SwissMAP
The Mathematics of Physics
National Centre of Competence in Research

Jean-Pierre Eckmann's 50th anniversary at UNIGE

Although now retired, Jean-Pierre remains an active researcher, who, so far, is daily at his office. He was a proud adviser of many outstanding students. His research has shifted over the many years from constructive quantum field theory, renormalization group, chaotic dynamics, partial differential equations, non-equlibrium systems, and stochastic partial differential equations, towards more biological questions.

2020 marked the 50th anniversary of Jean-Pierre Eckmann at the University of Geneva.

To celebrate this occasion there will be a conference in June 2022, regrouping his students and close collaborators.

In this interview Jean-Pierre speaks to us about his life, his students, and his research over the past 50 years.

Which characteristic would you say best describes you?

On many different levels I would say that the enduring characteristic throughout my life has been that I constantly try to be a "good amateur". This applies to my hobbies but also to science.

I have a list of diverse interests and hobbies. For example, I enjoy photography, origami, music, theatre, history of religion, being with my grandchildren… I can talk about many different subjects but I do not consider myself to be a specialist or an expert in any of them.

Even when I was a child, around 12 or 13 years old, I remember going to the library and reading a special collection of short articles which existed at the time, on a large range of different subjects. Even at that age I was fascinated by science, but also history, art as well as other topics.

I'm very interested in exploring new fields. In a way we could say it is based on the 19th century economic theory by David Ricardo on the "law of diminishing returns". In other words, the longer you remain in the same field, the less you are efficient.

In the same manner, my research has also evolved over time. I've always enjoyed trying out new things in my research. Also, I always tried to provide a new problem to each of my many students.

How did you choose to specialize in mathematical physics?

Nominally, I started as a theoretical physicist at ETH Zurich. Then, as the notion of mathematical physics basically started during this same time, it was quite the natural step to follow. I remember the International Association of Mathematical Physics was founded when I was a graduate student.

Are you more of a physicist or a mathematician?

I am most definitely both. However, I'm very glad to be in the physics department because of my multiple interests, it's a very inspiring environment. Instead of being an expert in something I like to be a good amateur.

Who have been your mentors?

After my PhD the people who mostly influenced me were David Ruelle and Gianni Jona-Lasinio. Again, I like to read many different papers and listen to many scientists and learn about their message.

For example, recently we could mention Dennis Sullivan, who was awarded the Abel prize just now. He pointed out to me that if you try too hard to prove a theorem, you make mistakes. Things like that continuously influence me too.

How has your research evolved over time?

I think it's not only that the research evolves, but also that I have evolved too. You know, it has been an entire half a century! My first students finished almost 50 years ago. And just as some of my first students may even be retired by now, others especially amongst the most recent ones, could still be looking for a permanent position.

My research has moved over many fields over time, but now, for the past few years, I've been really interested on whether mathematical thinking can be applied to biology.

You mentioned your students. Can you talk to us about them?

It is very important for me to say that I am very proud of all my students and how each one of them has evolved according to his or her own way and personal talents.

Yasha Sinai said: "One does not talk about "my former students": One talks about "my students": It's like children, even if they grow up they remain your "children", you don't call them "former children".

What do you think your students mostly remember you for?

I think it's better NOT to ask! Each one of them may have a different opinion of me and this opinion might not be good. I can only judge from my perspective.

During a recent conference in Geneva, Martin Hairer who also was one of your students, mentioned that your approach and particularly your way of looking at mathematics as a kind of game, had been a great source of influence on him.

Photograph: Courtesy of the Museum für Gestaltung Zürich, Poster Collection, ZHdK

Is this something that you have consciously wanted to transmit to your students?

No! but I tried to teach all my students the message of science and that it is important to distinguish between right and wrong and not to cheat.

For me personally these are principles which I have applied throughout my career and which I have tried to transmit to each one of my students.

Vaughan Jones, nearly became your student at some point. Can you tell us why he didn't in the end?

Vaughan Jones, who should have been with us for the conference and whom I miss very much, "almost" became my student: But when he heard about renormalization and statistical mechanics, he "fled" to mathematics, with the success we all know. But of course, we stayed in very good terms, and he always came to the coffees.

Is it true that being your student meant that you had to stop for these famous coffees every day at 9:00 and again at 15:00?

This was not a joke, and although some students resisted saying that they couldn't get up at 9:00 in the morning, it was real. My last students even made a sign for me to reserve my place in the cafeteria. And I must say that I was very surprised when we came back after the lockdown, to find out that the cafeteria didn't exist anymore!

As you know, this conference, which is being organized in June, was supposed to take place in 2020 to celebrate my 50 years at UNIGE, and now it will be 53! And during all the pandemic and lockdown period I had imagined many different scenarios like getting old, sick and even dying, but I had not imagined that the cafeteria would be gone! I mean these coffees were a long tradition, everybody knew about them, even people who were not my students would come to talk, even they had heard about this "cafeteria rule".

Were the coffees the only tradition?

There are also some other on-going jokes with my students which have been around for a long time. Like the "everything is wrong" custom which you can see on a German poster *("Alles Falsch")*. This started with my second or third graduate students and has become a long tradition. It is something that I like to say and which I really do believe in because it is not so bad when everything is wrong!

There is a difference between saying everything is wrong and saying nothing is right. One could say it is similar to when you have a proof and then it breaks down.

How have things changed at UNIGE from when you first arrived?

Not only were things different but they functioned differently. To give you an example, if we take the physics department, it was built in 1952 for only three professors, and it was delivered to them only two years after they first requested it. This would be impossible in our time things take much longer!

Another example is that one single person used to take care of the mail, the telephones, and the library, which used to be located where this office is now. This place looked very different. I remember the floor where the cafeteria was added the same year I arrived which was in 1970.

3pm coffee with Nirvana Cabellero, Postdoctoral Researcher at UNIGE

I have to say I've had a very good life at UNIGE. I never had any problems, on the contrary, I am very grateful to UNIGE as they have always allowed me to do what I wanted all my life. This has been great, particularly as I have mentioned that I like to change. I was never forced to specialize. I feel that at present, there is more pressure on young people to continue with an area of specialization.

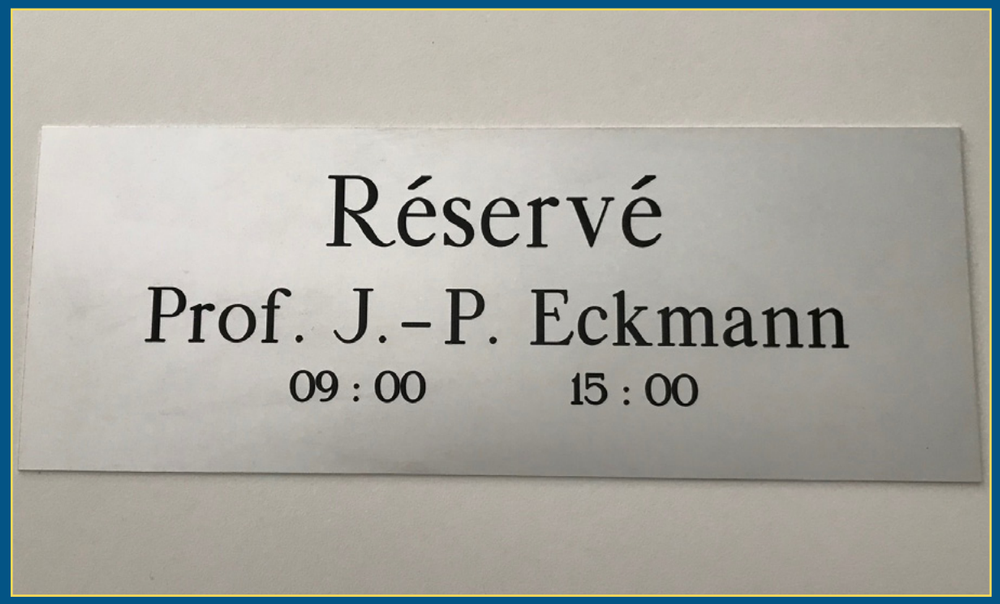
How has working in academia changed over the past 50 years?

Things are different now, but I want to clarify that I don't want to say they were better before, by no means, they were just different. Today, there are certain pressures which did not exist at the time. Like the pressure to become an expert, to build a large group, before groups were much smaller. Also, pressure to show that you can get funds and then of course, you have to spend these funds.

Basically, there's much more money around than there used to be. However, in a way it is also more difficult to spend it as there are significant administrative procedures involved. When I was young, professors just paid my salary and that was it. Currently, many people spend a lot of time constantly writing grant proposals, this was not the case before. I'm not saying it is a bad thing, I think many young people even perceive it as a kind of sport. These pressures of grants and ranking have been going on now for about the past 10-15 years.

And what about science?

To start with I think science has changed, there are more people in science and because there are more people, I think it might be more difficult to find a job. Nowadays, many young people can see all the National Science Foundation professors, which at the time used to be "chargé-e de cours" when I was at that stage. Once again, this is not a complaint or a judgement to say which is better or worse.
Further, there are also many more



interdisciplinary collaborations. I have also heard people even say, I don't know if it is true or not, that science has become technology, i.e., there are more technological aspects now through computers and so on.

Basically, science does of course progress, perhaps even better than before but in a different way.

And mathematical physics?

It has been extremely successful. In fact, from the moment when people first realized that mathematics could be used to precisely describe physics, which was revolutionary, up to now, it has managed to solve many of the problems which were still unclear before I started studying.

And the future?

For me it's a short perspective. I think health is an important factor for old people. Somebody my age fifty years ago would have been considered very old!

What do you think are the challenges ahead for the younger generations?

As I mentioned, I still have coffees with young researchers from other groups and I am familiar with their worries which are often linked to finding a job and the growing competition. Also, increasingly about the complexity of reconciling jobs and family life. This recently added element of having to move around has become essential, today without two or three postdocs you don't get the job. I did not have to face this dilemma at the time. If I had I think I would have left academia because I was reluctant to move. I have always tried to teach my students that there is life outside academia. Many of my students are also teachers, they also work in banks, and some even have their own companies.

What advice would you have for young researchers?

None. The advice is that they can listen to old people but then they can ignore what they say!

Interviewed by: Mayra Lirot
NCCR SwissMAP

Quotes by students

"I usually join the coffee breaks at 15:00 with Jean-Pierre. We use this coffee time to think and discuss our scientific questions from a different perspective, outside of the usual routine. It's a pause to re-think solutions, ask questions and wonder which are the important problems that need to be solved. We start from the big questions and identify the small advances that need to be achieved to be closer to the answer. It's a puzzle we try to solve during coffee time.
In a way these are also informal mentoring moments of great value, and I am sure that many would agree that Jean-Pierre is a great mentor."

Nirvana Caballero (in previous 3pm coffee picture)
(Theoretical Physicist at UNIGE & President of the UNIGE Association of Postdoctoral Researchers)

"What I learned from Jean-Pierre during the coffee sessions is his problem solving method. He breaks a big problem into smaller problems and smaller steps and if he can not solve them he doesn't wait long and doesn't hesitate to reach out to people who know more about the topic. Whenever we solved a small problem, he said "Ok, next problem!""

Mona Jalilvand
(Postdoc at McGill Space Institute, McGill University)

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