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<b>Research Interests</b>	<ul style="list-style-type: none"> <li>• Full-stack distributed ledger technology system research, with specialization in blockchain.</li> <li>• Mathematical modeling and simulation of semiconductor quantum nanostructures.</li> </ul>	
<b>Work Experience</b>	<p><b>Nanyang Technological University, Singapore</b> Nov 2017 – Ongoing Senior Research Engineer <i>Advisor:</i> Prof. K. Y. Lam, Asst. Prof. A. Chattopadhyay 'Cybersecurity Protocol and Mechanism for e-Logistics of Dangerous Goods Tracking Using Blockchain' funded by a ~\$1 million National Research Foundation (NRF) Singapore grant. I work on full-stack distributed ledger technology systems, with specialization in blockchain.</p> <p><b>KdotP Soft., (NTU) Singapore</b> Aug 2016 – Jan 2017 Software Engineering Intern <i>Advisor:</i> Assoc. Prof. Weijun Fan Worked on the simulation engine, database creation and development of a GUI for KdotP Soft, a scientific software for semiconductor physics and device physics simulation.</p> <p><b>Indian Institute of Science (IISc) Bangalore, India</b> May 2012 – Oct 2012 Research Intern, Microwave R&amp;D Lab <i>Advisor:</i> Prof. K. J. Vinoy Worked on delay engineering using cascaded microwave all-pass filters for acoustic imaging by chirp waveforms for application in transmission lines acting as dispersive structures.</p> <p><b>Qualcomm Inc., Bangalore, India (Offer Declined)</b> Summer 2012 Interim Engineering Intern, Corporate R&amp;D Lab Selected among top 6 students from NIT Trichy. Not pursued due to personal reasons.</p> <p><b>National Institute of Technology (NIT) Trichy, India</b> Dec 2011 – Feb 2012 Research Intern, Antennas Lab <i>Advisor:</i> Assoc. Prof. D. S. Kumar Worked on smart-fractals employing algorithms for rapid beam-forming in smart antennas.</p> <p><b>Intl. Institute of Information Technology (IIIT) Hyderabad</b> May 2011 – June 2011 Research Intern, VLSI and Embedded Systems Lab <i>Advisor:</i> Asst. Prof. S. R. Chowdhury Built an intelligent health security system for automated real-time breath rate tracking.</p> <p><b>Oil India Limited (OIL), Duliajan, India</b> Dec 2010 Industry Trainee <i>Advisor:</i> Mr. T. N. Madhavan Worked on various electronic/pneumatic instruments and developed a control system model.</p>	
<b>Education</b>	<p><b>Doctor of Philosophy (Ph.D.),</b> Electrical &amp; Electronic Engineering CGPA: 4.63/5.00 <b>Nanyang Technological University (NTU) Singapore</b> 2013 – 2017 <i>Thesis:</i> Semiconductor Quantum Nanostructures for Optoelectronic Applications <i>Advisor:</i> Assoc. Prof. Weijun FAN and Prof. Dao Hua ZHANG</p> <p><b>Bachelor of Technology,</b> Electronics &amp; Communication Engineering CGPA: 8.36/10.0 <b>National Institute of Technology (NIT) Trichy, India</b> 2009 – 2013 <i>FYP:</i> Mathematical Modeling of a Metamaterial Regular Polygon Split Ring Resonator <i>Advisor:</i> Prof. S. Raghavan</p>	

<b>Skillset</b>	<b>Programming:</b> Golang, C++, C/Embedded C, Python, Fortran, Perl, Verilog HDL. <b>Engineering tools/libraries:</b> MATLAB, Origin, COMSOL, OpenCV, NumPy, SciPy. <b>Blockchain Platforms:</b> Hyperledger Fabric, Ethereum (Solidity), Corda. <b>Web technologies:</b> NodeJS, HTML, PHP, CSS, JavaScript. <b>Operating systems:</b> Linux, Unix, RTOS, ROS, Windows, DOS. <b>Firmware development:</b> BLE, NFC, RFID Zigbee, I2C, SPI and UART. <b>Development platforms:</b> Arduino, Raspberry Pi, Beagleboard, TI Launchpad, FPGAs.	
<b>Mentoring</b>	<b>Nanyang Technological University (NTU) Singapore</b> Mentor Aug 2015 – Aug 2017 Mentored 2 students in their Final Year Projects (FYPs) on semiconductor simulation.	
<b>Teaching</b>	<b>Nanyang Technological University (NTU) Singapore</b> Language consultant, HG4045 Structure of a Language Spring 2016 – 2017 Recording, transcription, phonemic analysis and documentation of Assamese as a language.  Laboratory assistant, E2004L Digital Electronics Fall 2016 – 2017 Combinational logic circuits, counter and shift registers, logic circuit simulation.  Teaching assistant, EE1003 Introduction to Materials for Electronics Spring 2015 – 2016 Characteristics of semiconductors, biomaterials, smart materials and nanomaterials.  Laboratory assistant, EE1071 Introduction to EEE laboratories Fall 2015 – 2016 Electronic components, working with AC waveforms, soldering and circuit-building.  <b>National Institute of Technology (NIT) Trichy, India</b> Teaching assistant, EC204 Transmission Lines and Waveguides Spring 2012 – 2013 Planar transmission lines, composite substrates and electromagnetic CAD tools.  Teaching assistant, EC307 Antennas and Propagation Spring 2012 – 2013 Microstrip antennas, CNT antennas, metamaterial loaded antennas and wearable antennas.  <b>Non-affiliated teaching</b> Maker Faire, Singapore 2015 – 2016 Introduction to Robotics, Arduino, Raspberry Pi, PCB CAD design and 3D printing.	
<b>Organization</b>	<b>TheBlockchainSPIRIT Hackathon</b> Lead Organizer Jun 2018 Organized a Singapore wide 2-day blockchain hackathon on leading blockchain platforms – Hyperledger, Ethereum and NEM with 100+ participants and international representation.  <b>TEDxNTU</b> Lead Curator Apr 2016 – Mar 2017 Co-Curator Apr 2015 – Mar 2016 Involved in the planning and organization of TEDx (Technology, Entertainment, Design) chapter of NTU Singapore. Served as the lead organizer of the TEDxNTU 2016 edition.  <b>NTU – World of Wisdom (WOW)</b> Co-Founder and Vice-Chairman Apr 2015 – Mar 2017 Involved in the development of a think tank bringing together students and providing them with opportunities to mould their skills in diverse areas of science, economics, arts, etc.	

**NTU – Graduate Student Council (GSC)**

Committee Director

Apr 2015 – Mar 2016

Involved in the planning and organization of academic workshops and talks. The flagship event is the 3-minute-thesis (3MT) in collaboration with NTU library, Student Life Office.

**IEEE Young Professionals, Singapore Chapter**

Executive Committee Member

Nov 2015 – Nov 2016

Involved in facilitating young graduates to become world class professionals, enhancing their skills and establishing a diverse professional network, through workshops and networking.

**Robotics and Machine Intelligence (RMI), NIT Trichy**

Head, Electronics division

July 2011 – June 2013

Involved in robotics project including micromouse, line-follower, PIR motion sensor, accelerometer controller. Other projects involved image processing and PID control systems.

**Honors and Awards**

- IEEE Region-10 Young Professionals Affinity Group Award in recognition and appreciation of valued services and contributions; Aug 2016.
- NTU Research Scholarship, for the duration of Aug 2013 – July 2017
- University Graduate Scholarship, University of Glasgow, *offered* 2013
- *Grant for Student* of EUR 750 to present a paper at the 6<sup>th</sup> Intl. Congress on Adv. Electromagnetic Materials in Microwaves & Optics, St. Petersburg,; Sept 2012.
- Govt. of India's University Grant Commission (UGC) Sponsored Fellowship for Summer Research Internship at Indian Institute of Science (IISc), Bangalore; May – July 2012.

**Academic Services****Talks (*Invited*)**

- 7<sup>th</sup> Annual World Congress of Advanced Materials 2018 in Xiamen, China; Sep 2018.
- 4<sup>th</sup> Annual World Congress of Smart Materials 2018 in Osaka, Japan; Mar 2018.
- 3<sup>rd</sup> Annual World Congress of Smart Materials 2017 in Bangkok, Thailand; Mar 2017.
- EMN Meeting on Optical Communications 2016 in Dubai; Nov 2016.

**Journal Reviewer**

- Institute of Electrical and Electronics Engineers (IEEE): *Journal of Lightwave Technology*.
- Institute of Physics (IOP): *Materials Research Express*; *Nanotechnology*; *2D Materials*.
- Springer Open: *Nanoscale Research Letters*.
- Multidisciplinary Digital Publishing Institute (MDPI): *Computation*; *Applied Sciences*.

**Conference Reviewer**

- IEEE TENCON 2016 – IEEE Region 10 Conference
- IEEE CRALT 2016 – Conference on Recent Advances in Lightwave Technology

**Professional Memberships**

- *Member*, Institute for Electrical and Electronics Engineers (IEEE)
- *Member*, IEEE Photonics Society
- *Life Member*, Society of Electromagnetic Compatibility (EMC) Engineers India, SEMCE(I)

**Media Coverage**

- 'NIT-T student gets grant to attend conference on metamaterials', The Hindu, Aug 2012
- 'Young India', a mass broadcast radio program by All India Radio (AIR), Oct 2012

**Citation Indices**

- Citations: 158
- h-index: 7
- i10-index: 5

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|--------------------------------|---|
| <b>Thesis Publication</b>      | <ul style="list-style-type: none"> <li>• S. Bose, “Semiconductor Quantum Nanostructures for Optoelectronic Applications”, <i>Doctoral Dissertation</i>, Nanyang Technological University Singapore, 2018.</li> </ul>  |
| <b>Journal Publications</b>    | <ul style="list-style-type: none"> <li>• Y. Liu, S. Bose, W. J. Fan, “Effect of size and shape on electronic and optical properties of CdSe quantum dots”, <i>Optik – International Journal for Light and Electron Optics</i>, <b>155</b>, 242-250, 2018.</li> <li>• S. Bose, S. Shendre, Z. Song, V. K. Sharma, D. H. Zhang, C. Dang, W. J. Fan, H. V. Demir, “Temperature-dependent Optoelectronic Properties of Quasi-2D Colloidal Cadmium Selenide Nanoplatelets”, <i>Nanoscale</i>, <b>9</b>, 6595-6605, 2017.</li> <li>• S. Bose, W. J. Fan, D. H. Zhang, “Optoelectronics of Inverted Type-I CdS/CdSe Core/Crown Quantum Ring”, <i>Journal of Applied Physics</i>, <b>122</b> (16), 163102, 2017.</li> <li>• Z. Song, S. Bose, W. J. Fan, D. H. Zhang, Y. Y. Zhang, S. S. Li, “Quantum Spin Hall Effect and Topological Phase Transition in <math>\text{InN}_x\text{Bi}_y\text{Sb}_{1-x-y}/\text{InSb}</math> Quantum Wells”, <i>New Journal of Physics</i>, <b>19</b> (7), 073031, 2017.</li> <li>• S. Bose, Z. Song, W. J. Fan, D. H. Zhang, “Effect of lateral size and thickness on the electronic structure and optical properties of quasi two-dimensional CdSe and CdS nanoplatelets”, <i>Journal of Applied Physics</i>, <b>119</b> (14), 143107, 2016.</li> <li>• Z. G. Song, S. Bose, W. J. Fan, S. S. Li, “Electronic band structure and optical gain of <math>\text{GaN}_x\text{Bi}_y\text{As}_{1-x-y}/\text{GaAs}</math> pyramidal quantum dots”, <i>Journal of Applied Physics</i>, <b>119</b> (14), 143103, 2016.</li> <li>• W. J. Fan, S. Bose, D. H. Zhang, “Electronic bandstructure and optical gain of lattice matched III-V dilute nitride bismide quantum wells for <math>1.55\mu\text{m}</math> optical communication systems”, <i>Journal of Applied Physics</i>, <b>120</b> (9), 093111, 2016.</li> <li>• K. Prabu, S. Bose, D. S. Kumar, “BPSK based subcarrier intensity modulated free space optical system in combined strong atmospheric turbulence”, <i>Optics Communications</i>, <b>305</b>, 185-189, 2013.</li> <li>• M. Levy, S. Bose, D. S. Kumar, A. V. Dinh, “Rapid beam forming in smart antennas using smart-fractal concepts employing combinational approach algorithms”, <i>International Journal of Antennas and Propagation</i>, vol. 2012, ID <b>467492</b>, 2012.</li> <li>• M. Levy, S. Bose, A. V. Dinh, D. S. Kumar, “A novelistic fractal antenna for ultra wideband (UWB) applications”, <i>Progress In Electromagnetics Research B</i>, <b>45</b>, 369, 2012.</li> <li>• S. Bose, M. Ramaraj, S. Raghavan, S. Kumar, “Mathematical modeling, equivalent circuit analysis and genetic algorithm optimization of an N-sided regular polygon split ring resonator (NRPSRR)”, <i>Elsevier Procedia Technology</i> <b>6</b>, 763-770, 2012.</li> <li>• S. Bose, S. Delikanli, V. K. Sharma, C. Dang, W. J. Fan, D. H. Zhang, H. V. Demir, “Electronic Bandstructure and Excitonic Absorption in CdSe Nanoplatelets”, <i>Nanoscale</i>. [under review]</li> <li>• S. Bose, W. J. Fan, D. H. Zhang, “Optoelectronics of Quasi Two-dimensional <math>\text{CdS}_x\text{Se}_{1-x}</math> Nanoplatelets”, <i>Journal of Physics D: Applied Physics</i>. [under review]</li> </ul> |
| <b>Conference Publications</b> | <ul style="list-style-type: none"> <li>• S. Bose, M. Raikwar, A. Chattopadhyay, D. Mukhopadhyay, K. Y. Lam, “BLIC: A Blockchain Protocol for IC Manufacturing and Supply Chain Management”, <i>IEEE International Conference on Blockchain (Blockchain)</i>, 2018.</li> <li>• S. Mitra, S. Bose, S. Sen Gupta, A. Chattopadhyay, “BLAV: Blockchain Protocol for Tamper-resilient and Secure Data Aggregation in Autonomous Vehicles”, <i>14<sup>th</sup> IEEE Asia Pacific Conference on Circuits and Systems (APCCAS)</i>, 2018.</li> <li>• M. Raikwar, S. Ruj, S. Bose, S. Sen Gupta, A. Chattopadhyay, K. Y. Lam, “Security and Privacy of Permissioned Blockchains”, <i>1<sup>st</sup> Workshop on Blockchain and Sharing Economy Applications (BlockSEA)</i>, 2018. [progress]</li> </ul>  |

- S. Bose, S. Delikanli, A. Yeltik, M. Sharma, O. Erdem, C. Dang, W. J. Fan, D. H. Zhang, H. V. Demir, "Anomalous Spectral Characteristics of Ultrathin sub-nm Colloidal CdSe Nanoplatelets", *Conference on Lasers and Electro-Optics (CLEO)*, 2017.
- S. Bose, S. Delikanli, M. Z. Akgul, Y. Gao, W. J. Fan, D. H. Zhang, H. V. Demir, "Inverted Type-I CdS/CdSe Core/Crown Colloidal Quantum Ring", *Conference on Lasers and Electro-Optics (CLEO)/Europe and the European Quantum Electronics Conference (EQEC)*, 2017.
- S. Bose, W. J. Fan, D. H. Zhang, "Theoretical Investigations of Excitonic Absorption in Quasi Two-dimensional CdSe Nanoplatelets", *12<sup>th</sup> Conference on Lasers and Electro-Optics Pacific Rim (CLEO-PR)*, 2017.
- S. Bose, W. J. Fan, D. H. Zhang, "Strain Profile and Size Dependent Electronic Bandstructure of Type-I CdS/CdSe Quantum Ring", *12<sup>th</sup> Conference on Lasers and Electro-Optics Pacific Rim (CLEO-PR)*, 2017.
- S. Bose, Z. Song, W. J. Fan, D. H. Zhang, "KdotPsoft: Modelling and Simulation of Semiconductors and Device Physics", *9<sup>th</sup> International Conference on Materials for Advanced Technologies*, 2017.
- Z. Song, S. Bose, W. J. Fan, X. H. Tang, D. H. Zhang, S. S. Li, "Electronic structure and optical gain of  $\text{InAs}_{1-x-y}\text{N}_x\text{B}_y/\text{InP}$  pyramidal quantum dots", *9<sup>th</sup> International Conference on Materials for Advanced Technologies*, 2017.
- T. Chaudhuri, Y. C. Soh, S. Bose, L. Xie, H. Li, "On assuming Mean Radiant Temperature equal to air temperature during PMV-based thermal comfort study in air-conditioned buildings", *42<sup>nd</sup> Annual Conf. of the IEEE Industrial Electronics Society, (IECON)*, 2016.
- S. Bose, W. J. Fan, J. Chen, D. H. Zhang, C. S. Tan, "Strain Profile and Size Dependent Electronic Band Structure of GeSn/SiSn Quantum Dots for Optoelectronic Application", *International Conference on Fibre Optics and Photonics*, 2014.
- S. Bose, W. J. Fan, C. Jian, D. H. Zhang, C. S. Tan, "Strain profile, electronic band structure and optical gain of self-assembled Ge quantum dots on SiGe virtual substrate", *7<sup>th</sup> International Silicon-Germanium Technology and Device Meeting (ISTDM)*, 2014.
- S. Bose, K. J. Vinoy, "Group delay engineering using cascaded all pass filters for wideband chirp waveform generation", *IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT)*, 2013.
- K. Prabu, S. Bose, D. S. Kumar, "Analysis of optical modulators for Radio over Free Space Optical Communication systems and Radio over Fiber systems", *Annual IEEE India Conference (INDICON)*, 2012.
- S. Bose, M. Ramraj, S. Raghavan, "Design, analysis and verification of Hexagon Split Ring Resonator based Negative Index Metamaterial", *Annual IEEE India Conference (INDICON)*, 2012.
- S. Bose, S. Raghavan, "Theoretical Investigations of a N-sided Regular Polygon Split Ring Resonator with Skew Rotation", *The 6<sup>th</sup> International Congress on Advanced Electromagnetic Materials in Microwaves and Optics*, 2012 [accepted, but not presented] – Awarded 'Grant for Students' - registration fee waiver and travel allowance (EUR 750)
- M. Ramraj, S. Raghavan, S. Bose, S. Kumar, "Elliptical Split Ring Resonator: Mathematical Analysis, HFSS Modeling and Genetic Algorithm Optimization", *Progress In Electromagnetics Research Symposium (PIERS)*, 2012.
- M. Levy, D. S. Kumar, A. Dinh, S. Bose, "A novelistic approach for rapid beam forming in smart antennas for wireless applications using smart-fractal concepts and new algorithm", *International Conference on Advances in Mobile Network, Communication and its Applications (MNCAPPS)*, 2012.
- S. Bose, K. Prabu, D. S. Kumar, "Real-time breath rate monitor based health security system using non-invasive biosensor", *3<sup>rd</sup> International Conference on Computing Communication & Networking Technologies (ICCCNT)*, 2012.

- S. Bose, K. Prabu, D. S. Kumar, “Array Signal Processing & Optimization using Algorithms in Nature”, *International Proceedings of Computer Science & Information Technology*, 2012.

## References

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