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Interview



Professor Marcos Eberlin, who is the chief executive of the Brazilian Society of Mass Spectrometry, recently spoke to BrJAC about his work

Marcos Nogueira Eberlin

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At the head of the ThoMson Laboratory, located at the Institute of Chemistry, University of Campinas, SP, BR, the Brazilian, chemist, scientist, Professor Marcos Eberlin, maintains an active presence in the national and international scientific community. At the height of its 25 years, the laboratory has trained about 200 students, who now work in their own MS laboratories in universities or as MS specialists in companies in Brazil and worldwide. In addition, some 800 papers have already been published, which makes ThoMson a reference in MS in the world.

With a vivid personality, Eberlin motivates everyone with his positive energy and joy of living. The passion for chemistry came as a child, when a teacher showed him how fascinating chemistry can be. Since then he has traced his way into the world of chemistry, specializing in mass spectrometry. Also to his pride, his daughter Dr. Livia Eberlin followed in his footsteps and has been conquering his space. Graduated from UNICAMP, she received several awards, including the Nobel Laureate Signature Award 2014 from the American Chemical Society – a coveted prize, which bears the signature of all Nobel laureates in chemistry. A Brazilian researcher has never before won this award.

Dr. Eberlin is also an award-winning researcher. He recently had the honor of being the first Latin American scientist to receive the J.J. Thomson medal. The medal is the main honor of the mass spectrometry area in the world, offered by the International Foundation of Mass Spectrometry (IMSF). He also received the award “Zeferino Vaz de Reconhecimento Acadêmico” (2002) and the Scopus-Capes Award (2008) for excellence in publications and staff training.

Another line of research advocated by him is the theory of Intelligent Design. Since 2014 he has been president of the Brazilian Society of Intelligent Design. This theory analyzes the latest scientific data on the events that gave birth to the Universe and to living beings. The researchers evaluate the feasibility against the data, of two possible causes for the Universe and Life: natural forces or the action of an intelligent mind. The theory then maintains, after this careful analysis, that the characteristics of the Universe and living beings are contrary to the action of natural processes, and better explained by an intelligent cause.

Marcos Eberlin is currently chief executive of the Brazilian Society of Mass Spectrometry (BrMASS), which today represents Brazilian mass spectrometry. He is also an associate editor of *Journal of Mass Spectrometry (JMS)* of John Wiley & Sons Ltd.

How your career as a chemist started? And what motivated you to be a chemist?

When I was about to finish first grade, I had a chemistry teacher who showed to me how fascinating chemistry is, talking about the use of it in many aspects of our daylife. I was also given a very special game as a birthday gift that was called “O Pequeno Químico” [The Little Chemist] and I was again fascinated with the simple but beautiful chemistry that this minilab showed to me. Then for high school I enter a technical course at the “Colégio Técnico Industrial Conselheiro Antonio Prado – COTICAP” in Campinas, SP, BR and my carrier started.

What could you say about your supervisor, Graham Cooks from Purdue University, USA? How important he was in your career?

Graham Cooks is - for me - by far the most talented mass spectrometrists ever. He is amazing, and has made numerous contributions to MS in many different fields by using many different approaches. He is a great inventor, his mind is always full of great ideas, and a master in detecting new opportunities and the best way to solve analytical problems. He is also a great leader, giving to his students all the freedom to think, to plan and to make things happen. Students at his hands are formed as researchers, not technicians. He is the best! I have learned from him most of what I am as a supervisor, and group leader, and I am always trying to follow his footsteps when thinking of new ways to develop MS.

What is your opinion about analytical chemistry? What advice would you give to a freshman analytical chemist?

Analytical chemistry is the art – I believe – to reveal in details the chemical composition of a sample. In regard to MS, analytical chemistry is the art of going to the molecular and atomic level and inspecting a sample with the “hands” of a mass spectrometer.

Everything in the material universe is made of atoms and molecules for “everything is chemistry”! Analytical Chemistry is therefore a very exciting journey into revealing the molecular secrets of our Universe, from nature to all man-made products! It is indeed a great adventure and a very rewarding field in science. For the freshman I would say: discover new ways to “see” the ballet of molecules and atoms that compose the chemistry of our life and universe! Innovate! Try the craziest ideas! Make things as simple as possible in a way that brings analytical chemistry to all!



Professor Marcos Eberlin in the ThoMSon Lab. Photo: Luciene Campos

What studies are you current doing in you major research fields: “Fundamental Studies in MS” and “MS techniques and its applications”?

I think by far the most relevant and innovative studies are in the development of new analytical protocols in clinical and microbiology diagnosis. Recently we developed a new MS protocol for fast and secure characterization of different fungi that attacks the cacao plantations in Brazil causing serious diseases as that known as “vassoura de bruxa”. We also have developed an automate MS protocol for screening uterus cancer that could be used by pathologist to replace the tedious eye-inspection procedures they use today in the Papanicolau (Pap) testing.

As the founder and current president of the Brazilian MS society, and the organizer of its conferences that became of the largest in the world, what is your feeling about analytical chemistry conferences in Brazil?

Science is made by people, and is made in a much better way if such people know well each other and decide to get together summing their abilities and instruments in the pursuit of joint projects. Collaborations are the best strategy to countries where research funds are little to make the best possible use of funds. And there is no better way to motivate collaborations via conferences, and large conferences. Brazil should invest heavily in this area.

What is your opinion about Brazilian mass spectrometry?

If one looks back to 1990, MS in Brazil was nearly no-existing. Only a few brave pioneers doing their best. But in two decades Brazilian mass spectrometry has tremendously flourished and is today very active with numerous mass spectrometrists working in Brazil in various fields, from analytical chemistry to biochemistry, clinical and medical applications, material science, forensics, natural products, organic chemistry, proteomics, fuel chemistry and so on. We currently count close to 3.5% of all MS Science in the world!

In your opinion what is the future of MS and what is the major contribution is still to offer to

analytical chemistry?

I have no doubt here: we need to make mass spectrometers as easy to use and as cheap as a mobile phone! And the MS data as simple to interpret as an ordinary image. I use to say: "An image is worth a thousand spectra". And there are many mass spectrometrists in Brazil and around the world pursuing this dream!

Last year during the 21st International MS Conference in Toronto - Canada, you received the Thomson medal. What could you say about it?

It was a tremendous honor for me but particularly to all scientists in South America and Brazil; particularly to all analytical chemists, and most particularly to all mass spectrometrists. The Thomson medal is the greatest award one could be given in MS. If you look at previous winners, the list shows many great scientist including Nobel Prize winners. I received the medal but the medal was the international recognition of a great number of people and institutions in Brazil that contribute for the creation of the ThoMSON laboratory at UNICAMP and provided a perfect environment in which we could explore the chemical world with the hands of a mass spectrometer.

How was the experience to be president of the international MS society from 2009 up to 2014? In 2020, the international MS conference will be for the first time ever in South America, that is in Brazil (Rio de Janeiro). What is your feeling about this conference?

To preside IMSF was for me also a great honor and pleasure. I decide to "change the face" of IMSF and was able to implement several new programs such as the international MS schools (the 1st was in Siena, Italy with a large delegation of Brazilian students and the 2nd was organized in Natal, Brazil) and was responsible to implement International MS conferences "outside Europe". I, as the IMSF president, presided the first ever IMSC conference in Kyoto, Japan and the election committee for the 2nd in Toronto, Canada. I – as the BrMASS president – also presided the committee that get the IMSF approval to hold the 3rd international MS conference in Rio - 2020. This conference will be great and historical. BrMASS plans to organize the largest and best ever MS conference in Rio 2020 and we have started plans and actions to do it!

The 6th BrMASS (Brazilian MS conference) was last year organized in conjunction with the 1st Ibero American MS conference. As a BrMASS founder and its current president, how important it was to organize these joint conferences?

The BrMASS conferences have become the 3rd largest MS conferences in the world but by attracting people mainly from Brazil and South America. Last year, despite the strong economic and political crisis in Brazil, we dared to make the conference larger and a little more international and proposed to a number of Ibero American societies to join us. It was again a great success! Close to 1500 people attended the conference and they all enjoyed it very much! Lecture rooms were full of people and the atmosphere was of great enthusiasm and optimism. The conference place in Barra da Tijuca, Rio de Janeiro is outstanding an in all, a superb environment for new and international collaborations was steted up which is certainly to produce major gains for the further development of MS in Brazil.

You are the founder of the ThoMSON laboratory at UNICAMP. Last year the lab turned 25 years old. How were those 25 years there?

We started literally from scratch. There was no lab, no walls, no roofs. Only an empty field. There was also no instruments, no students. But we dreamed a giant dream and worked hard to make it true! In the celebration of the 25th anniversary of the ThoMSON laboratory it was a great pleasure to look back in time and see how much we did. A great selection of state-of-the-art instrumentation in MS. Close to 200 students graduated from the lab and a large new generation of Brazilian mass spectrometrists were formed, and are now working in their own MS laboratories in universities or as MS experts in companies in Brazil and worldwide. We have exported mass spectrometrists to USA, South America and Europe. We developed many new MS techniques. We published close to 800 manuscripts. We established the ThoMSON lab as a reference center for MS in the world. It was unthinkable but we made it!