AN INTERVIEW WITH

Ivette Gomes

by **Ana Cristina Moreira Freitas*** and **Jorge Milhases Freitas****

Maria Ivette Gomes (born 21 July 1948) is an Emeritus Professor of the University of Lisbon, editor-in-chief of REVSTAT, member of the editorial board of Extremes and researcher of the research centre of statistics and its applications of the University of Lisbon (CEAUL). She obtained a PhD in Statistics in 1978 from the University of Sheffield. She became a renown influential specialist in the field of Extremes. Together with Tiago de Oliveira, she is responsible for dynamizing a School of Extremes in Portugal, which, nowadays, counts with many researchers. She was one of the founders of SPE (the Portuguese society of statistics), which she presided from 1990 to 1993.

She was a member of the first Scientific Committee of CIM, in 1996, and a vice-president of the direction board from 2004 to 2008.

She was principal investigator of several national and international projects, she authored 5 books and published more than 100 publications in peer reviewed journals, including several of the most reputed journals in Probability and Statistics.

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When and how did you decide to become a mathematician?

Indeed, I think I decided to become a mathematician in my fifth year in the secondary school and the main reason was because I could not go to Architecture. I would like to go to Architecture because I liked very much geometry and drawing, but I did not have very good marks in History. To pursue a degree in Architecture, at the time, we needed to have very good marks in that subject and so, I decided to go to Sciences and my second choice was Mathematics, for sure.

So, we lost an architect but won a mathematician

Yes...

How does a graduate in pure Mathematics with a passion for Algebra get interested in Statistics and, in particular, in Extreme Value Theory?

I went to Mathematics, which was a five years degree. After the first three years we had to choose between three different topics: Pure Mathematics, Applied Mathematics and Mechanics. Indeed, I liked Algebra very much. I had the first course in Probability and Statistics taught by Tiago de Oliveira in the third year of our course in Mathematics. At the time I liked Probability and Statistics a lot but my decision was already taken and I decided to study Algebra and to go to Pure Mathematics. Afterwards, I had to choose again, in the fifth year, two different subjects. I decided to choose two courses, one in Probability Theory and the other one in Mathematical Statistics. In the course of Probability Theory I got to know the book by Gnedenko, I read the book and I liked it very much. So I think maybe that was the first push I had towards the field of Probability. Afterwards, I also got interested in the field of Statistics due to the wonderful course on Mathematical Statistics given by Tiago.

So, Gnedenko is the guy to blame.

Yes . . . He is the guy to blame . . . So, this was in my fifth year of Pure Mathematics, after a lot of very nice courses in Algebra and Analysis. I had courses given by Sebastião e Silva . . .

Ah, you were one of the lucky ones . . .

Yes, I was lucky to still have Sebastião e Silva as a professor. He gave me a course of Distribution Theory and there I could also see some connections to Probability Theory. He also gave me a very nice course about the history of mathematical thinking. But indeed, I always found that there was some kind of magic in the random and in Probability. Algebra was too much deterministic, you see ... Life is not so deterministic. It is more random. And so, I thought that maybe I should take the degree in Applied Mathematics, which meant two extra years. But then, Tiago de Oliveira learned about my intentions and he decided to offer me a position as assistant. So I was directly hired as an assistant of the department of Mathematics to work with Tiago in the Section of Applied Mathematics, which also meant to work with computers and I had never worked with computers . . .

Isabel (Fraga Alves) told me once that you know how to program quite well. So, is that how you learned?

Yes . . . At the time I learned by myself the Basic language and afterwards I had to learn Fortran.

So you worked with Tiago and that is what lead you to go and obtain a PhD in the field of Statistics . . .

Yes . . .

And how does the Extreme Value Theory come into the picture? Was Gnedenko, again?

Maybe not entirely Gnedenko, this time. Indeed, when I went to Sheffield, in 1975 to earn a PhD I was supposed to choose a topic different from the Extreme Value Theory. The idea was to go possibly to Nonparametric Statistics, which was a topic that I enjoyed and there was nobody here working in that field. But it happened that, at the time, Clive Anderson, who earned a PhD at the Imperial College and in the field of Extreme Value Theory, got to know that I was coming from Portugal and came to me and asked whether I did not want to work in the field of Extremes because he would like to supervise my PhD in that topic. I said I would think about it. I talked with Tiago and he said that it would be my decision. And then I decided to accept to be supervised by Clive. Hence, one can say that Clive was the responsible person for my dedication to Extreme Value Theory.

Do you have a favourite Mathematician that has particularly inspired you?

Gnedenko is obviously one of the names. But I would add two other names: Fisher and Tippett.

Some people say that Statistics is not Mathematics. What do you think?

It is a difficult question . . . I think that when we go to real applied statistics and applied data analysis, sometimes they are far away from Mathematics. But when we speak about it through Probability Theory, I think we can include it in Mathematics, obviously. Moreover, when we consider theoretical statistics and mathematical statistics, we definitely cannot say that they are not mathematics. But in my opinion we should keep some individuality for Statistics, because some people who are working in applied statistics are a bit away from Mathematics.

But they still need a mathematician . . . Or not?

They need . . . Yes, they need a mathematician, obviously.

You were a founder of SPE (Sociedade Portuguesa de Estatística — the Portuguese Society of Statistics) and its second president, after Tiago de Oliveira. Do you think we lived up to the expectations you had for the Portuguese community of statisticians when you helped to found SPE, back in 1980?

You know that before SPE we had SPEIO (Sociedade Portuguesa de Estatística e Investigação Operacional — Portuguese Society of Statistics and Operational Research). Afterwards they thought that Operational Research should have an Association and so there was no reason to go on with the joint society SPEIO. Then, we decided to found the Portuguese Statistical Society. And I think that SPE was quite important for the development of Statistics in Portugal. At the beginning, it was a surprise for me because at the time we were a very small group, then we

Figure 1.—Conference on Extremwerttheorie, Oberwolfach, 1987

had the first meeting of SPE in Vimeiro (1993), and after that the number of people in the Portuguese Statistical Society increased suddenly. We had a lot of activities at the time and we managed to have annual meetings of SPE, from 1993 to 2013, which gave some enthusiasm to people and allowed researchers from different places in Portugal to be together. Unfortunately, recently we lost something with the change from annual meetings to bi-annual meetings.

So, you think that if Tiago de Oliveira could now see what he started he would be happy with what he would see today, except for the change to the bi-annual meetings . . .

Yes, I think he would be happy to see how things have grown . . .

You were elected for the first Scientific Committee of CIM, in 1996, which was created to develop and promote research in Mathematics in Portugal. When you look back to that time and compare with today, how much do you feel we have evolved?

I get the impression that we are doing quite well. I have not followed how CIM has been working in the last years. I am a bit out of that, but I think that the research in Mathematics, in general, has evolved quite well, in terms of numbers and in terms of quality. I would say that things are going in the right direction.

How would you describe this evolution? What were the key aspects or events that you witnessed in first hand? Do you see anything that was crucial for this development?

I think that both FCT and Calouste Gulbenkian Foundation have supported many mathematicians and Mathematics in general. I do not know how CIM is now, but for instance I remember that when I was in that first Scientific Committee of CIM and even later, when I was in the board of directors, CIM had a strong support from both FCT and Calouste Gulbenkian Foundation. But I do not know how CIM is now . . .

Now, we depend essentially on the money coming from our associates. So, we have a very small budget and we try to do the best we can with it.

I think it would be important to find support from FCT. I definitely think that CIM should have the support from FCT.

Because, at the time, with that support, we were able to organize conferences in Portugal and that obviously boosted a lot the development of the field. I remember that at the time we were able to support several different conferences, organised around the country. We even had those SPM/CIM meetings or SPE/CIM meetings, which were also quite interesting and, usually, that was possible due to the support from FCT and also from Calouste Gulbenkian Foundation.

We now have some support of Calouste Gulbenkian but for very specific initiatives, like for example Pedro Nunes Lectures. But we do have to ask every time we organize it. It's not a regular thing. So that makes a bit the difference, I guess.

You have been the editor in chief of REVSTAT, which, essentially, in a 10 year period went from a national journal to an international respected journal classified at the Web of Science, with a five year impact factor of 1.4. Would you like to share with us how you did it?

A lot of work . . .

That I would suspect . . .

A lot of work, but no tricky way of getting any kind of impact factor. Indeed, as you used to say, I am from the *stone age* and at that time there were no impact factors, and for me is still a bit strange to work with these numbers. They don't tell me too much. Anyway, at the beginning it was a bit difficult . . . I had to invite a few people to submit papers to the journal and we had a very small number of papers submitted. But afterwards we had the organisation of the International Statistical Institute (ISI) World Statistical Congress (WSC), in 2007, and that was a big help. The first issue of the journal came out in 2003 and in 2007 we were already with a bulk of papers. Indeed, in the beginning, I was advised by the president of the National Statistical Institute, who told me that it would be a better strategy to begin with two issues and then, possibly, after some time, increase to three issues. Nowadays, we are already with four issues and a lot of papers in the list of forthcoming papers. We have around 200 submissions per year. As I said, the ISI WSC in 2007 was a big push because, at the time, we had different sections in the field of Extremes and so a few people offered to have a special issue related to papers at the ISI 2007. Then, with the boost of interest, I managed to write to the Web of Science and give them information about the journal, which was ultimately the main reason why they decided that, in 2010, we would be referenced in the Science Citation Index.

We have made a big effort to build a reputation, which was achieved also by the prestige of some associate editors who agreed to be with us from the very beginning. The idea to found the journal was not actually mine. The idea was of the people in charge of the *Revista de Estatística* from INE (the National Institute of Statistics) who contacted me, during the European Meeting of Statisticians, in 2001, in Funchal, to be editor in chief of the journal. Then, we thought it would be a good idea to seize the opportunity and invite some important people participating in the meeting to assemble a strong editorial board. Among them, were sir David Cox, Jef Teugels, . . . There were a few people that from the very beginning were very enthusiastic about the launching of REVSTAT, who helped a lot. Some of them were from Portugal like Antónia and Dinis. So, I was not alone, fortunately.

A controversial topic in the order of the day refers to the difficulties women go through in order to thrive in their careers. Worldwide there are much more male mathematicians than female and only in 2014 a woman was awarded a Fields medal. We are interviewing a very successful Portuguese mathematician who happens to be woman. Did you ever feel any difficulty because of that?

Never. Fortunately, I always felt that I was treated as everyone else. Easy question.

One of the most impressive aspects that we find in your career is the fact that you are responsible for the creation of strong community of statisticians dedicated to Extremes, in Portugal. Leadbetter even kindly described it as Ivette and her chicks.

The gang, the portuguese gang . . .

Do you also consider this as one of your best accomplishments in your career?

Yes, I think so. Indeed, I never had that specific objective. But the truth is that when I look now at what is happening in Portugal, I think I helped a lot with the obvious help of Tiago de Oliveira. Tiago was the pioneer and, together with Tiago, I helped a lot in the building of what we can nowadays call a school of Extremes. And so, ok, I'm proud of it.

So, you are proud of this legacy.

I'm proud. I'm proud of this legacy. And I'm proud of people who have really been involved in the field of Extremes. And you are two of them, obviously. Ana Cristina began with Margarida Brito, another pioneer in the field, who came from Paris, and worked under the supervision of Paul Deheuvels . . . And many more. Fortunately, I'm not alone . . .

Sure. But responsible for the . . .

Responsible maybe for some dynamism.

Is it a coincidence that most of your *descendants* are women?

In our faculty, for instance, there are more women than men working in Statistics. I mean, there are more women getting degrees in Statistics.

It's not an extreme thing, then . . .

I do not think so . . . But, in fact, among around twenty PhD students, I only had two male students.

You were president of SPE, a member of CIM's scientific committee, editor-in-chief of REVSTAT, member of the editorial board of Extremes, a full time full professor, advisor of many students and postdocs, a wife, a mother and, more recently, a dedicated grand-mother. How did you manage to cope it all? Did you ever feel you had too many responsibilities?

Not really . . . Nowadays, things are different, obviously. Nowadays I feel a bit tired, a bit old, I have not time for doing many things. But when I was doing those jobs, let's say, I was doing them enthusiastically. But I also had a lot of help, help from my mother, which I'll never forget, and also the help of my husband. The help of my mother and of my husband were crucial. And afterwards I was able, with enthusiasm and maybe with some dynamism, to work almost around 100%, or maybe more than 100%.

I would say that I was able to manage on both duties, reasonably well.

We have always known you as a very active and committed person. In fact, we have seen you being invited in several occasions either to participate, speak or simply borrow your experience and reputation to the events and projects, in some of which we were also involved. Not only you always say yes as you always engage enthusiastically and with your characteristic good mood in all initiatives. Have you ever had to say no?

It's very difficult for me to say no. Sometimes, even when I say no, I keep reflecting on it and afterwards the *no* becomes a *yes*.

But nowadays I am already able to say no several times. But sometimes it's difficult. For example, one month ago I had an invitation to go to Kiev. I would like to go there and I had to say no. Sometimes it's just not possible . . .

How did an average guy and an extreme girl come together to work on an extreme paper published in the Journal of the American Statistical Association?

You know that my husband, Dinis Pestana, also always liked the field of Extremes. And there is a big link between Extreme Value Theory and some of Dinis' works related with stable laws. So, we have worked jointly a long time ago, essentially in the topic of Penultimate Approximations and Rates of Convergence. Afterwards, he also became interested in Risk and that was maybe the main reason why he was involved in that paper in JASA, which is related to the estimation of the Value-at-Risk in the reduced-bias framework. Dinis has some nice ideas and indeed he was the guy who gave me the idea of reducing the bias, first in the extreme value index and next in the Value-at-Risk estimation. More recently, he gave me another nice idea related to the mean-of-order-p. He just asked me and Isabel why we were always studying the Hill estimator. And instead of working with the Hill estimator, which just considers the logarithm of the mean of order zero, he suggested us to work with the logarithm of the mean of order p, for any real p . . .

How was to work with your husband? Did you ever fight because of that?

Sometimes we had some discussions but not very strong discussions . . .

And do you have any future project with him?

In a certain sense . . . I think we can continue to work on these generalised means topic. But we are working less and less. It's true that research is a vice, but we need to be more and more calm.

Besides that particular paper, among your many results, is there one that you are particularly proud of?

Good question, but I go again back to the Penultimate Approximations and Rates of Convergence. I like the topic, it's more Mathematics than Applied Statistics but as you know, recently, but not with Dinis, we have been applying it to Reliability. We think that there is still something that can be done in that field. But I also like the generalized means . . .

Scientifically speaking, do you have any particular unfulfilled goal that you still would like to accomplish?

Indeed, I think I would like to go into a spacial framework . . . But it's too much for me at the moment . . . I have it in my head, but it's not going to be fulfilled, for sure.

Are you sure?

Almost sure . . .

Since your retirement in 2013, there have been a few conferences and events in your honour, such as the EVT2013, in Vimeiro, or the 7th International Conference on Risk Analysis, ICRA2017, in Chicago, or the award of the title of *Professor Emérito* of the University of Lisbon. Yet, who knows you well, knows you are a very humble and simple person, who we have already seen running after our six-year-old boy in the streets of Sevilla, a year ago. Do you ever feel a bit embarrassed with all such praising during those events? Or you just take it naturally?

Sometimes I feel a bit embarrassed. I felt particularly a bit embarrassed when I got the degree of *Professor Emérito*, the title of *Emeritus*. Indeed, at the time, I just mentioned that I felt that there were many people in the faculty who also deserved such a kind of distinction. I think it was the unique time where I indeed felt a bit bad. The other times, no. EVT in Vimeiro . . ., it was among friends . . . Well, I cannot say that I was not among friends when I got the distinction of Emeritus. But the truth is that I think that there were people who possibly deserved more . . .

For sure you deserved it . . .

I don't know . . . Ok, I am not humble enough to say that I didn't deserve, but I think that there are other people who also deserved such a kind of distinction, at least as much. They are very strict with the number . . . Only four people in the entire Faculty of Sciences got it and I think it's a very small number when compared with the number of people who indeed have contributed a lot for the image of the faculty.

In light of the recent developments and events in the Portuguese scientific policy, do you have any comment/suggestion/advice for the people in charge of the ministry of science, technology and higher education and the national science foundation?

The last known FCT evaluation of Research Centres in Portugal, associated with the period 2008–2013, was a nightmare and introduced a strong retroaction factor in the development of Science in Portugal, when such a development had been quite positive in the most diverse areas, including Statistics. Among others, I can mention two of the big problems related to the evaluation: 1) The specificity of Statistics in the area of Mathematics is recognised internationally, and it is crucial to have in the evaluation panel at least a recognised scientist in the area. Indeed, this happened in prior panels, with the integration of researchers like David Cox, Anthony Davison and Richard Smith, among others. But it did not happen for the aforementioned period; 2) Also, FCT was unable to ask in time to questions placed by researchers. I merely mention, among others, what happened with our research centre (CEAUL), with an excellent production in the above mentioned period. No answer was given by FCT to our rebutal for more than two years, and this led to a null funding in 2015. We could survive only due to to some projects CEAUL had in hands, but the process was exhausting and will surely have a strong negative reflex in our research centre and in the development of Science in Portugal.

Given your extensive experience, do you have any advice for these young researchers who are struggling to build a career in Mathematics?

Be enthusiastic, work hard and never give up.