

BIOGRAPHICAL PRESENTATION, Felisa Vázquez-Abad

Unlike most people, I wasn't born alone. It was the first important task that my identical twin and I would do together, and we learnt that cooperation, instead of competition, was essential for survival. That day was March 14, 1960 and the place was Havana, Cuba, where our father Jesús Vázquez Gayoso was Minister of Foreign Affairs of the Spanish Republican Government in exile.

As a young lawyer, he had been with the Diplomatic Government of the short-lived Spanish Republic since 1931. He led a troupe of *carabineros* during the Spanish Civil War and was able to survive and cross the Pyrenees by foot, fleeing into exile to escape the death penalty declared against the loyalists. He was appointed Minister of Foreign Affairs and assigned to Central America. During his stay in Cuba he pursued his academic career and became Dean of the Faculty of Law of the University of Havana. My mother Felisa Abad Serrano was also a Spanish refugee, living in Caracas, Venezuela. They met in Cuba in 1945 during a holiday trip when she was 15 years old, and my father was 36.



It came as a surprise that we were twins, and we were welcomed to a family with three older brothers. Today, Jesús is Professor of Education in Montreal, José is a computer programmer in Mexico, and Juan is former Head and Professor at the conservatory of music in Madrid.



We moved to Caracas, Venezuela, where we lived until August 1962, when we finally settled in Mexico City. We attended school at the Colegio Madrid, a prestigious school founded by Spanish Refugees that emphasized the study of science.

I graduated third of my class of 86 for the B.Sc. in Physics in 1983 and I obtained the M.Sc. degree in Statistics and Operations Research in 1984, both from the Universidad Nacional Autónoma de México (UNAM). Initially motivated by my Honours thesis project in nuclear physics, my interests focused on the study of the behaviour and the control of processes under uncertainty, or “stochastic processes.” In 1985 I went to Brown University in USA, where I obtained a Ph D in Applied Mathematics. I participated in a team of researchers working for NASA, where we studied the dynamics of turbulent wind flows under the wings of aircraft. I helped produce a number of chapters on the theory of numerical solutions of differential equations. At the same time, my Ph.D. project dealt with the optimal routing of packets in a telecommunication network, and I was amongst the first to test hypertext in the early days of Internet technology. It was at this time when the dreams started.

I often dream about myself as a mathematical entity, to whom operations such as integration, or being multiplied by “epsilon” can be applied. I rode on top of bifurcating differential equations, I have been inside a computer code causing compilation problems, and was once a subset of a set of measure zero... Until much later, I did not suspect that this was apparently uncommon. Years later I helped to produce a novel technique for control of stochastic processes, which I conceived imagining that I was a tiny part of a controller sitting inside the electronic connections of a telecommunications network.

My main research interest is called stochastic decentralised control. The goal is to understand and create intelligent mechanisms that can control behaviour, based on a multitude of small and simple computerised and semi-autonomous algorithms. We call these mechanisms *intelligent*, in analogy with biological systems, such as an ant colony, or a collection of neurons: global information about the system's goal for performance improvement is not physically localized, but rather lies in the collective coherent behaviour of its rather simple components. It is in these mechanisms that the capacity for learning and adaptation resides.

In 1989 I obtained my Ph.D. and after a year of postdoctoral experience at Brown, I decided to move to Montreal, where I was a researcher at the INRS-Telecommunications Centre of Excellence until 1993, when I became Assistant Professor at the Department of Computer Science and Operations Research at the University of Montreal. I was promoted to Associate Professor with tenure in 1996 and to Full Professor in 2004. During this time I developed many research collaborations and had the experience of travelling around the World, visiting the Netherlands, France, Switzerland, Spain, Australia and the United States. These collaborations have given me the opportunity to apply stochastic control to mobile and optical networks, transportation systems, financial problems, maintenance and insurance. In 2000, one of our papers on a new method for a maintenance control strategy was awarded the Jacob Wolfowitz prize of the American Statistical Society, for theoretical advances in the mathematical and management sciences.

I came to Melbourne many times as academic visitor since 1997 and I have been Honorary Principal Fellow of the Department of Electrical and Electronic Engineering since 2000. Here I learnt about optical network technology and soon became interested in applying my skills to work with engineers in this area. Back in Montreal, Brunilde Sansò (École Polytechnique) and I co-directed a M.Sc. thesis, which resulted in a temporary US patent for an optical switch. But this was not the only thing I learnt in Melbourne. I soon met many friends, mostly through the collegial and intellectually stimulating environment of University College, where I often stayed as a visiting academic. In August 2004 I accepted the position of Associate Professor of Mathematics and Statistics at Melbourne University, and thus started a new chapter in my life. So far, my career has focused on personal development, but I foresee in the future a change of focus towards the community.



My sister has always been a source of inspiration, support and understanding. Her integrity, passion and scientific excellence took her from being a Medical Doctor in a rural community in Mexico, to becoming Medical Director of the largest pharmaceutical company in the World. She has accumulated great research and service achievements, and is currently member of five diversity networks. We are probably closer today in our professional goals and life commitments than we have ever been in the past, albeit the great geographical distance. She has said to me: “you have gone so far away, that if you tried to get any farther, you would start to come back.”

The presence of women in scientific careers decreases significantly as the level of the position increases, and as we enter the 21st Century, it is somewhat sad to realise that young people still have the perception that our brains somehow are not fit for quantitative analysis. Even sadder is the realisation that many young women believe this themselves. The pioneering educational revolution proposed by the Melbourne Model is soon to be implemented. It promotes the highest quality of academic expertise, diverse research environments and innovative teaching development with focus into the community. I was one of twelve academics selected for the 2006 Academic Women in Leadership Programme, which will help me to engage in the larger vision of the University and help to motivate and inspire a new generation of young people, for whom gender should never have a negative impact.