Annual Report on Activities of National Taiwan Ocean University Chapter

National Taiwan Ocean University

February 2014
About SPIE NTOU Student Chapter

The SPIE Student Chapter at National Taiwan Ocean University (NTOU) was established on January 27th, 2012. In October 2013, Mr. Tzai-Shing Tang was elected president of SPIE NTOU Student Chapter and he had Student Travel Grants to attended SPIE Student Leadership Workshop and presented his paper in Optics+ Photonics meeting in San Diego. He works hard to perform chapter activities with newly elected officers. These chapter activities were including SPIE visiting lecture, GPU/CUDA Workshop, and Invited Presentations etc.

Furthermore, we begin to attend other chapters activities and promote our chapter visibility in Taiwan. In 2014, we plan to perform many technology talks and invite other chapters to attend these activities. Finally, we will build Facebook Group to promote our chapter to grow up in advance and attract many students to join our chapter.

Chapter Officers:

<table>
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<tr>
<th>President:</th>
<th>Vice-President:</th>
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<tbody>
<tr>
<td>Tzai-Shing Tang</td>
<td>Chun-Hao Huang</td>
</tr>
<tr>
<td>(<a href="mailto:zayshing@gmail.com">zayshing@gmail.com</a>)</td>
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<tr>
<th>Secretary:</th>
<th>Treasurer:</th>
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<tr>
<td>Shin-Chia Chen</td>
<td>Cheng-Yao Liu</td>
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Advisor: Lena Chang (lenachang@mail.ntou.edu.tw)
Total Student Members: 20

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<thead>
<tr>
<th>Name</th>
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<tr>
<td>Jing-Fen Chen</td>
<td>28 October 2014</td>
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<td>Shih-Chia Chen</td>
<td>28 October 2014</td>
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<tr>
<td>Zeu-Hao Chen</td>
<td>28 October 2014</td>
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<tr>
<td>Sheng-Feng Chiou</td>
<td>28 October 2014</td>
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<td>Kuang Lin Ho</td>
<td>28 October 2014</td>
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<td>Yung-Lin Hsu</td>
<td>28 October 2014</td>
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<td>Hsiao-Ching Hu</td>
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<td>Chun-Hao Huang</td>
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<td>Chia Chia Kao</td>
<td>28 October 2014</td>
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<td>Li Tang Lin</td>
<td>28 October 2014</td>
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<td>Cheng-Yao Liu</td>
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<td>Chao-Shan Shih</td>
<td>28 October 2014</td>
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<td>Jhung Wei Siao</td>
<td>28 October 2014</td>
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<tr>
<td>Tzai-Shing Tang</td>
<td>31 January 2015</td>
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<tr>
<td>Wei-Wen Tsao</td>
<td>28 October 2014</td>
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<td>Sheng-Wen Wang</td>
<td>28 October 2014</td>
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<td>Cheng-Hao Wu</td>
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<td>Chun-Ju Wu</td>
<td>28 November 2014</td>
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<tr>
<td>Kuon-Sheng Wu</td>
<td>28 October 2014</td>
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<tr>
<td>Chin-Hsuan Yeh</td>
<td>28 November 2014</td>
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Chapter Activities

1. SPIE Visiting Lecture (Date: 2013/04/09)

Title: Ultraspectral Sounder and Hyperspectral Imager Data Compression

Speaker: Dr. Bormin Huang (University of Wisconsin-Madison, SPIE Fellow)

Research interest: Satellite data compression, high-performance computing in remote sensing, remote sensing image processing, remote sensing forward modeling and inverse problems

Contents: In the era of contemporary and future ultraspectral sounders, better inference of atmospheric, cloud, and surface parameters is feasible for improved weather forecast and climate prediction. Given the large volume of three-dimensional data generated by an ultraspectral sounder each day, the use of robust data compression techniques will be beneficial for data transfer and archival. The physical retrieval of these geophysical parameters, involving the inverse solution of the radiative transfer equation, is a mathematically ill-posed problem (Huang et al. 2002), i.e. the solution is sensitive to the error or noise in the data. Therefore, there is a need for lossless or nearlossless compression of ultraspectral sounder data to avoid potential retrieval degradation of meteorological parameters due to lossy compression.
2. GPU/CUDA Workshop (Date: 2013/08/09)

Speaker: Dr. Jarno Mielikainen and Dr. Bormin Huang (University of Wisconsin-Madison)

Contents: The aim of the GPU/CUDA workshop is to improve the performance and the scalability of an example code by analyzing the code with performance tools, finding performance bottlenecks.

During the workshop, a CUDA application will be optimized.

CUDA Techniques:
- Page-Locked Memory
- Asynchronous Copies (CUDA Streams)
- Coalesced vs. Non-coalesced Memory Access
- Static Arrays vs. Dynamics Arrays
- Single Memory Allocation vs. Multiple Memory Allocations
- CUDA Kernel Callable from Fortran
- Multi-GPU Considerations
- Basics of Profiling-Driven Optimization (Memory vs. Instruction vs. Latency Bound)
- External Libraries (CUBLAS)
3. 2013 Fall Workshop on Information Theory and Communication (Date: 2013/08/15)

The workshop was held in National Chung Cheng University on Aug. 15, 2013. Tzai-Shing Tang, President of the SPIE NTOU Chapter, attended and published National Science Council research report with poster in the workshop.
4. Chapter Officer Election (Date: 2013/10/08)
The meeting for the election of the 2014 SPIE NTOU Chapter officers was held on Oct. 08, 2013. Tzai-Shing Tang was elected President of the SPIE NTOU Chapter.

Other Chapter Officers as follows:
Vice-President: Chun-Hao Huang
Secretary: Shin-Chia Chen
Treasurer: Cheng-Yao Liu

5. Invited Presentations (Date: 2013/11/28)
Title: Convex Geometric Analysis for Non-negative Blind Source Separation
Speaker: Dr. Chong-Yung Chi (Department of Electrical Engineering National Tsing Hua University)
Contents: Dr. Chong-Yung Chi presents a new framework for blind source separation (BSS) of
non-negative source signals. The proposed framework, referred herein to as convex analysis of mixtures of non-negative sources (CAMNS), is deterministic requiring no source independence assumption, the entrenched premise in many existing (usually statistical) BSS frameworks. The development is based on a special assumption called local dominance. It is a good assumption for source signals exhibiting sparsity or high contrast, and thus is considered realistic to many real-world problems such as multichannel biomedical imaging.

Figs. 5 Photos of SPIE NTOU Chapter Students with Prof. Chong-Yung Chi
6. Attending NTU Chapter Activity (Date: 2013/12/02)

Title: Student Chapter

Speaker: Dr. Eugene Arthurs (SPIE CEO)
7. 2013 SPIE Student Leadership Workshop & Optics and Photonics Annual Meeting

In August 2013, Mr. Tzai-Shing Tang had Student Travel Grants to attend SPIE Student Leadership Workshop. The SPIE society gives us an excellent opportunity to talk with other chapter student members in the world. He also presented his paper in Optics+ Photonics Annual meeting in San Diego. We appreciate SPIE society provides an excellent opportunity to our chapter.

Figs. 7 Photos of 2013 SPIE Student Leadership Workshop & Optics and Photonics Annual Meeting
Chapter Funds

Beginning balance: $-80

Funds obtained from SPIE: $900

Details:

Transportation fee for attending other chapter activity : $ 120
Transportation and handout copy fees for Invited Presentations :$360
Conference registration fees for 4 students attending 2013 Fall Workshop on Information Theory and Communication: $420

Total : $ 900

End balance $ 0

Planned Chapter Activities in 2014

1. Provide a series of lectures to increase the knowledge of optics for students.

2. Invite Dr. Bormin Huang to give a talk about remote sensing in April. (Apply SPIE’s support of visit lecture)

3. One NTOU chapter student member will attend “SPIE Sensing Technology + Applications” in May.

4. Visit related industry sites in the second half of the year.

5. Build Facebook Group of SPIE NTOU Student Chapter.

6. Perform chapter officer election in August.

7. Regular group meeting of SPIE NTOU Student Chapter in April.
Summary

Last year, we successfully performed many activities, including one SPIE Visiting Lecture, two workshops and 2013 SPIE Student Leadership Workshop etc. We also had one member to attend 2013 Optics and Photonics Annual Meeting and presented his paper in San Diego. Moreover, we would like to thank for our student chapter advisor Prof. Lena Chang, who always give us more assists and suggestions in research. Simultaneously, we also thank SPIE provides Student Travel Grants to our student chapter and Miss Tasha Chicovsky (Student Activities Coordinator) who always help us solve any problem in applying Student Travel Grants. Finally, this year, we plan NTOU student chapter usually connects other chapters in Taiwan.