

Kexin (Kathy) Li

EDUCATION

- 2019–2022 **Ph.D, ECE**, *University of Illinois Urbana-Champaign*, Champaign, IL, USA
2015–2019 **Ph.D candidate, M.Eng., Computer Engineering**, *New York University*, New York, USA
2013–2014 **MSc., Analog and Digital IC Design**, *Imperial College London*, London, UK (Merit Degree)
2008–2012 **B.Eng., Electronic, Science and Technology**, *Southeast University*, Nanjing, China

PROFESSIONAL EXPERIENCE

- 2023 Fall- **Assistant Professor**, *Arizona State University*, School of Electrical, Computer and Energy Engineering, Tempe, AZ, USA
2022 - 2023 **Postdoctoral Research Scientist**, *CoSMIC Lab, Columbia University*, New York City, NY
Summer 2020 **Research Intern**, *Mitsubishi Electric Research Laboratories (MERL)*, Cambridge, MA
Summer 2019 Applied Physics Group,
2016-2019 **Research Assistant**, *Quantum Nanoelectronics Lab*, New York University
Fall 2015 **Research Assistant**, *NYU Nano Lab*, New York University

RESEARCH INTERESTS

Nanoelectronic devices; GaN devices and circuits; Device-circuit co-design and optimization; Analog and digital IC design; Cryogenic device modeling for quantum computing.

SELECT HONORS and AWARDS

- 2022 Rising Stars in EECS
2015 ECE Academic Achievement Award. New York University
2011 Third place, "National Mathematical Modeling Competition. Southeast University
2011 Champion, the "Smart Car Competition." Southeast University

PUBLICATIONS, INTELLECTUAL PROPERTY, AND PRESENTATIONS

LEGEND

(*) Corresponding Author

Bold Font: ASU Ph.D. Student for whom Dr. Kexin Li is the sole advisor

(^) ASU Undergraduate Student

(~) Presenting author

Journal Publications

- J.10 Fahad Al Mamun*, Kexin Li, Dragica Vasileska, Ivan Sanchez Esqueda. Effects of Carrier Degeneracy on Electron Transport in Nanoscale FD-SOI Transistors at Cryogenic Temperatures. *IEEE Transactions on Electron Devices* (Volume: 73, Issue: 4, April 2026). DOI: 10.1109/TED.2026.3661367
J.9 **Ruilin Wang***, Dragica Dragica Vasileska, Kexin Li. Design and modeling of Scandium-alloyed wurtzite III-nitrides based ferroelectric heterostructure for power efficient applications. *MRS Advances*, (2025): 1-6. DOI:10.1557/s43580-025-01192-0
J.8 Ashwin Tunga*, Kexin Li, Ethan White, Nicholas Miller, Matt Grupen, John Albrecht, Shaloo Rakheja. A comparison of a commercial hydrodynamics TCAD solver and Fermi kinetics transport convergence for GaN HEMTs. *Journal of Applied Physics (JAP 2022)*. DOI: 10.1063/5.0118104
(Featured as Editor's Pick, in collaboration with Air Force Research Laboratory)

- J.7 Saptarshi Mukherjee*, Karen M Dowling, Yicong Dong, Kexin Li, Adam Conway, Shaloo Rakheja, Lars Voss. A Prony-based curve-fitting method for characterization of RF pulses from optoelectronic devices. *IEEE Signal Processing Letters (SPL 2021)*. DOI: 10.1109/LSP.2021.3135795
- J.6 Koon Hoo Teo*, Yuhao Zhang, Nadim Chowdhury, Shaloo Rakheja, Rui Ma, Qingyun Xie, Eiji Yagyu, Koji Yamanaka, Kexin Li, Tomás Palacios. Emerging GaN technologies for power, RF, digital, and quantum computing applications: Recent advances and prospects. *Journal of Applied Physics (JAP 2021)*. DOI:10.1063/5.0061555
- J.5 Shaloo Rakheja*, Kexin Li, Karen M. Dowling, Adam M. Conway, Lars F. Voss. Design and simulation of near-terahertz GaN photoconductive switches—operation in the negative differential mobility regime and pulse compression. *IEEE Journal of the Electron Devices Society (J-EDS 2021)*. DOI:10.1109/JEDS.2021.3077761
- J.4 Kexin Li*, Shaloo Rakheja. Modeling and simulation of quasi-ballistic III-Nitride transistors. *International Journal of High Speed Electronics and Systems, Special Issue on Wide Bandgap Semiconductor Electronics and Devices (2019)*. DOI:10.1142/S0129156419400111
- J.3 Kexin Li*, Shaloo Rakheja. A unified charge-current analytic model for ultra-scaled III-Nitride high electron mobility transistors. *Journal of Applied Physics (JAP 2019)*. DOI:10.1063/1.5064385
- J.2 Kexin Li*, Shaloo Rakheja. An analytic current-voltage model for quasi-ballistic III-nitride high electron mobility transistors. *Journal of Applied Physics (JAP 2018)*. DOI:10.1063/1.5025339
- J.1 Kexin Li*, Shaloo Rakheja. Analytic modeling of nonlinear current conduction in access regions of III-nitride HEMTs. *MRS Advances*, no. 3 (2018): 131-136. DOI:10.1557/adv.2017.632

Conference Publications

- C.16 **Ruilin Wang***, Naveen Chander Prabakaran, Siddhant Gangwal, Katerina Raleva, Dragica Vasileska, Kexin Li. CryoGaN: Towards Predictive Physics-Based Compact Models for GaN HEMTs across Bias, Geometry, and Temperature. In *2026 IEEE BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium (BCICTS)*, In Proceeding.
- C.15 **Mahathi Krishna Ravi Shankar***, Jeff Zhang, Kexin Li. A CMOS Active-Inductor Stochastic Processing Unit for Probabilistic AI. In *2026 IEEE BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium (BCICTS)*, In Proceeding.
- C.14 **Tasnia Jahan***, Kexin Li. Physics-Informed Neural Network Framework for Predicting Device Electrostatics and Characteristics in Gallium Oxide MOSFETs. In *2026 IEEE BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium (BCICTS)*, In Proceeding.
- C.13 **Tasnia Jahan***, Kexin Li. Physics-Informed Neural Networks for Predicting Characteristics of β -Ga₂O₃ based Devices. In *2025 International Compact Modeling Conference (ICMC)*. IEEE, 2026. DOI: Available soon, **Best Student Paper Award**
- C.12 **Habibullah Khan***, Nabasindhu Das, Nidhin Kurian Kalarickal, Kexin Li. Thermal-Aware Compact Modeling and Design-Space Exploration of δ -Doped β -Ga₂O₃ MOSFETs for RF Power Electronics. *The 27th International Symposium on Quality Electronic Design (ISQED'26)*. IEEE, 2026. DOI: 10.1109/ISQED69900.2026.11534727
- C.11 **Tasnia Jahan***, Kexin Li. Deep Learning and Bayesian Optimization based Tandem Solar Cell design. In *2025 Compound Semiconductor Week (CSW)*. IEEE, 2025. DOI: Available soon
- C.10 **Ruilin Wang***, Po-heng Ho, Kexin Li. Compact Modeling of NbO₂-Based Oscillator for Neuromorphic Computing. In *2025 International Compact Modeling Conference (ICMC)*, pp. 1-4. IEEE, 2025. DOI: 10.1109/ICMC64879.2025.11102441
- C.9 Kexin Li*, Hari Vemuri, Armagan Dascucus and Harish Krishnaswamy. Characterization and All-Region Virtual-Source Modeling of 40 nm GaN HEMT Technology for High Frequency IC Design. In *2025 IEEE 43rd VLSI Test Symposium (VTS)*, pp. 1-5. IEEE, 2025. DOI: 10.1109/VTS65138.2025.11022847
- C.8 Hari Vemuri*, Armagan Dascucus, Kexin Li, Jose Bahamode and Harish Krishnaswamy. Wide-band switched-capacitor and switched-transmission line circulators in 40 nm GaN technology. In *2023 IEEE BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium (BCICTS)*, pp. 114-117. IEEE, 2023. DOI: 10.1109/BCICTS54660.2023.10310784

- C.7 Kexin Li*, Takashi Matsuda, Eiji Yagyu, Koon Hoo Teo, Shaloo Rakheja. Trapping Phenomena in GaN HEMTs with Fe- and C-doped Buffer. *80th Device Research Conference, Columbus, OH. (DRC 2022)*. DOI: 10.1109/DRC55272.2022.9855817
- C.6 Kexin Li*, Shaloo Rakheja. Physical modeling of Quasi-ballistic GaN HEMTs operating at cryogenic temperatures. *The Compound Semiconductor Week, Ann Arbor, MI. (CSW 2022)*. DOI: 10.1109/CSW55288.2022.9930446
- C.5 Kexin Li*, Eiji Yagyu, Hisashi Saito, Koon Hoo Teo, Shaloo Rakheja. Compact modeling of gate leakage phenomenon in GaN HEMTs. *IEEE International Conference on Simulation of Semiconductor Processes and Devices (SISPAD 2020)*. DOI:10.23919/SISPAD49475.2020.9241666
- C.4 Kexin Li*, Shaloo Rakheja. A unified charge-current compact model of gallium nitride transistors for RF and digital applications. *IEEE Electron Devices Technology and Manufacturing, Singapore. (EDTM 2019)*. DOI:10.1109/EDTM.2019.8731282
- C.3 Kexin Li*, Shaloo Rakheja. A unified current-voltage and charge-voltage model of quasi-ballistic III-nitride HEMTs for RF applications. *IEEE 76th Device Research Conference, Santa Barbara, CA. (DRC 2018)*. DOI: 10.1109/DRC.2018.8442193
- C.2 Kexin Li*, Shaloo Rakheja. Optimal III-nitride HEMTs – from materials and device design to compact model of the 2DEG charge density. OPTO, the optoelectronics, photonic materials and devices conference, San Francisco, CA. (SPIE 2017). *International Society for Optics and Photonics* DOI: 10.1117/12.2251582
- C.1 Shaloo Rakheja*, Kexin Li. Graphene-based plasma wave interconnects for on-chip communication in the terahertz band. *IEEE Fifth Berkeley Symposium on Energy Efficient Electronic Systems & Steep Transistors Workshop, (2017)*. DOI: 10.1109/E3S.2017.8246185

Patents

- U.1 Lars F Voss, Adam M. Conway, Karen M. Dowling, David Hall, Shaloo Rakheja, Kexin Li. Pulse Compression Photoconductive Semiconductor Switches. *US Patent, App No. 17502681, 2021*.

PRESENTATIONS/TALKS

Invited Presentations

- P7 Ruilin Wang, Naveen Chander Prabakaran, Siddhant Gangwal, Katerina Raleva, Dragica Vasileska, Kexin Li~. CryoGaN: Towards Predictive Physics-Based Compact Models for GaN HEMTs across Bias, Geometry, and Temperature. *IEEE BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium (BCICTS) 2026*.
- P6 Ruilin Wang~, Kexin Li. Modeling and Optimization of the 2DEG Charge Density in AlScN GaN based Ferroelectric Heterostructure. *12th International Workshop on Nitride Semiconductors (IWN) 2024*.
- P5 Kexin Li~. Modeling and simulation of III-Nitride devices and circuits: for next generation communications and quantum computing. *EECS Rising Stars 2022*.
- P4 Kexin Li. A unified static-dynamic analytic model for ultra-scaled III-nitride high electron mobility transistor. *Design Automation Conference (DAC) 2019*.
- P3 Kexin Li. A unified static-dynamic analytic model for ultra-scaled III-nitride high electron mobility transistor. *ECEDHA 2019*.
- P2 Kexin Li. An analytic current-voltage model for quasi-ballistic III-nitride high electron mobility transistors. *Annual Scientist Symposium 2018*.
- P1 Kexin Li~, Shaloo Rakheja. Challenges and opportunities in modeling gallium nitride high electron mobility transistors— from numerical simulations to compact transistor model. *International Workshop on Nitride Semiconductors 2016*.

Invited Presentations – ASU Internal, including students

- P1 **Tasnia Jahan~**, Kexin Li. Physics Informed Neural Network for Predicting Characteristics of β -Ga₂O₃ based Devices. *11th International Workshop on Semiconductor Oxides (IWSO) 2025*.

Refereed Conference Presentations, including students

- P15 **Tasnia Jahan**[~], Kexin Li. Physics-Informed Neural Networks for Predicting Characteristics of β -Ga₂O₃ based Devices. *ICMC 2026*.
- P14 **Habibullah Khab**[~], Nabasindhu Das, Nidhin Kurian Kalarickal, Kexin Li. Thermal-Aware Compact Modeling and Design-Space Exploration of δ -Doped β -Ga₂O₃ MOSFETs for RF Power Electronics. *ISQED 2026*.
- P13 **Tasnia Jahan**[~], Kexin Li. Deep Learning and Bayesian Optimization based Tandem Solar Cell design. *CSW 2025*.
- P12 **Ruilin Wang**[~], Po-heng Ho, Kexin Li. Compact Modeling of NbO₂-Based Oscillator for Neuromorphic Computing. *ICMC 2025*.
- P11 Kexin Li[~], Hari Vemuri, Armagan Dascucus and Harish Krishnaswamy. Characterization and All-Region Virtual-Source Modeling of 40 nm GaN HEMT Technology for High Frequency IC Design. *VTS 2025*.
- P10 **Ruilin Wang**[~], Kexin Li. Design and modeling of Scandium-alloyed wurtzite III-nitrides based ferroelectric heterostructure for power efficient applications. *MRS Fall 2024*.
- P9 Hari Vemuri[~], Armagan Dascucus, Kexin Li, Jose Bahamode and Harish Krishnaswamy. Wideband switched-capacitor and switched-transmission line circulators in 40 nm GaN technology. *BCICTS 2023*.
- P8 Kexin Li[~], Takashi Matsuda, Eiji Yagyu, Koon Hoo Teo, Shaloo Rakheja. Trapping Phenomena in GaN HEMTs with Fe- and C-doped buffer. *DRC 2022*.
- P7 Kexin Li[~], Shaloo Rakheja. Physical modeling of Quasi-ballistic GaN HEMTs operating at cryogenic temperature. *CSW 2022*.
- P6 Kexin Li, Eiji Yagyu, Hisashi Saito, Koon Hoo Teo[~], Shaloo Rakheja. Compact modeling of gate leakage phenomenon in GaN HEMTs. *SISPAD 2020*.
- P5 Kexin Li[~], Shaloo Rakheja. A unified charge-current compact model of GaN transistor for RF and digital application. *EDTM 2019*.
- P4 Kexin Li[~], Shaloo Rakheja. A unified current-voltage and charge-voltage model of quasi-ballistic III-nitride HEMTs for RF applications. *DRC 2018*.
- P3 Kexin Li[~], Shaloo Rakheja. Analytic modeling of nonlinear current conduction in access regions of III-Nitride HEMTs. *MRS Fall 2017*.
- P2 Kexin Li[~], Shaloo Rakheja. Optimal III-nitride HEMTs – from materials and device design to compact model of the 2DEG charge density. *SPIE 2017*.
- P1 Shaloo Rakheja[~], Kexin Li. Graphene-based plasma wave interconnects for on-chip communication in the terahertz band. *IEEE Fifth Berkeley Symposium on Energy Efficient Electronic Systems & Steep Transistors Workshop, 2017*.

PROFESSIONAL ACTIVITIES AND SERVICE

International/national conferences chaired

- 1 2025, 2026 IEEE International Conference on Omni-layer Intelligent Systems (COINS) - Publication chair
- 2 2025 IEEE VLSI Test Symposium (VTS) - AV Chair
- 3 2024 Embedded Systems Week (ESWEEK) - PhD Forum Chair

International/national conference committees:

- 1 2025, 2026 International Compact Modeling Conference (ICMC) - TPC
- 2 2025 Device Research Conference (DRC) - Young Professionals Forum
- 3 2023 - 2026 Design Automation Conference (DAC) - TPC
- 4 2025, 2026 International Symposium on Quality Electronic Design (ISQED) - TPC

Peer Reviewer for Journals:

- 1 Applied Physics A

- 2 Micromachines
- 3 IEEE Transactions on Quantum Engineering (TQE)
- 4 IEEE Journal on Exploratory Solid-State Computational Devices and Circuits (JxCDC)
- 5 Journal of Applied Physics
- 6 Journal of Semiconductors
- 7 IEEE Transactions on Electron Devices (TED)
- 8 Journal of Computational Electronics
- 8 Journal of the Electron Devices Society

ASU-level Committees:

- 1 ASU Internal Faculty Review Committee for the Google PhD Fellowship
- 2 Focus on Finishing Your Degree Award Faculty Review Committee
- 3 Schmidt Science Fellowship Faculty Review Committee
- 4 ARCS Faculty Review Committee

Engineering School-level Committees:

- 1 Judge for ECEE graduate student research

Unit-level Committees:

- 1 PhD defense committee
- 2 Honor thesis committee

Outside ASU:

- 1 Judge for the Paradise Valley Schools Science and Engineering Fair (PVSEF)

PERSONNEL: STUDENT SUPERVISION / MENTORING, TEACHING, DISSERTATION COMMITTEES, RESEARCHERS, AND OUTREACH

Ph.D. Students Current

- 1 SP 24 - Now Ruilin Wang
- 2 FA 24 - Now Tasnia Jahan
- 3 SP 25 - Now Habibullah Khan
- 4 FA 25 - Now Naveen Chander Prabakaran
- 5 SP 26 - Now Arik Mahbub

Undergraduate Students (Research)

- 1 Po-Heng Ho (Undergraduate Student, Graduated), Furi and Suri
- 2 Michael Do (Barrett Honors Thesis)

Student Fellowship and Awards

- 1 Po-Heng Ho, Outstanding Graduate + Impact Award, Fall 2024
- 2 Michael Do, Outstanding Graduate + Impact Award, Fall 2025

Courses Taught

- 1 FA 2025 EEE335 Analog and Digital Circuits, EEE436 Fundamentals of Solid-State Devices
- 2 FA 2025 EEE335 Analog and Digital Circuits
- 3 Spring 2025 EEE598 VLSI Device Circuit Co-design
- 4 FA 2024 EEE335 Analog and Digital Circuits
- 5 SP 2024 EEE335 Analog and Digital Circuits
- 6 FA 2023 EEE335 Analog and Digital Circuits

CURRENT AND PRIOR FUNDED PROPOSALS (AWARDS)

- 1 Award # AWD00040317, Ultra-Wide Band Gap (UWBG) RF Center for Design and Engineering of Thermally Managed β -Ga₂O₃ Self-Aligned High Frequency Transistors, DOD-Army: Army Materiel Command (AMC), Co-PI, \$767,599, Start: 11/01/2024 – End: 10/31/2028
- 2 Award # 2537290, Modeling of III-Nitride Devices for Device-Circuit Co-optimization under Cryogenic Environments, NSF, PI, \$596,140, Start: 10/15/2026 – End: 09/30/2029