry*'s group at Texas A&M University working on a project regarding the foundations of quantum mechanics requiring the exact combination of expertise I had been fortunate to have acquired in Zurich: lasers, atomic and molecular spectroscopy. This versatility also earned me the tenure-track assistant professorship at Texas A&M in 1998. In 2002 I returned to Germany, where I became a professor of physics at TU Darmstadt. I am currently the chairman of the physics department. I continue to be fascinated by the possibilities of lasers and pursue experiments in applied and basic research combining lasers, quantum optics and spectroscopic techniques. Just recently we have started to pick up on some of the research that I had started during my PhD. In fact I will be using parts of my old experimental setup – another evidence to show how current the research at the Institute of Physical Chemistry has been. More about my research program can be found under the url *http://www.physik.tu-darmstadt.de/lqo*.

The time I spent at the Institute of Physical Chemistry was very productive. I learned what a small dedicated team focused on specific, closely linked projects can achieve. The entire group spent plenty of time together discussing science and our mutual projects. We shared successes and challenges learning from each other. This cooperative team spirit made the group to such a special place. Moreover, this included the people of the excellent machine and electronic shops. These superb facilities made me realize how crucially important a good support infrastructure is to successful research.

However, the influence on my later path was even more profound: the teaching assistantship awakened my passion for teaching. The abilities of Prof. Huber and his senior research assistants, *Peter Felder* and *Herbert Bitto*, to explain the 'big picture' behind the experiments inspired me, among others, to pursue an academic career. Now, I am striving to generate the same type of environment for my group and inspire my students in a similar manner.