Reseacher mobility in Europe: networks of excellence

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It is a pleasure to introduce myself in the capacity of the new associate editor for Europe and Africa. This regional mandate is a particularly exciting one as it gives the opportunity to bring activities with a distinctly local flavour to the attention of the international Newsletter readership. The diversity across even the European research is considerable with the range of languages, cultural identities, and working arrangements. This is something that can be very much appreciated by moving to work in a new country, and with my own recent appointment at the Technische Universiteit Eindhoven in the Netherlands, this is something I am very much enjoying at first hand.

Previously I had been with the University of Bristol where I worked on high speed semiconductor lasers with the support of a Royal Society university research fellowship. Subsequently I moved to the University of Cambridge where I was elected to a fellowship at Churchill College. My research interests diversified into a range of active photonic components for high capacity data links and reconfigurable optical links. A particular interest being the development of reconfigurable photonic switches and subsystems to facilitate low latency and high end to end capacity in data networking.

The appeal to move to a new country has been multifaceted. From a professional perspective, the increasingly global nature of technological and scientific research means that it has become commonplace for international networks and teams of researchers to work together on multidisciplinary challenges. For the researcher, the opportunities are there to share experiences, promote interests, acquire cutting-edge skills, participate in world-class research teams, and even gain access to unique clustered infrastructure. The opportunity to bring expertise to bear in a new field, and develop new techniques can be highly stimulating. From a personal perspective, the chance to explore a new culture and landscape, hone a new language, and make new acquaintances is particularly rewarding.

Now my work is supported by a Marie Curie Chair, an action funded by the European Union 6th framework programme specifically devised to enable and promote researcher mobility http://ec.europa.eu/research/fp6/mariecurie-actions/action/level_en.html. The programme also offers funding for PhD study and post-doctoral fellowships through to research team leaders with the twin aims of promoting research excellence and researcher mobility to or within Europe. These schemes should also play a significant role in the up-coming 7th framework programme, so do keep an eye open for calls for applications and proposals if this is something of interest to you.

In my own case, I have been able to complement the interest I have developed in the area of broadband optical switching at the University of Cambridge, where I am a Visiting Fellow, with the expertise and facilities at the Technische Universiteit Eindhoven, to explore new forms of photonic integrated circuit. Within this issue I continue the theme of mobility, with an article addressing opportunities for researcher offered by the relatively new concept in Europe of the Network of Excellence, with the particular example of ePixNet, within which I take part in the staff exchange program. Should you have suggestions for future topics you would like to see covered in the Newsletter, please do contact me at kevin.williams@ieee.org. Comments on the features included will be equally well received.

**Researcher Mobility in Europe: Networks of Excellence**

Networks of Excellence are becoming increasingly prominent at conferences and exhibitions, and are having an increasing influence on the nature of collaborative research within Europe. Launched within the 6th framework of the European Union, their raison d’être has been to strengthen research by gathering the critical mass of resources and required expertise to provide leadership in a given field http://cordis.europa.eu/fp6/instr_noe.htm. A particularly exciting aspect to the
work of these networks has been the promotion and funding of researcher mobility between partner institutes and the development of mechanisms for future access to highly specialised facilities.

ePIXnet www.epixnet.org is one such Network of Excellence with a particular research focus on photonic integration. The partnership comprises 19 Universities, 16 industrial and research organisations, and 18 affiliate members, including one recently joining from Taiwan. The nature of the collaborative research has ranged from novel integrated and integratable components, exploring routes to technologies for photonic VLSI, nanophotonics, advanced materials, integrated light sources and ultra-wide band photonic signal processing as indicated in the mosaic.

The Researcher Exchange programmes are particularly important instruments to facilitate sustainable research integration with the networks promoting such activities by meeting additional incurred costs, and through providing a formal research framework. Since the inception of ePIXnet in September 2004, over sixty junior researcher exchanges and eight senior staff exchanges have been confirmed within the one network.

Junior researchers, typically PhD students or young post-docs, stay for several weeks to several months at a partner institute with complementary know-how and skills to both gain experience with the facilities and get to know the researchers. This ensures effective collaboration afterwards. These exchanges have been considered to be very fruitful by the researchers involved and have commonly lead to research breakthroughs and joint publications which would not have otherwise been possible. In one of the first collaborations for example, Pascual Muñoz at the Universidad Politecnica de Valencia was able to put into practice his work on the design and modelling of arrayed waveguide gratings through a six month stay at the COBRA research institute in the Netherlands. A set of optical integrated circuit designs to compress highly dispersed optical pulses where implemented, with the aim of enabling ultra fast (THz) data transmission. The exchange of design and modelling expertise and the complementary activities of laser modelling and mask design and fabrication expertise providing a particularly fruitful exchange. Learning the fundamentals of mask layout design brought the theory closer to practice and the meeting researchers and working in the research groups directly provides an excellent basis for future collaboration.

Senior staff exchanges have similarly been facilitated, and in this case the intention has been to develop long-lasting collaboration between two partner institutions on a research and educational basis. These have ranged from faculty members spending prolonged periods of time at a partner institution to regular visits in which collaborative research programs are devised and PhD students are co-coached.

The involvement of industry is considered to be mandatory in the area of photonic integration technology where investment costs are particularly high. A number of industrial partners are directly involved in the research activities and the research integration activities of the network, ranging from manufacturers of photonic integrated circuits, system developers, component manufacturers and tool providers. There are many more companies that could potentially exploit the research on photonic integrated components and systems and an Industrial Workshop was held to engage with companies outside of the network to provide exposure to the network activities and invited them to become affiliate partners. The focus was on the affordability of wafer fabrication for the manufacturing of photonic integrated components, with objectives including the discussion of the future of photonic integration and in particular the affordability of photonic integration technology with as many actors as possible. Representatives of the MIT Photonic Roadmap group, the US Optoelectronics Industry Development Association OIDA, and the European Photonics Industry Consortium (EPIC) contributed with presentations about the work of their organizations. Finally there was also a presentation about shared access to foundry services in silicon microelectronics.

Educational programs are being developed to engage with the wider academic community. The winter school in Pontresina, Switzerland, has provided a forum for researchers to engage with expects in the field in a more intimate research environment and to discuss their own work in informal surroundings. New international bachelor and master programs are also under development amongst academic partners in the network, the first result of this being the Erasmus Mundus: Masters in Photonics.

For the longer term, networks are striving to facilitate both durable personal and organizational relationships. Efforts are therefore underway to devise economically viable research platforms based on high value infrastructure and the associated non-trivial know-how amongst the network partners to make cutting-edge facilities available to a wider research base.