PREFACE

The present volume being the first one I have been editing, I would like to take the opportunity to comment briefly on the needs and criteria a series such as "*Advances in Chemical Engineering*" should meet today.

In the first preface of this series, almost 50 years ago, the founding editors raised the issue of "the flood of information" created by "the practioners of the chemical engineering art". Communication both within and among scientific communities defines the borders of such a community and constitutes a major activity of any scientist, next to research as such of course. Complementary to the very important oral presentations and discussions at seminars or conferences, the scientific press has from the very beginning of print as medium been very instrumental in this: verba volent, scripta manent. The emergence of Information and Communication Technology (ICT) in general and Internet in particular has led to a tremendous increase of the amount of information that is available and the frequency at which it is exchanged. I am convinced that this does not decrease the added value of the so-called archival publications, on the contrary. This holds even more so for a series offering a stage to scholars who, upon invitation, are capable and willing to spend time to report in a broader context on their personal contributions to a field. Any paper in "*Advances in Chemical Engineering*" should allow to assess the state-of-the-art in a particular domain and to develop a feeling of its further evolution without claiming to be exhaustive. Going beyond the limits imposed by the "regular" scientific journals while not imposing those typical of a text book is part of the success recipe I have in mind.

The subjects covered are not limited to the classical chemical engineering disciplines. Contributions connecting chemical engineering to related scientific fields, either providing a fundamental basis or introducing new concepts and tools, are encouraged.

Of course applications of chemical engineering receive special attention. A balance between well-developed areas such as process industry, transformation of materials, energy and environmental issues and areas where applications of chemical engineering are more recent or emerging is aimed at.

The theme of the present volume "Multiscale Analysis" has been introduced about a decade ago and is now reaching a stage where a first balance can be made and further research directions should be decided. Which are the dominant and most successful concepts or methodologies? How do these relate to our "classics"? How and where should they be applied next?

The selection of the contributions was among others guided by the concern not to make the gap between the different scales too large. The reader will not be confronted with quantum mechanics at one side of the spectrum nor with chemical plants or even the environment on the other side. Bridging the gap

between the phenomena occurring on the scale of a catalytic site and those on the scale of a reactor or, even smaller, that of a polymer is sufficiently challenging and allows, if not to answer, at least to address the above questions. Maintaining a strong connection with reality, i.e. experimental data was another selection criterion. Experimental validation remains the corner stone of any theoretical development and very powerful experimental techniques are emerging.

First, a broad overview is provided by Dion Vlachos of the University of Delaware. An important example of experimental techniques is discussed in depth by Lynn Gladden and coworkers from the University of Cambridge. Coming from the medical world, Magnetic Resonance techniques can now provide even quantitative answers to problems our community is faced with. The modeling issue is discussed further in the paper coming from the Prague Institute of Chemical Technology and Imperial College, London. Finally, the limitations of the classic reactor engineering models are outlined in a paper from the University of Houston by contrasting the intuitive averaging over length and timescales they are based upon with the rigorous Liapunov–Schmidt method. The authors have made an effort to provide examples when appropriate. References to ''a jar containing soup and meat balls'' or to ''the wall of a champagne glass'' provocatively illustrate the broadness of the applications of chemical engineering.

This makes me return to the first preface of this series and even to the very first sentences of it. The danger of fragmentation of our field, some of us are so afraid of, was presented as an opportunity: ''The chemical engineer ministers to an industry of far-flung interests. Its products range from soap to plutonium, from gasoline to paper, from antibiotics to cement. It flourishes on change: new products, processes, methods, and applications; new needs are created and foreseen. Versatile men with breath of interest in science and commerce have been demanded and the challenge of the field has found for it such men.'' I leave it up to the reader to appreciate the flavor of the ''old'' American, the list of applications, the used gender. Most striking and still very much a topic of the day, however, is the frontier spirit expressed by these lines. A spirit which can be summarized by the device of a 16th century scholar, Pieter de Zuttere, who lived and preached in the Low Countries and in particular in the city of Ghent:

> ''Cesse le vieux, s'il appert mieux'' in old French, or in his and his contemporary Lowys Elsevier's native tongue:
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> ''Als beter can blycken, dat oude sal wijcken''.

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