

Curriculum Vitae

Pankaj Kumar

Assistant Professor
Department of Electronics and Communication Engineering
Indian Institute of Information Technology, Dharwad, India
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Personal Statement

- A dedicated researcher and an Assistant Professor (Research) in the field of Electronics and Communication Engineering. Possessing a specialization in the field of MOSFET devices and Circuits. My areas of interest include Semiconductor Device physics, VLSI Design, Analog Circuits, Digital Circuits, Conventional to Emerging Nanodevice Technologies. I desire to seize the opportunity available in the area of teaching and research with utmost dedication.

Working Experience

- **Indian Institute of Information Technology, Dharwad, India** (Oct. 2024 – Till Date)
Post Assigned: Assistant Professor
Responsibility:
 - Actively working on Research and Development in the field of Semiconductor Device Physics.
 - Teaching and supervising undergraduate and graduate students.
- **Graphic Era (Deemed to be University), India** (Oct. 2023 – Sept. 2024)
Post Assigned: Assistant Professor (**Research**)
Responsibility:
 - Actively working on Research and Development in the field of Semiconductor Device Physics.
 - Teaching and supervising undergraduate and graduate students.
- **Indian Institute of Technology Gandhinagar, India** (Jul. 2017 – Dec. 2017)
Post Assigned: Junior Research Fellow
Responsibility:
 - To develop a HiSIM model of fringing capacitance associated with high voltage MOSFET device.
 - To develop a high voltage device for CCD clock drivers.

Education

- **Ph.D.** (Dec. 2017 – Oct. 2023)
College: Indian Institute of Technology (ISM) Dhanbad, India
Specialization: Microelectronics and VLSI Design
Thesis title: Performance Evaluation and Reliability Analysis of Gate-All-Around Tunnel FETs
Supervisor: Prof. Subindu Kumar, Associate Professor, Department of Electronics Engineering, Indian Institute of Technology Dhanbad, India
Co-Supervisor: Prof. Kalyan Koley, Assistant Professor, Department of Electronics and Communication Engineering, Birla Institute of Technology Mesra, India
- **M.Tech.** (July 2015 – May 2017)
College: National Institute of Technology Silchar, India
Specialization: Microelectronics and VLSI Design
Thesis title: Gate-overlapped-source heterojunction Tunnel tri-gate FinFET with Surface Potential Modeling
Supervisor: Prof. Srimanta Baishya
CGPA: 8.79 out of 10
- **B.Tech.** (Nov. 2009 – July 2013)
University: West Bengal University of Technology, India
Specialization: Electronics and Communication Engineering
CGPA: 8.33 out of 10

Publications

➤ Journals:

1. **Pankaj Kumar** and K. Koley, "Breast Cancer and Prostate Cancer Detection Considering Transconductance Generation Factor (g_m/I_{DS}) as a Sensing Metric for III–V Gate-All-Around Tunnel FET Biosensor," *IEEE Sensors Journal*, vol. 23, no. 19, pp. 22723-22730, 1 Oct.1, 2023, doi: 10.1109/JSEN.2023.3306611., ISSN: 1558-1748
2. **Pankaj Kumar**, Kalyan Koley, and Subindu Kumar, "Impact of Hole trap-detrap Mechanism on X-ray Irradiation Induced Threshold Voltage Shift of Radiation-Hardened GAA TFET device," *Microelectronics Reliability*, vol. 145, pp. 114980, 2023, doi: 10.1016/j.microrel.2023.114980. , ISSN: 0026-2714
3. **Pankaj Kumar**, Kalyan Koley, Syed Sadique Anwer Askari, Ashish Maurya and Subindu Kumar, "Assessment of Negative Bias Temperature Instability Due to Interface and Oxide Trapped Charges in Gate-All-Around TFET Devices," *IEEE Transactions on Nanotechnology*, vol. 22, pp. 157-165, 2023, doi: 10.1109/TNANO.2023.3255012. , ISSN: 1941-0085
4. **Pankaj Kumar**, Kalyan Koley, Syed Sadique Anwer Askari, Ashish Maurya, and Subindu Kumar, "Assessment of interface trapped charge induced threshold voltage hysteresis effect in gate all-around TFET," *Micro and Nanostructures (Elsevier)*, vol. 175, pp. 207502, Dec. 2022. , ISSN: 2773-0123
5. Ashish Maurya, Kalyan Koley, **Pankaj Kumar**, and Jitendra Kumar, "Surface Orientated < 100>, < 110>, and < 111> Silicon-based Double-Gate Tunnel-FET for Linearity and Analog/RF Performance Analysis," *Silicon*, vol. 15, pp. 3829-3839, Jun. 2023, doi: 10.1007/s12633-022-02232-2. , ISSN: 1876-9918
6. **Pankaj Kumar**, Kalyan Koley, Bhubon C. Mech, Ashish Maurya, and Subindu Kumar, "Analog and RF performance optimization for gate all around tunnel FET using broken-gap material," *Scientific Reports (Nature)*, vol. 12, no. 1, pp. 1-15, Oct. 2022. , ISSN: 2045-2322
7. Ashish Maurya, Kalyan Koley, Jitendra Kumar, and **Pankaj Kumar**, "Investigation of Single-Event-Transient Effects Induced by Heavy-Ion in All-Silicon DG-TFET," *IEEE Access*, vol. 10, pp. 109357-109365, Oct. 2022. , ISSN: 2169-3536
8. Ashish Maurya, Kalyan Koley, Bhubon C. Mech, Jitendra Kumar, and **Pankaj Kumar**, "Investigation of Source Region's Random Doping Fluctuation Effects on Analog and RF Performance in All-Si DG-TFET," *IEEE Transactions on Electron Devices*, vol. 69, no. 9, pp. 5330-5336, Aug. 2022. , ISSN: 1557-9646
9. Routu Santosh, Satish Chandra, Shanmukha Priya M., and **Pankaj Kumar**, "A Low power tunable differentiator using voltage difference transconductance amplifier (VDTA) for tunable PD controller," *Journal of Circuits, Systems, and Computers*, 2024.
10. Routu Santosh, Satish Chandra, V. Kumar, Ball Mukund Mani Tripathi, **Pankaj Kumar**, "The structural, stability, electronic, optical and thermodynamic properties of MoX₂ (X= S, Se, and Te) under hydrostatic pressures: a plasmon approach and first-principle study," *Journal of Molecular Modeling*, vol. 30, no. 4, pp. 99, Apr. 2024.
11. Md. Akram Ahmad, **Pankaj Kumar**, Bhubon Chandra Mech, and Jitendra Kumar, "Trade-off analysis between g_m/I_D and f_T of GNR-FETs with single-gate and double-gate device structure." *Scientific Reports*, vol. 14, no. 1, pp. 10218, May 2024.
12. **Pankaj Kumar**, Kalyan Koley, Ashish Maurya, and Subindu Kumar, "Heavy ions and alpha particles irradiation impact on III-V broken-gap gate-all-around TFET," *Microelectronics Reliability*, vol. 158, pp. 115426, May 2024.
13. **Pankaj Kumar**, Kalyan Koley, and Subindu Kumar, "Comparative analysis of heavy ions and alpha particles impact on gate-all-around TFETs and gate-all-around MOSFETs," *Micro and Nanostructures*, vol. 192, pp. 207875, May. 2024.
14. Princy Sharma, Subindu Kumar, and **Pankaj Kumar**, "Proposal for Variability Induced Effective Radius of Elliptical Gate-all-around Junctionless Transistors and its Applicability in Hydrogen Gas Sensors," *AEUE - International Journal of Electronics and Communications*, vol. 180, ,2024, pp. 155337.
15. **Pankaj Kumar**, Aasif Mohammad Bhat, Pankaj Kumar Sharma, Rajeev Kumar Ranjan, "A Novel and Compact MOSFET-C only based Grounded Meminductor Emulator and its Application," *AEUE - International Journal of Electronics and Communications*, 2024, pp. 155378
16. Princy Sharma and **Pankaj Kumar**, "Sensitivity Analysis of Methanol, Chloroform, and Dichloromethane Considering GAA-JLT Based Gas Sensor" *Micro and Nanostructures*, vol. 195, 2024, pp. 207947.
17. Raushan Kumar, A. Priya, and **Pankaj Kumar**, "Exploration of Physical, Optical, and Electrical Properties of Mg-Doped CeO₂ Nanoparticles for Photovoltaic Device Applications" *High Energy Chem.*, vol. 58, pp. 499–512, Oct. 2024.
18. Aradhana Mohanty, Md Akram Ahmad, **Pankaj Kumar**, and Raushan Kumar, "Performance Analysis and Design Comparison of Junctionless TFET: a Review Study," *Silicon*, 2024, pp. 1-8.

➤ **Conferences:**

1. **Pankaj Kumar**, Ajay Chauhan, Samant Raj, Kalyan Koley, and Poonam Raturi, "Process Variation Impact on Dual Dielectric GateAll-Around Tunnel FETs," *IEEE International Conference on Computer, Electrical & Communication Engineering (ICCECE)*, West Bengal, India, 2024. (Accepted and presented).
2. **Pankaj Kumar**, Kalyan Koley, Rupam Goswami, Ashish Maurya, and Subindu Kumar, "Assessment of hot carrier stress induced threshold voltage shift in gate-all-around MOSFETs," *IEEE 19th India Council International Conference (INDICON)*, Kochi, India, 2022, pp. 1-4, doi: 10.1109/INDICON56171.2022.10039693., ISSN: 2325-9418
3. Ashish Maurya, Md. Akram Ahmad, **Pankaj Kumar**, Jitendra Kumar and Kalyan Koley, "Performance Analysis of Compound III-V Semiconductor Materials based MOSFET," *2022 IEEE 9th Uttar Pradesh Section International Conference on Electrical, Electronics and Computer Engineering (UPCON)*, Prayagraj, India, 2022, pp. 1-6, doi: 10.1109/UPCON56432.2022.9986476., ISSN: 2687-7767
4. **Pankaj Kumar**, Kalyan Koley, Rupam Goswami, Ashish Maurya, and Subindu Kumar, "Electrical Noise Behaviour of High-k Gate-All-Around MOSFET Based on Two-Port Device Network Analysis," *2022 14th International Conference on Information Technology and Electrical Engineering (ICITEE)*, Indonesia, pp. 68-72, Oct. 2022., ISSN: 978-1-6654-6077-4
5. Ashish Maurya, Kalyan Koley, Jitendra Kumar, and **Pankaj Kumar**, "Calculation of OFF-Current of Tunnel FETs based on Subthreshold Swing: A New Approach," *2020 IEEE 6th International Conference on Electronics, Computing and Communication Technologies (CONECCT)*, pp. 1-4, Jul. 2020., ISSN: 978-1-7281-6828-9
6. **Pankaj Kumar**, Saurav Roy, and Srimanta Baishya, "Gate-overlapped-source heterojunction tunnel tri-gate FinFET," In *2017 Devices for Integrated Circuit (DevIC)*, pp. 561-564, Mar. 2017., ISSN: 978-1-5090-4724-6.
7. **Pankaj Kumar**, Aradhana Mohanty, Sagar, Pankaj Kumar Sharma and Md Akram Ahmad, "Performance Comparison of Antimony with Group III Compounded Semiconductor Based JLTFET," *2024 First International Conference on Electronics, Communication and Signal Processing (ICECSP)*, New Delhi, India, 2024, pp. 1-4.
8. Raushan Kumar, Aradhana Mohanty, Sagar, **Pankaj Kumar**, and Pankaj Kumar Sharma, "Performance Analysis of Nitrides with Group III based Semiconductor in JLTFET Device," *2024 First International Conference on Electronics, Communication and Signal Processing (ICECSP)*, New Delhi, India, 2024, pp. 1-4.

➤ **Patents:**

1. **Pankaj Kumar**, Kalyan Koley, and Subindu Kumar, "A SYSTEM AND METHOD FOR ANALYSING RADIATION EFFECT ON GATE-ALL-AROUND TUNNEL TRANSISTOR," *Indian Patent Application No. 202411028791, (Published)*.

Workshop/Tutorials/STC Attended

- **INUP-i2i Hands-on Training on Circuit Simulation** from IIT Bombay, during August 01-05, 2022.
- **AI & CPS for Agricultural Automation Workshop** from IIT Ropar during 16th May-15 Jul 2022.
- Workshop on **VLSI Device, Circuit, and System Design Tools** from VIT-AP University during June 23-29, 2022.
- Webinar on **Modeling and Simulation of Semiconductor device** organized by IEEE SSCS on 20th Mar. 2022.
- Webinar on **Analysis and Design of ADC - A Generalized Sampling Approach** organized by IEEE SSCS on 6th Feb 2021.
- Short course on **Modeling and Simulation of Nano-Transistors** at IIT Kanpur during January 21-25, 2019.
- **Nano Science and Technology workshop** at NIT Silchar during March 02-04, 2017.
- **GIAN Courses at NIT Silchar** held during August 01-05, 2016 and January 05-09, 2017.
- **STTP Workshop on Emerging Devices and VLSI Design** at NIT Silchar during October 25-27, 2016.
- **Nanoelectronics and VLSI Design** of IEEE EDS NIT Silchar Student Branch Chapter during April 14-15, 2016.
- **Microelectronics and VLSI Design** of IEEE EDS NIT Silchar Student Branch Chapter during March 21-26, 2016.
- Workshop on **IoT (Internet of Things)** at NIT Silchar held during October 12-13, 2015.
- Industrial Training at **MSME Tool Room** Kolkata during July 02-30, 2012.
- Industrial Training at **Centre for Electronics Test Engineering (Electronics Regional Test Laboratory, East)** during 18th Jan. 2012 to 2nd Feb. 2012.
- **Industrial Training at BSNL**, Ranchi during 8th Jun. 2011 to 9th Jul. 2011.

Software Skills and Abilities

- **Software:** Sentaurus TCAD, Silvaco TCAD, APSYS Crosslight, Cadence Virtuoso, Tanner EDA, XILINX
- **Programming Language:** C

- **Typography:** Microsoft Office
- **Operating System:** - Windows and Linux

Achievements

- Reviewer of IEEE Access Journal, IET Circuits, Devices & Systems, Micro and Nanostructures, Silicon.
- Reviewer and Committee member of DICCT 2024 conference.
- GATE Qualified, 2015, Reg. No.: EC44021S3037.
- Got MHRD fellowship (@ ₹12,400/month) at NIT Silchar.
- Got MHRD fellowship (@ ₹31,000/month) for 2 Years at IIT (ISM) Dhanbad.
- Got MHRD fellowship (@ ₹35,000/month) for 3 Years at IIT (ISM) Dhanbad.
- All Dhanbad District Wushu Training Camp participant held at Digwadih No. 12 on 18th to 19th November 2008.
- Akhil Bhartiya Sanskrit Pratiyogita Pariksha participant at D.A.V Model School CFRI in June 2005.

Membership of Professional Bodies

- Professional Member IEEE. (Nov. 2015- Till Date)

Personal Details

- **Father's Name:** Mr. Bhola Mistry
- **Mother's Name:** Mrs. Kiran Devi
- **Date of Birth:** 05th Jun. 1989
- **Place of Birth:** Dhanbad, Jharkhand, 828119, India
- **Sex:** Male
- **Marital Status:** Unmarried
- **Nationality:** Indian
- **Hobbies:** Running, Photography, Table Tennis, Badminton
- **Languages Known:** English and Hindi

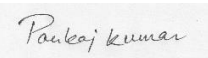
Professional References

- **Prof. Kalyan Koley**, Assistant Professor, Department of Electronics and Communication Engineering, Birla Institute of Technology Mesra, India.
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- **Prof. Subindu Kumar**, Associate Professor, Department of Electronics Engineering, Indian Institute of Technology Dhanbad, India.
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- **Prof. Srimanta Baishya**, Professor, Department of Electronics and Communication Engineering, National Institute of Technology Silchar, India.
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Declaration

I here declare that the above-mentioned information is correct up to my knowledge and belief.
I bear the responsibility for the correctness of the above-mentioned.

Date: Oct. 15th, 2024
Place: Dehradun, India



Pankaj Kumar