

# Karunananda Pemasiri

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## **OBJECTIVE:**

Having specialized in experimental condensed matter physics, with extensive experience in optical spectroscopy characterization techniques and micro device fabrication techniques used for semiconductor nanowires, I seek opportunities to utilize my experience in the semiconductor material research field.

## **EDUCATION/DEGREES:**

### **University of Cincinnati, OH, USA:**

- **Ph.D. in Physics: (August/2013)**

**Dissertation topic:** “Investigation of ZB, WZ and ZB/WZ mixed phase InP nanowires by photocurrent, photoluminescence and time-resolved photoluminescence spectroscopies”

**Advisor:** Prof. Leigh M. Smith, Ph.D

- **M.S in Physics: GPA 3.89/4.0 (March/2009)**

### **University of Peradeniya, Peradeniya, Sri Lanka:**

- **B.Sc. in Physics: First Class Honors (May/2004)**

## **RESEARCH EXPERIENCE:**

*Graduate Research Assistant*, Department of Physics, University of Cincinnati (Since 03/2008)

- Optical and photocurrent spectroscopy was used to investigate the physical properties of III-V semiconductor nanowires, especially InP. Photoluminescence and time-resolved spectroscopy were used to investigate the electronic band structure and carrier dynamics of InP nanowires. Ohmic nanowire devices were fabricated using photolithography techniques followed by sulfur passivation. Photocurrent spectroscopy was carried out to study the device characteristics as a function of the incident excitation energy, voltage bias, and temperature that are the basis of optoelectronic properties of nanowire devices.

## **TEACHING EXPERIENCE:**

### **University of Peradeniya, Department of Physics, Sri Lanka:**

**Senior Lecturer:** Since Dec/2014

**Temporary Senior Lecturer:** Feb/2014 – Dec/2014

**Temporary Lecturer/Teaching Assistance:** May/2004 – June/2006

### **University of Cincinnati, Department of Physics, USA, OH:**

**Teaching Assistant/Research Assistant:** Sep/2006 – Aug/2013

## **RESEARCH SKILLS:**

### **Instrumentation and General Labs**

- Cryogenic and vacuum skills.
- Chip mounting and manual wire bonding in micro size devices.
- Micro-photolithography techniques using Karl Suss MJB3 mask aligner for putting contact pads to single nanowires.
- Familiar with computer control and automatic data acquisition from instruments including programming in Labview.
- Clean room working experience towards device fabrication and wet etching.

### **Computer Software and Programming**

- Origin, Microsoft Excel for data analysis and characterization.
- Programming skills in Mathematica, Matlab and Python.

## **PUBLICATIONS:**

- ❖ *Effect of post deposition heat treatment on microstructure parameters, optical constants and composition of thermally evaporated CdTe thin films*, PKK Kumarasinghe, A Dissanayake, BMK Pemasiri, BS Dissanayake, *Materials Science in Semiconductor Processing* 58, 51-60 (2017)
- ❖ *Variation of optical, structural, electrical and compositional properties of thermally evaporated CdTe thin films due to substrate temperature*, P K K Kumarasinghe, A Dissanayake, B M K Pemasiri and B S Dissanayake, Submitted to *Journal of Materials Science: Materials in Electronics (JMSE)* (2016).
- ❖ *Quantum confinement of excitons in wurtzite InP nanowires*, K Pemasiri, HE Jackson, LM Smith, BM Wong, S Paiman, Q Gao, HH Tan, C Jagadish, *Journal of Applied Physics* 117 (19), 194306 (2015)

- ❖ *MOCVD-grown indium phosphide nanowires for optoelectronics*, Paiman Suriati, Gao Qiang, Joyce Hannah, Tan Hark Hoe, Jagadish Chennupati, Kim Yong, Guo Yanan, Pemasiri Kuranananda, Montazeri Mohammad, Jackson Howard, Smith Leigh, *Advanced Materials Research* 832, 201-205 (2014)
- ❖ *Determining wurtzite band structure using optical spectroscopies on single InP nanowires*, Karunananda Pemasiri, Saranga Perera, Yuda Wang, Mohammad Montazeri, Howard Jackson, Leigh Smith, Jan Yarrison-Rice, Qian Gao, Hoe Tan, Chennupati Jagadish, *AIP Conference Proceedings* 1566, 476-477 (2013)
- ❖ *Probing the valence band structure of wurtzite InP nanowires by photoluminescence excitation spectroscopy*, HE Jackson, S Perera, K Pemasiri, LM Smith, J Yarrison-Rice, JH Kang, Q Gao, HH Tan, C Jagadish, Y Guo, J Zou, Jisoon Ihm, Hyeonsik Cheong, *AIP Conference Proceedings-American Institute of Physics* 1399 (1), 481 (2011)
- ❖ *Probing valence band structure in wurtzite InP nanowires using excitation spectroscopy*, S. Perera, **K. Pemasiri**, M.A. Fickenscher, H.E. Jackson, L.M. Smith, J. Yarrison-Rice, S. Paiman, Q. Gao, H.H. Tan, and C. Jagadish, *Applied Physics Letters* **97**, 023106 (2010)
- ❖ *Room Temperature Photocurrent Spectroscopy of Single Zincblende and Wurtzite InP Nanowires*, A. Maharjan, **K. Pemasiri**, P. Kumar, A. Wade, L.M. Smith, H.E. Jackson, J.M. Yarrison-Rice, A. Kogan, S. Paiman, Q. Gao, H.H. Tan, and C. Jagadish, *Applied Physics Letters* **94**, 193115 (2009)
- ❖ *Effect of V/III ratio and catalyst particle size on the crystal structure and optical properties of InP nanowires*, S Paiman, Q Gao, H Hoe Tan, Chennupati Jagadish, **K Pemasiri**, M Montazeri, H E Jackson, L M Smith, J Yarrison-Rice, X Zhang and J Zou, *Nanotechnology* **20**, 225606 (2009)
- ❖ *Carrier dynamics and quantum confinement in Type-II ZB-WZ InP nanowire homostructures*, **Kuranaananda Pemasiri**, Mohammad Montazeri, Richard Gass, Leigh M. Smith, Howard E. Jackson, Jan Yarrison-Rice, Suriati Paiman, Qiang Gao, H. Hoe Tan, Chennupati Jagadish, Xin Zhang, and Jin Zou, *Nano Letters* **9**, 648-654 (2009)

## **PRESENTATIONS:**

- ❖ APS March Meeting 2013-Photocurrent Spectroscopy of ZB, WZ InP nanowire Ohmic devices, (oral) presents at Baltimore, MD

- ## AWARDS & HONORS:

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| ❖ URC Summer Fellowship 2012   | University of Cincinnati. 06/2012   |
| ❖ Henry Laws Research Fellowship 2012  | University of Cincinnati. 06/2012   |
| ❖ URC Summer Fellowship 2010   | University of Cincinnati, 06/2010   |
| ❖ Henry Laws Research Fellowship 2010  | University of Cincinnati. 06/2010   |
| ❖ Outstanding Poster in Physical Science & Engineering- Graduate poster Forum 2010, University of Cincinnati |                                     |
| ❖ University Prize for Academic Excellence   | University of Peradeniya, 12/2004   |
| ❖ Dr. C.A. Hewawitharana Memorial Prize For Physics-   | University of Peradeniya, 12/2004   |
| ❖ Prof. A.W. Wolfendale Prize for Physics  | University of Peradeniya, 2002/2003 |
| ❖ Prof. V. Appapillai Prize for Physics  | University of Peradeniya, 10/2002   |
| ❖ University Scholarship (Physical Science)  | University of Peradeniya, 11/2001   |