Kieran O'Brien

Dr Kieran O'Brien graduated with a Ph.D. in bioengineering from the University of Auckland, New Zealand, in 2009. His work there focused on developing novel flow sequences for measuring high-velocity turbulent jets. After earning his doctorate, Kieran worked as a postdoc at the Center for Biomedical Imaging in Switzerland on ultra-high-field sequence development. He then moved to Brisbane, Australia, to join Siemens Healthineers as a senior scientist in 2013.

In his current position, Kieran works in a team of five scientists who collaborate closely with Siemens Healthineers researchers in Australia and New Zealand. Specifically, he is responsible for the University of Queensland, where he is also an adjunct research fellow. As part of the ultra-high-field research team, he works on topics such as RF pulse design, parallel transmission technology, and quantitative susceptibility mapping.

Bowen Hills, Australia

How did you first come into contact with MRI?

I was first introduced to MRI during my bachelor's project with Professor Alistair Young (University of Auckland). The project was on strain imaging of the myocardium with DENSE MRI. My introduction to MRI was predominately from this image- or data-processing angle, and it was meant to continue into my Ph.D. – until I came to the point where I found that the data just didn't quite match the expectations. I then embarked on a process of investigating the interaction of fluid mechanics and MR physics with Professors Alistair Young and Brett Cowan (University of Auckland) and Professor Matthew Robson (University of Oxford).

What do you find most motivating about your job?

When Niels Bohr was asked once about magnetic resonance, he said: "You know what these people do is really clever. They put little spies into molecules and send radio signals to them, and then they have to radio back what they are seeing."

Yes, I am forever fascinated by how we can utilize our technology to generate the wide variety of contrasts that MRI is known for. And yes, I am motivated to tackle the current challenges that are facing the healthcare industry. But what really motivates me is those "clever people" that Niels Bohr referred to. I enjoy the interaction with my team, our academic partners, and our clinical collaborators, who all share the same passion and excitement about MRI.

What do you think are the most important developments in MRI?

Advancing MRI technology is about pushing the boundaries. Ultra-high field is once such boundary. Back in 2015, I was very privileged to be involved in the development of Siemen's clinical ultra-high-field system, MAGENTOM Terra. I was asked to port the neuro and MSK prototypes from the research systems to the clinical system. The project was immensely satisfying, and in particular was made easier by the fact that a lot of the sequence and RF pulse design work we had undertaken at ultra-high field had already found its way into other products. This "trickle-down" or "cross-pollination" of ideas and concepts is, I believe, an important philosophy behind MRI development within the community and within Siemens Healthineers. It is one of the reasons why we always need to be pushing the boundaries.

Where do you see MRI's place in the healthcare of the future?

Magnetic resonance imaging is an unbelievably versatile tool with tremendous diagnostic potential, and we continue to make it faster and simpler to use. I believe its development has been shaped by diagnosis being the conventional practice for clinical decision-making and treatment. However, with the continued integration of a patient's data from multiple sources – such as digital health records, lab tests, and genetics – and the downward pressure on health funding, I think there will be a shift toward patient prognosis in clinical decision-making and treatment. Going forward, I believe the real challenge will therefore be to develop mathematical models that integrate and interpret a patient's data, such as an MRI scan. These mathematical models will take MRI data as one of their inputs, and the data and the model will be used to predict the patient's response to a given treatment. This will enable better outcomes for the patient at a lower cost to the healthcare system.

If you could do whatever you wanted for a month, what would you do?

My two daughters love animals. Even though my eldest is only six, she has already planned her first career as a vet or a bush ranger! But she's not sure yet. So to help her out, and if I had a month off, I would love to do a safari in Africa. If there was enough time, I'd also do an Antarctic cruise. That way, I would have set foot on every continent and given my daughter an insight into her current career plans!

designs, we are looking to reduce the need for liquid helium. In 2014 we demonstrated a prototype dry magnet which was cooled by a separate minimal volume of liquid helium. Minimal or even no helium would make MRI system installations much simpler and cheaper for the customer and come closer to the 'plug and play' utility.