

Obituary

Claudio Mendoza (1951–2024)

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I met Claudio in 1989 when I was starting the last year of my physics bachelor's degree. Another student of Claudio's, Franklin Martinez, introduced me to him at the IBM Scientific Center, Venezuela. Claudio was a very dynamic, enthusiastic, and brilliant computational physicist at the IBM center, where he worked from 1983 to 1994. Claudio was known for his humor, irreverence, and frenetic intellectual activity. He challenged me to learn FORTRAN coding and to run the RMATRIX [1] (atomic scattering) codes. He became my undergraduate academic advisor, one of the most influential people in my life, and a close friend of 35 years.

Claudio was born on 16 August 1951, the son of a teacher, Sara (Sarita [2]) Guardia, and a literature Professor, Benjamín Mendoza. Claudio was the oldest of three siblings among Emilio [3] and Anela. During his early years, Claudio lived with his family in a small village (El Toronjil in the town of San Antonio de Los Altos [4] in the State of Miranda) on the outskirts of Caracas, where they secluded themselves after Sarita and Benjamín became unemployed for opposing the dictatorship of Marcos Pérez Jiménez [5] (1945–1958).

Paradoxically, this secluded village was a magnet for artists and intellectuals, all dissidents against the dictatorship, who together with Benjamín and Sarita self-organized to create an environment of intense intellectual activity. Among them in this community were Alejandro Otero [6] and Mercedes Pardo [7], two of the most prominent Venezuelan contemporary artists with whom Claudio would start his exploration of the arts. Also, in San Antonio de Los Altos, Sarita and local families created the elementary school, Escuela Cooperativa, where Claudio had his elementary training, followed by two years at the Santiago de León de Caracas. Such was Claudio's upbringing and basic education (1958–1965).

In 1965, after the dictatorship, the Mendoza family travelled to London, UK, where Sarita and Benjamín would complete a two-year assignment for the Venezuelan Ministry of Education. Claudio would remain in London for the next eight years, continuing his secondary education at the William Ellis School (1965–1970) and his Bachelor of Science at University College London [8] (UCL, 1970–1973). At this point, Claudio returned briefly to Venezuela to work as a faculty member of the Universidad Experimental del Táchira [9], on the western side of the country (1973–1975).

In 1975, Claudio would return to UCL (see Figure 1) to pursue Ph.D. studies with a fellowship from the Grand Mariscal de Ayacucho Foundation. He entered the Faculty of Science in the field of theoretical physics and astrophysics under the supervision of Professor Michael John (Mike [10]) Seaton. Claudio was characterized by very meticulous and detailed work, which earned him the Carey Foster Research Prize in 1978, and he became a Fellow of the Royal Astronomical Society. Claudio was awarded his doctorate degree in 1980 with a thesis entitled 'Frozen-core and model potential calculations for magnesium and calcium'.



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Figure 1. Claudio (right) and Keith Butler (left) at UCL.

This was only the beginning of Claudio's involvement with Mike and his other students and postdoctoral mentees. Claudio returned to Venezuela to teach physics at the Universidad Simón Bolívar [11] (1982–1985) in the Caracas area. Then, he took a position as an astrophysicist and computational scientist at the IBM Scientific Center Venezuela (1983–1994), which would be some of his most productive years in science and earned him the Premio Fundación Polar Lorenzo Mendoza Fleury [12] award in 1989. Claudio's productions include his first contribution to atomic data databases, i.e., a highly cited compilation of atomic data for optical spectroscopic diagnostics of Planetary Nebulae (1983), numerous publications with Claude Zeippen (Observatoire de Paris, France [13]) and Keith Butler [14] (Univ. Observatory Munich, Germany [15]), and his first incursions in computational chemistry with Fernando Ruetter (IVIC [16], Altos de Pipe, Edo. Miranda, Venezuela). The collaboration between Claudio and Claude meant that Claudio was a frequent and much-appreciated visitor to Meudon over many years.

Since the accuracy of available stellar opacities had been questioned in relation to worrying discrepancies in the results obtained for Cepheid Stars, Mike decided to launch an ambitious international project with the collaboration of Phil Burke, David Hummer [17], and Dimitri Mihalas [18]. It became known as the Opacity Project [19] (OP), later completed by the IRON Project (IP). Participants in the two projects were mainly members or former members of Mike or Phil's groups and their own associates or students. The work was centered on the calculation of atomic data for astrophysical applications using state-of-the-art theoretical and computational methods (mainly developed by the same groups). Claudio made fundamental contributions to these projects, treating important isoelectronic sequences and developing (with Walter Cunto) the databases TOPbase [20] and TIPbase [21], and the OPserver that hosts the OP and IP atomic data and opacities, which have been of great service to the astronomical community. Claudio showed his skills as an efficient organizer and a demanding editor when he hosted the Opacity Workshop in Caracas (in 1991), which was of great importance for the OP and IP projects. It is to be noted that the original participants in the projects were affiliated with scientific institutions in England, France, Germany, Northern Ireland, Scotland, the USA, and Venezuela (thanks to Claudio, who was always deeply attached to and proud of his country).

During his period at IBM, Claudio acted as a co-scientific advisor for the Doctorate work of Martha Elena Galavis [22] at the Université Pierre-et-Marie Curie (Paris VI), while

sharing her time between Caracas and Meudon. Also during this time, Claudio participated in several artistic collaborations, including a book with Alejandro Otero and in the Rolando Peña [23] sculptures (Mene, Dark Matter, the Higgs Barrel) in the visual arts, and a theatrical production of Copenhagen [24] with Michael Frayn.

Claudio started a new academic position in 1993 at the national scientific laboratory IVIC in 1993, from which he would retire in 2015. There, Claudio served as Chair of the Physics Center, created his own Laboratory of Computational Physics, acted as a member of the Directors Council, and later General Secretary of the Asociación Venezolana para el Avance de la Ciencia (AsoVAC [25]; 2006–2008), and wrote numerous opinion pieces for the national newspaper, *El Nacional* [26]. During this period, Claudio continued his scientific collaborations with the OP and IP projects, in computational chemistry, and even made an incursion into the field of mathematical biology with his student Santiago Schnell [27]. Despite his prolific scientific and civic contributions, Claudio's public opinions would lead to confrontation with the authoritarian Venezuelan regime of Hugo Chávez [28], and the forceful removal of Claudio from his post as head of his laboratory in 2006.

The hostile environment towards scientists and intellectuals in Venezuela would force Claudio to retire from IVIC and emigrate to the United States in 2016. By then, I was a professor of physics at Western Michigan University [29] and had the pleasure of hosting and supporting his scientific work for several years. In the early 2000's, Claudio had begun collaborating with me, Timothy (Tim) Kallman [30] (NASA Goddard Space Flight Center), and Patrick Palmeri [31] (Univ. Mons, Belgium) on the calculation of atomic data for X-ray spectral lines of astronomical interest (see Figures 2 and 3). After being Claudio's student at IBM and a member of his laboratory at IVIC, I was now benefiting from his skills in my own scientific projects. Additional support came from Tim and another of Claudio's former students, Javier Garcia [32]. Undoubtedly, during this period that ended with his death, Claudio made important contributions to atomic inner-shell processes and astronomical X-ray spectroscopy. His last position was Senior Researcher at the NASA Goddard Space Flight Center.



Figure 2. From left to right: Lainshui Zhao, Sultana Nahar [33], Claudio, Natalya Critchley [34] (Claudio's wife), and Anil Pradhan [35] (colleague and friend of Claudio's since graduate school at UCL) during a visit to Ohio State University, USA.

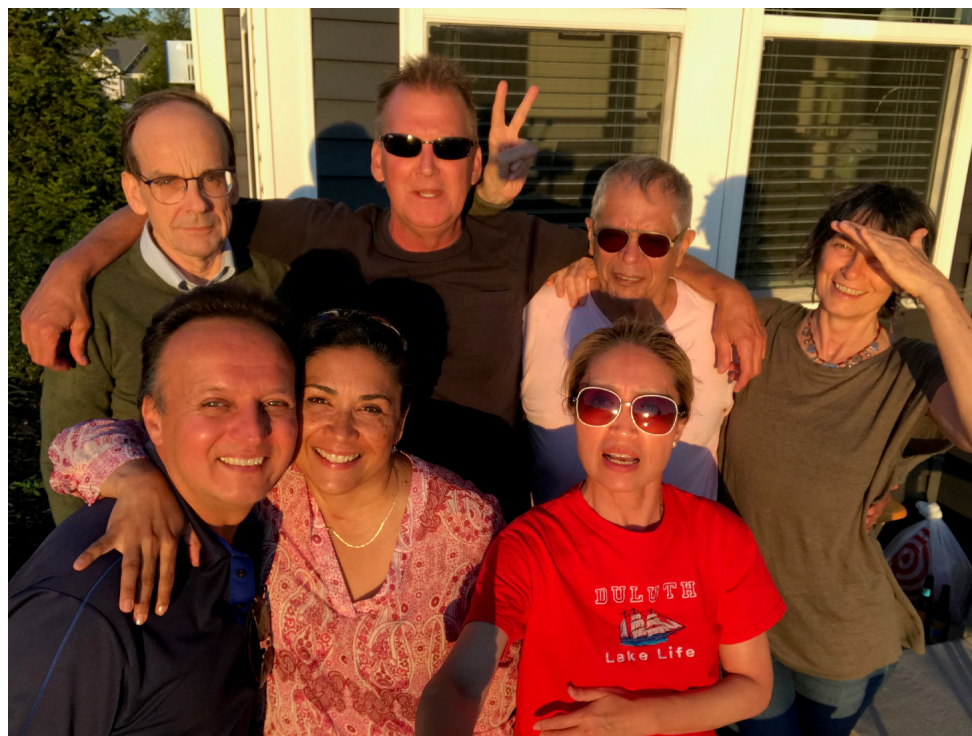


Figure 3. Living in Kalamazoo. From left to right in the back row: Nigel Badnell [36], Tom Gorczyca [37], Claudio, Natalya. Front row: Manuel Bautista, Magglé Bautista, Jade Gao.

Claudio was a scientist, an intellectual, and a loyal friend and family man. He was the father of two young boys, Cristóbal and Santiago, devoting exceptional attention to them since their mother, Marisel, perished in an accident when they were very young. Claudio passed away on 9 May 2024 in Kalamazoo, MI, USA after a year-long lung cancer affliction that he kept discreet. He was in the company of his wife, Natalya, and his two children. I visited him at the hospital on 7 May 2024; he was optimistic and humorous, writing computer code, and thinking of physics, family, and friends. Such was the way he lived and for that, he will be deeply missed.

I will miss him!

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Conflicts of Interest: The authors declare no conflict of interest.

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