



Srabanti Chowdhury

Associate Professor of Electrical Engineering and Senior Fellow at the Precourt Institute for Energy

CONTACT INFORMATION

- **Administrative Contact**

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Bio

BIO

Srabanti Chowdhury is an associate professor of Electrical Engineering (EE) and a Senior Fellow of Precourt Institute at Stanford. She leads the Widebandgap Lab at Stanford where her research focuses on the wideband gap (WBG) and ultra-wide bandgap (UWBG) materials and device engineering for energy-efficient and compact system architecture for electronics including power RF and computation applications. Besides Gallium Nitride, her group is exploring Diamond for various active and passive electronic applications, particularly thermal management.

Srabanti received her M.S and Ph.D. in Electrical Engineering from the University of California, Santa Barbara working on Vertical GaN Switches.

She received the DARPA Young Faculty Award, NSF CAREER, and AFOSR Young Investigator Program (YIP) in 2015. In 2016 she received the Young Scientist award at the International Symposium on Compound Semiconductors (ISCS). She is a senior member of IEEE and an alumni of NAE Frontiers of Engineering. She received the Alfred P. Sloan fellowship in Physics in 2020. To date, her work has produced over 6 book chapters, 90 journal papers, 110 conference presentations, and 26 issued patents. She serves the program committee of several IEEE conferences including IRPS and VLSI Symposium, and the executive committee of IEDM. She serves as the Associate Editor of Transaction Electron Devices as well as two committees under IEEE Electron Device Society (Compound Semiconductor Devices & Circuits Committee Members and Power Devices and ICs Committee). She is the Science Collaboration Director of the US Department of Energy Funded Energy Frontier Research Center, called ULTRA

ACADEMIC APPOINTMENTS

- Associate Professor, Electrical Engineering
- Senior Fellow, Precourt Institute for Energy

HONORS AND AWARDS

- Sloan Research Fellow in Physics, Alfred P. Sloan Foundation (2020)
- NAE Frontier of Engineering (symposium invitee and alumni), National Academy of Engineering (2019)
- Gabilan Fellow, Stanford University (2019)
- William George and Ida Mary Hoover Faculty Fellow, Stanford University (2019)
- Advisor of student (Dong Ji) receiving Anil Kr. Jain award for best dissertation, Electrical and Computer Engineering, UC Davis (2018)
- IEEE Senior Member, Institute of Electrical and Electronics Engineers (IEEE) (2017)

- Advisor of student (Dong Ji) receiving Outstanding Student Abroad Award, Chinese Government (2016)
- Young Scientist Award, International Symposium on Compound Semiconductors (ISCS) (2016)
- Fulton Faculty Development Chair for outstanding research, Arizona State University (2015)
- NSF CAREER Award, National Foundation of Science (2015)
- Young Faculty Award (YFA), Defense Advanced Research Projects Agency (2015)
- Young Investigator Program Award, Air Force Office of Research (2015)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Executive Committee Member, IEEE International Electron Devices Meeting (IEDM) (2018 - present)
- Program Co-Chair, Topical Workshop on Heterostructure Microelectronics (TWHM) (2018 - present)
- Program Committee Member, ISPlasma/IC-PLANTS (2018 - present)
- Subcommittee vice chair : High power electron devices, Compound Semiconductor Week 2019 (2018 - present)
- Subcommittee Chair for Power Devices / Compound Semiconductor and High Speed Devices Committee, IEEE International Electron Devices Meeting (IEDM) (2017 - 2018)
- Subcommittee Member for Power Devices / Compound Semiconductor and High Speed Devices Committee, IEEE International Electron Devices Meeting (IEDM) (2015 - 2017)

PROGRAM AFFILIATIONS

- Stanford SystemX Alliance

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Wide bandgap materials & devices for RF, Power and energy efficient electronics

Teaching

COURSES

2021-22

- Power Semiconductor Devices and Technology: EE 218 (Win)
- Semiconductor Devices for Energy and Electronics: EE 116 (Aut)
- Special Topics on Wide Bandgap Materials and Devices: EE 317 (Spr)

2020-21

- Principles and Models of Semiconductor Devices: EE 216 (Win)
- Semiconductor Devices for Energy and Electronics: EE 116 (Aut)
- Special Topics on Wide Bandgap Materials and Devices: EE 317 (Spr)

2019-20

- Principles and Models of Semiconductor Devices: EE 216 (Aut)
- Special Topics on Wide Bandgap Materials and Devices: EE 317 (Spr)

2018-19

- Special Topics on Wide Bandgap Materials and Devices: EE 317 (Spr)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Aaron Goldin, Thomas Heuser, Cagil Koroglu, Anand Lalwani, Koosha Nassiri Nazif

Orals Chair

Sam Mumford

Postdoctoral Faculty Sponsor

Kwangjae Lee, Mohamadali Malakoutian, Bhawani Shankar, Rohith Soman, Ke Zeng, Xinyu Zhou

Doctoral Dissertation Advisor (AC)

ZHENGLIANG BIAN, Seungbin Jeong, Jackson Meng, Rafael Perez Martinez, Kelly Woo

Master's Program Advisor

Luis Aragon, Xiaolin Wu

Doctoral (Program)

Adam Elwailly, Sebastian Fernandez, Anna Kasperovich, Shreyas Muralidharan, Maliha Noshin, Rafael Perez Martinez, Dennis Rich, Xinyi Wen

Publications

PUBLICATIONS

- **Demonstration of Monolithic Polycrystalline Diamond-GaN Complementary FET Technology for High-Temperature Applications** *ACS APPLIED ELECTRONIC MATERIALS*
Ren, C., Malakoutian, M., Li, S., Ercan, B., Chowdhury, S.
2021; 3 (10): 4418-4423
- **Oxidation Behavior of InAlN during Rapid Thermal Annealing** *PHYSICA STATUS SOLIDI A-APPLICATIONS AND MATERIALS SCIENCE*
Thron, A. M., Gao, J., Ercan, B., Laurent, M. A., Chowdhury, S., van Benthem, K.
2021
- **Diamond-Incorporated Flip-Chip Integration for Thermal Management of GaN and Ultra-Wide Bandgap RF Power Amplifiers** *IEEE TRANSACTIONS ON COMPONENTS PACKAGING AND MANUFACTURING TECHNOLOGY*
Shoemaker, D., Malakoutian, M., Chatterjee, B., Song, Y., Kim, S., Foley, B. M., Graham, S., Nordquist, C. D., Chowdhury, S., Choi, S.
2021; 11 (8): 1177-1186
- **Vertical GaN Power Devices: Device Principles and Fabrication Technologies-Part II** *IEEE TRANSACTIONS ON ELECTRON DEVICES*
Fu, H., Fu, K., Chowdhury, S., Palacios, T., Zhao, Y.
2021; 68 (7): 3212-3222
- **Vertical GaN Power Devices: Device Principles and Fabrication Technologies-Part I** *IEEE TRANSACTIONS ON ELECTRON DEVICES*
Fu, H., Fu, K., Chowdhury, S., Palacios, T., Zhao, Y.
2021; 68 (7): 3200-3211
- **Development of Polycrystalline Diamond Compatible with the Latest N-Polar GaN mm-Wave Technology** *CRYSTAL GROWTH & DESIGN*
Malakoutian, M., Ren, C., Woo, K., Li, H., Chowdhury, S.
2021; 21 (5): 2624-2632
- **Polycrystalline diamond growth on beta-Ga₂O₃ for thermal management** *APPLIED PHYSICS EXPRESS*
Malakoutian, M., Song, Y., Yuan, C., Ren, C., Lundh, J., Lavelle, R. M., Brown, J. E., Snyder, D. W., Graham, S., Choi, S., Chowdhury, S.
2021; 14 (5)
- **Electro-Thermal Investigation of GaN Vertical Trench MOSFETs** *IEEE ELECTRON DEVICE LETTERS*
Chatterjee, B., Ji, D., Agarwal, A., Chan, S. H., Chowdhury, S., Choi, S.
2021; 42 (5): 723-726
- **Study on Avalanche Uniformity in 1.2KV GaN Vertical PIN Diode with Bevel Edge-Termination**
Zeng, K., Chowdhury, S., Gunning, B., Kaplar, R., Anderson, T., IEEE
IEEE.2021

- **On impact ionization and avalanche in gallium nitride** *APPLIED PHYSICS LETTERS*
Ji, D., Chowdhury, S.
2020; 117 (25)
- **Designing Beveled Edge Termination in GaN Vertical p-i-n Diode-Bevel Angle, Doping, and Passivation** *IEEE TRANSACTIONS ON ELECTRON DEVICES*
Zeng, K., Chowdhury, S.
2020; 67 (6): 2457–62
- **60 A/W high voltage GaN avalanche photodiode demonstrating robust avalanche and high gain up to 525K** *APPLIED PHYSICS LETTERS*
Ji, D., Ercan, B., Benson, G., Newaz, A. M., Chowdhury, S.
2020; 116 (21)
- **Design and Fabrication of Ion-Implanted Moat Etch Termination Resulting in 0.7 m²/1500 V GaN Diodes** *IEEE ELECTRON DEVICE LETTERS*
Ji, D., Li, S., Ercan, B., Ren, C., Chowdhury, S.
2020; 41 (2): 264–67
- **Experimental Determination of Velocity-Field Characteristic of Holes in GaN** *IEEE ELECTRON DEVICE LETTERS*
Ji, D., Ercan, B., Chowdhury, S.
2020; 41 (1): 23–25
- **Hydrogen-terminated diamond FET and GaN HEMT delivering CMOS inverter operation at high-temperature**
Ren, C., Malakoutian, M., Li, S., Chowdhury, S., IEEE
IEEE.2020
- **Robust avalanche in GaN leading to record performance in avalanche photodiode**
Ji, D., Ercan, B., Benson, G., Newaz, A. M., Chowdhury, S., IEEE
IEEE.2020
- **Demonstration of GaN Impact Ionization Avalanche Transit-Time (IMPATT) Diode**
Ji, D., Ercan, B., Zhuang, J., Gu, L., Rivas-Davila, J., Chowdhury, S., IEEE
IEEE.2020
- **A Study on the First-Derivative Output Properties of GaN Static Induction Transistor with Submicrometer Fin Width** *PHYSICA STATUS SOLIDI B-BASIC SOLID STATE PHYSICS*
Chun, J., Li, S., Malakoutian, M., Ji, D., Chowdhury, S.
2019
- **A Study on the Growth Window of Polycrystalline Diamond on Si₃N₄-coated N-Polar GaN** *CRYSTALS*
Malakoutian, M., Laurent, M. A., Chowdhury, S.
2019; 9 (10)
- **Experimental determination of impact ionization coefficients of electrons and holes in gallium nitride using homojunction structures** *APPLIED PHYSICS LETTERS*
Ji, D., Ercan, B., Chowdhury, S.
2019; 115 (7)
- **A Demonstration of Nitrogen Polar Gallium Nitride Current Aperture Vertical Electron Transistor** *IEEE ELECTRON DEVICE LETTERS*
Rajabi, S., Mandal, S., Ercan, B., Li, H., Laurent, M. A., Keller, S., Chowdhury, S.
2019; 40 (6): 885–88
- **Gate Stability and Robustness of In-Situ Oxide GaN Interlayer Based Vertical Trench MOSFETs (OG-FETs)**
Ruzzarin, M., Borga, M., Zaroni, E., Meneghini, M., Meneghesso, G., Ji, D., Li, W., Chan, S. H., Agarwal, A., Gupta, C., Keller, S., Mishra, U. K., Chowdhury, et al
IEEE.2019
- **Processing of GaN vertical devices: Static Induction Transistors**
Chowdhury, S., Chun, J., IEEE
IEEE.2019

- **Experimental Determination of Hole Impact Ionization Coefficient and Saturation Velocity in GaN**
Ji, D., Ercan, B., Chowdhury, S., IEEE
IEEE.2019
- **The Doping Dependence of the Thermal Conductivity of Bulk Gallium Nitride Substrates** *JOURNAL OF ELECTRONIC PACKAGING*
Song, Y., Lundh, J., Wang, W., Leach, J. H., Eichfeld, D., Krishnan, A., Perez, C., Ji, D., Borman, T., Ferri, K., Maria, J., Chowdhury, S., Ryou, et al
2020; 142 (4)
- **Analysis of mobility-limiting mechanisms of the two-dimensional hole gas on hydrogen-terminated diamond** *PHYSICAL REVIEW B*
Peterson, R., Malakoutian, M., Xu, X., Chapin, C., Chowdhury, S., Senesky, D. G.
2020; 102 (7)