

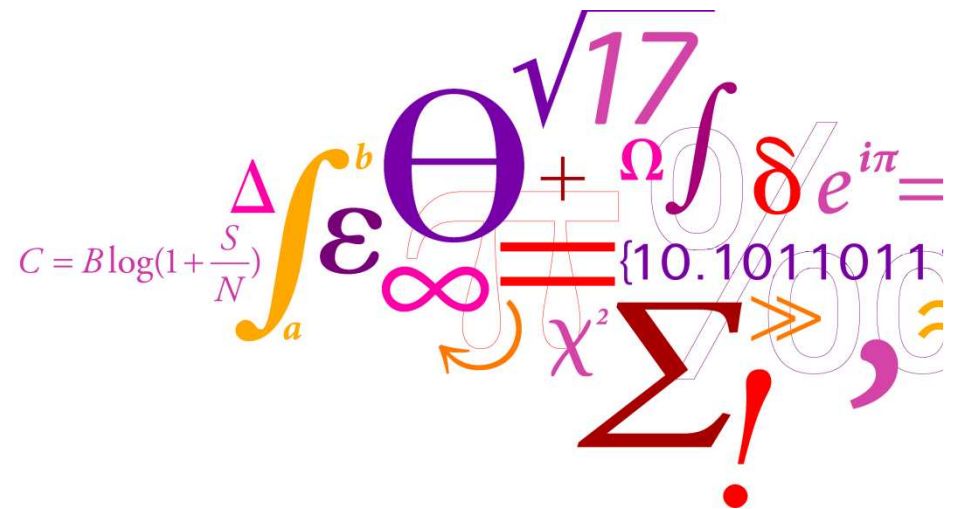
Research and Business Profile of the Photonics Sector in Copenhagen



A brief overview

Christian Pedersen

Innovation manager, DTU Fotonik



DTU Fotonik
Department of Photonics Engineering

DTU Fotonik

Department of Photonics Engineering

- Merger between COM•DTU and part of the optics department from Risø National Lab, OPL in 2008
- Today ~200 employees
- Organized in 17 research groups, which are combined in 4 clusters:
 - Light Sources and Industrial Sensors
 - Dynamic Photonics
 - Communication Technology
 - Nanophotonics



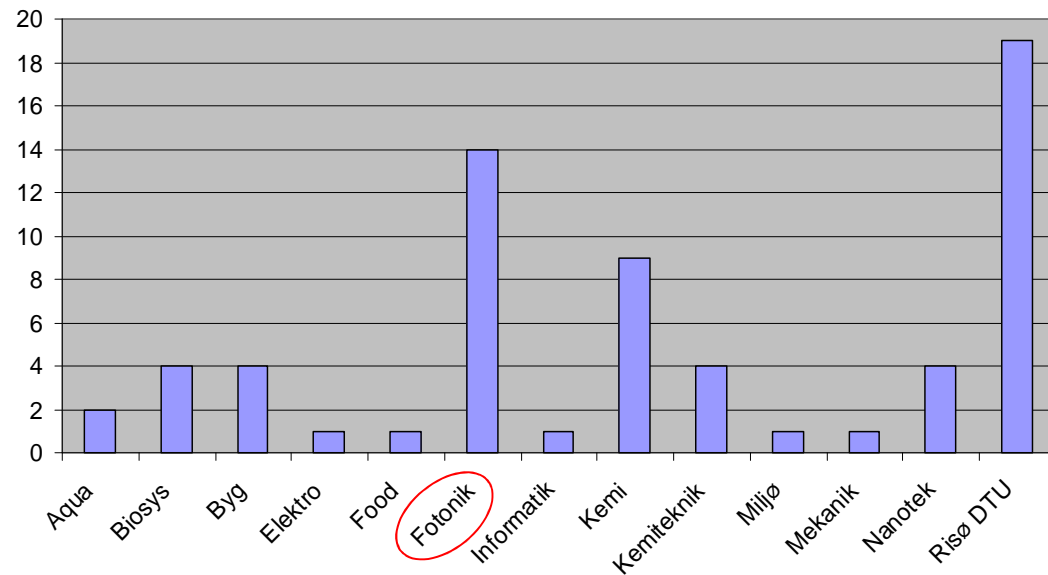
Educational activities

- Two bachelor lines:
 - IT and Communication Technology
 - ~40 students started in 2009 (shared with another department)
 - Physics and Nanotechnology
 - ~60 students started in 2009 (shared between 3 departments)
- An international Master in Telecommunication
 - ~30 students started in 2009
- Ph.D.-School
 - 27 students started in 2009

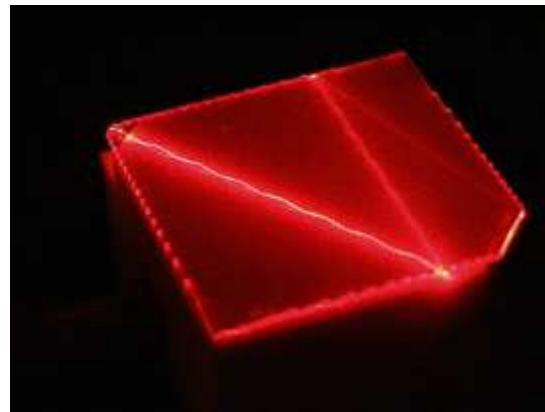
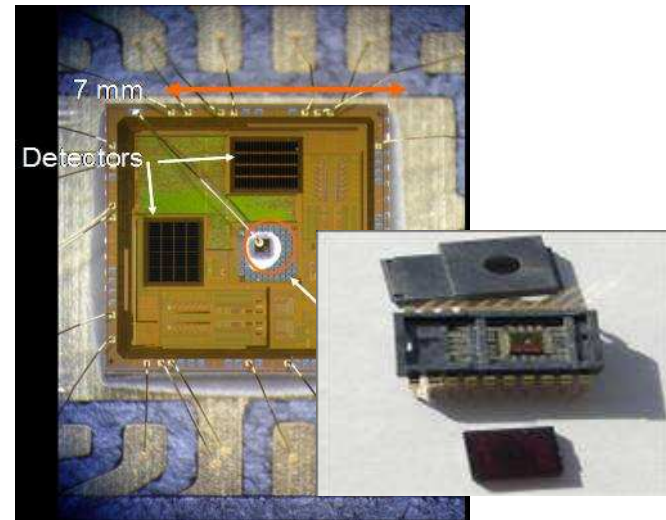
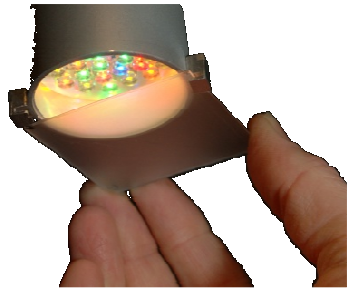
Innovation activities

- Start-up companies
 - Crystal Fibre A/S
 - Cisilias A/S
 - MMP A/S
 - Alight Technologies A/S
 - OCT Innovation ApS
 - CommWyse A/S
 - SEMuS A/S
 - Windar Photonics
 - (Radiocomp, XENA)

No. of patent notifications of inventions at DTU



Light Sources and Industrial Sensors (35 people)



Light Sources & Industrial Sensors Cluster,

coordinator: **Paul Michael Petersen**

Diode Lasers & LED Systems

group leader: Paul Michael Petersen

Optical Microsensors & Micromaterials

group leader: Jørgen Schou

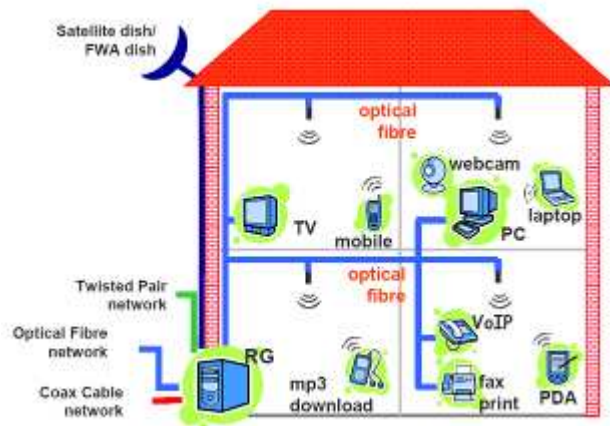
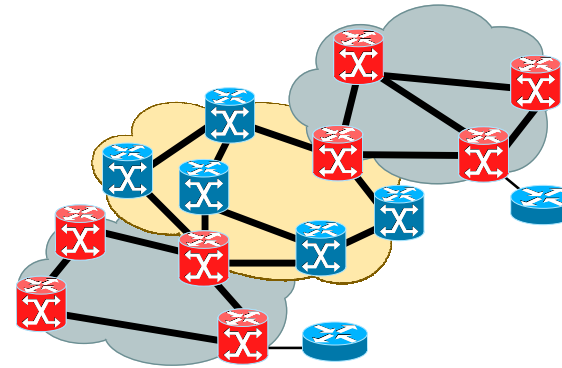
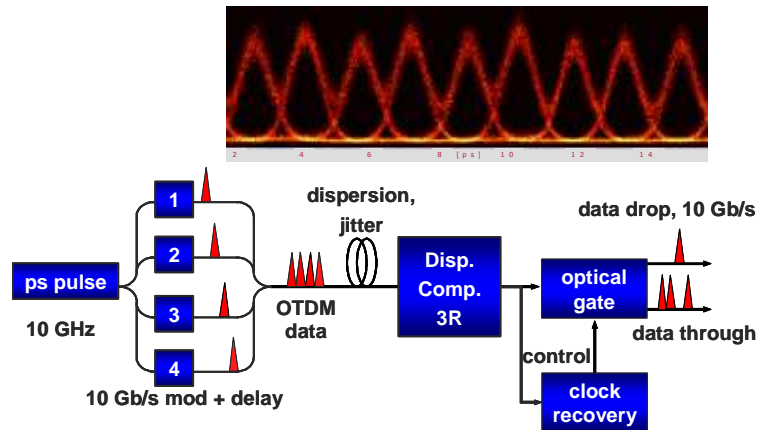
Optical Sensor Technology

group leader: Christian Pedersen

Light energy and harvesting

group leader: Beata Kardynal

Communication Technology (55 people)



Communication Technology Cluster,
coordinator: [Lars Dittmann](#)

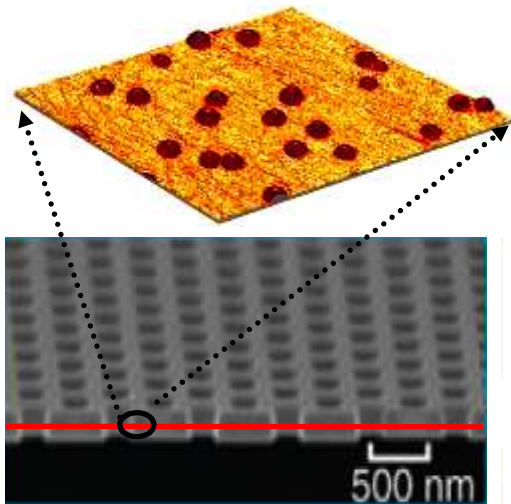
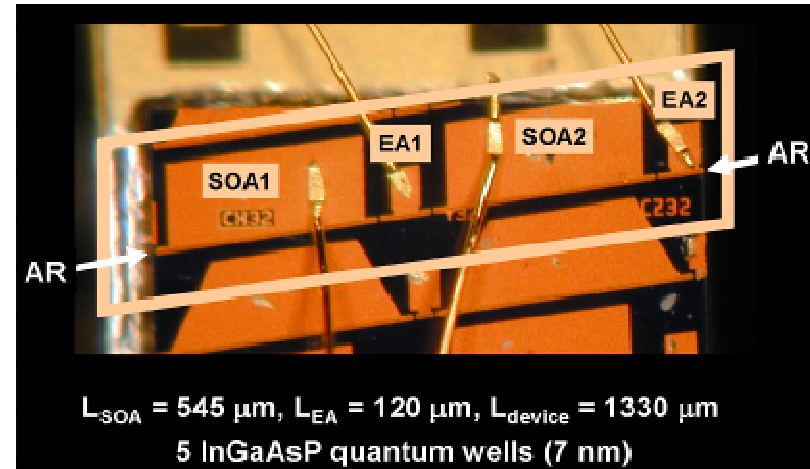
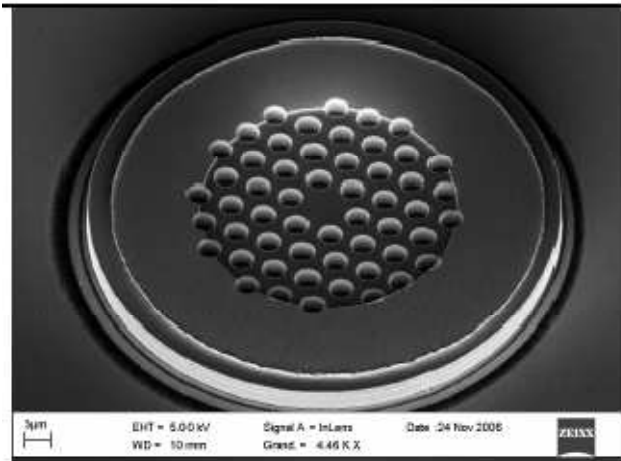
[Coding & Visual Communication](#)
 group leader: Søren Forchhammer

[Metro-Access & Short Range Systems](#)
 group leader: Idelfonso Tafur Monroy

[Networks Technology & Service Platforms](#)
 group leader: Lars Dittmann

[High Speed Optical Communications](#)
 group leader: Leif Katsuo Oxenløwe

Nanophotonics (52 people)



Nanophotonics Cluster,
coordinator: [Jesper Mørk](#)

[Nanophotonic Devices](#)
group leader: Kresten Yvind

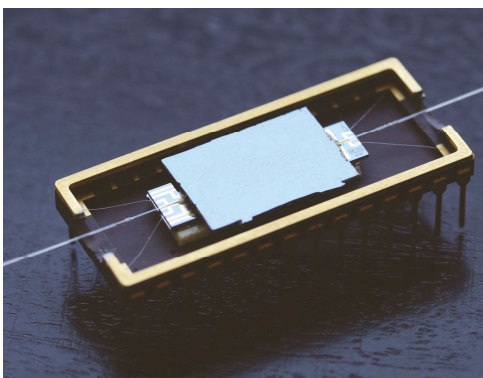
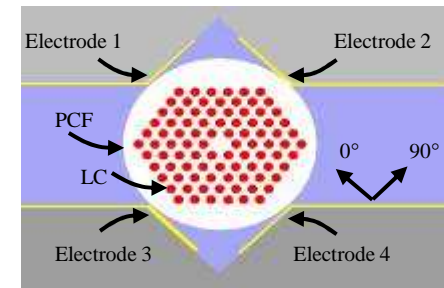
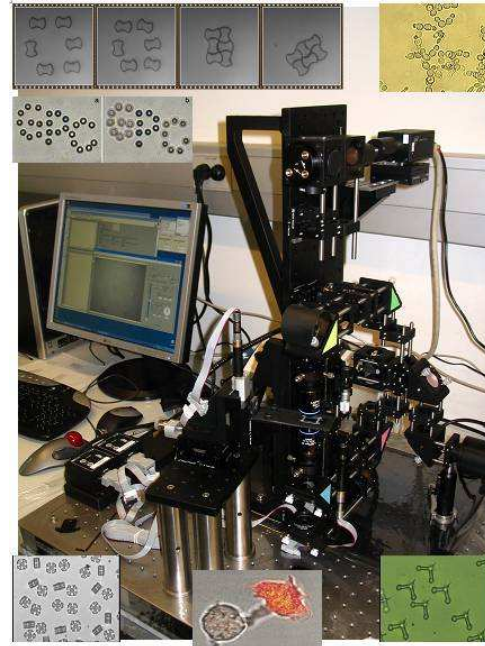
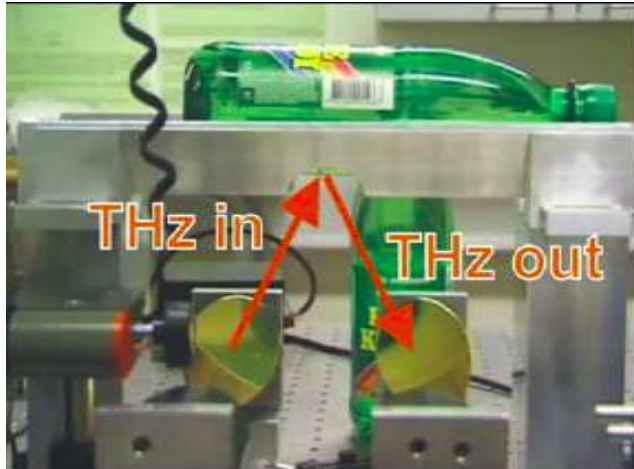
[Plasmonics & Metamaterials](#)
group leader: Andrei Lavrinenko

[Quantum Photonics](#)
group leader: Peter Lodahl

[Nanophotonics Theory & Signal Processing](#)
group leader: Jesper Mørk

[Structured Electromagnetic Materials](#)
group leader: N. Asger Mortensen

Dynamic Photonics (39 people)



Dynamic Photonics Cluster,

coordinator: [Peter Uhd Jepsen](#)

[Fiber Optics, Devices & Nonlinear Effects](#)

group leader: Karsten Rottwitt

[Fiber Sensors & Supercontinuum](#)

group leader: Ole Bang

[Terahertz Technologies and Biophotonics](#)

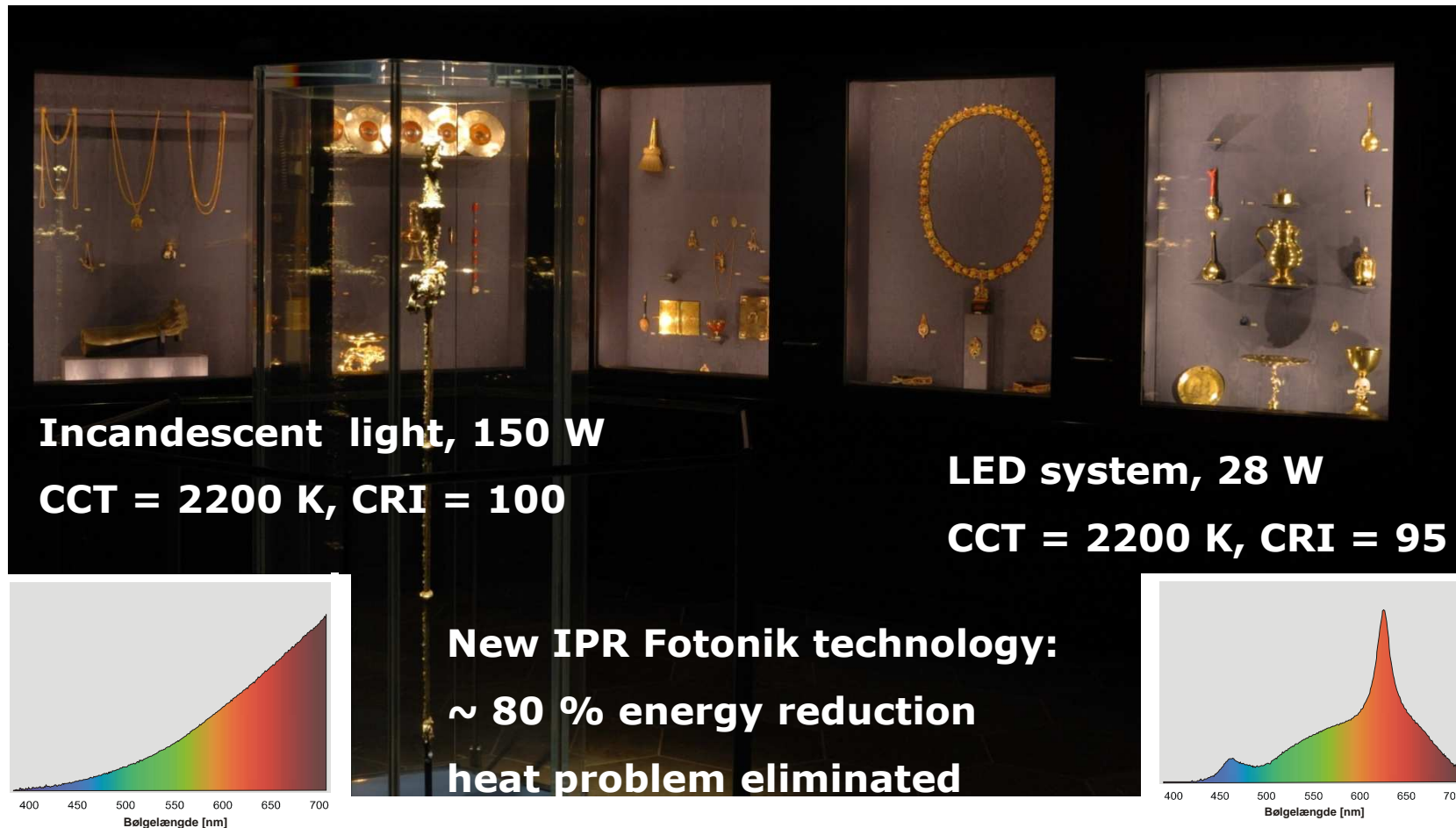
group leader: Peter Uhd Jepsen

[Nanoengineered Plasmonics](#)

group leader: Alexandra Boltasseva

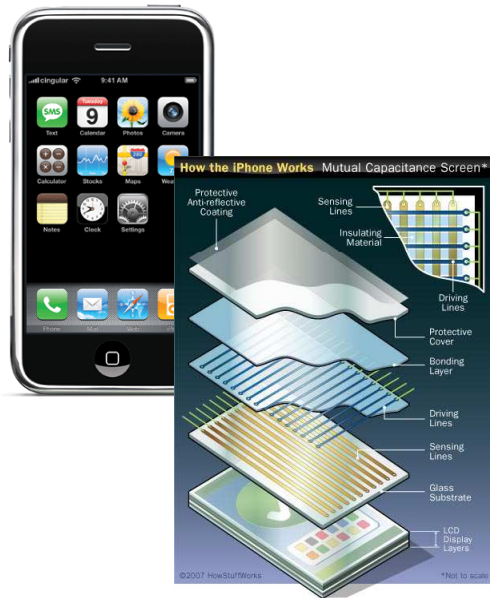
DTU Fotonik LED system for display cases

Illumination of gold objects at the royal treasury at Rosenborg



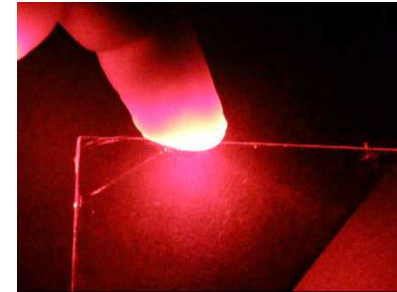
Waveguide Touch Technology

Today's touch devices are mostly based on a complex capacitive technology

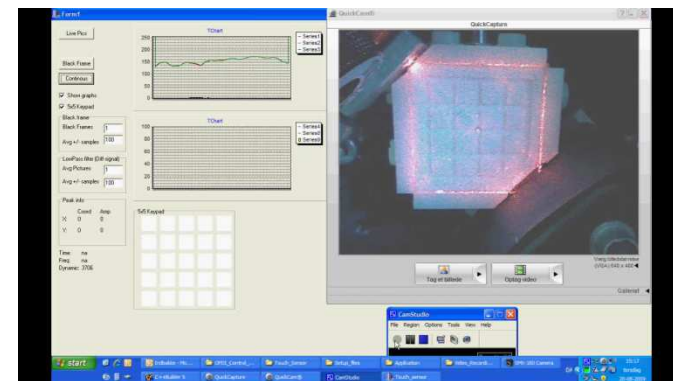


Capacitive touch

In a new technique based on optical waveguiding, light can be coupled out by touching an acrylic plate...



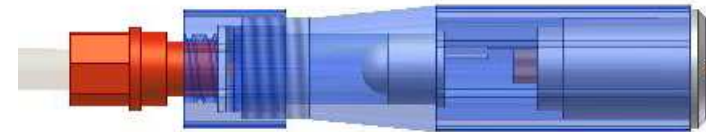
Final testing ...



Touch pad made in injection molded acrylic

UVC sterilisation of catheters

Catheter-related infections are common, costly and responsible for substantial morbidity and mortality, and impose a heavy burden on healthcare systems worldwide

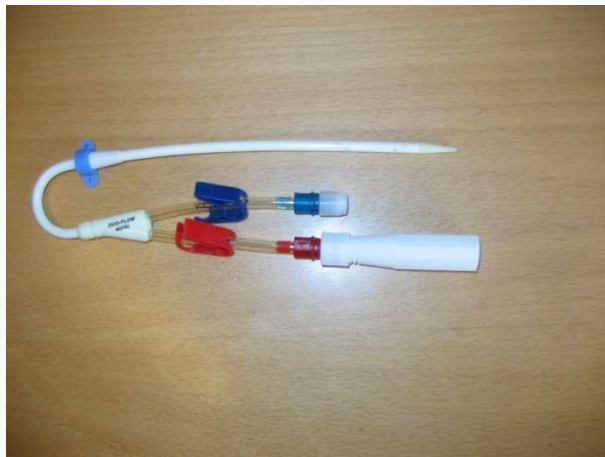


Patented UVC device

Dose requirements for UVC disinfection of catheter biofilms

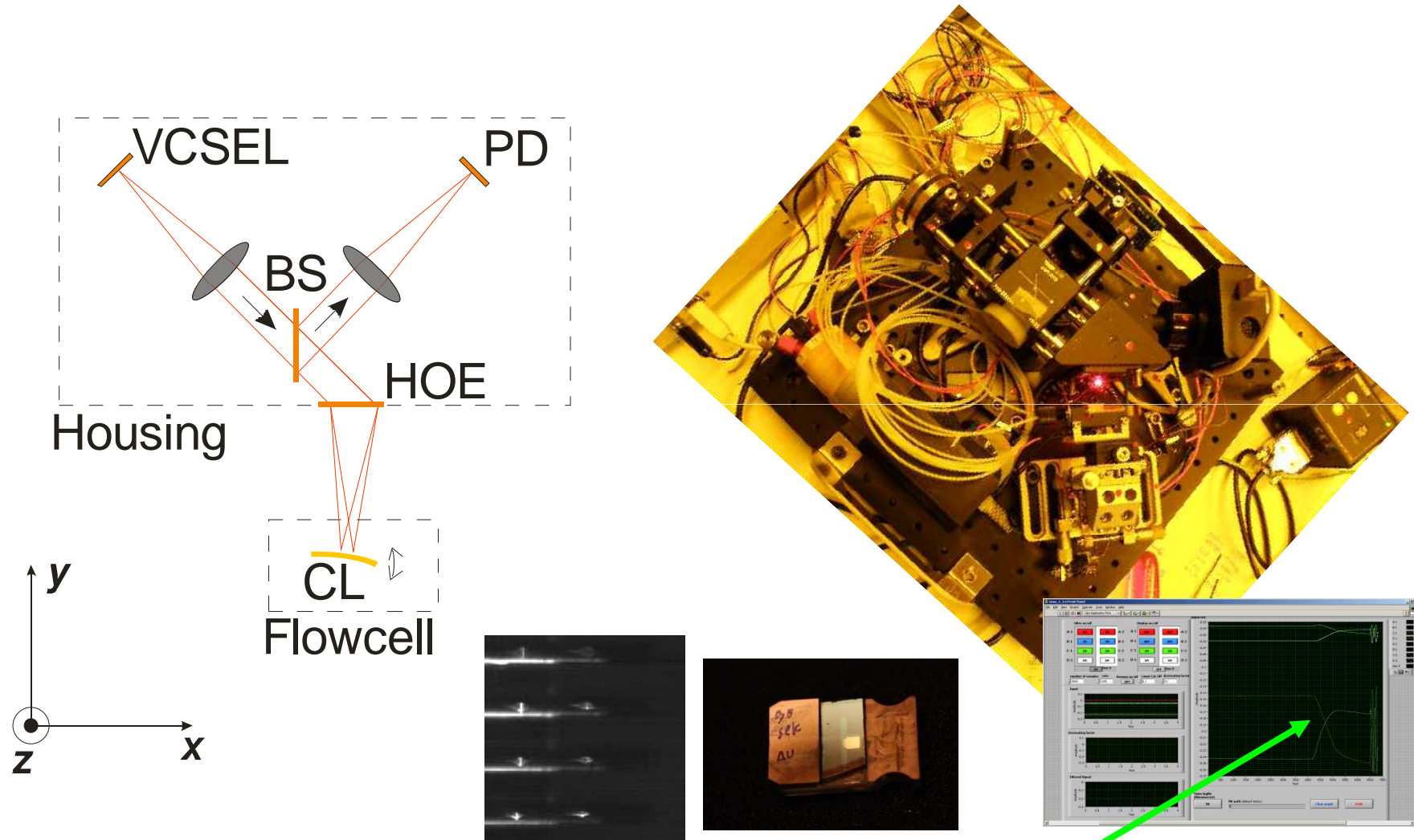
Jimmy Bak^{a*}, Søren D. Ladefoged^b, Michael Tvede^c, Tanja Begovic^d and Annette Gregersen^e

^aDTU Photonics, Technical University of Denmark, Roskilde, Denmark; ^bNephrological Clinic, Copenhagen University Hospital, Copenhagen, Denmark; ^cDepartment of Clinical Microbiology, Copenhagen University Hospital, Copenhagen, Denmark; ^dDTU Fotonik, Technical University of Denmark, Roskilde, Denmark; ^eDepartment of Clinical Microbiology, Copenhagen University Hospital, Copenhagen, Denmark



Prototype connected to CVC catheter

Holographic cantilever reader

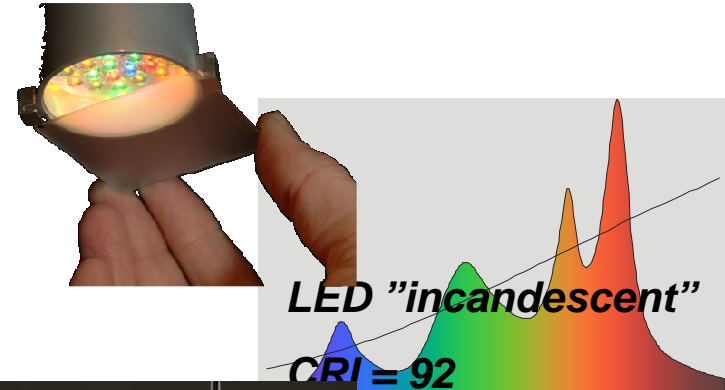


The system has subnanometer resolution

chemical reaction.

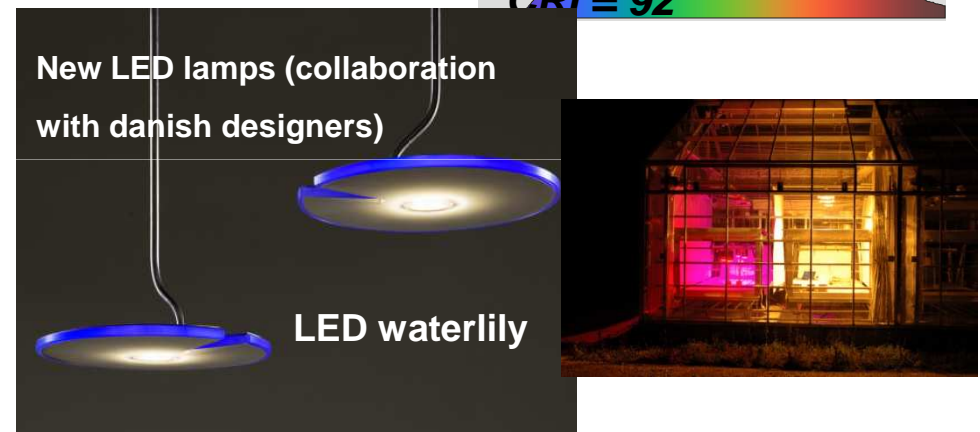
LED activities at DTU Fotonik

DTU Fotonik develops new LED sources. Our focus is light quality, color control, new LED sources, luminaire design, and high efficacy.



Projects:

Development of a new 5 W LED light source that can replace an 25 - 40 W incandescent bulb



Microoptics optics for LED systems

Photonic crystals in LEDs

Energy savings and photosynthesis in greenhouses

