

MEET THE GUEST EDITOR

Rainer Brüggemann

Leibniz-Institute of Freshwater Ecology and Inland Fisheries
Müggelseedamm 310
12587 Berlin
Germany
E-mail: brg_home@web.de

Dr. Rainer Brüggemann (born 1943) studied chemistry at the Ludwig-Maximilian University Munich (LMU), Germany. He received his Ph.D. in 1977 working on quantum chemistry where he was especially interested in applications of singularity theory and catastrophe theory to semiempirical quantum chemistry methods. After a postdoctoral time at the LMU, where he studied Redfield theory in the context of electron paramagnetic resonance spectroscopy, he joined a group performing risk assessment studies with respect to nuclear waste disposal sites (Technical University in Berlin). One of his specific tasks was to develop geochemical programs to assess the composition of salt brines and to estimate solution equilibria of actinides. In 1984, he went to the National Research Center for Environment and Health (HelmholtzZentrum München). There, he was one of the authors of the evaluation software code for chemicals, "E4CHEM", which was at that time one of the first multimedia programs combining QSAR-methodologies with transport and distribution behaviors of chemicals in the environment. The underlying idea behind E4CHEM was to derive chemical information to finally rank chemicals. Applying E4CHEM, the chemicals could be characterized by a series of numbers, called descriptors. In order to obtain a ranking of chemicals, these descriptors must be numerically combined. However, by any aggregation technique, the valuable information due to all E4CHEM models is lost. Therefore, in the late nineteen eighties, Dr. Brüggemann introduced concepts of partial order theory as a useful alternative in order to evaluate chemicals.

In 1996 he went to the Leibniz-Institute of Freshwater Ecology and Inland Fisheries, Berlin. Since that time, besides mathematical modeling in the field of limnology and ecotoxicology, he is intensifying the development and application of concepts of partial order in several fields of environmental sciences and chemistry. Since 1993, Dr. Brüggemann has been lecturer in different German universities. His topics are mathematical modeling of the fate of chemicals, exposure and ecotoxicological effects and how to combine all these results in evaluation procedures. He was and is a guest scientist in several international institutions and has published several books and more than 300 papers in scientific journals and book contributions. Dr. Brüggemann is a member of the editorial board of *Umweltwissenschaften und Schadstoff-Forschung* (UWSF) and of several scientific organizations, especially in the Ernst-Schröder Zentrum, Darmstadt, whose aim is to deepen and further distribute the conceptual thinking in sciences. The concepts of partial order, especially the lattices of formal concepts, play a dominant role in this context.

Rainer Brüggemann is the founder of a series of workshops named, "Hasse Workshops - Order Theoretical Tools in Environmental Sciences and Chemistry". They take place every other year in different European cities since 1998. In 2006, he retired. However, Dr. Brüggemann is still active in the field of applications of partial orders and in ecological/environmental modeling.

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