"What role do you believe software engineering can play in improving the success of machine learning projects focused on scientific discovery?"

Data, now, is everywhere. The international effort to halt and reverse the effects of climate change demands the rapid development of many sciences, from the chaos of meteorology to the deterministic physics of batteries. Our most urgent challenge is to transform economics from an historical to an experimental science.

If mathematics is the language of science, then economics is the language of politics. Computational economics allows us to frame hypotheses in the form of machine learning models. These can be trained with simple idealised data sets and then run with real historical data to see how theory fits the observed world. Stochastically generated data sets can be used to explore the limits of the model, and explainability and visualisation will help tune the model and lead to better understanding of the hypotheses; this new knowledge can be fed back into the process for further refinement.

Software engineering best practices can be applied to make this process efficient and error-free, enabling the scientists to remain focussed on their areas of expertise. Packaging the models as software frameworks would allow for licensing to commercial companies in profitable sectors, and for the creation of communities of individual developers via open-sourcing. Such communities might be extensive and globally distributed, and the mathematical nature of the modules would dramatically lower barriers to international cooperation. Hosting the frameworks on publicly-owned servers would be an inexpensive way to collect huge amounts of real-world data from many sources.

Framework documentation and visualisation tools may be developed to teach users and students the science behind their operation without requiring programming skills. A shared high-level conceptual understanding of economic models would foster better communication between the public and politicians in what is now a highly contentious arena.

In common with climate science, economics falls broadly into two disciplines: the macro- and micro-. The development of multiscale modelling techniques might eventually help us bridge the gap between the two domains. With the same technology, we might reconcile atomic physics with chemistry, biology with zoology, and so on, eventually arriving at full consilience. NLP and image processing, coupled with online libraries and web crawlers could bring the social sciences into the fold.

Data Science is pure science: with its development, we will communicate our knowledge to the wider world, and nation shall speak peace unto nation.