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# Photonics for Life Sciences at the University of Dundee

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Royal Society of Edinburgh, 17 February 2009



# Photonics meets Life Sciences @ Dundee

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- Physics / Photonics plays an important role in advancing biomedical tools.
- Strengths of the University of Dundee.
- Interdisciplinary collaboration is encouraged at the interface of Physics – Life Sciences.
- Creation of IMSAT.
- European Project FAST-DOT.



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# **FAST-DOT:** Compact Ultra**FAST** Laser Sources based on Novel Quantum-**DOT** Structures

**Integrated Project, FP7 European Programme, ICT**

**Coordinator:** Dr Edik Rafailov, University of Dundee

**Duration:** June 2008 – 2012

**Project Cost:** 13.7 Million Euros      **Project Funding:** 10.1 Million Euros

## Academic Partners



## Industrial Partners

- University of Dundee
- University of Sheffield
- ETH Zurich
- Tampere University of Technology
- KTH - Royal Institute of Technology, Stockholm
- ICFO - Institut de Ciències Fotòniques, FUND. PRIV.
- FORTH - The Foundation for Research and Technology Hellas
- Vilnius University
- Politecnico di Torino
- University of Athens
- Technical University of Darmstadt

- Philips
- Alcatel Thales III-V Lab
- Innolume GmbH (SME)
- M Squared Lasers Limited (SME)
- TOPTICA Photonics AG (SME)
- Time-Bandwidth Products AG (SME)
- Molecular Machines and Industries GmbH (SME)



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# Targets of FAST-DOT

- Enable widespread bio-photonic applications
  - Nanosurgery
  - Nonlinear microscopy
  - Optical Coherent Tomography
  - Endoscopy
- By development of
  - Compact Ultrashort pulsed lasers
  - High efficiency and low cost lasers
- Based on unique properties of novel nanostructures - Quantum Dots

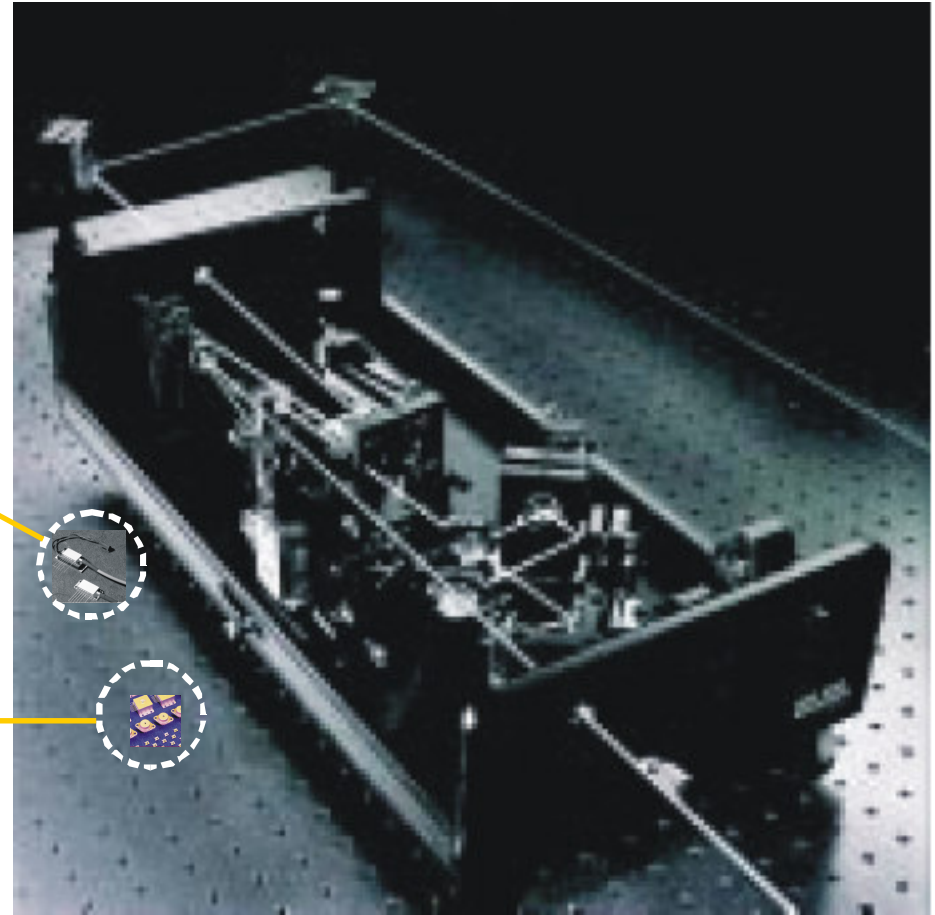
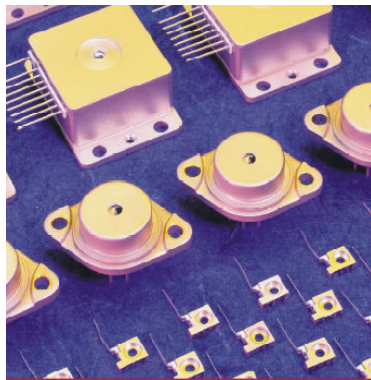
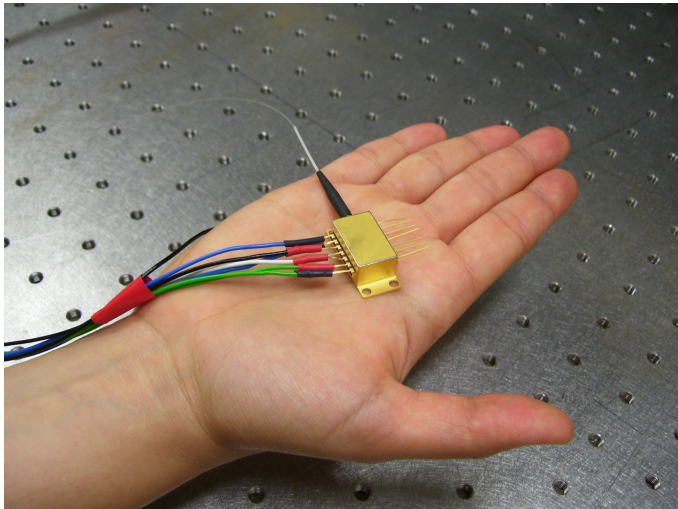


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***“Diode lasers are very efficient and reliable, and will lead to a silent revolution in medical applications.”***

*Peng et al, Lasers in Medicine, Rep. Prog. Phys. 71 (2008) 056701*



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# Impact of this research

- Leading position of UK/Europe in this area
- Impact to Life Sciences and Medical research
- Societal impact:
  - Better healthcare
  - Non-invasive diagnostics/therapies become available
  - Quality of life of patients
- Economic impact:
  - Transfer of knowledge to industry
  - Business opportunities in a blooming market



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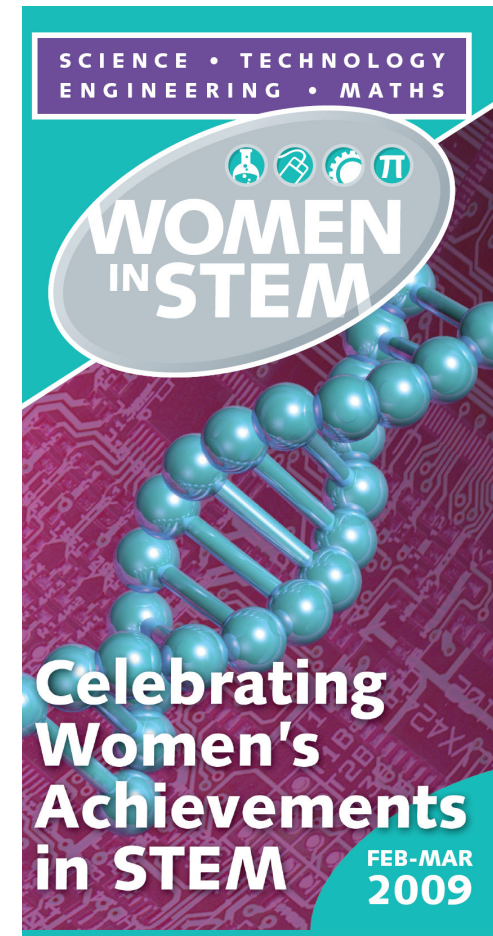
# Public outreach opportunities @ Dundee

- Communicate the excitement of research
- Educate – and not only kids...
- Raise awareness of the wider impact of research



## ***Revealing Research*** at the University of Dundee:

- Outreach events at the Sensation Science Centre, all year
- Women in STEM – specific events
- Café Science runs twice a month



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