

7 Asa Drive # 218 • Bethlehem, PA 18015 • USA  
Phone (610) 758-4326 • Fax (610) 758-2605 • E-mail: [pez311@Lehigh.Edu](mailto:pez311@Lehigh.Edu)

## (Ms.) Peifen Zhu

Information updated up to: *April 2013*

### **Contact Information**

Peifen Zhu  
PhD Candidate and Research Assistant  
Center for Optical Technologies  
Department of Electrical and Computer Engineering  
Lehigh University  
7 Asa Drive, Bethlehem, PA 18015, USA  
Email: [pez311@lehigh.edu](mailto:pez311@lehigh.edu), Phone: (610) 758-4326, Fax: (610) 758-2605  
Research Group: [www.ece.lehigh.edu/~tansu](http://www.ece.lehigh.edu/~tansu)

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

Sept. 1980, Taian, Shandong Province, China & Chinese

### **Education**

*July 2011 – present, Lehigh University (Bethlehem, Pennsylvania, USA)*

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

- Cumulative GPA: 4.0/4.0
- Research Assistant, PhD Advisor: Prof. Nelson Tansu (ECE, Lehigh)
- Research Areas: III-Nitride semiconductor nanostructures for thermoelectric, solid state lighting and solar hydrogen technologies.

*Aug. 2009 – May, 2011, Texas Tech University (Lubbock, Texas, USA)*

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

- Cumulative GPA: 3.67/4.0
- Research Assistant, Advisor: Prof. Hongxing Jiang and Jingyu Lin (ECE, Texas Tech University).
- Research Areas: III-Nitride semiconductor material characterization and device fabrication.

*Sep. 2004 – July, 2007 Jilin University (Changchun, Jilin, China)*

*Master of Science (M.S.)* in Physics

- Cumulative GPA: 3.83/4.0
- Research Assistant, Advisor: Prof. Qiren Zhu (Institute of Atomic and Molecular Physics, Jilin University).
- Research Areas: Nanomaterial synthesis and characterization
- Thesis: Synthesis, Luminescence Properties and Thermal Stability of BaMgAl<sub>10</sub>O<sub>17</sub>: Eu<sup>2+</sup> Blue Phosphors

*Sep. 2000 – July, 2004, Liaocheng University (Liaocheng, Shandong, China)*

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

- Thesis: Discussion on the Use of Analogy in Atomic Physics

### **Professional Experiences**

*July 2011 – 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

*May 2009 – May 2011, Texas Tech University (Lubbock, TX, USA)*

**Research Assistant**

Department of Electrical and Computer Engineering (ECE)

Edward E. Whitacre Jr. College of Engineering &amp; Nanophotonics Center

Advisor: Prof. Hongxing Jiang and Jingyu Lin

**Sep. 2006 – Oct. 2008, Jilin University (Changchun, Jilin, China)****Research Assistant**

College of Electronic Science &amp; Engineering &amp; State Key Laboratory on Integrated Optoelectronics

Advisor: Prof. Weiping Qin

**Sep. 2005 – Sep. 2006, Changchun Institute of Optics, Chinese Academy of Science (Changchun, Jilin, China)****Research Assistant**

Key Lab of Excited-State Processes

Advisor: Prof. Baojiu Chen

**Research Interests**

My research works cover various aspects of computational, growths, and device fabrication of III-Nitride semiconductor for photonics and thermoelectric applications. My research topics include the pursuit of novel materials for high thermoelectric figure of merit, solid state lighting, and solar hydrogen applications.

My early research works focused on the rare-earth doped luminescence materials for plasma display panels, fluorescence lamps, laser, solid state lighting, and photocatalysis applications.

**Awards & Honors Received**

- **Lehigh University Research Assistantship** (July. 2011- present), Lehigh University
- **Lehigh University Dean's Scholarship** (Aug. 2011- Aug. 2012), Lehigh University
- **Texas Tech University Research Assistantship** (Sep. 2009- May 2011), Texas Tech University
- **Jilin University Graduate Student Scholarship** (Sep. 2007- July 2010), Jilin University
- **Jilin University Graduate Student Scholarship** (Sep. 2004- July 2007), Jilin University

**Refereed Journal Publications (34)**

1. **P. F. Zhu**, G. Y. Liu, J. Zhang, and N. Tansu, "FDTD Analysis on Extraction Efficiency of GaN Light-Emitting Diodes with Microsphere Arrays", *Journal of Display Technology*, vol. 9, no. 5, pp. 316-322, May 2013. DOI: 10.1109/JDT.2013.2250253
2. X. H. Li, **P. F. Zhu**, G. Y. Liu, J. Zhang, R. B. Song, Y. K. Ee, P. Kumnorkaew, and J. F. Gilchrist, and N. Tansu, "Light Extraction Efficiency Enhancement of III-Nitride Light-Emitting Diodes by using 2-D Close-Packed TiO<sub>2</sub> Microsphere Arrays", *Journal of Display Technology*, vol. 9, no. 5, pp. 323-331, May 2013. DOI: 10.1109/JDT.2013.2246541
3. W. H. Koo, W. Youn, **P. F. Zhu**, X-H. Li, N. Tansu, F. So, Light extraction of organic light emitting diodes by defective hexagonal-close-packed array. *Advanced Functional Materials*, vol. 22, pp. 3453-3453, 2012.
4. G. Wei, W. Qin, **P. F. Zhu**, R. Kim, G. Wang, D. Zhang, K. Zheng and L. Wang, "Large-Scale Synthesis and Photoluminescence Properties of Aligned Multicore SiC-SiO<sub>2</sub> Nanocables," *Journal of Nanoscience and Nanotechnology*, 10(3): pp. 1964-1968, 2010.
5. H. Zhu, Y. Ma, H. Yang, **P. F. Zhu**, J. Du, C. Ji and D. Hou, "Ultrastable structure and luminescence properties of Y<sub>2</sub>O<sub>3</sub> nanotubes. *Solid State Communications*, 150(27-28): pp. 1208-1212, 2010.

6. G. Wei, W. Qin, L. Ning, R. Kim, G. Wang, D. Zhang, **P. F. Zhu**, K. Zheng and L. Wang, "Synthesis of ZnO Nanosheets by Microwave Thermal Vapor Method," *Journal of Nanoscience and Nanotechnology*, **10**(3): pp. 2065-2069, 2010.
7. D. Zhang, W. Qin, G. Wang, G. Wei, L. Wang, **P. F. Zhu**, R. Kim, F. Ding, K. Zheng and N. Liu, "Synthesis and Upconversion Luminescence of  $\text{YF}_3:\text{Yb}^{3+},\text{Tm}^{3+}$  and  $\text{TiO}_2$ -Coated  $\text{YF}_3:\text{Yb}^{3+},\text{Tm}^{3+}$  Microcrystals," *Journal of Nanoscience and Nanotechnology*, **10**(3), pp. 2032-2035, 2010.
8. G. Wang, W. Qin, D. Zhang, G. Wei, L. Wang, K. Zheng, **P. F. Zhu**, R. Kim and F. Ding, Synthesis and Luminescence Properties of  $\text{Er}^{3+}$  Doped  $\text{Y}(\text{OH})_3$ ,  $\text{NH}_4\text{Y}_3\text{F}_{10}$ , and  $\text{YF}_3$  Nanocrystals, *Journal of Nanoscience and Nanotechnology*, **10**(3), pp. 1728-1732, 2010.
9. G. Wang, W. Qin, L. Wang, G. Wei, **P. F. Zhu**, D. Zhang and F. Ding, "Enhanced ultraviolet upconversion in  $\text{YF}_3:\text{Yb}^{3+}/\text{Tm}^{3+}$  nanocrystals," *Journal of Rare Earths*, **27**, pp. 330-333, 2009
10. G. Wang, W. Qin, L. Wang, G. Wei, **P. F. Zhu**, D. Zhang and F. Ding, "Synthesis and upconversion luminescence properties of  $\text{NaYF}_4:\text{Yb}^{3+}/\text{Er}^{3+}$  microspheres," *Journal of Rare Earths*, **27**, pp. 394-397, 2009.
11. G. Wang, W. Qin, J. Zhang, L. Wang, G. Wei, **P. F. Zhu** and R. Kim, "Controlled synthesis and luminescence properties from cubic to hexagonal  $\text{NaYF}_4:\text{Ln}^{3+}$  ( $\text{Ln} = \text{Eu}$  and  $\text{Yb/Tm}$ ) microcrystals," *Journal of Alloys and Compounds*, **475**, pp. 452-455, 2009.
12. G. Wang, W. Qin, G. Wei, L. Wang, **P. F. Zhu**, R. Kim, D. Zhang, F. Ding and K. Zheng, "Synthesis and upconversion luminescence properties of  $\text{YF}_3:\text{Yb}^{3+}/\text{Tm}^{3+}$  octahedral nanocrystals," *Journal of Fluorine Chemistry*, **130**, pp. 158-161, 2009.
13. G. Wei, W. Qin, R. Kim, G. Wang, **P. F. Zhu**, D. Zhang, K. Zheng and L. Wang, "Large-scale synthesis and photoluminescence properties of SiC networks," *Applied Physics a-Materials Science & Processing*, **96**, pp. 521-527, 2009.
14. G. Wei, W. Qin, K. Zheng, D. Zhang, J. Sun, J. Lin, R. Kim, G. Wang, **P. F. Zhu** and L. Wang, "Synthesis and Properties of SiC/SiO<sub>2</sub> Nanochain Heterojunctions by Microwave Method," *Crystal Growth & Design*, **9**, pp. 1431-1435, 2009.
15. **P. F. Zhu**, Q. Zhu, H. Zhu, H. Zhao, B. Chen, Y. Zhang, X. Wang and W. Di, "Effect of SiO<sub>2</sub> coating on photoluminescence and thermal stability of  $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}^{2+}$  under VUV and UV excitation," *Optical Materials*, **30**, pp. 930-934, 2008.
16. **P. F. Zhu**, W. Di, Q. Zhu, B. Chen, H. Zhu, H. Zhao, Y. Yang and X. Wang, "Luminescent properties and thermal stability of  $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}^{2+}$  synthesized by sol-gel route," *Journal of Alloys and Compounds*, **454**, pp. 245-249, 2008.
17. H. Zhu, H. Yang, W. Fu, **P. F. Zhu**, M. Li, Y. Li, Y. Sui, S. Liu and G. Zou, "The improvement of thermal stability of  $\text{BaMgAl}_{10}\text{O}_{17}:\text{Eu}^{2+}$  coated with MgO," *Materials Letters*, **62**, pp. 784-786, 2008.
18. G. Wei, W. Qin, R. Kim, J. Sun, **P. F. Zhu**, G. Wang, L. Wang, D. Zhang and K. Zhen, "Quantum confinement effect and field emission characteristics of ultrathin 3C-SiC nanobelts," *Chemical Physics Letters*, **461**, pp. 242-245, 2008.
19. G. Wang, W. Qin, L. Wang, G. Wei, **P. F. Zhu** and R. Kim, "Intense ultraviolet upconversion luminescence from hexagonal  $\text{NaYF}_4:\text{Yb}^{3+}/\text{Tm}^{3+}$  microcrystals," *Optics Express*, **16**, pp. 11907-11914, 2008.
20. C. Cao, W. Qin, J. Zhang, Y. Wang, **P. F. Zhu**, G. Wei, G. Wang, R. Kim and L. Wang, "Ultraviolet upconversion emissions of  $\text{Gd}^{3+}$ ," *Optics Letters*, **33**, pp. 857-859, 2008.
21. C. Cao, W. Qin, J. Zhang, Y. Wang, **P. F. Zhu**, G. Wang, G. Wei, L. Wang and L. Jin, Enhanced ultraviolet upconversion emissions of  $\text{Tm}^{3+}/\text{Yb}^{3+}$  codoped  $\text{YF}_3$  nanocrystals, *Journal of Fluorine Chemistry*, **129**, pp. 204-209, 2008.
22. G. Wang, W. Qin, Y. Xu, L. Wang, G. Wei, **P. F. Zhu** and R. Kim, "Size-dependent upconversion luminescence in  $\text{YF}_3:\text{Yb}^{3+}/\text{Tm}^{3+}$  nanobundles," *Journal of Fluorine Chemistry*, **129**, pp. 1110-1113, 2008.
23. G. Wang, W. Qin, D. Zhang, L. Wang, G. Wei, **P. F. Zhu** and R. Kim, "Enhanced Photoluminescence of Water Soluble  $\text{YVO}_4:\text{Ln}^{3+}$  ( $\text{Ln} = \text{Eu}$ ,  $\text{Dy}$ ,  $\text{Sm}$ , and  $\text{Ce}$ ) Nanocrystals by  $\text{Ba}^{2+}$  Doping," *Journal of Physical Chemistry C*, **112**, pp. 17042-17045, 2008.
24. Y. Wang, W. Qin, J. Zhang, C. Cao, Y. Jin, X. Ren, **P. F. Zhu**, G. Wei, G. Wang and L. Wang, "Europium(III) complexes/silica hybrid nanospheres synthesized in microemulsion," *Journal of Nanoscience and Nanotechnology*,

- 8, pp. 1218-1220, 2008.
25. C. Cao, W. Qin, J. Zhang, Y. Wang, G. Wang, G. Wei, **P. F. Zhu**, L. Wang and L. Jin, "Up-conversion white light of  $\text{Tm}^{3+}/\text{Er}^{3+}/\text{Yb}^{3+}$  tri-doped  $\text{CaF}_2$  phosphors," *Optics Communications*, 281, pp. 1716-1719, 2008.
  26. G. Wang, W. Qin, J. Zhang, Y. Wang, C. Cao, L. Wang, G. Wei, **P. F. Zhu** and R. Kim, "Synthesis, growth mechanism, and tunable upconversion luminescence of  $\text{Yb}^{3+}/\text{Tm}^{3+}$ -codoped  $\text{YF}_3$  nanobundles," *Journal of Physical Chemistry C*, 112, pp. 12161-12167, 2008.
  27. G. Wang, W. Qin, J. Zhang, Y. Wang, C. Cao, L. Wang, G. Wei, **P. F. Zhu** and R. Kim, "Synthesis and spectral properties of  $\text{Eu}^{3+}$ -doped  $\text{YF}_3$  nanobundles," *Journal of Fluorine Chemistry*, 129, pp. 621-624, 2008.
  28. G. Wang, W. Qin, J. Zhang, Y. Wang, C. Cao, L. Wang, G. Wei, **P. F. Zhu** and R. Kim, "Enhancement of violet and ultraviolet upconversion emissions in  $\text{Yb}^{3+}/\text{Er}^{3+}$ -codoped  $\text{YF}_3$  nanocrystals," *Optical Materials*, 31, pp. 296-299, 2008.
  29. W. Qin, D. Zhao, J. Zhang, Y. Wang, C. Cao, G. Wang, G. Wei, L. Wang, Y. Jin, L. Fu, **P. F. Zhu** and S. Lu, "Synthesis and photophysical properties of core-shell  $\text{Eu}(\text{DBM})_3$  phen/ $\text{TiO}_2$  nano hybrids," *Journal of Nanoscience and Nanotechnology*, 8, pp. 1464-1467, 2008.
  30. Y. Jin, W. Qin, J. Zhang, Y. Wang, C. Cao, X. Ren, G. Wang, G. Wei, L. Wang, L. Jin and **P. F. Zhu**, " $\text{La}_3\text{PO}_7 : \text{Eu}^{3+}$  nanoparticles - A novel red phosphor," *Materials Letters*, 62, 3146-3148, 2008.
  31. W. Qin, C. Cao, L. Wang, J. Zhang, D. Zhang, K. Zheng, Y. Wang, G. Wei, G. Wang, **P. F. Zhu** and R. Kim, "Ultraviolet upconversion fluorescence from D-6J of  $\text{Gd}^{3+}$  induced by 980 nm excitation," *Optics Letters*, 33, pp. 2167-2169, 2008.
  32. W. Di, X. Wang, **P. F. Zhu** and B. Chen, Energy transfer and heat-treatment effect of photoluminescence in  $\text{Eu}^{3+}$ -doped  $\text{TbPO}_4$  nanowires, *Journal of Solid State Chemistry*, 180, pp. 467-473, 2007.
  33. Y. Wang, W. Qin, J. Zhang, C. Cao, Y. Jin, **P. F. Zhu**, G. Wei, G. Wang and L. Wang, "Bright green upconversion fluorescence of  $\text{Yb}^{3+}$ ,  $\text{Er}^{3+}$ -codoped fluoride colloidal nanocrystal and submicrocrystal solutions," *Chemistry Letters*, 36, pp. 912-913, 2007.
  34. Y. Wang, W. Qin, J. Zhang, C. Cao, Y. Jin, **P. F. Zhu**, G. Wei, G. Wang and L. Wang, "Synthesis and green upconversion fluorescence of colloidal  $\text{La}_{0.78}\text{Yb}_{0.20}\text{Er}_{0.02}\text{F}_3/\text{SiO}_2$  core/shell nanocrystals," *Journal of Solid State Chemistry*, 180, pp. 2268-2272, 2007.

### **Referred Conference Publications(8)**

35. **P. F. Zhu**, P. O. Weigel, G. Y. Liu, J. Zhang, A. L. Weldon, T. Muangnaphor, J. F. Gilchrist, and N. Tansu, "Optimization of Deposition Conditions for Silica / Polystyrene Microlens and Nanolens Arrays for Light Extraction Enhancement in GaN Light-Emitting Diodes," *Proc. of the SPIE Photonics West 2013*, San Francisco, CA, January 2013.
36. (Invited Conference Paper) N. Tansu, J. Zhang, G. Y. Liu, H. P. Zhao, C. K. Tan, and **P. F. Zhu**, "Physics of High-Efficiency III-Nitride Quantum Wells Light-Emitting Diodes," *Proc. of the Asian Communications and Photonics (ACP) Conference 2012*, Guangzhou, China, November 2012.
37. (Invited Conference Paper) N. Tansu, J. Zhang, G. Y. Liu, H. P. Zhao, C. K. Tan, and **P. F. Zhu**, "Physics of High-Efficiency III-Nitride Quantum Wells Light-Emitting Diodes," *Proc. of the Asian Communications and Photonics (ACP) Conference 2012*, Guangzhou, China, November 2012.
38. **P. F. Zhu**, J. Zhang, G. Y. Liu, and N. Tansu, "FDTD Modeling of InGaN-Based Light-Emitting Diodes with Microsphere Arrays," *Proc. of the IEEE Photonics Conference 2012, Burlingame*, CA, September 2012.
39. W. H. Koo, W. Youn, **P. F. Zhu**, X. H. Li, N. Tansu, and F. So, "Light extraction from OLEDs by defective hexagonal-close-packed silica array," *Proc. of the SPIE Optics + Photonics 2012*, Organic Electronics + Photonics, San Diego, CA, August 2012.
40. (Invited Conference Paper) J. Zhang, G. Y. Liu, C. K. Tan, **P. F. Zhu**, H. P. Zhao, and N. Tansu, "Engineering Nanostructures in Active Regions and Devices for High-Efficiency III-Nitride Light-Emitting Diodes – Epitaxy and Physics," *Proc. of the SPIE Optics + Photonics 2012*, NanoEpitaxy : Materials and Devices IV, San Diego, CA,

August 2012.

41. (Invited Keynote Plenary Conference Talk) N. Tansu, J. Zhang, G. Y. Liu, C. K. Tan, **P. F. Zhu**, and H. P. Zhao, "Physics and Technology of III-Nitride Semiconductors for Energy Efficiency Applications," *Proc. of the IUMRS-ICYRAM Conference 2012*, Material Research Society (MRS), Singapore, July 2012.
42. (Invited Conference Talk) N. Tansu, J. Zhang, G. Y. Liu, C. K. Tan, **P. F. Zhu**, and H. P. Zhao, "Advances in III-Nitride Semiconductors for Energy Efficiency Applications," *Proc. of the KAUST-UCSB-NSF Solid State Lighting Workshop 2012*, Thuwal, Saudi Arabia, February 2012.

### **Journal Reviewer (Reviewed more than 20 papers)**

- ✓ **Optical Material Express**
- ✓ **IEEE Photonics Journal**
- ✓ **Journal of Display Technology**