

The All-Party Parliamentary Group for Engineering

21 May 2024

Robotics

Discussion over lunch in the House of Lords

Chair – Professor the Lord Mair CBE

Speakers:

- Professor Fumiya Iida, Professor of Robotics at University of Cambridge
 - Dr Dana D. Damian, Senior Lecturer in the Department of Automatic Control and Systems Engineering at the University of Sheffield
 - Amie Owens, University of Lincoln
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Lord Mair began the meeting by welcoming everyone and thanking them for attending; he then introduced the distinguished speakers.

Professor Fumiya Iida

Fumiya Iida is a Professor of Robotics at the Department of Engineering, University of Cambridge. He is also the director of the Biologically Inspired Robotics Laboratory. He received his bachelor's and master's degrees in mechanical engineering from Tokyo University of Science in Japan, and his Dr. sc. nat. in Informatics from the University of Zurich in Switzerland. While working as a postdoctoral associate at the Computer Science and Artificial Intelligence Laboratory, Massachusetts Institute of Technology in the USA, he was awarded the Fellowship for Prospective Researchers from the Swiss National Science Foundation, and then, the Swiss National Science Foundation Professorship hosted by ETH Zurich. In 2014, he moved to the University of Cambridge as the director of the Bio-Inspired Robotics Laboratory.

His research interests include biologically inspired robotics, embodied artificial intelligence, and soft robotics, where he has been involved in numerous research projects related to robot locomotion, manipulation, and human-robot interactions leading to a few startup companies. He was a recipient of the IROS2016 Fukuda Young Professional Award, the Royal Society Translation Award in 2017, and the Tokyo University of Science Award in 2021.

Dr Dana D. Damian

Dana D. Damian is a Senior Lecturer in the Department of Automatic Control and Systems Engineering at the University of Sheffield. Dana leads the Sheffield Biomedical Robotics Lab, where her group's mission is to realise bionic and surgical robots that show life-like behavior and sustained operation to achieve long-term personalised healthcare.

She received her diploma in computer science and engineering from the Technical University Timisoara, Romania in 2007. In the same year she joined the Intelligent Systems Laboratory at University of Amsterdam, The Netherlands, to work on her diploma thesis. At the end of 2007, she became a PhD candidate at the Artificial Intelligence Laboratory, University of Zurich, Zurich, Switzerland, where she graduated with summa cum laude in 2012. In 2011 she was a Visiting Scholar for one year at the Haptics Laboratory of the Johns Hopkins University, Baltimore, US and at the Collaborative Haptics in Robotics and Medicine, Stanford

University, U.S.A. In 2012 she was a Visiting Scholar at the Soft Machines Laboratory at Carnegie Mellon University, U.S.A. From 2013 to 2015, she was a postdoctoral research fellow at Boston Children's Hospital, Harvard University, Boston, USA, in the Pediatric Cardiac Bioengineering Laboratory.

Amie Owens

Since graduating from the University of Leeds in Chemical Engineering, Amie has worked as an electrical engineer in the automotive industry for five years, working initially for a large manufacturer before moving to an engineering consultancy. Here she tested plug-in hybrid vehicles and the first all-electric vehicle for a large manufacturer.

On placement as a project manager, Amie managed a project to design a bespoke driveline solution for a hybrid vehicle. A separate project involved managing the installation of sensors for the testing of a prototype tractor run on compressed natural gas. Through this project she became interested in how technology could be used to advance processes within agriculture

Amie is very excited to be part of the EPSRC Centre for Doctoral Training in Agri-Food Robotics: Agri Forwards at the University of Lincoln. Her MSc research project involved the design of a simulation of the strawberry polytunnels at the Riseholme campus of the University to optimise transportation of fruit. Consequently, her PhD involved using real-world factory data as an input to a simulated factory environment to manage hygiene risk. Her research uses AI techniques to automate and optimise activities within a simulated world.

Q1. Fiona Smith (Brooklands Museum)

Question: How fast is the pace of robotic change occurring in countries like Japan and South Korea? How far advanced are these societies compared to somewhere like Britain, where automation is perhaps a little behind?

Professor Fumiya Iida: What is really interesting about technology is that it's very difficult to predict and we don't really know how fast the technology is going to develop. It's also extremely difficult to predict how humans are going to use this technology once it is available. Therefore, it is not easy to say how far behind countries are relative to each other.

Q2. Lord Mackenzie of Framwellgate

Question: Elon Musk recently said that artificial intelligence would supersede human intelligence and it needs controlling. So, I would like to ask the speakers' thoughts on that.

I would also like to ask Amie if she thinks that automation and the things that she's now preparing and inventing will replace the recruitment of seasonal workers in agriculture?

Professor Fumiya Iida: There are lots of questions surrounding AI at the moment, but we need to be a little careful about what it is that AI is doing at present. Whilst it is doing incredible things in cyberspace, it is really struggling to come down to the real world and there are still many things that robots can not do. For example, they would not be able to do a simple task such as taking keys out of a pocket. So it is probably too early to be scared of all jobs being taken by AI. This will be more of an issue in 50-100 years.

Amie Owens: I would echo Fumiya's words that robots don't have the capabilities to compete with the speed of humans and at present the focus is not on replacing jobs, more on looking for any inefficiencies and perhaps trying to plug any gaps to better support humans.

Q3. Tom Blake (UTC Portsmouth)

Question: What are your thoughts on future applications of AI in education?

Dr Dana Damian: AI definitely has the potential to assist with complementing different kinds of educational domains. Nevertheless, we do need to be cautious about the use of AI in education and engage our curiosity with good judgement.

Q4. Esha Pitrora (London Design and Technology UTC)

Question: How far do you think the use of robotics in biological industries will go in the next ten years? And what issues socially do you think we will be faced with as a result of this?

Dr Dana Damian: In 10 years time I just really hope that at least some of the technologies that are growing in our lab will actually reach patients, for example biohybrid robots. I also really hope that surgeons, engineers and biologists can work together for bigger aims such as harvesting energy from the body.

Socially I think it important that we start talking with the public and make people understand that these changes will not just happen overnight. People should be shown that these developments are good and will help with surgeries.

Q5. George Allman (UTC Portsmouth)

Question: We have had a lot of questions about the jobs that robots will take from humans, but my question is what jobs will it never be possible for robots to recreate?

Amie Owens: I think what comes to mind are things that involve creativity but recently there have been examples of AI being used to generate music or artwork that has been critically acclaimed. It's a really difficult one to answer so I think I'll pass the mic on!

Dr Dana Damian: The rise of AI has made us ask a lot of questions about ourselves. What really differentiates us is the fact that these machines do not actually recreate the way we work as humans with biological matter. I am not sure AI will ever be able to be as creative and empathetic.

Q6. Claire Lucas (King's College London)

Question: So robotics is obviously multidisciplinary. How would students know whether they were more interested in the computer science side of robotics or the engineering side?

Professor Fumiya Iida: What I usually say to my students in robotics is that robotics is everything and nothing at the same time. For example, if you pick up one motor, it's just a motor, not a robot. If you pick up a computer, it's a computer, but it's not a robot. To become a robot, you just need to put them all together. It's not really a situation of computer science versus robotics, as robotics is the science of interdisciplinarity or the science of integration.

Dr Dana Damian: I agree that robotics is the integration of many of these engineering disciplines. You can contribute to robotics regardless of whether you like coding, you like materials engineering, or you like mechanisms and mechanical engineering. Every student should choose whatever engineering path they want.

Q7. Stephen Metcalfe MP

My name is Stephen Metcalfe, Member of Parliament, but I also chair the All-party group for AI, which is the sort of sister organisation to the All-Party group for engineering. I think what the discussion today has demonstrated is how all these technologies are intertwined, and they perform in concert together.

There have been a lot of concerns about AI flagged today, but we should always make sure that we have an off button for AI so it doesn't become an apocalyptic disaster. Whilst it has great opportunities, I don't think that AI will ever be able to replicate creativity and empathy. It's very good at recreating things but it's not great at original thought.

Q8. Bryan Okafor (Bemrose School)

Question: As AI gets more advanced it should be able to take up basic tasks, will that allow humans more leisure time in the future?

Professor Fumiya Iida: Yes, we will have more time in the future as AI will be able to take up more basic tasks. However, this will not necessarily mean more free time, as we expect the world to move a lot faster in the future since we will likely be busier in different ways.

Q9. Alannah Van Den Berg (Alde Valley)

Question: Do you think robots will ever be able to build other robots? If so, how long do you think that will take?

Professor Fumiya Iida: This technology is coming in the future and is kind of happening already today. I am actually working on something like this currently. These robots are currently not dangerous and under control, it is important to monitor this in the future to ensure robots don't become fully self-replicating.

Professor the Lord Mair closed discussions by thanking the distinguished speakers, the guests for their excellent questions and the event organisers.