

IN MEMORIAM DR. CĂLIN VAMOȘ, MEMBER OF  
TIBERIU POPOVICIU INSTITUTE OF NUMERICAL ANALYSIS



Dr. Călin Vamoș.

On June 21 2017, the *Tiberiu Popoviciu* Institute of Numerical Analysis (Romanian Academy) has lost a remarkable member, an outstanding mathematician and physicist as well as a good colleague and friend to all of us, Dr. Călin Vamoș. He has passed away in a very short time, after a fight with a severe cancer, that has attacked him several times in the last ten years.

Călin Vamoș was born on 19th of March 1955, in Târgu Mureș, Romania. He obtained the Bachelor Degree in Physics, in 1979, and the title of Master of Science in Physics of the Atmosphere and Meteorology, in 1980, at the Faculty of Physics of the Bucharest University, as valedictorian. After completing the compulsory (at that time) three-year period, being assigned as a teacher of physics at Tehnofrig High School in Cluj-Napoca (1980–1983), Călin Vamoș became researcher at the Institute of Meteorology and Hydrology, Bucharest (1983–1991) and then at the Institute of Applied Mathematics of the Romanian Academy (1991–1995). Since 1995, Călin Vamoș moved to Cluj-Napoca and worked for the following 22 years as scientific researcher at *Tiberiu Popoviciu* Institute of Numerical Analysis, Romanian Academy.

The main trait of the personality of Călin Vamoș was his outstanding self-confidence. He has always chosen his way according to his own judgments, taking into account no conveniences and conventions. Therefore his track was

somehow different from that of an ordinary scientist. During the high school period, he successfully participated in national and international Olympiads in Physics and Mathematics, while as a student at the Faculty of Physics his exams were always marked at the highest level. He easily gained a position of leader of his generation. But in spite of his performances and against the recommendations of his professors he chose the Meteorology and Earth Physics as his specialty (instead of theoretical physics) because his dream was to work as reclusive as possible at a meteorological station in the mountains, with his wife. He could only partially fulfill this dream, as he worked for some time at the Institute of Meteorology and Hydrology, in Bucharest.

The history of his PhD title was again unusual. After 1990, his director at the Institute of Applied Mathematics insisted on the importance of the PhD title for his scientific career and urged him to submit for the title. He was admitted for the PhD preparation with a thesis on the subject of continuous description of the corpuscular systems. After four years of work and remarkable results, in the final stage of the thesis presentation, after some administrative disagreements with the institute management he renounced to defend his dissertation, and moved away to Cluj-Napoca.

In 1997 he submitted again and was admitted for another PhD preparation, this time at the University of Bucharest, Faculty of Physics, with Prof. Dr. Gheorghe Nenciu as advisor. The PhD in Theoretical Physics was awarded to him in 2002 with the distinction *Summa Cum Laude* for the thesis *Contributions to the description by means of continuous fields of the corpuscular systems*.

In physics there are two kinds of people, as the scientist and author Lee Smolin asserts in his book *The Trouble with Physics*: the seers (dreamers, or visionaries) and the craftspeople. Călin Vamoş was rather a visionary than a craftsman. Although the latter could be preferable for a fast professional advancement, Călin Vamoş has chosen the uncomfortable way of questioning basic theories and developing new paradigms. An outstanding illustration is his rigorous mathematical derivation of a general continuous model of corpuscular systems. In classical approaches, macroscopic balance equations were either postulated, as in rational thermodynamics, or derived with statistical physics methods for very simple corpuscular systems. In the new paradigm, a kinetic description by piecewise analytic time functions which describe the trajectories of the microscopic constituents of the thermodynamic system is enough to build up a macroscopic description through almost everywhere continuous fields obeying balance equations. Călin Vamoş applied the new approach for various systems, with notable results for constitutive laws of granular materials and hydrodynamic descriptions of financial time series.

With the same concern to make things clearer and to develop efficient investigation tools, Călin Vamoş designed a “global random walk” algorithm, based on the simple idea of a simultaneous scattering of all random walkers from lattice sites, instead of sequential procedure used in classical approaches.

He developed methods to identify intrinsic components of time series, solely based on the structure of local extreme values of the series. He has also proposed a new explanation of the hemispheric asymmetry in the propagation of the seismic waves by the hypothesis of a decentered inner core of the Earth, supported by observational data and numerical simulations.

In all the fields he was interested in, he dealt with fundamental problems. This is the case, for instance, with philosophy and psychology: he developed his own philosophical system (in some unpublished notes) and profoundly studied the psychological theory of C.G. Jung. His interests in these areas have been illustrated in the book *Eminescu. Viața unui om singular* (English title: *Eminescu. Life and Work of a Singular Man*), Risoprint, Cluj-Napoca, 2008, 361 pp, ISBN 978-973-751-759-3, published together with his wife, Doina.

Along with his research, Călin Vamoş also guided researchers who are now developing his seminal work.

He has published 92 scientific papers, out of which over 20 in outstanding journals in the field: Water Resources Research, Physical Review E, Physica A, Journal of Computational Physics, Monthly Notices of the Royal Astronomical Society, and so on. He has also elaborated three scientific books, one of them published by Springer: C. Vamoş and M. Crăciun, *Automatic Trend Estimation*, Springer, Dordrecht, 2012, pp. 131, ISBN 978-94-007-4824-8, DOI 10.1007/978-94-007-4825-5.

He was a brilliant researcher, having a deep thinking, with a quick understanding of the essential aspects of a problem. He was an active participant of the Institute seminars, with numerous and interesting comments and suggestions. He had some initiatives that required skills and labour, such as the construction in 2004 of the Institute website (first in html, then using Dreamweaver) – at that time the Institute was the first Institute of the Romanian Academy in Cluj-Napoca having website, and one of the first ones in the country.

He did not enjoy the administrative positions, but however, he was director of several grants as well as active member in others. His commitment was essential for example in a major grant of the *Tiberiu Popoviciu* Institute of Numerical Analysis, between 2006–2008, where he was a base member not only in obtaining important scientific results, but also in verifying the economic report and calculations.

He made himself appreciated by all his colleagues for his tact, being gentle and firm at the same time.

He was added to the selected list of the emeritus members of *Tiberiu Popoviciu* Institute of Numerical Analysis, [ictp.acad.ro/emertus-members](http://ictp.acad.ro/emertus-members).

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