

# KELLY C. MCGRODDY

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## SUMMARY

Candidate with a Ph.D. in the area of solid state lighting with a well rounded skill set. Excellent communication and leadership skills in addition to 8 years of research experience. Seeking a position that utilizes both technical and non-technical skills.

## EDUCATION

**University of California, Santa Barbara, Materials Department** Santa Barbara, CA  
Candidate for Ph.D. in Materials Science, August 2008  
Thesis: *Photonic Crystals for Light Extraction from GaN LEDs*  
Advisor: Evelyn Hu

**University of Pennsylvania** Philadelphia, PA  
B. S. in Materials Science and Engineering, May 2003, GPA 3.58/4.0

## HONORS

- NSF Graduate Research Fellowship, 2003-2006
- R. M. Brick Award, 2003, awarded for demonstration "through a combination of academic performance, effort, and personal qualities that he or she will be a credit to the Department, the School, and the University".
- Alpha Sigma Mu Honor Society for Materials Science and Engineering

## WORK AND RESEARCH EXPERIENCE

August 2003 – Present **University of California, Santa Barbara** Santa Barbara, CA  
*Graduate Student Researcher, Advisor: Evelyn Hu*

Optimized light extraction efficiency and emission directionality control from gallium nitride light emitting diodes using photonic crystals. Explored novel ways to incorporate photonic crystals into GaN LED devices and large area photonic crystal patterning techniques.

May 2003 – August 2003 **IBM, Almaden Research** San Jose, CA  
*Summer Intern, Manager: Don Eigler*

Performed low temperature scanning tunneling microscopy studies of C<sub>60</sub> molecules on metal surfaces.

September 2002 - May 2003 **University of Pennsylvania** Philadelphia, PA  
*Undergraduate Researcher, Advisor: Jay Kikkawa*

Designed and built a femtosecond pulse laser for time resolved pump probe optical spectroscopy. Used the laser to study spin precession across material interfaces, specifically a GaAs carbon nanotube interface.

June 2002 - August 2002 **NNUN REU, UCSB** Santa Barbara, CA  
*Summer Research Student, Advisor: Pierre Petroff*

Studied hydrogen etching of SiC to achieve smooth surfaces for use as substrates for epitaxial growth of AlGaIn.

Summer 2000, 2001, 2002 **IBM, Watson Research** Yorktown, NY  
*Summer Intern, Manager: Ron Nunes*

Studied the rheology of various polymers to optimize the material for soft stamp lithography masks. Monitored various lithography and processing steps and resolved defect issues.

September 2001 – May 2002 **University of Pennsylvania** Philadelphia, PA  
*Undergraduate Researcher, Advisor: David Luzzati*

Studied the filling of carbon nanotubes with C<sub>60</sub> molecules to understand the possibilities of functionalizing nanotubes.

## TECHNICAL MANAGEMENT COURSES

University of Pennsylvania: Corporate Responsibility and Ethics, Engineering Entrepreneurship I and II  
UCSB: Financial Management, Entrepreneurial Marketing, New Venture Creation

## LABORATORY TECHNIQUES

Photoluminescence (PL) and electroluminescence (EL) measurements (angular, integrating sphere), electrical testing, Atomic Force Microscopy (AFM), Scanning Electron Microscopy (SEM), lithography (optical, electron beam, holographic, imprint), lithography mask writing (Heidelberg DWL 200) and design (L-Edit), electron beam and sputter deposition, Plasma-Enhanced Chemical Vapor Deposition (PECVD), Reactive-Ion Etching (RIE), Inductively Coupled Plasma Etching (ICP).

## TEACHING EXPERIENCE

Summer 2007 **Apprentice Research Program Mentor, UCSB** Santa Barbara, CA

Designed a research project for and mentored a high school student for 10 weeks.

Spring 2005 **Teaching Assistant, UCSB** Santa Barbara, CA

Solid State Physics, graduate level. Lectured, held office hours, created and graded homework and tests.

2002-2003 **NSF Teaching Outreach Program** Philadelphia, PA  
Assisted science teachers at local K-12 schools with lesson preparation, teaching and science fair projects.

**PUBLICATIONS  
AND  
CONFERENCES**

- McGroddy K**, David A, Matioli E, Iza M, Nakamura S, DenBaars SP, Speck JS, Weisbuch C, Hu EL, *Directional emission control and increased light extraction in GaN photonic crystal LEDs*, in preparation.
- Tamboli AC, **McGroddy K**, Nakamura S, Hu EL, *Photoelectrochemical roughening of p-GaN for light extraction from GaN/InGaN light emitting diodes*, in preparation.
- McGroddy K**, David A, Iza M, Matioli E, Nakamura S, DenBaars SP, Weisbuch C, Hu EL, *Enhancement of Light Extraction in GaN LEDs using photonic crystals and index guiding layers*, International Symposium on Semiconductor Light Emitting Devices, Phoenix, AZ, April, 2008.
- David A, Moran B, **McGroddy K**, Matioli E, Hu E.L., DenBaars S.P., Nakamura S, and Weisbuch C, *GaN/InGaN light emitting diodes with embedded photonic crystal obtained by lateral epitaxial overgrowth*, Appl. Phys. Lett. Accepted Jan 2008.
- McGroddy K**, David A, Iza M, Nakamura S, DenBaars SP, Weisbuch C, Hu EL, *Photonic crystals for light extraction from GaN LEDs*, Materials Research Society Conference, Boston, MA, December 2006.
- K. McGroddy**, A. David ,C. Meier, R. Sharma, S. Nakamura, S. P. DenBaars, C. Weisbuch, E. L. Hu, *Enhancement of light extraction in GaN using photonic crystals*, International Workshop on Nitride Semiconductors, Kyoto, Japan, October 2006.
- Keller S, Schaake C, Fichtenbaum NA, Neufeld CJ, Wu Y, **McGroddy K**, David A, DenBaars SP, Weisbuch C, Speck JS, Mishra UK, *Optical and structural properties of GaN nanopillar and nanostripe arrays with embedded InGaN/GaN multi-quantum wells*, J. of Appl. Phys. 100, 054314 (2006).
- David A, Fujii T, Sharma R, **McGroddy K**, Nakamura S, DenBaars SP, Hu EL, Weisbuch C, Benisty H, *Photonic-crystal GaN light-emitting diodes with tailored guided modes distribution*, Appl. Phys. Lett. 88, 061124 (2006).
- Meier C, Hennessy K, Haberer ED, Sharma R, Choi YS, **McGroddy K**, Keller S, DenBaars SP, Nakamura S, Hu EL, *Visible resonant modes in GaN-based photonic crystal membrane cavities*, Appl. Phys. Lett. 88, 031111 (2006).
- K. McGroddy**, A. David ,C. Meier, R. Sharma, S. Nakamura, S. P. DenBaars, C. Weisbuch, E. L. Hu, *GaN photonic crystals for light extraction*, 49<sup>th</sup> International Conference on Electron, Ion, and Photon Beams and Nanolithography, Orlando, FL, May 2005.