



Dedication

This issue of the *Journal of Engineering Mathematics* is dedicated to Pieter J. Zandbergen on the occasion of his 65th anniversary on June 13, 1998. In this way a tribute is made to a man who not only devoted over 40 years to research and teaching activities in applied mathematics, but who also strongly stimulated other researchers and teachers in this field.

After graduating in Aeronautical Engineering at the University of Delft, Zandbergen joined the National Aerospace Laboratory (NLR) in Amsterdam. Here, he worked for a period of 10 years in the field of Aerodynamics and Computational Fluid Dynamics (CFD) and in 1962 he completed his Ph.D. thesis on supersonic flow around bodies. The dissertation of Zandbergen is in fact a perfect blueprint of his later research interests: the application of both mathematical analysis and numerical methods to nonlinear physical phenomena.

In 1966 he left NLR to be appointed Professor in Applied Analysis and Mathematical Physics at the University of Twente. Since this university was founded in 1964, it needs no argument that the major tasks in those early days was the development of a curriculum and teaching material, but also that management required attention. And so Pieter was already Dean of the Department of Applied Mathematics in 1968, two years after his arrival. This was followed later by the position of pro-rector and subsequently by that of Rector Magnificus of the University of Twente (1971–1974). At that time he also belonged to the group of people who created the *Journal of Engineering Mathematics*

In 1974 he became a member of the Committee of the International Conference on Numerical Methods in Fluid Dynamics and in 1976 under his supervision ICNMFD5 was organised in Twente. Up to the present day the balance of that conference is still in his control and is used as a fund to support young scientists to participate in ICNMFD conferences.

In the meantime Zandbergen had started an investigation on the subject of rotating-disk(s) flow based on the Von Kármán similarity equations. By combining mathematical analysis and numerical techniques he succeeded in resolving a number of issues on non-uniqueness and related topics. This gave rise to several papers on the subject of Von Kármán swirling flows and ultimately culminated in a major review paper in *Annual Review of Fluid Mechanics* (1987, Vol. 19, pp. 465–491).

Meanwhile, he established an intensive collaboration with the Physics Department in Twente on the subject of superconductivity. Under his guidance a number of Ph.D. theses were completed during the period 1982–1993 on the theme of computation of energy losses in superconducting devices.

In the early eighties Zandbergen initiated another major project, namely on the numerical simulation of nonlinear water waves. This project was and still is supported by the Dutch Technology Foundation (STW/NWO) and executed in collaboration with Maritime Institute Netherlands (MARIN) and Delft Hydraulics (WL). Within this project boundary-integral methods are used. Five Ph.D. theses with Zandbergen as supervisor have resulted from this. Recently, the latest two Ph.D. students have started to continue this long-lived water-wave project. (See P.J. Zandbergen: 10 years of investigations in nonlinear waves. *IABEM Symposium on Boundary Integral Methods for Nonlinear Problems* (Pontignano, 1995), pp. 221–226, Kluwer Acad. Publ., Dordrecht)

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Throughout his career Zandbergen has maintained strong relations with a number of Dutch Technological Institutes, be it as a member of the board, as a scientific consultant or as a supervisor of external Ph.D. theses. From a scientific point of view, the most important connections are those with the already mentioned WL, MARIN and, in particular, NLR. In 1986 the initiative towards a joint effort in CFD emerged from his NLR connection and led to another major task: the ISNaS project (Information System Navier-Stokes). Subsidised by the Dutch Ministry of Education and Sciences and the Ministry of Transport, this project established a strong collaboration between two universities (Twente and Delft) and two laboratories (NLR and WL) with Zandbergen in the chair of the project control board (1987–1993). The finite-volume flow solvers developed within the project had an appreciable impact on the research of the participating university groups, as may be inferred from the contents of the present journal issue.

Within the ISNaS project a strong need for adequate turbulence models became apparent and, as a consequence, Zandbergen and his group started investigations on the issue of turbulence and large-scale computations in 1990. Since then, a systematic and continuous flow of Ph.D. dissertations on CFD has emerged and is still emerging. Apart from the organisation of workshops this also resulted in a special issue of the present journal on large-scale computations in CFD with Zandbergen as one of the guest-editors (J. Eng. Math. Vol. 32, 1997, pp. 101–280). In line with the subject of large-scale computing Zandbergen became chairman of the national initiative on High Performance Computing and Networking (HPCN, 1993). In this position he could demonstrate again his great capability for creating research facilities for his department or others. The same applies to his position in the management team of the national research school for fluid mechanics (J.M. Burgers Centre).

Apart from regular teaching activities in his department, Zandbergen also developed special activities related to training and teaching. Most significant in this context is the 1988 University of Twente initiative for the post-graduate program “Computational Mechanics”. This two-year program, intended for students after their Master’s degree, established a strong collaboration between the Departments of Mechanical Engineering, Technical Physics and Applied Mathematics with Zandbergen as Director. Later on, these activities and those within the Burgers Centre led to the foundation of the Twente Institute for Mechanics (TIM).

Still, there is one respectable organisation which has not yet been mentioned: the Royal Netherlands Academy of Arts and Sciences, KNAW. In 1980 Zandbergen was appointed Member of the Academy and, after a number of positions on the Board, he finally became President of the KNAW in 1996. Undoubtedly, this position is the crown on his life’s work, dedicated not only to research and teaching, but – as has been outlined above – also and very strongly directed to the creation of teaching and research facilities for others. For his outstanding merits Zandbergen was Royally Decorated in 1991 as “Ridder in de orde van de Nederlandse Leeuw” by Her Majesty Queen Beatrix of the Netherlands.

The present journal issue, dedicated to Zandbergen by the authors and many others, is meant to be a scientific decoration and an acknowledgement for the things he realized in an inimitable way with great vision and above all with a very warm-hearted feeling for human relations.

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