

**Ioannis Fragkos, Ph.D.**308 W 8<sup>th</sup> Street • Bethlehem, PA 18015 • USAInformation updated up to: **Dec. 2016****Contact Information**

Ioannis Frakos, Ph.D Candidate  
Center for Photonics and Nanoelectronics (CPN)  
Laboratory for Emerging Photonics & Nanostructures  
P. C. Rossin College of Engineering and Applied Science  
Lehigh University  
7 Asa Drive, Bethlehem, PA 18015, USA  
Email: [iof213@lehigh.edu](mailto:iof213@lehigh.edu)  
Cell : 484-758-7074  
Fax: (610) 758-2605  
CPN Website: <http://www.ece.lehigh.edu/~tansu/>

**Birth Place and Date:**

Athens, Greece, February 19, 1988

**Professional Experiences****Fall. 2015 – current, Lehigh University (Bethlehem, PA, USA)****Ph.D. Candidate and Research Assistant**

Center for Photonics and Nanoelectronics (CPN)  
Laboratory for Emerging Photonics & Nanostructures  
Ph.D Advisor: Prof. Nelson Tansu

- III-Nitride semiconductor nanostructures for solid state lighting technologies
- Metalorganic Chemical Vapor Deposition (MOCVD)
- Physical vapor deposition techniques (Sputtering, Thermal Evaporation)
- Optical, electrical and structural characterization of devices
- Clean room protocols
- Theoretical work, data analysis and simulation tools: Matlab, Mathematica, Fortran, MS Office, OriginLab
- Experienced with design and simulation tools: Crosslight Software APSYS, Silvaco, Cadence

**Jan. 2015 – May 2015, Lehigh University (Bethlehem, PA, USA)****Teaching Assistant**

ECE Department  
Electronics Lab (Circuit Design and Simulation)

**Oct. 2012 – Oct. 2013, CENIMAT-FCT Universidade Nova de Lisboa (Lisbon, Portugal)****Research Scientist**

CENIMAT is a national scientific research center classified as EXCELLENT, by a panel of international experts in the field of Materials Science and Engineering since 1996. This grade reflects the high technical and scientific merit of the R&D activity carried out

- Transparent and conductive oxides for transparent electronics
- Research on growth and characterization of metal oxide thin films (Ag, Ti, Co, Zn, Nb, Cr)
- Physical Vapor Deposition techniques (RF,DC Magnetron Sputtering) and methods for structural, optical and electrical characterization

**Fall 2010 – Fall 2012, University of Crete (Heraklion, Greece)**

**Master Graduate Student and Research Assistant**

Transparent and Conductive Materials and Devices Lab-Institute of Electronic Structure and Laser, Foundation for Research & Technology-Hellas

- Physical Vapor Deposition Techniques (Sputtering, Evaporation)
- Optical, electrical and structural characterization of Al doped ZnO thin films

**Fall 2010 – Fall 2011, University of Crete (Heraklion, Greece)**

**Teaching Assistant**

Physics Department

Advanced Physics Lab (Advanced experiments in Physics)

## **Education Background**

**Spring 2014 – Present, Lehigh University (Bethlehem, Pennsylvania, USA)**

**Doctor of Philosophy (Ph.D.)** in Electrical Engineering (Specialization area: Photonics & Optoelectronics)

- Research Assistant (ECE, Lehigh)
- Ph.D. Advisor: Prof. Nelson Tansu
- Research Areas: III-Nitride semiconductor nanostructures for solid state lighting technologies

**Fall 2010 – Fall 2012, University of Crete (Heraklion, Greece)**

**M.Sc** in Micro-Opto Electronics, Department of Physics

- M.Sc Advisor: Prof. George Kiriakidis (Physics), Co-Advisor: Dr Elias Aperathitis
- Research Areas: Transparent and conductive oxides for transparent electronics
- M.Sc thesis: “Growth and Characterization of Al doped ZnO thin films”

**Fall 2005 – Fall 2010, University of Crete (Heraklion, Greece)**

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

- Minor: Social Phycology

## **Research Interests**

My research interests lie in the field of III-Nitride semiconductor nanostructures for solid state lighting technologies, the theoretical and experimental aspects of the physics in nano-scale semiconductors. I am currently focusing on theoretical and experimental studies of GaN based red LED as well as methods for efficiency improvement in III-Nitride based LED in red spectra regime. MOCVD and device fabrications of III-Nitride semiconductor devices on GaN substrates.

## **Awards and Recognition**

- Gerondelis Foundation Scholarship 2016

## **Refereed Journal and Conference Publications**

1. [I. Fragkos](#), V. Kampylafka, M. Gagaoudakis, K. Moschovis, K. Tsagkaraki, E. Aperathitis and G. Kiriakidis, “Effect of different annealing atmospheres on the properties of Al-doped ZnO thin films”, *4<sup>th</sup> International Symposium on Transparent Conductive Materials (TCM 2012)*, Hersonissos, Crete, Greece, October 2012.
2. [I. Fragkos](#), C. K. Tan, V. Dierolf, Y. Fujiwara, and N. Tansu, “Rare-Earth Doped GaN Based Light Emitting Diode: A Model of Current Injection Efficiency”, *Proc. of the SPIE Photonics West 2016, Physics and Simulation of Optoelectronic Devices XXIV*, San Francisco, CA, February 2016.
3. [I. Fragkos](#), C. K. Tan, Y. Zhong, V. Dierolf, Y. Fujiwara, and N. Tansu, “Understanding the Current Injection

- Efficiency in Rare-Earth Doped GaN:Eu Red-Emitting Light Emitting Diodes”, *Proc. of the IEEE Lester Eastman Conference on High Performance Devices 2016*, Bethlehem, PA, August 2016.
4. [I. Fragkos](#), C. K. Tan, Y. Zhong, V. Dierolf, Y. Fujiwara, and N. Tansu, “The role of Injection Efficiency in Eu-doped GaN LED”, *Proc. of the MRS Fall Meeting, Rare Earths in Advanced Photonics and Spintronics*, Boston, MA, November 2016.
  5. [I. Fragkos](#), C. K. Tan, Y. Zhong, V. Dierolf, Y. Fujiwara, and N. Tansu, “On the identification and understanding of limiting factors in IQE of GaN:Eu based PIN diodes for red light emission”, *Proc. of the SPIE Photonics West 2017, Physics and Simulation of Optoelectronic Devices XXV*, San Francisco, CA, February 2017.
  6. [I. Fragkos](#), Y. Zhong, C. K. Tan, V. Dierolf, Y. Fujiwara, and N. Tansu, “Enhancement of Internal Quantum Efficiency of GaN:Eu based Red Light Emitters through Surface Plasmon Engineering”, *Proc. of the SPIE Photonics West 2017, Light-Emitting Diodes: Materials, Devices, and Applications for Solid State Lighting XXI*, San Francisco, CA, February 2017.
  7. Y. Zhong, [I. Fragkos](#), and N. Tansu, “Surface Plasmon Dispersion Engineering by Using TiN / Au Double Metallic Layers for Yellow up to Red Spectral Emitters”, *Proc. of the SPIE Photonics West 2017, Photonic and Phononic Properties of Engineered Nanostructures VII*, San Francisco, CA, February 2017.

## References

**Prof. Nelson Tansu** [Fellow of National Academy of Inventors]  
Daniel E. '39 and Patricia M. Smith Endowed Chair Professor  
Smith Family Endowed Director, Center for Photonics and Nanoelectronics (CPN)  
Laboratory for Emerging Photonics and Nanostructures  
Department of Electrical and Computer Engineering (ECE)  
Rossin College of Engineering and Applied Science  
Lehigh University  
Bethlehem, Pennsylvania 18015, USA  
Email: [Tansu@Lehigh.Edu](mailto:Tansu@Lehigh.Edu)  
Phone: (610) 758-2678, Fax: (610) 758-2605  
Research Group: [www.ece.lehigh.edu/~tansu](http://www.ece.lehigh.edu/~tansu)  
CPN Web: [www.lehigh.edu/cpn](http://www.lehigh.edu/cpn)

**Dr. Elias Aperthitis**  
Micro & Nano Research Group (MNRG)  
Institute of Electronic Structure and Laser  
Foundation for Research & Technology-Hellas  
Heraklion, Greece  
Phone: (+30) 2810-394123, Fax: (+30) 2810-394106  
Email: [eaper@physics.uoc.gr](mailto:eaper@physics.uoc.gr)

**Dr. Thomas Charisoulis**  
Hardware Engineer, Apple Inc.  
Email: [tcharisoulis@apple.com](mailto:tcharisoulis@apple.com)  
Phone.: (650) 864-2037

**Dr Renbo Song**  
Scientific Manager  
Center for Photonics and Nanoelectronics (CPN)  
P. C. Rossin College of Engineering and Applied Science, Lehigh University  
7 Asa Drive, Bethlehem, PA 18015, USA  
Email: [resd@lehigh.edu](mailto:resd@lehigh.edu),  
Phone: (610) 758-2709 (office), 484-767-7299 (cell) Fax: (610) 758-2605

**Prof. George Kiriakidis**

Department of Physics  
Institute of Electronic Structure and Laser  
Foundation for Research & Technology-Hellas  
University of Crete, Heraklion, Greece  
Email: [kiriakid@iesl.forth.gr](mailto:kiriakid@iesl.forth.gr)  
Phone: (+30) 2810-391271, Fax: (+30) 2810-391295  
Research Group: <http://tcm.iesl.forth.gr>

**Prof. Luis Miguel Nunes Pereira**

Faculdade de Ciências e Tecnologia, UNINOVA  
CENIMAT/I3N, Instituto de Desenvolvimento de Novas Tecnologias, Lisbon, Portugal  
Phone: (+351) 212948525, Fax: (+351) 212948564  
Email: [lnp@fct.unl.pt](mailto:lnp@fct.unl.pt)