

## **CTO: Collaborative Technological Objectives (patents pending, new apparatus or prototypes realised, new software developed)**

### **Patents:**

- D. Ott, S.N.S. Reihani, L.B. Oddershede. "A detection system for an optical manipulation system for manipulating micro-particles or nano-particles of a sample by means of at least two optical traps." PATENT PA 2014 70097 (2014)
- E. Mihaylova, D. Cody, I. Naydenova, S. Martin, V. Toal, "Diacetone-acrylamide based pressure sensitive photopolymer", PCT/EP2015/064619 (2015).
- G. Cipparrone, A. Mazzulla, P. Pagliusi, C. Provenzano "Method of measuring chiro-optical properties in real time based on a polarization network". Università della Calabria PATENT IT1403559-B (2014).
- Bartosz Ziółkowski, Larisa Florea and Dermot Diamond "More Robust and Reversible Photoresponsive Hydrogels" British Patent Application No. GB1313220.4 Of DUBLIN CITY UNIVERSITY, DCU Ref.: 2013/13-PFGB, HMC Ref.: D07-396-66GB, filed July 24th, 2013 .
- M. H. Delville, J. P. Delville, L. Vauriot, "Particules de TiO<sub>2</sub> dissymétriques (particules de Janus) et leur procédé de synthèse par photodéposition", patent FR N° 126237; published June 20 (2014). PCT pending
- R. Buczynski, T. Stefaniuk, J. Pniewski, D. Pysz, G. Stepniewski, R. Stepień, patent application P- 411696, A photonic crystal fibre for transferring radially polarised light beam and a method of manufacturing such a fibre, filed 25.03.2015 (national phase Poland), 07.08.2015 (EPO). ITME submitted patent , national Poland and EPO procedure.

### **Demonstrators, prototypes, software:**

- New methods for fabrication of mass-producible holographic optical elements are being developed in collaboration with industry.(Toal, IE).
- Development of axicon fiber based microprobe for optofluidics, an early stage demonstrator is ready (Bucinsky, PL).
- New FDTD simulation software for calculation of trapping forces in optical fibre tweezers.(Marques, PT)
- Prototype of Optofluidic chip set-up for simultaneous determination of refractive index and absorption/fluorescence (Marques, PT)
- GPU accelerated toolbox for real-time beam-shaping in multimode fibres – software available from <http://complexphotonics.dundee.ac.uk> (Cizmar, UK)
- Novel patented technology for construction of large single-photon avalanche diode (SPAD) detector arrays in a cost-effective CMOS technology, with low dark count and low after pulsing probability, allowing to time-tag photons with a temporal resolution of 80 picoseconds in 2048 pixels.
- Application for simultaneous combined fluorescence lifetime imaging microscopy (FLIM) and fluorescence correlations spectroscopy (FCS). Collaboration between Sicoya, Politecnico di Milano, TU Berlin, institute of Bioenergetics (Cost participant Dr. Franz-Josef Schmitt, Prof. Thomas Friedrich), TU Berlin, institute of optics and atomic physics (Cost participant Prof. Hans Joachim Eichler) and institute of clinical neuroscience, Karolinska institute (Cost participant, Dr. Vladana Vukojevic) ;

- ITME build a demonstrator of a fiber probes with integrated nanostructured gradient index components for particle trapping. Demonstrator is given for test to COST members VUB, ITQB-UNL, Institute of Applied Physics, University of Munster;
- JSC “Holtida” was established in 2014 as a spin-off company, specialized in development of advanced optical security means. Prototype holographic security labels containing plasmonic properties, fluorescent security labels, nano texts were fabricated. (Ferraro, IT)
- Mass-manufacturable polymer microfluidic device for dual fiber optical trapping”D. De Coster, H. Ottevaere, M. Vervaeke, J. Van Erps, M. Callewaert, P. Wuytens, S.H. Simpson, S. Hanna, W. De Malsche, H. Thienpont, (2015)
- “Step-by-step guide to the realization of advanced optical tweezers”Pesce, G., Volpe, G., Maragó, O. M., Jones, P. H., Gigan, S., Sasso, A., Volpe, G.(2015)
- “T-junction droplet generator realised in lithium niobate crystals by laser ablation” G. Pozza, S. Kroesen, G. Bettella, A. Zaltron, M. Esseling, G. Mistura, P. Sartori, E. Chiarello, M. Pierno, C. Denz, C. Sada, (2015).
- "Set-up for characterization of SOI nanophotonic biosensors" (LT, MC and WG members) R. Petruskevicius, M. Gabalis, K. Vaskevicius , D. Urbonas, A.Balcytis (2016)
- "Phase-sensitive sum frequency generation spectrometer"(LT, MC and WG members) R. Petruskevicius, M. Gabalis, K. Vaskevicius , D. Urbonas, A.Balcytis (2016)