



Preface

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Published online: 21 December 2023

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Salvatore Rionero was born on December 21, 1932, in Nola (Naples). Intrigued by mathematics from high school, he decided to pursue university studies in the subject which led him to graduate in Mathematics—with top honours—on December 5, 1955, with a thesis supervised by Carlo Miranda and under the guidance of Carlo Ciliberto (later Rector of the University of Naples from 1981 to 1993).

After obtaining his degree, Professor Miranda offered him the opportunity of continuing his studies, supported by a ministerial scholarship for research into Rational Mechanics, an opportunity he eagerly accepted. He was guided in his early research endeavours by Carlo Tolotti, whom he later acknowledged as his Mentor, and who suggested his studying a challenging problem in Mechanics: a rigorous proof of the gyroscopic effect. Within a few months, four results were published in which Rionero successfully addressed Tolotti's proposed problem. However, Salvatore Rionero is best known for his work on stability in Fluid Dynamics. As he recalled, it was in Varenna, during a summer course taught by Professor Ferrero, that his passion for magneto-hydrodynamics began to develop and mature, it being a topic of great interest at that time. Upon returning to Naples, he informed Tolotti of his intention to continue his studies in that direction, and Tolotti (in the spirit of academic freedom that would later be a source of profound gratitude for Rionero) gave him every opportunity to focus on the study of magneto-hydrodynamics. On this topic, Rionero primarily explored the issue of stability. Notably, in 1968, he published a significant paper on this subject which garnered considerable attention and recognition in the mathematical physics scientific community, both in Italy and abroad. The work entitled *Metodi variazionali per la stabilità asintotica in media in magnetoidrodinamica*, *Annali di Matematica pura ed applicata*, 1968, dealt with the existence of a maximum for a variational problem that, by precisely determining the conditions for nonlinear stability, provided a fundamental answer in the field of stability theory. Throughout his long and prolific

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career, Rionero authored about 200 papers and 10 books. His research interests spanned various areas, including nonlinear diffusion, qualitative analysis of partial differential equations (notably in the monograph co-authored with James Flavin: *Qualitative Estimates for Partial Differential Equations: An Introduction*, Taylor & Francis, 1996), and the analysis of non-stationary bifurcations in complex systems.

His first academic position was as an “Assistente straordinario”, benefiting from a ministerial scholarship in Mechanics. He later won a competition for a permanent position as Assistant Professor. Subsequently, he obtained the “libera docenza” in Rational Mechanics in 1964, ultimately becoming a Full Professor at the University of Bari in 1968. He remained part of the faculty at Bari for the next three years, returning to Naples as Professor in the academic year 1971/72, where he stayed until 2008 when he was awarded the title of Professor Emeritus at the University of Naples “Federico II”. He was the first Director (from 1984 to 1987) of the Department of Mathematics and Applications “Renato Caccioppoli” of the Federico II, and later coordinator of the Ph.D. program (from 2000 to 2008). He also served as the President of the “Scuola di Dottorato in Scienze Matematiche e Informatiche” (Doctoral School in Mathematical and Computer Sciences) and the “Commissione Ricerca della Federico II” confirming his commitment, and the importance he attributed, to scientific research. In this regard, he humorously recalled that 1968, when he became a Professor, coincided with the year of student protests. “Sono diventato Professore quando i Professori venivano contestati¹”, he remarked. So, how does one, when contested, become a person who can and should be a guide? On this point, he responded thoughtfully: “Quando si diventa Professori, quello è il momento in cui bisogna dimostrare il proprio valore. E in cosa consiste questo valore? Nella capacità di fare ricerca scientifica, innovativa, e di contribuire alla ricerca in maniera tale che si allarghi il più possibile, avendo la capacità di guidare giovani ricercatori. Se non si fa questo non ha senso fare il professore universitario, diventa un impiego come un altro; non era la mia scelta, io ero nato e volevo fare la ricerca scientifica²”. This passion for research led him to build a dense network of scientific collaborations with researchers from various international institutions. Notable collaborators include D.L. Christiansen (DK, Technical University of Copenhagen), J.N. Flavin (IE, National Univ. of Ireland, Galway), B. Straughan (UK, Durham Univ.), R. Knops (UK, Herriot-Watt Univ.), D.D. Joseph (USA, Univ. Minneapolis), and L.E. Payne (USA, Cornell Univ.). He also engaged in an intense activity as a Visiting Professor in Spain, Portugal, the USA, England, Denmark, Germany, France, Norway, Israel, and China, where he delivered courses and numerous scientific lectures.

His prestige and commitment on the international stage led to him receiving an honorary *Doctor of Science* degree from the National University of Ireland (Galway) on June 28, 2002. Additionally, as a testament to his intense dedication to research and

¹ I became a Professor when Professors were being protested against.

² When you become a Professor you must demonstrate your worth. And what does this worth consist of? In the ability to conduct innovative scientific research and contribute to research in a way that expands it as much as possible and having the ability to guide young researchers. If you do not do this, being a university Professor makes no sense; it becomes just another job. For me it was not a choice; I was born to do and wanted to do scientific research.

the dissemination of knowledge, he was made an honorary member of the International Society for Interactions of Mechanics and Mathematics. Besides, he was the founder of the biennial international conference “Waves and Stability in Continuous Media” (WASCOM), and the co-founder of the biennial Italy-China conference “China-Italy Colloquium on Applied Mathematics” (CICAM). Nationally, he received recognition and held institutional roles, being a member of prestigious academies such as l’Accademia Nazionale dei Lincei, l’Accademia delle Scienze di Torino, la Società Nazionale di Scienze, Lettere ed Arti di Napoli e di Palermo, and l’Accademia Pontaniana di Napoli. His institutional roles included participation in the Scientific Council of the National Group for Mathematical Physics (GNFM). He was one of the co-founders, in 1976, of the prestigious Ravello Summer School of Mathematical Physics which he directed for many years. He also served on the Scientific Council of the National Institute of High Mathematics (INdAM), holding the position of Vice President for four years.

Rionero was a reference figure in Mathematical Physics for over half a century, harmoniously combining his roles as an educator and researcher. He contributed significantly to training researchers in Mathematical Physics, and many of his students currently hold prestigious positions in Italian and foreign universities.

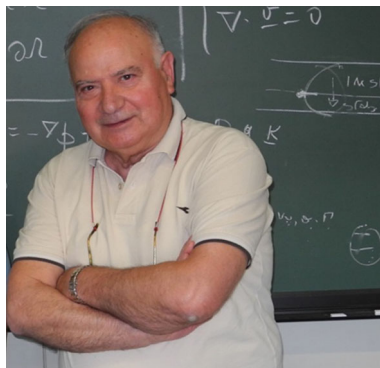
Beyond being a great scientist, Rionero consistently coupled his knowledge with exceptional humanity, intelligence, kindness, and affability. Some fond memories of these qualities, collected by Dr. Giuseppe Arnone at the *XXI International Conference on Waves and Stability in Continuous Media*, held in Catania from 6th to 10th June, 2022, can be found below.

This volume is dedicated to his memory:

From his students who, having taken up his scientific legacy and teachings, now represent the new guides in the research world;

From colleagues who accompanied him on his human and professional journey;

From all those who loved him and preserved a memory of his teaching in life experiences that shaped their own scientific paths.



November, 2023

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