

ACTUARIAL SYNERGY:
**HOW ACADEMIA
AND INDUSTRY
DRIVE INNOVATION TOGETHER**



KATRIEN ANTONIO

Prof. Katrien Antonio, professor in actuarial science and insurance analytics at KU Leuven and part-time professor in actuarial data science with the University of Amsterdam in the Netherlands whose research focuses on insurance data science joined Jennifer Baker to discuss developments in actuarial science, education and the profession overall.

How do you experience the collaboration between academia and industry in actuarial science? What works well and where might there be room for improvement?

That's a very interesting question, and one that is particularly relevant for the kind of work or research that I do. Working on actuarial data science, that has been a very important driver and a very important stimulus of some of my research contributions. Our collaborations with insurance >

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companies, or pension funds, allowed us or stimulated us to work on a question or challenge that they were confronted with in their daily activities. They were also able to give us access to work on their data and on the specific problems that they were facing. So that really was a driver for some of the recent contributions that we worked on – either in pricing or in reserving or in mortality modelling with data science tools, so I’m really grateful. For me, it’s very inspiring to work and be able to collaborate with insurance companies on their problems, using their data sets.

That was really great. Of course, it’s not easy to give external researchers access to data. It takes effort from actuaries working in these companies to make sure that they find a way to allow researchers to collaborate. So luckily enough, I know in my network, quite a few actors who are willing to make this effort. But I would like to call to anyone working in practice to reach out to academia or professors to share problems with us to stimulate interactions. Having more people who reach out and try to look over the hedge

on both sides – academia as well as industry – might be something we can all invest a bit more into.

You mentioned reserving and pricing and I understand your work applies data science techniques to actuarial theory. Is practical applicability an important goal in your research?

Let’s say the first, fundamental driver in our work is of course, to get the foundations right. So to get them technically right, to develop new ideas in a very solid way. And what I also find very important in my more recent work is to make our contributions reproducible, so that, for instance, actuaries in industry who want to learn from these research contributions can find the code, can find some simulated data that they can practise on or try out. So the theoretical foundations are key. Then it’s about illustrating, making it reproducible or showing what these models can do in different data sets, either simulated or real data to the best possible extent. Of course, with real data it is

shared within the boundaries of confidentiality agreements. So these are my main drivers.

Then of course, being stimulated by particular questions in industry is important, and that’s definitely a driver of the research. But I think there’s still a gap between the things that we develop and publish, and what one can use as tools in daily industry practice. I think there’s still a translation there to be made in making things more simple or more scalable. My main task as a researcher is to develop foundations and to make these reproducible. And then I hope that other people will take that last step in terms of making things simpler and translating the essentials for use in daily practice.

Artificial intelligence, cybersecurity, quantum computing and climate research are all examples of trending fields of research. Are such research fields relevant to actuarial science? Do you consider actuarial science to be a trending research field? >

Luckily, I see many intelligent people trying to innovate and work on it.

Again, that's a very important question and a very challenging question to answer. Everything that has to do with data science tools, machine learning tools, and AI in a broader sense, are of course, things I try to follow closely to see how they can be used in actuarial research and be relevant for actuarial practice.

From a broader perspective if you look at these 'grand challenges' for instance, climate change, what we tried to do in recent work is to examine how we can use very granular weather data. How can we use that in life insurance mortality modelling? How can we use this for long life reserving or for pricing claims for covers where weather can have an impact. These are things that drive what we're working on.

But of course there are so many challenges and I know other researchers that focus on cyber risk modelling. That's a theme that has been developed. How inclusive is insurance is another theme. How to share risks between different agents in the insurance ecosystem, with a contribution from governments, to make sure that we are ready to bring the

best possible protection to people and companies in the best possible way. Luckily, I see many intelligent people trying to innovate and work on it.

Turning now to Actuarial education: Is the Actuarial programme that you currently teach in Leuven different from when you started your Actuarial Studies? What have been the most important developments?

It has definitely changed substantially over the last decade. But what is important to stress is that the technical foundations are still the same. We still teach generalised linear models (GLM), probability theory, etc. So all these historical cornerstones are still there. But of course we have to teach more now. We have to bring in more techniques and tools from the data science and the computer science world, but also look at sustainability, or evolutions in regulation, IFRS, Solvency and so on. So the toolkit has extended, but the technical foundations are still there. And we build on these technical foundations while trying to give our students this

larger scope on how to use their technical skills for good to contribute to society and to try to innovate with respect to these grand societal challenges.

Why is it that so many highly-ranked Actuarial Science programmes worldwide are from Belgium? What can other countries learn from Belgium in terms of actuarial education?

Well ranking programs is always a big discussion, but I don't want to put too much weight on it, or say that our programs are better than any other great programs out there. But what I can say objectively is that Belgium has a very long standing tradition in Actuarial science. So we go back 80 years or so teaching actuarial science in universities in Belgium. We also have at least three universities teaching in French, in English and in Dutch. So we have three fully equipped two-year Master's programs in Actuarial Science and we try to collaborate.

We know that we can't be fully experts in all topics relevant to Actuarial Science, so we try to stimulate our students to look at what other actuarial programs in >

Belgium have to offer, and take elective courses there.

At European level we also have Erasmus exchanges and I think these are good evolutions.

So we do our best to keep up the tradition and I'm grateful for the universities, the boards and the government, that allow us to keep up these kinds of programs in a big university like ours.

How do you attract young people to become actuaries?

I can only answer from my own experience. Here in Leuven, we try to maintain a good connection with the bachelor's program in mathematics, mathematical engineering, in economics, business, economics, business engineering, etc. And we try

to offer elective courses so that students early on in their program get a sense of what actuarial science or financial mathematics could look like. Then we just try to do our best as professors in this discipline to spark some interest in what one can do. If they're interested in business economics, or business engineering, finding the interplay between so many different, interesting technical subjects and disciplines is what eventually attracts students. But also trying to build technical things that can help people to offer protection so that they can achieve their dreams and their life goals. I also encourage them to [check out a video](#) made with the team here at the university.

Finally, what are the most important messages you want to give to your actuarial students?

I think what I find important is that they take the time during their study to really work on their foundations. Because at that moment in their career they have the time to go deep into a subject, and I think that's still very, very important. So to take the time to really go into the depth of these foundations of profession. Then of course, it's important for them too, to get an overview of the different interesting disciplines that come together and the different challenges to which they can contribute in the next steps of their career. I guess that's the mix that I'll try to bring to my courses. Working on the technical foundations on one hand, but also trying to show them the bigger picture. <



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