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URL: <http://www.eecs.berkeley.edu/Faculty/Homepages/salahuddin.html>

EDUCATION

PhD, Dec, 2007	Electrical and Computer Engineering	Purdue University, West Lafayette, IN.
B. Sc. May, 2003	Electrical and Electronic Engineering	Bangladesh University of Engineering and Technology, Dhaka.

PROFESSIONAL EXPERIENCE

2019- present	TSMC Distinguished Professor	EECS, UC Berkeley
2017-2019	Professor	EECS, UC Berkeley
2014-2017	Associate Professor	EECS, UC Berkeley
2008-2014	Assistant Professor	EECS, UC Berkeley
2008	Post-doctoral research associate	Purdue University, West Lafayette, IN.
2007	Research intern	IBM Almaden Research Center, San Jose, CA.

TECHNOLOGY TRANSFER

- Co-founded Sonera Magnetics which is developing next generation brain-machine interface technology(<https://www.linkedin.com/company/sonera-magnetics/>)
- Patent licensed for use as the core technology by Sunrise 3D which is developing 3D memory solutions (<https://www.linkedin.com/company/sunrisememory/>)

TECHNICAL CONSULTING

- Consulted for Multiple Tier 1 memory companies and electronic material companies in the broad areas of transistors, memory cells, fabrication and material synthesis.

LITIGATION CONSULTING

- Expert witness on lithography technology related to FINFET technology (Retained by Latham & Watkins)
- Expert witness on technology related to FINFET fabrication processes (Retained by Wilmer Hale)
- Expert witness on technology related to heteroepitaxy and conformal synthesis of materials in the context of advanced transistor fabrication (Retained by Wilmer Hale)
- Expert witness on technology related to simulation of structures and current flow related to advanced transistors (Retained by Wilmer Hale)

LEADERSHIP and SERVICE HIGHLIGHTS

- Member of the Technical Advisory Board, Natcast, the operator for the National Semiconductor Technology Center
- Was member of the organizing team of multiple NSF panels on Microelectronics in the context of the CHIPS act. Specifically, coined the term CMOS+X and was the main organizer of a NSF workshop with the same name. CMOS+X has become one of the main research themes for NSF in this area as reflected in the request for proposals of multiple NSF initiatives.
- Co-authored the DOE Basic Research Needs for Microelectronic Document which led to EFRC initiatives in 2019 and DOE Lab initiatives in 2020.
- Director, E2CDA/ENIGMA center. A center on Energy Efficient Learning Machines, jointly supported by National Science Foundation (NSF) and Semiconductor Research Corporation (SRC).
- Co-Director, ASCENT, one of the six centers within the JUMP initiative, an effort jointly funded by DARPA and Semiconductor Research Corporation.
- Founder Co-Director of the Berkeley Center for Negative Capacitance Transistors, a center supported by Industry Affiliate Members. Co-directed with Chenming Hu.
- Founder Co-Director of the Berkeley Device Modeling Center. Co-Directed with Chenming Hu.
- Member, IEEE Electron Devices Society Publications Committee
- Panel member, Symposium on VLSI Technology (2021), IEDM evening panel, 2016, DRC evening panel (2018).
- Chair, the EDS committee on Nanotechnology (2014-2017).
- Served in the technical committee of leading conferences on electronic and spintronic devices such as IEDM, DRC, Symposium of VLSI Technology, Intermag.
- Served as one of the editors of IEEE Electron Devices Letters (2013-2017)

SELECTED AWARDS AND HONORS

- 2025 IEEE Andrew Grove Award
- 2024 Fellow, American Association for the Advancement of Science (AAAS)
- 2020 Fellow, American Physical Society (APS)
- 2019 IEEE George E Smith Award
- 2019 Fellow, Institute of Electrical and Electronics Engineers (IEEE)
- 2016 Presidential Early Career Award for Scientist and Engineers (PECASE)
- 2013 Army Research Office (ARO) YIP (Young Investigator Program) Award
- 2013 Air Force Office of Scientific Research (AFOSR) Young Investigator Award
- 2013 Participant in the National Academy German American Frontiers of Engineering Symposium
- 2012 IEEE Nanotechnology Council Early Career Award
- 2012 NSF CAREER Award
- 2010 Hellman Family Faculty Fellow
- 2009 UC Regents Junior Faculty Fellowship
- 2007 MARCO/FCRP Inventor Recognition Award

- 2007 IBM PhD Fellowship
- 2003 Kintarul Haque Gold Medal, Bangladesh University of Engineering and Technology (BUET)
(top of the graduating class)

SELECTED STUDENTS' AWARDS

- 2020 Best paper Award, Device Research Conference (Ava Tan)
- 2019 First prize and Gold medal, ACM Student Research Competition (Elizabetha Tresmina)
- 2019 Best paper award, IEEE VLSI-TSA conference (Ava J Tan)
- 2017 Intelligence Community postdoctoral fellowship, Dominic Labanowski
- 2013 Best paper award, IEEE VLSI-TSA conference (with A. I. Khan, C. Yeung, A Sarker and C. Hu).
- 2013 Best paper award, IEEE Transactions on VLSI systems (with J. Li, P. Ndai, A. Goel and K. Roy).
- 2012 Qualcomm Innovation Fellowship (A. I. Khan & C. Yeung).
- 2012 Ross Tucker Award for outstanding thesis, 2012, John T. Heron (co-advised with R. Ramesh).
- 2011 Silver award (device category), 5th TSMC outstanding student research award (A. I. Khan).

SELECTED PRESS

- Multiple Department of Energy Basic Energy Sciences Highlights
- Many news articles about research in Nature, Nature Nano, Nature Materials, Physics View Point and other science news outlets e.g. Physics.org and popular technology blogs such as CNET.
- [2 papers were selected in the list of most notable 50 papers among all areas](#) published in Applied Physics Letters between 2009-2012.
- Multiple papers selected for NSF Highlights.
- 5 Journal papers selected for cover story
- First experimental demonstration of negative capacitance stayed as top 20 downloaded papers from APL for two consecutive months.
- Negative Capacitance FET has been listed in the ITRS since 2009.
- Two highlights in the Berkeley Science Review

Education and Outreach and Societal Impact:

Till now, 24 Graduate students and 21 postdoctoral research associates have graduated from Salahuddin's group in the material physics and electronic applications area.

In addition, Salahuddin has mentored 163 undergraduate researchers in these areas over the last 14 years. A large number of these student advisees are women or represent other underrepresented groups. Salahuddin routinely works with minority serving institutions in California as well as HBCUs for recruiting students in his group.

Innovations from Salahuddin's group are currently being used in two different startup companies for commercialization.

Simulation codes developed at Salahuddin's group have been adopted by major semiconductor companies

Salahuddin also co-directs BSIM model development at Berkeley together with Chenming Hu. The BSIM models, *which are open source*, are used as standard models for circuit and system level simulation in the semiconductor industry, making a yearly economic impact of billions of dollars. Additionally, open source BSIM codes are used by thousands of researchers all over the world.

Major Research Accomplishments

- Salahuddin is mostly known for the discovery of the Negative Capacitance effect in ferroelectric materials and the invention of the Negative Capacitance transistors in 2008. Over the last decade Salahuddin performed a series of fundamental work at Berkeley, which established Negative Capacitance *as a new field of research* both in material physics and electronic devices. Indeed, a number of publications has been reported in top tier science journals such as Nature and Nature family journals on negative capacitance from all over the world (in addition to Salahuddin's own publications in these venues). The premier conferences in Physics and Material Science such as the American Physical Society March meeting and Material Research Society Meetings in the Fall and Spring have seen many papers on negative capacitance in the recent years. Tremendous activities have ensued in the electronic devices community. The two most premier conferences in this area are International Electron Devices Meeting (IEDM) and Symposium on VLSI Technology (VLSI). There were two dedicated sessions on negative capacitance transistors in each of IEDM 2017 and VLSI 2018. In IEDM 2018, there were two dedicated sessions and then more papers in the other sessions. The S3S conference in 2018 ran a 3-day long special session only on negative capacitance transistors. This is in addition to 10's of papers that are being published in various journals every year. Major semiconductor industries have also initiated work and published on negative capacitance transistors (such as Intel, Samsung, GlobalFoundries, Applied Materials), including a fully integrated demonstration on the 14nm FINFET platform from GlobalFoundries. Going beyond electronic devices, negative capacitance is also being investigated for super capacitor and solid-state battery applications. Starting from a concept, Negative Capacitance has now become an area of intense research in both scientific and electronic device communities.
- Over the last few years Salahuddin's work has accomplished the thinnest ferroelectrics directly on silicon, showing that
 - Robust ferroelectricity is achievable below 2 nm in doped HfO₂ films directly integrated on silicon and the ferroelectricity gets enhanced with decreasing thickness, balking the trend observed in conventional perovskite ferroelectric and considered fundamental (*Nature 2020*)
 - Negative capacitance can be stabilized in a mixed phase ferroelectric below 2 nm – these films, when used as a gate of a Si transistor demonstrated record performance (*Nature 2022*)
 - Simple binary oxide like ZrO₂ goes through a phase transition when thinned down and shows robust ferroelectricity down to single unit cell thickness or their Two dimensional limit (*Science 2022*).
- In 2014, Salahuddin's group demonstrated the first example of a nanomagnetic logic without the requirement for a magnetic field. A three to four orders of magnitude reduction of energy dissipation was demonstrated compared to state of the art. In 2015, Salahuddin's group also demonstrated switching of perpendicular magnets using an in-plane current, without the need of a magnetic field, by engineering a symmetry breaking in the system. In addition, Salahuddin is the inventor or co-inventor of a number of spin based computing concepts, known as 'all spin logic' (ASL), 'charge

coupled spin logic' (CSL), 'probabilistic spin logic' (PSL), etc. These computing concepts are currently investigated by researchers all over the world in both academia and industry.

- In a surprising prediction in 2012, Salahuddin showed that it should be possible, exploiting the physics of magnetostriction, to obtain ferromagnetic resonance (FMR) just with a voltage and without the need of any external magnetic field. In a series of experiments through 2016-17, Salahuddin's group has experimentally demonstrated such magnetic resonance with purely voltage driven excitation. This phenomenon shows potential for extremely high-resolution sensing of magnetic fields that can enable diverse applications such as brain imaging, functional MRI, cancer remedy etc. Building on the underlying physics of this phenomenon, Salahuddin's group has recently demonstrated a direct excitation of a two-level quantum system, at room temperature, completely electrically. This work could have substantial impact on the emerging field of quantum computing.
- Salahuddin is widely known as one of the firsts to study the potential of two-dimensional semiconductors. Today, the two-dimensional semiconductors are the topic of intense research all over the world. In a pioneering work in 2011 titled, 'How Good Can Monolayer MoS₂ Transistors be?' Salahuddin laid out the early ground work for the potential of these materials for advanced electronics. In addition, simulation work done at Salahuddin's group has led to new ideas such as 'Barrier-free tunneling' in nanotube junctions, negative differential resistance in carbon heterojunctions, resonant tunneling in the source of a MOSFET to provide steep turn ON of the transistor etc. The concept of 'barrier free' tunneling in carbon based tunnel transistors was [selected as one of the 50 most notable papers](#) among all areas between 2009-2012 published by APL).

***PUBLICATIONS IN PEER REVIEWED JOURNALS AND CONFERENCE
PROCEEDINGS***

Published: Journals in [J#] and Conferences in [C#]

2022

- J178.** [“Logically synthesized and hardware-accelerated restricted Boltzmann machines for combinatorial optimization and integer factorization”](#)
Saavan Patel and Philip Canozza and Sayeef Salahuddin
Nature Electronics, 5, 92-101, 2022.
- J177.** [“One nanometer HfO₂-based ferroelectric tunnel junctions on silicon”](#)
Suraj S Cheema and Nirmaan Shanker and Cheng-Hsiang Hsu and Adhiraj Datar and Jongho Bae and Daewoong Kwon and Sayeef Salahuddin
Advanced Electronic Materials, 8, 2100499, 2022.
- J176.** [“RKKY Exchange Bias Mediated Ultrafast All-Optical Switching of a Ferromagnet”](#)
Jyotirmoy Chatterjee and Debanjan Polley and Akshay Pattabi and Hyejin Jang and Sayeef Salahuddin and Jeffrey Bokor
Advanced Functional Materials, 32, 2107490, 2022.
- J175.** [“Fast Read-After-Write and Depolarization Fields in High Endurance n-Type Ferroelectric FETs”](#)
Michael Hoffmann and Ava Jiang Tan and Nirmaan Shanker and Yu-Hung Liao and Li-Chen Wang and Jong-Ho Bae and Chenming Hu and Sayeef Salahuddin
IEEE Electron Device Letters, 43, 717-720, 2022.
- J174.** [“Ultrathin ferroic HfO₂/ZrO₂ superlattice gate stack for advanced transistors”](#)
Suraj S Cheema and Nirmaan Shanker and Li-Chen Wang and Cheng-Hsiang Hsu and Shang-Lin Hsu and Yu-Hung Liao and Matthew San Jose and Jorge Gomez and Wriddhi Chakraborty and Wenshen Li and others
Nature, 604, 65-71, 2022.
- J173.** [“Innovating at Speed and at Scale: A Next Generation Infrastructure for Accelerating Semiconductor Technologies”](#)
Richard A Gottscho and Edlyn V Levine and Tsu-Jae King Liu and Paul C McIntyre and Subhasish Mitra and Boris Murmann and Jan M Rabaey and Sayeef Salahuddin and Willy C Shih and H-S Philip Wong
arXiv preprint arXiv:2204.02216, 2022.
- J172.** [“Accelerated Ultrafast Magnetization Dynamics at Graphene/CoGd Interfaces”](#)
Sucheta Mondal and Yuxuan Lin and Debanjan Polley and Cong Su and Alex Zettl and Sayeef

Salahuddin and Jeffrey Bokor
ACS nano, 16, 9620-9630, 2022.

- J171.** [“A Compact Model of Nanoscale Ferroelectric Capacitor”](#)
Chien-Ting Tung and Girish Pahwa and Sayeeff Salahuddin and Chenming Hu
IEEE Transactions on Electron Devices, 69, 4761-4764, 2022.
- C70.** [“On the PBTI Reliability of Low EOT Negative Capacitance 1.8 nm HfO₂-ZrO₂ Superlattice Gate Stack on L_g= 90 nm nFETs”](#)
Nirmaan Shanker and Li-Chen Wang and Suraj Cheema and Wenshen Li and Nilotpal Choudhury and Chenming Hu and Souvik Mahapatra and Sayeeff Salahuddin
2022 IEEE Symposium on VLSI Technology and Circuits (VLSI Technology and Circuits), 421-422, 2022.
- J170.** [“Critical Importance of Nonuniform Polarization and Fringe Field Effects for Scaled Ferroelectric FinFET Memory”](#)
Girish Pahwa and Sayeeff Salahuddin and Chenming Hu
IEEE Transactions on Electron Devices, 2022.
- 2021**
- J169.** [“Unifying femtosecond and picosecond single-pulse magnetic switching in Gd-Fe-Co”](#)
Florian Jakobs and T A Ostler and C-H Lambert and Yang Yang and Sayeeff Salahuddin and Richard B Wilson and Jon Gorchon and Jeffrey Bokor and Unai Atxitia
Physical Review B, 103, 104422, 2021.
- J168.** [“Local negative permittivity and topological phase transition in polar skyrmions”](#)
Sujit Das and Zijian Hong and V A Stoica and M A P Gonçalves and Yu-Tsun Shao and Eric Parsonnet and Eric J Marksz and Sahar Saremi and M R McCarter and A Reynoso and others
Nature materials, 20, 194-201, 2021.
- J167.** [“Novel Spin-Orbit Torque Generation at Room Temperature in an All-Oxide Epitaxial La_{0.7}Sr_{0.3}MnO₃/SrIrO₃ System”](#)
Xiaoxi Huang and Shehrin Sayed and Joseph Mittelstaedt and Sandhya Susarla and Saba Karimeddiny and Lucas Caretta and Hongrui Zhang and Vladimir A Stoica and Tanay Gosavi and Farzad Mahfouzi and others
Advanced Materials, 33, 2008269, 2021.
- J166.** [“Electric field-induced permittivity enhancement in negative-capacitance fet”](#)
Yu-Hung Liao and Daewoong Kwon and Suraj Cheema and Nirmaan Shanker and Ava J Tan and Ming-Yen Kao and Li-Chen Wang and Chenming Hu and Sayeeff Salahuddin
IEEE Transactions on Electron Devices, 68, 1346-1351, 2021.
- J165.** [“Epitaxial ferroelectric Hf_{0.5}Zr_{0.5}O₂ with metallic pyrochlore oxide electrodes”](#)
Zimeng Zhang and Shang-Lin Hsu and Vladimir A Stoica and Hanjong Paik and Eric Parsonnet and Alexander Qualls and Jianjun Wang and Liang Xie and Mukesh Kumari and Sujit Das and others
Advanced materials, 33, 2006089, 2021.
- J164.** [“Energy Storage and Reuse in Negative Capacitance”](#)
Ming-Yen Kao and Yu-Hung Liao and Girish Pahwa and Avirup Dasgupta and Sayeeff Salahuddin and Chenming Hu
IEEE Transactions on Electron Devices, 68, 1861-1865, 2021.

- J163.** [“Ferroelectric HfO₂ memory transistors with high-Å³ interfacial layer and write endurance exceeding 10¹⁰ cycles”](#)
Ava Jiang Tan and Yu-Hung Liao and Li-Chen Wang and Nirmaan Shanker and Jong-Ho Bae and Chenming Hu and Sayeef Salahuddin
IEEE Electron Device Letters, 42, 994-997, 2021.
- J162.** [“Negative capacitance enables GAA scaling VDD to 0.5 V”](#)
Ming-Yen Kao and Sayeef Salahuddin and Chenming Hu
Solid-State Electronics, 181, 108010, 2021.
- C69.** [“Ultrathin Ferroelectricity and Its Application in Advanced Logic and Memory Devices”](#)
Sayeef Salahuddin
2021 IEEE International Reliability Physics Symposium (IRPS), 1-4, 2021.
- J161.** [“Unified framework for charge-spin interconversion in spin-orbit materials”](#)
Shehrin Sayed and Seokmin Hong and Xiaoxi Huang and Lucas Caretta and Arnoud S Everhardt and Ramamoorthy Ramesh and Sayeef Salahuddin and Supriyo Datta
Physical Review Applied, 15, 54004, 2021.
- J160.** [“Compact modeling of temperature effects in FDSOI and FinFET devices down to cryogenic temperatures”](#)
Girish Pahwa and Pragma Kushwaha and Avirup Dasgupta and Sayeef Salahuddin and Chenming Hu
IEEE Transactions on Electron Devices, 68, 4223-4230, 2021.
- J159.** [“Atomic scale understanding of the electronic structure of 5d-3d perovskite oxide heterostructures using STEM-EELS.”](#)
Sandhya Susarla and Xiaoxi Huang and Shehrin Sayed and Lucas Caretta and Hongrui Zhang and Sayeef Salahuddin and Peter Ercius and Ramamoorthy Ramesh
Microscopy and Microanalysis, 27, 356-358, 2021.
- J158.** [“A compact model of polycrystalline ferroelectric capacitor”](#)
Chien-Ting Tung and Girish Pahwa and Sayeef Salahuddin and Chenming Hu
IEEE Transactions on Electron Devices, 68, 5311-5314, 2021.
- J157.** [“A voltage-controlled gain cell magnetic memory”](#)
Shehrin Sayed and Cheng-Hsiang Hsu and Sayeef Salahuddin
IEEE Electron Device Letters, 42, 1452-1455, 2021.
- J156.** [“Double-peaked resonance in harmonic-free acoustically driven ferromagnetic resonance”](#)
Adi Jung and Dorotea Macri and Samuel Margueron and Ausrine Bartasyte and Sayeef Salahuddin
Applied Physics Letters, 119, 142403, 2021.
- J155.** [“Large Injection Velocities in Highly Scaled, Fully Depleted Silicon on Insulator Transistors”](#)
Yu-Hung Liao and Khandker Akif Aabrar and Wriddhi Chakraborty and Wenshen Li and Suman Datta and Sayeef Salahuddin
IEEE Electron Device Letters, 43, 184-187, 2021.
- C68.** [“Towards the Integration of Hf 0.8 Zr 0.2 O₂-based Negative Capacitance Dielectrics on \$\beta\$ -Ga₂O₃ Substrates”](#)
Guillermo A Salcedo and Ahmad E Islam and Michael K Dietz and Suraj Cheema and Kevin D Leedy and Kyle J Liddy and Andrew J Green and Weisong Wang and Sayeef Salahuddin and Kelson D Chabak and others

NAECON 2021-IEEE National Aerospace and Electronics Conference, 7-11, 2021.

- C67.** [“Demonstration of Low EOT Gate Stack and Record Transconductance on \$L_g = 90\$ nm nFETs Using 1.8 nm Ferroic HfO₂-ZrO₂ Superlattice”](#)
W Li and L C Wang and S S Cheema and N Shanker and J H Park and Y H Liao and S L Hsu and C H Hsu and S Volkman and U Sikder and others
2021 IEEE International Electron Devices Meeting (IEDM), 13-16, 2021.
- C66.** [“FeFETs for Near-Memory and In-Memory Compute”](#)
Saveef Salahuddin and Ava Tan and Suraj Cheema and Nirmaan Shanker and Michael Hoffmann and J-H Bae
2021 IEEE International Electron Devices Meeting (IEDM), 14-19, 2021.
- 2020**
- J154.** [“Ferroelectric Domain Wall Motion in Freestanding Single-Crystal Complex Oxide Thin Film”](#)
Saidur R Bakaul and Jaegy Kim and Seungbum Hong and Mathew J Cherukara and Tao Zhou and Liliana Stan and Claudy R Serrao and Sayeeef Salahuddin and Amanda K Petford-Long and Dillon D Fong and others
Advanced Materials, 32, 1907036, 2020.
- C65.** “Electric-field control of the interlayer exchange coupling”
Shehrin Sayed and Cheng-Hsiang Hsu and Niklas Roschewsky and See-Hun Yang and Sayeeef Salahuddin
American Physical Society (March Meeting), 2020.
- J153.** [“Spin-orbit torque generated by amorphous Fe_{1-x}Si_x”](#)
Cheng-Hsiang Hsu and Julie Karel and Niklas Roschewsky and Suraj Cheema and Dinah Simone Bouma and Shehrin Sayed and Frances Hellman and Sayeeef Salahuddin
arXiv preprint arXiv:2006.07786, 2020.
- J152.** [“Tunable magnetoelastic effects in voltage-controlled exchange-coupled composite multiferroic microstructures”](#)
Zhuyun Xiao and Roberto Lo Conte and Maite Goirienea-Goikoetxea and Rajesh V Chopdekar and C-HA Lambert and Xiang Li and A T Ndiaye and P Shafer and S Tiwari and A Barra and others
ACS applied materials & interfaces, 12, 6752-6760, 2020.
- J151.** [“Fully transparent field-effect transistor with high drain current and on-off ratio”](#)
Jisung Park and Hanjong Paik and Kazuki Nomoto and Kiyoun Lee and Bo-Eun Park and Benjamin Grisafe and Li-Chen Wang and Sayeeef Salahuddin and Suman Datta and Yongsung Kim and others
APL Materials, 8, 11110, 2020.
- J150.** [“Tunneling electroresistance effects in epitaxial complex oxides on silicon”](#)
Mohammad Abuwasib and Claudy R Serrao and Liliana Stan and Sayeeef Salahuddin and Saidur Rahman Bakaul
Applied Physics Letters, 116, 32902, 2020.
- J149.** [“BSIM compact model of quantum confinement in advanced nanosheet FETs”](#)
Avirup Dasgupta and Shivendra Singh Parihar and Pragya Kushwaha and Harshit Agarwal and Ming-Yen Kao and Sayeeef Salahuddin and Yogesh Singh Chauhan and Chenming Hu
IEEE Transactions on Electron Devices, 67, 730-737, 2020.

- J148.** [“A density metric for semiconductor technology \[point of view\]”](#)
H-S Philip Wong and Kerem Akarvardar and Dimitri Antoniadis and Jeffrey Bokor and Chenming Hu and Tsu-Jae King-Liu and Subhasish Mitra and James D Plummer and Sayeef Salahuddin
Proceedings of the IEEE, 108, 478-482, 2020.
- J147.** [“Enhanced ferroelectricity in ultrathin films grown directly on silicon”](#)
Suraj S Cheema and Daewoong Kwon and Nirmaan Shanker and Roberto Dos Reis and Shang-Lin Hsu and Jun Xiao and Haigang Zhang and Ryan Wagner and Adhiraj Datar and Margaret R McCarter and others
Nature, 580, 478-482, 2020.
- C64.** [“BSIM-IMG: Advanced Model for FDSOI Transistors with Back Channel Inversion”](#)
H Agarwal and P Kushwaha and Avirup Dasgupta and M Y-Kao and T Morshed and G Workman and K Shanbhag and X Li and V Vinothkumar and Y S Chauhan and others
2020 4th IEEE Electron Devices Technology & Manufacturing Conference (EDTM), 1-4, 2020.
- C63.** [“Reliability of ferroelectric HfO₂-based memories: From MOS capacitor to FeFET”](#)
Ava J Tan and Li-Chen Wang and Yu-Hung Liao and Jong-Ho Bae and Chenming Hu and Sayeef Salahuddin
2020 Device Research Conference (DRC), 1-2, 2020.
- C62.** “GC-eDRAM design using hybrid FinFET/NC-FinFET”
Ramin Rajaei and Yen-Kai Lin and Sayeef Salahuddin and Michael Niemier and X Sharon Hu
Proceedings of the ACM/IEEE International Symposium on Low Power Electronics and Design, 199-204, 2020.
- J146.** “Ising model optimization problems on a FPGA accelerated restricted Boltzmann machine”
Saavan Patel and Lili Chen and Philip Canozza and Sayeef Salahuddin
arXiv preprint arXiv:2008.04436, 2020.
- J145.** “Analysis and modeling of polarization gradient effect on negative capacitance FET”
Ming-Yen Kao and Girish Pahwa and Avirup Dasgupta and Sayeef Salahuddin and Chenming Hu
IEEE Transactions on Electron Devices, 67, 4521-4525, 2020.
- J144.** [“Resonant enhancement of exchange coupling for voltage-controlled magnetic switching”](#)
Shehrin Sayed and Cheng-Hsiang Hsu and Niklas Roschewsky and See-Hun Yang and Sayeef Salahuddin
Physical Review Applied, 14, 34070, 2020.
- J143.** [“Design optimization techniques in nanosheet transistor for RF applications”](#)
Pragya Kushwaha and Avirup Dasgupta and Ming-Yen Kao and Harshit Agarwal and Sayeef Salahuddin and Chenming Hu
IEEE Transactions on Electron Devices, 67, 4515-4520, 2020.
- C61.** [“Dynamic memory and sequential logic design using negative capacitance finfets”](#)
Ramin Rajaei and Yen-Kai Lin and Sayeef Salahuddin and Michael Niemier and Xiaobo Sharon Hu
2020 IEEE International Symposium on Circuits and Systems (ISCAS), 1-5, 2020.
- J142.** [“Electric-field control of spin dynamics during magnetic phase transitions”](#)
Tianxiang Nan and Yeonbae Lee and Shihao Zhuang and Zhongqiang Hu and James D Clarkson and Xinjun Wang and Changhyun Ko and HwanSung Choe and Zuhuang Chen and David Budil and others
Science advances, 6, eabd2613, 2020.

- J141.** [“Highly scaled, high endurance, \$\Lambda\$ -gate, nanowire ferroelectric FET memory transistors”](#)
Jong-Ho Bae and Daewoong Kwon and Namho Jeon and Suraj Cheema and Ava Jiang Tan and Chenming Hu and Sayeef Salahuddin
IEEE Electron Device Letters, 41, 1637-1640, 2020.
- C60.** [“Hot electrons as the dominant source of degradation for sub-5nm HZO FeFETs”](#)
Ava J Tan and Milan Peâ%o^Â°iÆ’Ä; and Luca Larcher and Yu-Hung Liao and Li-Chen Wang and Jong-Ho Bae and Chenming Hu and Sayeef Salahuddin
2020 IEEE Symposium on VLSI Technology, 1-2, 2020.
- 2019**
- J140.** [“Spatially resolved steady-state negative capacitance”](#)
Yadav, Ajay K. and Nguyen, Kayla X. and Hong, Zijian and Garcia-Fernandez, Pablo and Aguado-Puente, Pablo and Nelson, Christopher T. and Das, Sujit and Prasad, Bhagawati and Kwon, Daewoong and Cheema, Suraj and Khan, Asif I. and Hu, Chenming and Vignuez, Jorge and Junquera, Javier and Chen, Long-Qing and Muller, David A. and Ramesh, Ramamoorthy and **Salahuddin, Sayeef**
Nature, 565, 7740, 468–471, 2019.
- J139.** [“Spacer Engineering in Negative Capacitance FinFETs”](#)
Lin, Yen-Kai and Agarwal, Harshit and Kao, Ming-Yen and Zhou, Jiuren and Liao, Yu-Hung and Dasgupta, Avirup and Kushwaha, Pragma and **Salahuddin, Sayeef** and Hu, Chenming
IEEE Electron Device Letters, 40, 6, 1009–1012, 2019.
- J138.** [“Challenges to Partial Switching of Hf_{0.8}Zr_{0.2}O₂ Gated Ferroelectric FET for Multilevel/Analog or Low Voltage Memory Operation”](#)
Chatterjee, Korok and Kim, Sangwan and Karbasian, Golnaz and Kwon, Daewoong and Tan, Ava J and Yadav, Ajay K and Serrao, Claudy R and Hu, Chenming and **Salahuddin, Sayeef**
IEEE Electron Device Letters, 2019.
- J137.** [“Optimization of NCFET by Matching Dielectric and Ferroelectric Nonuniformly Along the Channel”](#)
Kao, Ming-Yen and Lin, Yen-Kai and Agarwal, Harshit and Liao, Yu-Hung and Kushwaha, Pragma and Dasgupta, Avirup and **Salahuddin, Sayeef** and Hu, Chenming
IEEE Electron Device Letters, 40, 5, 822–825, 2019.
- J136.** [“A Spin-Orbit-Torque Memristive Device”](#)
Zhang, Shuai and Luo, Shijiang and Xu, Nuo and Zou, Qiming and Song, Min and Yun, Jijun and Luo, Qiang and Guo, Zhe and Li, Ruofan and Tian, Weicheng and Li, Xin and Zhou, Hengan and Chen, Huiming and Zhang, Yue and Yang, Xiaofei and Jiang, Wanjun and Shen, Ka and Hong, Jeongmin and Yuan, Zhe and Xi, Li and Xia, Ke and **Salahuddin, Sayeef** and Diény, Bernard and You, Long
Advanced Electronic Materials, 1800782, 2019.
- J135.** [“Characterization and Modeling of Flicker Noise in FinFETs at Advanced Technology Node”](#)
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- C5. [“Simulation of Spin Torque Devices with Inelastic Spin flip Scattering”](#)
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- C4. [“Quantum Transport Simulation of Tunneling Based Spin Torque Transfer \(STT\) Devices: Design Trade offs and Torque Efficiency”](#)
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- 2006
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- C2. [“An All Electrical Spin Detector”](#)
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- J7. [“Self-consistent simulation of quantum transport and magnetization dynamics in spin-torque based devices”](#)
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- J6. [“High-frequency performance projections for ballistic carbon-nanotube transistors”](#)
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- C1. [“Self-Consistent Simulation of Hybrid Spintronic Devices”](#)
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- J2. [“A modified a priori SNR for speech enhancement using spectral subtraction rules”](#)
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INVITED TALKS

[132] **Sayeeff Salahuddin**, “Ultrathin Ferroelectricity and Its Application in Advanced Logic and Memory Devices,” **Plenary Speech**, International Symposium on Applications of Ferroelectrics (ISAF), June, 2022.

[131] **Sayeeff Salahuddin**, “Ultrathin Ferroelectricity and Its Application in Advanced Logic and Memory Devices,” **Plenary Speech**, Symposium on Advances in Device Concepts and Applications, King Fahd University of Petroleum and Minerals, March, 2022.

[130] **Sayeeff Salahuddin**, “FE-FETs for Near-Memory and In-Memory Compute,” **IEEE International Electron Devices Meeting (IEDM)**, December, 2021.

[129] **Sayeeff Salahuddin**, “Ultrathin Ferroelectricity and Its Application in Advanced Logic and Memory Devices,” Electrochemical Society, October, 2021.

[128] **Sayeeff Salahuddin**, “Ultrathin Ferroelectricity and Its Application in Advanced Logic and Memory Devices,” Symposium on International Roadmap for Devices and Systems (IRDS), September, 2021.

[127] **Sayeeff Salahuddin**, “Compute in Memory,” DARPA ERI Summit Workshop on Memory Centric Computing, August, 2020.

[126] **Sayeeff Salahuddin**, “Towards Embedded Ferroelectric Memory,” **DARPA ERI Summit Podium Presentation, August, 2021.**

[125] **Sayeeff Salahuddin**, “Negative Capacitance,” **Panelist in Device Research Conference (DRC), June 2022.**

[124] **Sayeeff Salahuddin**, “The Role of Academia in Identifying Compelling Devices and Materials,” **Panelist in Symposium on VLSI Technology, June, 2021.**

[123] **Sayeeff Salahuddin**, “Ferroelectricity and Negative Capacitance in Ultra-thin Layers of HfO₂ Based Fluorite Oxides,” NAMLAB Workshop in Ferroelectrics, Dresden, Germany, May, 2021.

[122] **Sayeeff Salahuddin**, “FE-FET as a potential FEOL, Non-Volatile, Compute-in-Memory Technology,” NSF workshop on computing in memory, May, 2021.

[121] **Sayeeff Salahuddin**, “FE-FET Memory,” SRC Technology Forum, NSF workshop on next generation computing, May, 2021.

- [120] **Sayeeef Salahuddin**, “Ising Computing: Compositional Training and Parallel Asynchronous Sampling,” DARPA Microelectronics Consortium (MEC) workshop on Ising computing, May, 2021.
- [119] **Sayeeef Salahuddin**, “Negative Capacitance,” **Material Research Society (MRS) Spring Meeting, April, 2021.**
- [118] **Sayeeef Salahuddin**, “Ultrathin Ferroelectricity and Its Application in Advanced Logic and Memory Devices,” **Chey Institute Distinguished Lecture, April, 2021.**
- [117] **Sayeeef Salahuddin**, “Ultrathin Ferroelectricity and Its Application in Advanced Logic and Memory Devices,” **IEEE International Reliability Physics Symposium (IRPS), March, 2021.**
- [116] **Sayeeef Salahuddin**, “1 nm Ferroelectric on Silicon and Application for Energy Efficient Logic and Memory Devices,” IEEE Electron Devices Society (EDS) Webinar, February, 2021.
- [115] **Sayeeef Salahuddin**, “Recapturing US Leadership in Semiconductors” NSF CISE Workshop on Computing, December, 2020.
- [114] **Sayeeef Salahuddin**, “Gate Stack Optimization for Ferroelectric Field Effect Transistors,” DARPA ERI Summit, August, 2020.
- [113] **Sayeeef Salahuddin**, “Spin Orbit Interaction in Fe(x)Si(1-x)/Co bi-layers,” 31st Magnetic Recording Conference, August, 2020.
- [112] **Sayeeef Salahuddin**, “Negative Capacitance Transistors,” Tutorial on Negative Capacitance, Design Automation Conferences (DAC), July 2020.
- [111] **Sayeeef Salahuddin**, “Negative Capacitance RF Devices, ” AFRL, July 2020.
- [110] **Sayeeef Salahuddin**, “Negative Capacitance Transistors, ” KAUST, November, 2019.
- [109] **Sayeeef Salahuddin**, “Negative Capacitance,” Institute of New Era Electronics Distinguished Seminar, Purdue University, October 17, 2019.
- [108] **Sayeeef Salahuddin**, “Novel physics for next generation agile computing,” Microelectronics Workshop, Argonne National Laboratory, October, 2019.
- [107] **Sayeeef Salahuddin**, “Negative Capacitance, Ultra-thin Ferroelectrics and Applications,” International Workshop on Oxide Electronics, Kyoto, October, 2019.
- [106] **Sayeeef Salahuddin**, “Negative Capacitance for next generation Edge Intelligence,” DARPA ERI Workshop, July, 2019.
- [105] **Sayeeef Salahuddin**, “Exploiting new physics for next generation AI”, CASPA Summer Symposium: Breaking the Memory Wall, the AI Bottleneck, Jul 13, 2019
- [104] **Sayeeef Salahuddin**, “Negative Capacitance Transistors”, Tutorial, Symposium of VLSI Technology, June, 2019

- [103] **Sayeef Salahuddin**, “Exploiting new physics for next generation AI”, Huawei Corporation, Shenzhen, April 2019
- [102] **Sayeef Salahuddin**, “Hyperdimensional Computing for One shot learning,” IRDS Workshop, Monterey CA, March 2019
- [101] **Sayeef Salahuddin**, “Negative Capacitance Transistors”, SK Hynix Corporation, Jan 2019
- [100] **Sayeef Salahuddin**, “Negative Capacitance Transistors”, Samsung Corporation, Jan, 2019
- [99] **Sayeef Salahuddin**, “Spin Transfer Torque Memory Devices,” 2018 Symposium of Center for Semiconductor Technology Research, NCTU, Hsinchu, Taiwan, Dec, 2018.
- [98] **Sayeef Salahuddin**, “Spin Transfer Torque Memory: Device Physics and Scaling Trends,” TSMC, Hsinchu, Taiwan, Dec, 2018
- [97] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” Apple, Cupertino, Dec, 2018.
- [96] **Sayeef Salahuddin**, “Acoustically Driven Ferromagnetic Resonance Driven Excitation of Vacancy Centers,” Material Research Society (MRS) Fall Meeting, Boston, Dec, 2018.
- [95] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” European MRS Fall meeting, Warsaw, Poland, October, 2018.
- [94] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” UC Davis ECE seminar on The 4th Industrial Revolution: Fusion of Technologies, October, 2018.
- [93] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” IEEE S3S conference, October, 2018.
- [92] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” UC Berkeley Physics Colloquia, Aug, 2018.
- [91] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” Electrochemical Society Meeting, Seattle, May, 2018.
- [90] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” VLSI-TSA conference, Hsinchu, Taiwan, April, 2018.
- [89] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” Material Science and Engineering, UC Riverside, February, 2018.
- [89] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” SemiCon Korea, Seoul, Korea Feb, 2018.
- [88] **Sayeef Salahuddin**, Short course on Negative Capacitance Transistors, International Electron Devices Meeting (IEDM), Dec, 2017.
- [87] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” The 30th International Microprocesses and Nanotechnology Conference (MNC), JeJu, Korea, Nov, 2017. **[Plenary Talk]**
- [86] **Sayeef Salahuddin**, “Energy Efficient Electronics,” DARPA Microsystems Exploratory Council (MEC) workshop on Reinventing Fabrication, Albany, NY, October, 2017.

- [86] **Sayeef Salahuddin**, “Energy Efficient Computing with Hyperdimensional Vector Space Models,” SISPAD, Kamakura, Japan, September, 2017 [**Plenary Talk**].
- [85] **Sayeef Salahuddin**, “Negative Capacitance FET,” 12th Topical Workshop on Heterostructure Microelectronics, Kirishima, Japan, Aug, 2017.
- [84] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” I-RICE workshop, NCTU, Taiwan, June, 2017.
- [83] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” CTO Distinguished talk, GlobalFoundries, Malta, Albany, 2017.
- [82] **Sayeef Salahuddin**, “Spin Orbit Torque in Ferrimagnetic GdFeCo,” SpinTec, Grenoble, France, June 2017.
- [81] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” Semiconductor Interface Specialist’s Conference (SISC), San Diego, December, 2016.
- [80] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” American Vacuum Society Meeting, Connecticut, November, 2016.
- [79] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” Electrochemical Society meeting, Hawaii, October, 2016.
- [78] **Sayeef Salahuddin**, “Recent progress on Negative Capacitance Transistors,” Athens workshop on energy efficient Nanoelectronics, Athens, Greece, July, 2016.
- [77] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” Electronic Material Conference, Delaware, June, 2016.
- [76] **Sayeef Salahuddin**, “Energy efficiency in Nanoelectronics,” National Science Foundation, May, 2016.
- [75] **Sayeef Salahuddin**, “Negative Capacitance Transistors,” VLSI-TSA Conference, March, 2016.
- [74] **Sayeef Salahuddin**, “Voltage Control of Magnetization in Natural and Synthetic Multiferroic Heterostructures,” MRS Fall meeting, 2015.
- [73] **Sayeef Salahuddin**, ‘A Physics Quest for Energy Efficiency in Future Computing Technologies’, *EE Distinguished Lecture, Stanford University, 2015*.
- [72] **Sayeef Salahuddin**, ‘Negative Capacitance Transistors’, *Keysight Lecture*, Sonoma State University, 2015.
- [71] **Sayeef Salahuddin**, ‘Negative Capacitance Transistors’, SFSY, Nov, 2015.
- [70] **Sayeef Salahuddin**, ‘Negative Capacitance Transistors’, IWDTF, Tokyo, Japan, Nov, 2015.
- [69] **Sayeef Salahuddin**, ‘Controlled Phase Transition for Next Generation Electronics’, Ringberg Castle, Oct, 2015.

- [68] **Sayeef Salahuddin**, ‘Electronics and Optoelectronics with transitional metal dichalcogenides,’ IEEE Photonics Workshop, Nassau, Bahamas, July, 2015.
- [67] **Sayeef Salahuddin**, ‘Control of Nanomagnets using Spin Orbit Torque,’ Design Automation Conference, June, 2015.
- [66] **Sayeef Salahuddin**, ‘Control of Nanomagnets using Spin Orbit Torque,’ APS March Meeting, March, 2015.
- [65] **Sayeef Salahuddin**, ‘Control of Nanomagnets using Spin Orbit Torque,’ Samsung Corporation, San Jose, Jan, 2015.
- [64] **Sayeef Salahuddin**, ‘Spin Transfer Torque Memory : Device Physics and Technology Prospects,’ Lam Research, San Jose, CA, Dec, 2014.
- [63] **Sayeef Salahuddin**, ‘Control of Nanomagnets using Spin Orbit Torque,’ Condensed Matter Seminar, UC Santa Cruz, Nov, 2014.
- [62] **Sayeef Salahuddin**, ‘Control of Nanomagnets using Spin Orbit Torque,’ Stanford Memory Workshop, October, 2014.
- [61] **Sayeef Salahuddin**, ‘Controlling Magnetization With Spin Orbit Torque,’ Global Foundries, San Jose, CA, Sept 2014.
- [60] **Sayeef Salahuddin**, ‘Negative Capacitance Transistors’, SSDM, Tsukuba, Japan, September, 2014.
- [59] **Sayeef Salahuddin**, ‘Negative Capacitance Transistors,’ Emerging Research Devices Meeting, New Mexico, August, 2014.
- [58] **Sayeef Salahuddin**, ‘Electronics and Optoelectronics with transitional metal dichalcogenides,’ Workshop on Beyond Graphene electronics, Army Research Laboratory, Virginia, August, 2014.
- [57] **Sayeef Salahuddin**, ‘Control of Nanomagnets using Natural and Synthetic Multiferroics,’ Gordon Research Conference, University of New England, Biddeford, ME, August, 2014.
- [56] **Sayeef Salahuddin**, ‘Negative Capacitance Transistors,’ Silicon Nanoelectronics Workshop, June, 2014.
- [55] **Sayeef Salahuddin**, ‘Electronics and Optoelectronics with 2D semiconductors,’ International Microwave Symposium, Florida, June 2014.
- [54] **Sayeef Salahuddin**, ‘Electronics and Optoelectronics with 2D semiconductors’, MRS Spring Meeting, San Francisco, April, 2014.
- [53] **Sayeef Salahuddin**, ‘Negative Capacitance Transistors,’ MRS Spring Meeting, San Francisco, April, 2014.
- [52] **Sayeef Salahuddin**, ‘Electronics and Optoelectronics with 2D semiconductors,’ Symposium by IEEE San Francisco Bay area, April, 2014.

- [51] **Sayeeef Salahuddin**, ‘Emerging Materials for Energy Efficient Devices,’ ISQED, San Jose, CA, March, 2014.
- [50] **Sayeeef Salahuddin**, ‘Spin Transfer Torque Memory : Device Physics and Technology Prospects,’ Sandisk Corporation, Milipitas, CA, Feb 2014.
- [49] **Sayeeef Salahuddin**, ‘Emerging Materials for Energy Efficient Electronics,’ SMEE, Hongkong, December 2013. [*Keynote presentation*]
- [48] **Sayeeef Salahuddin**, ‘Emergent Materials for Electronics,’ UCLA, October 2013.
- [47] **Sayeeef Salahuddin**, ‘Electronics and Optoelectronics with 2D material semiconductors, International Workshop on Computational Electronics’, Nara, Japan, August, 2013.
- [46] **Sayeeef Salahuddin**, ”2D semiconductors and their heterostructures,” Conference on Flatlands Beyond Graphene, Jacobs University, Germany, June, 2013.
- [45] **Sayeeef Salahuddin**, ”Electronics with 2D materials,” CECAM Workshop, Bremen, Germany, June, 2013.
- [44] **Sayeeef Salahuddin**, ”Electronics with 2D materials,” International Workshop on Computational Electronics, Nara, Japan, June, 2013.
- [43] **Sayeeef Salahuddin**, “Electric field control of magnetism: experiment and modeling” APS March Meeting, Chicago, January, 2013.
- [42] **Sayeeef Salahuddin**, “How good 2D Materials are for electronics” Workshop on 2D materials, Penn State University, 2013.
- [41] S.Salahuddin, “My personal notes on writing a NSF CAREER proposal,” NSF Invited speaker for CAREER workshop, Temple University, 2013.
- [40] **Sayeeef Salahuddin**, “Electric Field Control of Magnetism,” Magnetism and Magnetic Materials (MMM) conference, Chicago, January, 2013.
- [39] **Sayeeef Salahuddin** “Beyond CMOS technologies,” Advanced Materials Symposium, San Francisco, December, 2012.
- [38] **Sayeeef Salahuddin**, “Negative capacitance in a ferroelectric-dielectric Heterostructure,” SPIE, San Diego, 2012.
- [37] **Sayeeef Salahuddin**, “2D semiconductor devices,” ARO Workshop on 2D Materials, Ohio State University, 2012.
- [36] **Sayeeef Salahuddin**, “Electric field control of magnetism,” ICYMAT, Singapore, 2012 (Keynote).
- [35] **Sayeeef Salahuddin**, “Ferro-FET,” Device Research Conference, Penn State University, 2012 (Tutorial).
- [34] **S.Salahuddin**, “Negative capacitance,” National University of Singapore, 2012.

- [33] **Sayeeff Salahuddin**, “Negative/Giant capacitance in a ferroelectric-dielectric heterostructure for ultra low power computing ,” University of Southern Illinois, Carbondale, 2012.
- [32] **Sayeeff Salahuddin**, “Giant/Negative capacitance in a ferroelectric/dielectric heterostructure,” Berkeley Nanoforum, 2012.
- [31] **S.Salahuddin**, “Numerical modeling for ultra low energy electronic devices: two examples of equilibrium and non-equilibrium Problems,” Lawrence Berkeley National Laboratory, 2012.
- [30] **Sayeeff Salahuddin**, “Ultra low power ferro FET,” Bangladesh University of Engineering and Technology (BUET), 2012.
- [29] **Sayeeff Salahuddin**, “Negative capacitance,” Qualcomm, San Diego, 2012.
- [28] **Sayeeff Salahuddin**, “Negative/Giant capacitance Gate Stack,” Intel, 2012.
- [27] **Sayeeff Salahuddin**, “Negative/Giant Capacitance in a Ferroelectric-Dielectric Heterostructure For Ultra Low Power Computing ,” IWPSD, IIT Kanpur, India, 2011.
- [26] **Sayeeff Salahuddin**, “Possibility of piezoelectric-ferromagnet bilayer based microwave resonators and oscillators,” Nano-DDS, 2011.
- [25] Salahuddin, “Simulation of carbon heterostructures as barrier free tunneling transistors ,” EMC, Montreal, Canada, 2011.
- [24] **Sayeeff Salahuddin**, “Current and electric field induced switching of ferromagnets for low-power memory applications,” ISQED, San Jose, 2011 (Tutorial).
- [23] **Sayeeff Salahuddin**, “Graphene based electronics,” Army Research Laboratory, 2011.
- [22] **Sayeeff Salahuddin**, “Giant capacitance in a ferroelectric-dielectric heterostructure,” Stanford University, 2011.
- [21] **Sayeeff Salahuddin**, “Multiscale modeling for novel nanoscale devices,” ARO Workshop, Washington, October, 2010.
- [20] **Sayeeff Salahuddin**, “Barrier free tunneling in a carbon heterostructure transistor,” Graphene Workshop, SUNY Albany, September 2010.
- [19] **Sayeeff Salahuddin**, “Novel concepts for steep slope switches”, SISPAD, Bolgna, Italy, 2010.
- [18] **Sayeeff Salahuddin**, “Steep subthreshold transistors for ultra low power electronics,” Tsinghua University, Beijing, China, 2010.
- [17] **Sayeeff Salahuddin**, “Quantum transport simulation: A few case studies where it is necessary,” Bridging the gap between theory and experiment: which theoretical approaches are best suited to solve real problems in nanotechnology and biology?, Stanford University, Februray, 2010.
- [16] **Sayeeff Salahuddin**, “On the possibility of a negative capacitance transistor,” MRS March meeting., 2010.

- [15] **Sayeeff Salahuddin**, “Spin Torque Transfer devices--perspectives on technology Simulation,” Emerging Technologies in Solid State Devices Workshop, December 5 - 6, 2009.
- [14] **Sayeeff Salahuddin**, “Spin Torque Devices: A technology simulation,” NCCAUS Thin Film Users Group, October 14, 2009.
- [13] **Sayeeff Salahuddin**, “Recent perspectives on spin torque devices”, 6th International Symposium on Advanced Gate Stack Technology, August 2009.
- [12] **Sayeeff Salahuddin**, “Nanomagnetic logic”, DARPA Industry Day on Spin Logic, Jackson Hole, Wyoming, July, 2009.
- [11] **Sayeeff Salahuddin**, “Can subthreshold swing in a classical FET be lowered below 60 mV/decade?”, Special Session on ‘Green Devices’ at “The International Symposium on VLSI Technology, Systems and Applications (2009 VLSI-TSA)”, 2009 .
- [10] **Sayeeff Salahuddin**, “Ferro FET, ” Independent University, Bangladesh, 2010.
- [9] **Sayeeff Salahuddin**, “Negative capacitance from a ferroelectric stack”, Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, June, 2009.
- [8] **Sayeeff Salahuddin**, “Tailoring non equilibrium for low power logic and memory”, Solid State Seminar, University of Notre Dame, Jan 23, 2009.
- [7] **Sayeeff Salahuddin**, “Novel electronic and spintronic Devices for Low Power Computing”, SEMATECH, Austin, TX, September, 2008.
- [6] **Sayeeff Salahuddin**, “Novel electronic and spintronic devices for low power computing”, Nano Seminar series, Berkeley Nanoscience and Nano Engineering Institute, Nov, 7, 2008.
- [5] **Sayeeff Salahuddin**, “Tailoring non equilibrium for low power logic and memory”, EECS seminar, UC Berkeley, August 29, 2008.
- [4] **Sayeeff Salahuddin**, “Novel electronic and spintronic devices for low power switching”, DTC seminar series, University of Minnesota, May 19, 2008.
- [3] **Sayeeff Salahuddin**, “Use of negative capacitance to provide voltage amplification for ultra low power nanoscale devices,” APS March Meeting, 2008.
- [2] **Sayeeff Salahuddin**, “Novel electronic and spintronic devices for low power switching”, IBM Watson Research Center, February, 2008.
- [1] **Sayeeff Salahuddin**, “Interacting systems for low power electronic and spintronic switching,” SRC TECHCON 2007: Technology and Talent for the 21st Century, Sept 11th, Austin, Texas, 2007.

PATENTS

23 patent disclosures through UC. 4 of them have been licensed.

OTHER NON-REFEREED TALKS AND PRESENTATIONS

Salahuddin group regularly presents in the annual March meeting of American Physical Society and Material Research Society’s Spring and Fall Meetings and MMM and Intermag Conferences.