

CURRICULUM VITAE

Dr. Anand Kumar Singh

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Objective: I am a high-energy driven individual, having expertise in graphene material and devices. Actively seeking a research position in the field of two-dimensional materials and devices.

Educational Qualification:

Ph. D., Electronics Engineering, December 2021

Dr. A.P.J. Abdul Kalam Technical University, Lucknow, India

Title of Thesis: Tailoring the Electronic Properties of Chemical Vapor Deposition Grown Single-Layer Graphene by Doping

Supervisor: Prof. S.R.P. Sinha, Co-supervisor: Dr. Arun Kumar Singh

M. Tech., VLSI Design, June 2009

Department of Electronics and Communication Engineering, SRM University, Chennai, India

Title of Thesis: Design and implementation of a floating-point arithmetic unit (32-bit single-precision) using FPGA technology

Supervisor: Dr. J. Selve Kumar

M. Sc., Electronics Science, June 2007

School of Electronics, Devi Ahilya Vishwavidyalaya, Indore, India

Research Experience:

Teaching cum Research Fellow, January 2016- December 2021

Place of Research: Institute of Engineering and Technology, Lucknow, India.

Funded by: Technical Education Quality Improvement Program, TEQIP-II & III (MHRD, New Delhi) India

- Synthesized a high-quality single-layer graphene (SLG) film on a polycrystalline copper substrate using plasma-enhanced chemical vapor deposition (PECVD) method and then grown SLG film was transferred on $\text{SiO}_2/\text{p}^{++}\text{-Si}$ substrate for device application. To investigate the effect of doping on charge transport properties of CVD-grown SLG, various types of doping sources such as nanoparticles, small molecules and macromolecules have been used in this research work. The Raman spectroscopy and electrical transport measurement results confirmed that the doping technique significantly changed the electronic properties of SLG. In addition, morphological study of pristine and doped SLG devices was analyzed by AFM and SEM images.

Teaching Experience:

Assistant Professor, August 2009 - April 2015

Department of Electronics and Communication Engineering

RFDF University, Bhopal (M.P.), India.

Role and Responsibilities:

- Preparing lecture plan/ lecture materials/course materials for UG and PG classes.
- Mentoring UG & PG students project and thesis work

- Course coordinator of M. Tech (VLSI) program
- Nodal officer of college for AICTE-BSNL EETP training program for UG students
- Actively involved in research and development activities of the college for the establishment of the Centre of Excellence.

Major Courses Taught:

- UG Level: Physics of Semiconductor Devices, Electronic Devices and Circuits, Digital Logic and Circuits, Integrated Circuits technology, CMOS VLSI Design
- PG Level: VLSI Technology, Low Power VLSI Design

Research Interests:

- Two-Dimensional Nanomaterials
- Fabrication and Characterizations of Graphene Devices (OLEDs, Solar Cells, Sensors)
- Optoelectronic Devices
- Semiconductor Thin Films

Skills:

Experimental Skills:

- Plasma Enhanced Chemical Vapor Deposition (PECVD)
- Wet Transfer method of Graphene
- Electron beam Lithography
- Photolithography
- Raman Spectroscopy
- Scanning Electron Microscopy
- Atomic Force Microscopy
- Kelvin Probe Force Microscopy
- Semiconductor Parameter Analyzer (I-V Measurement)

Computational Skills:

- Programming Language: C, C++, VHDL and Verilog.
- Software Tool: MATLAB, Xilinx Project Navigator, FPGA Spartan kit, T-spice, Synopsys EDA Tools, ORCAD, Origin Lab.

Certificate Courses:

Completed NPTEL Certificate courses conducted by IIT Madras in the following subjects:

- Fundamental of Electronic Materials and Devices - Jan-April 2020
- Material Characterization- Jan-April 2020
- Fundamentals of Semiconductor Devices- Jan-April 2020
- Microelectronics: Devices to Circuits- July-Dec 2020
- Digital Circuits- July-Dec 2020

Monitoring Experience:

1. Mr. Ambrish Patel, Master in Engineering 2015, Rajiv Gandhi Technological University, Bhopal, India.

2. Mr. Braj Kishore, Master in Engineering 2015, Rajiv Gandhi Technological University, Bhopal, India.
3. Ms. Amrita Khera, Master in Engineering 2014, Rajiv Gandhi Technological University (RGTU), Bhopal, India.

List of Publications in Peer-Reviewed Journals:

1. **Anand Kumar Singh**, V. Chaudhary, A.K. Singh and S.R.P. Sinha “Effect of TiO₂ nanoparticles on electrical properties of chemical vapor deposition grown single-layer graphene” *Synthetic Metals*, 2019, 256, 116155. (I.F=3.26)
2. **Anand Kumar Singh**, V. Chaudhary, A.K. Singh and S.R.P. Sinha “Tailoring of electrical properties of TiO₂ decorated CVD grown single-layer graphene by HNO₃ molecular doping” *Synthetic Metals*, 2020, 264, 116389. (I.F=3.26)
3. **Anand Kumar Singh**, V. Chaudhary, A.K. Singh and S.R.P. Sinha “Investigation of electronic properties of chemical vapor deposition grown single-layer graphene via doping of thin transparent conductive films of PEDOT: PSS” *RSC Advances*, 2021, 11, 3096-3103. (I.F=3.39)
4. **Anand Kumar Singh**, V. Chaudhary, A.K. Singh and S.R.P. Sinha “Tuning of electronic properties of chemical vapor deposition grown graphene via self-assembled monolayer doping” *Material Today Proceeding*, 2021, 46, 2919-2924.
5. **Anand Kumar Singh**, A.K. Singh and S.R.P. Sinha “Fermi level modulation of chemical vapor deposition grown monolayer graphene via nanoparticles to macromolecular dopants” *ACS Omega*, 2022, 7, 744-751. (I.F= 3.51)
6. **Anand Kumar Singh**, R.S. Singh, A.K. Singh and S.R.P. Sinha “Recent Developments in Chemical Doping of Graphene using Experimental Approaches and its Applications”- *ACS Applied Electronic Materials* (Under Review)

Papers Presented in International/National Conferences:

1. **Anand Kumar Singh**, A.K. Singh and S.R.P. Sinha “Molecular doping of TiO₂ nanoparticles coated CVD graphene by nitric acid” 5th International Conference on Emerging Electronics (IEEE-ICEE 2020) conducted by the Indian Institute of Technology (IIT Delhi), New Delhi, India during November 26-28, 2020.
2. **Anand Kumar Singh**, A.K. Singh and S.R.P. Sinha “ Tuning electronic properties of chemical vapor deposition grown graphene via self-assembled monolayer doping” International Conference on Advanced Material Science and Chemistry (ICAMSC-2020) conducted by Amrita Vishwa Vidyapeetham, Amritapuri, Kerala, India during August 10-12, 2020.
3. **Anand Kumar Singh**, A.K. Singh and S.R.P. Sinha “ Modification of SLG electronic properties via chemical doping with metal oxide nanoparticles” Indo-Korea virtual conference on Development of Advanced Materials for Future Technologies (DAMFT-2020) jointly organized by Jeonbuk National University, Jeonju, Korea & Vellore Institute of Technology, Vellore, India during July 9-10, 2020.

4. **Anand Kumar Singh**, A.K. Singh and S.R.P. Sinha “Bandgap technology in 2D hexagonal semiconductor materials for optoelectronic devices” International Conference on Advanced Materials (ICAM -2019) organized by Jamia Millia Islamia University, New Delhi, India during March 9-10, 2019.
5. **Anand Kumar Singh**, A.K. Singh and S.R.P. Sinha “Thermal and electrical carriers transport in nanocomposites materials” National Conference on Advanced Nanomaterial and their application (ANA-2018) organized by Motilal Nehru National Institute of Technology, Allahabad, India during December 21-23, 2018.
6. **Anand Kumar Singh** and S.R.P. Sinha “Design and performance issue of memory cells using FinFET: A Review” National Conference on Emerging Trends in Electrical & Electronics Engineering (NCETEEE’16) organized by Institute of Engineering and Technology, Lucknow, India during August 19-20, 2016.

Short Term Courses/Workshops/Symposiums:

1. Attended a workshop on “Sensors-based Innovation and Start-ups Opportunities and Challenges” conducted by IEEE Sensors Council (Delhi-Rajasthan Chapter), India during December 3-4, 2021.
2. Attended a one-week AICTE sponsored short-term training program on “Nanotechnology and functional materials” conducted by S V College of Engineering, Tirupati, India during September 14-19, 2020.
3. Attended a one-week national workshop on “Advanced Physical Tools and Techniques for Materials Characterization” organized by Mahatma Gandhi Central University, Motihari, India from 28 July -03 August 2020.
4. Attended a short-term course on “Advance Scanning Electron Microscopy & Microanalysis” conducted by Advance Centre of Material Science, IIT Kanpur, India during March 11-15, 2019.
5. Attended a short course on “Modeling and Simulation of Nano-Transistors” organized by the Department of Electrical Engineering, IIT Kanpur, India during February 13-17, 2017.
6. Attended a workshop on “Nanofabrication Technologies” under INUP familiarization (A project of DIT, MCIT, Govt. of India) organized by IIT Bombay, Maharashtra, India, during May 27-29, 2015.

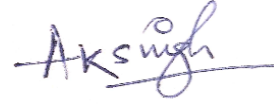
Achievements and Awards:

- Got the certificate of appreciation for best research paper in Indo-Korea virtual conference on Development of Advanced Materials for Future Technologies (DAMFT-2020) jointly organized by Jeonbuk National University, Jeonju, Korea & Vellore Institute of Technology, Vellore, India, July 2020.
- Received the Fellowship from the Technical Education Quality Improvement Program (TEQIP-III) project of MHRD, India during Ph.D. Program (Jan 2016- December 2020).
- Qualified national level Graduate Aptitude Test in Engineering (GATE) examination in 2016 & 2017.

Professional Membership:

- Life Member of Indian Society for Technical Education (ISTE), New Delhi.
- Associate Member of Institution of Engineers (IE), Kolkata.

Declaration: I hereby declare that all the details stated above are true and correct to the best of my knowledge.



(Dr. Anand Kumar Singh)

Date:

Place: Varanasi (India)