Dr Rajesh Ransing is an associate professor in the College of Engineering at Swansea University. In 2016, he was awarded a Royal Academy of Engineering Industrial Fellowship to collaborate with Polycast Ltd on novel approaches for optimising turbocharger wheel production.
RESEARCH
Turbochargers are used to increase power output for automotive engines. Some of their essential components are manufactured with nickel-based super alloys that must be made incredibly thin, while maintaining the ability to withstand high operating temperatures. These specifications can make the manufacturing process a challenge, and there is a continued push from the automotive industry to ensure that these components have a failure rate close to zero.

Dr Ransing identified the Royal Academy of Engineering Industrial Fellowship as an ideal opportunity to collaborate with Polycast Ltd on research aimed at improving the productivity levels at metal-casting foundries that manufacture turbocharger components. The Fellowship enabled Dr Ransing to apply his expertise in 7Epsilon, a novel approach designed to help the manufacturing industry to optimise production by using in-process data.

“This approach combines risk-based thinking and organisational knowledge to achieve quality improvements,” explains Dr Ransing. “By analysing Polycast Ltd’s data from international foundries, we have been able to develop an evidence-based approach for reducing unwanted outcomes and improving productivity.”

IMPACT
The Fellowship enabled Dr Ransing to work with industry to embed a new way of organisational thinking. “Dr Ransing was able to support us with data analysis, which has resulted in a new methodology and a new culture,” explains Dr Steve Leyland, Group Technical Director of the Uni-Pol Group at Polycast Ltd.

Furthermore, research arising from the collaboration has prompted the company to consider significant investments in its foundries to exploit the benefits of their new approach to working.

“My Industrial Fellowship reinvigorated an area of my work and brought visible benefits to industry underpinned by my research insights.”

It has also brought benefits to Swansea University, including opportunities for students to learn from industry-based guest lecturers.

“The Fellowship enabled us to build strong links with Polycast Ltd, and they have funded a four-year post at our university as result,” says Dr Ransing. “Our work has also inspired a new area of research on using microwaves to revolutionise metal-casting processes, which we are developing a significant proposal for.”

PROFESSIONAL DEVELOPMENT
The Fellowship allowed Dr Ransing to explore an area of work initially developed during his PhD. This led to a publication and opportunities to share findings at an international conference.

“It gave me the support and recognition needed to dedicate time to work with the 7Epsilon approach,” continues Dr Ransing. “Recent revisions to quality standards, and changes arising from Industry 4.0, make it timely to explore this way of working.”

ROYAL ACADEMY OF ENGINEERING INDUSTRIAL FELLOWSHIP SCHEME
The Industrial Fellowship scheme provides an invaluable opportunity for early- to mid-career academics to undertake a collaborative research project in an industrial environment. The scheme aims to strengthen the strategic relationship between the university and the industry host by providing an opportunity to establish or enhance collaborative research between the two parties and enhance the quality of teaching.