

SHAOYING HUANG

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EDUCATION

- Nanyang Technological University (NTU)** Singapore, Feb 2011
 Ph.D. School of Electrical and Electronic Engineering
 Thesis: the effect of ground planes in modern electromagnetic applications
- Massachusetts Institute of Technology (MIT)** MA, U.S.A., Jul. 08 - May 2009
 Visiting student, Department of Electrical Engineering and Computer Science
 Research focus: electromagnetic modeling for surface-enhanced Raman scattering including analytic analysis and numerical simulations.
- Nanyang Technological University** Singapore, Mar 2005
 Mater of Engineering, School of Electrical and Electronic Engineering
 Thesis: the development of novel dual-plane electromagnetic band-gap microstrip structures
- Nanyang Technological University** Singapore, Jan 2003
 Accelerated Bachelor Degree, School of Electrical and Electronic Engineering
 In the accelerated program, the four-year degree was obtained in 3.5 years.

AWARDS

- Standard Chartered Hong Kong Marathon 2011, **Half Marathon, 36th in the Female Group**, 20 Feb 2011
- **Champion**, the University of Hong Kong Campus Run 2010
- **Chinese Government Award for Outstanding Self-Financed Students Abroad 2008 (2008 年国家优秀自费留学生奖学金)**
- "Present Around the World", Institute of Engineering and Technology (IET), 2007
 - **Silver Medal** (Global Final, Amsterdam, the Netherlands, Nov. 2007)
 - **Gold Medal** (Regional Final, City University of Hong Kong, Hong Kong, Aug. 2007)
 - **Gold Medal** (Regional competition, Singapore, May 2007)
- **The 2nd position** at Young Persons' Lecture Competition Singapore 2007, Institute of Materials, East Asia, Singapore, Apr. 2007
- **The winner** of preliminary Young Persons' Lecture Competition Singapore 2007, Institute of Materials, East Asia, Singapore, Apr. 2007
- **Singapore Ministry of Education Scholarship**, 1999-2003.

WORKING EXPERIENCE

Massachusetts Institute of Technology (Oct. 2011 – present)
 Collaborator: **Massachusetts General Hospital**
 Post Doctorate Fellow
 Research focuses
 Magnetic resonance imaging (MRI) using parallel transmit
 - Electromagnetic modeling for optimizations
 - Clinical experiments

The University of Hong Kong (Feb 2010 – Sept. 2011)
 Post Doctoral Fellow

Research focuses

- Computational Electromagnetics
- Electromagnetic modeling of surface plasmonics and nanoplasmonics using integral equations.

Massachusetts Institute of Technology (Jul. 2008 - Dec. 2009)

Research Associate

Research is focusing on electromagnetic modeling of surface-enhanced Raman scattering and its applications.

Nanyang Technological University (Apr. 2005 - Dec. 2005)

Project Officer

Designing transceivers for multi-input multi-output communication systems

RESEARCH EXPERIENCE

The University of Hong Kong, Department of Electrical and Electronic Engineering

Time: Feb. 2010 – Sept. 2011

Advisor: Professor Weng Cho Chew, University of Illinois at Urbana-Champaign (UIUC)

- Responsible for the numerical electromagnetic modeling for periodic and non-periodic nanoparticles
- Responsible for measurements of surface plasmons enhanced LED's
- Successfully developed EM software using integral equations (method of moments)

DEVELOPED EM SOLVERS FOR

1. Non-periodic dielectric objects of arbitrary shapes
2. Non-periodic metallic objects of arbitrary shapes
3. Periodic dielectric objects of arbitrary shapes (touching/non-touching boundaries)
4. Periodic metallic objects of arbitrary shapes (touching/non-touching boundaries)

ACCURATE CALCULATIONS OF

- Near-field electric and magnetic fields
- Far-field radar cross section (RCS)
- Extinction cross section

MIT, Department of Electrical Engineering and Computer Science

Time: Jul. 2008 – Dec. 2009

Advisor: Dr. Bae-lan Wu (former advisor: Professor Jin-Au Kong)

- Conducted electromagnetic modeling for surface-enhanced Raman scattering (SERS). Studied electromagnetic theories for nanostructures to explore solutions for obtaining high enhancement of electric fields. The research focus was the analytic analysis of the surface plasmonic resonance of metallic nanoparticles and fabrications of the nanoparticles.
- Work involved analytic analysis, mathematical modeling of electromagnetic waves, numerical simulations, and fabrication techniques, such as electron beam lithography.
- The project was collaboration between MIT and MIT Lincoln Laboratory. The results that have been obtained and are expected will bring realistic progress to the application of SERS.

NTU, School of Electrical and Electronic Engineering

Time: Jan. 2006 – Jan. 2010

Advisor: Dr. Yee Hui Lee

- Studied the effect of ground planes with etched patterns on the propagation and radiation of wave-guiding structures (e.g., microstrip lines) at microwave frequencies. Conducted electromagnetic compatibility (EMC) studies of patterned ground structures based on wave analysis and experiments.

- Work involves designs, electromagnetic wave analysis, and circuit modeling of new microwave devices using patterned ground planes. The EMC studies include EMC testing, wave analysis, and numerical simulations.
- The results accelerate the applications of patterned ground structures to microwave circuits.

NTU, School of Electrical and Electronic Engineering

Time: Mar. 2003 – Mar. 2005

Advisor: Dr. Yee Hui Lee

- Designed new microwave filter structures using electromagnetic band-gap structures.
- Work involves numerical simulations, fabrications on printed circuit boards (PCB's), testing for scattering parameters.

NTU, School of Electrical and Electronic Engineering

Time: Jan. 2002 – Jan. 2003

Advisor: Associate professor Zhongxiang Shen

- Designed a circular patch antenna for radio frequency identification system.
- Work involves numerical simulations, fabrications on PCB's, testing for scattering parameters.

TEACHING EXPERIENCE

NTU, School of Electrical and Electronic Engineering

Engineering Electromagnetics. Tutor

Conducting tutorials (Semester 1.2009)

MIT, Department of Electrical Engineering and Computer Science

Advanced Electromagnetics. Teaching Assistant

Revising weekly homeworks and preparing for quizzes (Spring. 2009)

MIT, Department of Electrical Engineering and Computer Science

Electromagnetics. Teaching Assistant

Revising weekly homeworks and preparing for quizzes (Fall. 2008)

NTU, School of Electrical and Electronic Engineering

Engineering Electromagnetics. Tutor

Conducting tutorials (Semester 1.2007)

Home Tuition

Junior college mathematics, physics, and chemistry. Home tutor.

Teaching and reviewing the subjects (2001-2003)

FINAL-YEAR-PROJECT STUDENT SUPERVISIONS

Mr. RAN DUAN

Co-supervisor, report title: planar antenna designs (Aug. 2007 - Aug.2008)

Mr. RAN DUAN is pursuing his Ph.D. in California Institute of Technology, CA, U.S.A. His e-mail address is rduan@caltech.edu.

Miss TIANQI YU

Co-supervisor, report title: an automated optimization tool for compact microstrip filter designs (Aug. 2007 - Aug.2008)

Miss TIANQI YU is working in JP Morgan Singapore. Her email address is tianqi_yu@yahoo.com.

Mr. XIN HUA

Co-supervisor, report title: an automated optimization tool for compact microstrip filter designs (Aug. 2007 - Aug.2008)

Mr. XIN HUA is working in Oversea-Chinese Banking Corporation Limited, Singapore. His email address is huaxineva@gmail.com.

JOURNAL PUBLICATIONS

2012

1. **S. Y. Huang**, W. C. Chew, Y. G. Liu, B.-I. Wu, and H. W. Choi, "A Pancake-shaped Nano-Aggregate for Focusing Surface Plasmons," *Journal of Applied Physics*, Jan, 2012.

2011

2. L. Zhu, **S. Y. Huang**, P.T. Lai, and H. W. Choi, "Fiber-coupled light-emitting diode with a capillary-bonded hemispherical lens," *IEEE Photonics Technology Letters*, May, 2011.
3. G. Y. Mak, L. Zhu, Z. Ma, **S. Y. Huang**, E. Y. Lam and H. W. Choi, "Plasmonically enhanced quantum-dot white-light InGaN light-emitting diode," *Journal of Physics D: Applied Physics*, vol. 44, 2011. (Contribution: electromagnetic modeling of metallic nanoparticles).

2010

4. **S. Y. Huang** and Y. H. Lee, "Fast and accurate calculation of transmission coefficients for an EBG microstrip structure," *Microwave and Optical Technology Letters*, vol. 52, no. 4, pp. 793-797, Feb., 2010.
5. **S. Y. Huang** and Y. H. Lee, "Studies of the susceptibility of an electromagnetic band-gap microstrip filter," *IEEE Transactions on Electromagnetic Compatibility*, vol. 52, no. 3, pp. 599-603, Aug., 2010.

2009

6. **S. Y. Huang**, B.-I. Wu, B. Zhang, Y. H. Lee, Vladimir Liberman, and Mordechai Rothschild, "An analytical method to study the effects of a substrate in surface-enhanced Raman scattering," *Journal of Applied Physics*, 106, 114306, Dec., 2009.
7. **S. Y. Huang**, and Y. H. Lee, "A compact E-shaped patterned ground structure and its applications to tunable bandstop resonator," *IEEE Transactions on Microwave Theory and Techniques*, vol. 57, no. 3, pp. 657-666, Mar., 2009.
8. Y. H. Lee, and **S. Y. Huang**, "Electromagnetic susceptibility of an electromagnetic band-gap filter structure," *Progress in Electromagnetics Research B*, vol. 15, pp. 31-56, 2009.

2005 - 2008

9. **S. Y. Huang**, and Y. H. Lee, "Compact stepped-impedance low-pass filter with a slot-back microstrip line," *Microwave and Optical Technology Letters*, vol. 50, no. 4, pp. 1058-1061, Apr., 2008. (Impact factor: 0.743, citation: 0)
10. **S. Y. Huang**, and Y. H. Lee, "Compact U-shaped dual planar EBG microstrip lowpass filter," *IEEE Transactions on Microwave Theory and Techniques*, vol. 53, no. 12, pp. 3799-3805, Dec., 2005. (Impact factor: 2.711, citation: 8)
11. **S. Y. Huang**, and Y. H. Lee, "Tapered dual-plane compact electromagnetic band-gap microstrip filter structures," *IEEE Transactions on Microwave Theory and Techniques*, vol. 53, no. 9, pp. 2656-2664, Sept., 2005. (Impact factor: 2.711, citation: 17)
12. **S. Y. Huang**, and Y. H. Lee, "A tapered small-size EBG microstrip bandstop filter design with triple EBG structures," *Microwave and Optical Technology Letters*, vol. 46, no. 2, pp. 154-158, Jul., 2005. (Impact factor: 0.743, citation: 9)

CONFERENCE

Invited Talk

1. **S. Y. Huang**, "Accelerating the calculations of periodic structures using surface integral equations and Ewald's summation", *International Conference on Advanced Infocomm Technologies (ICAIT) 2011*, Wuhan, China, Jul., 2011.

Presentations

2. **S.Y. Huang**, "Implementations of Electromagnetic Solvers using Integral Equation Methods for Nanostructures", 2011 HKU Computational Science and Engineering Workshop (Organizer: Professor Weng Cho CHEW), Hong Kong, 18 Jun. 2011.
3. L. Zhu, **S.Y. Huang**, P.T. Lai and H.W. Choi, "Hemispherical InGaN/GaN Light-emitting Diode for efficient fiber coupling", the International Nitride Workshop 2010, Tampa, Florida, USA, Sept 2010.
4. **S. Y. Huang**, and Y. H. Lee, "Development of ultra-wideband (UWB) filters" 2008 URSI General, Chicago, Illinois, USA, Aug., 2008.
5. Y. H. Lee, and **S. Y. Huang**, "Further investigation into the electromagnetic susceptibility of an EBG microstrip filter," Proc. Asian Pacific Microwave Conference 2007, Bangkok, Thailand, Dec., 2007.
6. D. Ran, **S. Y. Huang**, and Y. L. Lu, "Optimization of broadband bandpass filter using tapered electromagnetic bandgap structures," Proc. Asian Pacific Microwave Conference 2007, Bangkok, Thailand, Dec., 2007.
7. Y. H. Lee, and **S. Y. Huang**, "A Study on the electromagnetic susceptibility of an electromagnetic band-gap microstrip filter structure," Proc. Eleventh URSI Commission F Triennial Open Symposium On Radio Wave Propagation and Remote Sensing, Rio de Janeiro, Brazil, Oct.-Nov., 2007.
8. **S. Y. Huang**, and Y. H. Lee, "A new optimization approach for high performance meander EBG filter design," Proc. 2007 IEEE International Symposium on Antennas and Propagation, Honolulu, Hawaii, USA, 10 – 15 Jun., 2007.
9. **S. Y. Huang**, and Y. H. Lee, "A distinction between a step impedance lowpass filter and an EBG microstrip structure," Proc. 2007 IEEE International Symposium on Antennas and Propagation, Honolulu, Hawaii, USA, 10 – 15 Jun., 2007.
10. Y. H. Lee, and **S. Y. Huang**, "Microstrip line coupling to a dual-plane electromagnetic band-gap microstrip filter structure," Proc. EMC Europe 2006 Barcelona, Barcelona, Spain, 4 - 8 Sep. 2006.
11. Y. H. Lee, and **S. Y. Huang**, "Electromagnetic compatibility of a dual-planar EBG microstrip filter structure," Proc. 17th International Zurich Symposium on Electromagnetic Compatibility, Singapore, 27 Feb. - 3 Mar., 2006.
12. **S. Y. Huang**, and Y. H. Lee, "Small-size dual-plane EBG microstrip lowpass filter with a U-shaped microstrip line geometry," Proc. 1st IEEE International Workshop on Radio-Frequency Integration Technology 2005, Singapore, Dec., 2005.
13. **S. Y. Huang**, and Y. H. Lee, "High performance, compact meander dual planar EBG microstrip lowpass filter design," Proc. 2nd IASTED International Conference on Antennas, Radar, and Wave Propagation, Banff, Canada, Jul., 2005.
14. **S. Y. Huang**, Y. H. Lee, and Y. Lu, "A novel compact electromagnetic band-gap filter design," Proc. Asian Pacific Microwave Conference 2004, New Delhi, India, Dec., 2004.
15. **S. Y. Huang**, Y. H. Lee, and Y. Lu, "Tapered electromagnetic band-gap filter structures," Proc. Asian Pacific Microwave Conference 2004, New Delhi, India, Dec., 2004.
16. **S. Y. Huang**, and Y. H. Lee, "A novel approach for the control of wave propagation in Electromagnetic Band-Gap structure," Proc. 4th International Conference of Microwave and Millimeter-wave Technology 2004, Beijing, China, Aug., 2004.
17. **S. Y. Huang**, and Y. H. Lee, "A novel dual-plane compact Electromagnetic Band-Gap structure for microstrip applications," Proc. 4th International Conference of Microwave and Millimeter-wave Technology 2004, Beijing, China, Aug., 2004.

RESEARCH INTERESTS

- Magnetic resonance (MR) imaging, high field system & applications
- MR safety
- MR engineering
- Surface plasmonic circuits
- Surface plasmons, the applications to optical devices, theories and experiments
- Computational electromagnetics, especially the acceleration of calculations for periodic structures
- Surface-enhanced Raman scattering, modeling and applications
- Periodic structures (e.g., metamaterials, photonic band-gap structures, and electromagnetic band-gap structures) and their applications for wave guiding and frequency selecting
- Miniaturized antennas (2.45 GHz and 60 GHz)
- EMC and EMI of microwave integrated circuits

PROFESSIONAL SERVICE & PEER GROUPS

Paper reviewer for

- The Institute of Electrical and Electronics Engineers (IEEE) Microwave and Wireless Components Letters (MWCL) (2008 - present)
- Journal of Electromagnetic Waves and Applications (JEMWA) (2009 - present)
- Progress in Electromagnetic Research (PIER, PIER B,C,M, PIER Letters) (2009 - present)
- AEU - International Journal of Electronics and Communications (June 2010 - present)
- The Institute of Engineering and Technology (IET) Micro & Nano Letters (March 2011 - present)

Conference Technical Committee Member of

- International Conference on Advanced Infocomm Technology 2011, Wuhan, China, 11-14 July 2011
- IEEE SENSORS 2011 CONFERENCE, LIMERICK, IRELAND 28-31 OCTOBER 2010
- International Conference on Advanced Infocomm Technology 2010, Haikou, Hainan, China
- Progress in Electromagnetic Research Symposium 2010, Cambridge, USA

Conference Section Chairs of

- IEEE SENSORS 2011 CONFERENCE, LIMERICK, IRELAND 28-31 OCTOBER 2010

Vice president of Institute of Engineering and Technology (IET), Nanyang Technological University Student Section (2008).

Main-committee member on board of IEEE Women in Engineering Society, Singapore Chapter (2007-2008).

Sub-committee member on board of Innovators and Entrepreneurs Association (IDEA), Singapore. A member of membership committee looking after the corporate area (2007-2008).

Founding members, Nanyang Technological University Student Chapter of Optical Society of America (OSA) (2003 - 2004)

PROFESSIONAL SKILLS

- Programming languages: Matlab, C++,C
- Windows, Linux
- Simulation software: CST Microwave Studio, Advanced Design Systems (ADS), HFSS, IE3D
- Fabrications: PCB's, electron beam lithography
- Testing experience: on wafer testing for microelectronic-mechanical-system devices

LANGUAGES

English, Mandarin, Cantonese, Teochew (the dialect in Chaozhou city, Guang Dong, China)

SELECTIVE UNDERGRADUATE EXTRA-CURRICULUM ACTIVITIES

- **President**, Chinese Student Union in Nanyang Technological University, Singapore (2001)
- **Programmer in Chief**, Orientation Camp for more than 500 Ministry-of-Education (Singapore) scholars (2001)

HOBBIES

- Reading (autobiographies, biographies, and books on economics, mathematics, physics, philosophy, psychology)
- Hiking, jogging, swimming, fishing, and playing table tennis
- Backpack traveling
- Cooking and studying recipes, especially Chinese and Italian cuisine.

PROFESSIONAL REFERENCES

1. Professor Weng Cho Chew

Professor, Department of Electrical and Computer Engineering, University of Illinois at Urbana-Champaign

Address: 378A Everitt Lab, MC-702 1406 W. Green Urbana, Illinois 61801

E-mail: w-chew@illinois.edu

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2. Dr Yee Hui LEE

Associate professor, school of electrical and electronic engineering, Nanyang technological university

Address: S2.2-B2-29, School of EEE, NTU, Singapore 639798

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3. Dr Bae-ian WU

Antennas Technology Branch

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E-mail: bae-ian.wu@hanscom.af.mil

4. Professor Arokiaswami Alphones

Associate Professor, school of electrical and electronic engineering, Nanyang technological university

Address: S2.2-B2-19, School of EEE, NTU, Singapore 639798

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5. Professor Yi Long LU

Professor, school of electrical and electronic engineering, Nanyang technological university

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Phone: (65) 6790-4543