

“US/EU Workshop on Key Issues and Grand Challenges in Optical Networking”

(Co-Sponsors: NSF, ePHOTON/One, COST)

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Workshop Co-Chair (from US/NSF side): Biswanath Mukherjee, mukherje@cs.ucdavis.edu

Workshop Co-Chair (from EU side): Fabio Neri, fabio.neri@tlc.polito.it

Workshop Overview

This Workshop was jointly sponsored by the US National Science Foundation (NSF) and the European Union (EU) (ePHOTON/One and COST). It was held June 27-28, 2005, at the European Commission (EC) premises in Brussels. Workshop participants included a diverse set of international experts from the optical networking research community in the US and the EU. (A delegation of ten optical networking experts from Japan was also invited to the Workshop as observers.) The Workshop objectives were: (a) to determine the future research needs and opportunities in optical networking and (b) to explore and define methods to facilitate stronger research collaboration between US and EU researchers.

Attendance at the Workshop was by invitation only, and limited to 30 participants -- 15 from US and 15 from EU. A Technical Program Committee (TPC) determined the Workshop's Technical Program.

Technical topics covered at the Workshop included (1) optical network **architectures**; (2) experimental optical systems research (i.e., **hardware** systems); and (3) optical network control and management (i.e., **software** systems). Special attention was paid to collaborations between these areas, to address forward-looking and high-impact research.

There was a consensus that successful and high-impact research in optical networking can be achieved by incorporating expertise from these diverse disciplines, and is referred to here as “cross-layer design”. In this regard, roughly three layers can be identified: (1) the application layer at the top (including control and management software); (2) the network architecture layer in the middle, and (3) the physical (or optical communications) layer at the bottom (mapping with the three topics--software, architecture, and hardware--indicated above).

This Final Workshop Report details important research challenges, both fundamental and technological, which are likely to be at the forefront of this field for many years to come. It contains an executive summary of the technical recommendations from the workshop. The executive summary is followed by three appendices, which provide detailed discussions on the three technical topics: (1) optical network **architectures**; (2) experimental optical systems research (i.e., **hardware** systems); and (3) optical network control and management (i.e., **software** systems). Finally, the Workshop Agenda and the List of Participants are also included in the Final Workshop Report (<http://networks.cs.ucdavis.edu/~mukherje/US-EU-wksp-June05-Final-Report.pdf>).