

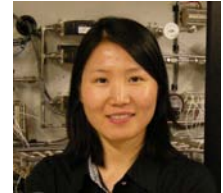
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## (Ms.) Hongping Zhao

Information updated up to: **Oct. 2009**

### **Contact Information**

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### **Birth Date and Place & Citizenship**

October 1980, Suzhou, China & Chinese

### **Education**

**Jan. 2007 – present, Lehigh University (Bethlehem, Pennsylvania, USA)**

**Ph.D. Candidate** in Electrical Engineering, Department of Electrical and Computer Engineering

- Cumulative GPA: 3.93/4.0 (as of May 2009)
- Research Assistant, PhD Advisor: Prof. Nelson Tansu (ECE, Lehigh)
- Research Areas: physics of III-Nitride semiconductor optoelectronics materials and devices, physics of III-Nitride semiconductor nanostructures, and III-Nitride semiconductors light emitting diodes and lasers.

**Sep. 2003 – Dec. 2006, Southeast University (Nanjing, China)**

**Master of Sciences (M.S.)** in Electrical Engineering

- Cumulative GPA: 3.85 / 4.0, Rank: 1<sup>st</sup> out of 97 students
- Specialization: Carbon Nanotube based Field Emission Display (CNT-FED)
- Research Assistant, Advisor: Prof. Wei Lei (ECE, Southeast University)
- Thesis: Study on cathode emission and structure design of high-frequency devices

**Sep. 1999 – Jul. 2003, Nanjing Normal University (Nanjing, China)**

**Bachelor of Science (B.S.)** in Physics

- Graduate with 1<sup>st</sup> Class Honors, Rank: 2<sup>nd</sup> out of 245 students
- Award: "Excellent Graduation Project Thesis"

### **Professional Experiences**

**Jan 2007 – present, Lehigh University (Bethlehem, PA, USA)**

**Ph.D. Candidate and Research Assistant**

Department of Electrical and Computer Engineering (ECE)

P. C. Rossin College of Engineering and Applied Science

& Center for Optical Technologies (COT)

Ph.D. Advisor: Prof. Nelson Tansu

- **III-Nitride Semiconductor Nanostructures for High Performance Light Emitting Diodes and Lasers**
  - Conduct accurate simulation and device physics of the III-Nitride semiconductor nanostructure
  - MOCVD epitaxy and device fabrication of III-Nitride semiconductor optoelectronics devices
  - Develop novel gain media with enhanced radiative recombination rate and optical gain for III-Nitride light emitting diodes and lasers.

Sep. 2003 – Dec. 2006

Southeast University (Nanjing, China)

**Master Graduate Student and Research Assistant**

- **Carbon Nanotube based Field Emission Display (CNT-FED)**
  - Developed a novel triode structure with insulator channel to improve the uniformity of field emission
  - Performed a study on the influence of residual gases to the cathode in FED device
- **Microwave Tube with cold cathode**
  - Fabricated Carbon Nanotube with high current density by Chemical Vapor Deposition
  - Designed Electro-Optical system to get well controlled electron beam in Microwave Tube

**Research Interests**

My research areas cover the fundamental device physics, technology, epitaxy (MOCVD), and fabrication of semiconductor optoelectronics devices based on semiconductor nanostructures. My research works include fundamental studies and novel approaches to improve radiative recombination rate and optical gain of visible gain media based on III-Nitride semiconductors for high efficiency light emitting diodes (LEDs) and lasers for applications in solid state lighting and biomedical lasers.

**Awards & Honors Received**

- **Feng Ruer Scholarship** (2002), Nanjing Normal University
  - *This scholarship is awarded by Nanjing Normal University to the students displaying excellent academic and practical ability in each department (awarded to 2 students in physics department).*
- **Leadership Awards** (2002-2003), Nanjing Normal University
  - *This award is awarded by Nanjing Normal University to the students with excellent communication and leadership skills (awarded to 1 student)*
- **Best Student Awards** (2000-2003), Nanjing Normal University
  - *This award is awarded by the Physics Department at Nanjing Normal University to the students with good academic performance in physics (awarded to 1 student)*
- **SEU Outstanding Scholarship** (2004), Southeast University
  - *This scholarship is awarded by Southeast University to graduate students with highest academic performance in each department (awarded to 1 student in the electrical engineering department).*
- **Lehigh University Research Assistantship**, Jan. 2007- present, Lehigh University
- **Phi Beta Delta Honors** (Inducted in 2007), Lehigh University
  - *This honor is to recognize the scholarly achievement of international students and scholars, U.S. students who have studied abroad and faculty and staff who are involved in international activities.*
- **Sigma Xi Research Society** (Inducted in 2008), Lehigh University
  - *Sigma Xi, the Scientific Research Society, is the honor society of scientists and engineers that recognizes scientific achievement.*
- **SPIE Educational Scholarship in Optical Science and Engineering** (2008), SPIE
  - *This scholarship is to award the upcoming generations of scientists and engineers who will develop the potential of optics and photonics.*
- **Sherman-Fairchild Fellowship for solid state studies** (2008-2009), Lehigh University
- **SPIE Scholarship in Optical Science and Engineering**(2009), SPIE

**Professional Affiliations**

2007 – present, Student Member, Institute of Electrical and Electronics Engineers (IEEE)

2007 – present, Student Member, IEEE Laser and Electro-Optics Society

2007 – present, Student Member, International Society for Optical Engineering (SPIE)

2007 – present, Student Member, Optical Society of America (OSA)

## Refereed Journal and Conference Publications

**Publication Name Search in ISI Web of Knowledge:** (zhao hp and tansu) or (zhao hp and lei w)

1. X. Zhong, **H. Zhao**, W. Lei, X. Zhang, H. Yin, W. van der Poel, D. den Engelsen, "Numerical study of the electron and ion trajectories in HOPFEDs," *Journal of the Society for Information Display*, 12(4), 483-488, 2004.
2. **H. Zhao**, W. Lei, X. Zhang, W. Gu, and Y. Zhang, "Simulation of the distribution of carbon nanotube-based cathodes for microwave tubes," *The 18th Vacuum Nanoelectronics Conference IVNC 2005*, Oxford UK, Jan. 2005.
3. **H. Zhao**, W. Lei, X. Zhang, X. Li, and Q. Wang, "Simulation of the cathode surface damages in a HOPFED during ion bombardment," *Journal of Vacuum Science & Technology B*, 23(6), 3148-3152, 2005.
4. W. Lei, X. Zhang, X. Zhou, Z. Zhu, C. Lou, and **H. Zhao**, "Characteristics of a cold cathode electron source combined with secondary electron emission in a FED," *Applied Surface Science*, 251, 170-176, 2005.
5. M. Liu, X. Zhang, W. Lei, **H. Zhao**, and B. Wang, "Transverse energy distribution analysis in a field emission element with an insulator funnel," *Nuclear Instruments and Methods in Physics Research Section B*, 234(3), 210-218, 2005.
6. **H. Zhao**, W. Lei, X. Zhang, and G. Yang, "Numerical Analysis of the Performance of Field Emission Display with Secondary Electrons Emission," *The Seventh IEEE International Vacuum Electronics Conference and Sixth IEEE International Vacuum Electron Sources Conference*, California, USA, Apr. 2006.
7. C. Li, W. Lei, X. Zhang, **H. Zhao**, and G. Yang, "A New Structure to Improve the Luminance Efficiency of a FED Panel," *The Seventh IEEE International Vacuum Electronics Conference and Sixth IEEE International Vacuum Electron Sources Conference*, California, USA, Apr. 2006.
8. Q. Wang, H. Mu, X. Zhang, W. Lei, J. Wang, and **H. Zhao**, "Field emitters with low turn on electric field based on carbon fibers," *Applied Surface Science*, 253(14), 5980-5984, 2007.
9. (**Invited Conference Paper**) R. A. Arif, Y. K. Ee, **H. Zhao**, M. Jamil, and N. Tansu, "Nanostructure Engineering of InGa<sub>N</sub>-Based Active Regions for Improved III-Nitride Gain Media Emitting at 420-650 nm," in *Proc. of the European MRS (E-MRS) Spring Meeting 2007: Symposium F: Novel Gain Materials and Devices Based on III-N-V Compounds*, Strasbourg, France, May-June 2007.
10. Y. K. Ee, **H. Zhao**, R. A. Arif, M. Jamil, and N. Tansu, "Self-Assembled InGa<sub>N</sub> Quantum Dots on GaN Grown by Metalorganic Vapor Phase Epitaxy," in *Proc. of the 13<sup>th</sup> Biennial Workshop on Organometallic Vapor Phase Epitaxy (OMVPE) 2007*, Salt Lake City, UT, August 2007.
11. **H. Zhao**, R. A. Arif, Y. K. Ee, and N. Tansu, "Optical Gain Analysis of Strain Compensated InGa<sub>N</sub>-AlGa<sub>N</sub> Quantum Well Active Regions for Lasers Emitting at 420-520 nm," in *Proc. of the 7<sup>th</sup> International Conference on Numerical Simulation of Optoelectronic Devices (NUSOD 2007)*, Newark, DE, September 2007.
12. **H. Zhao**, R. A. Arif, Y. K. Ee, and N. Tansu, "Optical Gain Analysis of Staggered InGa<sub>N</sub> Quantum Wells Active Regions for Lasers Emitting at 420-500 nm," in *Proc. of the 20<sup>th</sup> IEEE Laser and Electro-Optics Society (LEOS) Annual Meeting 2007*, Lake Buena Vista, FL, October 2007.
13. **H. Zhao**, R. A. Arif, Y. K. Ee, and N. Tansu, "Optical Gain and Spontaneous Emission of Strain-Compensated InGa<sub>N</sub>-AlGa<sub>N</sub> Quantum Wells Including Carrier Screening Effect," in *Proc. of the SPIE Photonics West 2008, Physics and Simulation of Optoelectronics Devices XVI*, San Jose, CA, Jan 2008.
14. R. A. Arif, Y. K. Ee, **H. Zhao**, and N. Tansu, "Radiative Efficiency and Spontaneous Recombination Rate of Staggered InGa<sub>N</sub> Quantum Wells Light Emitting Diodes Emitting at 420-510 nm," in *Proc. of the SPIE Photonics West 2008, Light-Emitting Diodes: Research, Manufacturing, and Applications XII*, San Jose, CA, Jan 2008.
15. R. A. Arif, **H. Zhao**, and N. Tansu, "Type-II InGa<sub>N</sub>-Ga<sub>N</sub>As Quantum Wells Active Regions for Lasers Applications," *Appl. Phys. Lett.* vol. 92(1), Art. No. 062801, January 2008.
16. **H. Zhao**, R. A. Arif, Y. K. Ee, and N. Tansu, "Optical Gain Analysis of Strain-Compensated InGa<sub>N</sub>-AlGa<sub>N</sub> Quantum Well Active Regions for Lasers Emitting at 420-500 nm," *Optical and Quantum Electronics*, vol. 40 (5-6), 301-306, April 2008.
17. Y. K. Ee, **H. Zhao**, R. A. Arif, M. Jamil, and N. Tansu, "Self-Assembled InGa<sub>N</sub> Quantum Dots on GaN Grown by Metalorganic Vapor Phase Epitaxy," *J. Crystal Growth*, vol. 310(7-9), pp.2320-2325, April 2008.
18. **H. Zhao**, R. A. Arif, Y. K. Ee, and N. Tansu, "Approaches for Low-Threshold 'Green' Nitride Lasers Diodes," in *IEEE Semiconductor Lasers Workshop 2008*, San Jose, CA, May 2008.
19. **H. Zhao**, R. A. Arif, G. S. Huang, Y. K. Ee, and N. Tansu, "Self-Consistent Optical Gain Analysis and Epitaxy of Strain-Compensated InGa<sub>N</sub>-AlGa<sub>N</sub> Quantum Wells for Laser Applications," in *Proc. of the IEEE/OSA Conference on Lasers and Electro-Optics (CLEO) 2008*, San Jose, CA, May 2008.

20. R. A. Arif, **H. Zhao**, and N. Tansu, "InGaN-GaNAs Type-II 'W' Quantum Well Lasers for Emission at 450-nm," in *Proc. of the IEEE/OSA Conference on Lasers and Electro-Optics (CLEO) 2008*, San Jose, CA, May 2008.
21. R. A. Arif, **H. Zhao**, Y. K. Ee, S. T. Penn, V. Dierolf, and N. Tansu, "Spontaneous Recombination Rate and Luminescence Efficiency of Staggered InGaN Quantum Wells Light Emitting Diodes," in *Proc. of the IEEE/OSA Conference on Lasers and Electro-Optics (CLEO) 2008*, San Jose, CA, May 2008.
22. R. A. Arif, **H. Zhao**, Y. K. Ee, and N. Tansu, "Spontaneous Emission and Characteristics of Staggered InGaN Quantum Wells Light Emitting Diodes," *IEEE J. Quantum Electron.*, vol. 44(5-6), pp.573-580, May-June 2008.
23. M. Jamil, **H. Zhao**, J. Higgins, and N. Tansu, "MOVPE Growth and Photoluminescence of Narrow-Bandgap InN Alloys on GaN / Sapphire Substrate Using Pulsed Growth Mode," in *Proc. of the 14th Int. Conf. – Metalorganic Vapor Phase Epitaxy (IC-MOVPE XIV) 2008*, Metz, France, June 2008.
24. **(Invited Conference Paper)** N. Tansu, R. A. Arif, Y. K. Ee, **H. Zhao**, H. Tong, M. Jamil, and G. S. Huang, "Nano-Engineering of III-Nitride Semiconductor Optoelectronics and New Applications," in *Proc. of the International Conferences of Materials and Technologies (CIMTEC) 2008 – 3rd International Conference on Smart Materials, Structures and Systems*, Sicily, Italy, June 2008.
25. M. Jamil, **H. Zhao**, J. Higgins, and N. Tansu, "Narrow Band Gap (0.77 eV) InN on GaN / Sapphire Substrate by Pulsed MOCVD Growth Mode," in *Proc. of the TMS Electronics Material Conference (EMC) 2008*, Santa Barbara, CA, June 2008.
26. **(Invited Conference Paper)** N. Tansu, R. A. Arif, **H. Zhao**, G. S. Huang, and Y. K. Ee, "Polarization Engineering of III-Nitride Nanostructures for High-Efficiency Light Emitting Diodes," in *Proc. of the SPIE Optics + Photonics 2008, The 8<sup>th</sup> International Conference on Solid State Lighting*, San Diego, CA, August 2008.
27. **H. Zhao**, R. A. Arif, and N. Tansu, "Self Consistent Gain Analysis of Type-II 'W' InGaN-GaNAs Quantum Well Lasers," *J. Appl. Phys.*, 104 (4), Art. 043104, August 2008.
28. **(Invited Conference Paper)** N. Tansu, **H. Zhao**, R. A. Arif, Y. K. Ee, G. Liu, X. Li, and G. S. Huang, "Polarization Engineering of InGaN-Based Nanostructures for Low-Threshold Diode Lasers and High-Efficiency Light Emitting Diodes," in *Proc. of the IEEE Photonics Global 2008, Nanophotonics Symposium*, Singapore, Republic of Singapore, December 2008.
29. M. Jamil, **H. Zhao**, J. Higgins, and N. Tansu, "MOVPE and Photoluminescence of Narrow Band Gap (0.77 eV) InN on GaN / Sapphire by Pulsed Growth Mode," in *Physica Stat. Solidi (a)*, vol. 205(12), pp. 2886-2891, December 2008.
30. M. Jamil, **H. Zhao**, J. Higgins and N. Tansu, "Influence of growth temperature and V/III ratio on the optical characteristics of narrow band gap (0.77 eV) InN grown on GaN/sapphire using pulsed MOVPE," *Journal of Crystal Growth*, vol. 310(23), pp. 4947-4953, November 2008.
31. **H. Zhao**, R. A. Arif, Y. K. Ee, and N. Tansu, "Self-Consistent Analysis of Strain-Compensated InGaN-AlGaIn Quantum Wells for Lasers and Light Emitting Diodes," *IEEE J. Quantum Electron.*, vol. 45(1), pp. 66-78, January 2009.
32. **H. Zhao**, M. Jamil, G. S. Huang, H. Tong, A. M. Driscoll, and N. Tansu, "Characteristics of InN Semiconductors Grown on Ga-Polar and N-Polar GaN Templates by Pulsed Metalorganic Vapor Phase Epitaxy," in *Proc. of the SPIE Photonics West 2009, Gallium Nitride Materials and Devices IV*, San Jose, CA, Jan 2009.
33. **H. Zhao**, R. A. Arif, G. S. Huang, Y. K. Ee, and N. Tansu, "Growths of Staggered InGaN Quantum Wells Light Emitting Diodes at 470-480 nm Employing Graded Temperature Profile," in *Proc. of the SPIE Photonics West 2009, LEDs: Materials, Devices, and Applications for Solid State Lighting XIII*, San Jose, CA, Jan 2009.
34. **H. Zhao**, R. A. Arif, and N. Tansu, "Design of Staggered InGaN Quantum Wells for Green Diode Lasers," in *Proc. of the SPIE Photonics West 2009, Novel In-Plane Semiconductor Lasers VIII*, San Jose, CA, Jan 2009.
35. **H. Zhao**, R. A. Arif, and N. Tansu, "Analysis of Current Injection Efficiency and Efficiency Droop of InGaIn Quantum-Wells Light-Emitting Diodes," in *Proc. of the SPIE Photonics West 2009, Physics and Simulation of Optoelectronics Devices XVII*, San Jose, CA, Jan 2009.
36. H. Tong, **H. Zhao**, and N. Tansu, "Analysis of Thermoelectric Characteristics of InGaIn Semiconductors," in *Proc. of the SPIE Photonics West 2009, Physics and Simulation of Optoelectronics Devices XVII*, San Jose, CA, Jan 2009.
37. **H. Zhao**, M. Jamil, G. Liu, G. S. Huang, H. Tong, G. Xu, Y. J. Ding, N. Tansu, "Pulsed Metalorganic Vapor Phase Epitaxy of In-Polar and N-Polar InN Semiconductors on GaN / Sapphire Templates for Terahertz Emitters," in *Proc. of the IEEE/OSA Conference on Lasers and Electro-Optics (CLEO) 2009*, Baltimore, MD, May 2009.

38. **H. Zhao**, G. Liu, X. Li, G. S. Huang, S. Tafon Penn, V. Dierolf, and N. Tansu, "Staggered InGaN Quantum Wells Light-Emitting Diodes at 520-nm Employing Graded Temperature Growths," in Proc. of the *IEEE/OSA Conference on Lasers and Electro-Optics (CLEO) 2009*, Baltimore, MD, May 2009.
39. G. Xu, Y. J. Ding, **H. Zhao**, M. Jamil, N. Tansu, I. B. Zotova, C. E. Stutz, D. E. Diggs, N. Fernelius, F. K. Hopkins, C. S. Gallinat, G. Koblmüller, and J. S. Speck, "THz Generation from InN Films Based on Interference between Optical Rectification and Photocurrent Surge," in Proc. of the *IEEE/OSA Conference on Lasers and Electro-Optics (CLEO) 2009*, Baltimore, MD, May 2009.
40. G. Sun, S. K. Tripathy, Y. J. Ding, G. Liu, G. S. Huang, **H. Zhao**, N. Tansu, and J. B. Khurgin, "Stark Effect Induced by Photogenerated Carriers in Multiple GaN/AlN Asymmetric Coupled Quantum Wells," in Proc. of the *IEEE/OSA Conference on Lasers and Electro-Optics (CLEO) 2009*, Baltimore, MD, May 2009.
41. **H. Zhao**, G. S. Huang, G. Liu, X. Li, J. D. Poplawsky, S. Tafon Penn, V. Dierolf, and N. Tansu, "Characteristics of Staggered InGaN Quantum Wells Light-Emitting Diodes Emitting at 480-525 nm," in Proc. of the *67<sup>th</sup> IEEE Device Research Conference (DRC) 2009*, University Park, PA, June 2009.
42. **H. Zhao**, R. A. Arif, and N. Tansu, "Design Analysis of Staggered InGaN Quantum Wells Light-Emitting Diodes at 500-540 nm," *IEEE J. Selected Topics in Quantum Electronics*, vol. 15 (4), pp. 1104-1114, July-August 2009.
43. Y. K. Ee, P. Kumnorkaew, R. A. Arif, H. Tong, **H. Zhao**, J. F. Gilchrist, and N. Tansu, "Optimization of Light Extraction Efficiency of III-Nitride Light Emitting Diodes with Self-Assembled Colloidal-based Microlenses," *IEEE J. Selected Topics in Quantum Electronics*, vol. 15 (4), pp. 1218-1225, July-August 2009.
44. (**Invited Conference Paper**) N. Tansu, **H. Zhao**, R. A. Arif, Y. K. Ee, G. Liu, X. Li, H. Tong, and G. S. Huang, "Novel Approaches for Efficiency Enhancement in InGaN-Based Light-Emitting Diodes," in Proc. of the *2<sup>nd</sup> International Conference on White LEDs and Solid State Lighting 2009*, Taipei, Taiwan, December 2009.
45. **H. Zhao**, G. Liu, X. H. Li, G. S. Huang, J. D. Poplawsky, S. Tafon Penn, V. Dierolf, and N. Tansu, "Growths of Staggered InGaN Quantum Wells Light-Emitting Diodes Emitting at 520-525 nm Employing Graded-Temperature Profile," *Appl. Phys. Lett.*, vol. 95(6), Art. No. 061104, Aug. 2009.
46. **H. Zhao**, G. Liu, and N. Tansu, "Surface Plasmon Dispersion Engineering Utilizing Double-Metallic Ag / Au Layers for InGaN Quantum Wells Light Emitting Diodes," in Proc. of the *SPIE Photonics West 2010, LEDs: Materials, Devices, and Applications for Solid State Lighting XIV*, San Francisco, CA, Jan 2010. (accepted)
47. X. H. Li, H. Tong, **H. Zhao**, and N. Tansu, "Band Structure Calculation of Dilute-As GaNAs by First Principle," in Proc. of the *SPIE Photonics West 2010, Physics and Simulation of Optoelectronics Devices XVIII*, San Francisco, CA, Jan 2010. (accepted)
48. G. Liu, **H. Zhao**, and N. Tansu, "Electron-Phonon and Electron-Photon Intersubband Scattering Rates in Asymmetric AlN / GaN Coupled Quantum Wells," in Proc. of the *SPIE Photonics West 2010, Physics and Simulation of Optoelectronics Devices XVIII*, San Francisco, CA, Jan 2010. (accepted)
49. H. Tong, J. A. Herbsommer, V. A. Handara, **H. Zhao**, G. Liu, and N. Tansu, "Thermal Conductivity Measurement of Pulsed-MOVPE InN Alloy Grown on GaN / Sapphire by 3  $\omega$  Method," in Proc. of the *SPIE Photonics West 2010, Gallium Nitride Materials and Devices V*, San Francisco, CA, Jan 2010. (accepted)
50. (**Invited Journal Paper**) **H. Zhao**, G. Liu, X.H. Li, R. A. Arif, G. S. Huang, J. D. Poplawsky, S. T. Penn, V. Dierolf, and N. Tansu, "Design and Characteristics of Staggered InGaN Quantum Wells Light-Emitting Diodes in Green Spectra Regime," *IET Optoelectronics* (accepted).

#### **Submitted Refereed Journal and Conference Publications**

1. (**Invited Topical Review Article**) N. Tansu, R. A. Arif, Y. K. Ee, **H. Zhao**, G. S. Huang, H. Tong, and M. Jamil, "Recent Progress on High Efficiency InGaN Quantum Wells and Quantum Dots Light Emitting Diodes for Solid State Lighting – A Review," *J. Phys. D: Appl. Phys.* (submitted).
2. (**Invited Review Article**) **H. Zhao**, R. A. Arif, Y. K. Ee, H. Tong, G. S. Huang, and N. Tansu, "Physics of III-Nitride Gain Media for Laser Applications," *Lasers and Photonics Review* (submitted).
3. (**Invited Journal Paper**) **H. Zhao**, R. A. Arif, Y. K. Ee, H. Zhao, G. S. Huang, H. Tong, and N. Tansu, "Approaches for High Internal Quantum Efficiency in InGaN Quantum Well Light Emitting Diodes," *IEEE Photonics Journal* (submitted).
4. **H. Zhao**, R. A. Arif, and N. Tansu, "Current Injection Efficiency Quenching Leading to Efficiency Droop in InGaN Quantum Well Light-Emitting Diodes," *J. Appl. Phys.* (submitted).

5. **H. Zhao**, R. A. Arif, and N. Tansu, "Optical Gain and Lasing Properties of Staggered InGaN Quantum Well Lasers Emitting at 500 nm," *J. Appl. Phys.* (submitted).

### **Other Technical Publications**

1. W. Gu, M. Yang, **H. Zhao**, X. Yang, and W. Lei, "S-correction in very slim CRT," *Journal of Southeast University*, 20(3), 272-276, 2005.
2. **H. Zhao**, W. Lei, X. Zhang, W. Gu, and X. Li, "Structure design for electron beam controlling in microwave tube with carbon nanotube cathode," *Journal of Southeast University*, 22(2), 159-163, 2006.

### **Patents or Invention Disclosures**

1. Nelson Tansu, Ronald A. Arif, Yik Khoon Ee, and **Hongping Zhao**, *Novel approach using polarization engineering for achieving nitride-based gain media with significant enhancement in radiative recombination rate and optical gain for high efficiency LEDs and lasers.* (PCT Application and US Patent Pending).

### **Selected Research Works Featured in Magazine / Newspapers**

1. "More Efficient LEDs for a Brighter Future" in NanoBriefs of *Resolve magazine*, vol.2, Fall 2007.
2. "NSF, DARPA see the light on Lehigh's wide bandgap semiconductor research" in *Lehigh News Center Highlight*, September 26<sup>th</sup> 2007.  
[http://www3.lehigh.edu/News/V2news\\_story.asp?iNewsID=2387&strBack=%2Finsidelehigh%2Fdefault%2Easp](http://www3.lehigh.edu/News/V2news_story.asp?iNewsID=2387&strBack=%2Finsidelehigh%2Fdefault%2Easp)
3. "Bridging the 'Green' LED Gap to Provide Greener Lighting" in *Lehigh News Center Highlight*, April 11<sup>th</sup> 2008.  
[http://www3.lehigh.edu/News/V2news\\_story.asp?iNewsID=2708&strBack=%2Finsidelehigh%2Fdefault%2Easp](http://www3.lehigh.edu/News/V2news_story.asp?iNewsID=2708&strBack=%2Finsidelehigh%2Fdefault%2Easp)
4. "Finding Energy Solutions" in *Cover Story Feature* section of *Lehigh Alumni Bulletin*, Winter 2009.  
[http://www.nxtbook.com/nxtbooks/lehigh/alumni\\_2009winter/index.php?startid=18](http://www.nxtbook.com/nxtbooks/lehigh/alumni_2009winter/index.php?startid=18)
5. "Illuminating Ideas: Innovations in Solid-State Lighting" in *US Department of Energy (DOE) – National Energy Technology Laboratory (NETL) Press Release*, February 2009.  
[http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl\\_illumbrch\\_09\\_final.pdf](http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/ssl_illumbrch_09_final.pdf)
6. "Student's Bright, Energy-Efficient Research Recognized" in *Lehigh News Center Highlight*, March 30<sup>th</sup> 2009.  
[http://www3.lehigh.edu/News/RCEASnews\\_story.asp?iNewsID=3198&strBack=%2Fengineering%2Fnews%2Fdefault2.asp](http://www3.lehigh.edu/News/RCEASnews_story.asp?iNewsID=3198&strBack=%2Fengineering%2Fnews%2Fdefault2.asp)
7. "Optics Graduate Student Repeats as International Award Winner" in *Lehigh News Center Highlight*, June 23<sup>rd</sup> 2009.  
[http://www3.lehigh.edu/News/V2news\\_story.asp?iNewsID=3309&strBack=%2Finsidelehigh%2Fdefault%2Easp](http://www3.lehigh.edu/News/V2news_story.asp?iNewsID=3309&strBack=%2Finsidelehigh%2Fdefault%2Easp)

### **Internal Scientific Lectures & Seminars (Non-Refereed)**

1. Y. K. Ee, **H. Zhao**, R. A. Arif, M. Jamil, and N. Tansu, "Self-Assembled InGaN Quantum Dots on GaN Emitting at 520-nm Grown by Metalorganic Vapor Phase Epitaxy," Poster in *Lehigh Center for Optical Technologies (COT) Open House 2007*, **Lehigh University**, Bethlehem, Pennsylvania, USA, October 2007.
2. **H. Zhao**, R. A. Arif, Y. K. Ee, and N. Tansu, "Optical Gain Analysis of Strain Compensated InGaN-AlGaIn Quantum Well Active Regions for Lasers Emitting at 420-520 nm," Poster in *Lehigh Center for Optical Technologies (COT) Open House 2007*, **Lehigh University**, Bethlehem, Pennsylvania, USA, October 2007.
3. N. Tansu, R. A. Arif, Y. K. Ee, and **H. Zhao**, "Nano-Engineered III-Nitride Materials and Devices for Solid State Lighting," Oral Presentation in *Lehigh Center for Optical Technologies (COT) Open House 2007*, COT Workshop on Nano-Photonics, **Lehigh University**, Bethlehem, Pennsylvania, USA, October 2007.
4. **H. Zhao**, R. A. Arif, Y. K. Ee, G. S. Huang, and N. Tansu, "Self-Consistent Optical Gain Analysis and Epitaxy of Strain Compensated InGaN-AlGaIn Quantum Well Active Regions for Laser Applications," Poster in *Lehigh Center for Optical Technologies (COT) Open House 2008*, **Lehigh University**, Bethlehem, Pennsylvania, USA, October 2008.
5. **H. Zhao**, R. A. Arif, Y. K. Ee, G. S. Huang, and N. Tansu, "Design Analysis of Staggered InGaN Quantum Well Diode Lasers Emitting at 500-nm," Poster in *Lehigh Center for Optical Technologies (COT) Open House 2008*, **Lehigh University**, Bethlehem, Pennsylvania, USA, October 2008.
6. N. Tansu, R. A. Arif, **H. Zhao**, Y. K. Ee, G. S. Huang, G. Liu, and X. Li, "High Efficiency III-Nitride Light-Emitting Diodes for Solid State Lighting," Oral Presentation in *Lehigh Center for Optical Technologies (COT) Open House*

2008, COT Workshop on Solid State Materials for Energy Applications, Lehigh University, Bethlehem, Pennsylvania, USA, October 2008.

7. N. Tansu, M. Jamil, **H. Zhao**, G. Liu, and G. S. Huang, "Toward InGaN-Based Solar Cells," Oral Presentation in *Lehigh Center for Optical Technologies (COT) Open House 2008*, COT Workshop on Solid State Materials for Energy Applications, Lehigh University, Bethlehem, Pennsylvania, USA, October 2008.

### **Outreach Lectures and Seminars (for Middle School and High School Students)**

1. Nelson Tansu, Ronald A. Arif, **Hongping Zhao**, Hua Tong, Muhammad Jamil, and Yik Khoon Ee, "Semiconductor Nanotechnology for High Energy Efficient Applications," Outreach Program, OptoCamp 2007 – Center for Optical Technologies, Lehigh University, Bethlehem, Pennsylvania, USA, August 13<sup>th</sup> 2007.
2. Nelson Tansu, Ronald A. Arif, **Hongping Zhao**, Hua Tong, Yik Khoon Ee, Xiaohang Li, and Guangyu Liu, "Semiconductor Nanotechnology for High Energy Efficient Applications," Outreach Program, OptoCamp 2007 – Center for Optical Technologies, Lehigh University, Bethlehem, Pennsylvania, USA, August 2008.
3. **Hongping Zhao**, Yik-Khoon Ee, "Color Sensors," SPIE Lehigh Student Chapter Outreach Program to teach topics in optics to middle school students, Springhouse Middle School, Allentown, Pennsylvania, USA, November 17<sup>th</sup> 2008.
4. **Hongping Zhao**, et. al., Summer CHOICES Program, Engineering Summer Camp for Middle-School Girls, which is a popular hands-on learning experience in engineering and science for 6<sup>th</sup>, 7<sup>th</sup>, or 8<sup>th</sup> grade middle-school girls. Lehigh University, July 2009.

### **Professional and Synergistic Services**

1. **Conference Volunteer** at the 8<sup>th</sup> Asian Symposium on Information Display (ASID), Feb. 2004, Nanjing, China.
2. **Technical Program Committee Member** – The 10<sup>th</sup> national conference of field emission and vacuum nano electronics, Nanjing, Sep. 2006, China
3. **Journal Reviewer:**
  - **Optical and Quantum Electronics** (published by Elsevier)
  - **IEEE Journal of Selected Topics in Quantum Electronics**
  - **Japanese Journal of Applied Physics**
  - **Nanoscale Research Letters**
4. **Secretary of the SPIE Student Chapter at Lehigh University**, 2008 - Present

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