

Activity Report

Period:	December 2006 – June 2007
Advisor:	Prof. Hugo Thienpont
Officers:	Nathalie Vermeulen (President), Sara Van Overmeire (Vice-President), Virginia Gomez (Treasurer), Iñigo Artundo (Secretary), Jürgen Van Erps (Past President)

OUTLINE

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I. ACTIVITY REPORT

FASCINATION OF LIGHT

1. GENERAL CONCEPT OF THIS OUTREACH ACTIVITY

An important outreach activity in which the SPIE Brussels Student Chapter participated was "Fascination of Light," an interactive traveling exhibition designed for raising the public awareness of the importance of photonics in daily life. Fascination of Light has been developed in Germany and is currently traveling through several European cities with the support of the European Commission, the consortium LASERLAB EUROPE and the Network of Excellence on Micro-Optics NEMO. The exhibition is based on a multidisciplinary approach where photonics and their pervasiveness in every-day life can be actively experienced through interactive, hands-on exhibition pieces, illustrative material and multimedia stations, functional models, visual aids, posters and simple experiments.

From March 5 till March 18, 2007, the exhibition was hosted in Brussels, more specifically at the campus of the Vrije Universiteit Brussel. After the official opening on March 5 by Commissioner Viviane Reding – at this occasion, the Commissioner received the SPIE CD-ROM "Optics at Work" – more than 80 guided school tours reaching 1000 students were organised, mainly by the members of the SPIE Brussels Student Chapter. In parallel, our Chapter members took care of 5 teacher training sessions for in total 100 secondary school teachers, in order to show them how they can bring optics and photonics into their lecture program. To give not only schools and school teachers but all interested people and families the opportunity to visit the exhibition, we also provided guided tours during the weekends.

All Chapter members feel that this intensive but rewarding event has been very successful and are happy that they have taken part in this. Thanks to the numerous exhibition visitors and also thanks to the interest of local and national press and media, this event has enhanced the "photonics awareness" of a very broad audience spread all over the country.

2. DESCRIPTION OF A TYPICAL SCHOOL TOUR

During a typical school tour, our Student Chapter members, as official guides, had to briefly explain the exhibition to several small groups of students, with ages ranging from 8-10 to 16-17. This large age difference between groups made every tour different from the previous one, and required from the guides a big capability of adaptation.



Depending on the interests, the time and the age of the attendants, guides could choose to introduce different optical experiments. Explanations were given in three languages (Dutch, French and English) and the duration of the tour was about 45 minutes, plus some extra time for the students to ask questions to the guides.



Every stand had a booth with detailed and easy to follow information about the experiment, and children could interact with it by pressing buttons that were activating different functions, like switching on and off a laser, inserting a diffractive grating on the beam path, or lighting a fluorescent compound with UV light. Every experiment was designed to show a specific phenomenon, and after the introductory explanations given by the guides, the students were able to try by themselves and play with the experiment. Most of the times, they were amazed watching in real-time the properties and interactions of light.

In this experiment, for example, one can see how children stare at a plastic cube illuminated by some light emitting diodes (LEDs). The chosen LEDs were green, red and blue, in an effort to illustrate the basic principles of colour composition in the classic RGB scheme. The students were free to switch on and off the different colours, to create combinations of other colours, like magenta light by switching on only the red and blue LEDs.



3. TRAINING SESSIONS FOR TEACHERS ON THE USE OF THE NEMO EDUKIT

The idea of the teacher training sessions was to provide information about the Edukit, a free educational optics kit developed by the Network of Excellence on Micro-Optics (NEMO) for giving school children the opportunity to get acquainted with optics and photonics already from secondary school level onwards. To emphasize the practical applicability of the Edukit, the teachers were also given information on how they could integrate experiments with the Edukit into their lectures at secondary school.

During the teacher training sessions, the Brussels Student Chapter members assisted the teachers during the experiments with the Edukit. Nice to know here is that one of the

experiments we demonstrated was based upon a game that our former Chapter President had learnt at the Leadership Day at Optics & Photonics 2006. At the end of the session, the teachers received not only an Edukit but e.g. also the SPIE CD-ROM "Optics at Work". As such, they returned home with sufficient material to further promote optics and photonics during their lectures.



Figure: Jürgen Van Erps, the former President of the Brussels Student Chapter, explaining to secondary school teachers how to experiment with the Edukit.



Figure: During the teacher training sessions, the teachers got hands-on experience with the Edukit.

4. VISIBILITY OF THIS EVENT

A website was launched to present the exhibition and to provide all the practical details for visitors and teachers. The communication department of the Vrije Universiteit Brussel provided help on contacting and inviting different schools with which our university collaborated already in the past. However, to attract as many children, students and teachers as possible, the SPIE Brussels Student Chapter also used a variety of other means to put the Fascination of Light exhibition in the spotlights, both in regional and national press and media.

In February, the exhibition was announced in a magazine called "Visie". "Visie" is a weekly magazine, jointly published by different unions and health insurances in Belgium. It is delivered to more than 1 million of families and as such it is the most widely circulating weekly magazine in the Dutch-speaking part of Belgium. The exhibition and more in general photonics and its applications in our daily life were introduced. Moreover, a special session at the exhibition with tours especially for the readers of this magazine was announced. This resulted in a huge response and interest from the readers: more than 300 families wanted to subscribe for one of these guided tours, of which only 15 could be selected for the special session.

At the start of the event, an interview about Fascination of Light with our Chapter's former Vice-President and actual President, Nathalie Vermeulen, was broadcast on FM Brussel, a regional radio station in Brussels.

Finally, the Fascination of Light exhibition in Brussels also got some media attention from the Belgian national television channel. On March 5, it was presented in the prime time television news. In addition, the 3D television of Philips – which was also presented at the exhibition – and our photonics department at the Vrije Universiteit Brussel were discussed more extensively in "Terzake", a program of the news service of the television channel where one examines some hot news items in an elaborate way. In the latter television program, our advisor prof. Hugo Thienpont talked about the research of several of our Chapter members, ranging from microlens fabrication and projecting systems, to biophotonics and fiber sources.



Figure: The Fascination of Light exhibition was presented in the national television news.



Figure: The advisor of the Brussels Student Chapter, prof. Hugo Thienpont, presenting the research of several of the Chapter members in a news program on the national television channel.

COLLABORATION WITH THE SPIE STUDENT CHAPTER OF WARSAW UNIVERSITY OF TECHNOLOGY, POLAND

1. VIDEOCONFERENCE

On December 11, 2006, the SPIE Student Chapter of the Warsaw University of Technology organized a videoconference with the SPIE Brussels Student Chapter. We used Skype® for the videoconference. The main goal of the videoconference was to present both Chapters as such that we could get to know each other and to identify possible collaborations for the future.

The presentation of the Warsaw University of Technology Student Chapter was done by Dariusz Lukaszewski. After a short introduction about their location, structure and officers, he briefly described the foreign and domestic conferences and events in which they participated or which they organized. Jürgen Van Erps did the same for our Student Chapter. Although we had only a very basic webcam-microphone-laptop set-up in comparison to the Warsaw Student Chapter, we did not experience any technical problems during the videoconference.

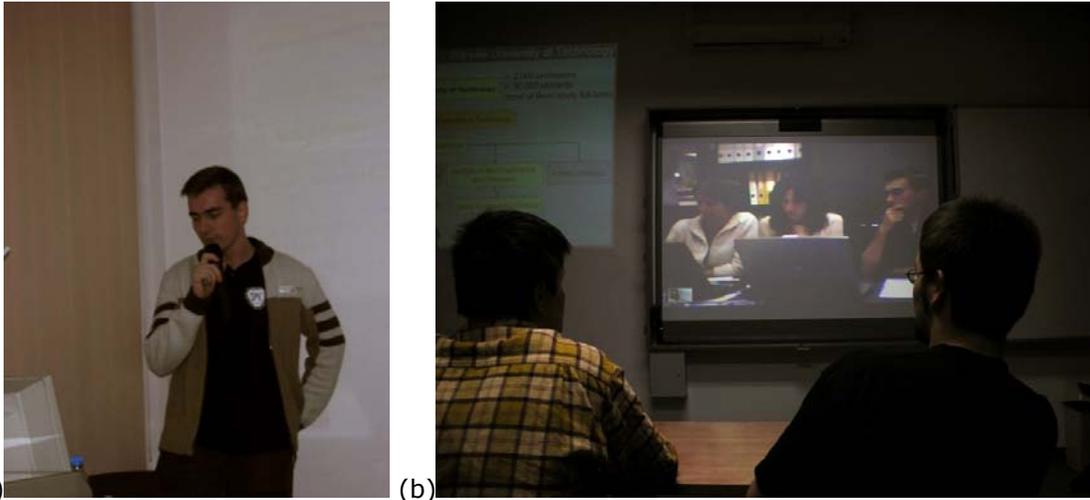


Figure: Dariusz presenting the Warsaw Student Chapter (a) and the webcam view in Warsaw of the three officers of the Brussels Student Chapter (b)

2. SCIENTIFIC COLLABORATION

As a result of the videoconference, common or related scientific research activities between the two Student Chapters were evaluated and a scientific collaboration project was proposed by the Brussels Student Chapter. Because both the Warsaw University of Technology (WUT) and the Vrije Universiteit Brussel (VUB) are partners in the Network of Excellence on Micro-Optics (NEMO), we also applied for funding for the scientific collaboration through that network. The proposed project is entitled **“Interferometric measurement system for fiber insertion and fixation in optical fiber connector structures”** and will focus on the development of an interferometric setup to determine fiber protrusion during insertion of optical fibers in connector plates.

Here is a short technical subject summary:

Fiber connectors have a wide application range within datacom and telecom. The demand for low-cost mass fabricatable devices is very high, especially for dense 2-D fiber array connectors. VUB has proven recently that their technology of Deep Proton Writing is capable of fabricating high-efficiency 2-D single mode fiber connector components, allowing the precise insertion and snap-fitting of fibers into the micro-holes. However, a severe issue arises when we consecutively insert fibers in the connector plates for fixation with UV curable adhesive. We namely want to be able to control the fiber protrusion, i.e. the depth of the fiber end facet in the micro-hole (or how far the fiber sticks out of the micro-hole). To achieve this goal, we would like to monitor the position of the fiber tip with respect to the micro-hole using an interferometric setup, as such that we can fix the fiber when its tip is at the correct position. This interferometric setup will be developed at WUT.

3. OTHER COLLABORATIONS

Although we could not directly identify a common conference venue for the near future, we will definitely try to organize a social student event in collaboration with the Warsaw Student Chapter. Certainly during the Photonics Europe 2008 conference, where a lot of

members of both student chapters will be present, there is an opportunity for the organization of (a) social event(s).

SOCIAL EVENTS

1. CHRISTMAS DINNER

One year more, the SPIE Brussels Student Chapter organized a Christmas Dinner attended by 30 people from our photonics department at the Vrije Universiteit Brussel. This year, we chose a Spanish typical tapas restaurant, and the event was a great success!



Figure (a), (b), and (c): Student Chapter members and other colleagues from the photonics department enjoying the company after the dinner.

2. ROXETTE DANCING TRAINING

As the famous Latin quotation reads: "mens sana in corpore sano" (A sound mind in a sound body), the Brussels Student Chapter also promotes activities which imply a bit of physical exercise. In this case it was a training on Roxette dancing given by Els Moens, member of the Chapter.

We started warming up (also with music) and after that we learnt a short choreography on Roxette music that we practised several times till we mastered it. In the end, there was a cooling down for avoiding morning-after pain for the not so sportive ones among us.

Unfortunately, we don't have proper pictures of this event.

3. RECEPTION EVENING FOR FASCINATION OF LIGHT TOUR GUIDES

After the intensive touring sessions at the Fascination of Light exhibition, the Student Chapter members had time to relax and to share experiences and anecdotes happened to each of us during the week. The conclusion was that working with children is very rewarding and can sometimes be very funny.



Figure: Picture with some of the Student Chapter members at the beginning of the reception evening.

4. NEW BOARD CELEBRATION: BOWLING

The new board composition of the Brussels Student Chapter was celebrated at a bowling event. Almost all the members of the Brussels Student Chapter joined on the occasion. We had a pleasant evening practising our bowling skills! We also took advantage of the opportunity to further strengthen the social band between Chapter members who do not meet each other on a daily basis. Unfortunately, due to unforeseen circumstances, our new president was not able to attend this event, so we will certainly repeat this activity in the near future!

ACCESS TO THE SPIE DL (DIGITAL LIBRARY)

The SPIE Brussels Student Chapter continues to devote part of its budget to provide access to the SPIE Digital Library for the Chapter members.

We proceed as follows: the members of the Student Chapter have access to the SPIE Digital Library through the personal subscription of two of the officers. For a request, the students should send an email to the SPIE officers with the complete reference of the paper. A thorough list of the already downloaded papers is kept to avoid duplicate downloads.

Until now we have observed that the access to the library has been very well welcomed. The students are making a wise and selective use of it. We will keep monitoring its use for evaluation later on.

SPIE CONFERENCE CONTRIBUTIONS

1. SPIE PHOTONICS WEST 2007

Lawrence Bogaert	LED based full color stereoscopic projection system
Virginia Gomez	Low-cost micro-optics for PCB-level photonic interconnects
Jürgen Van Erps	Low-cost micro-optics for PCB-level photonic interconnects
Bart Van Giel	LED based full color stereoscopic projection system
Sara Van Overmeire	Low-cost micro-optics for PCB-level photonic interconnects
Nathalie Vermeulen	<ul style="list-style-type: none">• Iterative resonator model describing the Stokes and anti-Stokes emission of a continuous-wave silicon-based Raman laser• Modeling mid-infrared continuous-wave silicon-based Raman lasers• Optical cooling of Raman lasers using CARS
Michael Vervaeke	Low-cost micro-optics for PCB-level photonic interconnects

2. SPIE INTERNATIONAL CONGRES ON OPTICS AND OPTOELECTRONICS 2007

Jürgen Van Erps	<ul style="list-style-type: none">• Sensing properties of Bragg grating in highly birefringent and single mode photonic crystal fiber• Sensing applications of photonic crystal fibres
Nathalie Vermeulen	<ul style="list-style-type: none">• Enhancement methods for CARS-based heat mitigation and application to near- and mid-infrared silicon-based Raman lasers• Mitigating heat dissipation in a hydrogen-based Raman laser using coherent anti-Stokes Raman scattering

ELECTIONS OF THE NEW BOARD

Elections were organized in March 2007. As of April 1, 2007, the new board of officers running the SPIE Brussels Student Chapter looks as follows:

Officers: Nathalie Vermeulen (President),
 Sara Van Overmeire (Vice-President),
 Virginia Gomez (Treasurer),
 Iñigo Artundo (Secretary),
 Jürgen Van Erps (Past President)

II. OVERVIEW OF PLANNED ACTIVITIES

The scientific collaboration between the Student Chapters of MWUT and VUB will be followed up closely, and other ways of cooperation between both chapters will be explored.

Furthermore, the Brussels Student Chapter is about to launch a T-shirt design contest within the Chapter to create our own SPIE T-shirt. The Chapter board is currently finalising the contest rules, so that the participants know in advance the requirements with respect to e.g. the correct use of the SPIE logo. We hope to get some terrific designs out of this competition!

Another activity that we plan for the near future will be a seminar on "Technology and Entrepreneurship," given by Marc Goldchstein, a lecturer at the business engineering faculty of the VUB. Together with our photonics department, Marc Goldchstein has started the initiative to strengthen the bands between his faculty and the engineering faculty by launching a number of courses that can be followed both by engineering students and business engineering students. To give our Student Chapter members the opportunity to see how their technological research can be linked with entrepreneurship, the Chapter board has contacted Marc Goldchstein on this topic and he is willing to organise a special lecture for our Members.

Finally, our Chapter is also getting prepared for SPIE Photonics Europe 2008. As for the edition of 2006, our plans for Photonics Europe 2008 are, on one hand, to gather with other SPIE Student Chapters, and, on the other hand, to further leverage our department's visibility e.g. by presenting all our recent research results at the conference (if our papers will be accepted of course) and by extending our contacts with industry at the exhibition.

III. FINANCIAL STATEMENT AND GRANTS

The SPIE Brussels Student Chapter was established in April 2006, and the table below shows its actual financial situation.

Previous balance (December 2006)	\$327.88
SPIE Activity grant	\$1150.00
Dancing event	- \$11.29
Fascination of Light	- \$250.00
New board reception and bowling event	- \$71.27
Student Chapter financial account cost	- \$10
Balance	\$1135.30

It should be mentioned that our Chapter advisor, Prof. Hugo Thienpont, has matched the expenses for a large part of our activities (especially for Fascination of Light) and provided full financial support for some others.

Our former Vice-President and actual President, Nathalie Vermeulen, obtained an SPIE travel grant to attend the SPIE Photonics West conference and received a Newport Spectra-Physics Research Excellence Award for her contributions. She also recently received an SPIE Officer Travel Grant to represent our Chapter at the Student Leadership Meeting at SPIE Optics & Photonics 2007 in San Diego.

IV. MEMBER LISTING

Our current list of members looks as follows:

1. Miss Nathalie Vermeulen, President
2. Miss Sara Van Overmeire, Vice-President
3. Miss Virginia Gomez, Treasurer
4. Mr. Iñigo Artundo, Secretary
5. Mr. Jürgen Van Erps, Past President
6. Mr. Hugo Thienpont, Advisor
7. Mr. Mikel Arizaleta
8. Mr. Thomas Berkvens
9. Mr. Martijn Beukema
10. Mr. Lawrence Bogaert
11. Mr. Miguel Cornelles Soriano
12. Mr. Ignace Gatere
13. Mr. Thomas Geernaert
14. Mr. Lendert Gelens
15. Mr. Yuzo Ishii
16. Miss Els Moens
17. Miss Christine Ruwisch
18. Mr. Philippe Tassin
19. Mr. Peter Toet
20. Miss Elke Van Den Brandt
21. Mr. Bart Van Giel
22. Mr. Michael Vervaeke