Henghua DENG

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Highlight

- Electrical Engineering, Electromagnetics, Optoelectronics, Photonics, Finite-Element Methods.
- Innovative, collaborative, preservative, self-confident, self-motivated, good problem-solving skills.

Objective

A research-based engineering position or a faculty position in electrical and computer engineering, optical communications, optoelectronics, computer software for Electromagnetics and photonics, etc.

EDUCATION

University of Waterloo, Ontario, CANADA 01/2001—07/2005
Doctor of Philosophy (**Ph.D.**), Electrical and Computer Engineering
Supervisors: Prof. David O. Yevick (*Fellow, IEEE, APS, OSA*)
and Prof. Sujeet K. Chaudhuri (Former *Dean of Eng. & Chair of ECE*)
A+, A+, A+ and A for all four credit courses (Cumulative GPA: 89.25/100)

Peking University, Beijing, CHINA 09/1997—07/2000
Master Degree (**M.A.Sc.**), Department of Electronics
Supervisors: Prof. Deming Wu (*Deputy Chair, National Lab. on Optical Comm.*)
and Prof. Anshi Xu (*Chair, Dept. of Electronics*)
Ten A+/A in thirteen core courses (Cumulative GPA: 86.7/100)

Northwestern Polytechnical University, Xi'an, CHINA 08/1993—07/1997
Bachelor Degree (**B.Eng.**) with highest honors, Department of Electrical Engineering
Ranked No. 1 (Best Overall) among over 1300 freshmen in the first year
Ranked No. 1 overall in the Department with 108 competitors for four years
(Cumulative GPA: 89.3/100; Core course GPA: 93.4/100)

SKILLS

- **Languages:** English, Chinese (Mandarin and Cantonese; Traditional and Simplified).
- **Mathematical Software:** MATLAB, FEMLAB, Mathematica, Maple, Origin, ...
- **Programming Languages:** Assembly language, Visual Basic, C/C++, Fortran, Pascal, ABEL, ...
- **Technical Software:** LaTeX, Protel, SPICE, HFSS, Labview, SYNARIO, ...
- **Computer Skills:** Unix, Linux, DOS, MS-Windows, MS-Office, Adobe, Ghostscript, Internet, Web Design (Dreamweaver), ...
- **Electrical Circuits:** Digital and Analog Circuits, Software and Hardware, Design and Fabrication, Microprocessors/Microchips (8051 & 89C51 families), Programmable Logic Devices (FPGA, GAL, ISPLSI, etc.), Liquid Crystal Display (LCD), Optical Lithography, …

Fast learning, thorough thinking, and comprehensive analyzing.

RESEARCH EXPERIENCE

- **Postdoctoral Fellow / Visiting Scholar** 08/2005—Present
  Department of Physics and Department of Electrical and Computer Engineering (since 01/2006), University of Waterloo, Ontario, CANADA
    - Split-operator and finite-difference beam propagation methods, finite-difference time-domain method (FDTD), ray tracing technique, radio-wave propagation and photonic band gap (PBG) fibers.
- **Research Assistant** 01/2001—07/2005
  Department of Electrical and Computer Engineering, University of Waterloo, Ontario, CANADA
    - Projects funded by: Canadian Institute for Photonic Innovations (CIPI), Natural Science and Engineering Research Council of Canada (NSERC), National Research Council Canada (NRC), and Nortel Networks. (Collaborated with the Center for Electrophotonic Materials and Devices (CEMD), McMaster University, Hamilton, Ontario, CANADA.)
        - **Photonics and Electromagnetics:** Integrated Optics, Silicon Photonics, III-V Semiconductor, Nano-photonics, Arrayed-Waveguide Gratings (AWG), and polarization manipulating devices.
        - **Numerical Methods**: Finite-Element Method (FEM), Finite-Difference Method (FDM), Beam-Propagation Method (BPM), Coupled Mode Theory (CMT), Perfectly-Matched Layer (PML), Adaptive Mesh Generation, Bending Analysis.
    - Developed sophisticated and efficient FEM packages for various electromagnetic/photonic problems, with both guided-wave and beam-propagation analysis. Designed a category of novel polarization converters on both III-V semiconductors and Silicon-on-Insulator (SOI).
- **Research Assistant** 09/1997—07/2000
  National Laboratory on Local Fiber-Optic Communication Networks and Advanced Optical Communication Systems (Beijing Division), Peking University, Beijing, CHINA
    - Optical Add/Drop Multiplexer in WDM Self-Healing Ring (Part of a National Natural Science Foundation China (NSFC) Project).
    - Monitoring and Controlling Optical Add/Drop Multiplexers (OADM) in All Optical Networks (AON) (part of a National *863* High Technology Project).
- **Research Assistant** 03/1997—07/1997
  Department of Electrical Engineering, Northwestern Polytechnical University, Xi'an, CHINA
    - Programmable Logic Devices and In-System Programmability (ISP) in Digital Systems.

TEACHING ACTIVITIES

- **Teaching Assistant,** Department of Electrical and Computer Engineering, University of Waterloo, Ontario, CANADA (Obtained *Certificate of Teaching Assistant* in 2001)
    - Electronic Devices (ECE231) 09/2002—12/2002
    - Photonic Communication Systems (ECE477 01/2002—04/2002
    - Digital Computation (PHYS239) 09/2001—10/2001
    - Fundamentals of Electrical Engineering (ECE100) 05/2001—08/2001
- **Teaching Assistant,** Department of Electronics, Peking University, Beijing, CHINA
    - Signal and System 03/1998—07/1998

INDUSTRY & ADMINISTRATION EXPERIENCE

- Industry Experience (Internship or contract)
  - **Electrical Engineer,** ECHO Technologies, Beijing, CHINA 08/2000—12/2000
  - **Technical Writer,** TRUE Software Corp., Beijing, CHINA 07/1998—08/1998
  - **Market Investigator,** Hui Kai Group, Xi'an, CHINA 03/1997—05/1997
  - **Engineering Worker,** Chengdu Airplane Manufactory, Sichuan, CHINA 07/1996—08/1996
- Administration and Management Experience
  - Vice-chairman, Graduate Student Association, Dept. of Electronics, Peking Univ. 09/1999
  - VP Education, Dept. of Electrical Engineering, Northwestern Polytechnical Univ. 06/1995
  - Committee member, the 13th Delegation, Northwestern Polytechnical Univ. 04/1995

MAJOR HONORS AND AWARDS

- **Honors and Fellowships**
  - **University of Waterloo Graduate Scholarship** (RA and TA) 2001—2005
  - **International Graduate Students Scholarship**, University of Waterloo 2001—2004
  - **Faculty of Engineering Award**, University of Waterloo 09/2001
  - **May 4th Fellowship**, Peking University, CHINA 11/1999
    (A highest honor named after the University Anniversary.)
  - **Outstanding Graduate of Shaanxi Province**, CHINA 07/1997
  - **Outstanding Graduate of Northwestern Polytechnical University**, CHINA 07/1997
  - **Special Prize of CATIC Fellowship**, CHINA 10/1996
    (A national wide scholarship among three first-class Universities in China. Sponsored by China National Aero-Technology Import & Export Corporation (CATIC). Only two persons won Special Prize each university each year.)
  - **Bao-Gang Educational Fellowship** (for Outstanding Student), CHINA 10/1995
    (A national wide scholarship among 20 first-class Universities in China. Sponsored by Baoshan Iron & Steel Corporation (Baosteel). Medal inscription by JIANG Zeming, President of CHINA.)
  - **57-62 Alumni Fellowship**, Northwestern Polytechnical University, CHINA 10/1994
    (Ranked No. 1 (**Best Overall**) among over 1300 freshmen. Titled as Most Excellent Student. Won highest scholarship — First Prize of 57-62 Fellowship.)
- **Competition Prizes**
  - First Prize, Contest on Electronic Circuit Experiments, NPU 04/1996
  - Special Prize, 95'China MCM (Mathematical Contest in Modeling), Shaanxi district. 10/1995
  - Successful Participant, MCM'95 (Mathematical Contest in Modeling) 02/1995
    (an international contest sponsored by American National Security Agency)
  - First Prize, Contest on Advanced Mathematics and English, NPU 04/1994

PUBLICATIONS

Detailed information in the attached *List of Publications and Reports*.

- **Referred Journal Papers:** IEEE/OSA JLT'2005 [1], IEEE PTL'2005 [2] [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];
- **Non-referred Conference Presentations and Posters:** CIPI'2004 [13], CIPI'2005/OPC'2005 [14];
- **Degree Theses:** Ph.D. 2005 [15], Master's 2000 [16], Bachelor's 1997 [17];
- **Technical Reports:** Course Project 2001 [18] [19] [20] [21], Ph.D. Proposal 2002 [22] [23].

PROFESSIONAL AFFILIATIONS

- **Member,** Institute of Electrical and Electronics Engineers (IEEE)
  Member, IEEE Laser & Electro-Optics Society (LEOS)
  Member, IEEE Microwave Theory and Techniques Society
- **Member,** Optical Society of America (OSA)

An active reviewer for journals published by IEEE and OSA, including: IEEE/OSA Journal of Lightwave Technology, IEEE Photonic Technology Letters (6 times in 2005), The Journal of the Optical Society of America A (JOSA:A), JOSA:B, Applied Optics, etc.

REFERENCES

- 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. 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. 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
- 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. Yung Leonard Chow, (Professor Emeritus; PhD, *Toronto*)
  Department of Electrical & Computer Engineering, University of Waterloo, Ontario, N2L 3G1, Canada
  Tel: +1 (519) 8884567 ext. 6231; Fax: +1 (519) 746-3077; Email: ylchow@mahtab.uwaterloo.ca

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List of Selected Publications and Reports

[1]. 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.

[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, and S. K. Chaudhuri, "Bending characteristics of asymmetric SOI polarization rotators," *IEEE Photon. Technol. Lett.*, vol. 17, no. 10, pp. 2113—2115, Oct. 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)*, revised manuscript submitted for publication.

[5]. C. Brooks, P. E. Jessop, H. Deng, D. O. Yevick, and G. Tarr, "Passive polarization rotating waveguides in silicon-on-insulator," *Optical Engineering*, to appear.

[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]. —, "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]. —, "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 procedures for slanted-angle SOI polarization rotators," 2004 Canadian Institute for Photonic Innovations (CIPI) Annual Meeting, Sherbrooke, Quebec, June 20-23, 2004.

[14]. H. Deng, "Fabrication Tolerance Study of Asymmetric SOI Polarization Rotators," 2005 Canadian Institute for Photonic Innovations (CIPI) Annual Meeting, Hamilton, Ontario, May 29-31, 2005; also presented at the First Annual Showcase of the Ontario Photonics Consortium, McMaster University, Hamilton, Ontario, June 1, 2005.

[15]. 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

[16]. —, "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.

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

[18]. —, "Research on the principle of arrayed waveguide grating (AWG)," ECE678 Course Project, University of Waterloo, Ontario, Canada, Apr. 2001.

[19]. —, "Gallium Arsenide (GaAs) heterojunction bipolar transistors (HBT)," ECE705 Course Project, University of Waterloo, Ontario, Canada, Mar. 2001.

[20]. —, "Research on arrayed waveguide grating (AWG)," ECE770 Course Project, University of Waterloo, Ontario, Canada, Apr. 2001.

[21]. Y. Liu, H. Deng, X. Chen, and Z. Wang, "Document classification & clustering using support vector machine (SVM)," SYDE622 Course Project, University of Waterloo, Ontario, Canada, Dec. 2001.

[22]. H. Deng, "Arrayed waveguide grating (AWG) and modeling methods," ECE Ph.D. Proposal, University of Waterloo, Ontario, Canada, June 2002.

[23]. —, "Silicon on insulator (SOI) polarization independent arrayed waveguide gratings (AWG)," ECE Ph.D. Proposal, University of Waterloo, Ontario, Canada, Oct. 2002.