

Brian J. Thibeault, Ph.D.

Experience

Project Scientist, University of California at Santa Barbara,

12/2000-Present

- Provide scientific guidance for researchers in all aspects of semiconductor and thin-film device processing. This involves all aspects of the process including advanced lithography, chemical treatments, metallization, thin film deposition, and advanced plasma-based etching.
- Research into new nanofabrication techniques with application to many research areas.
- Document existing and newly developed processes.
- Supervise professional engineers and advanced process characterization.
- Instruct graduate students and Post-Doctoral researchers in nanofabrication techniques, including full 4 unit graduate level course - Introduction to semiconductor device and thin-film fabrication.

Member of Technical Staff, Cree Lighting Company (formerly Nitres, Inc., formerly Widegap Technology, LLC.), 5/1996 – 12/2000.

- Started Widegap Technology, LLC with UCSB professors and other students. Company became Nitres, Inc. in June 1999 and was bought by Cree, Inc. in May 2000, becoming Cree Lighting Company.
- Over 4 years of GaN-based device and process experience.
- Key project member of high brightness and high efficiency LED development team. Responsible for Metal Organic Chemical Vapor Deposition (MOCVD) process development, device process development and advanced processing for light emitting devices. We demonstrated over 30% external quantum efficiency, 25% wall-plug efficiency LEDs in the violet spectrum in FY2000.
- Principal Investigator on SBIR contracts.
- Did MOCVD growth of GaN-based electronic materials on sapphire and worked on early material optimization, including GaN, insulating GaN, and AlGaIn layers. Performed processing as well as DC and RF device characterization.
- Led flip-chip bonding effort for GaN-based HEMTs onto AlN substrates for thermal management. Scaled process to 4-mm wide and larger HEMTs. Demonstrated record performance levels for RF power and DC current density in 1997.
- Eleven awarded patents from work done over this period in the area of light emitting devices in areas including materials growth, device structures, and advanced processing for light emitting diodes. Based on work from 1998-2000. Various Award Dates from 2002-2006.

Graduate Student Researcher, University of California at Santa Barbara,

8/1990 – 3/1997.

- Responsible for Vertical Cavity Laser (VCL) design, MBE growth, process development, and characterization.
- Developed low-optical loss, small diameter (< 2 um) vertical cavity lasers using thin AlAs oxidation layers. Demonstrated that parasitic optical losses had been limiting VCL laser scaling to smaller sizes. Predicted VCL threshold current and high-speed performance limitations due to optical, electrical, and thermal losses.
- 5 years of GaAs-based device and process experience.
- Responsible for organization / implementation of MBE system maintenance and repair for 2 years.

Education

Ph.D. in Electrical and Computer Engineering from University of California at Santa Barbara, awarded in March 1997. Prof. Larry A. Coldren, advisor. Dissertation title “High Efficiency Vertical-Cavity Lasers Using Low-Optical Loss Intra-Cavity Dielectric Apertures”

B.S. in Electrical Engineering from University of California at Irvine in June 1990.

Societies

Senior Member IEEE

Selected Publications (*Full List Upon Request*)

- “*Inductively coupled plasma etching of bulk titanium for MEMS applications*”, Parker E, Aimi M, Thibeault B, Rao M, MacDonald N, *J. Electrochem. Soc.* **152** (10): C675-C683 2005
- U.S. Patent 6,657,236. “Enhanced light extraction in LEDs through the use of internal and external optical elements”, awarded Dec. 2003
- “3-Watt AlGaIn/GaN HEMTs on Sapphire Substrates with Thermal Management by Flip-Chip Bonding,” Y.-F. Wu, B. J. Thibeault, et. al., *Device Research Conference*, 1998.
- “Electrical and optical losses in dielectrically apertured vertical cavity lasers,” (**Invited Paper**), B. J. Thibeault, et. al., *SPIE Proceedings*, **3003**, 1997.
- “High-Speed Characteristics of Low-Optical Loss Oxide-Apertured Vertical-Cavity Lasers,” B. J. Thibeault, et. al., *Photon. Tech. Lett.*, **9**, (1) pp. 11-13 (January 1997).
- L.A. Coldren and B.J. Thibeault, “Vertical Cavity Surface-Emitting Lasers”, book chapter 8 in *Optical Fiber Communications IIIB*, Edited by Kaminow and Koch, Academic Press, San Diego, CA 1997.