

# Sara Darbari, Ph.D.

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Date of Birth: 1982

Faculty of Electrical and Computer Engineering, Tarbiat Modares University

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## Education

### **PH.D. | 2008 - 2011 | UNIVERSITY OF TEHRAN, IRAN**

Semiconducting Devices, Electronics, Electrical Engineering

### **M.SC. | 2006 - 2008 | UNIVERSITY OF TEHRAN, IRAN**

Semiconducting Devices, Electronics, Electrical Engineering

### **B.SC. | 2001 - 2005 | UNIVERSITY OF TEHRAN, IRAN**

Electronics, Electrical Engineering

## Professional Experience

**Assistant professor of EE**, Feb. 2013 - Present, Tarbiat Modares University, Tehran, Iran

**Postdoctoral research assistant**, Nov. 2012 – Nov. 2013, Tarbiat Modares University, Tehran, Iran

**Graduate research assistant**, Sept. 2006 – Sept. 2011, University of Tehran, Tehran, Iran

## Research Interests

Emerging devices based on 2D materials: graphene, MoS<sub>2</sub> ...

Plasmonic devices: Optophoresis systems, Modulators, Plasmonic sensors

Acousto-plasmonic and Acousto-electric devices

Nano-Sensors and Detectors: photodetectors, gas sensors, pressure sensors

Energy harvesting devices: Piezoelectric Nanogenerators, Triboelectric nanogenerators

MEMS/NEMS devices

## Honors

Outstanding Post Doc. Researcher, Tarbiat Modares University, 2013

Outstanding Ph.D. Thesis, Women in Engineering Award, IEEE Iran Section, 2012

2nd ranked GPA among M.Sc. students, ECE department, University of Tehran, 2007

1st ranked GPA among Ph.D. students of Semiconductor Devices, ECE department, University of Tehran, 2011

INSF Award, 2014 and 2016

Niroo Research Institute Award, 2016

Semiconductor Center of Iran Electronics Industries Award, 2017

## Professional Experience

Foundation of Nano-Sensors and Detectors Lab. (NSDL), 2017  
Guest Editor of Modares Journal of Electrical Engineering (MJEE), 2015-2017.  
Reviewer of Sensors and Actuators A, Thin Solid Films, Photonics Technology Letters, Journal of Light Wave Technology, Applied Surface Science, and Applied Acoustics.  
Technical Committee member of Optics and Photonics Conference (ICOP), 2018, Shahrekord, Iran.  
Executive committee member of Optics and Photonics Conference (ICOP), 2017, Tehran, Iran.  
Technical Committee member of ICEE, 2016, Shiraz, Iran.  
Committee member of Health and Safety Executive (HSE), Tarbiat Modares University, since 2014.  
Committee member of WIE, IEEE Iran Section, since 2014.

## Journal Publication

- 1- A. Shakeri, **S. Darbari**, M. K. Moravvej-Farshi, "Designing a tunable acoustic resonator based on defect modes, stimulated by selectively biased PZT rods in a 2D phononic crystal", *Ultrasonics*, vol. 92, pp. 8–12 (2019).
- 2- P. Torkaman, **S. Darbari**, M. J. Mohammad-Zamani, "Design and Simulation of a Piezotronic GaN-Based Pulsed THz Emitter", *Journal of Lightwave Technology*, vol. 36, no. 17, pp. 3645 - 3651 (2018).
- 3- A. Keshvari, **S. Darbari**, M. Taghavi, "Self-powered plasmonic UV detector, based on reduced graphene oxide/Ag nanoparticles", *IEEE Electron Device Letters*, vol. 39, no. 9, 1433 - 1436 (2018).
- 4- S. Khalili Fard, **S. Darbari**, V. Ahmadi, "Electro-plasmonic gas sensing based on reduced graphene oxide/Ag nanoparticle heterostructure", *IEEE Sensors Journal*, vol. 18, no. 14, pp. 5770 - 5777 (2018).
- 5- M. Javadi, A. Heidari, **S. Darbari**, "Realization of enhanced sound-driven CNT-based triboelectric nanogenerator, utilizing sonic array configuration", *Current Applied Physics* 18, pp. 361-368 (2018), (IF: 1.97).
- 6- L. Shafiei, **S. Darbari**, F. Dehghan Nayeri, "Realization of a reduced graphene oxide/ZnO nanorod photodetector, suitable for self-powered applications", *Scientia Iranica*, vol. 25, no. 3, pp. 1824-1834 (2018).
- 7- M. Samadi, **S. Darbari**, M. K. Moravvej-Farshi, "Numerical Investigation of Tunable Plasmonic Tweezers based on Graphene Stripes", *Scientific Reports*, 7: 14533, DOI:10.1038/s41598-017-14912-w (2017), (IF: 4.25).
- 8- R. Rostami G. Moussavi, A. Jonidi Jafari, **S. Darbari**, "*Decomposition of benzene using wire-tube AC/DC discharge reactors*", *Journal of Electrostatics*, vol. 87, p. 158e166 (2017), (IF: 1.31).
- 9- M. Monshipouri, Y. Abdi, **S. Darbari**, S. Tsujino, "*Multiphoton photoemission of gold nanopillars fabricated by carbon nanotube templates*", *Journal of Vacuum Science & Technology B*, vol. 35, p. 02C110 (2017), (IF: 1.57).

- 10- M. Ghorbanzadeh, M. K. Moravvej-Farshi, **S. Darbari**, “A Plasmonic Optophoresis for Manipulating, In-situ Position Monitoring, Sensing, and 3D trapping of Micro/Nanoparticles”, IEEE Journal of Selected Topics in Quantum Electronics , vol.23, no.2, pp.1-1, Doi: 10.1109/JSTQE.2016.2593008 (2017), (IF: 3.97).
- 11- M. Monshipouri, Y. Abdi, **S. Darbari**, “Realization of low power-laser induced thermionic emission from Ag nanoparticle-decorated CNT forest: A consequence of surface plasmon resonance”, Applied Physics Letters, vol. 109, no. 20, p. 203105 (2016), (IF: 3.41).
- 12- E. Modaresinezhad, **S. Darbari**, “Realization of a room-temperature/self-powered humidity sensor, based on ZnO nanosheets”, Sensors and Actuators B: Chemical 237, 358-366 (2016), (IF: 5.4).
- 13- M. H. Feda, Y. Khosravi, **S. Darbari**, B. Abdollahi Nejand, “Electrically Controlled Photocatalytic Reduction of Graphene Oxide Sheets by ZnO Nanostructures, Suitable for Tunable Optoelectronic Applications”, IEEE Transactions on Electron Devices, vol. 63, No. 8, (2016), (IF: 2.6).
- 14- M. Javadi, **S. Darbari**, Y. Abdi, F. Ghasemi, “Realization of a Piezophototronic Device Based on Reduced Graphene Oxide/MoS<sub>2</sub>Heterostructure,” Elec. Dev. Lett., vol. 37, no. 5, pp. 677 – 680 (2016), (IF: 3.04).
- 15- M. Ghorbanzadeh, **S. Darbari**, M. K. Moravvej-Farshi, “Graphene-based Plasmonic Force Switch,” Appl. Phys. Lett. 108, 111105 (2016), (IF: 3.41).
- 16- M. Habibi, **S. Darbari**, S. Rajabali, V. Ahmadi, “Fabrication of a graphene-based pressure sensor by utilizing field emission behavior of carbon nanotubes”, Carbon 96, 259-267 (2016), (IF: 6.33).
- 17- M. Ghorbanzadeh, M. K. Moravvej-Farshi, **S. Darbari**, “Designing a Plasmonic Optophoresis System for Trapping and Simultaneous Sorting/Counting of Micro- and Nano-particles”, Journal of Lightwave Technology 33(16),3453-3460 (2015) (IF: 3.67).
- 18- **S. Darbari**, V. Ahmadi, P. Afzali, Y. Abdi, M. Feda, “Reduced graphene oxide /ZnO hybrid structure for high performance photodetection”, J Nanopart Res 16, 2798 (2014), (IF: 2.02).
- 19- H. Mazraati, M. Gharooni, **S. Darbari**, S. Mohajezadeh, F. Salehi, “Realization of suspended silicon-based structures using a smart three-dimensional etching method”, Journal of Vacuum Science & Technology B 32, 062002 (2014), (IF: 1.57).
- 20- S.M. Jebreil Khadem, Y. Abdi, **S. Darbari**, F. Ostovari, “Investigating the effect of gas absorption on the electromechanical and electrochemical behavior of graphene/ZnO structure, suitable for highly selective and sensitive gas sensors”, Current Applied Physics 14, Issue 11, 1498–1503 (2014), (IF:1.97).
- 21- **S. Darbari**, “Model calculation and empirical investigation of enhanced field emission behavior of branched carbon nanostructures”, Current Applied Physics 14, 1092-1098 (2014), (IF: 1.97).

- 22- S. Taak, S. Rajabali, **S. Darbari**, S. Mohajerzadeh; “*High sensitive/Wide dynamic range, field emission pressure sensor based on fully-embedded CNTs*”, J. Phys. D: Appl. Phys. 47, 045302 (2014), (IF: 2.58).
- 23- **S. Darbari**, V. Ahmadi, P. Afzali, Y. Abdi “*Photocatalytic-reduction of GO/ZnO to achieve GNRs for optoelectronic applications*”, Journal of Physics D-Applied Physics, Vol. 46, 385101 (2013) (IF: 2.58).
- 24- N. Doostani, **S. Darbari**, S. Mohajerzadeh , M. K. Moravej-Farshi , “*Fabrication of highly sensitive field emission based pressure sensor, using CNTs grown on micro-machined substrate*”, Sensors and Actuators A, Vol. 201, 310– 315 (2013), (IF: 2.49).
- 25- F. Ostovari, Y. Abdi, **S. Darbari**, F. Ghasemi, “*Effects of electromechanical resonance on photocatalytic reduction of the free-hanging graphene oxide sheets*”, J Nanopart Res, Vol. 15, 1551 (2013), (IF: 2.02).
- 26- Y. Abdi, A. Malekan, **S. Darbari**, “*High sensitivity field emission based sensors using carbon nanotubes on silicon tip for high frequency vibration sensing*”, Solid-State Electronics, Vol. 82, 6-10 (2013), (IF: 1.58).
- 27- M. Mohammadi, Z. Kolahdouz, **S. Darbari**, S. Mohajerzadeh, N. Masoumi, “*Graphene formation by unzipping carbon nanotubes using a sequential plasma assisted processing*”, CARBON, Vol. 52, 451-463 (2013), (IF: 6.33).
- 28- **S. Darbari**, S. Mohajerzadeh, S. Azimi, Y. Abdi, “*Gas sensing properties of Branched CNT-based structures using a novel low voltage emission*”, Journal of Nanoscience and Nanotechnology, Vol. 12, No. 11, 8666-8670(5) (2012)
- 29- J. Koohsorkhi, S. Mohajerzadeh, **S. Darbari**, “*Investigation of carbon nanotube-based field emission triode devices on silicon substrates*”, IEEE Transactions on Nanotechnology, Vol. 11, No. 6 (2012)
- 30- F. D. Nayeri, **S. Darbari**, E. A. Soleimani, S. Mohajerzadeh, “*Low temperature and cost effective synthesis of MWCNT/ZnO-NW heterojunction arrays suitable for field emission applications*”, Journal of Physics D: Appl. Phys., Vol. 45, 285101 (2012), (IF: 2.58).
- 31- **S. Darbari**, S. Mohajerzadeh, Y. Abdi, M. Robertson, M. Bluteau, T. Morrison, “*Silicon-based Light Emitting Diodes on Glass Substrates using a Low Temperature Multilayered Nano-crystalline structure*”, Thin Solid Films, Vol. 520, Issue 15, 5021-5028 (2012).
- 32- A.Sani, **S. Darbari**, Y. Abdi, E. Arzi, “*Using bent carbon nanotubes for the fabrication of electromechanical switches*”, CARBON, Vol. 50, Issue 10, 3635-3640 (2012), (IF: 6.33).
- 33- A. Gholizadeh, S. Shahrokhian, A. Irajizad, S. Mohajerzadeh, M. Vosoughi, **S. Darbari**, Z. Sanaee, “*Mediator-less highly sensitive voltammetric detection of glutamate using glutamate dehydrogenase/vertically aligned CNTs grown on silicon substrate*”, Biosensors and Bioelectronics, Vol. 31, Issue 1, 110-115 (2012)

- 34- A. Gholizadeh, S. Shahrokhian, A. Irajizad, S. Mohajerzadeh, M. Vosoughi, **S. Darbari**, J. Koohsorkhi, M. Mehran, “*Fabrication of sensitive glutamate biosensor based on vertically aligned CNT nanoelectrode array and investigating the effect of CNTs density on the electrode performance*”, Analytical Chemistry, Vol. 17, 84(14), 5932-8 (2012)
- 35- **S. Darbari**, Y. Abdi, S. Mohajerzadeh, “*Branched carbon nanotubes to realize a novel capacitive sensor and actuator device*”, Sensors and Actuators A-Physical, Vol. 167, No. 2 , 389-397 (2011)
- 36- **S. Darbari**, Y. Abdi, A. Ebrahimi, S. Mohajerzadeh, “*Fabrication of Silicon-Based Actuators Using Branched Carbon Nano-Structures*”, IEEE Sensors Journal, Vol. 11, No. 7, 1535-1540 (2011)
- 37- **S. Darbari**, Y. Abdi, F. Haghighi, S. Mohajerzadeh, N. Haghighi, “*Investigating the antifungal activity of TiO<sub>2</sub> nanoparticles deposited on branched carbon nanotube arrays*”, Journal of Physics D-Applied Physics, Vol. 44, No. 24 (2011), (IF: 2.58).
- 38- **S. Darbari**, M. Shahmohammadi, S. Mohajerzadeh, Y. Abdi, M. Robertson, T. Morrison, “*High performance multilayered nano-crystalline silicon/silicon-oxide light-emitting diodes on glass substrates*”, Nanotechnology, Vol. 22, 375204 (11pp) (2011), (IF: 3.44).
- 39- **S. Darbari**, Y. Abdi, S. Mohajerzadeh, “*A novel carbon-nanotube gas sensor based on field ionization from branched nanostructures*”, European Physical Journal-Applied Physics, Vol. 52, No. 3, 30602 (2010)
- 40- **S. Darbari**, Y. Abdi, S. Mohajerzadeh, E. Asl Soleimani , “*High electron emission from branched tree-like carbon nanotubes suitable for field emission applications*”, CARBON, Vol. 48, No. 9, 2493-2500 (2010), (IF: 2.58).
- 41- **S. Darbari**, S. Azimi, S. Mohajerzadeh, “*Hydrogenation-Assisted Lateral Micromachining of (111) Silicon Wafers*”, Journal of Microelectromechanical Systems, Vol. 17, No. 6, 1489-1494 (2008)
- 42- Y. Abdi, J. Koohshorkhi, S. Mohajerzadeh, **S. Darbari**, Zeinab Sanaee., “*Embedded vertically grown carbon nanotubes for field emission applications*”, Journal of Vacuum Science & Technology B, Vol. 25, No. 3, 822-828 (2007)
- 43- Y. Abdi, S. Mohajerzadeh, **S. Darbari**, E. Arzi, “*Both-end opened nanostructure holes by embedded carbon nanotubes realized on thinned membranes on (100) silicon substrates*”, Physica E-low-Dimensional Systems & Nanostructures, Vol. 37, No. 1-2, 226-230 (2007)

## Selected Presentations

- 1- **S. Darbari**, “Graphene-based Optoelectronic Devices”, Annual International Meeting on Low Dimensional Systems: RIAPA-LDS, *Invited Talk*, Tabriz, Iran (2017)

- 2- S. Vasini, **S. Darbari**, “Optical trapping of polystyrene particles, by plasmonic gold patterns”, *Awarded as the outstanding poster presentation*, 23<sup>rd</sup> Iranian Conference on Optics and Photonics (ICOP) 23:9, 453-456 (2017)

## Teaching Experience

### **University of Tarbiat Modares, Tehran, Iran**

Silicon VLSI Technology - since 2012

Solid State Physics - since 2013

Microelectromechanical Systems (MEMS) - since 2014

## Professional Expertise

Extensive experience in working with fabrication systems such as e-beam evaporation, thermal evaporation, RF PECVD, DC PECVD, Reactive Ion Etching, LPCVD.

Experience with various analysis methods of characterization: SEM and FESEM, AFM, UV-vis Spectroscopy, PL Spectroscopy, Raman Spectroscopy.

Extensive experience in carbon-based materials and nanostructures, such as CNT and graphene.

Extensive experience in fabrication of field emission display based on carbon nanotubes.

Extensive experience in growing novel nanostructures with novel efficiencies in various field of application including field emission, gas sensing, high capacitive sensors and actuators.

Extensive experience in silicon micromachining techniques including vertical etching and lateral etching of silicon.

Extensive experience in fabrication of low temperature nanocrystalline porous silicon and light emitting diodes.

Experience in fabrication of plasma displays on flexible substrates and glass.

Familiar with standard MOS technology and MOSFET transistors.

Familiar with Comsol, Lumerical, Silvaco, PSpice, HSpice, MATLAB.

Familiar with analytical and numerical investigation and modeling of semiconductor devices.