# Henghua DENG

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## Highlights

- **Optoelectronics**. **Photonic Devices. Optical Engineering.** Electronics. Semiconductors. Electromagnetics.
- Advanced fabrication skills for Optoelectronics/Electronics/Nanophotonics.
- WDM system architectures, photonic integrated circuit (PIC), optical signal processing, optical polarization control.

## PROFESSIONAL EXPERIENCE

OPTICAL ENGINEERING, FIBER OPTICS, & PHOTONICS

08/2005—07/2006 **University of Waterloo**, Ontario, CANADA

- **Researcher**, Electrical & Computer Engineering (with Drs. D. Yevick, S. Safavi-Naeini and S. K. Chaudhuri)
  - Analyzed novel photonic crystal polarization splitters and photonic bandgap devices (PBG).
  - Investigated bent optical waveguide arrays for Bloch oscillation through simulation of optical wave propagation.
  - Counseled FemSIM, MOST and BeamPROP modules for RSoft's technical team.
  - Excelled in computational electromagnetics (EM) algorithms and EM software (HFSS, FEKO) for optoelectronics.

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

- **Research Assistant**, Electrical & Computer Engineering (with Drs. D. Yevick and S. K. Chaudhuri)
  - Innovated integrated photonic polarization controllers with silicon-on-insulator (SOI) technology.
  - Developed efficient computer aided design (CAD) codes for guided-wave and beam-propagation analysis.
  - Researched silicon photonics, III-V semiconductors, and optoelectronic integrated circuits (OEIC).
  - Mastered numerical techniques such as finite-element method (FEM), finite-difference time-domain method (FDTD), finite-difference method (FDM), beam-propagation method (BPM), ray tracing, and automatic adaptive meshing.

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

- **Research Assistant**, National Key Laboratory for Optical Communications (with Profs. Deming Wu and Anshi Xu)
  - Constructed optical add/drop multiplexer (OADM) & optical cross-connect (OXC) with arrayed-waveguide grating (AWG). Improved optical crosstalk and loss performances with foldback path configuration for AWG-based OADMs.
  - Demonstrated DWDM self-healing ring networks with reconfigurable bi-directional OADM.
  - Implemented monitoring, switching, and routing of signals in all optical networks (AON).
  - Fabricated microprocessor (8051, 89C51) systems on printed circuit board (PCB) for optical power supervision.

ELECTRONICS, NANOPHOTONICS, & NANOFABRICATION

07/2000—12/2000 **ECHO Technologies**, Beijing, CHINA

- **Electrical Engineer**, Research & Development (R&D) Department
  - Realized intelligent remote terminal unit (RTU) automatic control with graphical liquid crystal display (LCD).
  - Communicated between microprocessor (89C51) PCB circuit and computers through RS-485 & RS-232 interfaces with Protel design and Assembly, C & VB programming.
  - Tested random access memory (RAM) and graphical user interface (GUI).
  - Experimented programmable logic devices (FPGA, GAL) and in-system programmability (ISP) in digital circuits.

08/2006—07/2007 **National Research Council (NRC),** Integrated Manufacturing Tech. Inst. (IMTI), London, ON, CANADA

- **NSERC Visiting Fellow in Government Laboratories**, Precision and Freeform Fabrication Technologies
  - Studied nanophotonics/biophotonics/nanomaterials/nanofabrication, pulsed laser deposition (PLD), laser machining.
  - Manufactured real-time high-resolution chemical and biomedical sensors with nanocomposite thin films.
  - Programmed surface plasma resonance (SPR), optical filters, and thin film sensors.

## SKILLS

- **Technical Software:** RSoft products, FEMLAB/Comsol Multiphysics, Ansoft HFSS, FEKO, Protel (PCB & SCH), AutoCAD, SPICE, Labview, SYNARIO, SCI FilmTEK, TFCalc, Essential Macleod, ...
- **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, ...
- **Mathematical Software:** MATLAB, Mathematica, Maple, Origin, ...
- **Electrical Circuits:** Digital and Analog Circuits, Microprocessors/Microchips (8051 & 89C51 families), Programmable Logic Devices (FPGA, GAL, ISPLSI), 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, …

## EDUCATION

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

- **PhD**, Electrical & Computer Engineering (with Drs. D. Yevick & S. K. Chaudhuri)
- Thesis: Design of silicon-on-insulator photonic polarization converter with finite element analysis (FEM)

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

- **Master**, Communication & Information Systems, Dept. of Electronics (with Profs. Deming Wu & Anshi Xu)
- Thesis: Arrayed-waveguide-grating based optical add/drop multiplexers in all optical telecommunication networks

08/1993—07/1997 **Northwestern Polytechnical University**, Xi'an, CHINA

- **Bachelor**, Electronic Engineering (**National** and provincial awards. Core Course GPA: 93.4/100)
- Ranked 1st university-wide (1993-1994, 1300 competitors) & department-wide (1993-1997, 108 rivals)

## HONORS AND DISTINCTIONS

03/2006 Natural Science and Engineering Research Council of Canada (NSERC) Industrial R & D Fellowship (IRDF)

04/2006 NSERC Visiting Fellowship 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)

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

- *National*: Special Prize of CATIC Fellowship (10/1996), Bao-Gang Educational Fellowship (10/1995)
- *Provincial*: Outstanding Graduate of the Province (07/1997), Provincial Special Prize of 95'China MCM (10/1995)
- *University*: Outstanding Graduate of the University (07/1997), Best Overall Freshman Fellowship (10/1994)
- Successful Participant of International MCM'95 (Mathematical Contest in Modeling) (02/1995)

## AFFILIATIONS

- **Member, Optical Society of America (OSA),** since 2004
- **Member, IEEE** (Societies: LEOS, ComSoc, MTT-S)**,** since 2004
- **Member, Canadian Institute of Photonics Innovation (CIPI-S),** since 2003
- **Reviewer** for prestigious journals published by OSA and IEEE
  IEEE/OSA Journal of Lightwave Technology (JLT), IEEE Photonic Technology Letters (PTL) (>12 reviews), The Journal of the Optical Society of America A (JOSA A), 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.

## PUBLICATIONS

[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]. **--**, "The fabrication tolerance of silicon-on-insulator polarization rotators," *JOSA A*, vol. 23, pp.1741-1745, July 2006.

[3]. **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.

[4]. **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.

[5]. **H. Deng**, D. Wu, and A. Xu, "Loss-imbalance equalization of AWG-based OADM," *Proceedings of SPIE*, vol. 4225, pp. 48-52, Oct. 2000.

[6]. **--**, "Crosstalk contrast of AWG-based OADM with loopback paths and foldback paths," *Proceedings of ICETS 2000*, pp. 228-231, Oct. 2000.

[7]. **H. Deng**, and D. Yang, "Optical characterization of pulsed laser deposited Au-$WO_3$ nanocomposite thin films", NanoForum Canada, June 18-20, 2007.

[8]. **H. Deng**, and D. Yang, "Au-$WO_3$ and Ag-$WO_3$ nanocomposite thin films for surface plasmon resonance sensors", to be submitted to Journal of Applied Physics.

## REFERENCE

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

## MISCELLANEOUS

- **Languages**: English, Chinese (Mandarin and Cantonese; Traditional and Simplified).
- **Citizenship**: Canadian Citizen (eligible to work in USA with **TN** visa).