

INTERNET project publications, Dec 2015

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110. Bamiedakis, N., Hashim, A., Beals, J., Penty, R.V., White, I.H., Hutter, T. and Elliott S., "PCB-Integrated polymer photonic devices", European Conference on Integrated Optics (ECIO 2012), Barcelona, 2012.
111. Lazaro, J.A., SolÀ, V. Wonfor A. and Schrenk, B., "InP wavelength shifter designs for colorless user terminals in passive optical networks," European Conference on Integrated Optics (ECIO 2012), Barcelona, 2012.
112. Kumar, W., Bhattacharya, S., Qazi, B.R. and Elmirghani, J.M.H., "An energy efficient double cluster head routing scheme for motorway vehicular networks," *Proc. IEEE International Conference on Communications (ICC'12)*, Ottawa, 10-15 June, 2012.
113. Grosvenor, M., "uvNIC: Rapid Prototyping Network Devices," MSN Cosener's House, 2012, (**Winner: 2012 Brendon Murphy Best Young Researcher Award**).
114. Grosvenor, M., "uvNIC: rapid prototyping network interface controller device drivers," Proceedings of the ACM SIGCOMM 2012, Helsinki, (**ACM SIGCOMM nominated paper for ACM Student Research Competition 2012**).
115. Gordon, G., Carpenter J., Crisp, M., Wilkinson, T., Penty, R.V. and White, I.H., "Demonstration of Radio-over Fibre Transmission of Broadband MIMO over Multimode Fibre using Mode Division Multiplexing," the European Conference and Exhibition on Optical Communication, 2012.
116. Lawey, A.Q., El-Gorashi, T.E.H. and Elmirghani, J.M.H., "Energy-Efficient Peer Selection Mechanism for BitTorrent Content Distribution," IEEE Global Telecommunications Conference (GLOBECOM'12), Anaheim, 3-7 Dec, 2012.
117. McKendry, J. J. D., Geng, L., Zhang, S., Watson, S., Massoubre, D., Haji, M., Gu, E., Kelly, A.E., Penty, R.V., White I.H. and Dawson, M.D., "Gigabit Data Transmission Over 10m Polymer Optical Fiber Using a Blue-Emitting Micro-Light-Emitting Diode," UKNC Conference, Cardiff 9 January 2013.
118. Idjmayyel, H., Qazi, B.R., and Elmirghani, J.M.H., "Energy Efficient Double Cluster Head Routing Scheme in a City Vehicular Network," Proc. 27th IEEE International Conference on Advanced Information Networking and Applications (AINA'13), Barcelona, March 25-28, 2013.
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120. Nabi, Z., Moncaster, T., Madhavapeddy, A. and Hand, S., "Evolving TCP.: how hard can it be?," Proceedings of the 2012 ACM conference on CoNEXT, 2012.
121. Lee, S.H., Penty, R.V., White, I.H., and Cunningham D.G., "Uncooled MIMO WDM system using advanced receiver signal processing techniques," Photonics West, San Francisco, 2012.
122. Wei, J.L., Cunningham, D.G., Penty, R.V. and White, I.H., "Feasibility of 100 G Ethernet enabled by carrierless amplitude/phase modulation and optical OFDM," ECOC, Amsterdam, 2012.
123. Geng, L., Penty, R.V., White, I.H., and Cunningham, D.G., "FEC-free 50 m 1.5 Gb/s plastic optical fibre link using CAP modulation for home networks," ECOC, Amsterdam, 2012.
124. Ingham, J.D., Lee, S.H., Penty, R.V., White, I.H., and Cunningham, D.G., "100 Gb/s uncooled WDM system using conventional WDM components and advanced receiver signal processing," ECOC, Amsterdam, 2012.
125. Probst Eide, S., Moore, A.W. and Crowcroft J., "Signpost: Persistent names to reach moving targets," Flexible Networks Workshop, 2012.
126. Moncaster, T., Moore, A.W. and Crowcroft, J., "The Dynamic Data Centre: Using SDN to Create Self-Optimising Data Centres," Flexible Networks Workshop, 2012.
127. Wei, J.L., Geng, L., Cunningham, D.G., Penty, R.V. and White, I.H., "100 Gigabit Ethernet Transmission Enabled by Carrierless Amplitude and Phase Modulation Using QAM Receivers," OW4A.5, Optical Fiber Communication Conference and Exposition (OFC), Anaheim, 2013.
128. Wang, K., Wonfer, A., Penty, R.V. and White, I.H., "Demonstration of Cascaded Operation of Active-Passive Integrated 4x4 SOA Switches with On-Chip Monitoring for Power Control and Energy Consumption Optimization," OW3J.1, Optical Fiber Communication Conference and Exposition (OFC), Anaheim, 2013.

129. Chen, C.,Penty, R.V., White, I.H. and Crisp, M., "Transmission of Simultaneous 10Gb/s Ethernet and Radio-over-Fiber Transmission using In-band Coding," OM3D.1, Optical Fiber Communication Conference and Exposition (OFC), Anaheim, 2013.
130. Ingham, J.D., Penty, R.V., White, I.H. and Cunningham,D.G., "Orthogonal Multipulse Modulation for 64 Gigabit Fibre Channel," OW4A.6, Optical Fiber Communication Conference and Exposition (OFC), Anaheim, 2013.
131. Geng, L. Wei, J., Penty, R.V., White, I.H. and Cunningham,D.G., "3 Gbit/s LED-Based Step Index Plastic Optical Fiber Link Using Multilevel Pulse Amplitude Modulation," OTh4A.1, Optical Fiber Communication Conference and Exposition (OFC), Anaheim, 2013.
132. Cheng, Q., Wonfer, A., Wang,K., Penty, R.V. and White, I.H., "Low-Energy, Scalable Hybrid Crosspoint Switch Design," Semiconductor and Integrated OptoElectronics (SIOE) Conference, Cardiff, April 9-11 2013.
133. Cheng, Q., Wonfor, A., Wang, K., Penty, R.V. and White I.H., "Low-Energy, Scalable Hybrid Crosspoint Switch Design," Semiconductor and Integrated OptoElectronics (SIOE) Conference, Cardiff, April 9-11 2013.
134. Dong, X., El-Gorashi, T.E.H. and Elmirghani, J.M.H., "Joint Optimization of Power, Electricity Cost and Delay in IP over WDM networks," Proc. IEEE International Conference on Communications (ICC'13), Budapest, 9-13 June 2013.
135. Hafeez, M. and Elmirghani, J.M.H., "Dynamic Spectrum Leasing for Beamforming Cognitive Radio Networks Using Network Coding," Proc. IEEE International Conference on Communications (ICC'13), Budapest, 9-13 June 2013. (**Winner IEEE ICC'13 Best Paper Award**).
136. Muhtar, A., Bhattacharya, S., Qazi, B.R. and Elmirghani, J.M.H., "Greening Vehicular Networks with Standalone Wind Powered RSUs: A Performance Case Study," Proc. IEEE International Conference on Communications (ICC'13), Budapest, 9-13 June 2013.
137. Osman, N.I., El-Gorashi, T.E.H. and Elmirghani, J.M.H., "The impact of content popularity distribution on energy efficient caching," *Proc IEEE 15th International Conference on Transparent Optical Networks (ICTON'13)*, 23-27 June, 2013, Spain.
138. Cheng, Q., Wonfor, A., Wang, K., Penty, R.V. and White I.H., "Low-Energy, Scalable Hybrid Crosspoint Switch Design," CTu1L.3 CLEO Conference, San Jose USA, June 9 - 14, 2013.
139. Wei, J. L., Geng, L., Penty, R.V., White, I.H. and Cunningham, D.G., "100 Gigabit Ethernet Transmission Enabled by Carrierless Amplitude and Phase Modulation Using QAM Receivers," OFC 2013, Anaheim, CA, USA. Paper OW4A.5. Mar. 2013.
140. von Lindeiner-Wildau, J.B., Penty, R.V. and White, I.H., "400 Gb/s Uncooled MIMO WDM with Advanced Coding Schemes for Low Power Consumption Datacommunication Links," Semiconductor and Integrated OptoElectronics (SIOE) Conference April 9-11th 2013.
141. Cheng, Q., Wonfor, A., Wang, K., Penty, R.V. and White I.H., "Low-Energy, Scalable Hybrid Crosspoint Switch Design," CTu1L.3 CLEO Conference, San Jose USA, June 9 - 14, 2013.
142. Wei, J.L., Ingham, J.D., Cunningham, D.G., Penty, R.V. and White, I.H. "Comparison of 100 Gb/s Ethernet Links using PAM-8, Multi-pulse, and Hybrid CAP-16/QAM Modulation Schemes", ECOC2013, London, UK. Paper Th.1.F.2, Sept. 2013.
143. Bamiedakis, N., Hashim, A., Penty, R.V. and White, I.H. "A 40 Gb/s Scalable Optical Polymer Backplane Using a Regenerative Shared Bus Architecture," ECOC Conference, London, 22-26 September 2013, paper Th.1.A.3.
144. Wei, J.L., Ingham, J.D., Cunningham, D.G., Cheng, Q., Penty, R.V. and White, I.H. "High Performance Optical Data Links using Hybrid CAP/QAM Transmitter/Receiver Scheme", ACP2013, Beijing, China. Nov. 2013.
145. Nencioni, G., Sastry, N., Chandaria, J. and Crowcroft, J., "Understanding and decreasing the network footprint of over-the-top on-demand delivery of TV content," 22nd International World Wide Web Conference (WWW), 2013.
146. Grosvenor, M., Schwarzkopf, M., Moore A.W. "R2D2: Bufferless, switchless data center networks using commodity Ethernet hardware," Proceedings of SIGCOMM 2013 Hong Kong.
147. Schwarzkopf, M., Grosvenor, M., and Hand, S., "New wine in old skins: the case for distributed operating systems in the data center," Asia Pacific Workshop in Systems, 2013. Lawey, A.Q., El-

- Gorashi, T.E.H. and Elmirghani, "Energy efficient cloud content delivery in core networks," *Proc. of IEEE Globecom 2013 Workshop on Cloud Computing Systems, Networks, and Applications (CCSNA)*, 09 Dec – 13, Atlanta, GA, USA, 2013.
148. Cheng, Q., Wonfor A., Wang K., Penty, R. V. and White, I. H., "Simulation on Low-energy, Scalable Hybrid Switch," *Semiconductor and Integrated Opto-Electronics Conference (SIOE)*, Cardiff, 2013.
 149. Li, T., Crisp, M. J., Penty, R. V. and White, I. H., "Digital Radio Distribution System Over Multiple Cabling Types," *Microwave Photonics Conference*, Virginia USA, 28 -31 October 2013.
 150. Gordon, G. S. D., Crisp, M. J., Penty, R. V. and White, I. H., "Experimental Investigation of Antenna Selection and Transmit Beamforming for Capacity Enhancement in 3 x 3 MIMO-enabled Radio-over-Fiber DAS," *Microwave Photonics Conference*, Virginia USA, 28 -31 October 2013.
 151. Adami D., Martini B., Antichi G., Giordano S., Gharbaoui M., Castoldi P., "Effective Resource Control Strategies using OpenFlow in Cloud Data Center," *IFIP/IEEE IM 2013*, Ghent, Belgium, 27 May-31 May, 2013.
 152. Antichi G., Adami D., Teixeira J., Del Chiaro A., Giordano S., Santos A., "Datacenter in a Box: Test your SDN Cloud-Datacenter Controller at Home," *EWSDN 2013*, Berlin, DE, 10-11 Oct 2013.
 153. Antichi G., Shahbaz M., Giordano S., Moore A.W., "From 1G to 10G: Code Reuse in Action," *ACM HPPN 2013*, New York, NY, USA, 18 June 2013.
 154. Antichi G., Callegari C., Giordano S., "Implementation of TCP Large Receive Offload on Open Hardware Platform," *ACM HPPN 2013*, New York, NY, USA, 18 June, 2013.
 155. Antichi G., Bruyere M., Campora Perez D.H., Liu G., Neufeld N., Giordano S., Owezarski P., Moore A.W., "Time Structure Analysis of the LHCb Online Network," *CHEP 2013*, Amsterdam, NL, 14-18 Oct (Poster), 2013.
 156. Audzevich, Y., Watts, P., West, A., Mujumdar, A., Crowcroft, J., & Moore, A. W. (2013). Low Power Optical Transceivers for Switched Interconnect Networks," *Proceedings of the IEEE International Conference on Advanced Technologies for Communications (ATC)*, 2013.
 157. Matthew P. Grosvenor, Malte Schwarzkopf , Robert N. M. Watson, Andrew W. Moore, "R2D2: Bufferless, Switchless Data Center Networks Using Commodity Ethernet Hardware," (poster) in *Proceedings of the Special Interest Group on Communications 2013 (SIGCOMM 2013)* , Hong Kong (**SIGCOMM ACM Student Research Competition Winner**).
 158. Grosvenor, M. P., Schwarzkopf, M., and Hand, S., "CamIO: declaring flexible and performant application I/O," *Demo at the 4th Asia-Pacific Systems Workshop (APSYS)*, Singapore, 2013.
 159. Parisi, G., Moncaster, T., Madhavapeddy, A., & Crowcroft, J., "Trevi: watering down storage hotspots with cool fountain codes," in *Proceedings of the Twelfth ACM Workshop on Hot Topics in Networks*, November 2013.
 160. Schwarzkopf, M., Grosvenor, M. P., and Hand, S., "New wine in old skins: the case for distributed operating systems in the data center," in *Proceedings of the 4th Asia-Pacific Workshop on Systems APSYS 2013* , Singapore.
 161. Rotsos, C., Howard, H., Sheets, D., Mortier, R., Madhavapeddy, A., Chaudhry, A., and Crowcroft, J., "Lost in the edge: Finding your way with DNSSEC signposts," *In the Proceedings of the 3rd USENIX Workshop on Free and Open Communications on the Internet*, 2013.
 162. Sathiaseelan, A., Rotsos, C., Sriram, C. S., Trossen, D., Papadimitriou, P., and Crowcroft, J., "Virtual Public Networks," *In the Proceedings of the 2nd European Workshop on Software Defined Networks (EWSDN)*, 2013.
 163. Shahbaz, M., Antichi, G., Geng, Y., Zilberman, N., Covington, A., Bruyere, M., Feamster, N., McKeown, N., Felderman, B., Blott, M., Moore, A.W., Owezarski, P., "Architecture for an Open Source Network Tester," *ACM/IEEE ANCS 2013*, San Josè, CA, USA, 21-22 Oct (Demo), 2013.
 164. Li, Y., Ingham, J. D., Olle, V. F., Gordon, G. S. D., Penty, R. V. and White, I. H., "20 Gb/s Mode Group-Division Multiplexing employing Hermite-Gaussian Launches over Worst-Case Multimode Fiber Links," *OFC*, March 9-13, San Francisco, 2014.
 165. Ingham, J., Penty, R. V., White, I. H. and Cunningham, D., "100 Gb/s PAM4-CAP2 Real-Time Modulation of a Single Optical Source for Next-Generation," *OFC*, March 9-13, San Francisco, 2014.

166. Liu, S., Cheng, Q., Wonfor, A., Penty, R. V., White, I. H. and Watts, P., "A Low Latency Optical Top of Rack Switch for Data Centre Networks with Minimized Processor Energy Load," *OFC*, March 9-13, San Francisco, 2014.
167. Pachnicke, S., Zhu J., Lawin, M., Wonfor, A., Eiselt, M., Penty, R. V., Cush, R., Turner, R., Firth, P., Wale, M. J., White, I. H. and Elbers, J. P., "First Demonstration of a Full C-Band Tunable WDM-PON System with Novel High-Temperature DS-DBR Lasers," *OFC* March 9-13, San Francisco, 2014.
168. Cheng, Q., Wonfor, A., Wei, J. L., Penty, R. V. and White, I. H., "Modular Hybrid Dilated Mach-Zehnder Switch with Integrated SOAs for Large Port Count Switches," *OFC*, March 9-13, San Francisco, 2014.
169. Rohit, A., Wonfor, A., Penty, R. V., White, I. H. and Williams, K., "Fast Dynamic Wavelength and Path Scheduling in a Monolithic 8x8 Switch," Q Cheng, R Stabile, *OFC*, March 9-13, San Francisco, 2014.
170. Lindeiner, J. B., Ingham, J. D., Wonfor, A., Zhu, J., Penty, R. V. and White, I. H., "100 Gb/s Uncooled DWDM using Orthogonal Coding for Low-cost Datacommunication Links," *OFC*, March 9-13, San Francisco, 2014 (**Outstanding Student Paper Competition Winner**).
171. Chen, J., Bamiedakis N., Penty, R. V., White, I. H., Westbergh, P., and Larsson, A., "Bandwidth Studies on a 1.4 m Long Multimode Polymer Spiral Waveguide," *Semiconductor and Integrated OptoElectronics*, Cardiff, April 29 - May 1, 2014.
172. Chen, J., "High Performance Optical Interconnects using Polymer Materials," *Summer School on Optical Interconnects*, Thessaloniki, Greece, 3-6 June 2014 (**Best Student Poster Award**).
173. Chen, J., Bamiedakis, N., Penty, R. V., White, I. H., Westbergh, P. and Larsson, A., "Bandwidth and Offset Launch Investigations on a 1.4 m Multimode Polymer Spiral Waveguide," *European Conference on Integrated Optics*, Nice, June 24 - 27, 2014.
174. Gordon, G. S. D., Crisp M. J., Penty, R. V. and White, I. H., "Experimental Comparison of Antenna Clustering Strategies in MIMO Distributed Antenna Systems," *Fall 2014 IEEE Vehicular Technology Conference (VTC)*, 2014.
175. Cheng, Q., Wonfor, A., Wei, J. L., Penty, R. V., and White, I. H., "Dilated 2x2 Hybrid MZI-SOA Switch Circuit Routing 100Gb/s DWDM Data," *European Conference on Integrated Optics (ECIO)*, Nice, 2014.
176. Cheng, Q., Wonfor, A., Wei, J. L., Penty, R. V., and White, I. H., "Cascaded Performance of a Monolithic MZI-SOA Hybrid Switch," *Conference on Laser and Electro Optics (CLEO)*, San Jose, 2014, paper SM4G.1.
177. M., Martini B., Adami D., Antichi G., Giordano S., Castoldi P., "On Virtualization-aware Traffic Engineering in OpenFlow Data Centers networks," *IEEE/IFIP NOMS 2014*, Krakow, Poland, 5-9 May, 2014.
178. Antichi G., Bruyere M., Owezarski P., Moore A.W., "The Open Source Network Tester on NetFPGA-10G," *Exceptionally Hard & Soft Meeting (EHSM)*, Humburg, DE, 27-29 June (Poster), 2014.
179. Antichi G., Callegari C., Moore A.W., Giordano S., Anastasi E., "JA-trie: Entropy-Based Packet Classification," *IEEE Workshop on High Performance Switching and Routing - HPSR*, July 1 - 4, Vancouver - Canada, 2014.
180. Lawey, A.Q.; El-Gorashi, T.E.H.; Elmirghani, J.M.H., "Renewable energy in distributed energy efficient content delivery clouds," in *Communications (ICC)*, 2015 IEEE International Conference on , vol., no., pp.128-134, 8-12 June 2015.
181. Mohammad Ali, H.M.; Lawey, A.Q.; El-Gorashi, T.E.H.; Elmirghani, J.M.H., "Energy efficient disaggregated servers for future data centers," in *Networks and Optical Communications - (NOC)*, 2015 20th European Conference on , vol., no., pp.1-6, June 30 2015-July 2 2015.
182. Alsalka, M.A.; Elmirghani, J.M.H., "CORNETO: A software system for simulating and optimizing optical networks," in *Networks and Optical Communications - (NOC)*, 2015 20th European Conference on , vol., no., pp.1-6, June 30 2015-July 2 2015.
183. Hammadi, A.; El-Gorashi, T.E.H.; Elmirghani, J.M.H., "High performance AWGR PONs in data centre networks," in *Transparent Optical Networks (ICTON)*, 2015 17th International Conference on , vol., no., pp.1-5, 5-9 July 2015

184. Musa, M.O.I.; El-Gorashi, T.E.H.; Elmirghani, J.M.H., "Energy efficient core networks using network coding," in *Transparent Optical Networks (ICTON)*, 2015 17th International Conference on , vol., no., pp.1-4, 5-9 July 2015.
185. Nasralla, Z, El-Gorashi T.E.H, Musa M.O.I, Elmirghani J.M.H, "Energy-Efficient Traffic Scheduling in IP over WDM Networks," 9th International Conference on Next Generation Mobile Applications, Services and Technologies 9-11 Sept 2015 Cambridge, UK.
186. Audu, G., Bhattacharya S., Elmirghani, J. M. H., "Wind Energy Dependent Rate Adaptation for Vehicular Roadside Units," 9th International Conference on Next Generation Mobile Applications, Services and Technologies 9-11 Sept 2015 Cambridge, UK.
187. Igder, S., Idjmayyel, H., Qazi, B. R., Bhattacharya, S., Elmirghani, J. M. H., "Load Adaptive Caching Points for a Content Distribution Network," 9th International Conference on Next Generation Mobile Applications, Services and Technologies 9-11 Sept 2015 Cambridge, UK.
188. Nonde L; El-Gorashi T.E.H.; Elmirghani J.M.H. "Cloud Virtual Network Embedding: Profit, Power and Acceptance" IEEE Global Telecommunications Conference (GLOBECOM'15), San Diego, 6-10 Dec, 2015.
189. Cheng, J. L., Q., Wonfor, A., Wei, J. L., Penty, R. V., and White, I. H., "Low-Energy, High-Performance Lossless 8x8 SOA Switch", *Optical Fibre Communication Conference (OFC)*, Los Angeles, Paper Th4E.6, 2015.
190. Wei, J. L., Cheng, Q., Cunningham, D. G., Penty, R. V., White, I. H., and Griesser, H., "High Performance 400 Gigabit Ethernet Links using Hybrid Multiband CAP/QAM Scheme", *J L Optical Fibre Communication Conference (OFC)*, Los Angeles, Paper Th2A.65. Mar. 2015
191. Li, X., Guo, X., Penty, R. V., I H. White, Zhou, L., Fang,L., "31 User, 46.5 Gb/s PAM-eCDMA Network Utilizing Pre-equalization and Crosstalk Cancellation", *Optical Fibre Communication Conference (OFC)*, Los Angeles, 2015.
192. Bamiedakis., N., Wei, J. L., Chen., J, Westbergh, P., Larsson, A., Penty, R. V., White, I. H., "56 Gb/s PAM-4 data transmission over a 1 m Long Multimode Polymer Interconnect", *Optical Fibre Communication Conference (OFC)*, Los Angeles, 2015
193. Pachnicke, M., Mayne, S., Quemeneur, B., Sayles D., Schwuchow H., Zhu, J., Wonfor, A., Marx, P., Lawin, M., Fellhofer, M., Turner, R., Neuber, P., Dietrich, M., Wale, M. J., Penty, R. V., White, I. H., and J P Elbers, "Field Demonstration of a Tunable WDM-PON System with Novel SFP+ Modules and Centralized Wavelength Control", *Optical Fibre Communication Conference (OFC)*, Los Angeles, 2015
194. Cheng, Q., Wonfor, A., Penty, R. V., and White, I. H., "Robust Large-Port-Count Hybrid Switches with Relaxed Control Tolerances", *Conference on Laser and Electro Optics (CLEO)*, San Jose, 2015
195. Ding, M., Cheng, Q., Wonfor, A., Penty, R. V., and White, I. H., "Routing Algorithm to Optimize Loss and IPDR for Rearrangeably Non-Blocking Integrated Optical Switches", *Conference on Laser and Electro Optics (CLEO)*, San Jose, 2015
196. Chen., J, Bamiedakis., N., Edwards, T. J., Brown, C. T. A., Penty, R. V., and White, I. H., "Dispersion Studies on Multimode Polymer Spiral Waveguides for Board-Level Optical Interconnects", *Optical Interconnects Conference*, 2015
197. Bamiedakis., N., Wei, J. L., Chen., J, Westbergh, P., Larsson, A., Penty, R. V., White, I. H., "56 Gb/s PAM-4 data transmission over a 1 m Long Multimode Polymer Interconnect", *Conference on Laser and Electro Optics (CLEO)*, San Jose, 2015
198. Chen., J, Bamiedakis., N., P Vasilyev, Edwards, T. J., Brown, C. T. A., Penty, R. V., and White, I. H., "Graded-index Polymer Multimode Waveguides for 100 Gb/s Board-level Data Transmission", *European Conference on Optical Communication (ECOC)*, Valencia, 2015
199. Cheng, Q., M Ding, Wonfor, A., Penty, R. V., and White, I. H., "The Feasibility of Building a 64x64 Port Count SOA-Based Optical Switch", *PS2015*, Florence, 2015
200. Chen., J, Bamiedakis., N., P Vasil'ev, Penty, R. V., and White, I. H.,. "Restricted Launch Polymer Multimode Waveguides for Board-level Optical Interconnects with >100 GHzxm Bandwidth and Large Alignment Tolerance", *Asia Communications and Photonics Conference*, Hong Kong, 2015
201. Penty, R. V., Wonfor, A., Cheng, Q. and White, I. H., "Scalable Energy Efficient InP Space Switches", *PS2015, ThII2-1*, Florence, 2015

202. Chen., J, Bamiedakis., N., P Vasil'ev, Penty, R. V., and White, I. H., "Bandwidth Enhancement in Multimode Polymer Waveguides Using Waveguide Layout for Optical Printed Circuit Boards", Optical Fiber Communications Conference and Exposition (OFC) 2015
203. Guo, X., Wang, Q. Zhou, L., L Fang, X, Li, Wonfor, A., Penty, R. V., and White, I. H., "High Speed OFDM-CDMA Optical Access Network", OFC 2016
204. Wei, J., Tang, J., Cheng, Q., Penty, R. V., White, I. H., and Griesser, H., "Optimization of Transceiver Bandwidths of 40 Gb/s NG-PONs Using Electrical Three-Level Duobinary", ACP 2015.
205. Zhu, J., Ingham, J. D., Von Lindeine, B., Adrian Wonfor, Richard V Penty and White, I. H., "MIMO DWDM System Using Uncooled DFB lasers with Adaptive Laser Bias Control and Post-Photodetection Crosstalk Cancellation", Journal of Lightwave Technology, Vol.32, No.21, pp.3372-3379, 2014
206. Cheng, Q., Wonfor, A., Wei, J. L., Penty, R. V., and White, I. H., "Monolithic MZI-SOA Hybrid Switch for Low-power and Low-penalty Operation", Optics Letters, Vol. 39, Issue 6, pp 1449-1452, 2014
207. Zhu, J., A. Wonfor, Lee, S. H., Pachnicke, S., Lawin, M., R. V. Penty, Elbers, J. P., Cush, R., Wale, M., and White, I.W., "Athermal Colourless C-band Optical Transmitter System for Passive Optical Networks". Journal of Lightwave Technology, Vol.32, No.22, pp.3651-3658, 2014 2014
208. Wei, J. L., Cheng, Q., Cunningham, D. G., Penty, R. V., and White, I. H., "Transmission of a 100 Gb/s CAP signal over a single optical carrier with a QAM receiver", IEEE Photonics Technology Letter, 201
209. Cheng, Q., Wonfor, A., Wei, J. L., Penty, R. V., and White, I. H., "Demonstration of the feasibility of large-port-count optical switching using a hybrid Mach-Zehnder interferometer-semiconductor optical amplifier switch module in a recirculating loop", Optics Letters, Vol. 39, No. 18, pp 5244-5247, September 15, 2014
210. Bamiedakis, N., Chen, J., Penty, R.V., and White, I. H., "Bandwidth Studies on Multimode Polymer Waveguides for ≥ 25 Gb/s Optical Interconnects", IEEE Photonics Technology Letters, vol. 26, pp. 2004-2007, 2014
211. Zilberman, N., Audzevich, Y. Audzevich, Y., G. Adam Covington, Andrew W. Moore, "NetFPGA SUME: Toward Research Commodity 100Gb/s", IEEE Micro, Special issue on High speed data center interconnects, vol.34, no. 5, pp. 32-41, September-October. 2014

Invited Talks (64)

212. Dong, X., El-Gorashi, T.E.H. and Elmirghani, J.M.H., "Renewable Energy in IP Over WDM Networks," *Proc IEEE 12th International Conference on Transparent Optical Networks ICTON 2010*, June 27 - July 1, 2010, Munich, Germany,
213. Elmirghani, J.M.H. "GreenTouch® and Green Wireless Communications" 21st Annual IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC 2010), Istanbul, Turkey, 26 – 30 September 2010. (Invited panel member)
214. White, I.H., Penty, R.V., Crisp, M., Sabesan S. "Wideband wireless over fiber systems", Optical Fiber Communication Conference and Exposition (OFC), San Diego, 2010.
215. Kwok, C.H., Penty, R.V. and White, I.H Novel passive launch scheme for ultimate bandwidth improvement of graded-index multimode fibers," Optical Fiber Communication Conference and Exposition (OFC), San Diego, 2010.
216. Bamiedakis, N., Hashim, A., Penty, R.V. and White, I.H. "Polymer waveguide integrated circuits," OptoElectronics and Communications Conference, OECC, Sapporo, 2010,.
217. Elmirghani, J.M.H., "Green IP over WDM Networks with Data Centres," GreenTouch® members meeting packet versus circuit switched architectures session, Amsterdam, November 2010.
218. White, I.H., Ingham, J.D. and Penty, R.V., "Systems aspects of optical technologies for use in data communications", Conference on Optical Fiber Communication, OFC, Los Angeles, 2011.
219. Penty, R.V., Bamiedakis, N., Hashim, A., Hao, Y. and White, I.H. "Multimode polymer optical interconnects for backplane and chip-to-chip applications," International Photonics and OptoElectronics Meetings, Wuhan, 2011.

220. Elmirghani, J.M.H., "Intelligent Energy Aware Networks," Bell Labs, Alcatel-Lucent, Murray Hill, New Jersey, 2 June 2011.
221. Elmirghani, J.M.H., "Data Centres, Renewable Energy and Green Communication Networks" International Conference on Sustainable Data Centre Design and Operation, June 2011, Leeds.
222. Dong, X., El-Gorashi, T.E.H. and Elmirghani, J.M.H., "Energy-efficient IP over WDM networks with data centres," *Proc IEEE 13th International Conference on Transparent Optical Networks (ICTON)* 2011, 26-30 June, 2011, Stockholm, Sweden.
223. Elmirghani, J.M.H., "Towards a Carbon-Free Internet," University of Bristol, July 2011.
224. Elmirghani, J.M.H., "Green ICT: Beyond sleeping memories", keynote address at the 2011 conference of the European Coordinated Research on Long term Challenges in Information and Communication Sciences & Technologies (ERA-Net), (CHIST-ERA) sponsored by EPSRC and the national research councils in , France, Italy, Spain, Germany, Ireland, Austria, Poland, Switzerland and Belgium, Cork 5-6 September 2011.
225. Elmirghani, J.M.H., "Creating the Green Internet," EPSRC Network in Communications and Networking, University of Oxford Balliol College September 2011.
226. Elmirghani, J.M.H., "Renewable Energy in Core and Data Centre Networks," GreenTouch® Open Forum, 17 Nov. 2011, Seattle, USA.
227. Elmirghani, J.M.H., "Content Caching for Back Haul Energy-Efficiency," OFC'12 Workshop "LTE: Driving Changes in Mobile Backhaul Networking," OFC'12, Los Angeles, 4 March 2012.
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229. Elmirghani, J.M.H., "Energy efficient VoD, IPTV and Peer-to-Peer Communication Networks," GreenTouch® Green IT and Telecom workshop, Bangalore, 5 April 2012.
230. Crowcroft, J., "Cutting the energy cost of TV content distribution by 5, by understanding the popularity of the top ten programs," e-Energy 2012, Madrid, 9-11 May 2012.
231. Elmirghani, J.M.H., "Energy Efficient Core Networks," Communications, Networking and Photonics Summer School organized by the EPSRC Network in Communications and Networking, Edinburgh, 19 June 2012.
232. Elmirghani, J.M.H. "Dynamic Resource Management in Core Networks," EU Sustainable Energy Week' GreenTouch® Workshop on 'ICT Sustainable Networks for Sustainable Life- styles', Brussels, 20 June 2012.
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238. Elmirghani, J.M.H., "INTERNET Project: Achievements and lessons learnt," EPSRC Workshop on Vision for Future Wireless Research, organized by the EPSRC Network in Communications and Networking, Royal Academy of Engineering, 19 October 2012, London.
239. Ingham, J.D., Qureshi, Z., Crisp, M.J., Penty, R.V., White, I.H., Westbergh, P., Gustavsson, J., Haglund, A., Larsson, A., Lott J.A. and Ledentsov, N.N. "Novel modulation approaches for directly

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 241. Elmirghani, J.M.H., “GreenTouch vision, Targets and Research Activities,” Keynote talk at Celtic-Plus Event 2013, Kayseri, Turkey, 6 March 2013.
 242. Elmirghani, J.M.H., “SwiTching And tRansmission (STAR),” CHIST-ERA Projects Seminar 2013, Brussels, 27 March 2013.
 243. Elmirghani, J.M.H. “Distributed Energy Efficient Resources,” IEEE INFOCOM 2013, TERND/GreenTouch® workshop on Green Communications, Torino, 19 April 2013.
 244. Elmirghani, J.M.H., “Green ICT: What would be the cost of doing nothing?”, EU Future Internet Assembly, 9 May 2013, Dublin.
 245. El-Gorashi, T.E.H., Dong, X., and Elmirghani, J.M.H., “Core network physical topology design for energy efficiency and resilience,” *Proc IEEE 15th International Conference on Transparent Optical Networks (ICTON’13)*, 23-27 June, 2013, Spain.
 246. Elmirghani, J.M.H., “Green Operator Networks: Topology, Routing and Data Centres”, IEEE 24th Tyrrhenian International Workshop on Digital Communications (TIWDC 2013), Genoa, Italy, 23-25 Sept. 2013.
 247. Elmirghani, J.M.H., “Energy Efficient Cloud Content Delivery in Core Networks Employing Renewable Energy”, IEEE 24th Tyrrhenian International Workshop on Digital Communications (TIWDC 2013), Genoa, Italy, 23-25 Sept. 2013.
 248. Elmirghani, J.M.H., “Overview of the INTelligent Energy aware NETworks (INTERNET) project,” UK Photonics research showcase at European Conference on Optical Communications (ECOC), London, 25 September 2013.
 249. Elmirghani, J.M.H., “GreenTouch Green Meter and Core Network Modelling,” at EC E1 Future Internet Cluster Meeting: Green and Energy-efficient Networking Workshop, Brussels, 21-24 Oct. 2013.
 250. Bamiedakis, N., Hashim, A., Penty, R.V. and White, I.H. “A Polymer Waveguide-Based 40 Gb/s Optical Bus Backplane for Board-Level Optical Interconnects,” paper WeA2.3, ICTON 2013.
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 253. Elmirghani, J.M.H., “Intelligent Energy Aware Networks - a Content Perspective,” Joint Academic Network (JANET) Networkshop, 1-3 April 2014, Leeds, UK.
 254. Elmirghani, J.M.H., “Energy Efficient Content Distribution Optical Networks,” Keynote talk at IEE19th European Conference on Network and Optical Communications, NOC 2014, 4-6 June 2014, Milano, Italy.
 255. White, I. H., Cheng, Q., Wonfor, A., and Penty, R. V., “Large Port Count Optical Switch Using Hybrid MZI-SOA Approach,” *International Conference on Transparent Optical Networks (ICTON)*, Graz, 2014.
 256. Ingham, J. D., Wei, J.L, Penty, R. V. and White, I. H., “Hybrid Modulation Approaches for Advanced Datacommunications,” *International Conference on Transparent Optical Networks (ICTON)*, 2014.
 257. Nonde, L., El-Gorashi, T.E.H. and Elmirghani,, “Green virtual network embedding in optical OFDM cloud networks,” *International Conference on Transparent Optical Networks*, Graz, Austria, July 6-10, 2014.
 258. Elmirghani, J.M.H., “Distributed Energy Efficient Clouds over Core Optical Networks,” OSA Photonics in Switching 13 - 17 July 2014, San Diego, USA.
 259. Wei, J. L., Cunningham, D. G., Cheng, Q., Penty, R. V. and White, I. H., “Complexity and power dissipation analysis of DSP-based advanced optical modulation formats,” *OSA Signal Processing in*

Photonics Communications (SPCom) meeting, Optics & Photonics Congress on Advanced Photonics for Communications, San Diego, July 2014.

260. Elmirghani, J.M.H., "Green Network and Data Centre Virtualization," GreenTouch workshop on Software-Defined Networks and Virtualization: Are the Energy Efficiency Benefits Obvious? During the Nantes Digital Week Nantes, France, 18 September 2014.
261. Elmirghani JM; Klein T; Hinton K; El-Gorashi TEH; Lawey AQ; Dong X "GreenTouch GreenMeter core network power consumption models and results," IEEE Online Conference on Green Communications, OnlineGreenComm, Oct 2014.
262. Elmirghani, J.M.H., "Greening Core, Data Centre and Content Distribution Networks," IEEE Distinguished Lecturer Tour, 11 November 2014 in Wellington, 13 November 2014 in Auckland and 14 November 2014 in Dunedin, New Zealand.
263. Penty, R. V., Bamiedakis, N., Hashim, A. E. and White, I. H., "Low Loss Bends for On-Board Polymer Interconnects," *1st Symposium on Optical Interconnect in Data Centers*, Berlin, 2014.
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265. Elmirghani, J.M.H., and Hinton, K., "Can we ensure the long term sustainability of the Internet?," Panel at IEEE ICC 2015, (1.5 hours), Speakers: Oliver Blume, Bell Laboratories Alcatel-Lucent, (Vendor, Wireless), Nagaraj Prasanth Anthapadmanabhan, Alcatel-Lucent, (Vendor, Access and Core Networks), Louise Krug, British Telecom, (Telecom Operator), Chris Chambers, BBC, (Content and Service Provider), at IEEE International Conference on Communications (ICC'15), London, 8-12 June 2015.
266. Elmirghani, J.M.H., "Green Content Distribution Networks," GreenTouch showcase, New York, 17-22 June 2015.
267. Elmirghani, J.M.H., "GreenTouch Core Network Energy Efficiency Improvement Measures," European Conference on Networks and Communications (EuCNC 2015), workshop on "State of the Art Research Results in Green and Energy Efficient Communications for the Exa-Scale Telecommunication Network of Tomorrow", Paris, June 29th – July 2nd, 2015.
268. Al-Quzweeni, A.; El-Gorashi, T.E.H.; Nonde, L.; Elmirghani, J.M.H., "Energy efficient network function virtualization in 5G networks," in *Transparent Optical Networks (ICTON)*, 2015 17th International Conference on , vol., no., pp.1-4, 5-9 July 2015.
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272. Elmirghani, J.M.H., "Sustainability: Greening ICT and by ICT," 15th IEEE International Conference on Ubiquitous Wireless Broadband (ICUWB 2015), Panel on Sustainability through Ubiquitous Wireless Broadband, 7 October 2015, Montreal, Canada.
273. Elmirghani, J.M.H., "IEEE Green ICT Initiative," IEEE 2015 Green Comm, Green ICT Open Forum, 11 November 2015.
274. Elmirghani, J.M.H., "Greening ICT and Vehicular Communications," IEEE International Symposium on Technology and Society (ISTAS 2015), Closing Plenary: Future Internet and Smart Cities, 12 November 2015, Dublin, Ireland.
275. Ali, H.M.M., Lawey, A.Q., El-Gorashi, T.E.H. and Elmirghani, J.M.H. "Disaggregated Data Centres," IEEE/OSA Asia Communication and Photonics Conference (ACP) 2015, Hong Kong, Nov. 19-23, 2015.

Book Chapters (4)

276. Audzevich, Y., Moore, A., Rice, A., Sohan, R., Timotheou, S., Crowcroft, J., Akoush, S., Hopper, A., Wonfor, A., Wang, H., Penty, R., White, I., Dong, X., El-Gorashi, T. and Elmirghani, J., "Intelligent energy aware networks," book chapter, published in *Handbook of Energy-Aware and Green Computing*, Taylor and Francis, 2011, (*invited*).
277. El-Gorashi, T., Lawey, A., Dong, X., and Elmirghani, J.M.H., "Energy Efficient Content Distribution," in *Communication Infrastructures for Cloud Computing: Design and Applications*, IGI Global, 2012, (*invited*).
278. Bamiedakis, N., Williams, K.A., Penty, R.V. & White, I.H., "Integrated and hybrid photonics for high performance interconnects (InP and Hybrid)," In I. Kaminov (Ed.), *Optical fiber telecommunications V1B: systems and networks* Elsevier Science, 2013.
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Contributions to standards (4)

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284. Klein, T., Buty, G., Ulrich, B., Vetter, P., Elmirghani, J.M.H., Penty, R.V., and Hinton K., "GreenTouch Green Meter Research Study: Reducing the Net Energy Consumption in Communications Networks by up to 90% by 2020," A GreenTouch White Paper, Version 1.0, June 26, 2013.
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Tutorials (14)

286. Zilberman, N., Audzevich, Y., Kalogeridou, G., Manihatty-Bojan, N., Antichi, G. Antichi, G. Antichi, G. Antichi, G., and Moore, A. NetFPGA Spring Camp, University of Technology, Poznan, PL, 20-24 March, 2013.
287. Elmirghani, J.M.H., "Greening the Internet," Short course at IEEE International Conference on Communications (ICC'13), Budapest, 9-13 June.
288. Adam Covington, Antichi, G. Antichi, G. Antichi, G. Antichi, G., and Moore, A. NetFPGA Summer Camp, Computer Science Department, Stanford University, CA, US, 29 July-2 August, 2013
289. Zilberman, N., Audzevich, Y., Kalogeridou, G., Manihatty-Bojan, N., Antichi, G. Antichi, G. Antichi, G. Antichi, G., and Moore, A. NetFPGA Summer Camp, Computer Lab, University of Cambridge, UK, 2-6 September, 2013.
290. Elmirghani, J.M.H., invited tutorial, "Energy Efficient Core and Content Distribution Networks," IEEE 21st International Conference on Software, Telecommunications and Computer Networks (SoftCOM'2013), split, Croatia, 18-20 Sept, 2013.

291. Elmirghani, J.M.H., "Greening Core, Data Centre and Content Distribution Networks," Tutorial at IEEE ICC 2014 (3.5 hours), (Short course) at IEEE International Conference on Communications (ICC'14), Sydney, 10-14 June 2014.
292. Zilberman, N., Audzevich, Y., Kalogeridou, G. and Andrew W. Moore, "Toward Commodity 100Gb/s", Design, extended abstract and demonstration, Automation and Test in Europe (DATE), Grenoble, France, March 2015.
293. Han, J. H., Antichi, G. Open Source Networking, IEEE Netsoft, London, UK, 13 April, 2015.
294. Elmirghani, J.M.H., "Greening Cloud Networks," Tutorial at IEEE ICC 2015 (3.5 hours), (Short course) at IEEE International Conference on Communications (ICC'15), London, 8-12 June 2015.
295. Anitichi, G., Zilberman, N., Audzevich, Y., Kalogeridou, G., Manihatty-Bojan, N., Zhang, J., and Andrew Moore. "Open Hardware Networking", ACM SIGCOMM, London, UK, 17 August, 2015.
296. Zilberman, N., Audzevich, Y., NetFPGA graduate summer course, Technion, Israel, August 2015.
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299. Han, J. H., Antichi, G., Zilberman, N., Charalampos Rotsos and Moore, A., "An Integrated Environment for Open-Source Network Softwarization", demonstration short paper, IEEE conference on Network Softwarization (NetSoft), London, UK, 2015.

Demonstrations (10)

300. Antichi G., Bruyere M., Campora Perez D.H., Liu G., Neufeld N., Giordano S., Owezarski P., Moore A.W., Time Structure Analysis of the LHCb Online Network, CHEP, Amsterdam, NL, 14-18 October, 2013.
301. Shahbaz M., Antichi G., Geng Y., Zilberman N., Covington A., Bruyere M., Feamster N., McKeown N., Felderman B., Blott M., Moore A.W., Owezarski P.,Architecture for an Open Source Network Tester, ACM/IEEE ANCS, San Josè, CA, USA, 21-22 October, 2013.
302. Noa Zilberman, Yury Audzevich, Georgina Kalogeridou, Neelakandan Manihatty-Bojan, Jingyun Zhang, and Andrew Moore. 2015. NetFPGA: Rapid Prototyping of Networking Devices in Open Source. In Proceedings of the 2015 ACM Conference on Special Interest Group on Data Communication (SIGCOMM '15). ACM, New York, NY, USA, 363-364.
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305. Gianni Antichi, Yury Audzevich, Noa Zilberman, Andrew W. Moore, "Performance Evaluation Beyond 10Gbps", ACM SIGCOMM, London, UK, 17 August, 2015.
306. Manihatty-Bojan N., Zilberman N., Antichi G., Moore A.W., Extreme data-rate scheduling for the Data CenterACM SIGCOMM, London, UK, 17-21 August, 2015.
307. Rotsos C., Antichi G., Bruyere M., Owezarski P., Moore A.W., "An Open Testing Framework for Next-Generation OpenFlow Switches", EWSDN, Budapest, HU, 1-3 September, 2014.
308. Noa Zilberman, Yury Audzevich, Georgina Kalogeridou and Andrew W. Moore, "NetFPGA - Rapid Prototyping of High Bandwidth Devices in Open Source", demonstration short paper, FPL, London, UK, September 2015.
309. Jong Hun Han, Gianni Antichi, Noa Zilberman, Charalampos Rotsos and Andrew W. Moore – "An Integrated Environment for Open-Source Network Softwarization", demonstration short paper, IEEE conference on Network Softwarization (NetSoft), London, UK, 2015.

Workshops Organized (6)

310. Elmirghani, J., "Selected Areas in Communications, Green Communication Systems and Networks (GCSN) track," Houston, 5-9 Dec, 2011 (First ICC/GLOBECOM Green track/Symposium).
311. Elmirghani, J., "ACM e-Energy 2011- 2nd International Conference on Energy-Efficient Computing and Networking 2011," NewYork, May 31 - June 1, 2011.
312. Elmirghani, J., "Selected Areas in Communications, Green Communications and Computing Track," IEEE International Conference on Communications (ICC'14), Sydney, 10-14 June 2014.
313. Crowcroft, J. and Penty, R.V., ACM e-Energy 2014, the 5th International Conference on Future Energy Systems - University of Cambridge 11-13 June 2014.
314. Penty, R.V., European Conference on Optical Communications (ECOC) 2014: Technologies for Short Reach Optical Interconnects.
315. Elmirghani, J. "Selected Areas in Communications, Green Communications Systems and Networks Track," IEEE International Conference on Communications (ICC'15), London, 8-12 June 2015.