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👉 Luis Alejandro Galicia Luna, a professor and researcher at the ESIQIE was awarded for his valuable contribution

RECOGNITION FOR CONTRIBUTION OF ESIQIE RESEARCHER

Adda Avendaño

The professional career of Dr. Luis Alejandro Galicia Luna, a professor and researcher at the Escuela Superior de Ingeniería Química e Industrias Extractivas (ESIQIE) at the Instituto Politécnico Nacional (IPN), was acknowledged with the 2023 International Asia Research Award (AIRA) in the category of Chemical Engineering, specifically in the field of Theoretical and Applied Thermodynamics.

As an Emeritus Researcher of the National System of Researchers (SNII), Dr. Galicia Luna received this international recognition during the Annual Awards Congress of Science, Technology, and Research (ASTRA) 2023, held in Tiruchirappalli, India. At this event, the achievements of seven of the world's brightest minds in various fields of knowledge were celebrated, along with the work of Asian researchers, professors, doctors, scientists, and scholars who have demonstrated exceptional performance.

Water purification with gas hydrates

This award, which took Dr. Galicia Luna by surprise, was granted in recognition of his teaching career and, more importantly, for his research in the development of environmentally friendly wastewater purification technology using gas hydrates.





👍 The award was presented at the Annual Congress of Science, Technology, and Research in Tiruchirappalli, India.

🕒 In 1994, Dr. Galicia Luna became a full-time professor in the Graduate Studies and Research Section (SEPI) of ESIQIE.

The development of this process, which has taken over 12 years of work, involves introducing gas into contaminated water and subjecting it to pressures of up to 400 atmospheres and temperatures below 20°C to form hydrates, a type of ice, with the purpose of separating contaminants through physical processes, rather than chemical reactions, as most environmentalists propose.

"Water becomes contaminated with phenols, dyes, alcohols, alkanes, hydrocarbons, and other industrial waste, and instead of cleaning it through chemical reactions like oxidation or ozonation, we subject it to an initial phase to remove suspended solids, and then we apply the gas hydrate technique, which does not generate secondary chemical reactions," explained Dr. Galicia Luna, who holds a Ph.D. in Process Engineering from the National Higher School of Mines in Paris, France.

The polytechnic teacher emphasized that this research has led to at least 10 undergraduate and graduate theses, the training of professionals in thermodynamics, four of whom were awarded Best Thesis in the field of Engineering and Physical-Mathematical Sciences, and one received international recognition.

Additionally, several graduates now work for prestigious national and international companies, and four are part of the National System of Researchers.

Applied Thermodynamics Laboratory for Processes

It is of utmost importance that teachers not only focus on theory but also engage in research. This provides a valuable opportunity to introduce students to the real world and allow them to propose practical solutions through process development. For this purpose, the Applied Thermodynamics Laboratory for Processes at ESIQIE has been significant, as it is unique not only in Mexico but also in Latin America, according to Luis Alejandro Galicia Luna.

"After completing my bachelor's degree in Physics at the Faculty of Science of the National Autonomous University of Mexico, around 1980, I joined the Mexican Institute of Petroleum, where I worked on nuclear reactions theory and quantum mechanics. It was there that I discovered the importance of applied thermodynamics. I managed to secure support for my master's and doctorate in Process Engineering at the National Higher School of Mines in Paris, and my idea has always been to return and repay the investment made by the Mexican government in me," said Dr. Galicia Luna.

In 1994, he became a full-time professor in the Graduate Studies and Research Section (SEPI) of ESIQIE. In the same year,



he proposed the establishment of the Thermodynamics Laboratory, which was inaugurated in June 1997 with two measurement and two calibration instruments.

Today, this laboratory has specialized equipment for measuring various properties, mainly the result of external projects rather than institutional or funding from the National Council for Science and Technology (Conacyt).

All of the research and scientific achievements of the polytechnic researcher have been developed in the Applied Thermodynamics Laboratory for Processes. In 2002, he joined the SNII. Nineteen years later, on February 1, 2022, he became an Emeritus Researcher. Since 2004, he has been a member of the Mexican Academy of Sciences, and he has received a series of national and international awards and distinctions that attest to his professional quality.

The AIRA 2023 Award

Dr. Galicia Luna's career has been recognized on multiple occasions, including being an Honorary Professor at the School of Engineering at the University of Kwazulu-Natal, South Africa; receiving an Honorary Doctorate from the International Organization for Inclusion and Educational Quality (OIICE) in 2021; the Excellence in Education Award, Cusco 2021, from OIICE; the Fluid Phase Equilibria (Netherlands) and Chemical Thermodynamics (England) Phase Equilibrium Certificate of Excellence, obtained in August 2013.

He has been an invited editor for the Fluid Phase Equilibria Journal in 2003, 2007, and 2010. He received the "Maestro Rafael Ramírez" Teaching Merit Medal from IPN in 2011 and the "Maestro Altamirano" Teaching Merit Medal from IPN in 2022. Furthermore, he participated in the *Politécnica Gazette's* "80 Scientists in Eighty Words" section, published in 2016 to mark the 80th Anniversary of IPN.

He has spoken at conferences in the United States, South Africa, Brazil, and France; he serves on international scientific committees and has chaired sessions at international congresses for the American Institute of Chemical Engineers (AIChE) and the Conferences on Supercritical Fluids (PROSCIBA), as well as the VII Ibero-American Conference on Phase Equilibria and Fluid Properties for Process Design (EQUIFASE 2006).

He is a member of the editorial boards of international journals, including "Journal Chemical & Engineering Data" from 2013 to 2016, "Journal of Chemical Thermodynamics" from 2010 to 2023, and the board of directors of the International Association of Chemical Thermodynamics (IACT) from 2010 to 2025.

As a guest examiner, he has participated in doctoral examinations at the National Higher School of Mines in Paris, France; the University of Delaware, USA; Aalto University School of Chemical Technology, Finland; the Department of Chemistry, University of North Bengal, India; and the University of Kwazulu-Natal, South Africa.

The polytechnic researcher, who has contributed to over 80 international publications, presented over 200 articles at international conferences, and graduated more than 60 undergraduate and postgraduate students, believes that the AIRA 2023 award is a result of the work he has carried out as an IPN professor for over 40 years. In this regard, he extends an invitation to the polytechnic community, particularly students, to strive for excellence and perform their work diligently and with enthusiasm to demonstrate that this institution can compete with the best in the world.

The primary goal of the International Asia Research Award (AIRA) is to create a competition that raises the overall performance standards and recognizes the achievements of scientists committed to excellence in various aspects of teaching and research worldwide.