

# Curriculum Vitae



**Subindu Kumar** F-IETE, SM-IEEE, LM-MRSI

**Professor**

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**Subindu Kumar** received M. Tech degree in Radio Physics and Electronics from University of Calcutta in 2001. He then joined Siliguri Institute of Technology (SIT), Siliguri, Darjeeling, India, as a faculty member. From 2005 he started working towards his Ph.D degree from Institute of Radio Physics and Electronics, University of Calcutta. He completed his Ph.D in 2009. He joined IIT (ISM), Dhanbad, Jharkhand, India, in July 2009 and is currently serving as Professor in the Department of Electronics Engineering. Dr. Kumar was the recipient of the University Gold Medal in 1999. He is one of the 22 successful candidates to showcase his work at the 23<sup>rd</sup> IPS Colloquium for Young Physicist (YPC 2005) held at Saha Institute of Nuclear Physics, Kolkata, India. He received special appreciation from IIT (ISM), Dhanbad for excellent teaching and student feedback for a number of academic sessions.

He is the Fellow of IETE, India, Senior Member of IEEE Electron Device Society, IEEE Photonics Society and a Life Member of Semiconductor Society of India (SSI) and Materials Research Society of India (MRSI). He is an active reviewer for different journals including *Journal of Chemical Physics (AIP)*, *IEEE Electron Device Lett.*, *IEEE Transactions on Nanotechnology*, and other SCI journals. He was also one of the "2015 EDL IEEE Golden Reviewers". Apart from being a 'Resource Person' for NEP-2020 Orientation & Sensitization Program organized by the UGC-Malaviya Mission Teacher Training Centre (MMTTC) – University Grant Commission (UGC), Govt. of India, Dr. Kumar has been instrumental in organizing various National and International Meets in various capacities. His current research includes optical properties of III-V nanostructures, low dimensional MOS devices and related circuits, and interconnects for Silicon and Post Silicon era.

## Professional Experience

| Position Held                         | Name of Institute  | Duration    |
|---------------------------------------|--|-------------|
| Lecturer                              | Dept. of ECE, Siliguri Institute of Technology (under Techno India Group), Siliguri – 734009 (W.B.), INDIA | 2001 – 2004 |
| Senior Lecturer                       | -- do --   | 2004 – 2006 |
| Assistant Professor                   | -- do --   | 2006 – 2009 |
| Assistant Professor                   | Dept. of Electronics Engineering,<br>IIT (ISM), Dhanbad, INDIA   | 2009 – 2014 |
| Assistant Professor<br>(Senior Grade) | -- do --   | 2014 – 2017 |
| Associate Professor                   | -- do --   | 2017 – 2023 |
| Professor                             | -- do --   | From 2023   |

## Invited Talks/Guest Lectures Delivered

| Nature of Talk                             | Conference/Institute   |
|--|--|
| ◆ <b>RESOURCE PERSON</b><br>[Invited Talk] | AICTE Training and Learning (ATAL), Mizoram University, Aizawl, Mizoram, India. [Up-Coming 2025]   |
| ◆ <b>RESOURCE PERSON</b>                   | NEP-2020 Orientation & Sensitization Program organized by the UGC-Malaviya Mission Teacher Training Centre (MMTTC) – University Grant Commission (UGC), Govt. of India   |
| ◆ <b>EMINENT SPEAKER</b>                   | Refresher Course: "Contemporary Issues of Nanoscience and Nanotechnology" organized by School of Materials Science and Nanotechnology, Jadavpur University, Kolkata in collaboration with UGC-HRDC, Jadavpur University during 9 <sup>th</sup> to 24 <sup>th</sup> January 2023. |
| ◆ <b>RESOURCE PERSON</b><br>[Invited Talk] | High-End Workshop on Emerging Nanomaterial-Based Devices for Future VLSI Applications, IIT (ISM), Dhanbad, sponsored by SERB, DST under Accelerate Vigyan scheme during 16-22 December, 2022.  |
| ◆ <b>RESOURCE PERSON</b><br>[Invited Talk] | Interdisciplinary Refresher Course on Science and Technology organized by UGC HRDC Mizoram University, Aizawl, Mizoram, India during 28 <sup>th</sup> September to 11 <sup>th</sup> October 2021.  |

| Nature of Talk                             | Conference/Institute  |
|--|---|
| ◆ <b>RESOURCE PERSON</b><br>[Invited Talk] | <i>Interdisciplinary Refresher course on Engineering and Technology</i> organized by UGC HRDC Mizoram University, Aizawl, Mizoram, India, during 1 <sup>st</sup> -14 <sup>th</sup> December 2020.   |
| ◆ <b>GUEST LECTURE</b>                     | Siliguri Institute of Technology (under Techno India Group), Siliguri, Dist: Darjeeling, India, on 8 <sup>th</sup> March 2019.  |
| ◆ <b>INVITED</b>                           | <i>International Union of Materials Research Societies – International Conference on Electronic Materials 2018 (IUMRS-ICEM 2018)</i> held during August 19 – 24, 2018 at Daejeon, Korea   |
| ◆ <b>INVITED</b>                           | <i>Nobel Laureate Prof. SUZUKI special symposium: The 15th International Conference of Advanced Materials (IUMRS-ICAM 2017)</i> held during August 27 – September 01, 2017 at Kyoto University, Kyoto, Japan  |
| ◆ <b>GUEST LECTURE</b>                     | Asansol Engineering College, Vivekananda Sarani, Kanyapur, Asansol, India, on 31 <sup>st</sup> October 2018   |
| ◆ <b>INVITED</b>                           | <i>Refresher Course on “VLSI Design and Nanotechnology: Issues and challenges”</i> , at the Department of Electronics and Telecommunication Engineering, Jadavpur University, Kolkata, India, held during 28 <sup>th</sup> November 2016 to 17 <sup>th</sup> December 2016. |
| ◆ <b>GUEST LECTURE</b>                     | Siliguri Institute of Technology (under Techno India Group), Siliguri, Dist: Darjeeling, India, on 17 <sup>th</sup> March 2015.   |
| ◆ <b>INVITED</b>                           | <i>International Conference on Small Science (ICSS 20014)</i> , held during 8 – 11 Dec at Hong Kong   |
| ◆ <b>PUBLIC</b>                            | Occasion of Engineers Day celebration on 15 <sup>th</sup> September, 2007, organized jointly by Siliguri Institute of Technology and The Institution of Engineers (India) [NBLC]  |
| ◆ <b>LECTURE</b>                           | Staff Development Program on Advancement of Modern Communication and Integrated Circuit Technology, sponsored by AICTE, held during 2 <sup>nd</sup> – 16 <sup>th</sup> July, 2007 at Siliguri Institute of Technology, Siliguri, W. B, India                                |

## Research & Development

### Research Interest:

- Optoelectronic properties of Semiconductor Nanostructures  
Quantum Dots (QDs), Wells and Wires || QD Solar Cells, Photodetectors || Photoluminescence, Absorption Spectra, and so on.
- Nanoscale FETs and circuits  
Non-conventional Devices || Strained MOSFETs || Ballistic Properties || On-Chip Interconnects

### Research & Development:

| Name of the work  | Duration                 | Funding Organization  |
|---|--------------------------|---|
| ➤ “Designing a Remote Actuation Device”<br>(The project was successfully tested on 8 <sup>th</sup> Jan, 2002)   | Nov 2001–Jan 2002        | 116 Engineer Regiment, Sukna Military Base, Sukna, Siliguri, Distt: Darjeeling, W.B, INDIA  |
| ➤ “Studies on the effects of Gaussian size distribution and interdiffusion on the optical absorption spectra of realistic III-V semiconductor quantum dot systems”<br>[Principle Investigator (sole)] | COMPLETED<br>(2012-15)   | Department of Science & Technology (DST), Govt. of INDIA, New Delhi   |
| ➤ DST-JSPS SPECIAL LECTURE TOUR PROGRAM<br>(EXPLORATORY EXCHANGE)   | Dec, 2015                | INDIA-JAPAN COOPERATIVE SCIENCE PROGRAMME (IJCSP)   |
| ➤ “Accurate Correlation of Dot Size Distribution with the Spectral Response of As-grown and Interdiffused Stacked Quantum Dots embedded in p-i-n Solar Cells”<br>[Principle Investigator]             | COMPLETED<br>(2021-2024) | Science and Engineering Research Board (SERB), DST, under Core Research Grant (CRG).<br>Department of Science & Technology (DST), Govt. of INDIA, New Delhi |
| ➤ Actively involved in Centre of Excellence in Renewable Energy (CERE), IIT (ISM), Dhanbad  |                          |   |

## Administrative/Organizational Responsibilities

| Responsibilities   | Duration   |
|--|------------|
| <b>At IIT (ISM), Dhanbad</b>                                   |            |
| ➤ Convener, Departmental Under Graduate Committee (DUGC) ..... | Since 2024 |
| ➤ Chairman, JEE (Advanced) .....                               | 2024       |
| ➤ Program Coordinator for MERITE, MoE, Govt. of India.....     | Since 2023 |
| ➤ Member, Departmental Post Graduate Committee (DPGC) .....    | 2022-2024  |

| Responsibilities  | Duration    |
|---|-------------|
| <b>At IIT (ISM), Dhanbad</b>  |             |
| ➤ Chairman, JEE (Advanced).....   | 2021 & 2022 |
| ➤ Vice-Chairman, JEE (Advanced) .....   | 2020-2021   |
| ➤ Member, GATE-JAM Committee 2020/IIT(ISM) Dhanbad.....                                     | 2019-2020   |
| ➤ Convener, Departmental Post Graduate Committee (DPGC) .....                               | 2019-2021   |
| ➤ Member – House Allotment Committee.....   | 2018-2021   |
| ➤ Convener, Space Audit Committee/Dept. of ECE.....   | 2019-2023   |
| ➤ Course Coordinator (M. Tech in VLSI Design) .....   | 2018-2021   |
| ➤ Member of Telephone Committee.....  | 2015-2017   |
| ➤ Member of Board of Courses Studies (BOCS) – M. Tech and B. Tech (ECE) .....               | 2015-2018   |
| ➤ In-Charge of VLSI laboratory.....   | since 2012  |
| ➤ Member of Examination Moderation Board (departmental) .....                               | 2012-2018   |
| ➤ Member of Doctoral Scrutiny Committee for Ph. D scholars of other sister departments..... | Serving     |
| ➤ Warden (Emerald Hostel) .....   | 2013-16     |
| ➤ Member of Selection Committee Meeting for various posts in IIT(ISM) Dhanbad.....          | 2014 & 2015 |
| ➤ Faculty In-Charge (Placement) [ECE] .....   | 2014-15     |
| ➤ Member of General Council & Executive Board, IIT (ISM), Dhanbad.....                      | 2013-14     |
| ➤ Member of JRF Selection Board.....  | 2013 & 2015 |
| ➤ Treasurer of Society of Electronics Engineers (SEE) .....                                 | 2010-14     |
| ➤ Member of purchase committee (for 'Central Research Facility).....                        | 2012-14     |
| ➤ Faculty In-Charge (Training) [ECE].....   | 2012-14     |

#### At Siliguri Institute of Technology, Siliguri

|  |         |
|--|---------|
| ➤ In-Charge, Applied Electronics & Instrumentation Engineering | 2005-07 |
|--|---------|

#### Other Organizations

- Ph. D Thesis Examiner of various Institutions
- Reviewer: Prime Minister's Research Fellows (PMRF)
- Expert: Jharkhand Public Service Commission (JPSC), Jharkhand, India
- Member of Selection Committee for campus interview: Coal India Limited

## Teaching

### Setting up teaching laboratories:

| Duration/Organization   | Laboratories Developed   |
|---|--|
| Duration: 2001 – 2009<br>Siliguri Institute of Technology,<br>Siliguri. | <ul style="list-style-type: none"> <li>➤ VLSI Lab</li> <li>➤ Sensors and Transducers Lab</li> <li>➤ Power Electronics Lab</li> </ul>   |
| Duration: 2009 – TILL DATE<br>IIT (ISM), Dhanbad                        | <ul style="list-style-type: none"> <li>➤ Electronics Engineering Lab (UG)</li> <li>➤ VLSI Design Lab (UG)</li> <li>➤ HDL and EDA Lab (PG)</li> <li>➤ Physical Design and EDA Lab (PG)</li> <li>➤ Device Simulation Lab (PG)</li> </ul> |

### Courses Taught & Laboratories Conducted:

| Duration/Organization   | Theory Courses   | Laboratory courses   |
|---|--|--|
| <b>Duration:</b><br><b>2001 – 2009</b><br>Siliguri Institute of Technology, Siliguri. | <ul style="list-style-type: none"> <li>■ EDA for VLSI Design</li> <li>■ VLSI Circuits &amp; Systems</li> <li>■ Microelectronic Technology and Circuits</li> <li>■ VLSI Design (two different syllabi under two different universities: West Bengal University of Technology and North Bengal University)</li> <li>■ Sensors and Transducers</li> </ul> | <ul style="list-style-type: none"> <li>■ Electronic Design Automation (EDA) Lab</li> <li>■ VLSI Circuits &amp; Systems Lab</li> <li>■ Sensors and Transducers Lab</li> <li>■ Basic Electronics Engg Lab</li> <li>■ Digital Electronics and Logic Design Lab</li> <li>■ Power Electronics Lab</li> <li>■ Transducers and Instrumentation Lab</li> </ul> |

| Duration/Organization   | Theory Courses  | Laboratory courses  |
|---|---|---|
|   | <ul style="list-style-type: none"> <li>■ Transducers &amp; Sensors</li> <li>■ Digital Electronics and Logic Design</li> <li>■ Basic Electronics Engg.</li> <li>■ Power Electronics</li> </ul>   |   |
| <b>Duration:</b><br><b>2009 – TILL DATE</b><br>IIT (ISM), Dhanbad | <b>UG:</b> <ul style="list-style-type: none"> <li>➤ Digital Electronics</li> <li>➤ Electronics Engineering</li> <li>➤ Power Electronics</li> <li>➤ Microelectronics &amp; VLSI</li> <li>➤ VLSI Design</li> <li>➤ Telemetry and Remote Sensing</li> <li>➤ Satellite Communication</li> <li>➤ Measurement and Instrumentation</li> </ul><br><b>PG:</b> <ul style="list-style-type: none"> <li>➤ Digital VLSI Circuits Design</li> <li>➤ Digital IC Design</li> <li>➤ On-Chip Interconnect</li> <li>➤ MOS Device Physics and Modeling</li> </ul> | <b>UG:</b> <ul style="list-style-type: none"> <li>➤ Electronics Engineering Lab</li> <li>➤ Power Electronics Lab</li> <li>➤ VLSI Design Lab</li> </ul><br><b>PG:</b> <ul style="list-style-type: none"> <li>➤ HDL and EDA Lab</li> <li>➤ Physical Design and EDA Lab</li> </ul> |

## Ph. D Guidance

### Thesis Awarded:

| Topic   | Name of the Scholar | Date        | Guidance       |
|---|---------------------|-------------|----------------|
| 1. STUDIES ON SOME PERFORMANCE PARAMETERS OF MOSFETS AND INVERTERS BASED ON MULTI-CHANNEL GATE-ALL-AROUND ARCHITECTURE                | Shankaranand Jha    | March, 2015 | Sole Guide     |
| 2. COMPUTATIONAL TECHNIQUES AND PERFORMANCE EVALUATION OF NANOSCALE STRAINED MOSFETS AND RELATED CMOS CIRCUITS                        | Amrita Kumari       | March, 2017 | Sole Guide     |
| 3. EMULATION AND IMPLEMENTATION OF BEHAVIORAL MODELS OF SOME ANALOG AND MIXED SIGNAL CIRCUITS ON FIELD PROGRAMMABLE GATE ARRAY (FPGA) | Rahul Bhattacharya  | Jan, 2019   | Sole Guide     |
| 4. STUDIES ON THE ABSORPTION SPECTRA OF III-V SEMICONDUCTOR QUANTUM DOTS  | S. S. K. Sinha      | July, 2022  | Sole Guide     |
| 5. PERFORMANCE EVALUATION AND RELIABILITY ANALYSIS OF GATE-ALL-AROUND TUNNEL FETs   | Pankaj Kumar        | Oct, 2023   | Joint Guidance |
| 6. STUDIES ON THE ABSORPTION SPECTRA OF III-V QUANTUM DOTS AND THEIR APPLICATION IN SOLAR CELLS                                       | Anjali Rai          | March 2024  | Sole Guide     |
| 7. MODELING AND ANALYSIS OF GATE-ALL-AROUND JUNCTIONLESS TRANSISTORS AND RELATED CIRCUITS   | Princy Sharma       | Jan, 2025   | Sole Guide     |

## Selected Publications

### Book Chapter:

Kumar S., Sharma T. K. (2021) On-Chip Carbon Nanotube Interconnects: Adaptation to Multi-gate Transistors. In: Kaneko S. et al. (eds) Carbon Related Materials. Springer, Singapore. [https://doi.org/10.1007/978-981-15-7610-2\\_7](https://doi.org/10.1007/978-981-15-7610-2_7) [Recognition of Nobel Lecture by Prof. Akira Suzuki in IUMRS-ICAM-17]

### Journal:

- P. Sharma and **S. Kumar** and P. Kumar, "Proposal for variability-induced effective radius of elliptical gate-all-around junctionless transistors and its applicability in hydrogen gas sensors." *AEU-International Journal of Electronics and Communications*, **180**, 155337 (2024).
- P. Kumar, K. Koley and **S. Kumar**, "Impact of Hole trap-detrap Mechanism on X-ray Irradiation Induced Threshold Voltage Shift of Radiation-Hardened GAA TFET device," *Microelectronics Reliability*, **145**, 114980 (2023).

- P. Kumar, K. Koley, S. S. A. Askari, A. Maurya and **S. Kumar**, "Assessment of Negative Bias Temperature Instability due to Interface and Oxide Trapped Charges in Gate-all-around TFET Devices," in *IEEE Transactions on Nanotechnology*, **22**, 157-165 (2023).
- A. Rai, S. S. A. Askari, M. K. Das and **S. Kumar**, "Efficiency enhancement of solar cells using multi-layer interdiffused InGaAs/GaAs quantum dots: A numerical approach", *Micro and Nanostructures*, **172**, 207445 (2022).
- P. Kumar, K. Koley, B. C. Mech, A. Maurya and S. Kumar "Analog and RF performance optimization for gate all around tunnel FET using broken-gap material", *Nature: Scientific Reports* **12(1)**, 1-15 (2022).
- S. S. K. Sinha, A. Rai, **S. Kumar**, and S. S. A. Askari "On the spectral response of interdiffused quantum dot ensembles embedded in the intrinsic region of InGaAs/GaAs quantum dot solar cells", *Physica E: Low-dimensional Systems and Nanostructures* **134**, 114810 (2021).

Full list available at: <https://people.iitism.ac.in/~download/publication/893/893.pdf>

## Awards and Recognitions

- Received special appreciation from Director/ECE/IIT (ISM), Dhanbad for **EXCELLENT STUDENT FEEDBACK** for the session 2022-23 Monsoon Semester.
- Received special appreciation from Head of Department/ECE/IIT (ISM) for **EXCELLENT STUDENT FEEDBACK** for the session 2017-18 and 2015-16.
- One of the **"2015 EDL IEEE GOLDEN REVIEWERS"** (<http://eds.ieee.org/edl/edl-golden-reviewers.html>)
- **BEST PAPER AWAED**: S. Jha, Jhuma Saha and **S. Kumar**, "Tuning the noise margins of Gate-All-Around MOSFET based inverters through non-circular multi-channel architecture", *IEEE 2014 International Conference on Advances in Electrical Engineering (ICAEE)*, held during 9-11 Jan. 2014 at VIT University, Vellore.
- Served as **REVIEWER** of: Journal of Chemical Physics (AIP) || IEEE Electron Device Letters || IEEE Transactions on Nanotechnology || Microsystem Technologies (Springer) || Infrared Physics & Technology (Elsevier) || Applied Physics A (Springer) || Journal of Materials Research (MRS/Cambridge University Press), and so on.  
⇒ Several National and International Conferences  
⇒ Some books published by *Tata McGraw-Hill Education Pvt Ltd*.
- One of the 22 successful candidates in India whose paper was accepted for presentation at the 23<sup>rd</sup> *IPS Colloquium for Young Physicist* (YPC 2005) held at Saha Institute of Nuclear Physics, 1/AF Bidhannagar, Kolkata 700 064, India.
- Recipient of the **UNIVERSITY GOLD MEDAL** from Guru Ghasidas Vishwavidyalaya, Bilaspur (M. P). [M. Sc (*Electronics*) – year 1999]

## Academic Outreach Programs/Conferences Organized

- ❖ **Organized** a Staff Development Program on "**Advancement of Modern Communication and Integrated Circuit Technology**", sponsored by AICTE, held during 2<sup>nd</sup> – 16<sup>th</sup> July, 2007 at Siliguri Institute of Technology, Siliguri, W. B. [In the capacity of **Program Co-Coordinator**]
- ❖ **Organized** a one day seminar on "**Convergence of Technologies for Rapid Development**" on the occasion of Engineers Day celebration on 15<sup>th</sup> September, 2007, organized jointly by Siliguri Institute of Technology and The Institution of Engineers (India) [NBLC].
- ❖ One of the **members of the organizing committee** of a one day seminar on "**New Generation Wireless Antenna**" organized by IEEE Antenna and Propagation & Microwave Theory and Techniques Chapter, IEEE Calcutta Section in association with dept. of ECE, Siliguri Institute of Technology held on 24<sup>th</sup> march 2008.
- ❖ Served as **Coordinator (Accommodation & Transport Committee)** for the **National Conference on Frontiers in Electronics, Communication & Instrumentation technology (FECIT 2011)**, held at Indian School of Mines, Dhanbad, Jharkhand, India, during November 3 – 4, 2011.
- ❖ **Organized** an **Institute Industry Interaction Program (IIIP 2013)** held at Indian School of Mines, Dhanbad, Jharkhand, India on March 9, 2013.
- ❖ Served as **Co-Convener** and **Coordinator (Accommodation & Transport Committee)** of IEEE Technically Co-Sponsored **International Conference on Microwave and Photonics 2013 (ICMAP 2013)**, held during 13-15 Dec. 2013 at ISM Dhanbad.
- ❖ Served as **Program Chair** for IEEE Technically Co-Sponsored **International Conference on Microwave and Photonics 2015 (ICMAP 2015)**, held during 11-13 Dec. 2015 at ISM Dhanbad.
- ❖ **Organized** a Short Tem Course entitled "**Advanced Device Modeling and VLSI Technology (ADMVT 2016)**" during 26<sup>th</sup> to 28<sup>th</sup> May, 2016 at ISM Dhanbad [In the capacity of **Consultant-In-Charge (CI)**].
- ❖ **Organized** a Short Tem Course entitled "**Modeling & Simulation of Optoelectronic Devices and Solar Photovoltaics (MSODSP 2016)**" during 29<sup>th</sup> Aug, 2016 to 2<sup>nd</sup> Sep, 2016 at ISM Dhanbad [In the capacity of **Co-CI**].

**SUBINDU KUMAR**