



Annual Report (2013 - 2014)

SPIE Student Chapter Singapore

Presented by

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President, SPIE Student Chapter Singapore (2013-14)

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### **Members and recruitment policy**

One of the most important tasks of our chapter is to recruit more members. We refund 50% of the membership fees (SGD 12.50) to both new and renewed members according to our policy for the expansion of our chapter. This year there is a decline in the number of members as few have already graduated and few have to renew their membership. Hopefully our chapter will be very healthy by the end of this year.

Currently, our chapter has 22 student members and 10 alumni members. All members are listed as follows:

Achyut Adhikari	Jin Tao
Zhao Ming	Fang Yang
Ta Van Duong	Li Hongru
Xiao Jing	Huapeng Ye
Chao Zuo	Tianhang Zhang
RATHEESH KUMAR MELEPPAT	Hao Wu
Chen Shuo	Dinesh Chobey
Nishtha	Indira Khadka
Anant Shinde	Dushan Wadduwage
Muneesh	Ali Hasnain
Wang Yong	Muhammad Mehmood

### **Chapter officers 2013-14**

President	Muneesh Maheshwari	<a href="mailto:muneesh29phy@gmail.com">muneesh29phy@gmail.com</a>	85533911
Vice President	Shou Chen	<a href="mailto:chenshuo@ntu.edu.sg">chenshuo@ntu.edu.sg</a>	94752089
Treasurer	Anant Shinde	<a href="mailto:anant004@e.ntu.edu.sg">anant004@e.ntu.edu.sg</a>	81468275
Secretary	Nishtha Panwar	<a href="mailto:nishthaoct@gmail.com">nishthaoct@gmail.com</a>	83192030
Advisor	Prof. A. Asundi	<a href="mailto:anand.asundi@pmail.ntu.edu.sg">anand.asundi@pmail.ntu.edu.sg</a>	

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### **Conferences and Workshops**

Conferences and Workshops attract people and they are always keen to learn through them. In the field of research, conferences and workshops hold a very unique place. A workshop, titled as *Fiber Optic Sensors and Applications*, was held on 16<sup>th</sup> May 2014. SPIE student chapter Singapore helped organize this workshop in congruence with Optics and Photonics Society Singapore (OPSS) and Centre for Laser and Engineering (COLE) in NTU Singapore.

In this workshop, some of the current developments in Fiber Optic Sensors were highlighted and demonstrated. In addition High Power Fiber Lasers are replacing conventional diode pumped solid state lasers were also talked about. The workshop demonstrated some of the capabilities in various labs at NTU.

We invited a lot of very prestigious speakers. Prof Tjin Swee Chuan from NTU talked about FBG and Microfiber sensors and its applications and Yuichi Takemasa/Tsuyoshi Takai from Kajima Technical Research Institute Singapore presented the contribution of Distributed Optical Fiber Sensor to structural health monitoring of different civil structures.



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**Welcome Group Dinner**

There is a tradition in our chapter that we get together and have dinner in the beginning of every financial year. This time we celebrated this in the month of Feb 2014. We believe that this activity boosts all the members to participate at their level best for the betterment of our chapter. Here are few glimpse of that fine evening-



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**SPIE representation @ IONS-Asia 5 Hokkaido organized by Optical Society of America in Japan**

This was a great event organized by OSA in Japan. A lot of big universities and companies participated in this event. One of our members, who was presenting his poster in this event agreed to represent our chapter there. We had a banner of SPIE student chapter Singapore there. This was great in terms of promotion of SPIE. We paid only for our banner and additional airfare caused because of our banner.





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**NANYANG UNIVERSITY**  
Centre for Optical & Laser Engineering  
**Birefringence Testing of Injection Molded Microplates**  
Optical Characterization of Microplates

**Introduction**  
Birefringence testing of injection molded micro-plates is one of the reliable methods to assess the quality of the injection plates. Depending upon their manufacturing production processes, different plates exhibit varying birefringence, which is undesirable when used as micro plates. Several parameters, such as the evaluation and adjustment of injection plates, should be considered to such as mechanical strength and other related parameters, what for the evaluation and adjustment of injection plates, the desirable properties that can be characterized by birefringence measurement. Birefringence, expressed in terms of light birefringence (transmittance) after passing through a sample with certain thickness (transmittance). Low birefringence plates provide high transmittance, demonstrating higher performance, hence suitable for bio-chemical analysis.

**Design, Setup and Experimental Values**

**Microplates Measurement Environment**  
Birefringence measurement based on phase delay method is used for microplates. The measurement system is composed of a light source, a polarizer, a sample, a waveplate, a compensator, a half-waveplate, a quarter-waveplate, a compensator, a polarizer, a detector, and a computer. The measurement system is shown in Figure 1. The measurement system is shown in Figure 1. The measurement system is shown in Figure 1.

**Experimental Observation & Results**

**Conclusion & Acknowledgement**  
Standard materials like Polypropylene and Polystyrene are used to manufacture the majority of micro plates. Polystyrene, being a clear polymer, shows excellent properties, ideally well for precise optical measurements. Polypropylene possesses excellent chemical and thermal stability, as well as a strong plate. Moreover, these clear, cyclic, stable copolymers are also used as a micro plates, exhibiting low level of birefringence, comparatively high clarity in UV range of low birefringence. However, and generally possessing high birefringence deviation of the materials, as shown in the table. Hence, Measuring, manufacturing, and production of the micro plates must be controlled. Low birefringence with least standard deviation is recommended to use as a micro plate. From the table material COC 24 W has low birefringence value, while COC 141 W has low birefringence throughout the material, both of which are made up of cyclic stable copolymers. The excellent optical properties by finding stress optic coefficient of the material, which can be calculated by using proper calibration in stress optic loading machine in the future work to be carried out. The authors wish to express their sincere gratitude to Dr. Xiao Yang for providing spectrum micro plates and technical contribution to aid the work.

**SPIE Student Chapter Singapore**



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### **Other meetings and get together**

We had our Annual general meeting (AGM) in Dec 2013. In the AGM we elected our new members and also discussed our plan for the next year. Prof Asundi chaired the meeting. Recently (2<sup>nd</sup> September), we had a meeting of all the officers to plan for IYL 2015. I chaired the meeting and we came up with a conclusion that we will celebrate IYL 2015 by organizing an Optics and Photonics exhibition in Jan 2015 for Poly/school students. Every member is committed to this exhibition and we have a very conclusive plan.

### **Balance sheet for the session 2013-14**

<b>Primary Bal.</b>		<b>S\$2621.08</b>
Annual General Meeting	S\$42.00	
Welcome Group Dinner	S\$290.00	
International Year of Light meeting	S\$43.00	
SPIE members' refund	S\$125.00	
SPIE representation at IONS-ASIA 5 Japan	S\$200.00	
<b>Available Bal.</b>		<b>S\$1921.08</b>

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### **Future Activities**

We will participate in **icEM2014**, Singapore, Nov. 15-17, 2014. We will have a get together of all the members in Oct 2014 to know their views for IYL 2015. We will try to encourage all the members to give their best for the society. Our committee has already decided to have an **Optics and Photonics Exhibition** on **Jan/Feb 2015** for school/poly students. We will be setting up and demonstrating some small but interesting experiments for this exhibition. It will help our younger minds to make their marks in this great field. We will apply for the SPIE funding for this event.

### **Acknowledgement**

Hereby, on behalf of all chapter members, I would like to express our special thanks to our chapter advisor Prof Asundi, former President Mr. Zhao Ming, our chapter officers, and following organizations for their support in the past year:

SPIE

Optics and Photonics Society of Singapore (OPSS)

Center for Optical & Laser Engineering (COLE), Nanyang Technological University

Kajima Technical Research Institute (KaTRI)