Zhejiang University SPIE Student Chapter

Annual Report September 2010

2009 Chapter Officers

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Kun Zhu
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Details of Chapter activities since last report

1. A series of activities related to the laser fest. (Leading performance)
   a) Invite some students from China Jiliang University to our lab to have a visit.
   b) Inviting professor Wenhua Yu to hold a seminar of the FDTD method
   c) Invite a company to give an introduction of their post, corporation culture, science
technology and product exposition by their technical illustrators.

2. Inviting Professor Dan Jiao to give a lecture on ‘Methods for the Analysis and
Design of VLSI Circuits’

3. Organize a sports match.

4. Propagate the activities held by Zhejiang Univ. Chapter of SPIE on the quarterly magazine of our research center.

1. A series of activities related to the laser fest. (Leading performance)

   a) Invite some students from China Jiliang University to our lab to have a visit.
   We invite some students from China Jiliang University to our lab to have a visit, introducing them some knowledge about laser, showing them some interesting laser experiment to stimulate their interest in laser, since our lab has some research on lasers and we have a lot of different laser facilities.

   b) Inviting professor Wenhua Yu to hold a seminar of the FDTD method
   In order to promote the dissemination of innovative ideas better and interdisciplinary exchange, our chapter organized a seminar of the FDTD method. We also invited some master and
Ph.D students from four universities (Shanghai Jiaotong University, National University of Defense Technology, Hangzhou Dianzi University) in China to attend and by the same time visit the centre for optical and electromagnetic research (COER) of Zhejiang University. We had deep discussions on chapter development and academic researches. This activity succeeded in communicating, enhancing the future of the chapters and creating chances for further cooperation.

**Seminar topics:** Parallel Computational Electromagnetics Methods and Their Applications.

**Speakers:** Professor Wenhua Yu (Visiting professor of Pennsylvania State University), Professor Peiguo Liu (National University of Defense Technology of China)

**Time:** Nov. 24th to 26th, 2009

**Location:** The conference room of COER in Zijinggang Campus

**Brief Description of Seminar:**

The FDTD method is one of the most important computational electromagnetic tools, and becomes the most popular one with the development of the computer technique. In this presentation, we will introduce the FDTD method and the new development such as the absorbing boundary condition, conformal technique and parallel processing technique, and, its engineering applications as well. In addition, we provide the on-site built-up technique of the parallel processing platform and parallel performance test. These seminars include the following five parts: (1) Introduction to FDTD method and project modeling techniques; (2) parallel processing techniques and introduction to the parallel processing systems; (3) The built-up technique of parallel processing platform (on-site, and require a laptop for each workshop attendant); (4) Engineering applications of FDTD method; (5) introduction to the hardware acceleration techniques and performance comparison of computer cluster and GPU cluster.

**Biography of Wenhua Yu:**

Wenhua Yu is a visiting professor of Pennsylvania State University and the president of 2COMU (www.2comu.com). He is the associate director of Electromagnetic Communication Lab of Pennsylvania State University. He has published over 100 technical papers and 5 books. The 5 serial articles published on IEEE Antennas and Propagation Magazine have established the foundation of parallel conformal FDTD software package development. He is the senior member of IEEE, and the general co-chair of 2009 International
c) Invite a company to give an introduction of their post, corporation culture, science technology and product exposition by their technical illustrators.

On April 22nd, we invited Doctor Harald from ERICSSON CHINA R&D INSTITUTE (BEIJING) to our lab to communicate with our students and have discussions about the work we have done. He also gave us an introduction about recent development of the optical network and next generation networks. In the end, he answered and analyzed some questions proposed by our students about the market of optical integrated devices.

2. Inviting professor Dan Jiao to give a lecture on ‘Methods for the Analysis and Design of VLSI Circuits’

Lecture topics: Linear-Complexity Computational Electromagnetic Methods for the Analysis and Design of VLSI Circuits
Speakers: Professor Dan Jiao (School of Electrical and Computer Engineering, Purdue University)
Time: May 22nd, 2010
Location: The conference room of COER in Zijinggang Campus

Details of the lecture:
The design of advanced engineering systems generally results in numerical problems of very large scale, requiring billions and billions of parameters to describe them accurately. In general, to solve problems with N parameters, the optimal computational complexity one can hope for is linear complexity O(N). For most methods in computational electromagnetics, however, the complexity is higher than O(N). In this talk, we present two linear-complexity
computational electromagnetic methods. One is the orthogonal finite-element reduction-recovery method; the other is the H2-matrix based direct integral equation solver of linear complexity. Both methods have been successfully applied to the design and analysis of very large scale integrated circuits. The orthogonal finite-element reduction-recovery method is capable of solving a sparse matrix involving more than 330 million unknowns associated with a realistic large-scale combined chip-package system in less than 200 s on a single 2.66 GHz Intel Xeon 5300 processor. The H2-based linear-complexity integral equation solver performs dense matrix inversion and LU factorization in linear complexity. It successfully inverts dense matrices that involve more than one million unknowns associated with large-scale on-chip 3D interconnects embedded in inhomogeneous materials in fast CPU time and less than 5 GB memory.

**Biography of the speaker:**

Dan Jiao received her Ph.D. degree in Electrical Engineering from the University of Illinois at Urbana-Champaign in October 2001. She then worked at Technology CAD (Computer-Aided-Design) Division at the Intel Corporation until September 2005 as Senior Engineer, Staff Engineer, and Senior Staff Engineer. In September 2005, she joined Purdue University as an Assistant Professor in the School of Electrical and Computer Engineering. Early in 2009, she was promoted to Associate Professor with tenure. She has authored two book chapters and over 100 papers in refereed journals and international conferences. Her student was one of the three recipients of IEEE Antennas and Propagation Society PhD Research Award for 2008-2009 selected throughout the world. Prof. Jiao is an Associated Editor of the IEEE Transactions on Advanced Packaging. She is also a Guest Editor of a special issue titled “Recent Progress in Electrical Modeling and Simulation of High-Speed Integrated Circuits and Packages” for the IEEE Transactions on Advanced Packaging. She has served as a TPC member for many international conferences on electromagnetics, high-speed circuits, and advanced packaging.

3. **Organize a sports match.**
   In order to make our members’ life more exciting and strengthen the relationship among us,
we organize a table tennis match. The match was held on June 12th, the semi-final on 13th, and the final on June 18th, in which eight teams including 36 members participated. Others helped to be umpires and carry the water and rackets. Although the match was a very close one, all the members went all out for it.

After the match, the players all spoke highly of the activity, adding that such match can not only build their body but also create a chance to have communication and cooperate as well.

4. Propagate the activities held by Zhejiang Univ. Chapter of SPIE on the quarterly magazine of our research center.

The magazine is called ‘Photonics in Zijin’. We list the lectures, seminars and other student activities held by our chapter in order to introduce our chapter to more people and attract more students in our university to join us.

Details of planned activities for the future

1. Elect new chapter officers and recruit new members.

   Print some flysheets and poster to the public about our SPIE chapter and attract more students in other research centers to join us.

   Propagate the activities held by our Zhejiang Univ. Chapter of SPIE on the quarterly magazine of our research center all the time.

2. Organize outreach activities to show the tremendous interest of Photonic Science.

   a) Lectures
   b) Seminars
   c) Visiting some photonics companies and other related research center.
   d) Invite some companies to give an introduction of their post, corporation culture, science technology and product exposition by their technical illustrators. At the same time, they can recruit our students.
   e) Invite some students in the high school or other university to our lab to have a visit,
introducing SPIE student chapters and showing some interesting optical experiment to stimulate their interest in both communication with people and science.

f) Other fascinating activities like sports match or discussion.

3. Invite a lecturer by using the SPIE travel lecture fund.
4. Attend activities organized by other student chapter.

Financial information

1. Beginning balance 47$+1581.98$ (The bank charges 7% for transferring money)
2. Expenses on building and maintaining the website of SPIE@ZJU 20$.
3. A series of activities related to the laser fest. (Leading performance)
   a) Invite some students from China Jiliang University to our lab to have a visit.
      Bought beverages and gifts 60$.
      Advertise the activities of chapter and printing posters and brochures which has sent to the students : 80$
   b) Inviting professor Wenhua Yu to hold a seminar of the FDTD method. 200$
   c) Invite a company to give an introduction of their post, corporation culture, science technology and product exposition by their technical illustrators. 150$
2. Inviting Professor Dan Jiao to give a lecture on ‘Methods for the Analysis and Design of VLSI Circuits’. 200$
3. Organize a sports match.
   Money was used for play ground rent, table tennis bats and balls, advertising the activity, water and food and the prize for the winner. 620$ in total.
4. Propagate the activities held by Zhejiang Univ. Chapter of SPIE on the quarterly magazine of our research center. Fees for printing: 100$.
5. Attending SPIE Optics and Photonics 2009 Student Leadership Workshop, applying visa cost 150$.

Ending balance: 48.98$