Dinusha Herath Mudiyanselage

(+1) 515 867 0329
dinusha@txstate.edu
dinushaherathm@gmail.com

Ph.D., Assistant Professor of Electrical Engineering, *Texas State University*

Biosketch Summary

Dr. Dinusha Herath Mudiyanselage received his Ph.D. from Arizona State University in 2025 and an M.Sc. in Physics and Electrical Engineering from Iowa State University. He earned his Bachelor's degree in Physics with First Class Honors from the University of Peradeniya in 2015. Dr. Dinusha's research focuses on **materials growth, device design, fabrication, and characterization** of wide and ultra-wide bandgap (WBG/UWBG) semiconductors for next-generation power electronic devices, enabling high-voltage, high-frequency, and high-temperature operation. He has authored over 30 peer-reviewed publications, presented at more than 30 international conferences, contributed to one book chapter, and holds two pending patent applications and four provisional patents. His notable work includes the demonstration of the first 3 kV AlN Schottky Barrier Diodes (SBDs), low-ideality-factor 600 V AlN SBDs, and 2 kV AlN metal–semiconductor field-effect transistors (MESFETs) on bulk AlN substrates. His research has been featured in *Compound Semiconductor Magazine* and *Semiconductor Today*. Dr. Dinusha has received multiple prestigious honors, including the 2025 Palais Outstanding Doctoral Award, the 46th JSAP Young Scientist Award, the 2024 ASU ECEE Research Award, and several gold medals recognizing his excellence in undergraduate studies.

Education

2022 Aug – 2025 May **Ph.D., Electrical Engineering**, *Arizona State University*, Tempe, AZ.
Thesis: Ultrawide bandgap semiconductors β-Ga_2O_3 and AlN for next-generation efficient power electronics. Advisor: Dr. Houqiang Fu, GPA:4.0/4.0.

2021 Jan – 2022 Jul **Ph.D. candidate, Electrical Engineering**, *Iowa State University*, Ames, IA.
Thesis: Ultrawide bandgap semiconductors β-Ga_2O_3 and AlN for next-generation efficient power electronics. Advisor: Dr. Houqiang Fu, GPA: 4.0/4.0 (Research group transferred to Arizona State University in Fall 2022).

2020 Jan – 2021 Dec **M.Sc., Electrical Engineering,** *Iowa State University*, Ames, IA.
Creative Component: Design and optimization of edge termination techniques for β-Ga_2O_3/GaN heterojunction for *p-n* power diodes using TCAD simulation. Advisor: Dr. Houqiang Fu, GPA: 3.77/4.0

2017 Aug – 2021 May **M.Sc., Physics**, *Iowa State University*, Ames. IA.
Creative Component: Terahertz Second Harmonic Generation Form Nb_3Sn.
Advisor: Dr. Jigang Wang, GPA:3.77/4.00

2011 Oct – 2015 Nov **B.Sc., Physics (*Hons*)**, *University of Peradeniya*, Peradeniya, Sri Lanka.
Research: Development of humidity sensors based on conducting polymer composites. Advisor: Dr. P.W.S.K. Bandaranayake, GPA:3.82/4.00.

Professional & Research Experience

2025 Aug – Present **Assistant Professor of Electrical Engineering (Tenure Track)**, *Texas State University.*

Leading a research group at TXST university focused on developing highly efficient electronic devices using WBG and UWBG semiconductors for next-generation high-voltage, high-frequency, and high-temperature applications. (https://dinusha.wp.txstate.edu/)

Teaching undergraduate and graduate courses in semiconductor physics with an emphasis on both theoretical foundations and practical applications.

Committed to training and mentoring the next generation of scientists for the future semiconductor workforce.

2025 May – 2025 Aug **Postdoctoral Research Scholar,** *School of ECEE*, *Arizona State University*.

Development of quasi-vertical high current density, high voltage AlN Schottky and PN diodes associated with Agnitron Technology Inc., funded by DARPA UWBGs program.

2022 Aug – 2025 May **Research Assistant,** *School of ECEE*, *Arizona State University*.
Currently focused on developing efficient power electronic devices using WBG and UWBG semiconductors, specifically GaN, Ga_2O_3, AlGaN, and AlN, which involves semiconductor device processing in a cleanroom environment to fabricate novel high-power and high-frequency devices.

Experienced in handling Ga_2O_3 and AlN MOCVD equipment, as well as thin-film growth techniques. Proficient in XRD, AFM, and ellipsometry, four probe, and hall measurements for characterization of epitaxial thin films.

Experienced in electrical characterization of Schottky barrier diodes, *p-n* diodes, and high electron mobility transistors using current-voltage, capacitance-voltage, pulse, and reverse recovery measurements.

Thermal and electrical stress testing of semiconductor devices.
Reliability assessment and noise characteristics of WBG and UWBG electronic devices.
https://faculty.engineering.asu.edu/houqiangfu/research/

2022 Aug – Present **Research Assistant,** *ULTRA Center*, *Arizona State University*.
ULTRA is an Energy Frontier Research Center Funded by the Department of Energy. Current research involves developing high-voltage electronic devices using the UWBG semiconductor AlN and understanding their electronic properties.
https://ultracenter.asu.edu/

2021 Jan – 2022 Jun **Research Assistant,** *Dept. of ECpE*, *Iowa State University*.
Investigated WBG and UWBG semiconductor device design, simulation, fabrication, and characterization in conjunction with Ga_2O_3 MOCVD equipment handling and epitaxial thin film growth.

2018 May – 2020 May **Research Associate,** *Ames National Laboratory*, Ames, IA
Experienced in characterizing optoelectronic properties of materials such as semiconductors (metal halide perovskites and graphene) and superconductors.

2017 Aug – 2020 Dec **Teaching Assistant,** *Dept. of Physics*, *Iowa State University*.
Performed teaching duties for undergraduate students in both labs and recitations.

Proctored exams and helped undergraduate students with basic physics and algebra.

2016 Jan – 2017 Jun **Demonstrator,** *Dept. of Physics*, *University of Peradeniya*.
Demonstrated physics labs and delivered lectures to undergraduate students.

Participated as a volunteer instructor in science camps organized to educate students in rural areas in Sri Lanka.

Teaching

2026 Jan – 2026 May **EE 3355: Solid State Devices.**

2026 Jan – 2026 May **EE 4353/EE: 5353 Fundamentals of Advanced Semiconductor Technology.**

2026 Aug – 2026 Dec **EE 7303: Physical Electronics.**

Research Highlights

Demonstration of the world's first 2 kV AlN metal-silicon carbide field-effect transistor.
Publication: https://iopscience.iop.org/article/10.35848/1882-0786/ad85c0/
Meida Coverage: Semiconductor Today and Compound Semiconductor
https://www.semiconductor-today.com/news_items/2024/nov/asu-221124.shtml
https://compoundsemiconductor.net/article/121113/A_debut_for_the_native_AlN_transistor

Demonstration of the first low ideality factor AlN Schottky barrier diode coupled with over 600 V breakdown.
Publication: https://doi.org/10.35848/1882-0786/ad5e5a
Media coverage- Compound Semiconductor https://compoundsemiconductor.net/article/120923/Boosting_AlN-on AlN_Schottky_barrier_diode_performance

Demonstration of the first high-voltage kV-Class AlN metal-semiconductor field-effect transistors on single-crystal AlN substrates.
Publication: https://doi.org/10.35848/1882-0786/ad85c0

Demonstration of the world's first 3 kV AlN Schottky barrier diode using homoepitaxial growth of AlN-on-AlN substrates.
Publication: https://doi.org/10.35848/1882-0786/ad15f4
Media coverage - Compound Semiconductor Magazine and Power Electronics World
https://compoundsemiconductor.net/article/118835/Advancing_the_AlN_Schottky_barrier_diode
https://powerelectronicsworld.net/article/118835/Advancing_the_AlN_Schottky_barrier_diode

Demonstration of e-beam NiO/Ga_2O_3 *p-n* diodes on different crystal orientations.
Publication: https://doi.org/10.35848/1882-0786/acf8ad
Selected as a Spotlight paper in Applied Physics Express: https://iopscience.iop.org/journal/1882-0786/page/Spotlights. Selected as Highlight paper in Applied Physics Express and Japanese Journal of Applied Physics, Device Physics Section: https://iopscience.iop.org/journal/1882-0786/page/APEX_JJAP_Highlights_2023. Nominated for the JSAP Young Scientist Award and Best Paper Award in 2024 by the Japan Society of Applied Physics. Won the 46th JSAP Young Scientist Award in 2024.

Research Funding

2025 **Start Up Funds** (> $ 1.1 M): *Texas State University.*

$631,500 for the acquisition and the facilities installation of the AIN MOCVD system through the Research Accelerator Program. Division of Research startup funding: $489,467.

2025 **Research Enhancement Program (REP) 2026**: *Texas State University.*

$24,000 for Ohmic Contacts Engineering for Ultra-Wide Bandgap Aluminum Nitride Power Devices Co. PI: Dr. Ming-Hsun Lee

2026 **Small Business Technology Transfer (STTR) 2026DON26TZ01-NV001**: *Department of the Navy.*

$ 250,000 AlGaN-based solar-blind chirped resonant-cavity detector array for an AI/ML-enhanced optical fire detector capable of reliable operation in environments with temperatures up to 400°F PI: Dr. Terry D. Golding, CEO, Amethyst Research $150,000 Co-PI: Dr. Dinusha Herath Mudiyanselage $ 100,000 subaward

Academic Achievements & Recognition

2025 **Palais Outstanding Doctoral Award**: *Arizona State University.*
Professor Emeritus Joseph Palais and his wife, Sandra, established the Palais Outstanding Doctoral Student Award. The award is presented annually to the best graduating doctoral student in the electrical engineering program. This is the highest honor for the ECEE PhD students and is awarded to only one student each year.

2024 **2024-2025 ECEE Graduate Student Research Awards:** *Arizona State University.*
These awards recognize excellence in research and related efforts for graduate students enrolled in either the doctoral or master's degree programs across ECEE (Area of the award won: Physical Electronics and Photonics).

2024 **46th JSAP Young Scientist Award**: *Japanese Society of Applied Physics*

JSAP Young Scientist Award is presented to young researchers who have mainly authored excellent papers that are expected to contribute to the progress of applied physics.

2023 **Outstanding PhD Research Award**: *Arizona State University.*
The Outstanding Research Award recognizes graduate and professional students that exemplify excellence in research on all ASU campuses.

2016 **Dr. C.A. Hewawitharana Memorial Prize for Physics**: *University of Peradeniya*.
The prize is awarded to the student with the best overall performance in the Honors Study Program in Physics.

2016 **Lakshman Dissanayake Gold Medal for Excellence in Physics**: *University of Peradeniya*.
The gold medal is awarded to the Physics Honors student who has recorded the highest GPA of not less than 3.70 for the compulsory Physics courses at the 100, 200, 300, and 400 levels.

2016 **George Dissanaike Memorial Gold Medal for Physics**: *University of Peradeniya*.
The gold medal is awarded to the student with the best performance at the examinations of the 300 and 400 level compulsory courses in the Honors Study Program in Physics.

2016 **A.W. Wolfendale Prize for Physics:** *University of Peradeniya*.
The prize is awarded to the student with the best performance during the first year of the Honors Study Program in Physics.

Details: https://sci.pdn.ac.lk/physics/prizes-scholarships.php

2016 **University Award for Academic Excellence:** *University of Peradeniya*.
This award is for excellence in academic courses at all programs of the university.

Professional Activities

Reviewer for DOE Office of Science Graduate Student Research Program SCGSR (2025).

Serve as a reviewer for journal articles on semiconductor physics and devices, epitaxial growths, and related applications.

IEEE Electron Device Letters, IEEE Transaction of Electron Devices, IEEE Transaction of Nuclear Science, IEEE Photonics, Semiconductor Science and Technology, Applied Physics Journal D, Optical letters, Optical Express, Optical Material Express, CystEngComm, Elsevier's e-Prime - Advances in Electrical Engineering, Electronics and Energy, Micro and Nanostructures, Memories-Materials, Devices, Circuits and Systems, and Multidiscipline Modeling in Materials and Structures.

President-Sri Lankan Student Association, Iowa State University (May 2018 – Jun 2022)**.** Organizing and leading social gatherings and activities for the Sri Lankan Student community at Iowa State University to promote student wellness and harmony to ease stressful academic life. Helping and mentoring incoming Sri Lankan international students to establish their lives in the university. Help students in need at difficult times.

Mentor for junior graduate and undergraduate students in Electrical Engineering and Physics to conduct research and excel in coursework.

Teaching Assistant for Semiconductor Theory I (Fall 2023 and 2024) and Fundamentals Wide/Ultrawide Bandgap Semiconductors (Spring 2025) in ASU.

Member of the IEEE and the Japanese Society of Applied Physics.

Patent Applications

2025 6) 2kV AlN Metal-Semiconductor Field-Effect Transistors (MESFETs) on Single-Crystal AlN Substrates (Houqiang Fu, Bingcheng Da, **Dinusha Herath Mudiyanselage**) Provisional.

2024 5) 10kV-Class Gallium Nitride Power Devices and Method of Manufacturing the Same (Houqiang Fu, **Dinusha Herath Mudiyanselage**, Dawei Wang) Provisional.

4) Fabrication method for high voltage aluminum nitride diodes with low ideality factor on high-quality semiconductor layers (Houqiang Fu, **Dinusha Herath Mudiyanselage**, Dawei Wang) Provisional.

3) Multi-Kilovolt AlN Power Diodes on free-standing substrates (Houqiang Fu, **Dinusha Herath Mudiyanselage**, Dawei Wang) Provisional.

2023 2) KV-class and Low RON Vertical β-Ga2O3 HEMT-CAVET Power Switch (Houqiang Fu, Dawei Wang, **Dinusha Herath Mudiyanselage**) US Patent App. 18/892,930

1) Ga2O3 p-n junctions and method of manufacturing the same (Houqiang Fu, **Dinusha Herath Mudiyanselage**, Dawei Wang). US Patent App. 18/898,925

Book Chapters

2024 1) H. Fu, K. Fu, D. Wang, **D. H. Mudiyanselage**, H. D. Ellis, I. Rahaman, C. Chang, S. M. Goodnick, D. J. Smith, R. J. Nemanich, F. A. Ponce, and Y. Zhao, "Selective Area Regrowth and Doping for Vertical GaN Power Devices", chapter in "Gallium Nitride and Related Materials – Device Processing and Materials Characterization for Power Electronics Applications", edited by Isik C. Kizilyalli, Jung Han, James S. Speck, and Eric P. Carlson, Springer, Switzerland (2025). (https://link.springer.com/chapter/10.1007/978-3-031-83056-3_13)

Journal Publications

First Author Peer-Reviewed Publications

2024 10) **D. H. Mudiyanselage***, A. E. Yektha*, R. Mandia, B. Da, D. Wang, Z. He, D. J. Smith, R. Neminach, and H. Fu. "Material and Electrical Characterization of Ultrawide Bandgap BN/AlN Metal-Insulator-Semiconductor (MIS) Schottky Diodes," ***J. Vac. Sci. Technol. A*** 43, 062701 (2025). **[*Equal contribution]**

9) **D. H. Mudiyanselage**, D. Wang, B. Da, Z. He, and H. Fu, "High-Temperature Electrical Characteristics of High-Voltage AlN Schottky Barrier Diodes on Single-Crystal AlN Substrates", ***IEEE Trans. Electron Devices*** 72, 1637 (2025).

8) **D. H. Mudiyanselage**, D. Wang, B. Da, Z. He, and H. Fu, "Over 600 V Lateral AlN-on-AlN Schottky Barrier Diodes with Ultra-Low Ideality Factor", ***Appl. Phys. Express*** 17, 074001 (2024).

7) **D. H. Mudiyanselage,** B. Da, J. Adivarahan, D. Wang, Z. He, K. Fu, Y. Zhao, H. Fu, "β-Ga_2O_3-based Heterostructures and Heterojunctions for Power Electronics: A Review on Recent Advances" ***Electronics*** 13, 1234 (2024).

6) **D. H. Mudiyanselage**, D. Wang, B. Da, Z. He, and H. Fu, "High-voltage AlN Schottky barrier diodes on bulk AlN substrates by MOCVD", ***Appl. Phys. Express*** 17, 014005 (2024).

2023 5) **D. H. Mudiyanselage**, R. Mandia, D. Wang, J. Adivarahan, Z. He, K. Fu, Y. Zhao, M. R. McCartney, D. J. Smith, and H. Fu, "Anisotropic electronic properties of NiOx/β-Ga2O3 p-n heterojunctions on (-201), (001), and (010) crystal orientations", ***Appl. Phys. Express*** 16, 094002 (2023). **[Selected as "Spotlights 2023" and "Highlights 2023" in Appl. Phys. Express].** **Won JSAP Young Scientist Award.**

4) S. Ghosh*, **D. H. Mudiyanselage***, F. Kargar, Y. Zhao, H. Fu, and A. Balandin, "Temperature dependence of low-frequency noise characteristics of NiOx/β-Ga2O3 p-n heterojunction diodes," ***Adv. Electron. Mater.*** 2300501, (2023). **[*Equal contribution]**

3) **D. H. Mudiyanselage**, D. Wang, and H. Fu, "Ultrawide bandgap vertical β-(AlxGa1-x)2O3 Schottky barrier diodes on free-standing β-Ga2O3 substrates," ***J. Vac. Sci. Technol. A*** 41, 023201 (2023).

2022 2) **D. H. Mudiyanselage**, D. Wang, Y. Zhao, and H. Fu, "Intersubband Transitions in Nonpolar and Semipolar III-Nitrides: Materials, Devices, and Applications," ***J. Appl. Phys.*** 131, 210901 (2022). **[Invited Review]**

1) **D. H. Mudiyanselage**, D. Wang, and H. Fu, "Wide bandgap vertical β-Ga2O3/GaN heterojunction p-n diodes with mesa edge termination," ***IEEE J. Electron Devices Soc.*** 10, 89 (2022).

Co-Author Peer-Reviewed Publications

2026 30) B. Da, F. Alema, J. Xie, W. Brand, V. Soukhoveev, D. Wang, X. Wei, **D. H. Mudiyanselage**, A. Osinsky, H. Fu, “Temperature-dependent electrical characterizations of high-current-density AlN quasi-vertical Schottky barrier diodes on AlN substrates.” ***APL Electronic Devices*** 2, 016130 (2026).

29) F. Alema, W. Brand, **D. H. Mudiyanselage**, B. Da, H. Fu, and A. Osinsky, “Nitrogen doping of metal-organic chemical vapor deposition β-Ga_2O_3 using nitric oxide**,” *J. Vac. Sci. Technol. A*** 44, 032701 (2026).

2025 27) B. Da, **D. H. Mudiyanselage**, D. Wang, J. Xie, X. Wei, H. Fu, “Effects of oxygen thermal annealing on AlN trench metal-semiconductor field-effect transistors (MESFETs) on single-crystal AlN substrates,” ***Appl. Phys. Lett.*** 127, 233504 (2025).

26) D. Wright, E. Guzman, M. S. H. Bijoy, R. B Wilson, **D. H. Mudiyanselage**, H. Fu, F. Kargar, A. A. Balandin, "Acoustic Phonon Characteristics of (001) and (201)β-Ga_2O_3 Single Crystals Investigated with Brillouin-Mandelstam Light Scattering Spectroscopy, " ***Appl. Phys. Lett.*** 127, 052201 (2025).

25) J. Xie, B. Da, D. Wang, **D. H. Mudiyanselage**, Z. He, and H. Fu, ”Lateral AlN Schottky Barrier Diodes with Graded AlGaN Contact Layer on Single-Crystal AlN Substrate,” ***Phys. Status Solidi A*** 222, e202500568 (2025).

24) Z. He, **D. H. Mudiyanselage**, D. Wang, B. Da, J. Xie, and H. Fu, “Electrical and Reliability Study of GaN E-mode MISHEMTs with Two-Step Etching Gate Recess,” ***IEEE Trans. Mater. Electron Devices 2, 103 (2025).***.

23) B. Da, **D. H. Mudiyanselage**, D. Wang, Z. He, J. Xie, and H. Fu “Ultrawide Bandgap AlN Trench Metal-Oxide-Semiconductor Transistors (MOSFETs) on Single-Crystal AlN Substrates,” ***IEEE Trans. Mater. Electron Devices*** 2, 108 (2025).

22) D. Wang, **D. H. Mudiyanselage**, B. Da, Z. He, and H. Fu, " 9.5 kV AlGaN/GaN Heterojunction Schottky Barrier Diodes with Hydrogen Plasma Guard Array Termination," ***IEEE Electron Device Lett.*** 46, 960 (2025).

2024 21) B. Da, **D. H. Mudiyanselage**, D. Wang, Z. He, and H. Fu, " High-Voltage kV-Class AlN Metal-Semiconductor Field-Effect Transistors on Single-Crystal AlN Substrates," ***Appl. Phys. Express.*** 17, 104002 (2024).

20) D. Wright, **D. H. Mudiyanselage**, E. Guzman, X. Fu, J. Teeter, B. Da, F. Kargar, H. Fu, A. Balandin, "Acoustic and Optical Phonon Frequencies and Acoustic Phonon Velocities in Si-Doped AlN Thin Film," ***Appl. Phys. Lett.*** 125, 142202 (2024).

19) I. Rahaman, H. D. Ellis, C. Chang, **D. H. Mudiyanselage**, M. Xu, B. Da, H. Fu, Y. Zhao, K. Fu, "Epitaxial Growth of Ga2O3: A Review, " ***Materials*** 17(17), 4261 (2024).

18) Z. He, X. Zhang, T. S. Pieshkov, A. E. Yekta, T. Terlier, **D. H. Mudiyanselage**, D. Wang, B. Da, M. Xu, S. Luo, C. Chang, T. Li, R. J. Nemanich, Y. Zhao, P. M. Ajayan, H. Fu, "Reduced trap state density in AlGaN/GaN HEMTs with low-temperature CVD-grown BN gate dielectric, " ***Appl. Phys. Lett.*** 125, 042106 (2024).

17) Q. Huang, X. Deng, L. Zhang, W. Lin, W.i Cheng, G. Yu, T. Ju, **D. H. Mudiyanselage**, D. Wang, H. Fu, Z. Zeng, B. Zhang, F. Xu, "High-performance GaN metal–insulator–semiconductor high electron mobility transistors (MIS-HEMTs) using Sc0.2Al0.8N/SiNX as composite gate dielectric," ***Appl. Phys. Lett.*** 124, 233510 (2024).

2023 16) D. Wang, **D. H. Mudiyanselage**, Z. He, B. Da and H. Fu, "Instability of On-Resistance in Vertical GaN PIN Diodes Under High-Temperature and Voltage Stress," ***IEEE Trans. on Electron Devices***, (2023).

15) D. Wang, **D. H. Mudiyanselage**, and H. Fu, "Design of kV-class and low RON E-mode β-Ga2O3 current aperture vertical transistors with delta-doped β-(AlxGa1-x)2O3/Ga2O3 heterostructure," ***IEEE Trans. Electron Devices*** 70, 5795 (2023).

14) S. Ghosh, **D. H. Mudiyanselage**, S. Rumyantsev, Y. Zhao, H. Fu, S. Goodnick, R. Nemanich, and A. A. Balandin, "Low-frequency electronic noise in β-(AlxGa1−x)2O3 Schottky barrier diodes," ***Appl. Phys. Lett.*** 122, 212109 (2023).

13) F. Angeles, S. Khan, V. Ortiz, M. Xu, S. Luo, **D. H. Mudiyanselage**, H. Fu, Y. Zhao, and R. Wilson, "Picosecond magneto-optic thermometry for improved spatiotemporal resolution of nanoscale thermal transport in AlN thin films," ***APL Mater.*** 11, 061127 (2023).

12) C. Leblanc, **D. H. Mudiyanselage**, S. Song, H. Zhang, A. Davydov, H. Fu, and D. Jariwala, "Vertical van der Waals heterojunction diodes comprising 2D semiconductors on 3D β-Ga2O3," ***Nanoscale*** 15, 9964 (2023).

11) Y. Hu, L. Zhang, T. Chen, Y. Ma, W. Tang, Z. Huang, B. Li, K. Xu, **D. H. Mudiyanselage**, H. Fu, X. Zhang, Z. Zeng, and B. Zhang, "High performance ε-Ga_2O_3 solar-blind ultraviolet photodetectors on Si (100) substrate with molybdenum buffer layer," ***Vacuum*** 213, 112130 (2023).

2022 10) X. Zhang, X. Duan, W. Niu, X. Liu, X. Zou, H. Huang, **D. H. Mudiyanselage**, **H. Fu**, B. Jiang, G. Liu, and Z. Yang, "The mechanism of performance variations in MoS2 vertical Schottky metal-semiconductor photodiode based on thermionic emission theory," ***IEEE Trans. Electron Devices*** 69, 5644 (2022).

9) W. Tang, Y. Ma, X. Zhang, X. Zhou, L. Zhang, X. Zhang, T. Chen, X. Wei, X. Lin, **D. H. Mudiyanselage**, H. Fu, and B. Zhang, "High-quality (001) β-Ga2O3 homoepitaxial growth by metalorganic chemical vapor deposition enabled by in situ indium surfactant," ***Appl. Phys. Lett.*** 120, 212103 (2022).

8) Y. Ma, T. Chen, X. Zhang, W. Tang, B. Feng, Y. Hu, L. Zhang, X. Zhou, X. Wei, K. Xu, **D. H. Mudiyanselage**, H. Fu, and B. Zhang, "High-photoresponsivity self-powered α-,ε-, and β-Ga2O3/p-GaN heterojunction UV photodetectors with an in situ GaON layer by MOCVD," ***ACS Appl. Mater. Interfaces*** 14, 35194 (2022).

7) D.Wang, **D. H. Mudiyanselage**, and H. Fu, "Design space of delta-doped β-(AlxGa1-x)2O3/Ga2O3 high electron mobility transistors," ***IEEE Trans. Electron Devices*** 69, 69 (2022).

6) M. Xu*, D. Wang*, K. Fu*, **D. H. Mudiyanselage**, H. Fu, and Y. Zhao, "A Review of Ultrawide-Bandgap Materials: Properties, Synthesis, and Devices," Oxford Open Mater. Sci. 2, itac004 (2022). (*Equal contribution) **[Invited Review].**

2021 5) H. Fu, K. Fu, C. Yang, H. Liu, K. A. Hatch, P. Peri, **D. H. Mudiyanselage**, B. Li, T. H. Kim, S. R. Alugubelli, P. Y. Su, D. C. Messina, X. Deng, C. Y. Cheng, R. V. Meidanshahi, X. Huang, H. Chen, T. H. Yang, J. Zhou, A. M. Armstrong, A. A. Allerman, E. T. Yu, J. Han, S. M. Goodnick, D. J. Smith, R. J. Nemanich, F. A. Ponce, and Y. Zhao, "Selective area regrowth and doping for vertical GaN power transistors: challenges and recent progress", ***Mater. Today*** 49, 296 (2021).

2020 4) C. Vaswani, L.-L. Wang, **D. H. Mudiyanselage**, Q. Li, P. M. Lozano, G. D. Gu, D. Cheng, B. Song, L. Luo, R. H. J. Kim, C. Huang, Z. Liu, M. Mootz, I. E. Perakis, Y. Yao, K. M. Ho, and J. Wang, "Light-Driven Raman Coherence as a Nonthermal Route to Ultrafast Topology Switching in a Dirac Semimetal", ***Phys. Rev. X*** 10, 021013 (2020).

3) C. Vaswani, M. Mootz, C. Sundahl, **D. H. Mudiyanselage**, J. H. Kang, X. Yang, D. Cheng, C. Huang, R. H. J. Kim, Z. Liu, L. Luo, I. E. Perakis, C. B. Eom, and J. Wang, "Terahertz Second-Harmonic Generation from

Lightwave Acceleration of Symmetry-Breaking Nonlinear Supercurrents" ***Phys. Rev. Lett.* 124**, 207003 (2020).

2) Z. Liu, C. Vaswani, X. Yang, X. Zhao, Y. Yao, Z. Song, D. Cheng, Y. Shi, L. Luo, **D.-H. Mudiyanselage**, C. Huang, J.-M. Park, R. H. J. Kim, J. Zhao, Y. Yan, K.-M. Ho, and J. Wang, "Ultrafast Control of Excitonic Rashba Fine Structure by Phonon Coherence in the Metal Halide Perovskite CH3NH3PbI3" ***Phys. Rev. Lett.* 124**, 157401(2020).

2019 1) D. Cheng, Z. Liu, L. Luo, C. Vaswani, J.-M. Park, Y. Yao, Z. Song, C. Huang, **D.-H. Mudiyanselage**, R. H. J. Kim, Y. Yan, K.-M. Ho, J. Wang, "Helicity-dependent terahertz photocurrent and phonon dynamics in hybrid metal halide perovskites", ***J. Chem. Phys.*** 151, 244706 (2019).

Conference Presentations

2026 43) S. H. Rabbi, D. Chettri, A. Haque and **D. H. Mudiyanselage**, " Design and Optimization of a Normally OFF β-Ga2O3 Bidirectional Switch", ***68th Electronic Materials Conference (EMC 2026)***, June 2026, Ann Arbor, Michigan, Poster Presentation. **[Best student poster honorable mention]**

42) J. Xie, B. Da, D. H. Mudiyanselage, D. Wang, X.i Wei and H. Fu, " AlN Monolithic Bidirectional Switches on Bulk AlN Substrates ", ***68th Electronic Materials Conference (EMC 2026)***, June 2026, Ann Arbor, Michigan, Oral Presentation.

41) J. Xie, X. Zhang, B. Da, D. H. Mudiyanselage, D. Wang, X. Wei, P. M. Ajayan, M. Khoury, and H. Fu, " E-mode GaN HEMT with High On/off Ratio and Low Dit Enabled by BN Gate Dielectric", ***68th Electronic Materials Conference (EMC 2026)***, June 2026, Ann Arbor, Michigan, Oral Presentation.

2025 40) **D. H. Mudiyanselage**, F. Alema, B. Da, W. Brand, V. Soukhoveev, A. Osinsky, and H. Fu, "High Current Density AlN Quasi-vertical Schottky Barrier Diodes," ***Lester Eastman Conference on High Performance Devices (LEC 2025),*** August 2025, Gainesville, Florida, Oral Presentation.

39) **D. H. Mudiyanselage**, A. E. Yektha, R. Mandia, B. Da, D. Wang, Z. He, D. J. Smith, R. Neminach, and H. Fu. "Electrical Characterization of BN/AlN Metal-Insulator-Semiconductor (MIS) Diodes," ***The 67th Electronic Materials Conference (EMC 2025),*** June 2025, Durham, North Carolina, Oral Presentation.

38) Z. He, **D. Mudiyanselage**, D. Wang, B. Da , J. Xie, Y. Zhao, and H. Fu,"GaN E-mode MISHEMT with 2-step Etching Gate Recess" ***The 67th Electronic Materials Conference (EMC 2025),*** June 2025, Durham, North Carolina, Oral Presentation.

37) B. Da, **D. H. Mudiyanselage**, D. Wang, Z. He, J. Xie, and H. Fu "AlN Trench Metal -Oxide-Semiconductor Transistor (MOSFET) on AlN Substrates," ***The 67th Electronic Materials Conference (EMC 2025),*** June 2025, Durham, North Carolina, Oral Presentation.

36) J. Xie, Z. He, **D. H. Mudiyanselage**, B. Da, D. Wang, "High Current Lateral AlN Schottky Barrier Diodes with Graded AlGaN Contact Layer on Single-Crystal AlN Substrate," ***The 67th Electronic Materials Conference (EMC 2025),*** June 2025, Durham, North Carolina, Oral Presentation.

35) **D. H. Mudiyanselage**, R. Mandia, D. Wang, J. Adivarahan, Z. He, K. Fu, Y. Zhao, M. R. McCartney, D. J. Smith, and H. Fu, "Anisotropic NiO_x/β-Ga_2O_3 p-n heterojunctions on (-201), (001), and (010) β-Ga_2O_3 substrates," ***The 72nd Japan Society of Applied Physics Spring Meeting 2025***, Noda, Japan, March 2025, Oral Presentation. **Invited Talk.**

34) **D. H. Mudiyanselage**, H. Fu, "Ultrawide Bandgap Aluminum Nitride Power Electronics," ***Electronic Materials and Applications 2025 (EMA 2025)***, Denver, Colorado, February 2025, Oral Presentation. **Invited Talk.**

2024 33) **D. H. Mudiyanselage**, H. Fu, "AlN-on-AlN Schottky barrier diodes for high-voltage and high-temperature electronics," ***12th International Workshop on Nitride Semiconductors (IWN 2024)***, O'ahu, Hawai'i, November 2024, Oral Presentation.

32) W. Brand, F. Alema, A. Osinsky, **D. H. Mudiyanselage**, B. Da, H. Fu, "Nitrogen Doping of Ga2O3 via MOCVD Using Nitric Oxide Precursor," ***The 7th U.S. Workshop on Gallium Oxide (GOX 2024)***, August 2024, Columbus, Ohio, Oral Presentation.

31) **D. H. Mudiyanselage**, D. Wang, B. Da, Z. He, and H. Fu, "High-Temperature AlN Schottky Barrier Diodes on Single-Crystal AlN Substrates," ***The 66th Electronic Materials Conference (EMC 2024),*** June 2024, College Park, Maryland, Oral Presentation.

30) A. Winchester, **D. H. Mudiyanselage**, H. Fu, S. Pookpanratana, "Crystal orientation-dependent electronic properties of βGa2O3 surfaces," ***The 66th Electronic Materials Conference (EMC 2024),*** June 2024, College Park, Maryland, Oral Presentation.

29) B. Da, **D. H. Mudiyanselage**, and H. Fu, "β-(AlxGa1−x)2O3 Vertical SBD with a BN interlayer," ***The 66th Electronic Materials Conference (EMC 2024),*** June 2024, College Park, Maryland, Oral Presentation.

28) D. Wang, **D. H. Mudiyanselage**, B. Da, Z. He, H. Fu, "Lateral p-GaN/AlGaN/GaN Hybrid Anode Diodes (HADs) with Hydrogen Plasma Triangular Guard Array (TGA) Termination," ***The 66th Electronic Materials Conference (EMC 2024)***, June 2024, College Park, Maryland, Oral Presentation.

27) **D. H. Mudiyanselage**, D. Wang, Z. He, B. Da, and H. Fu, "Developing High-Voltage AlN Schottky Barrier Diodes on AlN Substrates for Power Electronic Device Applications," ***2024 MRS Spring Meeting***, Seattle, Washington, April 2024, Oral Presentation.

26) B. Da, **D. H. Mudiyanselage**, M. Xu, D. Wang, Z. He, A. Biswas, P. Ajayan, Y. Zhao, and H. Fu, "Vertical β-$(Al_xGa_{1-x})_2O_3$ Schottky barrier diodes with a BN interlayer," ***2024 MRS Spring Meeting***, Seattle, Washington, April 2024, Oral Presentation.

25) B. Da, **D. H. Mudiyanselage**, D. Wang, Z. He, and H. Fu, "Investigation of temperature-dependent hysteresis and interface trap density in E-beam evaporated NiOx/β-Ga2O3 p-n diodes," ***2024 MRS Spring Meeting***, Seattle, Washington, April 2024, Oral Presentation.

24) Z. He, D. Wang, **D. H. Mudiyanselage**, B. Da, Y. Zhao, and H. Fu, "Microwave-plasma-assisted chemical vapor deposition of BN as gate dielectric for AlGaN/GaN metal-insulator-semiconductor high electron mobility transistors," ***2024 MRS Spring Meeting***, Seattle, Washington, April 2024, Poster Presentation.

23) S. Ghosh, **D. H. Mudiyanselage**, F. Kargar, Y. Zhao, H. Fu, S. Goodnick, R. Nemanich, and A. Balandin, "Comparative study of low-frequency noise in diodes made of ultra-wide band semiconductors," ***2024 MRS Spring Meeting***, Seattle, Washington, April 2024, Oral Presentation.

22) D. Wang, **D. H. Mudiyanselage**, Z. He, B. Da, and H. Fu, "Lateral p-GaN/AlGaN/GaN Hybrid Anode Diodes (HADs) with Hydrogen Plasma Guard Line Termination," ***2024 MRS Spring Meeting***, Seattle, Washington, April 2024, Oral Presentation.

2023 21) **D. H. Mudiyanselage**, D. Wang, Z. He, B. Da, and H. Fu, "Demonstration of 3 kV Schottky barrier diodes on AlN epilayers grown on bulk AlN substrates by MOCVD," ***2023 MRS Fall Meeting***, Boston, Massachusetts, November 2023, Oral Presentation. **[LATE NEWS]**

20) C. Leblanc, **D. H. Mudiyanselage**, S. Song, H. Zhang, A. Davydov, H. Fu, and D. Jariwala, "Vertical van der Waals heterojunction diodes comprising 2D semiconductors on 3D β-Ga2O3," ***2023 MRS Fall Meeting***, Boston, Massachusetts, November 2023, Oral Presentation.

19) D. Wang, **D. H. Mudiyanselage**, and H. Fu, "Modeling of β-(AlxGa1-x)2O3/Ga2O3 high electron mobility transistor (HEMT) and current aperture vertical electron transistor (CAVET)," ***The 6th U.S. Workshop on Gallium Oxide (GOX 2023)***, August 2023, Buffalo, New York, Poster Presentation.

18) **D. H. Mudiyanselage**, D. Wang, and H. Fu, "Anisotropy nature of NiOx/β-Ga2O3 p-n heterojunctions on (-201), (001), and (010) β-Ga2O3 substrates," ***The 6th U.S. Workshop on Gallium Oxide (GOX 2023)***, August 2023, Buffalo, New York, Poster Presentation

17) D. Wang, **D. H. Mudiyanselage**, Z. He, and H. Fu, "Reliability study and analysis of vertical GaN power devices," ***The 65th Electronic Materials Conference (EMC 2023)***, June 2023, Santa Barbara, California, Oral Presentation. **[LATE NEWS]**

16) Z. He, **D. H. Mudiyanselage**, D. Wang, Y. Zhao, and H. Fu, "Effect of impact ionization coefficients on high-voltage vertical AlN power devices," ***The 65th Electronic Materials Conference (EMC 2023)***, June 2023, Santa Barbara, California, Oral Presentation.

15) **D. H. Mudiyanselage**, D. Wang, Z. He, and H. Fu, "Anisotropic Electronic Properties of NiOx/β-Ga2O3 p-n Heterojunctions on (-201), (001), and (010) β-Ga2O3 Substrates," ***The 65th Electronic Materials Conference (EMC 2023)***, June 2023, Santa Barbara, California, Oral Presentation.

14) D. Wang, **D. H. Mudiyanselage**, Z. He, and H. Fu, "Design and fabrication of AlGaN/GaN multiple p-channel Schottky barrier diodes," ***The 65th Electronic Materials Conference (EMC 2023)***, June 2023, Santa Barbara, California, Oral Presentation.

13) **D. H. Mudiyanselage**, D. Wang, Z. He, and H. Fu, "Comparative study of NiOx/β-Ga2O3 p-n heterojunctions on (-201) and (001) free-standing β-Ga2O3 substrates," ***2023 MRS Spring Meeting***, San Francisco, April 2023, Poster Presentation.

12) D. Wang, **D. H. Mudiyanselage**, and H. Fu, "Design and fabrication of AlGaN/GaN multiple p-channel Schottky barrier diodes," ***2023 MRS Spring Meeting***, San Francisco, April 2023, Oral Presentation.

2022 11) D. Wang, **D. H. Mudiyanselage**, and H. Fu, "Comprehensive design and simulation of E-mode β-Ga2O3 current-aperture vertical electron transistors," ***2022 MRS Spring Meeting***, Honolulu, Hawai'i, May 2022, Oral Presentation.

10) **D. H. Mudiyanselage**, D. Wang, and H. Fu, "Ultrawide bandgap β-Ga2O3/p-GaN heterojunction barrier Schottky rectifiers for efficient power electronic applications," ***2022 MRS Spring Meeting***, Honolulu, Hawai'i, May 2022, Oral Presentation.

9) **D. H. Mudiyanselage**, D. Wang, and H. Fu, "Ultrawide Bandgap Vertical β-(AlxGa1-x)2O3 Schottky Barrier Diodes on Free-Standing Ga2O3 Substrates," ***2022 Compound Semiconductor Week (CSW 2022) and the 48th International Symposium on Compound Semiconductors (ISCS 2022)***, June 2022, Anna Arbor, Michigan, Oral Presentation. **[LATE NEWS]**

8) D. Wang, **D. H. Mudiyanselage**, and H. Fu, "High-voltage kilovolt enhancement-mode β-Ga2O3 current-aperture vertical electron transistors with recessed-gate design," ***2022 Compound Semiconductor Week (CSW 2022) and the 48th International Symposium on Compound Semiconductors (ISCS 2022)***, June 2022, Anna Arbor, Michigan, Poster Presentation.

7) **D. H. Mudiyanselage**, D. Wang, and H. Fu, “Design and analysis of kV-class ultrawide bandgap β-Ga2O3/ p-GaN heterojunction barrier Schottky diodes,” ***2022 Compound Semiconductor Week (CSW 2022) and the 48th International Symposium on Compound Semiconductors (ISCS 2022)***, June 2022, Anna Arbor, Michigan, Poster Presentation.

2021 6) **D. H. Mudiyanselage** and H. Fu, “Wide bandgap beta-Ga2O3/GaN heterojunction based vertical p-n diode with mesa edge termination,” ***2021 Compound Semiconductor Week (CSW 2021) and the 47th International Symposium on Compound Semiconductors (ISCS 2021)***, May 2021, Stockholm, Sweden, Oral Presentation.

5) **D. H. Mudiyanselage** and H. Fu, “Vertical Wide Bandgap β-Ga2O3/GaN p-n Heterojunction with Mesa Based Edge Termination,” ***The 63rd Electronic Materials Conference (EMC 2021)***, June 2021, Oral Presentation.

4) **D. H. Mudiyanselage** and H. Fu, Mesa edge terminated wide bandgap ß-Ga2O3/GaN heterojunction based vertical p-n diode,” ***2021 MRS Spring Meeting***, April 2021, Poster Presentation. **[LATE NEWS].**

3) C. Vaswani, **D. Mudiyanselage**, C. Huang, L. Luo, X. Fan, C. Zeng, J. Wang, "Ultrafast carrier dynamics and photoconductivity in gated graphene probed by THz pump-THz probe spectroscopy", ***Bulletin of the American Physical Society*** (2021).

2020 2) C. Vaswani, **D. Mudiyanselage**, J.-H. Kang, M. Mootz, X. Yang, I. Perakis, C.-B. Eom, J. Wang, "Ultrafast nonlinear excitation of collective modes in iron pnictides by intense terahertz pulses", ***Bulletin of the American Physical Society*** (2020).

1) M. Mootz, I. E Perakis, C. Vaswani, **D. H Mudiyanselage**, X. Yang, J. Wang, "Terahertz lightwave control of non-equilibrium phases and collective modes in multi-band superconductors", ***Ultrafast Phenomena and Nanophotonics XXIV*** (2020).