**The team from the Centre for Advanced Photonics and Process Analysis (CAPPA) at CIT, led by Dr Eamonn O'Neill, aims to harness light to boost broadband and telecommunications links, and improve gas and molecular sensors.**

# Researchers aim to use power of light

CREATING better lasers, faster internet and more efficient use of solar energy are among the missions of the 25 researchers in the Centre for Advanced Photonics and Process Analysis (CAPPA) in CIT.

Photonics is the science of generating and harnessing light.

Applications include devices for broadband internet and telecommunications links, gas and molecular sensors and medical and pharmaceutical imaging techniques.

In Europe alone, the photonics industry creates more than €49 billion in revenue a year and CIT is a leading contributors to this through their high-quality photonics research.

Dr Éamonn O'Neill, the CAPPA centre manager, explained that the CIT researchers, who are based both in the Tyndall National Institute and on campus in Bishopstown, are making huge strides in forwarding this cutting edge technology.

Alcon, the eyecare company, are already in the process of licensing their improved cataract treatment system — however the work in the labs shows no signs of stopping just there.

Dr O'Neill said one of the major areas where the photonics research can have a big impact is in the pharmaceutical industry.

**Cork Institute of Technology is fast becoming a centre of photonic research.**

Photonics has the capacity to make the inspection process at drug plants far more effective and efficient.

Currently, a sample has to be tested from a batch at the end of the line. Optical online monitoring, using photonics, has the capacity to keep an eye on the chemicals all the way through the process and also to isolate the redundant drugs from the good ones — meaning the whole batch would not have to be discarded.

Dr O'Neill said this potentially has huge economic benefits for Cork, with so many drug companies based in the region, and that research like this also adds to Cork's reputation as a leader in the research field.

Down the line, though, he is excited by the other possibilities of this research.

"Regionally, and as an economy, we will look to expand that research to the microbiology and food sector and to help the agricultural sector and local producers.

"Currently it is difficult for small and medium sized Irish companies to scale up production and to compete with the big companies because of the need to monitor the quality process as the equipment out there is out of their price league and is too skilled for them to use. This will allow them to scale up and have their quality control in-house," he said.

Dr O'Neill explained while the core of the research is making the use of light more effective and efficient, they are also helping medium companies to develop next generation products — with about 80% of the 20 companies they assist in this regard based here in Cork.

For the bigger projects, where there is Intellectual Property (IP) at stake, Enterprise Ireland get involved.

He said the college and the overseeing State agency are always mindful that the technological breakthroughs are used for the good of society here in Ireland.

Dr O'Neill said all the excellent breakthroughs came down to the same central function — understand the physics.

Once those breakthroughs were made in the lab, then there would be even more commercial and real benefits down the line for the world and for the regional economy.

# Patients have vision restored with new lenses

A TECHNOLOGY breakthrough by the photonics researchers at CIT is being used to help restore the vision of cataract patients.

The team at the Centre for Advanced Photonics and Process Analysis (CAPPA) came up with an advanced optical inspection system to improve the manufacture of intraocular lenses.

Commonly called IOLs, these lenses restore the sight of cataract patients with blindness or impaired vision by replacing the eye's natural lens during surgery.

Many aged over 65 have some cataract development and fortunately it can be treated by IOL technology.

The breakthrough by the CIT team means Alcon have a better product at their disposal.

After receiving training in the operation of the system from CAPPA researchers, staff in Alcon's Bishopstown base began validation testing of the equipment on their IOL production line.

The initial tests have been successful and results have proven the performance of the CAPPA technology on the production line.

The collaboration between Alcon and CIT is being jointly funded by the company and Enterprise Ireland.

This project is the eyecare company's first research and development collaboration on the IOL manufacturing process to take place outside of the US.

The technology is currently at the licensing stage, and after that Alcon will be able to roll it out across their other facilities worldwide.

The results produced by CAPPA have also facilitated further investment by Alcon in Cork to enable new high value development activities.

Commenting on the work so far, Barry Walsh, process engineering manager for Alcon, highlighted that "a successful relationship has been forged with the group (at CIT) which is now bearing fruit."

Mr Walsh also indicated that Alcon hoped to build on the relationship with CAPPA by exploring a follow up on the innovation partnership currently being undertaken with another metrology based project this year.