COSTA JOHN RALLIS

Costa John Rallis was born in Maputo, Mozambique, on 6 June 1925. The first languages he spoke were Greek and Portuguese, but his education, both in Mozambique and in South Africa, was through the medium of English.

He graduated from this University with a Bachelor of Science in Mechanical Engineering in 1946 and continued to a Masters degree, which he was awarded in 1948. He joined the staff of the then Department of Mechanical Engineering in 1947 and was promoted to senior lecturer in 1955.

During his first sabbatical leave he attended the School of Gas Turbine Technology in Farnborough and the Reactor School at Harwell. He also worked in the Gas Turbine Design Office of the English Electric Company and attended a course on heat transfer at Oxford University. On returning to Wits he was appointed Acting Head of the Mechanical Engineering Department – a post he held for two years.

After obtaining his PhD in 1963 Professor Rallis was appointed to the De Beers Chair of Fluid Mechanics. In 1966 he accepted an appointment as the James Fulton Professor and Head of the Department of Mechanical Engineering at the University of Natal, a position he relinquished to spend two years in industry as Joint Managing Director of the Millers Electrical Lines group of companies.

This short sojourn in commerce and industry convinced him that he was not a businessman at heart and he returned to Wits as the Transvaal Industries Professor of Applied Mechanics in the Department of Mechanical Engineering. He subsequently took over the John Orr Chair of Thermodynamics, a post which he held until he retired in 1990. In 1991 his reputation as a teacher of engineering design brought him an invitation to take up a two-year post as Stocker Visiting Professor at the University of Ohio. On his return he was appointed Emeritus Professor and Honorary Professorial Research Fellow in the department.

Professor Rallis's ability to hold, at different times in his career, chairs in fluid mechanics, solid mechanics and thermodynamics is a reflection of the breadth and depth of his knowledge and understanding of mechanical engineering. It is this range of knowledge and his ability to integrate the fields that has given him, not only amongst his colleagues in academe but also in industry, a reputation as an outstanding engineer.

He has been an active member of a number of societies and professional bodies, particularly the South African Institution of Mechanical Engineering on which he has served as council member, president, editor of the journal and chairman of the editorial board. He also served as a member of the Government Committee of Enquiry into the Education and Training of Technicians and as planner of the Faculty of Engineering of the University of Rhodesia (now Zimbabwe). Professor Rallis is a member of six professional bodies in South Africa, the United Kingdom and the United States of America.

His greatest contribution to the profession, and more particularly to the University and the Department of Mechanical Engineering, lies in his commitment to teaching at both the undergraduate and postgraduate levels. His dedication to the University is exemplified by the fact that he served for a total of twenty-one years as Dean and Deputy Dean of the Men's Hall of Residence . In this role he influenced thousands of students in all disciplines to appreciate the value of hard work, integrity and commitment.

In 1965, while acting head of department, Professor Rallis initiated a restructuring and reorganisation of the department in order to modernise its teaching effort. This commitment

to effective teaching, driven by a very real interest in the development of his students, continued until his retirement.

His particular contribution at undergraduate level was the development of the teaching of engineering design, introducing content and techniques that were often in advance of contemporary international practice. In the 1950s and 1960s, he believed the tendency to focus engineering education almost exclusively on theory and analysis and to ignore creative application on the grounds that it was difficult to teach and considered not academically respectable, was a serious fault. He took an early lead in introducing creative application to the curriculum, an approach that is now widely recognised and applied all over the world. His initiatives placed the University of the Witwatersrand at the cutting edge of engineering education, both in South Africa and internationally.

It is, however, in the field of postgraduate studies that Professor Rallis has contributed most substantially to the development of teaching. He was an early driving force behind the conversion of the department from what was essentially an undergraduate teaching facility to a fully fledged university department granting masters and doctoral degrees and with an enviable reputation for capability in experimental research.

During his tenure Professor Rallis personally supervised some 52 MSc and postgraduate projects and 17 PhDs. At least 12 of these graduates have achieved positions of eminence in industrial and academic fields in South Africa, the United Kingdom, Holland and the United States. A number of the current senior staff in the School of Mechanical, Industrial and Aeronautical Engineering were his postgraduate students.

He has made a significant contribution to the development of high-level engineering skills in previously disadvantaged communities. One of his doctoral and four of his masters graduates come from these communities and several others are well on their way to completing postgraduate courses. His ability to excite and stimulate students, while demanding academic standards of the highest order, accounts for his enormous contribution to the development of high-level skills in his students.

Professor Rallis is recognised as a world authority on the analysis of thermodynamic cycles and is particularly known for his work on Stirling engines, a field in which he has remained active to the present day. He is believed to have been the only person in the 20th century to have had a thermodynamic cycle named after him. One of the major texts in the field, *Stirling Cycle Engineering Analysis*, is dedicated to him by its authors, Urieli and Berchowitz. One of the world's leading companies dealing with Stirling engine technology is largely staffed by his graduate students.

Costa Rallis's impact on engineering teaching and on the development of a generation of graduates committed to high quality research and engineering application constitutes a major contribution to the profession of mechanical engineering and to this country. Its is with great pride that the University bestows upon Costa John Rallis the degree of Doctor of Science in Engineering *honoris causa*