Scientific report for the COST training school, joint with PolyNano summer school

COST Action MP 1205:

Advances in Optofluidics: Integration of Optical Control and Photonics with Microfluidics

Technical University of Denmark, Denmark

August 10th – 28th, 2015

COST is supported by the EU Framework Programme

ESF provides the COST Office through a European Commission contract

The training school of the COST Action MP1205, **Bringing lab-on-chip systems closer to the market,** was held successfully at Technical University of Denmark from the 10th to 28th of August 2015, with a total number of participating COST students of 10. Students received 5ECTS for their participation, and school duration was three weeks as fixed by the ECTS system requesting 25-30 hours of study per ECTS point. Students were evaluated on the basis of their active participation during in particular the experimental exercises and assessed on the basis of a written report, formulated as a journal paper describing the majority of the experimental work performed by the students during the summer school.
In the first week of the summer school, the students received lectures from 3 external COST participants (Tomas Cizmar, Mihail Pascu, Lene Oddershede) in addition to lectures from local COST members (Anders Kristensen, Kirstine Berg-Sørensen and Christoph Vannahme). During the second and third week, focus was on preparation of Lab-on-Chip systems in the cleanroom facilities at DTU; Danchip, followed by application of the Lab-on-Chip devices produced. The experimental training was carried out with the assistance of one COST supported trainer, Giovanni Nava, as well as local Ph.D. students and junior researchers.
As the school was arranged jointly with the Danish PolyNano network and the EU network Cell-O-Matic, the total number of students was 17, and COST lecturers/trainers were supplemented by 10 additional speakers, as well as local clean-room personnel. Two workshops with focus on presentation of research work, in oral and in writing, were also part of the school.

The learning objectives of the summer school were as follows:

- Describe and understand the needs for industrially relevant fabrication of polymer Lab-on-Chip systems from an industrial point of view
- Construct a polymer chip using injection molding and/or nanoimprint lithography
- Modify the chip for bioanalytical measurements
- Make relevant bioanalytical measurements on the chip
- Evaluate and analyze the bioanalytical results from the chip
- Present the results and write a journal-like paper based on the experimental results

For the practical work, the students were split in smaller groups that constructed and applied either of a) a Lab-on-Chip device for optical manipulation in a microfluidic channel; b) a Lab-on-Chip device for electrochemical measurements or c) a Lab-on-Chip device for optofluidic measurements on singe DNA molecules.

The final program of the school is included.

At the end of the school, two evaluations forms were distributed, to provide feedback to the organizers as to which parts went well and which parts could be improved – including evaluation of practical issues like accommodation, social events, flow of information, IT

service. The full summary of these evaluation forms will be sent to the office of the grant holder in electronic form; exerts of the evaluation are included below:

Results of the student evaluation:

Intellectually stimulating:	4.58/5
Clear goals and expectations:	4.08/5
Motivating course:	4.67/5
Stimulating enthusiasm for further learning:	4.25/5
Easy to know standard of work expected:	4.0/5
Development of problem-solving skills:	4.17/5
IT helped me to learn:	3.42/5

As it appears, the overall impression was very positive. The only critical remarks were about the work-load becoming very heavy near the end of the course, as students had to write their reports – and about the cleanliness of the accommodation; the latter was not in our control.

Photographs:

Group photo

Groups of COST students working with trainers on the optofluidic lab-on-chip device

Group of COST students working on data analysis and report writing