

# Prof. Can Bayram

*Department of Electrical and Computer Engineering,  
University of Illinois at Urbana-Champaign, IL, USA*

## **EDUCATION:**

2005 - 2011 Ph.D. ([Electrical Engineering](#)) [Northwestern University](#), Illinois, USA  
(~ 6 years)

*Ph.D. focus on Solid State Devices and Photonics*

2001 - 2005 B.S. ([Electrical Engineering](#)) [Bilkent University](#), Ankara, TURKEY  
(~ 4 years)

*B.S. focus on Physical Electronics*

## **PROFESSIONAL POSITIONS:**

2014 - present **Assistant Professor**, *Department of Electrical and Computer Engineering, University of Illinois at Urbana Champaign, IL, USA*  
**Affiliate Faculty**, *Micro and Nanotechnology Laboratory, University of Illinois at Urbana Champaign, IL, USA*

Research Interest: Advanced compound semiconductor devices

2011 - 2014 **Postdoctoral Research Scientist**, *IBM Research, Thomas J. Watson Research Center, Yorktown Heights, NY, USA*  
(~3 years)

Research Area: III-V devices (light emitting diodes, solar cells, transistors) and co-integration with silicon, flexible thin film devices, epitaxial graphene

2010 - 2011 **Research Fellow**, *IBM Research, Thomas J. Watson Research Center, Yorktown Heights, NY, USA*  
(~ 9 months)

Research Area: Novel GaN-based terahertz photonic devices

2010 - 2011 **Energy Fellow**, *Link Foundation Energy Programs, Thayer School of Engineering, Dartmouth College, NH, USA*  
(~ 1 year)

Research Area: High performance GaN-based visible light emitting diodes

2005 - 2010 **Research Assistant**, *Department of Electrical Engineering and Computer Science, Northwestern University, IL, USA*  
(~ 5 years)

Research Area: High efficiency wide bandgap (AlGaInN and MgZnO) photonic devices: Ultraviolet detectors and green light emitting diodes

2004 - 2005 **Research Assistant**, *Department of Electrical Engineering, Bilkent University, Ankara, TR*  
(~ 1 year)

Research Area: Capacitive micromachined ultrasonic transducer arrays

2003 - 2003 **Research Intern**, *ASELSAN, Ankara, TR*

(~ 3 months) Research Area: Communication and information technologies

2002 - 2002 **Visiting Researcher**, *Department of Electrical Engineering, Stanford University, CA, USA*  
(~ 3 months)

Research Area: Novel ultrasonic micro-electro-mechanical systems

**SELECT RESEARCH HONORS, AWARDS, & RECOGNITION:**

- **(2017) NSF CAREER Award** (awarded to select junior faculty by [National Science Foundation](#) and includes a \$500K grant funding for five-years for the project titled “*CAREER: Cubic Phase Light Emitting Diodes for Advanced Solid State Lighting*”)
- **(2016) AFOSR Young Investigator Award** (awarded to 56 scientists amongst > 265 applicants in the U.S. by [Air Force Office of Scientific Research](#) and includes a \$360K grant funding for three-years for the project titled “*Investigating Heteroepitaxy Principles and Transport Characteristics of Vertically-Integrated GaN-on-Graphene Heterostructures*”)
- **(2016) IEEE Society Senior Membership Elevation** (awarded to *only 9% of IEEE’s approximately 428,000 members*, which requires extensive experience, and reflects professional maturity and documented achievements of significance)
- **(2014) IEEE Electron Devices Society Early Career Award** (awarded annually to *one in the world* - by [IEEE Electron Devices Society](#))
- **(2014) Docent (Associate Professor)** title in Electrical Engineering from the [Turkish Council of Higher Education](#)
- **(2014, 2013, 2013) IBM Invention Achievement Awards** (by [International Business Machines Corporation](#))
- **(2013) SPIE Society Senior Membership Elevation** for significant technical accomplishments in GaN devices and for significant contributions as an educator in the field of electronics, optics, and photonics.
- **(2012) Best Paper Award** at Infrared Optoelectronics Materials and Devices Conference, ([MIOMD-XI](#)) (co-chaired by Nobel Laureates Profs. Leo Esaki, and Klaus von Klitzing)
- **(2010) IBM Ph.D. Fellowship** (awarded annually to *select researchers in the world* by [International Business Machines Corporation](#))
- **(2010) Link Foundation Energy Fellowship** (awarded annually to *three in USA and Canada* by [Link Foundation](#))
- **(2010) IEEE Electron Devices Society PhD Fellowship** (awarded annually to *three in the world* - one in USA - by [IEEE Electron Devices Society](#))
- **(2009) Boeing Engineering Student of the Year** (awarded annually to *one in the world* by [Boeing Company](#))
- **(2009) IEEE Photonics Society Graduate Student Fellowship** (awarded annually to *twelve in the world* - seven in USA - by [IEEE Photonics Society](#))
- **(2009) SPIE Laser Technology, Engineering and Applications Scholarship** (awarded annually to *one in the world* - third top recognition - by [SPIE Society](#))
- **(2009) Ludo Frevel Crystallography Scholarship** (awarded annually to *ten in the world* by [ICDD](#))
- **(2008) Dow Sustainability Innovation Award** (awarded to *one in select worldwide universities* by [Dow Chemical Company](#))

**SELECT TEACHING HONORS, AWARDS, & RECOGNITIONS:**

- **(2015) Collins Scholar** (The Academy for Excellence in Engineering Education, College of Engineering, UIUC)

**SELECT RESEARCH ACCOMPLISHMENTS:**

- 2017 [IEEE Electron Device Lett. 38 \(8\) 1094 – 1096](#)  
- HIGHLIGHTED BY SEMICONDUCTORTODAY
- 2017 [J. Appl. Phys. 121, 245109](#)
- 2017 [J. Phys. D: Appl. Phys. 50, 055103](#)  
- HIGHLIGHTED BY 20+ NEWS AGENCIES
- 2016 [APL 109, 151904](#)
- 2016 [APL 109, 042103](#)  
- HIGHLIGHTED BY 20+ NEWS AGENCIES
- 2014 [Nat. Commun. 5, 4836](#)  
- DOWNLOADED > 1,000 TIMES IN FIRST TWO WEEKS
- 2014 [Adv. Funct. Mater. 24 \(28\), 4492](#)  
-FRONTISPIECE COVER
- 2013 [Appl. Phys. Express 6, 112301](#)
- 2013 [Adv. Energy Mater. 3, 566](#)  
-INSIDE COVER ARTICLE
- 2013 [APL 102, 011106](#)
- 2012 [APL 100, 053901](#)  
-EDITOR'S PICK 2012  
-TOP 20 MOST READ
- 2010 [APL 97, 181109](#)
- 2009 [APL 95, 131109](#)
- 2009 [AP A 96, 403](#)
- 2008 [APL 93, 08111](#)
- 2008 [APL 93, 211107](#)
- 2007 [APL 91, 041104](#)
- First integrated GaN HEMTs on CMOS-Si platform
  - First theory capturing the uniaxial nature of wurtzite semiconductors for transport
  - GaN-on-Si technology for 200-mm scalability
  - A new passive cooling technology for GaN power devices
  - First cubic GaN-on-Si(100)
  - Cubic Phase GaN via Phase-transition
  - Entire cubic phase GaN surface coverage by aspect ratio patterning
  - Thinnest/Flexible light emitting diode
  - First GaN-on-Graphene technology
  - Demonstration of graphene as a cleave layer
  - Demonstration of an infinitely-reusable substrate
  - First polarization-free visible emitters
  - First CMOS-compatible integration of GaN on Si (100) substrates (8-inch)
  - New class of vertical/thin-film LEDs enabled via mechanical release
  - Highest specific power ( $\geq 1995$  W/kg) flexible III-V tandem solar cells
  - Highest power ultraviolet LED on Si
  - Highest efficiency Ge/GaAs/InGaP- based thin film solar cell
  - First reliable GaN-based resonant tunneling diode
  - First mid-infrared GaN-based intersubband device
  - First green emitting InGaN quantum dots
  - First ZnO-InGaN hybrid light emitting diodes
  - Highest efficiency AlGaIn-based ultraviolet detector
  - First AlGaIn-based ultraviolet single photon detector

**SELECT ARTICLES ABOUT RESEARCH THAT HAVE APPEARED IN POPULAR PRESS AND JOURNALS:**

- “Towards gallium nitride integration with silicon CMOS”, [SemiconductorToday](#) 07/26/2017.
- “GaN-on-Silicon for scalable high electron mobility transistors”, [ScienceDaily](#), [EurekAlert](#), [CompoundSemiconductor](#), [SemiconductorToday](#), [R&D Magazine](#), [ElectroIQ](#), [Physics.org](#) 01/09/2017.
- “Thinner Is Cooler For GaN Devices”, [Compound Semiconductor](#), 10/11/16.
- “Making green LEDs more efficient and brighter”, [EETimes Europe](#), 08/12/2016.
- “Cubic GaN-on-Si Makes More Efficient Green LEDs, According to Researchers”, [Solid State Lighting](#), 08/01/2016.
- “UIUC uses MOCVD growth of cubic GaN on silicon to boost efficiency and brightness of green LEDs”, [Semiconductor Today](#), 08/01/2016.
- “US Researchers Make Better Green LEDs With Cubic GaN-On-Silicon”, [Compound Semiconductor](#), 07/30/16.
- “New method for making green LEDs enhances their efficiency and brightness”, highlighted by 20+ press organizations including [Science Daily](#), [EurekAlert](#), [Science Newline Technology](#), [Physics.org](#) 7/30/2016.
- “Big Blue Ambition”, [Compound Semiconductor](#), 10/2014.
- “IBM Shows Graphene as Epi Template”, [Solid State Technology](#), 10/2014.
- “Van der Waals epitaxy of GaN and blue LEDs”, [Semiconductor Today](#), 10/2014.
- “Graphene gets another real use – blue LED fabrication”, [Electronics Weekly](#), 10/2014.
- “IBM Conquers Wafer-Scale Graphene”, [EE Times](#), 10/2014.
- “Growing single-crystalline materials on reusable graphene”, [IBM Research](#), 09/2014.
- “US Researchers Use Graphene To Make Flexible Blue LEDs On Plastic”, [Compound Semiconductor](#), 09/2014.
- “Exfoliated single-crystalline GaN films grown on graphene lead to new types of LEDs”, [Laser Focus World](#), 09/2014.
- “Cubic Phase GaN on Nano-grooved Si (100) via Maskless Selective Area Epitaxy”, [FRONTISPIECE COVER](#), [Advanced Functional Materials](#), 07/2014.
- “Growing cubic and hexagonal GaN on standard (100) silicon substrates”, [Semiconductor Today](#), 05/2014.
- “GaN On CMOS-Compatible On-Axis Silicon (100) For Hetero-Integration”, [Power Electronics World](#), 04/2014.
- “Polarisation-free GaN shows promise for visible photonics”, [Compound Semiconductor](#), 04/2014.
- “Ultra-Light High-Efficiency Flexible InGaP/(In)GaAs Tandem Solar Cells on Plastic”, [INSIDE COVER](#), [Advanced Energy Materials](#), 05/2013.
- “High-efficiency thin-film InGaP/InGaAs/Ge tandem solar cells enabled by controlled spalling technology”, [TOP 20 Most Downloaded Articles](#), [Applied Physics Letters](#), 02/2012. [Editor's Choice 2012](#): Selected as one of "The Best of Papers of 2012" published in Applied Physics Letters, the most cited journal in Applied Physics.

- “UV APD improved by m-plane free-standing GaN substrate”, [Semiconductor Today](#), 05/26/2010.
- “Nitrides push performance of UV photodiodes”, [Laser Focus World](#), 9/2009.
- “ZnO does away with green-LED problem”, [Laser Focus World](#), 11/2008.
- “ZnO/GaN hybrid shows green LED promise”, [Compound Semiconductor](#), 11/2008.
- “A hybrid green light emitting diode comprised of n-ZnO/(InGaN/GaN)/ multi-quantum-wells/ p-GaN”, [TOP 20 Most Downloaded Articles](#), *Applied Physics Letters*, 09/2008.
- “Tiny Avalanche Photodiode Detects Single UV Photons”, [ScienceDaily](#), 1/2/2008.
- “Tiny Avalanche Photodiodes Target Bioterrorism Agents”, [Science Daily](#), 09/14/2005.

### **PROFESSIONAL AND HONORARY SOCIETIES:**

Senior Member	2016-present	IEEE Electron Devices Society ( <i>member since 2009</i> )
Senior Member	2016-present	IEEE Photonics Society ( <i>member since 2007</i> )
Senior Member	2016-present	IEEE Society ( <i>member since 2005</i> )
Senior Member	2013-present	SPIE Society ( <i>member since 2006</i> )
Member	2010-present	Institute of Physics (IOP)
Member	2009-present	Electrochemical Society (ECS)
Member	2009-present	American Association for the Advancement of Science
Member	2008-present	American Physical Society (APS)
Member	2008-present	Materials Research Society (MRS)
Member	2005-present	Optical Society of America (OSA)

### **PROFESSIONAL ACTIVITIES:**

<b>Proposal Reviewer</b>	Croatian Science Foundation, 2017
	French National Research Agency, 2017
	Singapore National Research Foundation, 2017
	Advanced Research Projects Agency – Energy, 2017
	National Science Foundation (NSF), 2017, 2013
	Air Force Office of Scientific Research (AFOSR), 2017, 2016
	Israeli Ministry of Science, Technology and Space, 2017
	Dutch Research Council, 2016
	European Research Council (ERC), 2015
	Department of Energy (DOE), 2012
<b>Conference Co-Chair</b>	SPIE Optics + Photonics, <i>San Diego, USA, August 28-Sept. 1, 2016</i>
	SPIE Optics + Photonics, <i>San Diego, USA, August 9-13, 2015</i>
<b>Conference Organizing Committee</b>	SPIE Photonics West, <i>San Francisco, USA, February, 2018</i>
	International Conference on Electron Devices and Solid-State Circuits, <i>Taipei, October, 2017</i>
	SPIE Optics + Photonics, <i>San Diego, USA, August 6-10, 2017</i>
	CNST 14th Annual Nanotechnology Workshop, University of Illinois at Urbana-Champaign, <i>IL, USA, May 5-6, 2016</i>
	SPIE NanoScience + Engineering, <i>San Diego, USA, August 9-13, 2015</i>
	SPIE Photonics West, <i>San Francisco, USA, February 7-12, 2015</i>
	SPIE Photonics West, <i>San Francisco, USA, February 1-6, 2014</i>
	OPTIC, <i>Chungli City, TAIWAN, Dec 5-7, 2013</i>

<b>Session Chair</b>	SPIE Photonics West, 2017, 2010 International Workshop on Nitrides, 2016
<b>Fellowship Committee</b>	SPIE Scholarship, 2017 to present Link Foundation, 2013, 2014, 2015, 2016
<b>Technical Committee</b>	EDS Optoelectronic Devices, 2017 to present
<b>Editorial Board</b>	International Journal of Nanomedicine and Nanosurgery, 2015 to present Recent Patents on Nanotechnology, 2014 to present
<b>Journal Referee</b>	<b>ACS Journals</b> ( <i>ACS Nano</i> ); <b>APS Journals</b> ( <i>Applied Physics Letters</i> , <i>Journal of Applied Physics</i> , <i>AIP Advances</i> ); <b>OSA Journals</b> ( <i>Optics Express</i> , <i>Optical Materials Express</i> , <i>Optics Letters</i> , <i>Journal of the Optical Society of America A</i> , <i>Applied Optics</i> ); <b>IOP Journals</b> ( <i>Reports on Progress in Physics</i> , <i>New Journal of Physics</i> , <i>Journal of Physics D</i> , <i>Nanotechnology</i> , <i>Semiconductor Science and Technology</i> ); <b>IEEE Journals</b> ( <i>Electron Device Letters</i> , <i>Journal of Quantum Electronics</i> , <i>Transactions on Electron Devices</i> , <i>Photonics Technology Letters</i> , <i>Photonics Letters</i> ); <b>ECS Journals</b> ( <i>Journal of the Electrochemical Society</i> , <i>Electrochemical and Solid-State Letters</i> , <i>Solid State Letters</i> , <i>Measurement Science and Technology</i> , <i>Solid State Science and Technology</i> ); <b>Elsevier Journals</b> ( <i>Superlattices and Microstructures</i> , <i>Materials Chemistry and Physics</i> , <i>Solid State Electronics</i> , <i>Thin Solid Films</i> ); <b>Nature Journals</b> ( <i>Nature</i> , <i>Scientific Reports</i> ); <b>Springer Journals</b> ( <i>Applied Physics B</i> ); <b>Wiley Journals</b> ( <i>Advanced Materials</i> , <i>Advanced Functional Materials</i> , <i>Laser &amp; Photonics Reviews</i> )

### **SERVICE TO UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN:**

MNTL Search Committee / Diversity Advocate	2017/09 to present
<i>Grants and Contracts Specialist</i>	
MNTL Search Committee	2017/04 to 2017/07
<i>Visiting Research Scientist</i>	
MNTL Search Committee / Diversity Advocate	2016/04 to present
<i>MOCVD Research Engineer Position</i>	
MNTL Search Committee Chair	2015/12 to 2016/10
<i>Cleanroom Manager Position</i>	
MNTL Search Committee / Diversity Advocate	2015/04 to 2016/06
<i>Research (Etch) Engineer Position</i>	
MNTL Equipment Committee Chair,	2015/01 to present
ECE Curriculum Committee,	2014 Fall to present
ECE Colloquium Committee,	2014 Fall to present
ECE Qualifying Exam Committee,	(9 students)
ECE Preliminary Exam Committee,	(5 students)
ECE PhD Final Exam Committee,	(3 student)
Mentor, ARISE (Academic Redshirt in Science and Engineering) Program, 2017 – present	
Reviewer, Andrew T. Yang Research and Entrepreneurship Award 2017	
Judge, Undergraduate Research Symposium	2017 Spring
HKN Power Lunch	2017 Spring
Judge, Introduce a Girl to Engineering Day,	2017 Spring
Judge, Introduce a Girl to Engineering Day,	2016 Spring
Session Chair, BioNanotechnology Summer Institute,	2015 Summer
Judge, Promoting Undergraduate Research in Engineering (PURE),	2014 Fall

**SERVICE TO OTHER UNIVERSITIES:**

EECS PhD Final Exam Committee, (Northwestern University, IL, USA)	2015 Spring to present (2 students)
EECS Qualifying Exam Committee, (Northwestern University, IL, USA)	2011 Fall to present (1 students)

**TEACHING / COURSES:**

ECE 340 Semiconductor Electronics,	2017 Spring	(Class of 46 Students)
ECE 397 Individual Study in ECE Problems,	2017 Spring	(Supervision of 3 Students)
ECE 497 Senior Research Project,	2017 Spring	(Supervision of 2 Students)
ECE 498 CB LEDs and Solar Cells,	2017 Spring	(Class of 10 Students)
ECE 340 Semiconductor Electronics,	2016 Fall	(Class of 20 Students)
ECE 396 Individual Study in ECE Problems,	2016 Fall	(Supervision of 1 Student)
ECE 397 Individual Study in ECE Problems,	2016 Fall	(Supervision of 2 Students)
ECE 496 Senior Research Project,	2016 Fall	(Supervision of 2 Students)
ECE 498 CB LEDs and Solar Cells,	2016 Spring	(Class of 23 Students)
ECE 396 Individual Study in ECE Problems,	2016 Spring	(Supervision of 3 Students)
ECE 397 Individual Study in ECE Problems,	2016 Spring	(Supervision of 3 Students)
ECE 499 Senior Thesis,	2016 Spring	(Supervision of 2 Students)
ECE 340 Semiconductor Electronics,	2015 Fall	(Class of 46 Students)
ECE 397 Individual Study in ECE Problems,	2015 Fall	(Supervision of 4 Students)
ECE 496 Senior Research Project,	2015 Fall	(Supervision of 2 Students)
ECE 397 Individual Study in ECE Problems,	2015 Summer	(Supervision of 1 Students)
ECE 597 Individual Study in ECE	2015 Summer	(Supervision of 1 Student)
ECE 340 Semiconductor Electronics,	2015 Spring	(Class of 50 Students)
ECE 397 Individual Study in ECE Problems,	2015 Spring	(Supervision of 5 Students)
ECE 597 Individual Study in ECE	2015 Spring	(Supervision of 1 Student)
ECE 340 Semiconductor Electronics,	2014 Fall	(Class of 28 Students)
ECE 397 Individual Study in ECE Problems,	2014 Fall	(Supervision of 1 Student)
ECE 597 Individual Study in ECE	2014 Fall	(Supervision of 1 Student)

**SELECT OUTREACH ACTIVITIES:**

- **Callan McCormick (of Colorado College, CO)** Research Experience for Undergraduates Program, May 30 – Aug 25, 2017.
- **Kelly Jolley (of Canby High School, Canby, OR)** Research Experience for Teachers Program, June 28 – August 8, 2017.
- **Larissa Del Rosario (of University of Puerto Rico, Mayaguez, Puerto Rico)** Research Experience for Undergraduates Program, May 23 – July 29, 2016.
- **Kelly Jolley (of Abilene High School, Abilene, TX)** Research Experience for Teachers Program, June 13 – July 22, 2016.
- **Geoffrey W. Freymuth (of Jefferson Middle School, Champaign, IL),** Research Experience for Teachers Program, June 15 – July 24, 2015.

**SELECT GRAD STUDENT AWARDS (EXTERNAL)**

- 1 [NASA Space Technology Research Fellow](#)
  - (2017) Richard Liu
- 1 [NSF Graduate Research Fellow](#)
  - (2017) Richard Liu {declined}

- [2 CS MANTECH Travel Awardees](#)
  - (2017) *Richard Liu; Hsuan-Ping Lee*

#### **SELECT GRAD STUDENT AWARDS (INTERNAL)**

- [1 UIUC Graduate College Conference Travel Grant](#)
  - (2017) *Hsuan-Ping Lee*

#### **SELECT UG STUDENT AWARDS (EXTERNAL)**

- [2 NSF Graduate Research Fellows](#)
  - (2017) *Ryan Grady*; (2016) *Connor Bailey*
- [1 NSF Graduate Research Honorable Mention](#)
  - (2017) *Josh Perozek*
- [1 Goldwater Scholar](#)
  - (2017) *Dennis Rich*
- **2 Summer School Invitees**
  - (2017) *Jose Ignacio Vergara Panzone*, invitation to the Summer Undergraduate Research Program for Diversity in Chemistry at the Department of Chemistry at Princeton University.
  - (2016) *Yifan Yao*, invitation to the Summer School "[Finding Nano - Nanoscience, Research and Industry in Germany](#)" (from June 13th - July 14th) at the Technical University of Munich..
- [1 League of Railway Industry Women Scholar](#)
  - (2016) *Connor Bailey*

#### **SELECT UG STUDENT AWARDS (INTERNAL)**

- [1 UIUC Illinois Distinguished Fellow](#)
  - (2017) *Josh Perozek*
- [1 UIUC ECE Distinguished Research Fellow](#)
  - (2017) *Josh Perozek*
- [2 UIUC ECE A. R. "Buck" Knight Award](#)
  - (2017) *Josh Perozek; Ryan Grady*
- [1 UIUC MATSCI Earl J. Eckel Scholarship](#)
  - (2017) *Yifan Yao*
- [1 UIUC ECE Robert C. MacClinchie Scholarship](#)
  - (2016) *Ryan Grady*
- [1 UIUC College of Engineering Scholarship](#)
  - (2016) *Josh Perozek*
- [2 UIUC Office of Undergraduate Research Conference Travel Award](#)
  - (2017) *Yifan Yao*
  - (2016) *Josh Perozek*

#### **BIBLIOGRAPHY** (students supervised: **underlined**)

##### **Patents:**

44. C. Bayram, R. Grady, and K. Park, "Normally-Off, Cubic Phase GaN Field Effect Transistors" US Patent Application {filed on Sept. 8, 2017}.
43. C. Bayram and R. Liu, "Maximizing cubic phase group III-nitride on patterned silicon," US Patent Application {filed on April 16, 2017}.
42. C. Bayram, C.P. D'Emic, J. Kim, and D.K. Sadana, "Hetero-integration of III-N material on silicon," [US Patent Application 20170092483](#).
41. C. Bayram, S. W. Bedell, N. Li, K.T. Shiu, and D. K. Sadana "Back contact LED through spalling," [US Patent Application 20160284930](#).



40. C. Bayram, C.P. D'Emic, W.J. Gallagher, E. Leobandung, and D.K. Sadana "Group III nitride integration with CMOS technology," [US Patent Application 20160284832](#).
39. C. Bayram, C.P. D'Emic, W.J. Gallagher, E. Leobandung, and D.K. Sadana, "Group III nitride integration with CMOS technology," [US Patent Application 20160233244](#).
38. C. Bayram, C.P. D'Emic, J. Kim, and D.K. Sadana, "Hetero-integration of III-N material on silicon," [US Patent Application 20160020283](#).
37. C. Bayram, C.P. D'Emic, W.J. Gallagher, E. Leobandung, and D.K. Sadana, "Group III nitride integration with CMOS technology," [US Patent Application 20150318283](#).
36. C. Bayram, C.P. D'Emic, W.J. Gallagher, E. Leobandung, and D.K. Sadana, "Group III nitride integration with CMOS technology," [US Patent Application 20150318276](#).
35. C. Bayram, S. W. Bedell, and D. K. Sadana,, "Engineered base substrates for releasing III-V epitaxy through spalling," [US Patent Application 20150318168](#).
34. C. Bayram, C.-W. Cheng, D.K. Sadana, and K.-T. Shiu, "Selective gallium nitride regrowth on (100) silicon," [US Patent Application 20150287790](#).
33. C. Bayram, C.-W. Cheng, T.H. Ning, D.K. Sadana, and K.-T. Shiu, "Heterogeneous integration of group III nitride on silicon for advanced integrated circuits," [US Patent Application 20150235838](#).
32. C. Bayram, S.W. Bedell, K.E. Fogel, J.A. Ott, and D.K. Sadana, "Controlled spalling of group III nitrides containing an embedded spall releasing plane," [US Patent Application 20150179428](#).
31. C. Bayram, C. Dimitrakopoulos, K. Fogel, J. Kim, J.A. Ott, and D.K. Sadana, "Gallium nitride material and device deposition on graphene terminated wafer and method of forming the same," [US Patent Application 20150084074](#).
30. C. Bayram, C. Dimitrakopoulos, K. Fogel, J. Kim, J.A. Ott, and D.K. Sadana, "Gallium nitride material and device deposition on graphene terminated wafer and method of forming the same," [US Patent Application 20150083036](#).
29. C. Bayram, S.W. Bedell, and D.K. Sadana, "Curvature compensated substrate and method of forming the same," [US Patent Application 20150035123](#).
28. C. Bayram, J. O. Chu, C. Dimitrakopoulos, J. Kim, H. Park, and D.K. Sadana, "Thin film wafer transfer and structure for electronic devices," [US Patent Application 20140220764](#).
27. C. Bayram, J. O. Chu, C. Dimitrakopoulos, J. Kim, H. Park, and D.K. Sadana, "Thin film wafer transfer and structure for electronic devices," [US Patent Application 20140217356](#).
26. C. Bayram, D.K. Sadana, and K.-T. Shiu, "Group III-nitrides on nanopatterned substrates," [US Patent Application 20140191284](#).
25. C. Bayram, D.K. Sadana, and K.-T. Shiu, "Group III-nitrides on nanopatterned substrates," [US Patent Application 20140191283](#).
24. C. Bayram, C.-W. Cheng, D.K. Sadana, and K.-T. Shiu, "Selective gallium nitride regrowth on (100) silicon," [US Patent Application 20140134830](#).
23. C. Bayram, C.-W. Cheng, D.K. Sadana, and K.-T. Shiu, "Selective gallium nitride regrowth on (100) silicon," [US Patent Application 20140131724](#).

22. C. Bayram, C.-W. Cheng, D.K. Sadana, and K.-T. Shiu, “*Dual phase gallium nitride material formation on (100) silicon*,” [US Patent Application 20140131722](#).
21. C. Bayram, S.W. Bedell, D. Sadana, and J.L. Saenger, “*Laser-initiated exfoliation of group III-nitride films and applications for layer transfer and patterning*,” [US Patent Application 20130280885](#).
20. C. Bayram, C.-W. Cheng, T.H. Ning, D.K. Sadana, and K.-T. Shiu, “*Heterogeneous integration of group III nitride on silicon for advanced integrated circuits*,” [US Patent Application 20130270608](#).
19. C. Bayram, C.P. D’Emic, W.J. Gallagher, E. Leobandung, and D.K. Sadana, “*Group III nitride integration with CMOS technology*,” [U.S. Patent 9,660,069](#), issued May 23, 2017.
18. C. Bayram, C.-W. Cheng, T. Gokmen, N. Li, J.A. Ott, D.K. Sadana, and K.T. Shiu, “*Polarization free gallium nitride-based photonic devices on nanopatterned silicon*,” [U.S. Patent 9,608,160](#), issued March 28, 2017.
17. C. Bayram, C.P. D’Emic, J. Kim, and D.K. Sadana, “*Hetero-integration of III-N material on silicon*,” [U.S. Patent 9,601,583](#), issued March 21, 2017.
16. C. Bayram, C. Dimitrakopoulos, K. Fogel, J. Kim, J.A. Ott, and D.K. Sadana, “*Gallium nitride material and device deposition on graphene terminated wafer and method of forming the same*,” [U.S. Patent 9,574,287](#), issued February 21, 2017.
15. C. Bayram, C.P. D’Emic, W.J. Gallagher, E. Leobandung, and D.K. Sadana, “*Group III nitride integration with CMOS technology*,” [U.S. Patent 9,564,526](#), issued February 7, 2017.
14. C. Bayram, C.-W. Cheng, D.K. Sadana, and K.-T. Shiu, “*Selective gallium nitride regrowth on (100) silicon*,” [U.S. Patent 9,391,144](#), issued July 12, 2016.
13. C. Bayram, C.P. D’Emic, W.J. Gallagher, E. Leobandung, and D.K. Sadana, “*Group III nitride integration with CMOS technology*,” [U.S. Patent 9,362,281](#), issued June 7, 2016.
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34. **(INVITED) C. Bayram**, “*LED lighting*” International Summer School on Advanced TV Technologies, Antalya, TURKEY, Aug. 25-29, 2014.
33. **C. Bayram**, J. Kim, H. Park, C.-W. Cheng, C. Dimitrakopoulos, J. Ott, K.B. Reuter, S.W. Bedell, and D. K. Sadana, “*Revolutionary GaN-on-graphene technology*,” 5th International Symposium on Growth of III-Nitrides, Atlanta, GA, USA, May 18-22, 2014.
32. **C. Bayram**, J. Ott, K.-T. Shiu, C.-W. Cheng, Y. Zhu, J. Kim, M. Razeghi, and D.K. Sadana, “*Cubic phase GaN on nano-grooved Si (100) via maskless selective area epitaxy*,” 5th International Symposium on Growth of III-Nitrides, Atlanta, GA, USA, May 18-22, 2014.

31. **(INVITED)** D. K. Sadana, N. Li, **C. Bayram**, K.-T. Shiu, and C.-W. Cheng, "Technologies for high speed III-V optical links on silicon optoelectronics," International Conference and Exhibition on Lasers, Optics & Photonics, Hilton San Antonio Airport, TX, USA, Oct. 07-09 (2013).
30. **(INVITED)** **C. Bayram**, "Renewable energy and energy-efficiency in Turkey: Research and development trends," 2nd TUBITAK Workshop for Turkish Scientist Residing Abroad (hosted by Scientific and Technological Research Council of Turkey), Grand Cevahir Otel, Istanbul, TURKEY, July 4-5 (2013).
29. D. Shahrjerdi, S. W. Bedell, **C. Bayram**, and D. K. Sadana, "Flexible InGaP/(In)GaAs tandem solar cells with very high specific power," 39th IEEE Photovoltaic Specialists Conference, Tampa, Florida, USA, June 16-21 (2013).
28. **(INVITED)** **C. Bayram**, "Gallium nitride compound semiconductors for ultraviolet, visible, and terahertz photonics," Special Materials Science & Engineering Seminar, Columbia University, Morningside Campus, NY, USA, June 12 (2013).
27. **(INVITED)** **C. Bayram**, K.T. Shiu, Y. Zhu, C.W. Cheng, D.K. Sadana, F.H. Teherani, D.J. Rogers, V. E. Sandana, P. Bove, Y. Zhang, S. Gautier, C.-Y. Cho, E. Cicek, Z. Vashaei, R. McClintock, and M. Razeghi, "Engineering light-emitting diodes with inexpensive materials: Integrating ZnO and Si into solid state lighting," SPIE Photonics West, San Francisco, CA, USA, February 2-7 (2013).
26. **(INVITED)** **C. Bayram**, K.T. Shiu, Y. Zhu, C.W. Cheng, D.K. Sadana, Z. Vashaei, E. Cicek, R. McClintock, and M. Razeghi, "Gallium nitride on silicon for cheap, scalable, and sustainable photonics," SPIE Photonics West, San Francisco, CA, USA, February 2-7 (2013).
25. **(INVITED)** D. K. Sadana, S.W. Bedell, D. Shahrjerdi, B. Hekmatshoar, N. Li, **C. Bayram**, and J. Kim, "Advanced PV technologies: Challenges & Opportunities," SPIE Photonics West, San Francisco, CA, USA, February 2-7 (2013).
24. **(INVITED)** D. Shahrjerdi, S. W. Bedell, B. Hekmatshoar, **C. Bayram**, and D. Sadana, "New paradigms for cost- effective III-V photovoltaic technology," Pacific Rim Meeting on Electrochemical and Solid-State Science, Honolulu, Hawaii, USA, October 7-12 (2012).
23. **C. Bayram**, Z. Vashaei, R. McClintock, D.K. Sadana, and M. Razeghi, "Al<sub>x</sub>Ga<sub>1-x</sub>N-based engineered intersubband devices," Infrared Optoelectronics: Materials & Devices (MIOMD-XI) Conference, Chicago, IL, USA, September 4-8 (2012).
22. D. Shahrjerdi, S. W. Bedell, C. Ebert, **C. Bayram**, B. Hekmatshoar, K. Fogel, P. Lauro, M. Gaynes, T. Gokmen, J. A. Ott, and D. K. Sadana, "High-efficiency thin-film InGaP/InGaAs/Ge tandem solar cells enabled by controlled spalling technology," 38th IEEE Photovoltaic Specialists Conference, Austin, Texas, USA, June 3-8 (2012).
21. **(INVITED)** **C. Bayram**, "Applied photonics for a sustainable earth: High efficiency light emitting diodes and solar cells," TASSA Annual Conference, University of Maryland, College Park, MD, USA, March 3-4 (2012).
20. **(INVITED)** **C. Bayram**, D. K. Sadana, Z. Vashaei, and M. Razeghi, "Reliable GaN-based resonant tunneling diodes with reproducible room-temperature negative differential resistance," SPIE Photonics West, San Francisco, CA, USA, January 22-27 (2012).

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18. **(INVITED) C. Bayram** and M. Razeghi, "*III-Nitride optoelectronic devices*," ICDD Spring Meetings, Pennsylvania, USA, March 15 (2011).
17. Z. Vashaei, **C. Bayram**, R. McClintock, and M. Razeghi, "*Effects of substrate quality and orientation on the characteristics of III-nitride resonant tunneling diodes*", SPIE Photonics West, San Francisco, CA, USA, January 22-27 (2011).
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15. **(INVITED) R. McClintock**, E. Cicek, Z. Vashaei, **C. Bayram**, M. Razeghi, and Melville P. Ulmer, "*III-nitride based avalanche photodetectors*," SPIE Optics + Photonics, San Diego, USA, August 1-5 (2010).
14. M. Razeghi, **C. Bayram**, and Z. Vashaei, "*III-Nitride intersubband absorption devices and resonant tunneling diodes*," 3rd International Symposium on Growth of III-Nitrides (ISGN-3) Corum - Montpellier, France, July 4-8 (2010).
13. M. Razeghi, Z. Vashaei, and **C. Bayram**, "*High quality metal-organic chemical vapor deposition of (Al)GaN-based resonant tunneling diodes*," 3rd International Symposium on Growth of III-Nitrides (ISGN-3) Corum - Montpellier, France, July 4-8 (2010).
12. **(INVITED) M. Razeghi**, **C. Bayram**, R. McClintock, F.H. Teherani, D.J. Rogers, and V.E. Sandana, "*Novel green light emitting diodes: Exploring droop-free lighting solutions for a sustainable Earth*", LED 2010: The 4<sup>th</sup> International Conference on LED and Solid State Lighting, COEX (Seoul), Korea, Feb. 3-5 (2010).
11. **(INVITED) C. Bayram**, F. H. Teherani, D. Rogers, and M. Razeghi, "*Novel green light emitting diodes*", Dow Chemical Company Sustainability Innovation Student Challenge Recognition Event, University of Michigan Ann Arbor, Oct. 19 (2009).
10. **(INVITED) F. H. Teherani**, **C. Bayram**, D. J. Rogers, M. Razeghi, and R. McClintock, "*Hybrid Green LEDs with n-type ZnO Substituted for n-type GaN in an Inverted p-n Junction*", 2009 Annual Meeting of IEEE Photonics Society, Antalya - Belek, Turkey, Oct. 4-8 (2009).
9. **(INVITED) C. Bayram** and M. Razeghi, "*III-nitride optoelectronic devices*", 2009 Annual Meeting of IEEE Photonics Society, Antalya - Belek, Turkey, Oct. 4-8 (2009).
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7. **(INVITED) M. Razeghi**, **C. Bayram**, R. McClintock and N. Péré-Laperne, "*III-nitride optoelectronic devices: High performance GaN avalanche photodiodes, novel green light emitting diodes and III-nitride intersubband devices*", AFOSR Joint Electronics Program Review, Arlington, VA, May 27 (2009).

6. **C. Bayram**, D. J. Rogers, F. Hosseini Teherani, and M. Razeghi, “*Novel hybrid green LEDs based on substituting n-type ZnO for n-type GaN in an inverted p-n junction*,” Proc. of the 5th International Workshop on ZnO and Related Materials, Sept. 22-24, Michigan (2008).
5. V. E. Sandana, D. J. Rogers, F. H. Teherani, R. McClintock, **C. Bayram** M. Razeghi, H.-J. Drouhin, V. Sallet, G. Garry, F. Falyouni, “*Comparison of ZnO nanostructures grown using PLD, MOCVD & PVT*,” Proc. of the 5th Int. Workshop on ZnO and Related Materials, Sept. 22-24, Michigan (2008).
4. **(INVITED)** M. Razeghi, J. L. Pau, **C. Bayram**, B. Fain, P. Giedraitis, and R. McClintock, “*UV single photon detection based on III-nitride Geiger mode avalanche photodiodes*,” 2nd International Symposium on Growth of III-Nitrides (ISGN-2). Laforet Shuzenji Izu, Japan, July 6 (2008).
3. **(INVITED)** M. Razeghi, J. L. Pau, **C. Bayram**, R. McClintock, K. Kim, P. Giedraitis, and B. Fain, “*GaN Avalanche Photodiodes and Green Emitters*,” AFRL-AFOSR Nanotechnology Initiative Review, Dayton, OH, USA, May 6 (2008).
2. **(INVITED)** R. McClintock, J. L. P. Vizcaino, K. Minder, **C. Bayram** and M. Razeghi, “*III-nitride photon counting avalanche photodiodes*,” SPIE Photonics West, San Francisco, CA, USA, January 20-25 (2008).
1. **(INVITED)** K. Minder, F. H. Teherani, D. Rogers, **C. Bayram**, R. McClintock, P. Kung, and M. Razeghi, “*Etching of ZnO towards the development of ZnO homostructure LEDs*,” SPIE Photonics West, San Francisco, CA, USA, January 20-25 (2008).

#### **Magazine Articles & Interviews:**

5. **(INVITED)** **C. Bayram**, “*Green LEDs: The case for cubic GaN*,” [Compound Semiconductor Magazine 22 \(8\), 27 \(Dec. 2016\)](#).
4. **(INVITED)** **C. Bayram**, “*Link Fellows, Where are they now*,” [Link Foundation Newsletter, Sept. 2015](#).
3. **(INVITED)** **C. Bayram**, “*Featured Engineer*,” [EEWeb.com, 7 Sept. 2015](#).
2. **(INVITED)** **C. Bayram**, “*ICORLAB Gearing Up for the 21st Century*,” [IEEE Electron Devices Society Newsletter, 22 \(2\) Apr. 2015](#).
1. **(INVITED)** **C. Bayram**, “*Doç. Dr. Can Bayram ile Söyleşi*,” [TUBITAK, 22 Aug. 2014](#).

#### **Workshops/Meetings:**

13. *Naval Future Force Science and Technology Expo*, Washington, D.C. (July 20-21, 2017).
12. *GHz-THz Electronics Review*, Arlington, VA (July 11-13, 2017).
11. *ARPA-E SWITCHES Annual Review*, Philadelphia, PA, USA (March 28-29, 2017).
10. *ARL Open House*, Adelphi Laboratory Center, MD, USA (November 16-17, 2016).
9. *CLEO Conference*, San Jose, CA, USA (June 05-10, 2016).
8. *CS Man Tech Conference*, Miami, FL, USA (May 15-20, 2016).
7. *NSF CAREER Proposal Writing Workshop*, St. Louis, MO, USA (March 21-22, 2016).
6. *ARL Open House*, Aberdeen Proving Ground, MD, USA (November 3-4, 2015).
5. *AFOSR YIP Annual Meeting*, Arlington, VA, USA (June 15-18, 2015).
4. *NSF Spring Grants Conference*, Tampa, FL, USA (June 1-2, 2015).

## Curriculum Vitae

Prof. Can Bayram

3. *Illinois Partnership for Ophthalmology Engineering Workshop*, Urbana, IL, USA (May 18, 2015).
2. *NSF CAREER Proposal Writing Workshop*, Northeastern University, Boston, MA, USA (April 27-28, 2015).
1. *DOE Solid State Lighting R&D Workshop*, San Francisco, CA, USA (January 27-29, 2015).