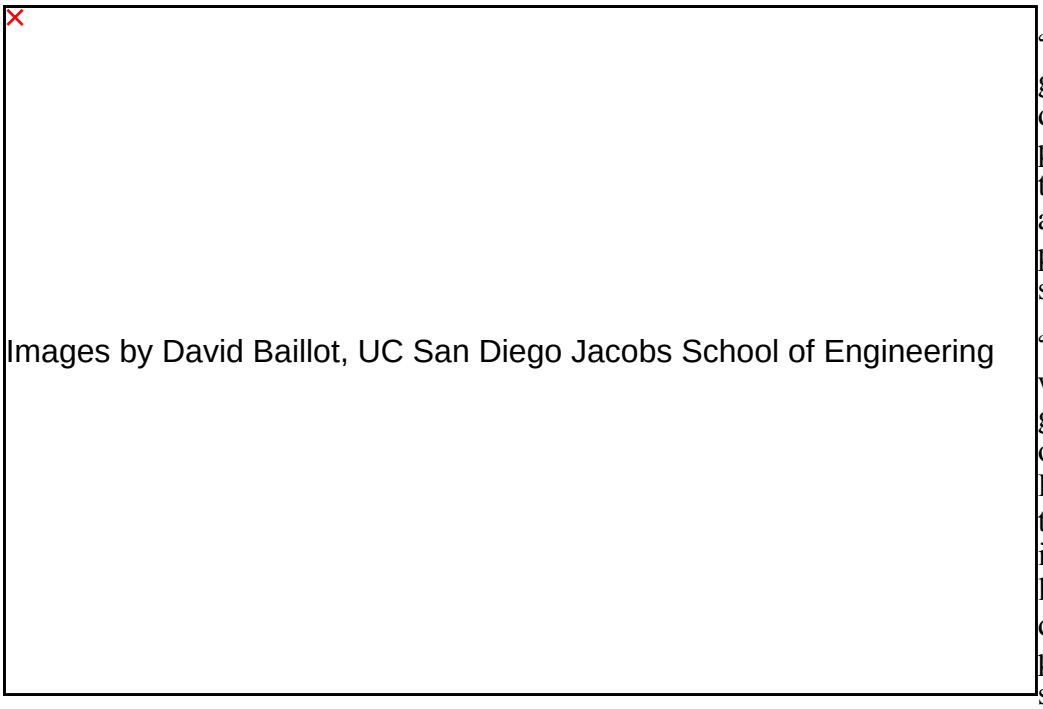
Tyndall continues to meet a growing demand for photonics skills

Tyndall National Institute in collaboration with researchers at the University of California San Diego,have developed an educational toolkit to bring integrated photonics into the college engineering and science curriculum.

The toolkit is aimed at teaching undergraduate students practical skills in integrated photonics, including how to characterize and test photonics integrated circuits—skills that today are typically acquired at the PhD level. The team envisions that teaching these skills earlier on will enable more graduates to enter the integrated photonics industry workforce and meet a growing demand for photonics technicians and engineers.

Images by David Baillot, UC San Diego Jacobs School of Engineering

The UC San Diego team is collaborating with researchers led by professor Peter O'Brien at Tyndall's European Packaging Pilot Line PIXAPP. The project was conceived by Abdelkrim El Amili, a research scientist in the Department of Electrical and Computer Engineering at UC San Diego. His team includes Shaya Fainman, a professor of electrical and computer engineering at the UC San Diego Jacobs School of Engineering, and Jordan Davis, a PhD student in Fainman's lab.

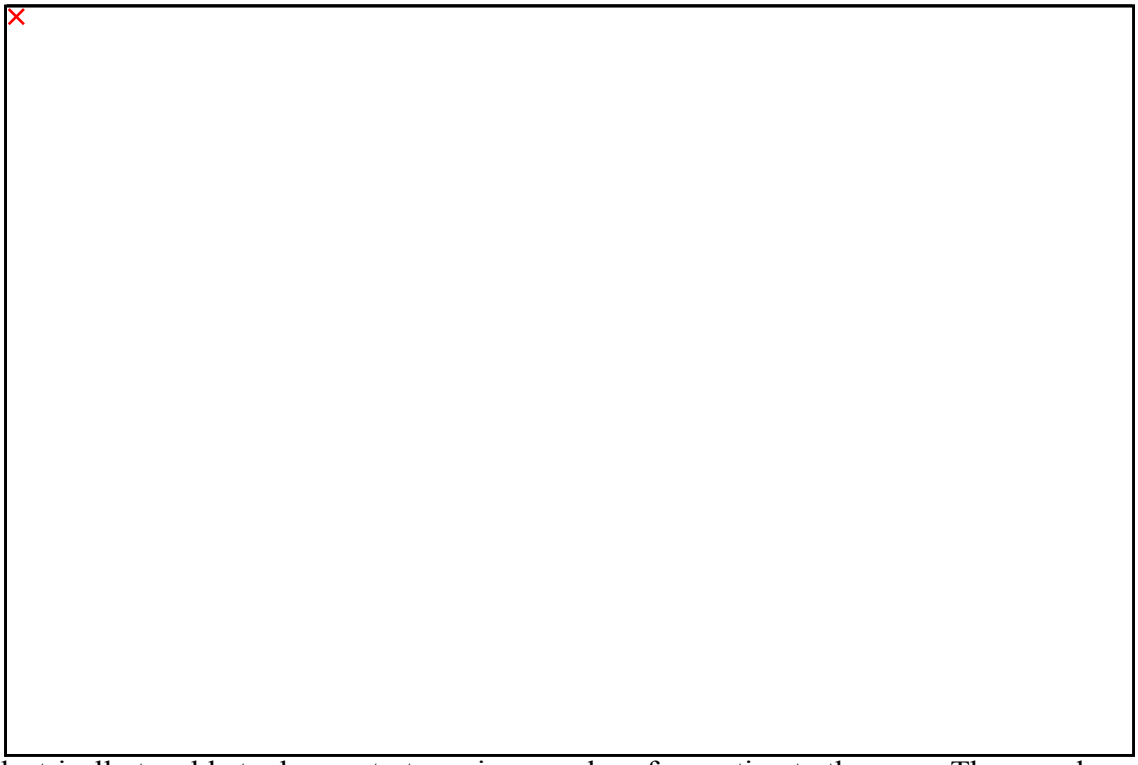


Images by David Baillot, UC San Diego Jacobs School of Engineering

"This toolkit will bridge the gap between the growing demand in the silicon photonics job market and the supply of technicians and engineers who have practical skills in the field," said El Amili.

"As the market grows, there will not be enough graduates to fill all these opportunities because only PhD graduates so far have the practical skills in integrated photonics. But learning integrated circuit design, device fabrication, packaging and testing should not be limited to PhD students. Our hope is that by bringing hands-on integrated photonics training to undergraduat2e and masters students, this toolkit will equip them with the knowledge and skills to fill new job opportunities."

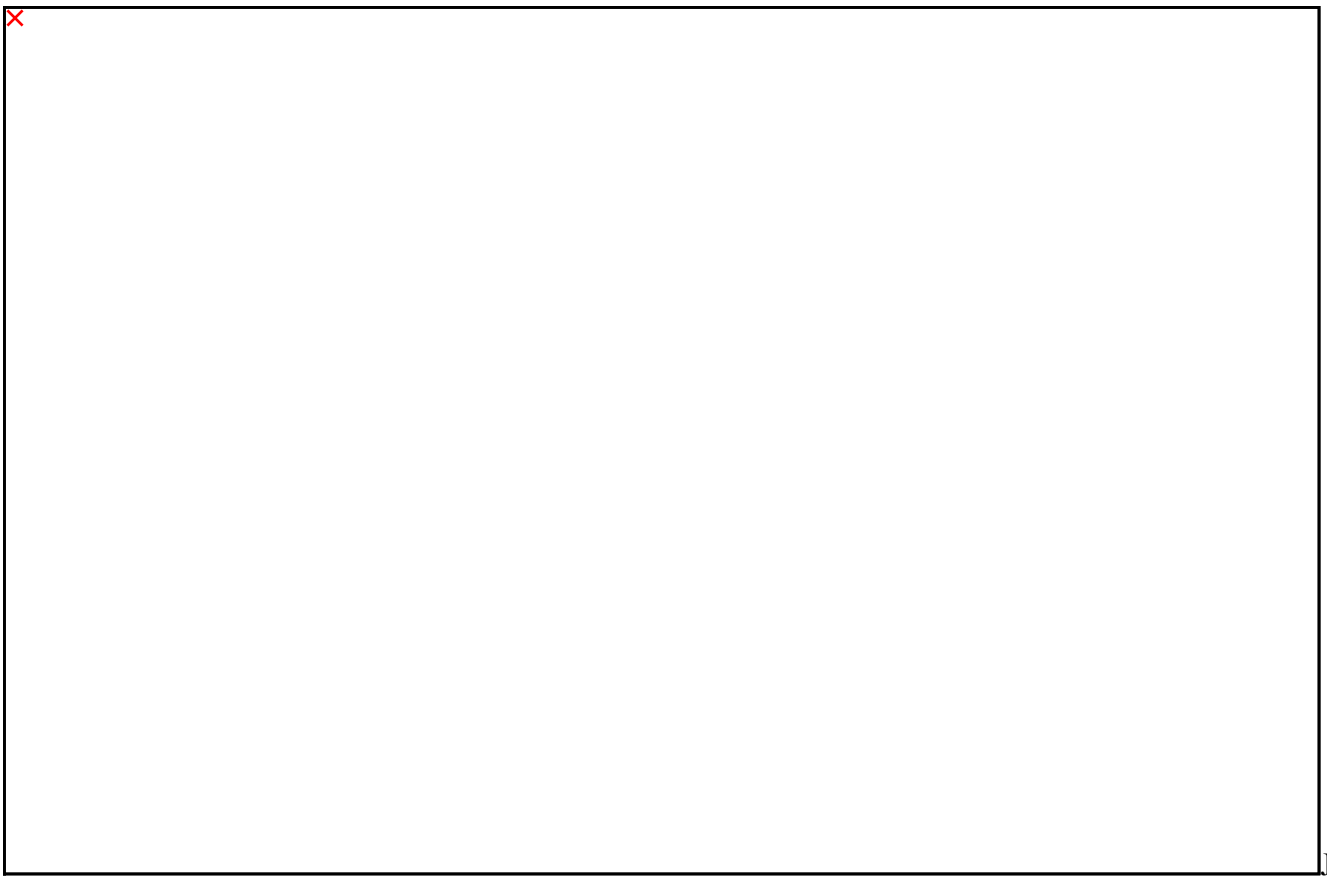
The toolkit, called the Integrated Photonics Education Kit (IPEK), is a packaged silicon photonic platform. Instructors can use it as part of an engineering laboratory course to teach students basic building blocks of photonics integrated circuits. By experimenting with the plug-and-play kit, students can gain experience designing, assembling and testing photonics integrated circuits.



The current prototype includes 6 photonic components such as a waveguide, micro-ring resonator, short and long Bragg mirrors, filters, and a Mach-Zehnder interferometer. These are basic building blocks in educational, research, and industrial environments. The devices can be controlled using heaters. Additionally, many of these devices are electrically tunable to demonstrate various modes of operation to the user. They can be also combined together externally using fiber for more complex photonic functionality.

IPEK offers many of the functionalities of conventional photonics platforms for a fraction of the cost, and while conventional platforms are bulky and require a separate lab space, IPEK is portable. The current prototype fits in a user's hand. IPEK is also robust and easy to use, said El Amili. With the plug-and-play package tool, users no longer need to spend time aligning and stabilizing the optical fiber like they would with a conventional platform.

"The Tyndall Institute through the support of the PIXAPP Pilot Line is delighted to collaborate with UC San Diego on this unique educational program," said O'Brien. "Tyndall and PIXAPP recognize the need for a skilled workforce in integrated photonics across all skill levels. The IPEK toolkit is an excellent initiative dedicated to training the next generation of engineers and technicians."



Jordan Davis (Graduate Student, UCSD) Dr. Abdelkrim El Amili (Research Scientist, UCSD) and Prof. Peter O'Brien Tyndall National Institute

The team presented a prototype of the toolkit at the 2019 Optical Fiber Communications Conference and Exhibition (OFC) in San Diego.

Sincere thanks to David Baillot, UC San Diego Jacobs School of Engineering for permission to use his photos of the device and the laboratory testing.