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Science in Latin America Today and Tomorrow

• 22nd TWAS LACREP Young Scientist Conference • 1st TYAN Regional Conference for Latin America and Caribbean Region

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SPEAKERS • 22ND TWAS LACREP YOUNG SCIENTIST CONFERENCE

CLAUDIA S. ROMERO-OLIVA
UVG- UNIVERSIDAD DEL VALLE DE GUATEMALA
GUATEMALA, GUATEMALA

Paleoecotoxicology, a tool to understand cultural eutrophication in Lake Amatitlán, Guatemala

This poster presents via a transdisciplinary approach, the study of cultural eutrophication in a urban lake in Amatitlán, Guatemala. Paleolimnological analysis in lake sediments evaluated via a muliproxy approach determined that both east and west sides of Lake Amatitlán evidenced different concentrations of elements in parts per million (ppm), such as (Cu, Fe, Mn, Na, Zn), heavy metal in ppm (Pb), microplastics in ind/g, and nutrients in % (N, K, P and organic carbon) evidenced in sediments from both parts of the lake (east and west) at least in the last decades. East side of the lake evidences a higher concentrations of Zn, Na, Mn, %N, %K and N:P ratios; whereas the west side evidenced a higher pH with concomitant higher concentrations of Fe, microplastics, %P, and %Ca. Even though a prominent peak (14ppm) in concentration of Pb was found at the depth of 20cms in the east side sediments, a constant higher concentration of this heavy metal was found in the west side (7ppm). Finally, biological indicators from the Chironomidae family (Phylum Arthropoda) evidenced a more abundant (408 ind) and more diverse (8 species) community in the east side in comparison to the west side (40 and 3; specifically). The obtained results in Lake Amatitlán, until a depth of 80cms from lake bottom surface, evidenced that both lake sides evidenced cultural eutrophication, though from different managements. The east side has responded to a management more based in agricultural activities with lower water exchange, whereas the west side evidenced a more industrial and domestic type of activities, infered by the high concentration of Pb and microplastics (in the first 20 cms). With the present study it is possible to determine that within an paleoecotoxicological approach cultural eutrophication from Lake Amatitlán, Guatemala, could be infered using the combination of paleolimnological and ecotoxicological indicators in a multiproxy approach.

Claudia S. Romero-Oliva was graduated in Biology from the Universidad de San Carlos de Guatemala, Guatemala in 2007, and in 2010 she recieved a Licentiate degree (equal to Masters in Science) in Aquatic Ecology from the Linnaeus Universitaet, Sweden. In 2017, she recieved a Ph.D. in Ecotoxicology from the Technische Universität Berlin, Germany with the thesis tittled: "Metabolism and phytoremediation potential of microcystins from three aquatic macrophytes, Case study Lake Amatitlán, Guatemala". In 2018, she was awarded by TWAS, the price for young scientists from The World Academy of Sciences for the Advancement of Science in Developing Countries, corresponding to Guatemala. She is currently profesor from biology school from the Universidad de San Carlos de Biología and director of the Center for Atitlán Studies from the Universidad del Valle de Guatemala, Guatemala. Today she is a national authority for lake assessment, management and ecotoxicological studies for both lakes Amatitlán and Atitlán, Guatemala. Within the Center that she leads research lines in traditional ecological knowledge (TEK), paleolimnology, aquatic ecology and ecotoxicology, paleoecotoxicology and lake water quality.

ELÍAS HUMBERTO PERAZA CASTANEDA
MINED-SALVADORIAN MINISTRY OF EDUCATION
SAN SALVADOR – EL SALVADOR

Innovation Behavior of Salvadoran Food & Beverage Industry Firms

This poster presents a quantitative analysis about the external and internal determinants that affects the innovation dynamics of a low-tech sector in a less developed economy, the food & beverage (F&B) industry in El Salvador. The empirical framework relies on a multivariate probit analysis applied to data from the 1st National Innovation Survey 2013 of El Salvador. The results are useful to understand the specificities of low-tech sectoral systems of innovation in a less developed economy, the role that science, technology and innovation public policies can play in the Salvadoran agri-food innovation system and the managerial implications of external and internal innovation determinants in the case of Salvadoran F&B industry firms.

Elias Humberto Peraza Castaneda was graduated in Business Administration from the University of El Salvador (UES) in 2010, he got "Ruben Dario" Central American Award for Academic Excellence (representative of El Salvador in 2009) and his final CUM was 9.55. Then for his academic excellence, he got and Erasmus Mundus scholarship and received a Master degree in Business Management from the Innovation and Internationalization by the University of Basque Country, Spain (UBC/ EHU, Euskal Herriko Unibertsitatea) in 2011, he got a final average of 9.26 and his master thesis supervised by PhD. Jose Maria Barrutia is entitled: "Coordination between the marketing plan and Local Agenda 21 for a competitive and sustainable management of tourist destinations".

In 2019, Elias Humberto Peraza Castaneda received a Ph.D. degree in Economics with Outstanding CUM LAUDE from Universities of Burgos (UB), Valladolid (UVa) and Salamanca (USAL), Spain. These studies were possible by EURICA and N-CONACYT scholarships plus own funds. His doctoral thesis is entitled "The dynamics of the sectorial innovation system of the agri-food industry in El Salvador from an evolutionary perspective", and it was written under the supervision of PhD. Guillermo Aleixandre Mendizábal and PhD. Olga Ogando Canabal. Also, this year he participated in the high-level course "Planning and Development of Science and Technology Parks (STP) Policy, and Technology Transfer and Commercialization" thanks to a grant from KOICA and taught by the Science and Technology Policy Institute (STEPI) in Daejeon, South Korea.

PhD. Elias Humberto Peraza Castaneda is currently Head of Business Intelligence and Communication in Technological Parks Unit of Ministry of Education at El Salvador. He has published academic and diffusion articles about Sectoral Innovation Systems, STI policies, Business Innovation Behavior, Industry Sectoral Analysis and Salvadoran Industrial History. He is mainly interested in Innovation Systems (National, Regional and Sectoral) for Developing Countries and STI Policies for promote economic development in them.

ESTEBAN JAVIER CRISTALDO MORALES
FIUNA – FACULTAD DE INGENIERÍA DE LA UNIVERSIDAD NACIONAL DE ASUNCIÓN
UCSA – UNIVERSIDAD DEL CONO SUR DE LAS AMÉRICAS
ASUNCIÓN – PARAGUAY

Design of transimpedance amplifiers for Silicon Photomultipliers at cryogenic temperatures for the DUNE experiment

The Deep Underground Neutrino Experiment (DUNE) is the largest international experiment for neutrino science and proton decay studies. The DUNE will consist of two detectors in between a neutrino beam, the first located near the beam generator at Fermi National Accelerator Laboratory, in Batavia, Illinois, USA. The latter detector will be placed in Sandford Underground Research Laboratory in South Dakota 1300 km from the beam source. The interaction between the neutrinos and the scintillating material, liquid argon, will produce photons with known wavelength that will be collected by a light trap called ARAPUCA, designed at UNICAMP, Campinas, Brazil. The photons will be detected and transformed to electrical signals by Silicon Photomultipliers inside the ARAPUCA. Due to the large area detection and limited cabling space, signals from multiple ARAPUCAs need to be amplified through a single data acquisition channel. This work presents the design and simulation of the active ganging transimpedance amplifier of 48 Silicon Photomultipliers and preliminary test results at cryogenic temperatures conducted at the Fermilab National Accelerator Laboratory.

Esteban Cristaldo was graduated Mechatronic Engineer at the Faculty of Engineering at the National University of Asunción. His graduate thesis titled "Design and implementation of a data acquisition system for Silicon Photomultipliers for the DUNE experiment" under the supervision of Prof. Dr. Jorge Molina, was a contribution to the data acquisition system of the DUNE experiment, the largest neutrino physics experiment that is currently under construction. During February-March, 2018, was invited to work under the supervision of Prof. Dr. Ettore Segreto at the Leptons Laboratory in UNICAMP, Campinas, Brazil. During April-July, 2019, was invited to work at Femi National Accelerator Laboratory (FERMILAB) under the supervision of Dr. Gustavo Cancelo, developing and testing cryogenic electronics for Silicon Photomultipliers for the DUNE experiment and developing data acquisition software for the Short Baseline Neutrino Detector at FERMILAB. Currently, Esteban Cristaldo is doing his master's degree in Electronics Engineering at the Universidad del Cono Sur de las Américas (UCSA) and continues his collaboration to the DUNE experiment.

IVANIA ANDREA CORNEJO
INSTITUTE FOR INTERDISCIPLINARY RESEARCH OF NATURAL SCIENCES
UNIVERSIDAD CENTROAMERICANA (UCA)
MANAGUA, NICARAGUA

The forestry sector in Nicaragua within the socio-political crisis: Reflections with key actors

Since April 2018, the sociopolitical crisis in Nicaragua has produced many social, environmental and economic impacts for the country. It was deemed necessary to evaluate the impacts on the forestry sector. Previously the forest industry and forest management already represented a challenge due to a weak governance.

Main issues addressed are: the impacts for the forestry sector, measures/strategies to face them and desired changes by the actors. For the study secondary sources were reviewed and questionnaires and in-depth interviews were conducted to a dozens of key actors (indigenous communities, plantations, NGOs, small and medium enterprises, private reserves and investors). Also some systems thinking tools were applied to support analysis of results.

Reported impacts such as the increasing illegal occupation in indigenous territories, the cancelation or suspension of projects of international cooperation or research and reduced institutional capacity may derive in a higher vulnerability of the forests and the associated biodiversity and human communities to climate change and (other) human-caused events.

New participatory governance models based on evidence and trust building among key actors will be needed for a new sociopolitical agreement that allows forests and forestry sector be a pillar for sustainable development for a country in a rebuilding process.

Andrea holds a Master in Environmental Management (2015) with emphasis in Sustainable Development by the University of Queensland, Australia and a background in Industrial Engineering (UCA, 2007). She has worked as Project manager for 1300 ha of native pine forest in Nueva Segovia, Nicaragua where she prioritized fire protection, reforestation and assisted natural regeneration. In 2016, she undertook a fellowship at the World Forest Institute in Portland, Oregon where she focused on community and forest smallholders' associations. In 2017 she joined Universidad Centroamericana as a researcher and has been a lecturer for the course of Environmental Management for the Industry and for the summer course Environmental and Socioeconomic challenges and opportunities in Nicaragua with Seattle University. She also has had an important role in organizing events for communication and discussion of socio-environmental issues (i.e., Meeting of Social Actors of the Indio Maiz Biological Reserve, the Forum on Forests and Sustainable Forest Management (2017, 2019)).

Andrea has contributed for publications in Food Security and Nutrition (IANAS 2019), Water Quality in the Americas (IANAS 2019), Non-timber forest products and Poverty Reduction (Pullanikkatil &,Shackleton (eds) 2018), Ecological evaluation of a forest fire in the Biosphere Reserve of the South East (Centro Humboldt 2019). She is interested in sustainable forest management of tropical forests, sustainable livelihoods, local forest enterprises, indigenous communities in forested landscapes and protected areas and forest governance and policies. Andrea is individual member of Forest Stewardship Council (FSC) and of the International Union of Forest Research Organizations (IUFRO).

DR JACKY PAUL
PHD (ECONOMICS AND MANAGEMENT) 2017
MASTER OF SCIENCE (AGROECOLOGY) 2013
AGRICULTURAL ENGINEER DIPLOMA (DEVELOPMENT ECONOMICS) 2012
LECTURER IN INNOVATION ECONOMICS AND
AGRICULTURAL EXTENSION, STATE UNIVERSITY OF HAITI

Composting and organic fertilization in Guadeloupe: conditions for the emergence of a waste recycling industry in agriculture

In French West Indies, the reduction and recycling of wastes become an important issue of sustainable development. The organic waste production is about 786 000 tons per year. Local authorities have proposed composting as a sustainable practice for recycling organic wastes as well as for orientating farmers towards the use of organic amendments. However, increasing supply, particularly for local industrial composts, means ensuring the existence of a strong and consistent demand. This raises the question of the conditions of adoption of compost by farmers in Guadeloupe. We propose an analysis of constraints to adoption to deliver various promotional levers of the use of composts. From an original economic approach, combining choice experiment, experimental economics and territorial modelling, the purpose of the research presented is to seek the economic, technical and organizational conditions of emergence of a sustainable waste recycling industry in agriculture.

Jacky PAUL is a graduate of the Faculty of Agronomy and Veterinary Medicine of the State University of Haiti. He holds a M.Sc. in Agronomy and Sustainable Development from the territories of the University of the West Indies and Guyana (UAG). Trained at the INRAAgroParisTech Joint Research Unit in Public Economics, he subsequently obtained a doctorate (Ph.D) in Economics and Management (Innovation Economics) from the Paris Institute of Technology for Life, Food and Environmental Sciences (AgroParisTech). The aims of his research are the design and evaluation of transition modalities towards a more sustainable agriculture. To do this, research is conducted on the diagnosis of farmers' decision-making processes, the economic evaluation of agro-ecological innovations, decision support, and integrated and multidimensional modeling. His works are applied to agro-ecology in general, and declined on plantain, energy cane and agricultural valorization of organic amendments. The results of my work are very good qualities and have been valued in peer-reviewed scientific journals.

THEODULE JEAN-BAPTISTE
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PORT-AU-PRINCE, HAITI

Quality of the antibiotics sold in the streets of Port-au-Prince

The unregulated sale of medicines in the developing countries represents a major problem in pharmacovigilance and public health. In Haiti, medicines labeled as antibiotics are sold by streets vendors without any prescription or guidance or proper diagnosis. This study assesses and describes the antibiotics that are available on the streets vendors' buckets. Using a Raman spectrometer (BWTEK), we analyze a sample of these antibiotics to determine if they contain the active compound they claim to be made of to determine what proportion are potentially counterfeit.

Dr Jean-Baptiste Théodule graduated as a medical doctor from the Faculté de Médecine et de Pharmacie, Université d'Etat d'Haiti, in 2011. During his year of community service, in 2012, he was awarded a scholarship to do a master in pharmacovigilance and pharmacoepidemiology at the European Program of Pharmacovigilance and Pharmacoepidemiology (EU2P). Since 2014, he has introduced and has been teaching the class of pharmacovigilance to pharmacy students at Université d'Etat d'Haiti. In 2015, he was awarded a Fulbright scholarship to pursue a master of public health at University of Alabama at Birmingham. Since his return to Haiti, he has continued his teaching in pharmacovigilance and quantitative methods in research. His research interests encompass drugs safety in developing countries, infectious diseases controls and the use of data and technology for public health improvement. In his actual research, he is mentored by Dr John Carpenter of University of Colorado Denver and Dr Albert Figueras of University of Barcelona. He works presently as the regional director of Santé, a public health program aimed at improving health services delivery led by Caris Foundation International in Haiti. He is also the founder of the Groupe Haitien de Recherche d'Innovation et de Créativité (GHRIC), an organization that promotes the use of innovation and creativity to tacle challenges faced by the Haitian society.

JESSICA PÉREZ-REYNOSA
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Recycling movements, resistance and the urban commons. Stories from the resilient community La Chureca

This presentation is about the history of resistance of the community of waste pickers that since 1972 work at La Chureca (the municipal landfill in Managua, Nicaragua). We examine the everyday/individual, collective and material strategies of resistance articulated by this community striving to maintain access to waste as an urban common. Methodologically, it combines more than hundred in-depth interviews conducted since 2009 to 2019 with waste pickers and other actors, documents, mass media analysis and observations.

Jessica Pérez-Reynosa was graduated in Economics from the Polytechnic University of Nicaragua (UPOLI) in 2007, and received a Master degree in Industrial Organization from the Universitat Rovira i Virgili, Spain. In 2013, she received a Ph.D. degree in Economics from the same university with the thesis entitled "Essays on Human Capital", written under the supervision of Profa. Susana Iranzo and Prof. Luis Díaz-Serrano. She carried out an empirical analysis on the link between institutions, governance and education. During her research project She gained a great practical insight into Education, Personnel Economics and Applied Microeconometrics. She is currently a Professor of Economics and Environmental Business at the University of Central America (UCA) and Director of the Institute of Interdisciplinary Research in Social Sciences (IICS) from the same university, in Managua, Nicaragua. She has produced articles on issues of informal economy, education economics, business economics and waste governance. As a counterpart to Nicaragua, she is currently coordinating two research projects on Inclusive Recycling Networks in conjunction with the University of Gothenburg, Sweden and the University of Victoria, Canada. From the Interdisciplinary Institute of Social Sciences, she contributes to interdisciplinary research in the study of Political Economy.

LESLIE K. TEJEDA PÉREZ
UMSA UNIVERSIDAD MAYOR DE SAN ANDRÉS
LA PAZ-BOLIVIA

Food chemistry with national and international perspective

The Food Chemistry team of the Institute of Chemical Research (IIQ), of the Universidad Mayor de San Andrés (UMSA), has been doing research for more than 10 years thanks to the support of the Swedish Cooperation, conducted research on antioxidant activity, chemical characterization in Andean and Amazonian foods from Bolivia. Based on some analytical and molecular biology techniques, services are provided to the food industry.

With everything mentioned above it was developed a spin-off company called SWEBOL Biotech with branch office in Bolivia and Sweden and the main goal of formulating strategic functional foods for the national and international market and currently has an international patent.

Leslie Tejeda graduated of the Chemical Science Career from UMSA in 2001. Her doctoral studies were made at Lund University in Sweden in the Department of Food Science and Technology, during the years 2007- 2013, her doctoral work "Antioxidants in Andean food and Meals "was directed by Professor Lars Nilsson (Sweden) and Juan Antonio Alvarado (Bolivia). She currently works as a professor and researcher at the Chemical Science Career of the UMSA, La Paz, Bolivia. She is also part of the SWEBOL Biotech Company. She has published articles on chemical characterization and antioxidant activity in isolated and complex foods, also participated in the preparation of guides, books and patents. Her main interest is the formulation of functional foods based on Andean and Amazonian foods.

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Microplastics (MPs, <5 mm in size) are classified as emerging contaminants but treatment processes are not designed to remove these small particles. Wastewater treatment systems have been proposed as pathways for MPs pollution to receiving waters but quantitative and qualitative data on MP occurrence and transport remains limited, hindering risk assessment and regulation. Here, for the first time, the stepwise abundance and loading of MPs (60–2800 µm) in a tertiary wastewater treatment plant in the UK was assessed by sampling from May 2017 to February 2018. Microplastics were found in all sampling campaigns, with an average inflow of 8.1×10^8 (95% CI, 3.8×10^8 to 1.2×10^9) items day^{-1}. Their prevalence decreased from influent to final effluent. Overall abundances decreased on average by 6%, 68%, 92%, and 96% after the pre-treatment, primary, secondary, and tertiary treatment stages respectively, although considerable variability occurred throughout the year. Sufficient particles remained in the treated effluent to generate an average discharge of 2.2×10^7 (95% CI, 1.2×10^7 to 3.2×10^7]) particles day−1 to the recipient river. Secondary MPs were predominant, while primary MP abundances were minimal. Fibres comprised 67% of all items, followed by films (18%) and fragments (15%). Chemical characterisation confirmed the presence of different types of polymers, with polypropylene fibres and fragments most abundant (23%). This research informs understanding of how wastewater effluent may channel MPs to the natural environment and their composition, and helps understand control points for optimising advanced treatment processes.

Dr. Maricela Blair is an interdisciplinary professional with degrees in Environmental Studies and Anthropology from St. Lawrence University in Canton, NY (B.A., 2004), Crop, Soil, and Environmental Sciences from the University of Arkansas at Fayetteville, AR (MSc, 2007), Freshwater Systems Science from the University of Glasgow (MSc, 2011), and Geographical and Earth Sciences at the University of Glasgow (PhD, 2019).

Previously, Maricela worked as faculty in the Environmental Sciences programme at Zamorano Panamerican Agricultural School in Honduras, and later as Chief of the Scientific Research and Technological Development Unit for the Honduran Institute of Science, Technology, and Innovation in the Ministry of Science, Technology and Innovation. She has also served as Quality Control consultant for censuses and surveys for the National Institute of Statistics in Honduras and as a member of the coordinating committee for the Regional Partnership for the Development and Strengthening of Competencies and Capacities for the Management of Natural Resources/Environment in Central America and the Hydro Nation Forum in Scotland, UK. She has conducted research in environmental, soil and water sciences and taught courses in both the natural sciences and the humanities.

To view Maricela's latest knowledge exchange outputs: https://www.hydronationscholars.scot/scholars/dr-maricela-blair

SISSI LOZADA-GOBILARD[1,2]
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Towards a Completely Eco-Friendly Coffee

Agroforestry combines the use of forestry and agriculture to achieve a more productive and sustainable use of land. In north of Bolivia, local coffee producers follow three different levels of agroforestry strategies (a) Simple agroforestry, which produce shadow coffee with one tree species as shadow providerf; (b) Complex agroforestry, which includes other native tree species for timber and fruit production, following organic certification regulations; and (c) Under-forest, the strategy with the lowest intervention where coffee are planted without disturbing the primary or secondary forest. The latter possess organic and bird-friendly certification. These strategies possess a decreasing net coffee production, but a higher economic income in the under-forest due to the certifications (openness to new markets). Even though there is a clear decrease in disturbance from simple to under forest, our previous study found no differences in herbivory and soil quality among the three strategies. However, a higher diversity of birds in the complex agroforestry was found, with a positive effects controlling coffee borer beetle (Hypothenemus hampei) outbreaks. These preliminary results suggest that the complex agroforestry might benefit from the lower and upper levels highlighting their interactions and integration. However, there is still a lack of information to infer clear processes of this system. Therefore, we propose a 5 year monitoring project to better understand how ecological processes influence coffee production at different land management levels. We propose to quantify ecosystem focused on biodiversity (birds, bats, ants), water provision and soil quality, as well as coffee production and coffee seed processing (yield, fermentation). These results will allow us to identify whether an integral management of the system will lead to a more sustainable coffee production. An ecological integral land management recognized by local and international markets through certifications, can enhance the economic income, and encourage the sustainable use of agroforestal systems for coffee production and biodiversity conservation. Our project aim to build links between science and practice, answering local economic needs and conservation practices within a sustainable development framework.

Keywords: coffee, agroforestry, Bolivia, ecosystem services, land management

Sissi Donna Lozada Gobilard was born in La Paz Bolivia on 20th January 1990. She studied biology in La Paz focusing on plant ecology. Afterwards she did postgraduate studies in Germany. She completed a master program Plant Sciences in Bonn in 2012 focusing on pollination syndromes and plant breeding systems. After the master, she began her doctorate at the University of Potsdam which was completed in October 2019 investigating plant metacommunities in agricultural landscapes. She has experience on fieldwork as well laboratory skills, experiment design, statistical analyses and scientific writing. She is interested in understanding how ecosystem function, specifically how plants interact with their environment with a focus on nature conservation and adaptation to climate change.

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ALEJANDRA DOMIC

Alejandra I. Domic is a biologist, born in La Paz, Bolivia. Her research interests are based on understanding the role of climate change and human disturbances in the distribution, structure and composition of tropical forests and semi-arid regions. She completed her undergraduate studies at the Universidad Mayor de San Andrés (Bolivia) and later her doctorate in Ecology, Systematics and Evolution at the Saint Louis University of San Luis. She has been a postdoctoral researcher at the University of Pittsburgh (USA), the Center for Advanced Studies in Arid Zones (Chile) and currently in the Department of Geosciences and the Deparment Anthropology at Pennsylvania State University (USA). She is also a research associate with the National Herbarium of Bolivia with which she carries out research projects in Bolivia. She was recently awarded with the Marie Curie award for women scientist granted by the Bolivian National Academy of Sciences.

ALEXANDER DELUNA

Alexander DeLuna is an Research Professor at the Unidad de Genómica Avanzada (Langebio) of CINVESTAV-IPN in Irapuato, Mexico, where he leads the Systems Genetics Laboratory. His main focus and expertise is on aging genetics, whereby his lab seeks to contribute to a better understanding how genes, environment, and their interactions shape this complex biological trait using budding yeast as a model. His background is on the fields of genetics, evolution, and cellular metabolism. He got a Biology BSc degree from the University of Guadalajara, Mexico, and obtained his PhD in Biomedical Science at the National Autonomous University of Mexico (UNAM). He was a Postdoctoral Research Fellow of the Department of Systems Biology at Harvard Medical School. He has authored 34 research articles, including publications in PLOS Genetics, PLOS Biology, Aging Cell, and Nature Genetics, which have been cited over 1500 times. In 2012 he was named Young Affiliated Member of TWAS World Academy of Sciences, and in 2017 he was awarded the Aida Weiss-UNAM award for biomedical genomics research. For his scientific contributions and commitment to the development of science in the region, in 2017 we was elected member of the ACAL Latin American Academy of Science.

ANDREA PAULA LIMA

Pharmacist and PhD in Biological Chemistry from the Federal University of Rio de Janeiro, Andrea Paula-Lima developed her post-doctorate at the University of Chile, where she is currently associate researcher of the Institute of Biomedical Neuroscience and Assistant Professor of the Faculty of Dentistry. For her professional contribution to the study of Alzheimer's disease (AD), she won the Junior Faculty Award from the AAT-ADPD 2011 (Barcelona, Spain) and in 2013 (Florence, Italy) and received distinctions from important scientific societies such as the Society for Neurosciences (USA), the National Academy of Sciences of Chile and Brazil, the Council for the Lindau Nobel Laureate Meetings, Foundation Lindau Nobel Laureate Meetings and the the Royal Society. Using experimental models ranging from the in vitro to the study in patients, she is interested in elucidating and blocking the intraneuronal signaling pathways activated by beta-amyloid peptide oligomers, with emphasis on those pathways that are dependent on calcium ion as the second messenger. She is also searching for functional alterations detectable by fEEG in patientes, to contribute to the early diagnose of AD.

ANTONIO JOSÉ DA COSTA FILHO

Antonio José da Costa Filho received a Bachelor degree in Physics from the University of São Paulo (USP) in 1994. After that he started his Graduate program in the same university, concluding his Masters in 1996. His PhD project was developed both in São Carlos, under the supervision of Prof. Otaciro Nascimento, and in Ithaca (USA), where he spent 3 years as a visiting graduate student at Cornell University, working under Prof. Jack Freed´s supervision. During his PhD, Prof. Antonio Costa worked on the development of new electron magnetic resonance methods for the study of: (1) lipid-protein interactions, (2) the dynamic structure of lipid membranes, and (3) metal centers in protein structure. In 2001 he received his PhD degree in Physics from the University of São Paulo and started working as an Assistant Professor at USP (Campus São Carlos). He is currently Full Professor at USP-Ribeirão Preto and his research interests involve the investigation of interactions between biomolecules with emphasis on how the interaction between proteins and their ligands (substrates, inhibitors, and membranes) can lead to modulation of the protein function. More recently, he also got interested in the structural behavior of proteins involved in the unconventional secretory pathways of the cell, in particular the so-called Golgi Reassembly and Stacking Proteins (GRASPs). To accomplish those objectives his group makes use of a combined and interdisciplinary approach of experimental techniques, such as magnetic resonance, circular dichroism, and microcalorimetry. He has received several awards for his teaching skills as well as for contributions to his specific field of scientific interest. He is a Young Affiliate Alumnus of the Brazilian Academy of Sciences and of the World Academy of Sciences, former member and coordinator of the Advisory Committee of the Brazilian National Science Foundation (CNPq) on Biophysics/Biochemistry/Physiology/Pharmacology/ Neurosciences, current President of the Brazilian Biophysical Society, and director of the Ribeirão Preto Institute of Advanced Studies of the University of São Paulo.

CLAUDIA FIGUEIREDO

The research area of Figueiredo is neuroscience focused in understand the pathological neuroimmune modulation that occurs in neurodegenerative diseases, aiming the development of preventive or therapeutics strategies to theses conditions. In one of her first projects as an independent researcher, she used mouse model of sepsis to study the late cognitive impairment associated to this condition. We found that a disrupted hippocampal insulin signalling is linked to memory impairment in sepsis-surviving mice, similarly to what has been described in AD models. Her research group also published important findings related to the alpha-synuclein oligomers, an important toxin associated to Parkinson's disease. During her career, she has developed a strong and broad background in the study of the fundamental mechanisms that modulate neurodegenerative diseases. She is affiliated member of the Brazilian Academic Science and published more than 50 peer-reviewed papers on topics related to pharmacology and neuroscience. Actually she is proposing a challenging project to elucidate neuroimmune mechanisms involved in Zika Virus infection in the adult central nervous system.

DANIEL LIMONTA

Dr. Daniel Limonta's training and research is focused on lessening the health burden of global pathogens such as dengue and zika viruses. Today, he is receiving cell biology and molecular virology training through a Post-Doctoral Fellowship at the University of Alberta in Edmonton, Canada. The University of Alberta is among the top-ranking universities in Canada. He graduated from the University of Havana School of Medicine, the most prestigious school of medicine in Cuba. In 2014, he completed his PhD dissertation at the Pedro Kouri Institute of Tropical Medicine (IPK) in Havana, Cuba. IPK is the national reference center for infectious diseases and a Pan- American Health Organization/World Health Organization Collaborating Center. His PhD dissertation focused on the association of apoptosis with clinical manifestations of dengue hemorrhagic fever. Throughout his research career, Dr. Daniel has published peer-reviewed manuscripts in leading journals in the area of infectious diseases and virology. Most of these publications are on dengue and zika viruses. Daniel has presented his research at international conferences and scientific institutions in Spain, Brazil, US, Italy, Israel, Germany, Canada and Oman. As a result of his research accomplishments, he was twice the recipient of the most prestigious annual award from the National Academy of Sciences (2009 and 2013) in Cuba. In 2009, he also received the most important individual annual award from the Ministry of Health in Cuba. Dr. Daniel was honored to be elected as the first Young Affiliate Fellow of The World Academy of Sciences (TWAS) and member of the Global Young Academy (GYA) from Cuba.

EVA ACOSTA

Dr. Eva Acosta Rodriguez is a graduate of the Facultad de Ciencias Quimicas, de la Universidad Nacional de Cordoba, where she received the title of MSc (Biochemistry) in 2000 and the Ph.D. in Chemistry in 2005.

During her doctoral thesis under the direction of Dr. Adriana Gruppi, she studied the mechanisms of regulation of survival and differentiation of B lymphocytes during infection with Trypanosoma cruzi.

In the period 2005-2007, she performed her postdoctoral training under the direction of Dr. Federica Sallusto (Institute for Research in Biomedicine, Bellinzona, Switzerland) investigating the biology of human Th17 cells.

In 2007 he returned to Argentina as a postdoctoral fellow of CONICET under the direction of Dr. Adriana Gruppi.

Since 2008, she runs her own research group integrating the areas of experience gained during her doctoral and postdoctoral studies.

Currently, she is a member of the research career of CONICET (Category Independent) and Associate Professor in Immunology of the Facultad de Ciencias Quimicas, de la Universidad Nacional de Cordoba.

FABIÁN SÁENZ BIOSKETCH

I have 17 years of experience working in malaria. In fact, after finishing my bachelor's degree at

Pontificia Universidad Catolica del Ecuador (PUCE) I completed my Ph.D studies at University of Notre Dame, IN, USA in Dr. John Adams laboratory. My main area of research was the characterization of MAEBL in the life cycle of P. falciparum. We determined that the transmembrane isoform of MAEBL is essential for the invasion of Anopheles salivary glands. This was the first characterization of a protein essential in mosquito stages in a human malaria parasite. After completing my Ph.D, I worked in the laboratory of Dr. Dennis Kyle at University of South Florida as a postdoctoral trainee in antimalarial drugs discovery and understanding of P. falciparum drug resistance.

In March 2011 I returned to Ecuador as Assistant professor at the Center for Infectious Disease research (now Center for Research on Health in Latin America, CISeAL), Biology department at PUCE. The main goal of my group's research focuses in understanding malaria situation in Ecuador to help in elimination policies. In particular, my research group focuses in molecular epidemiology of Plasmodium in Ecuador. We are interested in the characterization of malaria parasite populations circulating in the country, antimalarial drug resistance in Ecuadorian parasites and the epidemiology of malaria in low transmission areas of Ecuador. Our results show that Ecuadorian P. falciparum are resistant to some of the common antimalarials but that the treatment currently used appears to be effective. In addition, parasites circulating in Ecuador have a diverse origin and asymptomatic malaria plays an important role in the persistence of malaria.

Over the years working in malaria I have thought several microbiology and parasitology lectures and courses and I have trained students in undergraduate, masters and Ph.D levels in malaria research techniques.

FEDERICO BROWN

Federico Brown is currently Assistant Professor at the Universidade de São Paulo. He graduated from his undergrad at the Pontificia Universidad Católica del Ecuador (2001), and his PhD at the University of Washington (2008). He did a postdoc at the Max Planck Institute for Developmental Biology (2008-2010). He worked as Assistant Professor at the Universidad de los Andes, Colombia (2010-2013). Current research projects include: (1) evolution of stem cells, regeneration and coloniality in marine chordates (i.e. ascidians); (2) troglomorphism in planarians; and (3) evolution of behaviors in nematodes. Former Fulbright Scholar (2002-2004), American Heart Association Fellow (2006-2008), and Max Planck Institute Fellow (2008-2010). Elected Member of the Ecuadorean Academy of Sciences (2016), and Young Affiliate Member for the The World Academy of Science (2013-2018). The Government of Ecuador awarded him a Prometeo Professorship, with distinction (2012). He helped establish the PanAmerican Society of Evo-Devo and the Colombian Society for Developmental Biology. Member of the Board for the Latin American Society for Developmental Biology (2010-2013 and 2018-). Serves as Associate Editor for Neotropical Biodiversity, Member of the Editorial Board for the Journal of Experimental Zoology Part B (JEZ-B), Review Editor of Evolutionary Developmental Biology for Frontiers in Ecology and Evolution, and Member of the Board for the Colombian Bulletin of Evolutionary Biology (COLEVOL).

FRANCO M. CABRERIZO

Franco M. Cabrerizo received the BSc in Chemistry (2002) and PhD in Chemical Science (2005) from UNLP, Arg. He was a postdoctoral research fellow at the CIHIDECAR (CONICET–UBA, 2005–2006). He has carried out research stays in Germany, Japan and Denmark. Since 2006 he has been a Research Member of CONICET, leading (rom 2010 to date) the Photochemistry and Molecular Photobiology research group at IIB-INTECH (CONICET-UNSAM). He served as an Assistant Professor at UNLP and UNSAM (2011–2013). In 2013 he was appointed Associate Professor at UNSAM. His current research focuses on understanding the molecular aspects of mechanisms underlying the photosensitized processes triggered by UVA and visible light. This knowledge provides valuable information for the development of different biotechnological applications that might contribute to attend unresolved or neglected socially relevant local and global problems related to some chronic and/or infectious diseases, renewable energies, etc. Dr. Cabrerizo was awarded the: G. Cilento Award (I-APS, 2006), R. Caputto Award (The Nat. Acad. Sci, Arg, 2009), and Dr. E. Gros prize (The Nat. Acad. Exacts, Phys. Nat Sci, Arg, 2015).

HERNÁN GRECCO

Hernán Grecco is a Professor at Universidad de Buenos Aires (UBA), where he studied Physics and obtained his Ph.D. He is a researcher at the Physics Institute of Buenos Aires (IFIBA, CONICET), a Max Planck Partner Group Leader and the co-director of the Quantum Electronics Lab. His group develops novel optical approaches to quantify the structure, dynamics and state of biological molecules; and apply them to understand the spatial organization of living matter.

JAQUELINE MESQUITA

Jaqueline Godoy Mesquita completed her PhD in Mathematics in 2012 at the University of São Paulo with a period at the Academy of Sciences of Czech Republic in Prague. She had two post-doctorate positions, one at the Universidad de Santiago de Chile and the other one at University of São Paulo. She held the position of Assistant Professor at University of São Paulo (2013–2015) and is currently Assistant Professor at University of Brasília since 2015. She has won the International Bernd-Aulbach Prize for Students in 2012, awarded by the International Society of Difference Equations. She was selected to participate at the 5th Heidelberg Laureate Forum 2017 and was selected to be an Oberwolfach Leibniz Fellow during 2018. She was elected young affiliated member of TWAS-LACREP (2018–2022), affiliated member of the Brazilian Academy of Sciences (2018–2022) and regional secretary of the Brazilian Mathematical Society (2019-2021). She is currently an Alexander von-Humboldt/Capes fellow at Justus Liebig Universität Giessen, Germany. She won the brazilian prize "For women in sciences" awarded by L'Oreal, UNESCO and Brazilian Academy of Sciences in 2019 at the category of "Mathematics".

KAREN CASTILLO

I am a biophysics researcher at the Centro Interdisciplinario de Neurociencia de Valparaíso, CINV. As Young Investigator, my main research now is focused in to understand the molecular mechanisms that govern ion channel gating by temperature.

During my career development I transit from Cellular Physyology studying ion channels and transporters involved in olfactory transduction, passing for a postdoctoral training studying mechanisms of neurodegeneration in animal models and the role of autophagy in the amelioration of disease, and I was back to ion channels to looking them from a biophysics perspective.

My entire career has been mainly in Chile. My undergraduate formation at Universidad de Chile, lead me to receive the title of Molecular Biotechnology Engineer, with a thesis characterizing potassium channels in the cilia of olfactory neurons (2005). After that I enters to a graduate program at the University of Chile, and get the academic degree after a research in which I revealed a new mechanism for calcium removal during olfactory responses (2008). Then as postdoctoral fellow at the Faculty of Medicine in Universidad de Chile, I investigated the role of autophagy pathway in the clearance of protein aggregates in models of amyotrophic lateral sclerosis (2009-2013).

I arrive to Valparaíso, as a postdoctoral fellow investigating the structure-function relationships in ion channels, where I unravel the mechanism by which the voltage sensors in BK channel are modulated by auxiliary subunits (2013-2016).

After that, I was enrolled as a Young Researcher at CINV, and as independent researcher, associated to biophysics line of investigation, and we are investigating the mechanism for temperature detection in thermally-gated ion channels and the role of voltage and calcium sensors in BK channel gating (2017-present).

MARCELO FARINA

Marcelo Farina is the leader of the laboratory of experimental neuropathology of the Federal University of Santa Catarina, Brazil, where he teaches biochemistry and develops basic research in the field of biochemistry, toxicology and neurosciences. He holds a BSc in pharmacy (1997) and a master degree (1999) in toxicological biochemistry, both from the Federal University of Santa Maria. He earned his PhD in biochemistry (2003) at the Federal University of Rio Grande do Sul, Porto Alegre, Brazil. Farina's main research interests include the mechanisms mediating the toxic effects of environmental pollutants toward the central nervous system, with a particular emphasis on the potential occurrence of neurodegenerative disease as consequence of pollutant-induced neurotoxicity. The most important accomplishments derived from the research developed in his laboratory (Federal University of Santa Catarina) are related to: (i) the role of the selenoprotein glutathione peroxidase on the mechanisms of neurotoxicity elicited by the environmental contaminant methylmercury, (ii) beneficial effects of probucol and probucol-derivatives in mitigating neuronal injury in neurodegenerative processes.

OSWALT R. JIMÉNEZ

Dr. Oswalt R. Jiménez is a plant breeder and geneticist from Nicaragua, graduated from the University of Helsinki, Finland. In his 17 years of career he has participated in many research activities, occupying different key work positions as a professor at the National Agrarian University and researcher, coordinator and director in government institutions in his country. He has led many research teams at the national level in partnership with prestigious international agencies. His work has focused on the use of local plant genetic resources in breeding programs aided by biotechnological tools, with the objective of obtaining varieties better adapted to climate change conditions such as droughts, heat, and occurrence of new pest and diseases strains, under conventional and participatory approaches. In addition to the development of new varieties, Dr. Jiménez has improved the use of molecular markers to conserve the genetic purity of released cultivars and the study of local beneficial microorganisms with high potential for bio-fertilization and the control of pests and diseases. Currently, Dr. Jiménez is Director of the Institute for Training, Research and Environmental Development (CIDEA) at the University of Central America (UCA), as well as an assessor of the Interdisciplinary Institute of Natural Sciences in the same university.

PABLO BOLAÑOS-VILLEGAS

Associate Faculty at the University of Costa Rica, Fabio Baudrit Agricultural Research Station. Received B.Sc. in Plant Science from the University of Costa Rica (2005); and M.Sc. in Horticulture, National Pingtung University of Science and Technology, Taiwan (2007). Ph.D. degree in Molecular and Cellular Agricultural Sciences, Taiwan International Graduate Program, Chung Hsing University and Academia Sinica, Taiwan (2014). Research objectives include advance knowledge in the reproductive biology of tropical crops to boost yields and enhance stress tolerance (done in order to advance the UN sustainable development goals of zero hunger), life on land and climate action. He is an International Representative of the American Society of Plant Biologists (ASPB), and young affiliate of the Academy of Sciences for the Developing World (TWAS/UNESCO).

PATRICIA ZANCAN

Patricia Zancan is Associate Professor at UFRJ, Brazil since 2007. She got her MSc in 2002 and her PhD, in 2005 in Biological Chemistry in the Institute of Medical Biochemistry Leopoldo de Meis, at UFRJ. In 2008, she established a novel laboratory devoted to the study of signalling in cancer biology aimed to control the development of cancer cells. During the professional career, she has supervised Masters, PhD and post-doctoral fellows at high levels, contributing to the formation of qualified personnel. At administrative level, acted as the Head of the department of Pharmaceutical Biotechnology (2012-2014). She has authored more than 40 scientific articles in peer-reviewed journals. During 2014-2015, she was in a sabbatical period at Université Laval, Quebec, Canada, where she served as invited professor working in projects related to diabetes molecular triggers. In 2016 she was nominated as Young Affiliate of TWAS and was elected as co-chair of TYAN (TWAS Young Affiliates Network).

ROGÉRIO PANIZZUTTI

Rogério Panizzutti is a medical doctor, specialist in psychiatry, with a doctorate and postdoctoral degree in neuroscience, and experience in universities and research centers in the United States, Switzerland, Ireland and France. He is Associate Professor and Director of the Brain Enhancement and Neuroscience Laboratory at the Federal University of Rio de Janeiro. He was Affiliated member of the TWAS and fellow of the Human Frontiers Science Program, at the University of California, San Francisco, and the Global Brain Health Institute, at the Trinity College Dublin. He wrote many scientific articles, book chapters, and his work has been featured in major TV and radio shows.

ROLANDO A. GITTENS

Dr. Rolando A. Gittens received his bachelor´s in Electrical and Electronics Engineering from the Universidad Tecnológica de Panamá (2006), and his Master in Materials Science & Engineering (2011) and PhD in Bioengineering (2012) from the Georgia Institute of Technology. His research focuses on the role of nanostructural and electrical properties of biomaterials in cell differentiation processes for tissue regeneration. His work has resulted in one patent and another active application for surface nanomodificación of titanium implants, more than 20 publications in high impact journals, co-authorship in a book chapter and prestigious awards such as the TWAS-LACREP Affiliated Member recognition in 2017, being named one of Central America Innovators Under 35 by the MIT Tech Review, obtaining several Young Investigator Awards in recognized international conferences, and being appointed as a Distinguished Member of the National Research System (SNI) in Panama. Currently, Dr. Gittens is a Research Engineer at the Institute for Scientific Research and High Technology Services (INDICASAT AIP) in Panama, where he continues to study biomaterials and stem cells for regenerative engineering, as well as applications of mass spectrometry for innovations in public health. Finally, he actively applies his soft skills in intellectual property and scientific diplomacy for scientific lobbying to enact laws that support the Science, Technology and Innovation system. Dr. Gittens also works as a consultant for business innovation through R&D and the formulation of new ventures.

YRAIMA CORDEIRO

Yraima Cordeiro holds a bachelor's degree in Biological Sciences from the Federal University of the State of Rio de Janeiro (UNIRIO) (1999), a Master's degree (2001) and Doctor's degree (2005) in Biological Chemistry by the Federal University of Rio de Janeiro (UFRJ). She is currently Associate Professor of the Department of Pharmaceutical Biotechnology at the Faculty of Pharmacy of UFRJ. He has experience in the field of Biochemistry and Biophysics of macromolecules, working mainly in the following subjects: prion protein, protein aggregation and folding, spectroscopy, protein-protein and protein-nucleic acid interactions and screening of protein aggregation inhibitors. From September 2011 to January 2016, she was vice-coordinator of the Graduate Program in Pharmaceutical Sciences (PPGCF) of the Faculty of Pharmacy, UFRJ. Since March 2016 she is the Coordinator of the PPGCF. She was a member of the World Academy of Sciences - TWAS (2010-2014) and an affiliate member of the Brazilian Academy of Sciences (2012-2016). Since 2017, Yraima is a TYAN member.

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