Prof. Can Bayram

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

EDUCATION:

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

Ph.D. focus on Solid State Devices and Photonics

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

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 *(~3 years)* **Postdoctoral Research Scientist**, *IBM Research, Thomas J. Watson Research Center, Yorktown Heights, NY, USA*
Research Area: III-V devices (light emitting diodes, solar cells, transistors) and co-integration with silicon, flexible thin film devices, epitaxial graphene

2010 - 2011 *(~ 9 months)* **Research Fellow**, *IBM Research, Thomas J. Watson Research Center, Yorktown Heights, NY, USA*
Research Area: Novel GaN-based terahertz photonic devices

2010 - 2011 *(~ 1 year)* **Energy Fellow**, *Link Foundation Energy Programs, Thayer School of Engineering, Dartmouth College, NH, USA*
Research Area: High performance GaN-based visible light emitting diodes

2005 - 2010 *(~ 5 years)* **Research Assistant**, *Department of Electrical Engineering and Computer Science, Northwestern University, IL, USA*
Research Area: High efficiency wide bandgap (AlGaInN and MgZnO) photonic devices: Ultraviolet detectors and green light emitting diodes

2004 - 2005 *(~ 1 year)* **Research Assistant**, *Department of Electrical Engineering, Bilkent University, Ankara, TR*
Research Area: Capacitive micromachined ultrasonic transducer arrays

2003 - 2003 *(~ 3 months)* **Research Intern**, *ASELSAN, Ankara, TR*
Research Area: Communication and information technologies

2002 - 2002 *(~ 3 months)* **Visiting Researcher**, *Department of Electrical Engineering, Stanford University, CA, USA*
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 **- HIGHLIGTED BY SEMICONDUCTORTODAY**	○ First integrated GaN HEMTs on CMOS-Si platform
2017	J. Phys. D: Appl. Phys. 50, 055103 **- HIGHLIGTED BY 20+ NEWS AGENCIES**	○ GaN-on-Si technology for 200-mm scalability
2016	APL 109, 151904	○ A new passive cooling technology for GaN power devices
2016	APL 109, 042103 **- HIGHLIGTED BY 20+ NEWS AGENCIES**	○ First cubic GaN-on-Si(100) ○ Cubic Phase GaN via Phase-transition ○ Entire cubic phase GaN surface coverage by aspect ratio patterning
2014	Nat. Commun. 5, 4836 **- DOWNLOADED > 1,000 TIMES IN FIRST TWO WEEKS**	○ Thinnest/Flexible light emitting diode ○ First GaN-on-Graphene technology ○ Demonstration of graphene as a cleave layer ○ Demonstration of an infinitely-reusable substrate
2014	Adv. Funct. Mater. 24 (28), 4492 **-FRONTISPIECE COVER**	○ First polarization-free visible emitters ○ First CMOS-compatible integration of GaN on Si (100) substrates (8-inch)
2013	Appl. Phys. Express 6, 112301	○ New class of vertical/thin-film LEDs enabled via mechanical release
2013	Adv. Energy Mater. 3, 566 **-INSIDE COVER ARTICLE**	○ Highest specific power (≥1995 W/kg) flexible III-V tandem solar cells
2013	APL 102, 011106	○ Highest power ultraviolet LED on Si
2012	APL 100, 053901 **-EDITOR'S PICK 2012** **-TOP 20 MOST READ**	○ Highest efficiency Ge/GaAs/InGaP- based thin film solar cell
2010	APL 97, 181109	○ First reliable GaN-based resonant tunneling diode
2009	APL 95, 131109	○ First mid-infrared GaN-based intersubband device
2009	AP A 96, 403	○ First green emitting InGaN quantum dots
2008	APL 93, 08111	○ First ZnO-InGaN hybrid light emitting diodes
2008	APL 93, 211107	○ Highest efficiency AlGaN-based ultraviolet detector
2007	APL 91, 041104	○ First AlGaN-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 Newsline 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 *(member since 2009)*
Senior Member	*2016-present*	IEEE Photonics Society *(member since 2007)*
Senior Member	*2016-present*	IEEE Society *(member since 2005)*
Senior Member	*2013-present*	SPIE Society *(member since 2006)*
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:

Proposal Reviewer

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*

Conference Co-Chair

SPIE Optics + Photonics, *San Diego, USA, August 28-Sept. 1, 2016*
SPIE Optics + Photonics, *San Diego, USA, August 9-13, 2015*

Conference Organizing Committee	SPIE Photonics West, *San Francisco, USA, February, 2018* International Conference on Electron Devices and Solid-State Circuits, *Taipei, October, 2017* SPIE Optics + Photonics, *San Diego, USA, August 6-10, 2017* CNST 14th Annual Nanotechnology Workshop, University of Illinois at Urbana-Champaign, *IL, USA, May 5-6, 2016* SPIE NanoScience + Engineering, *San Diego, USA, August 9-13, 2015* SPIE Photonics West, *San Francisco, USA, February 7-12, 2015* SPIE Photonics West, *San Francisco, USA, February 1-6, 2014*
Session Chair	SPIE Photonics West, 2017, *2010* International Workshop on Nitrides, *2016*
Fellowship Committee	SPIE Scholarship, *2017* Link Foundation, *2013, 2014, 2015, 2016*
Technical Committee	EDS Optoelectronic Devices, *2017 to present*
Editorial Board	International Journal of Nanomedicine and Nanosurgery, *2015 to present* Recent Patents on Nanotechnology , *2014 to present*
Journal Referee	**ACS** Journals (*ACS Nano*); **APS** Journals *(Applied Physics Letters, Journal of Applied Physics, AIP Advances);* **OSA** Journals *(Optics Express, Optical Materials Express, Optics Letters, Journal of the Optical Society of America A, Applied Optics);* **IOP** Journals *(Reports on Progress in Physics, New Journal of Physics, Journal of Physics D, Nanotechnology, Semiconductor Science and Technology);* **IEEE** Journals *(Electron Device Letters, Journal of Quantum Electronics, Transactions on Electron Devices, Photonics Technology Letters, Photonics Letters);* **ECS** Journals *(Journal of the Electrochemical Society, Electrochemical and Solid-State Letters, Solid State Letters, Measurement Science and Technology, Solid State Science and Technology);* **Elsevier** Journals *(Superlattices and Microstructures, Materials Chemistry and Physics, Solid State Electronics, Thin Solid Films);* **Nature** Journals (*Nature, Scientific Reports*); **Springer** Journals *(Applied Physics B);* **Wiley** Journals (*Advanced Materials, Advanced Functional Materials, Laser & Photonics Reviews*)

SERVICE TO UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN:

MNTL Search Committee 2017/04 to 2017/07
Visiting Research Scientist

MNTL Search Committee / Diversity Advocate 2016/04 to 2017/07
MOCVD Research Engineer Position

MNTL Search Committee Chair 2015/12 to 2016/10
Cleanroom Manager Position

MNTL Search Committee / Diversity Advocate 2015/04 to 2016/06
Research (Etch) Engineer Position

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)*

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

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*

BIBLIOGRAPHY (students supervised: underlined)

Patents:

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.
12. 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 9,331,076, issued May 3, 2016.
11. C. Bayram, S. W. Bedell, and D. K. Sadana,, "*Engineered base substrates for releasing III-V epitaxy through spalling,*" U.S. Patent 9,245,747, issued January 26, 2016.
10. C. Bayram, S. W. Bedell, D. K. Sadana, and K. L. Saenger, "*Laser-initiated exfoliation of group iii-nitride films and applications for layer transfer and patterning,*" U.S. Patent 9,236,271, issued January 12, 2016.
9. C. Bayram, C.-W. Cheng, D.K. Sadana, and K.-T. Shiu, "*Heterogeneous integration of group iii nitride on silicon for advanced integrated circuits,*" U.S. Patent 9,236,251, issued January 12, 2016.
8. C. Bayram, C.-W. Cheng, D.K. Sadana, and K.-T. Shiu, "*Selective gallium nitride regrowth on (100) silicon,*" U.S. Patent 9,099,381, issued August 4, 2015.
7. C. Bayram, C.-W. Cheng, D.K. Sadana, and K.-T. Shiu, "*Selective gallium nitride regrowth on (100) silicon,*" U.S. Patent 9,059,075, issued June 16, 2015.
6. C. Bayram and D.K. Sadana, "*Light emitting diodes with via contact scheme,*" U.S. Patent 9,059,339, issued June 16, 2015.

5. 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*," U.S. Patent 9,058,990, issued June 16, 2015.
4. C. Bayram, C.-W. Cheng, D.K. Sadana, and K.-T. Shiu, "*Heterogeneous integration of group iii nitride on silicon for advanced integrated circuits*," U.S. Patent 9,053,930, issued June 9, 2015.
3. C. Bayram, C.-W. Cheng, T. H. Ning, D.K. Sadana, and K.-T. Shiu, "*Dual phase gallium nitride material formation on (100) silicon*," U.S. Patent 9,048,173, issued June 2, 2015.
2. C. Bayram, D.K. Sadana, and K.-T. Shiu, "*Group III nitrides on nanopatterned substrates*," U.S. Patent 8,927,398, issued January 6, 2015.
1. C. Bayram, J. O. Chu, C. Dimitrakopoulos, J. Kim, H. Park, and D.K. Sadana, "*Thin film wafer transfer and structure for electronic devices*," U.S. Patent 8,916,451, issued December 23, 2014.

Books:

1. **C. Bayram.** *III-nitride Optoelectronic Devices: AlGaInN Gap Engineering from Ultraviolet and Visible Wavelengths towards Terahertz Regime;* ProQuest, UMI Dissertation Publishing, 2012; ISBN-10: 1249058430; ISBN-13: 978-1249058434.

Book Chapters:

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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).
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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).
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