Two underlying goals of the United Kingdom’s (UK) science strategy are accelerating the pace at which basic research is translated into useful technologies and fostering international collaborations. As part of this strategy, the UK is supporting a partnership between universities in Scotland and California that brings together photonics research and industry, motivating materials research aimed at meeting industry needs.

The Scotland Universities, Stanford University Partnership (SU2P) is a three-year initiative focused on, but not limited to, five research areas: biophotonics, solar cell devices and characterization, integrated photonics, solid-state laser engineering and nonlinear optics, and photonics sensors. Materials development plays a key role in each of these areas. By connecting researchers directly with industry partners, SU2P aims to incorporate new materials into useful technologies more quickly.

Metamaterials are one example of this, said Thomas Baer, executive director of the Stanford Photonics Research Center and a founding member of SU2P. Using techniques developed in the integrated circuit industry, research groups have been able to produce materials with unique optical properties. “Breakthroughs of this type are in part motivating increased investment in the photonics material science area in both the UK and the US, and provide a rationale for optimism that these investments will result in new device capabilities,” he said.

Both the United States (USA) and the UK recognize the importance of photonics research for technological advancement, said Baer. He continues, “In academia in the UK there is perhaps a better appreciation of the need for and acceptance of increased federal investment into translation activities.”

According to Iain Ross, SU2P Director, UK funding sources have significantly increased the “impact” requirement of research over the past decade. “Fortunately the photonics research community in Scotland has always had very strong relationships with industry and has strived (through programs such as SU2P) to maximize the transfer of knowledge into industry and society,” he said.

SU2P aims to break down the barriers across the Atlantic and between academia and industry through five interventions:

1. enabling employees of participating institutions to spend up to six months at a partner institution doing exploratory work that has a potential commercial outcome;
2. supporting collaborative, short-term, proof-of-concept projects that have definite commercial potential;
3. building a network of investors interested in photonics technology and connecting them with researchers through technology showcases and company and university visits;
4. engaging industrial partners to determine research needs and identifying researchers that can provide industrial partners with advice and potential solutions; and
5. supporting early-career fellows to work at Stanford University or an affiliated laboratory for one year, where they receive research and entrepreneurial mentoring from the Stanford Photonics Research Center.

At this point it may be too early to evaluate the economic impact of the program, according to Ross, “however, there is no doubt that it has cemented
The existing relationships between the partners will be a springboard for further collaboration into the future.” He also said that the original early-career fellows are returning to Scotland and already engaging with the local industry in new and exciting ways.

Scotland has been active in photonics research and the photonics industry for many years. The sector employs roughly 7,000 people in defense applications, medical diagnostics, and other laser-based industries. Although universities and companies have a history of working together in Scotland, SU2P established an organized process for doing so that aims to capture the whole range of disciplines that benefit from photonics research.

Universities and large companies were quick to sign on to SU2P because of the mutual benefits—companies have a direct line to potential employees and their training program, while universities have a direct line to entrepreneurial expertise and industry needs. The program aims to mirror the successful relationship between the Silicon Valley photonics industry and the Stanford Photonics Research Center within the Scotland environment, said Ross, as well as to enable the sites to tap into each other’s resources and range of skills.

In some sense SU2P is a prototype, said Baer, who envisions an international photonics network of entrepreneurs and researchers that highlights research synergies and areas with promising commercial applications. Talks about such an effort have already begun with groups from Germany, Switzerland, Japan, and China.

SU2P is now in its second of three years of funding from the Research Councils UK Science Bridges Award, the Scottish Funding Council, and the Scottish Enterprise. Partnering institutions include the Universities of Strathclyde, St Andrews, Glasgow, and Heriot-Watt in Scotland and Stanford University and California Institute of Technology in the United States. Current industry partners include Coherent, Inc.; mLED; M Squared Lasers; Optos; SELEX Galileo; and Thales UK.

For more information on SU2P programs and opportunities, visit www.su2p.com.

Kendra Redmond