IPN stands out at the ASIA RESEARCH AWARDS 2024

IPN researchers receive the International Research Award in Asia

The International Prize for Research in Asia, awarded this year to 11 scientists from around the world, is a recognition of academic excellence and outstanding research in different areas of knowledge.

Zenaida Alzaga/Adda Avendaño

For their scientific contributions and distinguished academic and professional careers, three scientists from the Instituto Politécnico Nacional (IPN were awarded the International Award for Research in Asia (AIRA) 2024 at the International Congress for Research Excellence 2024 (ICRE 24) held in Trichy, India.

STUDIES ON THE EVOLUTION OF THE SOUTH PACIFIC COASTLINE OF MEXICO

Dr. Godwyn Paulson Pitchaimani from the Escuela Superior de Ingeniería y Arquitectura (ESIA), Ticomán Unit, and Dr. Pedro Francisco Rodríguez Espinosa from the Centro Interdisciplinario de Investigaciones y Estudios sobre Medio Ambiente y Desarrollo (CIIEMAD) received the International Best Researcher Award in environmental management and the International Best Article Award in environmental geochemistry, respectively, for their article "Evolution of the South Pacific Coastline of Mexico: Responses to Meteo-oceanographic and Physiographic Conditions."

Published in the indexed journal *Regional Studies in Marine Science*, issue 47, 2021, volume 101914, their research analyzed the evolution of the coastline of Oaxaca using Landsat satellite images from 1973 to 2020. They utilized algorithms and annual change statistics to detect erosion and accretion caused by natural events and anthropogenic activities.

The researchers explained that the coastline, where the sea, atmosphere, and hydrosphere converge, has a direct relationship with the sand or rocks transported by wave intensity and direction, hurricanes, or seasonal events like El Niño and La Niña, resulting in erosion or accretion—removal or accumulation of sand along the coastline.

During the study period, they found that climate change exacerbates meteorological and oceanographic storm effects in some areas of Oaxaca, negatively impacting economic activities.

"Natural precipitation, river discharges, cyclones, and wave dynamics determine changes in coastlines, estuaries, and wetlands. Meanwhile, anthropogenic factors, such as jetties or breakwaters and urbanization, influence coastal activities along beaches and ports," they noted.

Higher rainfall or hurricanes increase the likelihood of rivers removing sediments, particularly in estuaries (coastal prisons), whereas reduced rainfall and/or cyclones lead to wave impact and direction, coupled with urbanization in some Oaxacan regions, resulting in estuary erosion.

With satellite images and algorithms, the researchers established that northern Oaxaca's coastline shows more rocks and less deterioration, while southern areas experience more riverbank erosion and sediment deposition on beaches.

They found significant sediment deposition in Puerto Escondido beaches, moving north-northeast away from the coastline, affecting estuaries and increasing erosion. Similarly, the Tehuantepec River is

Pedro Francisco Rodríguez Espinosa, CIIEMAD researcher

Godwyn Paulson Pitchaimani, ESIA Ticomán researcher

undergoing erosion due to regional urbanization.

The researchers indicated that erosion-accretion trends over 47 years are likely to increase due to climate change, ocean warming, and rising sea levels, leading to more dangerous hurricanes along the coast, sediment accumulation, and coastline loss.

Pitchaimani and Rodríguez Espinosa emphasized that these changes directly affect tourism, navigation, and socio-economic activities tied to the coast. Historical accretion and regression phenomena related to hurricanes will aid in proposing preventive actions for the population.

With the initial scientific records from Oaxaca's coastline, it is possible to develop public policies for prevention and mitigation against climate change effects or new geo-environmental phenomena, reducing the impact of severe hurricanes.

DISTINGUISHED RESEARCHER OF THE YEAR IN THERMODYNAMICS

Dr. Luis Alejandro Galicia Luna from the Escuela Superior de Ingeniería Química e Industrias Extractivas (ESIQIE) received the AIRA 2024 for the second consecutive year as Distinguished Researcher of the Year in Thermodynamics.

From Tehuacán, Puebla, Galicia Luna was curious about the world from an early age. His interest in physics began in high school, leading him to study at the Faculty of Sciences at UNAM and work at the Mexican Petroleum Institute (IMP).

"Although my work was related to theoretical physics in nuclear reaction theory and quantum mechanics, I discovered that thermodynamics was very interesting, but it was necessary to do experiments. Then I was able to get support to do a Master's and PhD at the Ecole Nationale Supérieure des Mines in Paris, France, a very important institution in applied thermodynamics, with one of the best laboratories in the world", the polytechnic professor recalled.

Back in Mexico, he stayed full time at the Sección de Estudios de Posgrado e Investigación (SEPI), of the ESIQIE, where he proposed the creation of the Applied Thermodynamics Laboratory, which started with a couple of measuring and calibration devices, but in 30 years has been developing state-of-the-art equipment to measure more than 10 different properties of pure fluids and their mixtures.

An Emeritus Researcher of the National System of Researchers (SNII), Galicia Luna's work includes phase equilibria, volumetric properties, high-pressure viscosities, supercritical fluids for industrial compo-

ESIQIE researcher Luis Alejandro Galicia Luna was awarded, for the second consecutive year, the International Prize for Research in Asia.

und extraction, and gas hydrates for water purification without environmental impact.

The water purification process using carbon dioxide hydrates, which earned him the AIRA 2023, has taken over 13 years of work, producing excellent results. It uses physical processes to clean contaminated water without secondary chemical reactions.

The polytechnic professor highlighted that this research has generated at least 10 undergraduate and graduate theses, in addition to the training of professionals in thermodynamics, four of which were awarded with the Best Thesis in the area of Engineering and Physical Mathematical Sciences, one with the international distinction and six who belong to the National System of Researchers, in addition to a number of graduates who work in companies of national and international prestige.

Dr. Galicia Luna's career has been recognized on several occasions with the Teaching Merit Medals "Maestro Rafael Ramirez" and "Maestro Altamirano", both awarded by the IPN in 2011 and 2022, respectively; the Thermodynamics Excellence Award (Netherlands) and Chemical Thermodynamics (England), in 2013; Honorary Professor of the School of Engineering of the University of Kwazulu-Natal, South Africa; Doctor Honoris Causa by the International Organization for Inclusion and Quality Education (OIICE) in 2021; the Award for Educational Excellence by the OIICE, Cusco 2021 edition. He is also a member of the Mexican Academy of Sciences since 2004.

INTERESTING FACT

The AIRA jury conducts a thorough review of research projects published worldwide and awards those who have made extraordinary contributions with significant social impact and have outstanding careers in various fields of knowledge.

He has been invited as a juror for doctoral examinations at internationally prestigious schools and has participated as a guest editor of Fluid Phase Equilibria Journal in 2003, 2007 and 2010. He has also served on the editorial boards of several international journals and on the board of directors of the International Association of Chemical Thermodynamics (IACT) from 2010 to 2025.

With over 80 international publications, 200 conference presentations, and more than 60 graduated students, Galicia Luna sees this award as a recognition of his 40-year career, reflecting IPN's standing among the world's top institutions.