

## Laudation for Roger Temam

Born in Tunis on May 19, 1940, Roger Temam moved to Paris in 1957 to study at the University of Paris, which was at that time the only university in Paris, known as La Sorbonne. He wrote his doctoral thesis under the supervision of Professor Jacques-Louis Lions. Then he became professor at the University of Paris-Sud XI at Orsay in 1968. There, he founded, together with Professors Jacques Deny and Charles Goulaouic, the Laboratory of Numerical and Functional Analysis which he directed from 1972 to 1988. He was also Maître de Conférences (equivalent of a full professorship) at the famous Ecole Polytechnique from 1968 to 1986.

In 1972, Roger Temam co-organised (with H. Cabannes) the Third international conference on numerical methods in fluid mechanics in Paris.

In 1983, he co-founded the SMAI, the French Applied and Industrial Mathematical Society, analogous to SIAM, and served as its first president. He initiated the ICIAM conference series and was head of the Steering Committee of its first meeting held in Paris in 1987. He was the Editor-in-Chief of the mathematical journal M2AN from 1986 to 1997, and he is or has been on the editorial board of such journals as Asymptotic Analysis, Discrete and Continuous Dynamical Systems, Journal of Differential Equations, Physica D, Communications in PDEs and SIAM Journal of Numerical Analysis.

Roger Temam also has a very successful career in the United States. He was appointed College Professor in 1986 at the Indiana University at Bloomington, initially on a part time basis. Then, he became Distinguished Professor in 2014. There, he co-directed, together with Ciprian Foias, the Institute for Scientific Computing and Applied Mathematics. He became the Director of this Institute in 1992, which he has remained up to now.

Roger Temam has won several prestigious prizes during his scientific career.

He obtained his first prize, namely the Peccot Prize from the Collège de France, in 1970 for his thesis work on the fractional steps method. He was then awarded the Carrière Prize from the French Academy of Sciences in 1977, the Seymour Cray Prize for numerical simulations in 1989 for his work on the nonlinear Galerkin method and other multilevel methods, the Alexandre Joannides Prize from the French Academy of Sciences in 1993 and the Jacques-Louis Lions Prize from the French Academy of Sciences in 2003 (he was the first laureate of this prize).

In December 2007, Roger Temam was elected member of the French Academy of Sciences, in the Mechanics and Computer Sciences Section. He was named Fellow of SIAM (in the first promotion) in 2009 and fellow of AMS (again in the first promotion) in 2012.

Roger Temam has recently been elected to the American Academy of Arts and Sciences. He is also an Honorary Professor at Fudan University, Shanghai.

The scientific work of Roger Temam, which is at the interface between mathematical analysis, numerical analysis and scientific computing, includes mathematical modeling and analysis, as well as the development of novel numerical methods. Many of his works lie at the interface between mechanics and mathematics.

He has published over 400 research papers in top mathematical journals and 12 books, several of which are now bestsellers and classical in the corresponding research fields. He is among the ISI Highly Cited (according to Mathscinet to date, he has 12772 citations by 5877 authors).

As already mentioned the first work of Roger Temam dealt with the fractional steps method and its application to the incompressible Navier-Stokes equations, which was independently studied by Alexandre J. Chorin.

Then he constantly explored and developed new directions and techniques in several different areas, from fluid mechanics to combustion theory, from nonlinear elasticity and plasticity to plasma physics. He also contributed to found the modern theory of infinite-dimensional dynamical systems. In particular, he studied the existence of the finite-dimensional global attractor for many dissipative equations of mathematical physics, including the incompressible Navier-Stokes equations, for which he obtained, with Peter Constantin, Ciprian Foias and Oscar Manley, a physically relevant almost sharp upper bound on the dimension of the global attractor. He was also the co-founder of the concepts of inertial manifolds together with Ciprian Foias and George R. Sell and of exponential attractors together with Alp Eden, Ciprian Foias and Basil Nicolaenko.

The main activities of Roger Temam nowadays concern the study of geophysical flows, the atmosphere and oceans. This program started in the 1990s through a collaboration with Jacques-Louis Lions and Shouhong Wang.

The influence of Roger Temam in the development of applied mathematics in France, as well as all over the world, has been essential. His scientific aura and influence can also be measured in the number of doctoral theses which were written under his guidance, both in France and in the United States. According to the Mathematical Genealogy Project database, he holds the second position in the top 50 advisors, with 115 PhD students (and 439 descendants), the first one being a computer scientist with 118 PhD students (and 118 descendants). More than 30 of his students are now full professors, all over the world, and have themselves many descendants.

Roger Temam is currently as active as ever. He is always extremely kind and helpful with young people. A veritable gold mine of knowledge, experience and wisdom.

Maurizio Grasselli

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