Henghua DENG

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Highlights

- **Electromagnetics**. Microwaves. RF. Electronics. Semiconductors. Communications. Optoelectronics. Nanotechnology.
- Proficient Computer **Programming** Skills (**C/C++, Fortran, MATLAB**, Assembly language, Visual Basic, Pascal, etc.).
- Professional Skills for Electronic Design Automation (EDA) **Software** Design (**Ansoft HFSS**, **FEKO**, **FEMLAB**/Comsol Multiphysics, RSoft products, Protel PCB & SCH, AutoCAD, Labview, etc.).
- Extensive Research on **Computational Electromagnetics** (finite-element method–**FEM**, finite-difference method–**FDM**, finite-difference time-domain method–**FDTD**, Coupled Mode Theory–**CMT**, beam-propagation method–**BPM**, etc.).
- Advanced **Fabrication** Skills for Electronics/Optoelectronics/Nanotechnology.

EDUCATION

01/2001—10/2005 **University of Waterloo**, Ontario, CANADA
- **Ph.D.** in Electrical & Computer Engineering (with Drs. S. K. Chaudhuri & D. Yevick. GPA: 89.3/100)
- Thesis: Design of silicon-on-insulator (SOI) polarization converter with finite element analysis (FEM)

09/1997—07/2000 **Peking University** (Beijing University), Beijing, CHINA
- **M.A.Sc.** in Communication & Information Systems, Dept. of Electronics (GPA: 86.7/100)
- Thesis: Optical add/drop multiplexers based on arrayed-waveguide grating in communication networks

08/1993—07/1997 **Northwestern Polytechnical University**, Xi'an, CHINA
- **B.Eng.** in Electronic Engineering (**National** and provincial awards. GPA: 89.3, Core Course: 93.4/100)
- Ranked 1st university-wide (1993-1994, 1300 competitors) & department-wide (1993-1997, 108 rivals)

WORK AND RESEARCH EXPERIENCE

08/2006—present **National Research Council (NRC),** Integrated Manufacturing Tech. Inst. (IMTI), Ontario, CANADA
- **NSERC Fellow in Government Laboratories,** Precision and Freeform Fabrication Technologies.
  - Computer programming for plasmonics, thin film optical filters, and biomedical&chemical sensors.
  - Evanescent waves, surface plasma resonance (SPR), pulsed laser deposition (PLD), chemical and bio-sensors.
  - Nanofabrication instrument experiences (SEM/EDS, AES, PLD), nanomaterials, laser machining.

08/2005—07/2006 **University of Waterloo**, Ontario, CANADA
- **Postdoctoral Fellow**, Electrical & Computer Engineering (with Drs. S. Safavi-Naeini and Dr. S. K. Chaudhuri)
  - Wave propagation and computational electromagnetics (EM) in antenna, microwave and optoelectronic systems.
  - EM software (HFSS, FEKO, etc.) and programming on wireless communication for vehicular radio networks.
  - Spiral and helical antenna, dipole, ultra-wide-band (UWB) antenna design, and general mobile radio service (GMRS).

01/2001—07/2005 **University of Waterloo**, Ontario, CANADA
- **Research Assistant**, Electrical & Computer Engineering (with Drs. S. K. Chaudhuri & D. Yevick)
  - Extensive research on numerical techniques such as finite-element method (**FEM**), finite-difference method (**FDM**), finite-difference time-domain method (**FDTD**), coupled mode theory–**CMT**, beam-propagation method (**BPM**), ray tracing, and adaptive meshing.
  - Comprehensive development of efficient CAD computer programs for various electromagnetic and photonic problems, with both guided-wave and beam-propagation analysis. Design of novel polarization controllers.
  - Electromagnetic and photonic systems and devices: III-V semiconductor, silicon-on-insulator (SOI), arrayed waveguide grating (AWG) router, silicon photonics, optoelectronic integrated circuit (OEIC).
- **Teaching Assistant (TA)** for courses: *Electronic Devices* (ECE231), *Photonic Communication Systems & Devices* (ECE477), *Scientific Programming with C++* (PHY239), and *Fundamentals of Electrical Engineering* (ECE100).

08/2000—12/2000 **ECHO Technologies**, Beijing, CHINA
- **Electrical Engineer**, Research & Development Department
  - Design of intelligent remote terminal unit (RTU) automatic control and graphical liquid crystal display (LCD).
  - Hardware&software realization of microprocessor (89C51) circuits. Communication between microprocessors and computers with C, Assembly, and VB. Testing random access memory (RAM). Graphical user interface (GUI) Design.

09/1997—07/2000 **Peking University** (Beijing University), Beijing, CHINA
- **Research Assistant**, National Key Laboratory on Optical Communications (**TA** for course *Signal and System*)
  - Monitoring, controlling, switching, and routing of signals in all optical communication networks.
  - Development of microprocessor (8051) systems with printed circuit board (PCB) and Assembly language program.
  - Programmable logic devices (FPGA, GAL, etc.) and in-system programmability (ISP) in digital electronic circuits.

PROFESSIONAL AFFILIATIONS

- **Member, Institute of Electrical and Electronics Engineers (IEEE),** since 2004
  Microwave Theory and Techniques Society (MTT-S), Communications Society (ComSoc), Laser & Electro-Optics Society (LEOS)
- **Member, Optical Society of America (OSA),** since 2004
- **Member,** Student Network of the **Canadian Institute of Photonics Innovation (CIPI-S),** since 2003
- **Reviewer** for prestigious journals published by IEEE and OSA
  IEEE Photonic Technology Letters (>10 reviews), IEEE/OSA Journal of Lightwave Technology, The Journal of the Optical Society of America A (JOSA A) and B (JOSA B), Applied Optics, Optics Letters, Optics Express, etc.
- Registration Pending for **Professional Engineer** Ontario
  Academic requirements satisfied; PPE Law & Ethics exams passed; only working experience requirement in process.

HONORS AND DISTINCTIONS

03/2006 **Approved meritorious candidate for NSERC Industrial R & D Fellowship (IRDF) (valid till June 2008)**

04/2006 Approved meritorious candidate by Natural Science and Engineering Research Council of Canada (NSERC) for the Visiting Fellowships in Canadian Government Laboratories

01/2001—07/2005 **University of Waterloo**, Ontario, CANADA

- Faculty of Engineering Award (09/2001), International Graduate Scholarship (2001-2004), Graduate Scholarship

09/1997—07/2000 **Peking University** (Beijing University), Beijing, CHINA

- May 4th Fellowship (11/1999), a highest honor named after the University Anniversary
- Vice-chairman, Graduate Student Association, Dept. of Electronics (09/1999)

03/1997—07/1997 **Northwestern Polytechnical University**, Xi'an, CHINA

- Provincial Outstanding Graduate (07/1997), and University Outstanding Graduate (07/1997)
- Special Prize of CATIC Fellowship (nationally sponsored by China Nat. Aero-Tech. Import & Export Corp.) (10/1996)
- Bao-Gang Educational Fellowship (nationally sponsored by China Baoshan Iron & Steel Corp.) (10/1995)
- First Prize of 57-62 Alumni Fellowship (Best Overall University Freshman) (10/1994)
- Competition prizes: First prize of Contest on Electronic Circuit Experiments (04/1996), Provincial Special Prize of 95'China MCM (Mathematical Contest in Modeling) (10/1995), Successful Participant of International MCM'95 (Mathematical Contest in Modeling, sponsored by American National Security Agency) (02/1995)
- Vice President Education in the department (06/1995). Committee member of University's 13th delegation (04/1995).

SKILLS

- **Programming Languages**: C/C++, Fortran, Visual Basic, Assembly language, Pascal, BASIC, ABEL, HTML, ...
- **Computer Skills:** Unix/Linux, DOS/Windows, LaTeX, MS-Office/Outlook, Adobe, Ghostscript, Internet/Web, ...
- **Technical Software:** Ansoft HFSS, FEKO, FEMLAB/Comsol Multiphysics, Protel (PCB & SCH), RSoft products, AutoCAD, SPICE, Labview, SYNARIO, SCI FilmTEK, TFCalc, Essential Macleod, ...
- **Mathematical Software:** MATLAB, Mathematica, Maple, Origin, ...
- **Electrical Circuits:** Digital and Analog Circuits, Microprocessors/Microchips (8051 & 89C51 families), Programmable Logic Devices (FPGA, GAL, ISPLSI, etc.), Liquid Crystal Display (LCD), …
- **Nanofabrication & Integrated Manufacturing:** Pulsed Laser Deposition (PLD), Scanning Electron Microscope (SEM), Energy-dispersive X-ray spectroscopy (EDS), Auger Electron Spectroscopy (AES), Optical Lithography, …

MISCELLANEOUS

- **Personality**: initiative, collaborative, self-confident, self-motivated, team worker with excellent problem-solving and good communication skills.
- **Volunteer** work: Western Fair, London, Ontario, Sept. 8-17, 2006.

Appendix A: List of Selected Publications and Reports

- **Referred Journal Papers:** IEEE PTL'2005 [1] [2], IEEE/OSA JLT'2005 [3], OSA JOSA:A [4], SPIE Opt. Eng. [5].
- **Referred Conference Papers:** IEEE/OSA OFC'2004 [6], OSA IPR'2004 [7], SPIE OEIC'2000 [8], IEEJ/IEICE/Osaka-U OFSET'2000 [9], CAE/CAS ICETS'2000 [10] [11], Sino-Korea'1999 [12].
- **Degree Theses:** Ph.D. 2005 [13], Master's 2000 [14], Bachelor's 1997 [15].
- **In progress:** paper [16] [17], report [18].

[1]. **H. Deng**, D. O. Yevick, and S. K. Chaudhuri, "Bending characteristics of asymmetric SOI polarization rotators," *IEEE Photon. Technol. Lett.*, vol. 17, no. 10, pp. 2113—2115, Oct. 2005.

[2]. **H. Deng** and D. O. Yevick, "The nonunitarity of finite-element beam propagation algorithms," *IEEE Photon. Technol. Lett.*, vol. 17, no. 7, pp. 1429—1431, July 2005.

[3]. **H. Deng**, D. O. Yevick, C. Brooks, and P. E. Jessop, "Design rules for slanted-angle polarization rotators, " *IEEE/OSA J. Lightwave Technol.*, vol. 23, no. 1, pp. 432—445, Jan. 2005.

[4]. **H. Deng**, D. O. Yevick, C. Brooks, and P. E. Jessop, "The fabrication tolerance of silicon-on-insulator polarization rotators," *Journal of the Optical Society of America A (JOSA A)*, vol. 23, no.7, pp.1741—1745, July 2006.

[5]. C. Brooks, P. E. Jessop, **H. Deng**, D. O. Yevick, and G. Tarr, "Passive polarization rotating waveguides in silicon-on-insulator," *Optical Engineering 45 (4), 044603, Apr. 2006.*

[6]. **H. Deng**, D. O. Yevick, C. Brooks, and P. E. Jessop, "Design procedures for slanted-angle SOI polarization rotators," in *OSA/IEEE Proc. Optical Fiber Communication Conference (OFC'04)*, Los Angles, CA, Feb.22-27, 2004, paper MF-41.

[7]. C. Brooks, P. E. Jessop, **H. Deng**, D. O. Yevick, and G. Tarr, "Polarization rotating waveguides in silicon on insulator," in *OSA Proc. Integrated Photonics Research Conference (IPR'04)*, San Francisco, CA, June 30-July 2, 2004, paper IFG4.

[8]. **H. Deng**, D. Wu, and A. Xu, "Loss-imbalance equalization of AWG-based OADM," in *Optical Interconnects for Telecommunication and Data Communications*, X. Ren and S. Tang, Eds., vol. 4225. The International Society for Optical Engineering (SPIE), Oct. 2000, pp. 48-52.

[9]. D. Wu, **H. Deng**, and A. Xu, "Research on bidirectional OADMs (BADMs) based on AWGs (invited)," in *Proceedings of OFSET 2000*. Osaka, Japan: IEEJ & IEICE, Dec. 4-6, 2000.

[10]. **H. Deng**, D. Wu, and A. Xu, "Crosstalk analysis of AWG-based OADM," in *Proceedings of International Conference on Engineering and Technological Science 2000 (ICETS2000)*, J. Song and Y. Wang, Eds., vol. 2, Chinese Academy of Engineering. Beijing, China: New World Press, Oct. 11-13, 2000, paper SS220, pp. 221-227.

[11]. **H. Deng**, D. Wu, and A. Xu, "Crosstalk contrast of AWG-based OADM with loopback paths and foldback paths," in *Proceedings of International Conference on Engineering and Technological Science 2000 (ICETS2000)*, J. Song and Y. Wang, Eds., vol. 2, Chinese Academy of Engineering. Beijing, China: New World Press, Oct. 11-13, 2000, paper SS221, pp. 228—231.

[12]. **H. Deng**, D. Wu, and A. Xu, "Design on bidirectional add/drop multiplexer in bidirectional WDM self-healing ring networks," in *Proceedings of the 4th Annual Joint Workshop (on Modern Electronic Technologies and Applications)*. Beijing, China: Peking University (China) & Kyungpook National University (Korea), Dec. 10, 1999, pp. 106—111.

[13]. **H. Deng**, "Design and characterization of silicon-on-insulator passive polarization converter with finite element analysis," Ph.D. dissertation, University of Waterloo, Waterloo, Ontario, Canada, June 22, 2005 (Supervisors: Prof. David O. Yevick and Prof. Sujeet K. Chaudhuri; Examiners: Prof. Anand Gopinath, Prof. Safieddin Safavi-Naeini, Prof. Yung Leonard Chow, and Prof. Joseph Sanderson). University Library [Online]: http://etd.uwaterloo.ca/etd/hdeng2005.pdf

[14]. **H. Deng**, "Research on optical add/drop multiplexers (OADM) based on arrayed waveguide grating (AWG)," Master's thesis, Peking University, Beijing, China, June 2000, supervisors: Prof. Deming Wu and Prof. Anshi Xu.

[15]. **H. Deng**, "The application of ISP (in-system programmable) logic devices in digital systems," Bachelor's Thesis, Northwestern Polytechnical University, Xi'an, China, June 1997, advisor: Prof. Yi YUE. Distinguished as Excellent Thesis.

[16]. **H. Deng**, and D. Yang, "Metal-dielectric nanocomposites for sensor applications of surface plasmon resonance", in preparation.

[17]. **H. Deng**, and D. Yang, "Optical Characterization of Pulsed Laser Deposited Au-WO3 Nanocomposite Thin Films ", in preparation.

[18]. **H. Deng**, "Surface Plasma Resonance for Sensor Applications", NRC-IMTI technical report, in preparation, 78 pages finished.

Appendix B: List of Previous and Current References

References Available Upon Request.

Prof. Sujeet K. **Chaudhuri**, Prof. Safieddin **Safavi-Naeini**, and Prof. David. O. **Yevick** at the University of Waterloo; Prof. Paul E. **Jessop** at McMaster University; Prof. Anand **Gopinath** at the University of Minnesota, Minneapolis; Dr. Dongfang **Yang**, Dr. Bo **Chen** at the National Research Council Canada.

- Prof. **Sujeet K. Chaudhuri** (O'Donovan Research Chair; BE, MTech, *IIT*; MSc, PhD, *Manitoba*)
  (Former Dean of Engineering; Former Chair of ECE; Senior Member, IEEE)
  Department of Electrical & Computer Engineering, **University of Waterloo**, Ontario, N2L 3G1, Canada
  Tel: +1 (519) 8884567 ext. 2843, Fax: +1 (519) 746-3077; Email: sujeet@maxwell.uwaterloo.ca
- Prof. **Safieddin Safavi-Naeini** (NSERC/RIM Industrial Research Chair; MSc, PhD, *UIUC*)
  Department of Electrical & Computer Engineering, **University of Waterloo**, Ontario, N2L 3G1, Canada
  Tel: +1 (519) 8884567 ext. 2822, Fax: +1 (519) 746-3077; Email: safavi@maxwell.uwaterloo.ca
- Prof. **David O. Yevick** (*Fellow*, IEEE; *Fellow*, OSA; *Fellow*, APS; AB *Harvard*; MA, PhD, *Princeton*)
  Department of Physics (Adjunct, ECE), **University of Waterloo**, Ontario, N2L 3G1, Canada
  Tel: +1 (519) 8884567 ext. 5200, Fax: +1 (519) 746-8115; Email: yevick@uwaterloo.ca
- Prof. **Anand Gopinath** (*Fellow*, IEEE; *Fellow* IEE; *Fellow*, OSA; B. Eng, *Madras*; M. Tech., *IIT*; PhD, D. Eng., *Sheffield*)
  Department of Electrical & Computer Engineering, **University of Minnesota**, Minneapolis, MN 55455, U.S.A
  Tel: +1 (612)-625-3054, Fax: +1 (612) 625-4583; Email: gopinath@ece.umn.ca
- Prof. **Paul E. Jessop** (Chair of Engineering Physics; B.Sc. *Waterloo*, M.A., PhD, *Harvard*)
  Department of Engineering Physics, **McMaster University**, Hamilton, Ontario, L8S 4L7, Canada
  Tel: +1 (905) 525-9140 ext. 24928, Fax: +1 (905) 527-8409; Email: pjessop@mcmaster.ca
- Dr. **Dongfang Yang** (Research Officer of NRC; PhD, *Guelph*, PDF, *NRC*)
  Integrated Manufacturing Tech. Inst. (IMTI), **National Research Council** (NRC), Ontario, N6G 4X8, Canada
  Tel: +1 (519) 430-7147, Fax: +1 (519) 430-7064; Email: Dongfang.Yang@nrc.gc.ca
- Dr. **Bo Chen** (Research scientist; PhD, *McMaster*, PDF, *UWO*)
  Integrated Manufacturing Tech. Inst. (IMTI), **National Research Council** (NRC), Ontario, N6G 4X8, Canada
  Tel: +1 (519) 430-7170, Fax: +1 (519) 430-7090; Email: Bo.Chen@nrc.gc.ca