CV of Dr. Mohendra Roy

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AREA OF EXPERTISE AI/ML, Biomedical imaging/ processing, AI. and ML in Material Engineering

EDUCATION

Doctor of Philosophy (PhD.) in Electronics and Information Engineering (Advisor: Dr. Sungkyu Seo), Korea University (Seoul, South Korea: Sep. 2011 ~ Feb. 2016)

Dissertation: 'Biophotonic Telemedicine Device and Algorithm for Biomedical Applications using CMOS Image Sensor Based Lens-free Imaging Technology.'

Master of Technology in Bioelectronics
Dept. of E. C. E. Tezpur University (Tezpur, India: July. 2006 ~ Jun. 2008)
Thesis: 'Development of Novel Ion Sensitive Field Effect Transistor (ISFET)'

Master of Science in Physics
Tezpur University (Tezpur, India: July. 2004 ~ Jun. 2006)
Thesis: 'Magneto Optic Properties of ZnS:Mn and ZnO:Mn Nanoparticles'

Bachelor of Science in Physics
Gauhati University (Guwahati, Assam, India: July. 2001 ~ Jun. 2004)

CAREER HISTORY

Current Status: (Aug 2019 ~ Present) Full-time Assistant Professor in the Department of Information and Communication Technology, Pandit Deendayal Energy University, Gandhinagar, India.

Post Doc at NTU: (Dec 2017 ~ Jun 2019): Post Doc Research Fellow, Delta-NTU corporate Lab of Cyber-Physical System, school of EEE, Nanyang Technological University, Singapore

Assistant Professor: (April 2016 ~ Nov. 2016), Rajiv Gandhi University (A Central University), Arunachal Pradesh India (http://www.rgu.ac.in/)

Ph.D. Researcher (Sep. 2011 ~ Feb 2016)
Department of Electronics and Information Engineering
Korea University (Sejong, South Korea)

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Engineering Assistant (March. 2009 ~ Aug. 2011), Indian Oil Corporation Limited, Bongaigaon Refinery, Assam, India.

Associate Project Engineer (Dec. 2008 ~ March.2009), Indian Institute of Technology (IIT), Guwahati, Center for Energy, IIT, Guwahati

AWARDS AND HONORS

[1] Project Funding of INR 37 Lakh (March 2022), from Gujarat Council on Science and Technology (GUJCOST), Govt of Gujarat.
[2] Project funding of INR 71 Lakh (March 2021), from Science and Engineering Research Board (SERB Core) India.
[3] 2nd Prize at IISF2020 (Dec 2020), Jointly by ICMR, CSIR, DST, Ministry of Science and Technology, Government of India.
[4] Post-Doctoral Fellowship at Nanyang Technological University (NTU), Singapore (2017 to 2019).
[5] Korea University Graduate Achievement Award (February 2016), Korea University, South Korea.
[6] Best Researcher Award (Dec. 2015), by NBPL, Korea University, South Korea.
[7] IEEE Student Paper Award (Dec. 2014), by IEEE, Seoul section, Seoul, South Korea.
[8] Best Researcher Award (Dec. 2014), by NBPL, Korea University, South Korea.
[9] Outstanding Paper Award (Oct. 2014), by Biochip 2014 fall Conference, The Korean Biochip Society, Osong, South Korea.
[10] Brain Korea 21 Project Scholarship (2013 - 2016), Govt. of South Korea
[11] Korea University Ph.D. Scholarship (2011 – 2013)
[12] Meritorious Award (Feb 2009) by Indian Oil Corporation Limited BGR (BRPL)
[13] Gold medal (Dec. 2008) by Tezpur University.

RESEARCH GRANTS

[1] Title: A smart telemedicine facility for auto characterization of pathological disorders
PI: Mohendra Roy
Duration of Research: 2 years
Sources: PDPU, India
Grant No: ORSP/R&D/PDPU/2019/MR/RO051
Budget granted: Rs. 10 lakhs
Month & Year: Feb 2020

[2] Title: Development of Low Cost and Flexible Memristor Devices for High Density Data Storage and Neuromorphic Applications
PI: DR. Ankur Solanki (PI), Dr. Mohendra Roy (Co-PI), Prahalad Baruah (Co-PI)
Funding Agency: CRG, SERB.
Budget granted: INR 71 Lakh.
Grant No. CRG/2020/000869

[3] Title: Hybrid Perovskite based Flexible memristor on Paper Substrate for data Storage and Neuromorphic Computing

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PATENTS

[1] Application number: Korea: 2016-0153134 of Nov 17, 2016 "System and method for detecting milk adulteration using stalagmometer", status: Applied to The Korean Intellectual Property Office (KIPO).

[2] Design Patent: Pyramid-shaped design for compact digital inline holography (DIH) microscope, Application Number: 332427-001 dated 27th August 2020.

BOARD MEMBER:

[1] External Member, Board of Studies, Centre for Creative Learning, Rajiv Gandhi University (a Central University, Govt of India), Itanagar, Arunachal Pradesh, India (Oct 2021 till date).

[2] External Member, Board of Studies, Department of Computer Science and Engineering, Institute of Advanced Research, Gandhinagar, Gujarat 382426, India. (May 2022 till date)

PROFESSIONAL SERVICES

[1] Course Coordinator of Master of Technology in Artificial Intelligence of Dept of ICT, Pandit Deendayal Energy University, Gandhinagar

[2] NAAC Criterion 3 and Criteria 5 coordinator of Dept of ICT, Pandit Deendayal Energy University, Gandhinagar

[3] Member of Program/curriculum development committee of M. Tech. AI, B. Tech ECE and B. Tech ICT of Dept of ICT, Pandit Deendayal Energy University, Gandhinagar

[4] Co-Editor, Special issue: "In silico Methods and Artificial Intelligence in Antimalarial Drug Discovery", Journal of *Frontiers in Tropical Diseases* (May 2022 to date)

[5] Guest editor, Materials today proceedings Journal, Materials Today (Nov 2021 to till date).

[6] External Member, Board of Studies, Centre for Creative Learning, Rajiv Gandhi University (a Central University, Govt of India), Itanagar, Arunachal Pradesh, (Oct 2021 till date).

[7] External Member, Board of Studies, Department of Computer Science and Engineering, Institute of Advanced Research, Gandhinagar, Gujarat 382426, India. (May 2022 till date)

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[8] Executive committee member and treasurer of IEEE Computational Intelligence Society (CIS), IEEE Gujarat.

[9] Technical Program Committee (TPC) member for National Seminar on Computer Vision and Image processing (NaSCoVIP) 2020, by IEEE Gujarat.

[10] Session Chair, 2018 IEEE Symposium Series on Computational Intelligence (IEEE SSCI 2018).

[11] Academic Mentor, Students Start-up, and Innovation Policy, Govt of Gujarat.

[12] Reviewer of Nature Scientific Reports Journal, IEEE Sensors Journal, Biomedical Optics Express Journal, Optics Express journal, Journal of Tissue and Cells, Springer Mobile Networks and Applications Journal, Proceedings of IEEE, IEEE/ASME Transactions on Mechatronics, Optics and Lasers in Engineering, MDPI Algorithms, MDPI-Sensors.

INVITED TALKS

[1] Invited Expert talk on "Applications of Artificial Intelligence in Healthcare", at a SERB workshop, organised by Department of Science and Technology (DST), Govt of India at North-Eastern Hill University (Central University), India on 19 to 24 Sept 2022.

[2] Invited Expert Talk on "Application of Artificial Intelligence on Biological Sciences" at Bodoland University, Bodoland Territorial Council, India on 27 June 2022.

[3] Department of Physics, Jagannath Barooah College, Jorhat, Assam, at a two-day workshop on "Applications of Laser Based Imaging in Material Science (ALBIMS)" during 11-12 March 2022

[4] Invited expert talk, "International Conference on Convergence of Interdisciplinary Science", by SCINTIA RESEARCH FOUNDATION (https://www.srfglobal.org/), India, Feb 19-20, 2022

[5] Tutorial presented at 13th Annual summit of Asia pacific signal and information processing association, Tokyo Japan, 14 Dec 2021

[6] Nirma University, Gandhinagar, Expert talk on "Artificial Intelligence and Machine Learning for Healthcare " on 22 July 2021

[7] North-Eastern Hill University (Central University, Govt of India), Invited talk on "Recent Trends in Science and Technology" on 26th February 2021.

[8] Centre for Nanoscience & NanoTech, Dept of Physics, Punjab University (central university, Govt of India), Chandigarh on 7th Nov 2020. For a talk on "Artificial Intelligence in material Science "

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[9] Birjhora Mahavidyalaya, Assam, Invitation as a Resource Person in the webinar on "Industry 4.0 and its Impact", 31st July 2020

[10] Jorhat Institute of Science and Technology (JIST), Assam, for Technical Education Quality Improvement Programme (TEQIP) of MHRD, Government of India, Invited as a resource person for a talk on "Opportunities in AI and ML", on 11 July 2020.

[11] Northeast Centre for Technology Application & Reach (NECTAR), Department of Science and Technology (DST), Government of India, invited as an expert for a brainstorming session to develop Northeast India, on 20 Nov 2019.

JOURNAL PUBLICATIONS

[1] Monika Patel, Neelgund Ramesh Hemanth, Jeny Gosai, Ranjit Mohili, Ankur Solanki, Mohendra Roy, Baizeng Fang, Nitin K. Chaudhari, MXenes: promising 2D memristor materials for neuromorphic computing components, Trends in Chemistry, Volume 4, Issue 9, 2022, Pages 835-849, ISSN 2589-5974, https://doi.org/10.1016/j.trechm.2022.06.004

[2] Vaghashiya R, Shin S, Chauhan V, Kapadiya K, Sanghavi S, Seo S, Roy M., Machine Learning Based Lens-Free Shadow Imaging Technique for Field-Portable Cytometry. Biosensors. 2022; 12(3):144. https://doi.org/10.3390/bios12030144

[3] Divy Patel, Dhairya Shah, Param Modi, Mohendra Roy, Artificial intelligence powered material search engine, Materials Today: Proceedings, 2022, ISSN 2214-7853, https://doi.org/10.1016/j.matpr.2022.01.120.

[4] Bapi Kar; Pradeep Kumar Gopalakrishnan; Sumon Kumar Bose; Mohendra Roy; Arindam Basu, "ADIC: Anomaly Detection Integrated Circuit in 65-nm CMOS Utilizing Approximate Computing", IEEE Transactions on Very Large Scale Integration (VLSI) Systems, 02 September 2020, DOI: 10.1109/TVLSI.2020.3016939 ,

[5] Sumon Kumar Bose, Bapi Kar, Mohendra Roy, Pradeep Kumar Gopalakrishnan, Lei Zhang, Aakash Patil, and Arindam Basu, "ADEPOS: A Novel Approximate Computing Framework for Anomaly Detection Systems and Its Implementation in 65-nm CMOS", IEEE Transactions on Circuits and Systems I: Regular Papers, PP 913 - 926 ,Volume: 67 , Issue: 3 , March 2020, DOI: 10.1109/TCSI.2019.2958086.

[6] Mohendra Roy, D. Seo, and S. Seo, "Recent development of lens-free imaging and sensing," Biosensors and Bioelectronics, Volume 88, 15 February 2017, Pages 130–143 DOI: 10.1016/j.bios.2016.07.115, Impact Factor: 9.51, Q1 category

[7] Mohendra Roy, D. Seo, Y. Hwang, S. Oh, and S. Seo, "Automated Micro-Object Detection for Mobile Diagnostics Using Lens-Free Imaging Technology, " Invited Paper, Diagnostics 2016, 6(2), 17; doi:10.3390/diagnostics6020017. , Impact Factor: 2.48, Q2 category

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[8] Y. Hwang, D. Seo, Mohendra Roy, E. Han, R.N. Candler, and S. Seo, "Capillary flow in PDMS cylindrical microfluidic channel using 3D printed mold", Journal of Microelectromechanical Systems, Volume: 25, Issue: 2, April 2016 DOI: 10.1109/JMEMS.2016.2521858 (2016). Impact Factor: 2.62, Q1 category

[9] Mohendra Roy, G. Jin, J-H Pan, D. Seo, Y Hwang, S. Oh, M. Lee, Y. J. Kim, and S. Seo, "Staining-free cell viability measurement technique using lens-free shadow imaging platform," Sensors and Actuators B: Chemical, Vol. 224, PP. 577-583(2016). https://doi.org/10.1016/j.snb.2015.10.097 Impact Factor: 6.39, Q1 category

[10] Mohendra Roy, D. Seo, C.-H. H. Oh, M.-H. H. Nam, Y. J. Kim, and S. Seo, "Low-cost telemedicine device performing cell and particle size measurement based on lens-free shadow imaging technology," Biosensors and Bioelectronics, vol. 67, pp. 715–723, 2015. https://doi.org/10.1016/j.bios.2014.10.040 Impact Factor: 9.51, Q1 category

[11] Mohendra Roy, G. Jin, D. Seo, M.-H. Nam, and S. Seo, "A simple and low-cost device performing blood cell counting based on lens-free shadow imaging technique," Sensors and Actuators B: Chemical, vol. 201, pp. 321-328, 2014.   . https://doi.org/10.1016/j.snb.2014.05.011 Impact Factor: 6.39, Q1 category

[12] Nirmal Misra, Mohendra Roy, Dambarudhar Mohanta, Kishor Kumar Baruah, Amarjyoti Choudhury "Photochromism and magneto-optic response of ZnO:Mn semiconductor quantum dots fabricated by microemulsion route" Central European Journal of Physics, Vol 6, Issue 1, pp. 109-115, 2008.   doi:10.2478/s11534-008-0025-1   Impact Factor: 1.08, Q3 category

BOOK CHAPTERS:

[1] Role of Artificial Intelligence Based Wireless Sensor Network for Pandemic Control: A Case Study Using CupCarbon, River publishers and IEEE Explore, ISBN 9788770224420

[2] Glioblastoma Multiforme Patient Survival Prediction, Lecture Notes in Electrical Engineering, vol 784. Springer, Singapore. https://doi.org/10.1007/978-981-16-3880-0_6

CONFERENCE PUBLICATIONS

[1] M Raval, S Rajput, M Roy, R Agravat, Glioblastoma multiforme patient survival prediction, Proceedings of 2021 International Conference on Medical Imaging and Computer-Aided Diagnosis (MICAD 2021): Medical Imaging and Computer-Aided Diagnosis, 784, 47, Springer Nature.

[2] Rajkumar Vaghashiya, Kaushal Kapadiya, Riya Thakore, Ishita Nandwani, Dongmin Seo, Sungkyu Seo, and Mohendra Roy, "An Optimized Neural Network Architecture for Auto Characterization of Biological Cells in Digital Inline Holography Micrographs", IEEE ICHI 2020, 8TH IEEE INTERNATIONAL CONFERENCE ON HEALTHCARE INFORMATICS, 15-18 June, 2020 OLDENBURG, Germany

[3] Varun Chauhan, Smit Sanghavi, Jeanie Jessica, Vishwajeet Jadeja, Dongmin Seo, Sungkyu Seo, and Mohendra Roy, "ANNSESDIHM: An Artificial Neural Network based Signal Enhancement Scheme for Digital Inline Holography (DIH) Microscope", IEEE ICHI 2020, 8TH IEEE INTERNATIONAL CONFERENCE ON HEALTHCARE INFORMATICS, 15-18 June, 2020 OLDENBURG, Germany

[4] Mohendra Roy and Sungkyu Seo, "A smart telemedicine device for auto diagnosis of pathological disorders in human blood ", Young Scientist Conference 2019, BBCC, Kolkata, India. 5- 7 Nov 2019

[5] Pradeep Gopalakrishnan, Bapi Kar, Sumon Bose, Mohendra Roy and Arindam Basu"Live Demonstration: Autoencoder-Based Predictive Maintenance for IoT", live demonstration at the 2019 IEEE International Symposium on Circuits and Systems (ISCAS 2019), in Sapporo, Japan, May 26-29, 2019.

[6] Sumon Kumar Bose, Bapi Kar, Mohendra Roy, Pradeep Kumar Gopalakrishnan, Arindam Basu, "ADEPOS: Anomaly Detection based Power Saving for Predictive Maintenance using Edge Computing", ASP-DAC JAPAN Jan, 2019. (https://dl.acm.org/citation.cfm?id=3287716)

[7] Mohendra Roy, Sumon Bose, Bapi Kar, Pradeep Kumar Gopalakrishnan, and Arindam Basu "A Stacked AutoEncoder Neural Network based Automated Feature Extraction Method for Anomaly detection in On-line Condition Monitoring", Presented at IEEE-SSCI Nov, 2018. https://ieeexplore.ieee.org/abstract/document/8628810

[8] Dongmin Seo, Mohendra Roy, Sangwoo Oh, Junhee Lee, Yongju Kim, Yongha Hwang, Jaewoo kim, Kiyoung Ann, and Sungkyu Seo: Stain-free mammalian cell counting and viability measurement platform, Biosensors 2016, 25-27 May 2016 Swedish Exhibition and Congress Centre, Gothenburg, Sweden

[9] Mohendra Roy, Yeonghun Chae, Dongmin Seo, Jaewoo Kim, Kiyoung Ann, Sangwoo Oh and Sungkyu Seo: Cell image characterization using deep learning algorithm, ILSBE 2015, Tokyo, Japan; 02-04 December 2015

[10] Mohendra Roy, Dongmin Seo, Yongha Hwang, Jaewoo Kim, Kiyoung Ann, Yeon Hwa Kwak, Sangwoo Oh, Moonjin Lee, Sungkyu Seo: Lens-free automated cell detection system for telemedicine application. IEEE Sensors 2015, Busan, South Korea; 1-4 November 2015

[11] Mohendra Roy, Dongmin Seo, Jaewoo Kim, Sungkyu Seo, Sangwoo Oh: Smartphone based automated microparticle analysis system. International conference on Computer, Communication, Control and Information Technology, Academy of Technology, West Bengal, India; 07-08/02/2015

[12] Mohendra Roy, Dongmin Seo, Jaewoo Kim, Sangwoo Oh, Sungkyu Seo: An automated detection algorithm for lens-free imaging system. IEEE Paper Contest 2014, Seoul; 06/12/2014

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[13] Mohendra Roy, Dongmin Seo, Jaewoo Kim, Sang Woo Oh, Sungkyu Seo: Optimization of Plasmonic Nanohole Array Sensor-design for Biosensing Application. Biochip 2014 fall, Osong, Korea; 02/10/2014 (Selected for the outstanding paper award)

[14] Dongmin Seo, Mohendra Roy, Myung-Hyun Nam, Sungkyu Seo: Development of poikilocyte Detection Method Using Lensfree Shadow Imaging Technique. Biochip 2014 fall, Osong, Korea; 10/2014

[15] Mohendra Roy, G. Jin, D. Seo, M-H Nam, and S. Seo: Shadow Image Based Portable Cell Counter (SIPCC). Biosensors 2014, Melbourne Australia. 27-30/05/2014

[16] S. Oh, M. Lee, S. Seo, Mohendra Roy, J. Kim: Underwater Multispectral Imaging System for Environmental Monitoring. IEEE/MTS, Oceans'14, Taipei, Taiwan; 07-10/04/2014

[17] Mohendra Roy, G. Jin, D. Seo, S. Seo: A Modified Hough Scheme Based Automated Cell Counting Method for the Lens-free Shadow Imaging Platform. International Conference on Green and Human Information Technology (ICGHIT), 2014, Ho Chi Minh City, Vietnam; 12-14/02/2014

[18] G. Jin, Mohendra Roy, J.-H. Pan, Y.J. Kim, S. Seo: Reagent-free Cell Viability Measurement Using Lens-free CMOS Image Sensor, IEEE Life Sciences Grand Challenges Conference, IEEE, U-Town, NUS, Singapore; 2-3/12/2013

[19] Mohendra Roy, Jin, Y. H. Kwak, S. Oh, S. Seo: Automated Cell Size Profiling Using Lens-free Shadow Imaging Technique. The Korean Biochip Society, fall 2013, Gangwon, Korea; 13-14/11/2013

[20] Mohendra Roy, Junhee Lee, Geonsoo Jin, Sungkyu Seo: An automated Cell Detection Algorithm for Lensfree Shadow Imaging Platform. International Conference on Emerging Trends in Communication, Control, Signal processing & Computing Application, Bangalore, INDIA; 11-11/10/2013

[21] S. Seo, Mohendra Roy, S. Han: Generation of less-diffractive nanoscale beam using a single aperture type plasmonic lens. SPIE 2013 Optics+Optoelectronics, Prague, Czech Republic; 16-17/04/2013

[22] J. Lee, H.-S. Kim, Mohendra Roy, S.-H. Peak, S. Seo: Detection of Listeria Monocytogenes using a CMOS image sensor based light absorption measurement platform. The 4-th International Conference on Microelectronics and Plasma Technology (ICMAP 2012), Jeju, Korea; 4-6/07/2012

[23] Mohendra Roy, Santanu Sharma: A Novel Approach for Modeling the Threshold Voltage of Cylindrical Ion Sensitive Field Effect Transistor. International Conference on Emerging Trends in Electronic and Photonic Devices & Systems (ELECTRO-2009), 2009, Banaras Hindu University, Banaras, India.; 22-24/12/2009, Macmilllan Publishers India limited. ISBN: 978-0230-32851-8, PP 54

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PERSONAL INFORMATION

Date of Birth: 26 June 1982
Nationality: Indian
Language Known: English (Fluent), Hindi (Fluent), Korean (Basic)
Hobby: Volunteer at the Art of Living organization (since from 2007)

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