

Rio de Janeiro, May 21st 2010

Dear Fellows of TWAS-ROLAC,

We are pleased to announce the names of five young scientists elected in 2010 as TWAS Affiliated Members, for a five-year period:

Jaime Costales Cordero  
Marvadeen Singh- Wilmot  
Mauricio Calderon  
Rogerio Panizzutti  
Yraima Cordeiro

Biographical information on each of the new Affiliated Members, extracted from their nomination files, is included at the end of this letter. It testifies to their high scientific level.

We thank all Fellows of TWAS\_ROLAC for their fundamental contribution in nominating the brightest young scientists working in the region and in evaluating the nominees.

With very best regards,

Marcelo Viana  
Head of TWAS-ROLAC

## Jaime Costales Cordero

Dr. Jaime Costales obtained the “Licenciatura” in Biological Sciences at the Pontificia Universidad Católica del Ecuador (PUCE, Quito, Ecuador, 1999), and his Ph.D. degree in Molecular and Cellular Biology at Ohio University, Athens, Ohio, U.S.A (2004). Subsequently, he performed post-doctoral training at the Harvard School of Public Health (2005-2008). After completing his postdoctoral training, Dr. Costales returned to Ecuador with the goal of continuing his research career and fostering scientific development in his home country. Currently, Dr. Costales serves as a faculty member and researcher in the Center for Infectious Disease Research (CIDR) at the School of Biological Sciences, PUCE, in Quito-Ecuador.

Jaime Costales studies the biology of the protozoan parasite *Trypanosoma cruzi*, causative agent of Chagas disease, which infects an estimated 10-12 million people in Latin America and over 200,000 people in Ecuador. This disease causes extensive morbidity and mortality, since no vaccine or satisfactory chemotherapeutic treatment are currently available. Dr. Costales has contributed to the knowledge regarding the interactions of *T. cruzi* with the mammalian cells it invades and multiplies in. He performed pioneering studies about the process by which the parasite egresses from the cells after intracellular multiplication, showing that *T. cruzi* induces host cell permeability and employs secreted proteases during cellular egress. Furthermore, he has shown that cell permeability allows antibodies found in serum from Chagas disease patients to reach the parasite intracellularly and reduce its ability to egress from infected cells, potentially constituting a new protective mechanism of human antibodies against infection. Additionally, he studied the modulation of host gene expression during intracellular infection with *T. cruzi*, and shown that the parasite affects the progression of the host cell cycle and prevents cytokinesis. Finally, he has been involved in several studies regarding the epidemiological status and transmission of Chagas disease in Ecuador.

Currently, his work is focused on the study of Ecuadorian strains of *T. cruzi*, the cellular invasion routes they employ, the host-gene modulation patterns they induce *in vitro*, and the clinical manifestations they produce in patients. Furthermore, he forms part of an international team for the study of the biology of the different phylogenetic lineages of *T. cruzi*. He participates in research aimed at the use of molecular tools to unravel the transmission cycles of *T. cruzi* in Ecuador. Jaime Costales directs the research thesis of four students. Finally, he has placed a great deal of effort in building the research and training capacity at PUCE in Ecuador, for which he has received the financial support from the Special Programme for Tropical Disease Research of the World Health Organization (TDR/WHO).

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## Marvadeen Singh- Wilmot

Dr. Singh-Wilmot completed a double major in Pure and Applied Chemistry and was awarded her B. Sc. in 1997. In the same year she started her Ph.D. in Lanthanide Chemistry under the supervision of Professor Ishenkumba Kahwa. In 2002 the Department of Chemistry offered her an Assistant Lectureship and in 2003 she was awarded the Ph.D. with high commendation. At this time the Department was not happy with the level of activity in its X-ray Crystallography Lab which had been established since 1999. Problems associated with finding a crystallographer were the main reasons for this. As a young member of staff Dr. Singh-Wilmot volunteered to assist in the lab and she spent many nights and many days learning crystallography through reading and experimentation. She made connections with the American Crystallography Association (ACA) which provided assistance in the form of mentors. She communicated with them via email and in the summer of 2005 she participated in the ACA's short course in crystallography. This was her first encounter with formal training in this field but by then she had already been solving structures on her own. At the meeting of the ACA in Hawaii (2006) she presented a paper on X-ray Crystallography at UWI and people were impressed. She forged further connections with both industrial and academic crystallographers and continued to learn with their help. In the summer of 2008 she visited the lab of Vratislav Langer at Chalmers University of Technology in Gothenburg, Sweden and spent the summer sorting out crystallographic problems under Vratislav's supervision. Today her efforts have resulted in increased output from the X-ray Lab at Mona and widespread use of the technique in all areas of research throughout the Faculty of Pure and Applied Sciences. She has managed to do this even while maintaining full responsibilities as a Lecturer in the Department, including a full teaching load. At the same time Dr. Singh-Wilmot continued her research in Lanthanide Chemistry and started to do work in the areas of framework and nano-materials. She was awarded a New Initiatives Grant from UWI in 2008 and today she supervises 3 students; 2 graduates and 1 undergraduate. Her work is progressing well and new lanthanide clusters have been made which have the potential to lead to the development of novel functional materials. Some of this material is currently being prepared for publication.

Dr. Singh-Wilmot has an infectious passion for chemistry and science in general. She is dedicated to the promotion of science as a tool for development and she uses every opportunity to spread her excitement to her students and young people in general. She has recently been appointed to Jamaica's Cooperative Development Committee where she will focus on the use of science to improve the lives of people through direct involvement in the Cooperative Movement. She also coordinates a Saturday programme called "Lab Rats" which exposes children from 3 to 12 years old to science. It builds their investigative and analytical skills and promotes creativity and critical thinking as it uses science to both enlighten and delight them. Children do experiments and write their findings in their lab journals. Lab Rats is a direct consequence of her desire to contribute to building a strong science culture in our region.

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## **Mauricio Calderon**

Dr. Calderón has had the most productive scientific career at his young age of 34. He has completed Thesis for obtaining his Title as a Geologist, his Master Degree, and his PhD at the Geology Department of Universidad de Chile. His PhD Thesis was awarded the Prize of the Academy of Sciences of Chile for the best thesis in Natural Sciences for the period 2004 – 2006. As a result of this thesis, he has published 10 articles in ISI Journals, 2 papers in international Scientific Books, and more than 30 abstracts and short papers in national and international congresses and symposia. In 2009, he obtained the TWAS – ROLAC award for Young Scientists in Earth and Planetary Sciences.

Mauricio is a natural leader, and he is interested and capable of establishing cooperation relationships with researchers from different parts of the world. It is notable that his publication record includes co-authorship with scientists and students from 10 different countries ( Argentina, Australia, Brasil, Germany, Italy, New Zealand, Sweden, UK, USA and Chile), with whom he has interacted in a very open and positive way. He has become a key figure in congresses in Chile and Argentina, where his presentations attract big numbers of participants.

He has developed a deep comprehension of igneous and metamorphic processes, starting from the study of gneisses, granites and ophiolites in the Patagonian Andes, where he has participated and organized many field excursions under difficult conditions, always successfully in logistic and scientific terms. His need of obtaining first class analytical data has taken him to have research stages in Brasil, Portugal, Germany and now Australia, interacting with world class scientists that also become involved in his research. This has resulted in formal cooperation agreements with some of these foreign scientists. He has formulated new models about the tectonic evolution of the ophiolitic belts in the Patagonian Andes, and is now comparing these with his recent research in West Antarctica.

Finally he has natural skills for teaching, due to his open and expressive personality, and he has done this successfully at the university level, and also in schools and professional institutions. He is at present lecturer in Mineralogy at U. de Chile.

## **Rogério Panizzutti**

Rogério joined the Universidade Federal do Rio de Janeiro to study medicine and biomedical sciences, with the aim to connect them. As a first year medical student, Rogério started to work in the laboratory of Leopoldo de Meis (ABC, TWAS). At the end of the medical school Rogério was invited by his previous mentor Dr. Herman Wolosker to do a PhD thesis studying the neurobiological role of D-serine, an endogenous modulator of NMDA receptors in the nervous system. Rogério studied the serine racemase, a brain-enriched enzyme that converts L- to D-serine, and found that the

pharmacological inhibition of serine racemase decreases D-serine levels providing a new strategy to decrease NMDA receptor co-activation. He also found enzyme physiological ligands able to widely increase D-serine production and to elicit another enzyme function: generation of pyruvate from L-serine.

Next he decided to study which brain areas are affected by D-serine administration and joined the Novartis Institute of Biomedical Research, Basel, Switzerland. Using functional magnetic resonance he found that D-serine activates the hippocampus of rats. Additionally, he searched for new molecular targets for tropical diseases treatment and discovered significant amount of D-alanine and alanine racemase activity in *Leishmania amazonensis*.

At the end of his Ph.D. he won the 2004-Young Talent in Life Sciences award, from the Brazilian Society for Biochemistry and Molecular Biology (SBBq), which is given yearly to one Ph.D. student in biological sciences from Latin America. In the following year he was awarded 2005-Young Latin American Scholars Award, from the American Society for Neurochemistry.

Just after he finished his Ph.D. he got a tenure position as assistant professor at the Instituto de Ciências Biomédicas of the Universidade Federal do Rio de Janeiro. He started his own research group, 3 PhD and 4 graduate students, and develop pivotal collaborations with different Brazilian groups studying biological markers of neuropsychiatric disorders, focusing on D-serine. His group described that D-serine degradation is increased in schizophrenia. They are also finishing studies describing the role of phosphorylation on serine racemase modulation, the D-serine metabolism during Alzheimer disease progression, and the behavioral effects of D-serine, both in humans and animal models. Those findings generated two master thesis and Rogerio is currently supervising three Ph.D. students.

In 2006, looking for translating neurosciences to clinical applications Rogerio was accepted for a postdoc with Michael Merzenich at the University of California in San Francisco (UCSF), a leader in studies of brain plasticity, who has been developing brain training software to improve and prevent cognitive deficits. To support his postdoc, Rogerio was awarded two prestigious fellowships: Long-Term Fellow, Human Frontier Science Program and John G. Nicholls Fellowship, International Brain Research Organization. In the last two years, besides leading his research group in Brazil, Rogerio has been in California studying brain plasticity and molecular and genetic markers related to the response of schizophrenia patients to the brain training. Based on his findings he was awarded the Program for Breakthrough Biomedical Research Fellowship from the University of California, San Francisco.

## **Yraima Cordeiro**

Dr. Cordeiro joined my laboratory in 1995 as an undergraduate student. In 1999, she was accepted as a graduate student in our Program and obtained her PhD in February 2005. After a short period as a

postdoctoral research associate in my laboratory she was hired by our University as Associate Professor. During all these years, Dr. Cordeiro's research accomplishments have been remarkable. She is a young (35y), very talented and hardworking young scientist. I would rank her in the top 5% among the graduate students and postdocs that have been in my lab. This can be verified by her outstanding academic production, with more than 20 papers published in Journals of high impact factors, such as Journal of Biological Chemistry, Biochemistry and Trends in Biochemical Science; and her articles have received 370 citations (index  $h=10$ , ISI). After she started her laboratory in 2006, she was awarded the ABC-UNESCO-L'Oréal Prize for Young Scientist in Brazil. She has also obtained support for her research from different funding agencies. Her research group includes undergraduate and graduate students.

Her work has focused on studies about the conversion of the cellular prion protein (PrP<sup>C</sup>) into a misfolded, beta-sheet-rich isoform (PrP<sup>Sc</sup>). In 2001, Dr. Cordeiro described for the first time that nucleic acid molecules could catalyze the conversion between PrP<sup>C</sup> and PrP<sup>Sc</sup> isoforms (*J. Biol. Chem.*, 2001). This work was followed by several publications by other groups that confirmed her studies. Dr. Cordeiro has also used pressure techniques to reveal the key importance of hydration on the interconversion between the different prion isoforms (*J. Biol. Chem.* 2004 ; *Biophys. J.*, 2005).

Dr. Cordeiro and coworkers also published the first structural characterization of prion protein (PrP) complexed to another macromolecule, as determined by NMR spectroscopy and small-angle X-ray scattering. In this work, Dr. Cordeiro showed how a PrP and a nucleic acid molecule wrap each other, a picture made possible by the use of two different structural techniques (SAXS and NMR). The tight complex visualized by these biophysical tools may explain how nucleic acids can stimulate the conversion of the cellular form to the infectious one. This new study was the first structural description of the complex. The structural identification of a specific site of nucleic-acid binding opens new avenues to the design of compounds that may interfere with the conversion to the scrapie conformation. In a more recent work (*J. Biol. Chem.* 2008), the interaction of the prion protein with RNA derived from neuroblastoma cells was shown to be highly toxic. In conclusion, I believe that Dr. Cordeiro's studies have advanced the field of TSEs and other neurodegenerative diseases.

I have no hesitation in concluding that Dr. Cordeiro is among the two best researchers I was in contact, including my graduate students and the students I was in close contact during a 3-year term as Chairman of the Department of Biochemistry and as Director of the NMR center. I will be delighted to provide any additional information.