

# Ganesh Balakrishnan

Assistant Professor, Dept. of Electrical and Computer Engineering.  
Center for High Technology Materials, University of New Mexico,  
1313 Goddard SE, Albuquerque, New Mexico 87106-4343,  
Tel. (505) 272-7970; Fax (505) 272-7801; Email: gunny@unm.edu

## (a) Professional Preparation:

<u><i>Institution</i></u>	<u><i>Major/Area</i></u>	<u><i>Degree &amp; Year</i></u>
University of Madras, Chennai, India.	Electrical and Communications Engineering	Bachelor of Engineering, 2000
University of Toledo, Toledo, OH.	Electrical Engineering	Master of Engineering, 2001
University of New Mexico, NM	Optical Sciences and Engineering	PhD, 2006
University of New Mexico (Post-Doctoral)	Antimonide MBE research	2006 - 2007

## (b) Appointments:

<u><i>Appointment</i></u>	<u><i>Inclusive Dates</i></u>
<i>Assistant Professor</i> , Electrical and Computer Engineering Department, University of New Mexico, Albuquerque, NM.	October 2008 - Present
<i>Technical Director</i> , Integrated nonmaterial core lab, California nanosystems institute, UCLA, Los Angeles, CA	2007 - 2008

## (c) Research activities:

- Demonstration of multi-watt (~5 W CW) VECSELs based on InAs quantum dot active region.
- The development of high power InGaSb quantum well based MIR VECSELs on GaAs/AlGaAs DBRs.
- Growth of high quality GaSb on GaAs resulting in laser diodes with record emission wavelengths of 1.6 to 2  $\mu\text{m}$ .
- Identification of growth modes involved in the epitaxy of type II GaSb quantum dots on GaAs resulting in lasers, memory devices and solar cells.
- The development of III-Sb epitaxy on Si resulting in communications wavelength laser diodes on Si.

**(d) Synergistic Activities:**

- Program Chair NAMBE 2012.
- Program Committee member for the 2012 International MBE conference Nara, Japan.
- Co-Organizer (with Prof. Archie Holmes), Mid-IR laser workshop at NAMBE 2010.
- Session Chair, North American MBE conference, 2008 and 2010.
- Invited Organizer, Electronics Materials Conference, 2009 and 2010.
- Session Chair, Electronics Materials Conference 2007, 2008, 2009, 2010 and 2011.
- Program committee member, Rio Grande Symposium for Advanced Materials.
- Program committee member, IPRM 2013.
- IEEE Albuquerque section outstanding young engineer award 2012.
- Air Force summer faculty fellowship 2012.
- University of New Mexico Undergraduate Senate Committee Chair.
- Area Chair for Optoelectronics at the Electrical and Computer Engineering Department at the University of New Mexico.
- Participant scientist at the NSF funded Portal to Public program at the Explora Science Museum in Albuquerque.
- Over 60 publications in peer reviewed journals with 90% of the papers in the area of molecular beam epitaxy and related devices. 15 conference presentations as a speaker and 31 conference presentations as a contributing author.
- Filed for 10 patents, with three converted and seven in provisional stage. All patents based on MBE enabled epitaxial processes.

**(e) Select publications and patents:**

1. "New high for quantum dot VECSELS", D. Sandham, **Electron. Lett.** 46, 807 (2010).
2. "Multi-watt 1.25  $\mu\text{m}$  quantum dot VECSEL", A.R. Albrecht, T.J. Rotter, C.P. Hains, A. Stintz, J.V. Moloney, K.J. Malloy, and G. Balakrishnan, **Electron. Lett.** 46, 856 (2010).
3. "340-W Peak Power From a GaSb 2 micron Optically Pumped Semiconductor Laser (OPSL) Grown Mismatched on GaAs", YY Lai, JM Yarborough, Y Kaneda, J Hader, JV Moloney, TJ Rotter, G Balakrishnan, C Hains, SW Koch, **IEEE Photonics Technology Letters** 22, 1253 (2010).
4. "1220–1280-nm Optically Pumped InAs Quantum Dot-Based Vertical External-Cavity Surface-Emitting Laser", A.R. Albrecht, A. Stintz, F.T. Jaeckel, T.J. Rotter, P. Ahirwar, V.J. Patel, C.P. Hains, L.F. Lester, K.J. Malloy and G. Balakrishnan, **IEEE Journ. Select. Topics in Silicon Photonics** 17, 1787 (2011).
5. "Continuous-Wave, Room-Temperature Operation of 2- $\mu\text{m}$  Sb-Based Optically-Pumped Vertical-External-Cavity Surface-Emitting Laser Monolithically Grown on GaAs Substrates", Thomas J. Rotter, Jun Tatebayashi, Pradeep Senanayake, Ganesh Balakrishnan, Marcel Rattunde, Joachim Wagner, Jörg Hader, Jerome V. Moloney,

Stephan W. Koch, L. Ralph Dawson and Diana L. Huffaker, **Appl. Phys. Express** 2 112102 (2009).

6. “*Interfacial misfit array formation for GaSb growth on GaAs*”, Shenghong Huang, Ganesh Balakrishnan, and Diana L. Huffaker, **J. Appl. Phys.** 105, 103104 (2009)
7. “*Strain Relief by Periodic Misfit Arrays for Low Defect Density GaSb on GaAs*”, S.H. Huang, G. Balakrishnan, A. Khoshakhlagh, A. Jallipalli, L.R. Dawson, and D.L. Huffaker, **Appl. Phys. Lett.** 88, 131911 (2006).
8. “*Monolithic growth of III-Sb on Si for Integrated Photonic light Emitters*”, G. Balakrishnan, A. Jallipalli, S.H. Huang, A. Khoshakhlagh, P. Rotella, A. Amtout, S. Krishna, C.P. Haines, L.R. Dawson and D.L. Huffaker, **IEEE Journ. Select. Topics in Silicon Photonics**, 12, 1636 (2006).
9. “*Misfit dislocation forming interfacial self-assembly for growth of highly-mismatched III-Sb alloys*”, DL Huffaker, LR Dawson, G Balakrishnan, US Patent App. 11/622,262.
10. “*Hybrid integration based on wafer-bonding of devices to AlSb monolithically grown on Si*”, DL Huffaker, LR Dawson, G Balakrishnan, US Patent 7,700,395