IN MEMORIAM

José Luís Fontes da Costa Lima *An example to be followed*

I am very sad to communicate the death of the Emeritus Professor José Luís Fontes da Costa Lima, a leading chemist who made significant contributions to the development of Analytical Chemistry in Brazil.

His parents, José Coimbra da Costa Lima and Maria de Belém Rodrigues Fontes da Costa Lima, lived in the parish of Cedofeita, Porto (Portugal), where he was born on December 5, 1945. He married Maria Assunção da Costa Lima and both were graced with two children (José Pedro and Rui) and five grandchildren.

He graduated in Chemistry at the Faculty of Sciences of the University of Porto (FF-UP), in 1970. After that, he spent 9 years at the service of Portugal in Africa. In 1985, he concluded the doctoral program in Chemistry, specialty Analytical Chemistry, being approved with distinction and praise.

At the beginning of his scientific career, Prof. Costa Lima experienced important moments when, together with colleagues from Barcelona, proposed a flow-through sandwich PVC matrix membrane electrode for flow injection analysis¹ and, in collaboration with renowned scientists from Cardiff, proposed an ion-selective electrode without inner reference solution².

In 1986, he started working at FF-UP and decisively contributed to the formation and consolidation of a research group that today stands out in the context of analytical, bioanalytical and electroanalytical chemistry, especially in the pharmaceutical, biological, and agro-environmental areas.

In 1996, he was appointed Full Professor, and after his compulsory retirement in 2016, he became Emeritus Professor.

Regarding Luso-Brazilian scientific interactions, Prof. Costa Lima was one of the pioneers. In 1989, during an international congress on FIA-HPLC held in Córdoba he was introduced to some researchers from CENA/USP, and invited me to spend a 15-day period in Portugal, where we prepared a research project on multisite detection in flow analysis³. This was the initial seed of a fruitful scientific interaction that lasted for a quarter of a century.

This interaction resulted in important scientific contributions involving conceptual, methodological and/or applicative developments in flow analysis, including multi-site detection, multi-commutation, multi-pumping flow analysis, in-line separation/concentration exploiting fluidized beds, single-interface flow analysis, nanomaterial applications, among others⁴. In addition, other Brazilian (e.g., IQ/USP, IQ/Unicamp, Embrapa, UNESP, UFPB, UFPE, UEB), Portuguese (Catholic University of Porto) and Spanish institutions were involved. Apart from the excellent research results, the outstanding number of scholarships, scientific visits and student participations in a different scientific environment was a positive factor towards the improvement of the formation of students and technicians.

In Brazil, Prof. Costa Lima actively participated in the organization of the VII International Conference on Flow Analysis (1997), and collaborated in several Annual Meetings of the Brazilian Chemical Society

(RA-SBQ) and National Meetings on Analytical Chemistry (ENQA). In 2000, he had a prominent role in the XXIII RA-SBQ, as the theme of the meeting was “The Brazil-Portugal chemical bond”. In 2003, he attended the XII ENQA giving the brilliant conference “Development of flow analysis in the context of the Luso-Brazilian interaction”⁵.

He encouraged more than 30 Brazilian collaborators to undertake medium-term internships at the University of Porto, and to participate in scientific events in Portugal, especially the Luso-Galician Congresses, the Euroanalysis XI (Lisbon, 2000), and the X International Conference on Flow Analysis (Porto, 2006). On the other hand, more than 20 Portuguese researchers carried out scientific missions in Brazil. This resulted in 89 published articles with the participation of both Portuguese and Brazilian researchers.

In 2005, he was sworn in as a member of the Brazilian Academy of Sciences.

The relevance of the scientific work of Prof. Costa Lima can be assessed in terms of its publications (Web of Science: 454 scientific articles, 9293 citations, $h = 52$), communications at scientific events and training of human resources, especially graduate students, which he affectionately called “scientific children”⁵.

He also dedicated himself to academic-scientific management activities, participating in the organization of several congresses, workshops and similar. During the last years as an active scientist, he was the Director of FF-UP, carrying out an outstanding work.

A big party took place on December 5, 2005 to celebrate his retirement. I had the pleasure of being present, offering him an award from the University of São Paulo, which recognized his efforts in favor of Brazil.

As an Emeritus Professor, he continued to work at FF-UP, giving international conferences, strengthening the scientific relations with Brazil, etc.

Throughout his career, he was member of editorial boards of several journals (e.g., *Microchim. Acta*, *Farmaco Sci*, *Am. J. Enol. Vitic.*, *Port. Electrochimica Acta* and *Rev. Port. Quim.*); member of organizing committees in 26 international meetings; member of 06 scientific societies; coordinator of the European M.Sc. program in Environmental Analytical Chemistry; integrant of the Chemical Center of the University of Porto - REQUIMTE; collaborator with several research foundations; etc. He was worldwide recognized, as demonstrated by the important awards.

Some personal characteristics of Prof. Costa Lima, such as leadership, creativity, spirit of investigation, tenacity, ease of integration into a teamwork and, above all, friendship and companionship should be highlighted. As for friendship, I received from Prof. Costa Lima an extraordinary example: when serious health problems affected me, he surprised me: I received a visit from this friend who crossed the Atlantic Ocean to comfort me.

He did several society volunteer activities, promoting social aid, participating in charity parties, etc. An interesting activity is that, when young, he was the table tennis coach of the Portuguese team.

He was always ready to host visiting friends. I was often at his home, and confirmed that he was an exemplary host, and also an excellent father, grandfather, husband and son-in-law. There, I could see that important moral values are passed from generation to generation in his family.

Costa Lima had a special dedication to Brazil and his collaborators lost a very good friend and example to be followed. I am sure that he will be very happy in this new dimension of his life, undoubtedly full of Peace, Joy and Happiness.

REFERENCES

- (1) Alegret, S.; Alonso, J.; Bartoli, J.; Lima, J. L. F. C.; Machado, A. A. S. C.; Paulis, J. M. Flow-Through Sandwich PVC Matrix Membrane Electrode for Flow Injection Analysis. *Anal. Lett.* **1985**, *18* (18), 2291–2303. <https://doi.org/10.1080/00032718508068619>
- (2) Moody, G. J.; Thomas, J. D. R.; Lima, J. L. F. C.; Machado, A. A. S. C. Characterisation of Poly(Vinyl Chloride) Barium Ion-Selective Electrodes without an Internal Reference Solution. *Analyst* **1988**, *113* (7), 1023. <https://doi.org/10.1039/an9881301023>

- (3) Zagatto, E. A. G.; Bergamin Fo., H.; Brienza, S. M. B.; Arruda, M. A. Z.; Nogueira, A. R. A.; Lima, J. L. F. C. Multi-Site Detection in Flow Analysis. *Anal. Chim. Acta* **1992**, 261 (1–2), 59–65. [https://doi.org/10.1016/0003-2670\(92\)80176-8](https://doi.org/10.1016/0003-2670(92)80176-8)
- (4) Zagatto, E. A. G.; Oliveira, C. C.; Townshend, A.; Worsfold, P. J. *Flow Analysis with Spectrophotometric and Luminometric Detection*; Elsevier: Amsterdam, **2012**.
- (5) Lima, J. L. C. Professor José Luís Costa Lima, with an Extensive and Prestigious Academic Career, Collaborated and Continues to Collaborate with Many Brazilian Research Groups. *Brazilian J. Anal. Chem.* **2019**, 6 (22). <https://doi.org/10.30744/brjac.2179-3425.interview.jlclima>

By Elias Ayres Guidetti Zagatto
BrJAC Associate Editor
Full Professor at the Center for Nuclear Energy in Agriculture, University of São Paulo (CENA-USP), Piracicaba, SP, Brazil
Member of the Brazilian Academy of Sciences