# Dr. Sudip Roy


CONTACT INFORMATION

Assistant Professor
Dept. of Computer Science & Engineering (CSE)
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RESEARCH INTERESTS

(i) Algorithms and Computer Architecture; (ii) CAD for Emerging Technologies like Microfluidic Biochips, VLSI Chips, etc.; (iii) Parallel Computing for Multi-Core Systems; (iv) Embedded System Design.

ACADEMIC EXPERIENCE

**Indian Institute of Technology Roorkee (IITR)**, Roorkee, India

*Assistant Professor* **July 2014 to present**

- Working at the Department of Computer Science and Engineering (CSE) as an Assistant Professor.
- Past/Present Teaching: UG Course Computer Architecture and Microprocessors (Autumn 2014-2015, Autumn 2015-2016, Autumn 2016-2017), UG Course Design and Analysis of Algorithms (Spring 2015-2016), PG Course Computational Geometry (Spring 2014-2015, Spring 2015-2016) and PG Course Algorithms and Foundations for Chip Design (Autumn 2016-2017).

**National Cheng Kung University (NCKU)**, Tainan, Taiwan

*Research Associate* **February 2014 to July 2014**

- Worked at the *Electronic Design Automation Laboratory* of Department of Computer Science and Information Engineering (CSIE) as a Research Associate.
- Research Mentor: Professor Tsung-Yi Ho, Dept. of CSIE, National Cheng Kung University, Tainan, Taiwan.
- Research Area: Algorithms for design and automation of microfluidic chips.

**Indian Institute of Technology Kharagpur (IITKGP)**, India

*Research Scholar* **October 2009 to January 2014**

- Worked at the *Department of Computer Science and Engineering (CSE)* as a *Microsoft Research India PhD Fellow*.

**Indian Statistical Institute Kolkata (ISICAL)**, India

*Project Linked Personnel* **July 2008 to September 2009**

- Worked at *Advanced Computing and Microelectronics Unit (ACMU)* in a project "Floorplan Optimization for Nano-Bio Chips" funded internally by the Institute.
- Principal Investigator: Professor Bhargab B. Bhattacharya, ACMU, ISI Kolkata.
- Research Area: CAD algorithms for digital microfluidic biochips.

**Indian Institute of Technology Kharagpur (IITKGP)**, India

*Junior Project Assistant* **August 2005 to June 2008**

- Worked at *Sponsored Research and Industrial Consultancy (SRIC)* in a project "Low-Power Circuits and Systems" sponsored by Intel Corporation, USA.
- Principal Investigator: Professor Ajit Pal, Dept. of CSE, IIT Kharagpur.

**Indian Statistical Institute Kolkata (ISICAL)**, India

*Project Linked Personnel* **November 2004 to July 2005**

- Worked at *Machine Intelligence Unit (MIU)* in a project "Support Vector Machines and Web Page Ranking for Data Mining" funded internally by the Institute.
- Principal Investigator: Professor C. A. Murthy, MIU, ISI Kolkata.

## Book and Book Chapter Publications

(B1) **Sudip Roy** and Ajit Pal, "Impact of Leakage Power Reduction Techniques on Parametric Yield: Low-Power Design of Digital Integrated Circuits under Process Parameter Variations", ISBN:978-3-659-27391-9, 172 pages, LAP Lambert Academic Publishing, January, 2013. Weblink.

(B2) Sarmishtha Ghoshal, Debasis Mitra, **Sudip Roy**, and Dwijesh Dutta Majumder, "Chapter 9: Advance in Biosensors and Biochips", Modern Sensors, Transducers and Sensor Networks (Book Series: Advances in Sensors: Reviews, Vol. 1), Sergey Y. Yurish(ed.), ISBN:978-84-615-9012-4, pp. 9:1-9:33, International Frequency Sensor Association (IFSA) Publishing, May, 2012. Weblink.

## Journal Publications

(J1) Sukanta Bhattacharjee, Sudip Poddar, **Sudip Roy**, Juinn-Dar Huang, Bhargab B. Bhattacharya, "Dilution and Mixing Algorithms for Flow-Based Microfluidic Biochips", accepted in IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (IEEE TCAD), July, 2016. Digital Object Identifier: 10.1109/TCAD.2016.2597225.

(J2) Yu-Wei Wu, Yiyu Shi, **Sudip Roy** and Tsung-Yi Ho, "Obstacle-Avoiding Wind Turbine Placement for Power Loss and Wake Effect Optimization", accepted in ACM Transactions on Design Automation of Electronic Systems (TODAES), vol. 22(1), pp. 5.1-5.24, June, 2016. Digital Object Identifier: 10.1145/2905365.

(J3) Ta-Yang Huang, Chia-Jui Chang, Chung-Wei Lin, **Sudip Roy** and Tsung-Yi Ho, "Delay-Bounded Intra-Vehicle Network Routing Algorithm for Minimization of Wiring Weight and Wireless Transmit Power", accepted in IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (IEEE TCAD), April, 2016. Digital Object Identifier: 10.1109/TCAD.2016.2568203.

(J4) **Sudip Roy**, Partha P. Chakrabarti, Krishnendu Chakrabarty, Bhargab B. Bhattacharya, "Waste-Aware Single-Target Dilution of a Biochemical Fluid using Digital Microfluidic Biochips", Integration, the VLSI Journal, vol. 51, pp. 194-207, September, 2015. Digital Object Identifier: 10.1016/j.vlsi.2014.12.004.

(J5) **Sudip Roy**, Partha P. Chakrabarti, Krishnendu Chakrabarty, Bhargab B. Bhattacharya, "Layout-Aware Mixture Preparation of Biochemical Fluids on Application-Specific Digital Microfluidic Biochips", ACM Transactions on Design Automation of Electronic Systems (TODAES), vol. 20(3), pp. 45.1-45.34, June, 2015. Digital Object Identifier: 10.1145/2714562.

(J6) **Sudip Roy**, Bhargab B. Bhattacharya, Sarmishtha Ghoshal and Krishnendu Chakrabarty, "An Optimal Two-mixer Dilution Engine with Digital Microfluidics for Low-power Applications", ASP Journal of Low Power Electronics (JOLPE), Vol. 10(3), pp. 506-518, September, 2014.

(J7) **Sudip Roy**, Bhargab B. Bhattacharya, Sarmishtha Ghoshal and Krishnendu Chakrabarty, "Theory and Analysis of Generalized Mixing and Dilution of Biochemical Fluids using Digital Microfluidic Biochips", ACM Journal on Emerging Technologies in Computing Systems (JETC), Vol. 11(1), pp. 2.1-2.33, September, 2014. Digital Object Identifier: 10.1145/2629578.

(J8) Debasis Mitra, **Sudip Roy**, Sukanta Bhattacharjee, Krishnendu Chakrabarty, and Bhargab B. Bhattacharya, "On-Chip Sample Preparation for Multiple Targets using Digital Microfluidics", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Vol. 33(8), pp. 1131-1144, August, 2014. Digital Object Identifier: 10.1109/TCAD.2014.2323200.

(J9) **Sudip Roy**, Bhargab B. Bhattacharya, Sarmishtha Ghoshal, and Krishnendu Chakrabarty, "A High-Throughput Dilution Engine for Sample Preparation on Digital Microfluidic Biochips", Special Issue Journal of IET Computers & Digital Techniques (IET-CDT), Vol. 8(4), pp. 163-171, July, 2014. Digital Object Identifier: 10.1049/iet-cdt.2013.0060.

(J10) **Sudip Roy**, Debasis Mitra, Bhargab B. Bhattacharya, and Krishnendu Chakrabarty, "Congestion-aware Layout Design for High-throughput Digital Microfluidic Biochips", ACM Journal on Emerging Technologies in Computing Systems (JETC), Vol. 8(3), Article 17, August, 2012. Digital Object Identifier: 10.1145/2287696.2287700.

(J11) **Sudip Roy**, Bhargab B. Bhattacharya, and Krishnendu Chakrabarty, "Optimization of Dilution and Mixing of Biochemical Samples using Digital Microfluidic Biochips", IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), vol. 29(11), pp. 1696-1708, November, 2010. Digital Object Identifier: 10.1109/TCAD.2010.2061790.

(J12) **Sudip Roy**, and Ajit Pal, "A New Technique for Runtime Leakage Reduction and Its Sensitivity and Parametric Yield Analysis Under Effective Channel-length Variation", Journal of Low Power Electronics (JOLPE), Vol. 6(1), pp.80-92, American Scientific Publishers, April, 2010 Weblink.

(J13) Sarmishtha Ghoshal, Debasis Mitra, **Sudip Roy**, and Dwijesh Dutta Majumder, "Biosensors and Biochips for Nanomedical Applications: a Review", Sensors and Transducers Journal (ISSN 1726-5479), Vol. 113(2), pp. 1-17, IFSA, February, 2010 Weblink.

## Conference/ Workshop Publications

(C1) Varsha Agarwal, Ananya Singla, Mahammad Samiuddin, **Sudip Roy**, Tsung-Yi Ho, Indranil Sengupta, Bhargab B. Bhattacharya, "Reservoir and Mixer Constrained Scheduling for Sample Preparation on Digital Microfluidic Biochips", accepted for publication in Proc. of the 22nd Asia and South Pacific Design Automation Conference (ASP-DAC), January 16-19, 2017, Tokyo, Japan. Weblink

(C2) Satendra Kumar, Ankur Gupta, **Sudip Roy** and Bhargab B. Bhattacharya, "Design Automation of Multiple-Demand Mixture Preparation using a K-Array Rotary Mixer on Digital Microfluidic Biochips", accepted for publication in the 34th IEEE International Conference on Computer Design (ICCD), October 3-5, 2016, Phoenix, USA. Weblink

(C3) Ta-Yang Huang, Chia-Jui Chang, Chung-Wei Lin, **Sudip Roy** and Tsung-Yi Ho, "Intra-Vehicle Network Routing Algorithm for Weight and Wireless Transmit Power Minimization", in Proceedings of the 20th Asia and South Pacific Design Automation Conference (ASP-DAC), January 19-22, 2015, Japan. Digital Object Identifier: 10.1109/ASPDAC.2015.7059017.

(C4) Yu-Wei Wu, Yiyu Shi, **Sudip Roy** and Tsung-Yi Ho, "Obstacle-Avoiding Wind Turbine Placement for Power-Loss and Wake-Effect Optimization", in Proceedings of the 20th Asia and South Pacific Design Automation Conference (ASP-DAC), January 19-22, 2015, Japan. Digital Object Identifier: 10.1109/ASPDAC.2015.7059005.

(C5) **Sudip Roy**, Chi-Ruo Wu and Tsung-Yi Ho, "Recent Trends in Chip-Level Design Automation for Digital Microfluidic Biochips", in Proceedings of the 14th International Symposium on Integrated Circuits (ISIC), December 10-12, 2014, Singapore. Digital Object Identifier: 10.1109/ISICIR.2014.7029546.

(C6) **Sudip Roy**, Srijan Kumar, Partha P. Chakrabarti, Bhargab B. Bhattacharya and Krishnendu Chakrabarty, "Demand-Driven Mixture Preparation and Droplet Streaming using Digital Microfluidic Biochips", in Proceedings of the ACM/IEEE Design Automation Conference (DAC), June 1-5, 2014, San Fran-

cisco, CA, USA. Digital Object Identifier: 10.1145/2593069.2593119.

(C7) Bhargab B. Bhattacharya, **Sudip Roy** and Sukanta Bhattacharjee, "Algorithmic Challenges in Digital Microfluidic Biochips: Protocols, Design, and Test", Invited Paper in the International Conference on Applied Algorithms (ICAA), Lecture Notes in Computer Science, Volume 8321, pp. 1-16, January 13-15, 2014, Kolkata, India. Digital Object Identifier: 10.1145/2287696.2287700.

(C8) **Sudip Roy**, Bhargab B. Bhattacharya, Sarmishtha Ghoshal and Krishnendu Chakrabarty, "Optimal Two-Mixer Scheduling in Dilution Engine on a Digital Microfluidic Biochip", in Proceedings of the Fourth International Symposium on Electronic System Design (ISED), pp. 82-86, December 12-13, 2013, NTU, Singapore Weblink.

(C9) **Sudip Roy**, Partha P. Chakrabarti, Srijan Kumar, Bhargab B. Bhattacharya and Krishnendu Chakrabarty, "Routing-aware Resource Allocation for Mixture Preparation in Digital Microfluidic Biochips", in Proceedings of the IEEE International Symposium on VLSI (ISVLSI), 2013, Natal, Brazil. Digital Object Identifier: 10.1109/ISVLSI.2013.6654653.

(C10) **Sudip Roy**, Bhargab B. Bhattacharya, Sarmishtha Ghoshal and Krishnendu Chakrabarty, "On-Chip Dilution from Multiple Concentrations of a Sample Fluid using Digital Microfluidics", in Proceedings of the Seventeenth International Symposium on VLSI Design and Test (VDAT), pp. 274-283, July 27-30, 2013, Jaipur, India. Digital Object Identifier: 10.1007/978-3-642-42024-5_33.

(C11) Srijan Kumar, **Sudip Roy**, Partha P. Chakrabarti, Bhargab B. Bhattacharya and Krishnendu Chakrabarty, "Efficient Mixture Preparation on Digital Microfluidic Biochips", in Proceedings of the Sixteenth IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems (DDECS), pp. 205-210, April 8-10, 2013, Karlovy Vary, Czech Republic. Digital Object Identifier: 10.1109/DDECS.2013.6549817.

(C12) **Sudip Roy**, Bhargab B. Bhattacharya, Sarmishtha Ghoshal, and Krishnendu Chakrabarty, "Low-Cost Dilution Engine for Sample Preparation using Digital Microfluidic Biochips", in Proceedings of the Third International Symposium on Electronic System Design (ISED), pp. 203-207, December 19-22, 2012, Kolkata, India. Digital Object Identifier: 10.1109/ISED.2012.70.

(C13) **Sudip Roy**, Partha P. Chakrabarti, and Bhargab B. Bhattacharya, "Algorithms for On-Chip Solution Preparation using Digital Microfluidic Biochips", in Proceedings of the IEEE International Symposium on VLSI (ISVLSI), pp. 7-8, August 19-21, 2012, Amherst, USA. Digital Object Identifier: 10.1109/ISVLSI.2012.79.

(C14) Debasis Mitra, **Sudip Roy**, Krishnendu Chakrabarty, and Bhargab B. Bhattacharya, "On-Chip Sample Preparation with Multiple Dilutions Using Digital Microfluidics", in Proceedings of the IEEE International Symposium on VLSI (ISVLSI), pp. 314-319, August 19-21, 2012, Amherst, USA. Digital Object Identifier: 10.1109/ISVLSI.2012.52.

(C15) **Sudip Roy**, Bhargab B. Bhattacharya, and Krishnendu Chakrabarty, "Waste-Aware Dilution and Mixing of Biochemical Samples with Digital Microfluidic Biochips", in Proceedings of the IEEE/ACM Design, Automation and Test in Europe (DATE) Conference, pp. 1059-1064, March 14-18, 2011, Grenoble, France. Digital Object Identifier: 10.1109/DATE.2011.5763174.

(C16) **Sudip Roy**, Bhargab B. Bhattacharya, Partha P. Chakrabarti, and Krishnendu Chakrabarty, "Layout-Aware Solution Preparation for Biochemical Analysis on a Digital Microfluidic Biochip", in Proceedings of the IEEE International Conference on VLSI Design (VLSID), pp. 171-176, January 2-7, 2011, Chennai, India. Digital Object Identifier: 10.1109/VLSID.2011.55.

(C17) **Sudip Roy**, Debasis Mitra, Bhargab B. Bhattacharya, and Krishnendu Chakrabarty, "Pin-Constrained Designs of Digital Microfluidic Biochips for High-Throughput Bioassays", in Proceedings of the IEEE International Symposium on Electronic System Design (ISED), pp. 4-9, December 20-22, 2010, Bhubaneswar, India. Digital Object Identifier: 10.1109/ISED.2010.10.

(C18) Sujan Kundu, **Sudip Roy**, and Ajit Pal, "A Power-Aware Wireless Sen-

sor Network Based Bridge Monitoring System", in Proceedings of the Sixteenth IEEE International Conference on Networks (ICON), pp. 1-7, December 12-14, 2008, New Delhi, India. Digital Object Identifier: 10.1109/ICON.2008.4772584.

(C19) **Sudip Roy**, and Ajit Pal, "Impact of Runtime Leakage Reduction Techniques on Delay and Power Sensitivity under Effective Channel Length Variations', in Proceedings of IEEE Region 10 Conference (TENCON), November 18-21, 2008, Hyderabad, India. Digital Object Identifier: 10.1109/TENCON.2008.4766400.

(C20) **Sudip Roy**, Indranil Sen Gupta, and Ajit Pal, "Artificial Intelligence Approach to Test Vector Reordering for Dynamic Power Reduction during VLSI Testing", in Proceedings of IEEE Region 10 Conference (TENCON), November 18-21, 2008, Hyderabad, India. Digital Object Identifier: 10.1109/TENCON.2008.4766747.

(C21) **Sudip Roy**, and Ajit Pal, "Why to use Dual-Vt, if Single-Vt serves the purpose better under Process Parameter Variations?", in Proceedings of the Eleventh Euromicro conference on Digital System Design (DSD), pp. 282-289, September 3-5, 2008, Italy. Digital Object Identifier: 10.1109/DSD.2008.37.

## US Patents

(P1) "Architectural Layout for Dilution with Reduced Wastage in Digital Microfluidic Based Lab-On-a-Chip", Bhargab B. Bhattacharya, **Sudip Roy** and Krishnendu Chakrabarty, United States Patent # 9,201,042, issued on December 1, 2015. Weblink.

(P2) "High Throughput and Volumetric Error Resilient Dilution with Digital Microfluidic Based Lab-On-a-Chip", Bhargab B. Bhattacharya, Sarmishtha Ghoshal, **Sudip Roy** and Krishnendu Chakrabarty, United States Patent # 9,128,014, issued on September 8, 2015. Weblink.

## Patent Applications Filed and Pending

(P1) "Dilution Method for Digital Microfluidic Biochips", Bhargab B. Bhattacharya, **Sudip Roy** and Krishnendu Chakrabarty, US Patent Application number: US 13/809,357, Filing date: 13 November, 2010, Publication number: US20130115703 A1, Publication date: May 9, 2013. Weblink.

(P2) "Routing-Aware Resource Allocation for Biochemical Mixture Preparation Using Digital Microfluidic Biochips", **Sudip Roy**, Partha Pratim Chakrabarti, Srijan Kumar and Bhargab Bikram Bhattacharya, Patent application no. 601/KOL/2013 dated 24th May, 2013.

(P3) "An Efficient Mixture Peparation Method Using Digital Microfluidic Biochips", Srijan Kumar, **Sudip Roy**, Partha Pratim Chakrabarti and Bhargab Bikram Bhattacharya, Patent application no. 600/KOL/2013 dated 24th May, 2013.

## Education

**IIT Kharagpur**, West Bengal, India

**Doctor of Philosophy (PhD)** in Computer Science and Engineering, ***2014***

- Duration: October 2009 to January 2014.
- PhD Thesis Title: "Design Automation Algorithms for Sample Preparation on a Digital Microfluidic Lab-on-a-Chip".
- Research Advisors: Professor Partha P. Chakrabarti, Dept. of CSE, IIT Kharagpur and Professor Bhargab B. Bhattacharya, ACMU, ISI Kolkata.
- Research Area: Algorithms for automation of sample preparation in digital microfluidic biochips.
- Contributions in the Thesis: This research envisions the algorithmic microfluidics and it expands the computer-aided-design (CAD) research to develop digital microfluidic (DMF) lab-on-a-chips by developing design-automation algorithms for automatic and on-chip sample preparation (dilution and mixing) of several fluids. In a bioassay, input sample and reagent biochemical fluids are very expensive and therefore, waste minimization is desirable while

executing a bioassay with limited volume of expensive input fluids. Reducing the waste is also crucial for avoidance of cross-contamination and for reducing the overhead of waste droplet routing. The primary motivation of this thesis was to minimize the wastage, reactant usage and time of completion for automatic sample preparation using DMF biochips. This thesis presents extensive simulation results for evaluation of the proposed CAD algorithms on several test cases of dilution/mixing problems and also demonstrates comparative results with earlier approaches, wherever applicable. It is believed that the CAD algorithms developed in this thesis will be useful in designing efficient biochips and will further motivate future research directions in this domain.

**IIT Kharagpur**, West Bengal, India

**Master of Science (MS by Research)** in Computer Science and Engineering, ***2009***

- Duration: January 2006 to June 2008.
- MS Thesis Title: "Impact of Leakage Power Reduction Techniques on Parametric Yield".
- Thesis Advisor: Professor Ajit Pal, Dept. of CSE, IIT Kharagpur.
- Research Area: Low-Power VLSI Circuits and Systems.
- Contributions in the Thesis: The thesis discusses on the impact of process parameter variations on low power VLSI circuits. Sensitivity and Parametric yield values of a newly proposed runtime leakage reduction technique have been compared with the well-known dual threshold voltage assignment technique considering random variations in effective channel length and shown that the new logic synthesis technique is better under process parameter variations. The thesis also covers high-level synthesis of DSP benchmark circuits using the newly proposed leakage reduction technique during gate-level synthesis.

**University of Calcutta**, Kolkata, West Bengal, India

**Bachelor of Technology (B.Tech.)** in Computer Science and Engineering, University College of Science and Technology, Kolkata, ***2004***

- Duration: July 2001 to August 2004.
- Final Year Project Topic: Crosstalk Minimization in VLSI Channel Routing using Artificial Intelligence.
- Supervisors: Professor Samar Sensarma, Dept. of CSE, University of Calcutta and Professor Partha Sarathi Dasgupta, Management Information Systems Department, Indian Institute of Management Calcutta.
- Contributions in the thesis: The thesis discusses two algorithms of novel approach for crosstalk minimization in VLSI channel routing. One algorithm uses A-star (A*) algorithm from Artificial Intelligence and another algorithm uses Approximation algorithm for Traveling Salesman Problem (TSP) and we obtained better crosstalk reduction over the routing solutions given by existing Left-Edge Algorithm (LEA).

**Bachelor of Science (B.Sc.)** in Physics (Honours), Rahara Ramkrishna Mission Vivekananda Centenary College (under University of Calcutta), ***2001***

- Duration: July 1998 to July 2001.

## Seminars/Invited Talks Delivered

- Invited Talk: "Computer-Aided- Design (CAD) for Fluidic Sample Preparation using Microfluidic Biochips", for the graduate-level seminar course under the EECS International Graduate Program in National Chiao Tung University (NCTU), Hsinchu, Taiwan in a visit during 24-26 May 2016. (Host: Prof. Juinn-Dar Huang)

- Special Session: "Design of Microfluidic Biochips: Connecting Algorithms and Foundations of Chip Design to Biochemistry and the Life Sciences", in the 29th International Conference on VLSI Design (VLSID 2016), January 4-8, 2016, Kolkata, India.
- Invited Talk: "Design Automation for Digital Microfluidic Biochips", in the Dept. of Computer Science and Information Engineering at National Cheng Kung University (NCKU), Tainan, Taiwan on Sep 3, 2015. (Host: Dr. Da-Wei Chang)
- Invited Talk: "Design Automation for Digital Microfluidic Biochips", in the FanTASY laboratory of the Dept. of Mechanical Engineering, National Taiwan University (NTU), Taipei, Taiwan on Sep 2, 2015. (Host: Prof. S. K. Fan)
- Invited Talk (IEEE CEDA, Taipei): "Design Automation for Digital Microfluidic Biochips", in the Dept. of Computer Science at National Tsing Hua University (NTHU), Hsinchu, Taiwan on Sep 1, 2015. (Host: Dr. Wai-Kei Mak)
- Seminar Talk in EDA workshop, National Tsing Hua University (NTHU), Hsinchu, Taiwan during 31 Aug 2015.
- Invited Talk in Dagstuhl Seminar:15352 on "Design Automation for Digital Microfluidic Biochips", in Dagstuhl, Saarbruken, Germany during August 23-26, 2015.
- Poster: "Algorithms for Design Automation of Sample Preparation on Digital Microfluidic Biochips", in the IEEE/ACM Design Automation and Test in Europe (DATE) conference, 24-28 March, 2014, Dresden, Germany (PhD Forum).
- Poster: "Algorithms for Automatic Sample Preparation on Digital Microfluidic Biochips", in the SELECTBIO International Conference Microfluidics and Lab-on-a-Chip India, 27-28 September, 2013, Bangalore, India (Best Poster Award).
- Invited Talk: "Algorithms for Mixture Preparation with Digital Microfluidic Biochips", in the Fifth Workshop on Nanocomputing and Biochips (Nano-Bio 2012), 26-28 March, 2012, Indian Statistical Institute Kolkata, India.
- Invited Talk: "Algorithms for Sample Preparation with Digital Microfluidic Biochips", in the Fourth Workshop on Nanocomputing and Biochips (Nano-Bio 2011), 1-2 March, 2011, Indian Statistical Institute Kolkata, India.
- Seminar & Poster Presentation: "Automated Dilution of Biochemical Fluids in Digital Microfluidic Biochips", in the Research Scholars' Day, 12th February, 2011, Dept. of CSE, IIT Kharagpur, India.
- Invited Talk: "Pin-Constrained Designs of Digital Microfluidic Biochips for High-Throughput Bioassays", in the IEEE International Symposium on Electronic System Design (ISED), 20th December, 2010, Bhubaneswar, India.
- Seminar: "CAD Algorithms for Digital Microfluidic Biochips", in the CSE Lecture Series, 9th August, 2010, Dept. of CSE, IIT Kharagpur, India.
- Seminar & Poster Presentation: "Computer-Aided Design (CAD) Algorithms and Techniques for Digital Microfluidic Biochips", in the Research Scholars' Day, 6th February, 2010, Dept. of CSE, IIT Kharagpur, India.
- Invited Talk: "Design and Testing of Digital Micro-fluidic Nano-Bio Chips", in the Second Workshop on Nanoscience and Biochips (Nano-Bio 2009), 16-17 February, 2009, Indian Statistical Institute Kolkata, India.

## Awards and Achievements

- Invited Talk in Dagstuhl Seminar:15352 on "Design Automation for Digital Microfluidic Biochips", in Dagstuhl, Saarbruken, Germany during August 23-26, 2015.
- EDAA and ACM SIGDA Travel Grant to attend IEEE/ACM DATE conference in Dresden, Germany during March 24-28, 2014.
- Travel Grant (Fellowship) to attend ISED conference in Nanyang Technological University, Singapore during December 12-13, 2013.
- Best Poster Award in SELECTBIO International Conference Microfluidics and Lab-on-a-Chip India held in Bangalore, India during September 27-28, 2013.
- ACM SIGDA Travel Grant to attend IEEE/ACM DATE in Grenoble, France during March 14-18, 2011.
- Microsoft Research India Ph.D. Fellowship Award in 2010 (Duration: 3.5 years

from August, 2010)
- National scholarship by the Ministry of Human Resource Development (MHRD), Government of India, for the result of B.Sc. in Physics Honors in 2001 (Duration: One time).

## Technical Skills

**Programming:** C, C++, Perl, UNIX shell script, Python
**Applications:** LaTeX, BibTeX, Other packages of Windows and Linux platforms
**Operating Systems:** Microsoft Windows, Linux, Solaris, and other UNIX variants
**Electronics Design Automation (EDA) Tools:** Synopsys Design Analyzer / Compiler, Xilinx ISE Synthesis Tool, Cadence Virtuoso Spectre, Synopsys TetraMax

## Professional Affiliations

- Member of the Institute of Electrical and Electronics Engineers (IEEE) and the Association for Computing Machinery (ACM).
- Served as a reviewer of the following journals: IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD), Springer Journal of Electronic Testing - Theory and Applications (JETTA), Springer Journal of Microfluidics and Nanofluidics, IEEE Transactions on Computers (TC), IEEE Transactions on Knowledge and Data Engineering (TKDE), Elsevier Integration, the VLSI Journal, Elsevier Microelectronics Journal, Springer Journal of Microfluidics and Nanofluidics
- Served as a reviewer of the following conferences: IEEE Students' Technology Symposium (TechSym, 2011), IEEE International Symposium on VLSI (ISVLSI, 2011), ACM/IEEE Design Automation Conference (DAC, 2013, 2014, 2015 and 2016), First International Conference on Computational Intelligence: Modeling, Techniques and Applications (CIMTA, 2013), Eighteenth International Symposium on VLSI Design and Test (VDAT, 2014 and 2016), 29th International Conference on VLSI Design (VLSID, 2016), IEEE BioMedical Circuits and Systems Conference (BioCAS, 2016), Asia and South Pacific Design Automation Conference (ASP-DAC, 2016 and 2017)
- Served as a program committee member of the following conferences: International Conference on Eco-friendly Computing and Communication Systems (ICECCS, 2013 and 2015), International Conference on Mining Intelligence and Knowledge Exploration (MIKE, 2013, 2014 and 2015), Fifth International Symposium on Electronic System Design (ISED, 2014 and 2015), Ninth IEEE International Conference on Industrial and Information Systems (ICIIS, 2014), IEEE Region 10 Conference (TENSYMP, 2015), International Conference on Next Generation Computing Technologies (NGCT, 2015), IFSA International Conference on Sensors Engineering and Electronics Instrumental Advances (SEIA, 2015), International Conference on Advances in Computing and Management (ICACM, 2016), Asia and South Pacific Design Automation Conference (ASP-DAC, 2016), IEEE International Advance Computing Conference (IACC, 2016).

## Personal Profile

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|---|---|---|
| Date of Birth | : | $1^{st}$ August 1979 |
| Marital Status | : | Married |
| (Indian) Passport No. | : | F9199535 |
| Language Known | : | English, Hindi and Bengali |
| Nationality | : | Indian |
| Residential Address | : | GH-216/4, Canal View Apartments<br>39, Civil Lines<br>Roorkee, District: Haridwar<br>Uttarakhand, Pin - 247667, India |

## Declaration

- I, hereby declare that the information furnished above is true to the best of my knowledge.

**Place:** Roorkee
**Date:** September 5, 2016

**Sudip Roy**