

CAN BAYRAM

Department of Electrical and Computer Engineering
Nick Holonyak, Jr Micro and Nanotechnology Laboratory
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APPOINTMENTS

University of Illinois at Urbana-Champaign, IL, USA

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| Assoc. Prof. (tenured), <i>Electrical and Computer Engineering Department</i> , | 2020-present |
| Affiliate Faculty, <i>Health Care Engineering Systems Center</i> , | 2021-present |
| Affiliate Faculty, <i>Carle Illinois College of Medicine</i> , | 2019-present |
| Engineering Partner, <i>Carle Illinois College of Medicine</i> , | 2020-2022 |
| Resident Faculty, <i>Nick Holonyak, Jr. Micro and Nanotechnology Laboratory</i> , | 2014-present |
| Asst. Prof. (tenure-track), <i>Electrical and Computer Engineering Department</i> , | 2014-2020 |

IBM, Thomas J. Watson Research Center, NY, USA

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| Postdoctoral Research Scientist, <i>Silicon Technologies Division</i> , | 2011-2014 |
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EDUCATION

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|-------------------------|------------------------|-------------|
| Northwestern University | Electrical Engineering | Ph.D., 2011 |
| Bilkent University | Electrical Engineering | B.S., 2005 |

RESEARCH STATEMENT

The fundamental particle of optics, a photon, is unique as it rarely interacts with other fundamental particles. *If a photon hardly interacts with another photon or an electron/hole, how can we create photons of interest efficiently?* The answer is through man-made semiconductor materials. **I research electron/hole and photon interactions in semiconductors and use the emergent understanding to design novel semiconductors and semiconductor devices.** Particularly, I engineer semiconductor quantum structures with unique electronic band properties for high-speed transport and energy states for ultraviolet, visible, and terahertz optical transitions.

TEACHING STATEMENT

The 21st century is the age of semiconductors. In all aspects of modern life, we utilize semiconductor technologies. From lighting to communication and computing to transportation, we rely on semiconductors for comfort, safety, and sustainability. Today, we are switching to solid-state lighting for halving our lighting electricity usage, 5G communication for networked devices, and autonomous systems for land/sea/air transportation. Our reliance on semiconductors is only to evolve as solid-state lighting extends into horticulture and medicine, new communication spectra above 95 gigahertz open opportunities for 6G and beyond networking, and space exploration leads to space settlements. Thus, it is **imperative to understand, control, and exploit semiconductor technologies and to create an innovative education platform** considering the needs of not only the current but also of the next generation.

RESEARCH HONORS

INTERNATIONAL

Young Scientist Medal, International Union of Pure and Applied Physics, 2018.

for revolutionizing the way graphene has been employed and making major contributions to III-V photonic devices

*awarded annually to **one in the world***

Early Career Award in Nanotechnology, IEEE Nanotechnology Council, 2018.

in recognition of his seminal contributions to III-V quantum devices and their hetero-integration on silicon and graphene platforms through nanotechnology

*awarded annually to **one in the world***

Early Career Award, IEEE Electron Devices Society, 2014.

for his seminal contributions to GaN-based electron devices and their heterointegration on silicon

*awarded annually to **one in the world***

Senior Membership Elevation, Optica Society, 2018.

in recognition of his experience and professional accomplishments in the field of optics and photonics

Senior Membership Elevation, IEEE Society, 2016.

*awarded to **only 9% of IEEE's approximately 428,000 members**, which requires extensive experience, and reflects professional maturity and documented achievements of significance*

Senior Membership, SPIE Society, 2013.

for significant technical accomplishments in GaN devices and for significant contributions as an educator in the field of electronics, optics, and photonics.

Ph.D. Fellowship, IBM Company, 2010.

*awarded annually to **select researchers in the world***

Ph.D. Fellowship, IEEE Electron Devices Society, 2010.

*awarded annually to **three in the world** - one in the USA*

Engineering Student of the Year, Boeing Company, 2009.

*awarded annually to **one in the world***

Graduate Student Fellowship, IEEE Photonics Society, 2009.

*awarded annually to **twelve in the world** - seven in the USA*

Laser Technology, Engineering and Applications Scholarship, SPIE Society, 2009.

*awarded annually to **one in the world***

Ludo Frevel Crystallography Scholarship, International Centre For Diffraction Data, 2009.

*awarded annually to **ten in the world***

NATIONAL

Collegiate Inventors Competition Finalist, National Inventors Hall of Fame, 2019.

*Team: Cubic LEDs, Graduate Student: Mr. Richard Liu, Advisor: Prof. Can Bayram - awarded to **only five graduate-advisor teams** nationally for U.S. Patent 10,027,086 – a method for enabling single-crystal single-*

phase cubic GaN semiconductors. This work lays the foundations for enabling this next phase of III-nitride materials for advanced light emitting diodes and transistors.

Frontiers of Engineering Symposium, hosted by Qualcomm and organized by the National Academy of Engineering and Chinese Academy of Engineering, 2019.

held biennially, sixty participants - including the organizing committee and speakers - from Chinese and US universities, industry, and government covered four topics - Smart Cities, New Materials, Neuroengineering, and 5G Wireless Communication Technology during the two and a half days of the symposium

Young Scholar Award, Turkish American Scientists & Scholars Association, 2018.

in recognition of his accomplishments as a young Turkish American scholar

two junior Turkish-American faculty is recognized every other year

CAREER Award, NSF, 2017.

for a five-year \$500K grant funding for the project titled "CAREER: Cubic Phase Green Light Emitting Diodes for Advanced Solid-State Lighting")

awarded to 156 scientists amongst > 3,050 applicants (success rate of ~5%)

Young Investigator Award, AFOSR, 2016.

for a three-year \$360K grant funding for the project titled "YIP: Investigating Heteroepitaxy Principles and Transport Characteristics of Vertically-Integrated GaN-on-Graphene Heterostructures"

awarded to 56 scientists amongst > 265 applicants (success rate of ~20%)

Docent (Associate Professor) in Electrical Engineering, Turkish Council of Higher Education, 2014.

Energy Fellowship, Link Foundation, 2010.

awarded annually to three in USA and Canada

CONFERENCE

Best Student Poster Honorable Mention, DOE Lighting R&D Workshop, 2021.

awarded to Mr. Yi-Chia Tsai (success rate of ~ 15%)

Faculty Advisor, Best Student Paper Award, International Conference on Compound Semiconductor Manufacturing Technology (CS MANTECH), 2017.

awarded to only 1 (Mr. Richard Liu) amongst 22 student presenters (success rate of < 5%)

Best Paper Award, Infrared Optoelectronics Materials and Devices Conference (MIOMD-XI), 2012.

co-chaired by Franklin Medal Laureate Prof. Manijeh Razeghi, Nobel Laureates Profs. Leo Esaki, and Klaus von Klitzing

Travel Award, IEEE Ultrasonics, Ferroelectrics, and Frequency Control Society, 2005.

CAMPUS

Andrew T. Yang Research and Entrepreneurship Award, 2022.

for the project titled "Diamond Power Semiconductor Devices for Next Generation Electric Grid".

awarded to one graduate student and one faculty member as they work together to take on risky research that could add value and wealth to the University of Illinois, the state, and the nation.

Dean's Award for Excellence in Research for Assistant Professor, 2018.

for the best research conducted during the academic year

awarded to 6 assistant professors amongst the eligible pool of 135+ (tenure-track) CoE assistant professors

Invention Achievement Awards, IBM Company, 2014, 2013, 2013.

Sustainability Innovation Award, Dow Chemical Company, 2008.

TEACHING HONORS

Faculty Advisor, Campus Nominee, CGS/ProQuest Distinguished Dissertation Award Competition, 2022.

for advising Mr. Yi-Chia Tsai and his PhD dissertation, “Theoretical Exploration of Efficiency Droop Mechanisms in III-Nitride Visible Light-Emitting Diodes,” to represent the University of Illinois in the national competition.

Faculty Advisor, Lemelson-MIT Student Prize Graduate Finalist, 2019.

Since the competition opened nationwide in 2014, Mr. Richard Liu is *the first ECE ILLINOIS student* to be recognized as a graduate finalist.

List of Teachers Ranked as Excellent by Their Students, 2018.

for outstanding ECE 443 class ratings of Instructor’s Overall Teaching Effectiveness of 4.7 and Overall Quality of Course of 4.5

Collins Scholar, The Academy for Excellence in Engineering Education, 2015.

SERVICE HONORS

SPIE Community Champion, 2019.

This distinction recognizes his commitment to SPIE, its mission, and the broader optics and photonics community.

RESEARCH IMPACT

Cubic GaN synthesis, i.e. invention and scaling of U-groove aspect ratio silicon patterning for phase-transition III-nitride material synthesis. Adv. Funct. Mater. 24 (28) 4492 (2014). Appl. Phys. Lett. 109, 042103 (2016). ACS Photonics 5 (3), 955–963 (2018). Appl. Phys. Lett. 121, 032101 (2022).

Cubic-phase III-nitride LEDs overcome the efficiency droop. J. Appl. Phys. 131, 193102 (2022).

Auger coefficient myth in III-nitride LEDs debunked. IEEE J. of Quantum Electron. 58 (1), 1-9 (2022). IEEE Trans. Electron Devices (2022).

Cubic III-nitride semiconductor properties. Sci. Rep. 9:6583 (2019). ACS Omega 5, 3917 (2020). Comp. Mater. Sci. 190, 110283 (2021).

Impact of dislocations on GaN thermal conductivity. J. Appl. Phys. 126, 185103 (2019).

Passive cooling of GaN devices via thickness optimization. Appl. Phys. Lett. 109, 151904 (2016).

GaN on 200 mm Si, i.e. direct integration of photonic and electronic devices on Si. AIP Advances 9, 025306 (2019) ; IEEE Electron Device Lett. 38 (8) 1094 (2017) ; Sci. Rep. 6: 37588 (2016).

GaN on graphene, i.e. first 3D compound semiconductor direct epitaxy integration on a 2D one. Invented the missing link in epitaxy technology at the intersection of 3D-on-3D conventional and 2D-on-2D van der Waals epitaxy, opening quasi-van der Waals (a.k.a. remote) epitaxy and enablement of 3D/2D heterostructures. Nat. Comm. 5: 4836 (2014).

Resonant tunneling in GaN RTDs, i.e. first reliable and reproducible negative differential resistance via defect reduction, elimination of polarization-fields, and reduction of Al-content. Appl. Phys. Lett. 96, 042103 ; 97, 092104 ; 97, 181109 (2010).

Hybrid green LED, i.e. first ZnO atop InGaN-based high spectral quality green LEDs. Appl. Phys. Lett. 93, 081111 (2008).

RESEARCH PUBLICITY

- [Illinois-led initiative receives funding from Intel to update microelectronics education and create new pathways to industry](#), by Michael O'Boyle. 1/17/2023
- “Quashing droop with cubic GaN,” [Compound Semiconductor Magazine](#), Issue VII, Pages 48-53, (2022).
- “Structural and Optical Properties of Cubic GaN on U-grooved Si (100)”, [EDITOR'S PICK](#), Applied Physics Letters, 2022. Selected as one of "The Best of Papers of 2022" published in Applied Physics Letters, the most cited journal in Applied Physics. Highlighted by [CompoundSemiconductor](#), [Semiconductor Today](#) 07/18/2022.
- “[Clear For Take Off](#)”, by Heather Coit, 06/29/2022.
- “HMNTL team topples the longstanding "efficiency droop" barrier to green-light LEDs” by Jenny Applequist, [HMNTL](#), [EurekAlert](#), 06/08/2022.
- “[Cubic-phase III-nitride LEDs overcome efficiency droop](#)” Semiconductor Today, 05/18/2022.
- “[How Internal Polarisation Impacts InGaAlN LED Performance](#)” CompoundSemiconductor, 05/18/2022.
- “Going Cubic Halves InGaAlN LED Efficiency Droop” [CompoundSemiconductor](#), [Semiconductor Today](#), [Tech Xplore](#), [Morning News](#). 04/27/2022.
- “[Taking flight with the paper wings](#)”, FOX, NBC, & CBS affiliates, News Gazette. 04/03/2022.
- “[Shining a Light on Solid-state Green LEDs: Could C-GaN Be the Answer?](#)”, All About Circuits, 03/07/2022.
- “[Bayram wins prestigious ARPA-E OPEN grant to develop novel green LEDs](#)”, UIUC, 02/14/2022.
- “[DOE Announces \\$175 Million for Novel Clean Energy Technology Projects](#)”, DOE, 02/14/2022.
- “Large Auger coefficient myth in III-nitride LEDs debunked?” [Physics.org](#), 01/04/2022.
- “Debunking The Auger Coefficient Myth In III-Nitride LEDs” [CompoundSemiconductor](#) 01/04/2022.
- “Effect of Auger electron-hole asymmetry on efficiency droop in InGaN QW LEDs” [SemiconductorToday](#), [LEDinside](#) 12/21/2021.
- “[UI awarded grant to train ROTC students in cyber, electronic warfare](#)” by Kimberly Belser, The Grainger College of Engineering, 3/17/2021.
- “Zincblende GaN Promises High Hole Concentrations” [SemiconductorToday](#) 02/02/2021.
- “How to save \$6 billion: Exploring new materials for LED lights” [Science Node](#) 07/13/2020.
- “Bright early lights of LEDs” [Texas Advanced Computing Center](#) 07/08/2020.
- “New heat model may help electronic devices last longer” [ILLINOIS NEWS BUREAU](#), [EurekAlert](#), [Physics.org](#), [Bioengineer.org](#), [WCIA News](#) 12/16/2019.
- “University of Illinois reports thermal conductivity dependence on dislocation density of various GaN materials” [SemiconductorToday](#) 11/12/2019.
- “US Team Models GaN Thermal Conductivity” [CompoundSemiconductor](#) 11/11/2019.
- “Finalists Named for 2019 Collegiate Inventors Competition” [PRNewswire](#) 09/19/2019.

- “Phase-transition cubic gallium nitride doubles ultraviolet emission efficiency”, [EurekAlert](#), [Physics.org](#), [PhotonicsOnline](#), [SolidStateTechnology](#), [NSF](#) 02/19/2018.
- “Hexagonal-to-cubic phase transition in GaN via aspect ratio nano-patterning of silicon substrate”, [SemiconductorToday](#) 01/19/2018.
- “Phase-transition Cubic GaN Doubles UV Efficiency”, [CompoundSemiconductor](#) 01/15/2018.
- “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](#), [Physics.org](#) 7/30/2016.
- “Big Blue Ambition”, [Compound](#)
- “IBM Shows Graphene as Epi Template”, [Solid State Technology](#), 10/2014.
- “Van der Waals epitaxy of GaN and blue LEDs”, [Semiconductor](#)
- “Graphene gets another real use – blue LED fabrication”, [Electronics](#)
- “IBM Conquers Wafer-Scale Graphene”, [EE](#)
- “Growing single-crystalline materials on reusable graphene”, [IBM](#)
- “US Researchers Use Graphene To Make Flexible Blue LEDs On Plastic”, [Compound Semiconductor](#), [Laser Focus World](#), 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](#), [Power Electronics World](#), 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”, [ScienceDaily](#), 09/14/2005.

MEMBERSHIPS

| | | |
|---------------|--------------|---|
| Senior Member | 2018-present | Optica (member since 2005) |
| 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) |

SERVICE (TO SOCIETIES, FOUNDATIONS & AGENCIES)

Board Member (Advisory): Celal Bayar University Journal of Science, 2020 to present.

Conference (Advisory Board): 1st International Conference on Smart Materials and Applications, National Institute of Technology, Raipur, India, March 4-5, 2022.

Conference (Co-Chair): SPIE Optics + Photonics, San Diego, USA, 2015 to present

Conference (Organizing Committee): IEEE Photonics Conference (IPC), Vancouver, Canada, Nov. 13-17, 2022; International Conference on Electron Devices and Solid-State Circuits, Taipei, October, 2017; CNST 14th Annual Nanotechnology Workshop, University of Illinois at Urbana-Champaign, IL, USA, May 5-6, 2016; OPTIC, Chungli City, TAIWAN, Dec 5-7, 2013; SPIE Photonics West, San Francisco, USA, 2013 to 2016.

Editor (Guest): IEEE Nanotechnology Magazine, April & August Issues, 2019.

Editor (Associate): IEEE Nanotechnology Magazine, 2019 – present ; IEEE Transactions on Electron Devices, 2019 – 2022.

Publication Representative: IEEE EDS Society, 2022 – 2023.

Board Member (Editorial): Journal of Physics: Photonics, 2019 to present; Recent Patents on Nanotechnology, 2014 to 2018; International Journal of Nanomedicine and Nanosurgery, 2015 to 2018.

Fellowship Committee: SPIE Scholarship, 2017 – 2019; Link Foundation, 2013 to 2016.

Journal Referee: ACS Journals (*Nano Letters*, *ACS Nano*, *ACS Photonic*, *Crystal Growth and Design*, *Applied Nano Materials*); APS Journals (*Applied Physics Letters*, *Journal of Applied Physics*, *AIP Advances*); ASME (*Journal of Electronic Packaging*); Optica 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*, *Journal of the Electron Devices Society*, *Sensors*, *Transactions on Components, Packaging and Manufacturing Technology*); 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*, *Journal of Crystal Growth*); Nature Journals (*Nature*, *Scientific Reports*); SPIE Journals (*Journal of Nanophotonics*) Springer Journals (*Applied Physics B*); Wiley Journals (*Advanced Materials*, *Advanced Functional Materials*, *Advanced Optical Materials*, *Laser & Photonics Reviews*, *Physica Status Solidi A: Applications and Materials Science*).

Judge: Collegiate Inventors Competition, 2021, 2020. Mustafa Prize, 2021.

Proposal Reviewer: National Aeronautics and Space Administration (NASA), 2021; Turkish National Science Foundation, 2020; Polish National Science Centre, 2020; German Research Foundation, 2020, 2018; Jump ARCHES Program, 2019; National Science Foundation (NSF), 2022, 2021, 2020, 2019, 2018,

2017, 2013; Advanced Research Projects Agency – Energy, 2018, 2017; Air Force Office of Scientific Research (AFOSR), 2022, 2021, 2020, 2018, 2017, 2016; Israeli Ministry of Science, Technology and Space, 2018, 2017; Croatian Science Foundation, 2017; French National Research Agency, 2017; Singapore National Research Foundation, 2017; Dutch Research Council, 2016; European Research Council (ERC), 2015; Department of Energy (DOE), 2012.

Technical Committee Chair: IEEE EDS Optoelectronic Devices, 01/01/2020 to 12/31/2021.

Technical Committee Member: Lester Eastman Conference on High Performance Devices, 2023; Compound Semiconductor Week (CSW), 2022; 5th IEEE Electron Devices Technology and Manufacturing (EDTM) Conference Power and Energy Devices, 2021; IEEE Int. Conference on Nano/Molecular Medicine and Engineering, 2019; IEEE EDS Optoelectronic Devices, 2017 – 2019; IEEE Young Professionals, 2014 – 2020.

Session Chair: SPIE Photonics West, 2018, 2017, 2010; International Workshop on Nitrides, 2016.

SERVICE (TO THE UNIVERSITY)

ECE DEPARTMENT COMMITTEE:

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| Microelectronics and Nanotechnology, | 2019 Fall to present |
| Curriculum Committee, | 2014 Fall to present |
| Colloquium Committee, | 2014 Fall to present |
| ECE Qualifying Exam Committee, | (14 students) |
| ECE Preliminary Exam Committee, | (10 students) |
| ECE PhD Final Exam Committee, | (6 students) |
| Moderator, ECE Head Candidate Meeting with Asst. Professors | 2019 Summer |
| Guest Lecturer, Solar Car Class | 2019 Spring |
| Panelist, ECE Faculty Retreat | 2018 Spring |
| Panelist, ECE Town Hall | 2017 Fall |
| Panelist, HKN Power Lunch | 2017 Spring |
| Reviewer, Andrew T. Yang Research and Entrepreneurship Award | 2019, 2017 |

HMNTL COMMITTEE:

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| Search Committee, <i>Cleanroom Engineer</i> , | 2021/12 to 2022/05 |
| Search Committee, <i>Research Engineer</i> , | 2021/12 to 2022/05 |
| Aixtron Working Group, | 2019/08 to 2022/03 |
| Equipment Committee Chair, | 2014/12 to 2018/12 |
| Search Committee, <i>MOCVD Research Engineer</i> , | 2018/09 to 2019/04 |
| Session Organizer, MNTL Mini-Retreat, | 2019/01/15 |
| Search Committee, <i>MOCVD Research Engineer</i> , | 2017/05 to 2018/05 |
| Search Committee, <i>MOCVD Research Engineer</i> , | 2016/04 to 2017/05 |
| Search Committee, <i>Grants and Contracts Specialist</i> , | 2017/09 to 2018/03 |
| Search Committee, <i>Visiting Research Scientist</i> , | 2017/04 to 2017/07 |
| Search Committee Chair, <i>Cleanroom Manager Position</i> , | 2015/12 to 2016/10 |
| Search Committee, <i>Research (Etch) Engineer Position</i> , | 2015/04 to 2016/06 |

ENGINEERING COLLEGE:

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| Committee Member, Course Reviewer, | 2021 Spring |
| Guest Speaker, Illinois Scholars Undergraduate Research Program, | 2019 Fall |

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| Panelist, NSF CAREER Panel of Awardees, | 2019 Spring |
| Mentor, Academic Redshirt in Science and Engineering Program, | 2017 – present |
| Judge, Introduce a Girl to Engineering Day, | 2017 Spring |
| Judge, Introduce a Girl to Engineering Day, | 2016 Spring |
| Judge, Promoting Undergraduate Research in Engineering (PURE), | 2014 Fall |

CAMPUS:

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| Contributor, Illinois Summer Academy, | 2019 Summer |
| Table Facilitator, General Ed. Assembly on Learning Outcomes, | 2019 Spring |
| Judge, Undergraduate Research Symposium, | 2017 Spring |
| Session Chair, BioNanotechnology Summer Institute, | 2015 Summer |

SERVICE (TO OTHER UNIVERSITIES)

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| EECS PhD Final Exam Committee, (Northwestern University, IL, USA) | (2 students) |
| EECS Qualifying Exam Committee, (Northwestern University, IL, USA) | (1 student) |

TEACHING

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| ECE 110 Intro. to Electrical Engineering, | 2020 Fall | (Class of 104 Students) |
| ECE 297 Individual Study in ECE Problems, | 2020 Fall | (Supervision of 1 Student) |
| ECE 397 Individual Study in ECE Problems, | 2020 Fall | (Supervision of 1 Student) |
| ECE 297 Individual Study in ECE Problems, | 2020 Spring | (Supervision of 3 Students) |
| ECE 443 LEDs and Solar Cells, | 2020 Spring | (Class of 8 Students) |
| ECE 397 Individual Study in ECE Problems, | 2019 Spring | (Supervision of 1 Student) |
| ECE 443 LEDs and Solar Cells, | 2019 Spring | (Class of 19 Students) |
| ECE 110 Intro. to Electrical Engineering, | 2018 Fall | (Class of 109 Students) |
| ECE 499 Senior Research Project, | 2018 Fall | (Supervision of 1 Student) |
| ECE 397 Individual Study in ECE Problems, | 2018 Spring | (Supervision of 2 Students) |
| ECE 496 Senior Research Project, | 2018 Spring | (Supervision of 1 Student) |
| ECE 498 LEDs and Solar Cells, | 2018 Spring | (Class of 20 Students) |
| ECE 297 Individual Study in ECE Problems, | 2017 Fall | (Supervision of 1 Student) |
| ECE 397 Individual Study in ECE Problems, | 2017 Fall | (Supervision of 1 Student) |
| ECE 445 Senior Design Laboratory, | 2017 Fall | (Class of 45 Students) |
| ECE 340 Semiconductor Electronics, | 2017 Spring | (Class of 42 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 LEDs and Solar Cells, | 2017 Spring | (Class of 10 Students) |
| ECE 340 Semiconductor Electronics, | 2016 Fall | (Class of 15 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 396 Individual Study in ECE Problems, | 2016 Spring | (Supervision of 3 Students) |

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

SELECT OUTREACH ACTIVITIES

- **Aleksai Herrera (of University of Illinois at Urbana-Champaign, IL)** ONR Accelerated Learning and Engineering Research Training Program, Aug. 16, 2022 – May 15, 2023.
- **Jessica Rangel-Galera (of University of Illinois at Urbana-Champaign, IL)** ONR Accelerated Learning and Engineering Research Training Program, Aug. 16, 2022 – May 15, 2023.
- **Victoria Garcia (of University of Illinois at Urbana-Champaign, IL)** ONR Accelerated Learning and Engineering Research Training Program, Jan. 16, 2022 – Dec. 15, 2022.
- **Samuel Weiss (of University of Illinois at Urbana-Champaign, IL)** ONR Accelerated Learning and Engineering Research Training Program, Aug. 16, 2021 – May 15, 2022.
- **Sothio Suzue-Pan (of University of North Dakota, Grand Forks, North Dakota)** Research Experience for Undergraduates Program, July 1, 2021 – August 16, 2022.
- **Anna Miller (of University of Illinois at Urbana-Champaign, IL)** Research Experience for Undergraduates Program, Aug. 16, 2020 – May 15, 2021.
- **Zach Flagg (of Colorado College, CO)** Research Experience for Undergraduates Program, July 1, 2020 – Aug. 15, 2020.
- **Nisha Kolagotla (of University of Illinois at Urbana-Champaign, IL)** Research Experience for Undergraduates Program, Aug. 16, 2019 – May 5, 2020.
- **Jarod Meyer (of University of Illinois at Urbana-Champaign, IL)** Research Experience for Undergraduates Program, Aug. 16, 2018 – May 5, 2019.
- **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.

Ph.D. THESES BEING SUPERVISED

3. **Zhuoran Han, Ph.D. student in EE, expected degree completion in 2026,**
Ultra-Wide-Bandgap Power Devices.
2. **Jaekwon Lee, Ph.D. student in EE, expected degree completion in 2026,**
Green Light Emitting Diodes for the Ultimate Solid-State Lighting.
1. **Yu-Chieh Chiu, Ph.D. student in EE, expected degree completion in 2025,**
Micro-Light Emitting Diodes for Virtual and Augmented Reality.

Ph.D. ALUMNI

4. **Dr. Yi-Chia Tsai, Ph.D. in EE, 2022,** Theoretical Exploration of Efficiency Droop Mechanisms in III-nitride Visible Light Emitting Diodes.
Yi-Chia joined ASML Corporation as a Senior Software Algorithm Engineer. He is responsible of designing and developing algorithms to improve performance and accuracy of the world-leading lithography models for microchip manufacturing. His team is based at the San Jose, CA.
3. **Dr. Richard Liu, Ph.D. in EE, 2020,** [Cubic Phase Gallium Nitride Photonics Integrated on Silicon\(100\) for Next Generation Solid State Lighting.](#)
Richard joined Aerospace Corporation as a Senior Technical Staff Member. He is responsible of exploring reliability of GaN electronics and III-V infrared sensors (as an alternative to MCT) for space applications. His team is based at the Los Angeles site.
2. **Dr. Kihoon Park, Ph.D. in EE, 2020,** [Investigation of Generation, Dissipation, and Transport of Heat in GaN Materials for Advanced High-Power Devices.](#)
Kihoon joined Intel as a TCAD SW / Modeling Engineer. He is responsible of building new models involving device physics, implementing them in TCAD, benchmarking results against experimental results, and using them to support other groups. He is part of the Logic Technology Development group at the Hillsboro site.
1. **Dr. Hsuan-Ping Lee, Ph.D. in EE, 2020,** [Al₂O₃-passivated AlGaIn/GaN High Electron Mobility Transistors on Si\(111\) Towards Reliable Terahertz Electronics.](#)
Hsuan-Ping joined Intel as a Transistor/Interconnect Process/Device Development Engineer. He is responsible for leading scientific research to enable design, definition of transistor/interconnect architecture and high-volume manufacturing of products with innovative microprocessors. His team is based at the Hillsboro site.

M.S. THESES BEING SUPERVISED

1. N/A

M.S. ALUMNUS

2. **Yu-Chieh Chiu, M.S. in EE, 2022**, Absolute Internal Quantum Efficiency of Indium-Gallium Nitride Based Light Emitting Diodes.
Yu-Chieh continued to pursue his Ph.D. degree at U of I.
1. **Richard Liu, M.S. in EE, 2017**, [Structural and optical properties of phase transition cubic phase gallium nitride for photonic devices](#).
Richard continued to pursue his Ph.D. degree at U of I.

SELECT GRADUATE STUDENT AWARDS (EXTERNAL)

- 1 Honorable Mention, [DOE-IES Lighting R&D Student Poster Competition](#)
 - (2021) Yi-Chia Tsai
- 1 [Lemelson-MIT Student Prize Graduate Finalist](#)
 - (2020) Richard Liu
- 1 [National Hall of Fame Collegiate Inventors Competition Graduate Finalist](#)
 - (2019) Richard Liu
- 1 [SPIE Optics and Photonics Education Scholarship](#)
 - (2019) Richard Liu
- 1 Invitation to [Siegman School on Lasers](#), hosted by the Technical University Denmark on the Spirit of Hven Backafallsbyn, Island of Hven, AB, Sweden on 28 July 2018 – 04 August.
 - (2018) Richard Liu
- 1 [NASA Space Technology Research Fellow](#)
 - (2019, 2018, 2017) Richard Liu
- 1 [NSF Graduate Research Fellow](#)
 - (2017) Richard Liu {declined}
- 1 [CS MANTECH Best Student Paper Awardee](#)
 - (2017) Richard Liu
- 2 [CS MANTECH Travel Awardees](#)
 - (2017) Richard Liu; Hsuan-Ping Lee

SELECT GRADUATE STUDENT AWARDS (INTERNAL)

- 1 [Andrew T. Yang Research and Entrepreneurship Award in ECE](#)
 - (2022) Zhuoran Han
- 1 [UIUC Campus Nominee, CGS/ProQuest Distinguished Dissertation Award Competition](#)
 - (2022) Yi-Chia Tsai
- 1 [Shun Lien Chuang Memorial Award for Excellence in Graduate Education](#)
 - (2020) Yi-Chia Tsai
- 3 [ECE 443 LEDs and Solar Cells Crosslight Best Project Award](#)
 - (2022) Jaekwon Lee; (2021) Yu-Chieh Chiu; (2019) Yi-Chia Tsai
- 2 [Gregory Stillman Semiconductor Research Award](#)
 - (2019) Kihoon Park, Hsuan-Ping Lee
- 1 [UIUC Graduate College Image of Research Semi-finalist](#)
 - (2019) Richard Liu
- 5 [List of Teachers Ranked as Excellent by Their Students](#)
 - (2019 Spring, TA ECE 443) Kihoon Park, Hsuan-Ping Lee
 - (2018 Fall, TA ECE 444) Kihoon Park
 - (2018 Spring, TA ECE 443) Kihoon Park, Hsuan-Ping Lee
- 1 [UIUC Graduate College Travel Grant for Dissertation Research](#)
 - (2018) Richard Liu

- 1 [UIUC College of Engineering Yunni & Maxine Pao Memorial Fellowship](#)
 - (2018) Richard Liu
- 2 [UIUC ECE Nick and Katherine Holonyak, Jr. Outstanding Research Award](#)
 - (2021) Yi-Chia Tsai; (2018) Richard Liu
- 1 [UIUC ECE Ernest A. Reid Fellowship](#)
 - (2018) Hsuan-Ping Lee
- 1 [UIUC Graduate College Conference Travel Grant](#)
 - (2017) Hsuan-Ping Lee

UNDERGRADUATE ALUMNI & POST-GRADUATION APPOINTMENT

12. Alkesh Sumant, [B.S. in EE, 2022]
* joined MIT Lincoln Laboratory (MA, USA) as an Integrated Photonics Development Engineer.
11. Anna Miller, [B.S. in EE, 2022]
* joined Stanford University (CA, USA) as a Ph.D. Candidate.
10. Jarod Meyer, [B.S. in MatSE, 2020]
* joined Stanford University (CA, USA) as a Ph.D. Candidate.
9. Dennis Rich, [B.S. in EE and Engineering Physics, 2019]
* joined Stanford University (CA, USA) as a Ph.D. Candidate.
8. Josephine Melia, [B.S. in Engineering Physics, 2018]
* currently at Applied Materials (CA, USA) as an Application Engineer.
7. Josh Perozek, [B.S. in EE, Minor in MatSE, 2017]
* joined Massachusetts Institute of Technology (MA, USA) as a Ph.D. Candidate.
6. Ryan Grady, [B.S. in EE, 2017]
* joined Stanford University (CA, USA) as a Ph.D. Candidate.
5. Taiming Zhang, [B.S. in EE, 2017]
* joined Stanford University (CA, USA) as an M.S. Candidate.
4. Estelle Kao, [B.S. in Engineering Physics, 2017]
* joined Intel (CA, USA) as a Product Development Engineer.
3. Kai Zhang, [B.S. in EE, 2016]
* joined Continental Structure Plastics (MI, USA) as an R&D Intern.
2. Begum Kasap, [B.S. in EE, 2016]
* joined ETH Zurich (Zürich, Switzerland) as an M.S. Candidate.
1. Philip Tsai, [B.S. in EE, 2016]
* joined Texas Instruments (TX, USA) as a Manufacturing Engineer.

SELECT UNDERGRADUATE STUDENT AWARDS (EXTERNAL)

- 1 [Interdisciplinary Research Opportunities for Undergraduates in Semiconductor Technology](#)
 - (2023) Colin Shan
- 1 [STEM Student of the Year, Association of Old Crows](#)
 - (2022) Samuel Weiss
- 1 [Kaiser Aluminum Scholarship](#)
 - (2022) Colin Shan
- 1 [Greater Austin Illini Club Scholarship](#)

- (2020) Nisha Kolagotla
- 3 [Research Experience for Undergraduates Program](#)
 - (2020) Anna Miller; (2019) Nisha Kolagotla; (2018) Jarod Meyer
- 1 [Gulf Coast Undergraduate Research Symposium Outstanding Presentation Trophy](#)
 - (2019) Jarod Meyer
- 1 [DaRin Butz Foundation Research Scholarship](#)
 - (2019) Nisha Kolagotla
- 1 [Dr. Michael Bennett Horwitz Greater Austin Illini Club Scholarship](#)
 - (2019) Nisha Kolagotla
- 1 [SPIE BACUS Scholarship](#)
 - (2019) Dennis Rich
- 1 [NDSEG Fellow](#)
 - (2019) Josh Perozek
- 1 [IEEE Photonics Conference Women in Photonics Travel Grant](#)
 - (2018) Josephine Melia
- 1 [SPIE Optics and Photonics Education Scholarship](#)
 - (2018) Yifan Yao
- 4 [NSF Graduate Research Fellows](#)
 - (2021) Dennis Rich; (2019) Josh Perozek; (2017) Ryan Grady; (2016) Connor Bailey
- 2 [NSF Graduate Research Honorable Mention](#)
 - (2022) Jarod Meyer; (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 ECE Bardeen Fellowship](#)
 - (2020) Jarod Meyer (declined)
- 1 [UIUC ECE Bardeen Undergraduate Award](#)
 - (2019) Dennis Rich
- 1 [University of Illinois Campus Churchill Scholarship Nominee](#)
 - (2018) Dennis Rich
- 1 [UIUC Office of Undergraduate Research Support Grant](#)
 - (2018) Dennis Rich
- 1 [UIUC ECE Michael Edward Napier Memorial Award](#)
 - (2018) Dennis Rich
- 1 [UIUC MATSCI Alfred W. Allen Award](#)
 - (2018) Yifan Yao
- 2 [UIUC Campus Honors Program Summer Research Grant](#)
 - (2021) Sevan Brodjian
 - (2018) Dennis Rich
- 3 [UIUC Office of Undergraduate Research Support Grant](#)
 - (2020) Sevan Brodjian

- (2018) *Dennis Rich {declined}*
 - (2017) *Josephine Melia*
- 2 [UIUC Illinois Distinguished Fellow](#)
 - (2020) *Jarod Meyer (declined)*
 - (2017) *Josh Perozek (declined)*
- 1 [UIUC ECE Distinguished Research Fellow](#)
 - (2017) *Josh Perozek(declined)*
- 2 [UIUC ECE A. R. "Buck" Knight Award](#)
 - (2017) *Josh Perozek; Ryan Grady*
- 1 [UIUC MATSCI Earl J. Eckel Scholarship](#)
 - (2017) *Yifan Yao*
- 2 [UIUC ECE Robert C. MacClinchie Scholarship](#)
 - (2018) *Dennis Rich*
 - (2016) *Ryan Grady*
- 1 [UIUC College of Engineering Scholarship](#)
 - (2016) *Josh Perozek*
- 1 [ECE 443 LEDs and Solar Cells Crosslight Best Project Award](#)
 - (2017) *Ryan Grady*
- 3 [Gulf Coast Undergraduate Research Symposium Travel Award](#)
 - (2019) *Jarod Meyer*
 - (2017) *Yifan Yao*
 - (2016) *Josh Perozek*
- 3 [UIUC Office of Undergraduate Research Conference Travel Award](#)
 - (2019) *Jarod Meyer*
 - (2017) *Yifan Yao*
 - (2016) *Josh Perozek*

UNDERGRADUATE SENIOR THESES

6. [Hydrogen-terminated Diamond MOSFETs for Power Electronics](#), *Alkesh Sumant* (May 2022).
5. [Application of Controlled Spalling to Thin-film Lithium Niobate Transducers](#), *Dennis Rich* (Dec. 2018).
4. [Thin-film GaN HEMTs For Flexible Electronics](#), *Joshua Perozek* (May 2017).
3. [Simulation of Zinc-blende Gallium Nitride High Electron Mobility Transistors For Normally-off Operation](#), *Ryan Grady* (May 2017).
2. [Optimization of Off-State Breakdown Voltage in GaN High Electron Mobility Transistors](#), *Begum Kasap* (May 2016).
1. [Normally-off GaN Transistors](#), *Philip Tsai* (May 2016).

Postdoctoral Research Scientist ALUMNI

1. **Dr. Ali Johar, 2020 - 2022**, Cubic Gallium Nitride on Silicon as a Scalable Platform for Advanced Energy Devices.
Ali joined Structured Materials Industries as a Scientist and Principal Investigator. He is responsible of designing and developing AlGaIn/GaN transistors for 10A/600V applications to improve performance and accuracy of next generation RF/power devices. His team is based at Piscataway, NJ.

BIBLIOGRAPHY (students supervised: underlined)

Publications

Journal Articles (listed in the International Science Index database):

[December 2022] [h-index \geq 26; citations \geq 2,730]

59. J. Lee, J.P. Leburton, and **C. Bayram** "Design trade-offs between traditional hexagonal and emerging cubic $\text{In}_x\text{Ga}_{(1-x)}\text{N}/\text{GaN}$ -based green light-emitting diodes," Journal of the Optical Society of America B (IN-PRESS, 2023).
58. Y. C. Chiu and **C. Bayram** "Low Temperature Absolute Internal Quantum Efficiency of InGaIn-based Light-Emitting Diodes," [Appl. Phys. Lett. 122, 091101 \(2023\)](#).
57. J. Lee*, Y. C. Chiu*, M. A. Johar*, and **C. Bayram** "Structural and Optical Properties of Cubic GaN on U-grooved Si (100)," [Appl. Phys. Lett. 121, 032101 \(2022\)](#). (EDITOR'S PICK 2022)
56. Y.-C. Tsai, **C. Bayram**, and J.P. Leburton "Interplay between Auger recombination, Carrier Leakage, and Polarization in InGaIn Multiple-Quantum-Well Light-Emitting Diodes," [J. Appl. Phys. 131, 193102 \(2022\)](#).
55. Y.-C. Tsai, J.P. Leburton, and **C. Bayram**, "Quenching of the Efficiency Droop in Cubic Phase InGaIn Light-Emitting Diodes," [IEEE Trans. Electron Devices 69\(6\), 3240-3245 \(2022\)](#).
54. Y.-C. Tsai, **C. Bayram**, and J.P. Leburton "Effect of Auger Electron-Hole Asymmetry on the Efficiency Droop in InGaIn Quantum Well Light-Emitting Diodes," [IEEE J. Quantum Electron. 58 \(1\), 1-9 \(2022\)](#).
53. Y.-C. Tsai and **C. Bayram**, "Mitigate Self-Compensation with High Crystal Symmetry: A First-Principles Study of Formation and Activation of Impurities in GaN," [Comp. Mater. Sci. 190, 110283 \(2021\)](#).
52. J. Meyer, R. Liu, R.D. Schaller, H-P Lee, and **C. Bayram**, "Systematic Study of Shockley-Read-Hall and Radiative Recombination in GaN on Al_2O_3 , Freestanding GaN, and GaN on Si," [J. Phys. Photonics 2, 035003 \(2020\)](#).
51. R. Liu, E. Z. Tucker, S. M. Lee, K. Kasarla, C. McCormick, and **C. Bayram**, "Cp₂Mg-Induced Transition Metal Ion Contamination and Performance Loss in MOCVD-Grown Blue Emitting InGaIn/GaN Multiple Quantum Wells," [Appl. Phys. Lett. 116, 192106 \(2020\)](#).
50. A. Mohamed, K. Park, **C. Bayram**, M. Dutta, and M. Strosio, "Phonon-assisted reduction of hot spot temperature in AlInN ternaries," [J. Phys. D-Appl. Phys. 53, 365102 \(2020\)](#).

49. H-P. Lee and **C. Bayram**, “Improving Current on/off Ratio and Subthreshold Swing of Schottky-gate AlGa_N/Ga_N HEMTs By Post-metallization Annealing,” [IEEE Trans. Electron Devices 67 \(7\), 2760 \(2020\).](#)
48. Y.-C. Tsai and **C. Bayram**, "Band Alignments of Ternary Wurtzite and Zincblende III-Nitrides Investigated by Hybrid Density-Functional Theory," [ACS Omega 5, 3917 – 3923 \(2020\).](#) (FRONT COVER ARTICLE)
47. K. Park and **C. Bayram**, “Impact of dislocations on the thermal conductivity of gallium nitride studied by time-domain thermoreflectance,” [J. Appl. Phys. 126, 185103 \(2019\).](#)
46. H-P. Lee and **C. Bayram**, “Investigation of annealed, thin(~ 2.6 nm)-Al₂O₃/AlGa_N/Ga_N metal-insulator-semiconductor heterostructures on Si(111) via capacitance-voltage and current-voltage studies,” [Mater. Res. Express 6, 105904 \(2019\).](#)
45. Y.-C. Tsai and **C. Bayram**, "Structural and Electronic Properties of Hexagonal and Cubic Phase AlGaInN Alloys Investigated Using First Principles Calculations," [Sci. Rep. 9, 6583 \(2019\).](#)
44. A. Mohamed, K. Park, **C. Bayram**, M. Dutta, and M. Strosio, “Confined and Interface Optical Phonon Emission in GaN/InGa_N Double Barrier Quantum Well Heterostructures,” [PLoS ONE 14\(4\): e0214971 \(2019\).](#)
43. R. Liu, C. McCormick, and **C. Bayram**, “Comparison of Structural and Optical Properties of Blue Emitting In_{0.15}Ga_{0.85}N/GaN Multi-Quantum-Well Layers Grown on Sapphire and Silicon Substrates,” [AIP Advances 9, 025306 \(2019\).](#)
42. K. Park, A. Mohamed, M. Dutta, M. Strosio, and **C. Bayram**, “Electron Scattering via Interface Optical Phonons with High Group Velocity in Wurtzite Ga_N-based Quantum Well Heterostructure,” [Sci. Rep. 8:15947 \(2018\).](#)
41. R. Liu, R. Schaller, C.-Q. Chen, and **C. Bayram**, “High internal quantum efficiency ultraviolet emission from phase-transition cubic Ga_N integrated on nanopatterned Si(100),” [ACS Photonics 5 \(3\), 955–963 \(2018\).](#)
40. K.-T. Lee, **C. Bayram**, D. Piedra, E. Sprogis, H. Deligianni, B. Krishnan, G. Papasouliotis, A. Paranjpe, E. Aklimi, K. Shepard, W. J. Gallagher, T. Palacios, and D. K. Sadana, “Heterogeneous Integration of Ga_N Devices on a 200 mm Si(100) Wafer via Scalable CMOS Technology,” [IEEE Electron Device Lett. 38 \(8\), 1094 - 1096 \(2017\).](#)
39. K. Park, M. A. Strosio, and **C. Bayram**, “Investigation of electron mobility and saturation velocity limits in gallium nitride using uniaxial dielectric continuum model,” [J. Appl. Phys. 121, 245109 \(2017\).](#)
38. R. Grady and **C. Bayram**, “Simulation of zincblende AlGa_N/Ga_N high electron mobility transistors for normally-off operation,” [J. Phys. D-Appl. Phys. 50, 265104 \(2017\).](#)
37. J. Perozek, H.-P. Lee, B. Krishnan, G. Papasouliotis, A. Paranjpe, K. B. Reuter, D. K. Sadana, and **C. Bayram**, “Investigation of Structural, Optical, and Electrical Characteristics of an AlGa_N/Ga_N High Electron Mobility Transistor Structure across a 200 mm Si (111) Substrate,” [J. Phys. D-Appl. Phys. 50, 055103 \(2017\).](#)

36. H-P. Lee, J. Perozek, L. N. D. Rosario, and C. Bayram, "Investigation of AlGaIn/GaN high electron mobility transistor structures on 200-mm silicon (111) substrates employing different buffer layer configurations," *Sci. Rep.* **6**:37588 (2016).
35. K. Park and C. Bayram, "Thermal Resistance Optimization of GaN / Substrate Stacks Considering Thermal Boundary Resistance and Temperature-dependent Thermal Conductivity," *Appl. Phys. Lett.* **109**, 151904 (2016).
34. R. Liu and C. Bayram, "Maximizing Cubic Phase Gallium Nitride Surface Coverage on Nano-patterned Silicon (100)," *Appl. Phys. Lett.* **109**, 042103 (2016).
33. R. Liu and C. Bayram, "Cathodoluminescence study of luminescence centers in hexagonal and cubic phase GaN hetero-integrated on Si(100)," *J. Appl. Phys.* **120**, 025106 (2016).

Postdoctoral Journal Articles

32. J. Kim[†] & C. Bayram[†] ([†] equal contribution), H. Park, C.-W. Cheng, C. Dimitrakopoulos, J. A. Ott, K. B. Reuter, S. W. Bedell, and D.K. Sadana, "Principle of direct van der Waals epitaxy of single-crystalline films on epitaxial graphene," *Nat. Commun.* **5**:4836 (2014).
31. 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," *Adv. Funct. Mater.* **24** (28), 4492 (2014). (FRONTISPECE COVER ARTICLE)
30. S. W. Bedell, C. Bayram, K. Fogel, P. Lauro, J. Kiser, J. Ott, Y. Zhu, and D. Sadana, "Vertical light-emitting diode fabrication by controlled spalling," *Appl. Phys. Express* **6** (11), 112301 (2013).
29. D. Shahrjerdi, S. W. Bedell, C. Bayram, C. C. Lubguban, K. Fogel, P. Lauro, J. A. Ott, M. Hopstaken, M. Gayness, and D. Sadana, "Ultra-light high-efficiency flexible InGaP/(In)GaAs tandem solar cells on plastic," *Adv. Energy Mater.* **3** (5), 566–571 (2013). (INSIDE COVER ARTICLE)
28. Y. Zhang, S. Gautier, C.-Y. Cho, E. Cicek, Z. Vashaei, R. McClintock, C. Bayram, Y. Bai, and M. Razeghi, "Near miliwatt power AlGaIn-based ultraviolet light emitting diodes based on lateral epitaxial overgrowth of AlN on Si(111)," *Appl. Phys. Lett.* **102**, 011106 (2013).
27. D. Shahrjerdi, S. W. Bedell, C. Ebert, C. Bayram, B. Hekmatshoar, K. Fogel, P. Lauro, M. Gaynes, T. Gokmen, J. Ott, and D. K. Sadana, "High-efficiency thin-film InGaP/InGaAs/Ge tandem solar cells enabled by controlled spalling technology," *Appl. Phys. Lett.* **100**, 053901 (2012). (TOP 20 Most Downloaded Articles) (EDITOR'S PICK 2012)
26. C. Bayram, "High quality AlGaIn/GaN superlattices for near- and mid-infrared intersubband transitions," *J. Appl. Phys.* **111**, 013514 (2012).

Predoctoral Journal Articles

25. **C. Bayram**, Z. Vashaei, and M. Razeghi, "Reliability in room-temperature negative differential resistance characteristics of low-aluminium-content AlGaIn/GaN double-barrier resonant tunneling diodes," [*Appl. Phys. Lett.* 97, 181109 \(2010\).](#)
24. Z. Vashaei, **C. Bayram**, P. Lavenus, and M. Razeghi. "Photoluminescence characteristics of polar and nonpolar AlGaIn/GaN superlattices," [*Appl. Phys. Lett.* 97, 121918 \(2010\).](#)
23. **C. Bayram**, Z. Vashaei, and M. Razeghi, "Room temperature negative differential resistance characteristics of polar III-nitride resonant tunneling diodes," [*Appl. Phys. Lett.* 97, 092104 \(2010\).](#)
22. E. Cicek, Z. Vashaei, R. McClintock, **C. Bayram**, and M. Razeghi, "Geiger-mode operation of ultraviolet avalanche photodiodes grown on sapphire and free-standing GaN substrates," [*Appl. Phys. Lett.* 96, 261107 \(2010\).](#)
21. Z. Vashaei, E. Cicek, **C. Bayram**, R. McClintock, and M. Razeghi, "GaN avalanche photodiodes grown on m-plane freestanding GaN substrate," [*Appl. Phys. Lett.* 96, 201908 \(2010\).](#)
20. Z. Vashaei, **C. Bayram**, and M. Razeghi, "Demonstration of negative differential resistance in GaN/AlN resonant tunneling diodes at room temperature," [*J. Appl. Phys.* 107, 083505 \(2010\).](#)
19. **C. Bayram**, Z. Vashaei, and M. Razeghi, "AlN/GaN double-barrier resonant tunneling diodes grown by metal-organic chemical vapor deposition," [*Appl. Phys. Lett.* 96, 042103 \(2010\).](#)
18. **C. Bayram**, N. P  r  -Laperne, and M. Razeghi, "Effects of well width and growth temperature on optical and structural characteristics of AlN/GaN superlattices grown by metal-organic chemical vapor deposition," [*Appl. Phys. Lett.* 95, 201906 \(2009\).](#)
17. N. P  r  -Laperne, **C. Bayram**, L. Nguyen-Th  , R. McClintock, and M. Razeghi, "Tunability of Intersubband absorption from 4.5 to 5.3 μm in a GaN/Al_{0.2}Ga_{0.8}N superlattices grown by metalorganic chemical vapor deposition," [*Appl. Phys. Lett.* 95, 131109 \(2009\).](#)
16. **C. Bayram** and M. Razeghi, "ULTRAVIOLET DETECTORS: Nitrides push performance of UV photodiodes," [*Laser Focus World* 45\(9\), p. 47-51 \(2009\).](#)
15. **C. Bayram**, D. Rogers, F. H. Teherani, and M. Razeghi, "Fabrication and characterization of novel hybrid green LEDs based on substituting n-type ZnO for n-type GaN in an inverted p-n junction," [*J. Vac. Sci. Technol. B* 27, 1784 \(2009\).](#)
14. V. E. Sandana, D. J. Rogers, F. H. Teherani, R. McClintock, **C. Bayram**, M. Razeghi, H.-J. Drouhin, M.C. Clochard, V. Sallet, G. Garry, and F. Falyouni, "Comparison of ZnO nanostructures grown using pulsed layer deposition, metalorganic chemical vapor deposition, and physical vapor transport", [*J. Vac. Sci. Technol. B* 27, 1678 \(2009\).](#)
13. **C. Bayram**, N. P  r  -laperne, R. McClintock, B. Fain and M. Razeghi, "Pulsed metalorganic chemical vapor deposition of high quality AlN/GaN superlattices for near-infrared intersubband transitions," [*Appl. Phys. Lett.* 94, 121902 \(2009\).](#)
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9. **C. Bayram**, J. L. Pau, R. McClintock, M. Razeghi, M. P. Ulmer, and D. Silversmith, "High quantum efficiency back-illuminated GaN avalanche photodiodes," [Appl. Phys. Lett. 93, 211107 \(2008\)](#).
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72. **(INVITED) Y. Tsai and C. Bayram**, “*Next-Generation Green Light-Emitting Diodes by Novel Cubic III-Nitrides*,” DOE Lighting R&D Workshop, Virtual Meeting, Feb. 1 - 4 (2021).
71. **(INVITED) A. Mohamed, K. Park, C. Bayram, R. Singh, M. Dutta, and M. A. Strosio**, “*Reduction of Hot Spot Temperature in Nitride-based Devices using Interface Phonons*,” Workshop on Compound Semiconductor Materials and Devices (WOCSEMADD), Palm Springs, CA, USA Feb. 19 (2020).
70. **K. Park and C. Bayram**, “*GaN thermal conductivity and its dependence on threading dislocations for advanced electronic and photonic device designs*,” 13th International Conference on Nitride Semiconductors, WA, USA, July 7-12, (2019).
69. **C. Bayram**, “*Vertical Thinking with GaN Devices: Ultraviolet, Visible, and Terahertz Photonics*,” National Academy of Engineering China-America Frontiers of Engineering Symposium, San Diego, CA, USA, June 20 - 22 (2019).
68. **C. Bayram**, “*Ultraviolet Light Emitting Diodes for Disinfection*,” Nature-Society Interactions in Developing Communities Workshop, University of Illinois at Urbana-Champaign, IL, USA, April 5 (2019).
67. **R. Liu, C. McCormick, and C. Bayram**, “*Suppression of indium clustering and quantum confined stark effect of InGaN LED on Silicon (111)*,” SPIE Photonics West, San Francisco, CA, USA, Feb. 2 - Feb. 7 (2019).
66. **(INVITED) C. Bayram**, “*Atomic Engineering of Gallium Nitride Semiconductors for Ultraviolet-to-Terahertz Photonics*,” IEEE Nanotechnology Materials and Devices Conference, Portland, OR, USA, October 14-17, 2018.
65. **(INVITED) C. Bayram**, “*LIGHTing and NETworking (LIGHTNET) through Advanced Solid State Lighting*,” Turkish American Scientists & Scholars Association (TASSA) Conference, Boston University, MA, USA, June 2-3, 2018.
64. **R. Liu, R. Schaller, C.-Q. Chen, and C. Bayram**, “*Phase-transition Cubic GaN with ~29 % Internal Quantum Efficiency*,” Compound Semiconductor Week, Massachusetts Institute of Technology, MA, USA, May 29 - June 1, 2018.
63. **(INVITED) C. Bayram**, “*Al_xGa_(1-x)N-based intersubband devices*” Room Temperature High-Power Terahertz Frequency Sources Symposium, Drexel University, PA, USA, April 18, 2018.
62. **(INVITED) C. Bayram**, “*Vertical thinking in light emitting diodes*” Nanotechnology Lecture, University of California at Los Angeles, CA, USA, April 9, 2018.
61. **(INVITED) C. Bayram, R. Grady, and K. Park** “*Novel cubic phase III-nitride complementary metal-oxide-semiconductor transistor technology*,” SPIE Photonics West, San Francisco, CA, USA, Jan. 27 - Feb. 1 (2018).
60. **(INVITED) C. Bayram**, “*Next Generation Gallium Nitride Microelectronics & Photonics*,” Air Force Research Laboratory - Wright-Patterson Air Force Base, Dayton, OH, USA, Jan. 10 (2018).
59. **(INVITED) C. Bayram**, “*Vertical thinking in light emitting diodes*” Nanotechnology Lecture, University of Illinois at Chicago, IL, USA, Nov. 30, 2017.

58. **C. Bayram** “*InGaN-based flexible light emitting diodes*,” The 11th International Symposium on Semiconductor Light Emitting Devices, Banff, Alberta, Canada, Oct. 8-12, 2017.
57. **C. Bayram**, J. Kim, H. Park, C.W. Cheng, C. Dimitrakopoulos, J. Ott, K.B. Reuter, S.W. Bedell, and D.K. Sadana, “*A Novel Thin-film Blue Light Emitting Diode via GaN-on-Graphene Technology*,” IEEE Photonics Conference, FL, USA, Oct. 1-5, 2017.
56. **C. Bayram** and R. Liu “*Cubic Phase Light Emitters Hetero-integrated on Silicon*,” IEEE Photonics Conference, FL, USA, Oct. 1-5, 2017.
55. (INVITED) **C. Bayram**, “*Next Generation Gallium Nitride Microelectronics & Photonics*,” NANOTAM Seminar, Bilkent University, Ankara, Turkey, Aug. 4 (2017).
54. (INVITED) **C. Bayram** “*Investigating Thermal Properties of Vertically-Integrated GaN Heterostructures*,” AFOSR GHz-THz Electronics Review, Arlington, VA, USA, July. 10- 13, (2017).
53. K. Park, M. A. Strosio, and **C. Bayram**, “*Electron momentum relaxation rates via Frohlich interaction with polar-optical-phonons in bulk wurtzite gallium nitride*,” International Workshop on Computational Nanotechnology, Windermere, UK, June 5-9, 2017.
52. H.-P. Lee, J. Perozek, and **C. Bayram**, “*Scaling AlGaIn/GaN High Electron Mobility Transistor Structures onto 200-mm Silicon (111) Substrates through Novel Buffer Layer Configurations*,” International Conference on Compound Semiconductor Manufacturing Technology, Indian Wells, CA, USA, May 22 - 25, 2017.
51. R. Liu and **C. Bayram**, “*Cubic Phase GaN Integrated on CMOS-Compatible Silicon (100)*,” International Conference on Compound Semiconductor Manufacturing Technology, Indian Wells, CA, USA, May 22 - 25, 2017.
50. (INVITED) **C. Bayram** “*InGaN-based flexible light emitting diodes*,” SPIE Photonics West, San Francisco, CA, USA, Jan. 28 - Feb.2 (2017).
49. (INVITED) **C. Bayram** and R. Liu, “*Polarization-free integrated gallium-nitride photonics*,” SPIE Photonics West, San Francisco, CA, USA, Jan. 28 - Feb.2 (2017).
48. **C. Bayram**, J. Kim, C. Dimitrakopoulos, and D. K. Sadana, “*A Novel Thin-Film Blue Light Emitting Diode via GaN-on-Graphene Technology*,” MRS Fall Meeting, Boston, MA, USA, Nov. 27-Dec. 2, (2016).
47. **C. Bayram** and R. Liu, “*Polarization-Free Integrated Gallium Nitride Photonics*,” International Workshop on Nitride Semiconductors, Orlando, FL, USA, Oct. 2-7, (2016).
46. (INVITED) **C. Bayram**, “*GaN Devices Gearing up for the 21st Century*,” NANOTAM Seminar, Bilkent University, Ankara, Turkey, July 27 (2016).
45. (INVITED) **C. Bayram**, “*Vertical thinking in light emitting diodes*,” Nano@Illinois RET Research Seminar, University of Illinois at Urbana-Champaign, Urbana, IL, USA, June 28 (2016).
44. (INVITED) **C. Bayram**, “*GaN devices gearing up for the 21st century*,” Company Seminar, Veeco Company, Somerset, NJ, USA, January 11 (2016).

43. K.-T. Lee, C. Bayram, W. Gallagher, D. Sadana, D. Piedra, T. Palacios, B. Krishnan, G. Papasouliotis, A. Paranjpe, E. Aklimi, and K. L. Shepard, "A Scalable CMOS Technology Platform for Co-integrating GaN on Si," Compound Semiconductors Week 2, 45 (2015).
42. **(INVITED) C. Bayram**, "*Vertical thinking in light emitting diodes*," Nano@Illinois RET Research Seminar, University of Illinois at Urbana-Champaign, Urbana, IL, USA, July 21 (2015).
41. **(INVITED) C. Bayram**, "*Vertical thinking in light emitting diodes*," CNST 13th Annual Nanotechnology Workshop, University of Illinois at Urbana-Champaign, Urbana, IL, USA, May 7-8 (2015).
40. **(INVITED) C. Bayram**, "*Light emitting diode gearing up for the 21st century*," ECE Explorations, University of Illinois at Urbana-Champaign, Urbana, IL, USA, Feb. 25 (2015).
39. **(INVITED) C. Bayram**, J. Kim, H. Park, C.-W. Cheng, C. Dimitrakopoulos, J. A. Ott, K. B. Reuter, S. W. Bedell, and D.K. Sadana, "*Vertical thinking in blue light emitting diodes: GaN-on-graphene technology*," SPIE Photonics West, San Francisco, CA, USA, February 7-12 (2015).
38. **(INVITED) C. Bayram**, J. Ott, K. T. Shiu, C. W. Cheng, Y. Zhu, J. Kim, D. K. Sadana, and M. Razeghi, "*Polarization-free GaN emitters in the ultraviolet and visible spectra via heterointegration on CMOS-compatible Si (100)*," SPIE Photonics West, San Francisco, CA, USA, February 7-12 (2015).
37. **(INVITED) C. Bayram**, "*Vertical thinking in light emitting diodes*" ECE Colloquium, University of Illinois at Urbana-Champaign, Urbana, IL, USA, Nov. 13, 2014.
36. **C. Bayram**, J. Kim, H. Park, C.-W. Cheng, C. Dimitrakopoulos, J. Ott, K.B. Reuter, S.W. Bedell, and D. K. Sadana, "*Thin-film blue light emitting diodes via revolutionary GaN-on-graphene technology*," International Symposium on Graphene Devices (ISGD-4), Bellevue, WA, USA, Sep. 21-25, 2014.
35. **(INVITED) C. Bayram**, "*Gallium nitride compound semiconductors for ultraviolet, visible, and terahertz photonics*" 2nd International Conference and Exhibition on Lasers, Optics, and Photonics, Philadelphia, PA, USA, Sep. 08-10, 2014.
34. **(INVITED) C. Bayram**, "*LED lighting*" International Summer School on Advanced TV Technologies, Antalya, TURKEY, Aug. 25-29, 2014.

Postdoctoral Talks & Presentations

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_xGa_{1-x}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).

Predoctoral Talks & Presentations

19. (INVITED) **C. Bayram** and M. Razeghi, "*AlGaInN gap engineering from ultraviolet and visible wavelengths towards terahertz regime*," ICDD Spring Meetings, Pennsylvania, USA, March 17 (2011).
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).
16. E. Cicek, Z. Vashaei, **C. Bayram**, R. McClintock, and M. Razeghi, "*Comparison of ultraviolet APDs grown on free-standing GaN and sapphire substrates*", SPIE Optics + Photonics, San Diego, California, USA, August 1-5 (2010).
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)GaInN-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 4th 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).
8. (INVITED) **C. Bayram**, F. H. Teherani, D. Rogers, R. McClintock, and M. Razeghi, "*Novel green light emitting diodes: Innovating droop-free lighting solutions for sustainable Earth*", 2009 symposium of the Chicago AIChE (American Institute of Chemical Engineers), Chicago, IL, Oct. 4-5 (2009).

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).**

Select Recorded and Posted Talks

- 2021 [Vertical thinking in light emitting diodes](#)
 2017 [InGaN-based flexible light emitting diodes](#)
 2017 [Polarization-free integrated gallium-nitride photonics](#)

Other Presentations & Posters (presenter: underlined)

11. Jaekwon Lee, Yi-Chia Tsai, Jean-Pierre Leburton, and Can Bayram, "Green Light Emitting Diodes for the Ultimate Solid-State Lighting," Compound Semiconductor Week, Ann Arbor, MI, USA, June 1 – 3 (2022). [Poster]
10. Z. Han, S. Weiss, V. Garcia, and C. Bayram, "Diamond Semiconductor Devices for Advanced Power Electronics," Compound Semiconductor Week, Ann Arbor, MI, USA, June 1 – 3 (2022). [Poster]
9. Y. Tsai and C. Bayram, "Electronic Surface and Heterostructure: Band Offsets in Ternary Wurtzite and Zincblende III-Nitrides," SPIE Photonics West, San Francisco, CA, USA, March 6 - 11 (2021). [Poster]

8. **(INVITED) N. Kolagotla**, “*The Effect of Temperature on the Electrical Properties of LEDs*,” The Grainger College of Engineering Illinois Scholars Undergraduate Research Expo, University of Illinois at Urbana-Champaign, IL, USA, April 19, 2020. [Presentation]* **DaRin Butz Foundation Research Scholar**
7. **(INVITED) J. Meyer**, R. Liu, R.D Schaller, H-P Lee, and C. Bayram, “*Impact of Defects on Shockley-Read-Hall and Radiative Recombination in Bulk GaN under Weak Excitation*,” Gulf Coast Undergraduate Research Symposium, Rice University, TX, USA, Nov. 2, 2019. [Presentation]***Outstanding Presentation Trophy Winner**
6. **(INVITED) C. Bayram**, “*Vertical Thinking with GaN Devices: Ultraviolet, Visible, and Terahertz Photonics*,” National Academy of Engineering China-America Frontiers of Engineering Symposium, San Diego, CA, USA, June 20 - 22 (2019). [Poster]
5. **(INVITED) R. Liu** and C. Bayram, “*Cubic Phase Gallium Nitride Emitters*,” Siegman School on Lasers, Technical University Denmark, Island of Hven, AB, Sweden, July 28 – August 04, 2018. [Poster]
4. **(INVITED) R. Liu** and **C. Bayram**, “*Cubic Phase Gallium Nitride Emitters*,” Turkish American Scientists & Scholars Association (TASSA) Conference, Boston University, MA, USA, June 2-3, 2018. [Poster]
3. **(INVITED) Y. Yao**, “*Investigation of Stress and Structural Evolution in Electrodeposited Thick Nickel*,” Gulf Coast Undergraduate Research Symposium, Rice University, TX, USA, Oct. 4, 2017. [Presentation]
2. **Y. Yao**, “*Investigation of Stress and Structural Evolution in Electrodeposited Thick Nickel*,” MRL Fall Conference, University of Illinois at Urbana-Champaign, IL, USA, Nov. 8-9, 2017. [Presentation]
1. **(INVITED) J. Perozek**, “*GaN Transistors for Next Generation Electronics*,” Gulf Coast Undergraduate Research Symposium, Rice University, TX, USA, Oct. 22, 2016. [Presentation]

Magazine Articles & Interviews

10. **(INVITED) Y. Tsai**, J.P. Leburton, and C. Bayram, “*Quashing droop with cubic GaN*,” [Compound Semiconductor Magazine](#), Issue VII, Pages 48-53, (2022)
9. **(INVITED) C. Bayram**, “*Reflections from an EDS Young Professional*,” [IEEE Electron Devices Society Newsletter](#), 28 (2) 34 (April 2021).
8. **(INVITED) C. Bayram**, “*Message from the Chair of the EDS Optoelectronic Devices Committee*,” [IEEE Electron Devices Society Newsletter](#), 28 (1) 37 (Jan. 2021).
7. **(INVITED) C. Bayram**, “*Young Scientist of the Month, Can Bayram*,” [Turkish American Scientists & Scholars Association](#) (Oct. 2018).
6. **(INVITED) C. Bayram**, “*The power for change: van der Waals Epitaxy*,” [Compound Semiconductor Magazine](#) 24 (3), 52 (April/May 2018).
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

29. *ARPA-E Ultra-fast-triggered Devices Workshop*, Washington, DC, USA (Oct. 6th & 7th, 2022).
28. *Semiconductor Industry Energy Efficiency Scaling (EES2) Goal Technical Workshop*, DOE Advanced Manufacturing Office (Sept. 14, 2022).
27. *Microelectronics/Semiconductor Research Community Virtual Workshop*, Stanford University (Sept. 8 – 9, 2022).
26. *Power Electronics and Energy Conversion Workshop*, Sandia National Laboratories, Virtual Workshop (Aug. 23 – 24, 2022).
25. *Solid-State Lighting Workshop*, DOE, Virtual Workshop (Jan. 31 – Feb. 3, 2022).
24. *Advanced Packaging for Energy Efficient Microelectronics Workshop*, DOE AMO, Virtual Workshop (Jan. 12 - 13, 2022).
23. *Semiconductor R&D for Energy Efficiency: Manufacturing and Integration Challenges for Analog and Neuromorphic Computing*, DOE AMO, Virtual Workshop (Aug. 11 - 13, 2021).
22. *International Conference on Compound Semiconductor Manufacturing Technology*, Virtual Conference (May 24-27, 2021).
21. *Nobel Prize Summit “Our Planet, Our Future”*, Virtual Workshop (April 26-28, 2021).
20. *Semiconductor R&D for Energy Efficiency Workshop 2: Ultra-Precision Control for Ultra-Efficient Devices*, DOE, Virtual Workshop (April 21-23, 2021).
19. *NSF Future of Semiconductors and Beyond Workshop: Materials, Devices and Integration*, NSF, Virtual Workshop (March 1-2, 2021).
18. *Materials for Harsh Service Conditions (M4HSC) Workshop*, U.S. Department of Energy, Virtual Workshop (Oct. 27-30, 2020).
17. *Second Workshop on Diamond Electronic Materials*, Michigan State University, Virtual Workshop (Oct. 19-22, 2020).
16. *5G Enabled Energy Innovation Workshop (5GEEIW)*, Office of Science, U.S. Department of Energy, Westin Michigan Avenue Hotel, Chicago, IL, USA (March 10-12, 2020).
15. *Nature-Society Interactions in Developing Communities Workshop*, University of Illinois at Urbana-Champaign, IL, USA (April 5, 2019).
14. *Franklin Institute Awards*, Philadelphia, PA, USA (April 19, 2018).
13. *Naval Future Force Science and Technology Expo*, Washington, D.C., USA (July 20-21, 2017).
12. *GHz-THz Electronics Review*, Arlington, VA, USA (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).
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).