

In memoriam

Prof. Dr. WOLF-DIETER DECKWER

August 3, 1941 – October 4, 2006

A year has passed since we heard shocking news that Prof. Dr. Wolf-Dieter Deckwer suddenly died shortly after his 65-th birthday celebration and retirement as Professor for Biochemical Engineering at the Technical University of Braunschweig, Germany. We are very proud that we can say that Prof. Deckwer was one of the strongest supporters of *Chemical and Biochemical Engineering Quarterly* journal and was a member of its Scientific Advisory Board from its foundation in 1986 onwards until his death. Through his professional and scientific life he was one of the world's most productive scientists in chemical and biochemical engineering with more than 490 publications covering and merging classical chemical engineering research with biochemical engineering and systems biology. In 2001 he received a very prestigious Erwin-Schrödinger-Award of the Helmholtz-Society for "A new technology for mercury remediation". He was not only a very fruitful scientist but also exceptionally respected teacher and mentor who "produced" world wide a whole class of modern university professors and scientists in the field of chemical and biochemical engineering.

With this special issue we want to honor Prof. Dr. Wolf-Dieter Deckwer for his great scientific contributions and sincere friendship. We all will miss him very much, but he will continue to live in our hearts and our future publications.

Prof. Dr. Želimir Kurtanjek
Editor

We met in 1959 while working in an industrial laboratory in Mannheim, in the western part of still divided Germany. He came from former GDR, while I came from former Yugoslavia; he had just started the same path in education (chemistry technician, a working high-school graduate, studies), I had just gained my diploma from the Faculty of Technology in Zagreb.

I taught him the application of synthetic methods in organic chemistry, while he, a nine-year younger, mature and strong personality, became my German teacher and a dear friend. Although we later went our separate ways – he went to study in Berlin, I went for my doctor's degree in Heidelberg – we remained closely connected. Several times, we spent our summer holidays together on the Croatian coast, where he, as a university professor, became an indispensable lecturer at chemical and biochemical engineering seminars organized by the Croatian Society of Chemical Engineering and Slovenian Society of Chemical Engineering.

As I came to realize, thanks to you, the importance of those engineering disciplines, I participated in the founding of the joint journal of chemical and biochemical engineers from Graz, Ljubljana, Trieste and Zagreb, and for the first 15 years I assumed duty as publisher of the new journal *Chemical and Biochemical Engineering Quarterly* (CABEQ), with you as author, consulting editor, and a member of the Advisory Board. Your professionalism, decent approach, and your unique charm gained you many friends and admirers in these regions of south Central Europe. You never forgot your old, retired friend. In the fall of 2005, when you "popped over" from a symposium in Ljubljana to my second residence in a little Istrian village 150 miles away only to spend a few evening hours together, we never sensed that it would be our last reunion. You did not succumb to your long-lasting chronic disease; death came suddenly with the eternal question: Why did it have to be you? "Alte Kroaten" would say: "Because the good ones always go first."

Thank you, Wolf Dieter, for everything. I thank you on behalf of everyone that knew you. Thank you for your friendship.

Prof. Dr. Ivan Butula



Wolf-Dieter Deckwer studied Chemistry and Chemical Engineering at the Technical University of Berlin. He received the *Dr. rer. nat.* at the Institute of Technical Chemistry of the TU Berlin in 1973 and only two years later he gained his habilitation. During his “Berlin years” as a Ph.D. student, academic assistant and post doctoral fellow he published thirty papers, mainly on modelling of bubble column reactors (18 papers) and on absorption of isobutene in sulphuric acid (11 papers).

For modelling and dimensioning of bubble column reactors, Wolf studied the effects of reactor geometry, physical and chemical properties of the gas and liquid phases, reaction rate constant, order of chemical reaction, and adjustable operating parameters (superficial gas and liquid velocity, concurrent or counter-current flow of gas and liquid phases, temperature etc.) on the non-adjustable parameters (gas hold-up, bubble size distribution, gas and liquid phase back-mixing, volumetric mass transfer coefficient, specific interfacial area, heat transfer coefficient).

The systematic investigation of the acid-catalyzed isobutene hydration started with solubility measurements and absorption studies in the stirred cell (flat interface) to evaluate the reaction rate constants in a wide range of the sulphuric acid concentration. The results were tested in a small bubble column and applied for determination of optimal process conditions in columns up to 7 m height.

In 1976 Wolf became Associate Professor for Technical Chemistry (C3) at the University of Hannover. In the Institute of Technical Chemistry, headed by Professor Schügerl, Wolf continued research on multiphase reactors, specifically: gas solubilities in microbial culture media; effective interfacial area in dispersions: liquid-side mass and heat transfer coefficients in bubble columns, three-phase fluidized beds, and stirred tanks; immobilized enzymes; chlorination of toluene and Fischer-Tropsch synthesis in slurry reactors. One of the more exotic subjects was de-nitration of aqueous waste solutions from nuclear fuel processing. He was a Visiting Scientist at the Pittsburgh Energy Technology Center (PETC-DOE) in 1980 and a Guest Professor at the Chemical and Petroleum Engineering Department of the University of Pittsburgh in 1981.

Wolf accepted the Chair of Technical Chemistry (C4) at the University of Oldenburg in 1981. After some years in a former dairy, his group moved into beautiful new buildings. New facilities enabled experimental studies on Fischer-Tropsch and methanol synthesis in slurry reactors. Also the fundamental studies in three-phase fluidized beds, viscous polymer solutions and organic liquids in bubble columns were continued. This work culminated in the publication of the book “*Reaktionstechnik in Blasensäulen*” in 1985; later the book became available also in English language

(“*Bubble Column Reactors*”). Wolf had become well known as a researcher and had many international contacts, e.g. he had hosted several Humboldt fellows (E. Alper, Turkey; K.D.P. Nigam, India; S. Ledakowicz, Poland; A. Zaidi, Morocco). He was also an excellent teacher and his lectures attracted many students. However, instead of settling in this position, he was still open to new challenges.

In 1986 Wolf became head of the Division of Biochemical Engineering of the GBF (National Research Institute for Biotechnology). Research was carried out in integrated bioprocess development, metabolic engineering of microbial and animal cell cultures, environmental biotechnology and chemicals from renewable resources (“white biotechnology”) which topic receives much attention nowadays. Wolf emphasized always the application of (chemical) engineering principles to biological processes, especially the quantitative, model-based and systematic approaches which are important components of what is now known as systems biology. He was among the few leading biochemical engineers who realized the importance of considering the cell itself as a bioreactor and pushed studies in this direction in the early 1990’s.

Wolf-Dieter Deckwer was always open to new technological developments and had a broad overview. At the turn of the century he realized the importance of bioinformatics and functional genomics for bioprocess analysis and development. As a Professor of Biochemical Engineering at the Braunschweig University of Technology, free of the many administrative duties at GBF, he set out with a dedicated research group to establish tools to study proteome and fluxome of bioprocesses and cooperate with bioinformaticians to work with genome sequence and functional genomic data. He also strongly propelled the integration of systems biology into bioprocess development. Wolf-Dieter Deckwer was one of the major initiators of the DFG (German Research Foundation) special research program “*From gene to products*” at the Braunschweig University of Technology. In this special research programme his group applied systems biology to *Bacillus megaterium* for the production of recombinant proteins.

With a publication list of more than 400 peer-reviewed scientific papers, Wolf-Dieter Deckwer was a very fruitful scientist. As a mentor he had a very sharp scientific judgement but gave his students and associates enough free room to develop their own ideas. Many of his students from all over the world followed his invitation to celebrate his 65th birthday and the retirement. All too soon after this joyful get-together, Wolf-Dieter Deckwer died unexpectedly on October 4, 2006. His students and co-workers share the warm feeling of his remembrance.

Prof. Dr. M. Popović, Prof. Dr. A. Schumpe,
Prof. Dr. A. Zeng