Ali Esfandiar

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Research and Teaching

2017- Present Assistant Professor, Department of physics, Sharif University of Technology Tehran, Iran

2015- 2017 Associate researcher (post doc), Department of physics, University of Manchester Manchester, UK

2013- 2015 Assistant professor, Physics faculty, Kharazmi University, Tehran, Iran
Non-resident researcher, Institute of Physics and mathematics (IPM)

Education

Ph.D

2009-2013 Sharif University of Technology *Tehran, Iran*
Institute for Nano Science and Nanotechnology- Nanophysics
Thesis Title: fabrication and characterization of graphene and graphene based nanomaterials for olfactory/environmental gas sensing applications
Thesis Supervisors: Prof. A. Iraji Zad, Dr O. Akhavan and Prof. M R Gholami
Relevant course: Advanced Condensed Matter 1&2, Physics of Semiconductors, Nanotechnology (synthesis& &characterization and applications) I&II, Approximation Methods in Band Structure Calculations, Molecular Dynamic Simulations.
(GPA: 18.25 out of 20)
Sabbatical course: Charlie Johnson Group, Department of Physics University of Pennsylvania, (7 months) Philadelphia, USA

M. Sc

2007-2009 Tehran University Tehran, Iran
Nano Physics, (GPA: 18.20 out of 20), rank: 1
Thesis Title: Optical and electrical properties of Nano sculptures materials and its sensing applications
Thesis Supervisors: Professor H. Savaloni

B. Sc

2003-2007 Kharazmi University (Tarbiat Moallem University) Tehran, Iran
Solid State Physics, (GPA: 17.11 out of 20), rank: 2
Thesis Title: Lithography techniques on flexible substrates
Thesis Supervisors: Dr H. Dadgar

Honors & Awards

- Distinguished researcher by Iranian scientific elite federation (Saramadan Iran 2016)
- Extended Post-doc position for second year in National Graphene Institute (NGI) in Prof. Andre Geim group (2016)
- Distinguished researcher by Iranian scientific elite federation (Saramadan Iran 2015)
- European Research council (ERC advanced grant projects) for post- doc position in Prof. Andre Geim group in department of physics, University of Manchester (2015)
- Invited speakers for graphene workshop in international nanostructures conference, Kish Island (2014)
- Gifted innovator from Iranian Nano organization for innovation of graphene based inks prototype (2013)

- Admission to the Nanophysics Ph. D. program, Institute for Nanoscience and Nanotechnology Sharif University of Technology, Iran. (2009)
- Admission to the physics Ph. D. program, Tehran University of Technology, Iran. (2009)
- Accepted for pursuing M. Sc. Degree, University of Tehran, Iran. (2007)
- Rank 69 among 5500 students in the Nationwide Graduate Entrance Exam in Physics. (2007)
- Rank 3 among 1500 students in the Nationwide Graduate Entrance Exam in Photonics. (2007)
- Gifted student award ranked 2st (among 35 students) in B.Sc., Kharazmi University of Tehran, Iran. (2007)

Journal Papers (total citations: 2250 , h-index: 19 , i10 index: 22)

1- F. Babaei, **A. Esfandiar** and H. Savaloni, Optical spectra of graded nanostructured TiO_2 chiral sculptured thin films, **Optics Communications**, 283 ,2849 (*2010*).

2- H. Savaloni, **A. Esfandiar,** Fabrication, characterization and some applications of graded chiral zigzag shaped nano-sculptured silver thin films, **Applied Surface Science**,257, 9425(*2011*)

3- O. Akhavan, M. Abdolahad**, A. Esfandiar** and M. Mohtashamifar , Photodegradation of Graphene Oxide Sheets by TiO_2 Nanoparticles after a Photocatalytic Reduction, **J. Phys. Chem. C**, 114 30,(*2010)*.

4- O. Akhavan, E. Ghaderi, and **A. Esfandiar,** Wrapping Bacteria by Graphene Nanosheets for isolation from Environment, Reactivation by Sonication, and Inactivation by Near-Infrared Irradiation, **j. Phys. Chem. B**, 115, (*2011*)

5- **A. Esfandiar**, O. Akhavan and A. Iraji Zad "Melatonin as powerful bio antioxidant for reduction of graphene oxide **J. Mater. Chem**., 21, 10907,(*2011)*

6- **A. Esfandiar**, S. ghasemi, O. Akhavan, M.R. Gholami and A. Iraji Zad, Pd and Pt Doped in reduced graphene oxide -TiO_2 nanocomposite for hydrogen gas sensing, **International Journal of Hydrogen Energy**, 37, (2012)

7- S. Ghasemi, **A. Esfandiar**, S. Rahman Setayesh,A. Habibi-Yangjeh, A. Iraji zad, M.R. Gholami, Synthesis and characterization of TiO_2–graphene nanocomposites modified with noble metals as a photocatalyst for degradation of pollutants, **Applied Catalysis A: General**, 462, (2012).

8- O. Akhavan, M. Kalaee, Z.S. Alavi, S.M.A. Ghiasi, **A. Esfandiar**, Increasing the antioxidant activity of green tea polyphenols in the presence of iron for the reduction of graphene oxide, **Carbon**, 50, (2012)

9- **A.Esfandiar**, H. Savaloni, On the Farication and Charactrization of graded slanted chiral nano-sculptured silver thin films, ***Physica E: Low-dimensional Systems and Nanostructures***, 50, (2013)

10- **Ali Esfandiar,** Nicholas J. Kybert,Eric N. Dattoli,Gang Hee Han,Mitchell B. Lerner,Omid Akhavan,Azam Irajizad,A. T. Charlie Johnson " DNA-decorated graphene nanomesh for detection of chemical vapors " **App. Phys. Lett**., 103, 183110 (2013).

11- **A.Esfandiar**, O. Akhavan and A. Iraji Zad, Pd-WO_3/reduced graphene oxide hierarchical nanostructures as efficient hydrogen gas sensors, **International Journal of Hydrogen Enenrgy, 39**, (2014)

12- N. J. Kybert, G. Hee Han,M. B. Lerner, E. N. Dattoli, **A. Esfandiar**, A. T. C Johnson, Scalable Arrays of Chemical Vapor Sensors Based on DNA-decorated Graphene, ***Nano Research***, 7, (2014)

13- P. Parand, M. Samadpour, **A. Esfandiar**, A Iraji Zad , Graphene/PbS as a Novel Counter Electrode for Quantum Dot Sensitized Solar Cells, **ACS Photonics,** 1, (2014)

14- O. Akhavan, E. Hashemi, M. Shamsara, R. Rahighi, **A. Esfandiar**, Aidin Rahim Tayefeha, Cyto-and geno-toxicities of graphene oxide and reduced graphene oxide sheets on spermatozoa, RSC Advances, 4 (2014)

15- S. Valedbagi, S. M. Elahi, MR Abolhassani, A. Fathalian, **A. Esfandiar**, Effects of vacancies on electronic and optical properties of GaN nanosheet: A density functional study **, Optical Materials**, 47, (2015)

16- N. Naseri, **A. Esfandiar**, M. Qorbani, and A. Z. Moshfegh, Selecting Support Layer for Electrodeposited Efficient Cobalt Oxide/Hydroxide Nanoflakes to Split Water, **ACS Sustainable Chem. Eng**., 2016, Article in press.

17- B. Radha, **A. Esfandiar**, F. C. Wang, A. P. Rooney, K. Gopinadhan, A. Keerthi, A. Mishchenko,A. Janardanan, P. Blake, L. Fumagalli, M. Lozada-Hidalgo, S. Garaj, S. J. Haigh, I. V. Grigorieva, H. A. Wu, A. K. Geim, Molecular transport through capillaries made with atomic scale precision, **Nature, 538 (**2016).

18- Mohammad Qorbani, Tsu-chin Chou, Yi-Hsin Lee, Satyanarayana Samireddi, Naimeh Naseri, Abhijit Ganguly, **Ali Esfandiar**, et.al, Multi-porous Co3O4 nanoflakes @ sponge-like few-layer partially reduced graphene oxide hybrids: towards highly stable asymmetric supercapacitors, J. Mater. Chem. A, 5, 12569 (2017)

19- **A Esfandiar**, B Radha, FC Wang, Q Yang, S Hu, S Garaj, RR Nair, A.K.Geim Size effect in ion transport through angstrom-scale slits., **Science**, 358, (2017).

20- M. Lozdada, S. Zhang, S. Hu, **A. Esfandiar**, I. V. Grigorieva and A. K. Geim, Photon Induced Proton transport through two dimensional crystals, **Nature Communication8**, 2017; 8: 15215.

21- A. Keerthi,A. Janardanan, A. K. Geim,S. Hu, **A. Esfandiar**, I. V.Grigorieva, Ballistic molecular transport through two-dimensional channels, **Nature**, 558, 420–424 (2018).

22- L. Fumagalli**, A. Esfandiar,** S. Hu, K. novoselov, A.K.Geim L. Fumagalli, Dielectric constant of confined water, **Science.** 360, 6395, pp. 1339. 2018.

23- K. Farain, **A. Esfandiar**, AZ Moshfegh, Universal rotation of nanowires in static uniform electric fields in viscous dielectric liquids, Just accepted in **Applied physics Letter**, 03317 (2018)

24- K. Gopinadhan,S. Hu, **A. Esfandiar**, M. Lozada-Hidalgo,F. C. Wang, Q.Yang, A. V. Tyurnina,A. Keerthi,B. Radha, A. K. Geim , Complete steric exclusion of ions and proton transport in twodimensional water, **Science**, 363, 2019.

25- Sajjad Janfaza, Maryam Banan Nojavani, Maryam Nikkhah, Taher Alizadeh, **Ali Esfandiar**, Mohammad Reza Ganjali A selective chemiresistive sensor for the cancer-related volatile organic compound hexanal by using molecularly imprinted polymers and multiwalled carbon nanotube , **Microchimica Acta**,186, 2019.

26- K Farain, **A Esfandiar**, AZ Moshfegh Shooting at the nanoscale: Collection and acceleration of nanowires with an external electric field, **Applied Physics Letters**, 114,2019,

27- YanZi Yu, JingCun Fan, **Ali Esfandiar**, YinBo Zhu, HengAn Wu, FengChao Wang Charge Asymmetry Effect in Ion Transport through Angstrom-Scale Channels, ,**The Journal of Physical Chemistry C**,123, 2019,

28- SA Hosseini, **A Esfandiar**, AI Zad, SH Hosseini-Shokouh, SM Mahdavi, High photoresponsive backward diode by two dimensional SnS2/Silicon heterostructure, **ACS Photonics,** 6 (3), pp 2019.

29- M. Qorbani, **A. Esfandiar**, H. Mehdipour, Chaigneau, Marc; Zad, Azam Iraji; Moshfegh, Alireza Shedding Light on Pseudocapacitive Active Edges of Single-Layer Graphene NanoribbonsasHigh-Capacitance,Supercapacitors, **Acepted in ACS Applied Energy materials.**

30. Nassim Rafiefard, Azam Iraji zad1, **Ali Esfandiar**, Pezhman Sasanpour, et. al, A graphene/TiS3 heterojunction for resistive sensing of polar vapors at room temperature. **Microchimica Acta, just acceped.**

31. **Ali Esfandiar**,Mohammad Qorbani, Indrajit shown and Badrosadat Ojaghi DogaheA High-Energy Hybrid Supercapacitor Using Three-Dimensional Porous Cu₂O-Cu_{1.8}S Nanowires, **Journal of material Chemistry A, Just accepted**.

Conference papers

- **A. Esfandiar** and H. Savaloni, fabrication of Spatially Graded Helical Silver Nano-rods With Zigzag Shape, International Symposium on Reactive Sputter Deposition, RSD2009 , The University of Manchester, UK
- **A. Esfandiar** and H.Savaloni, Optical properties of TiO_2 chiral sculptured thin films, 7th nanotechnology Iranian student conference ,Trbiat Modarres University, 2010, Tehran,
- **A. Esfandiar**, O. Akhavan, A. Iraji zad, Pd Doped Graphene-WO_3 Films prepared by Sol gel Method for Hydrogen Sensing, GraphITA, 2011, Assergi-L'Aquila Italy.
- M. Mohammadi aria, **A. Esfandiar**, R. Sarvari, A. Iraji zad, High sensitive H_2S gas sensor based on Graphene oxide flakes coated on Quartz crystal microbalance, ICN5 Kish, 2014.

Research Interests

- Two dimensional nanomaterials: Synthesis, characterization and applications
- Transport of ions and fluids at atomic scales
- Nanostructure based chemical sensors
- Renewable energy systems by nanostructures
- Instruments and analytical methods for characterization of nanostructures
- Surface physics
- Nano-biophysics

Research Experiences

- Design of GLAD (Glancing Angles Deposition) set up
- Fabrication of nanorods by means of GLAD method
- Field ionization gas sensors
- Simulation of optical properties of TiO_2 nano structures
- Photo lithography
- CVD growth of Graphene, MoS_2 and ZnO nanostructures
- Chemical synthesis of graphene oxide,TiO_2 nanoparticles and WO_3 nano structures
- Gas chromatography mass spectrometer
- Low noise Current-voltage probe station
- Precise ionic transport measurement through nano channels

Teaching Experiences

- Solid State physics, Department of physics faculty, Kharazmi University of Tehran (2014)
- Analytical Mechanics 1&2, Department of physics faculty, Kharazmi University of Tehran (2013)

- Basic Physics 1, Department of physics faculty, Kharazmi University of Tehran (2013)
- Vacuum Technology, Department of physics faculty, Kharazmi University of Tehran (2013)
- Teaching Assistant, Department of physics, University of Tehran, "Surface Physics". (2008)
- Lab Assistant, Department of physics, Sharif University of Technology, "General Physics Laboratory (2010)
- Lab Assistant, Department of physics, Sharif University of Technology, "Modern Physics Laboratory (2011)

Computer Skills

- Programming with Mathematica and C++
- Familiar with SPERESSO and Wein2K software packages
- LabVIEW software for automating measurements
- Working with Origin, MATLAB and AUTOCAD
- Operating Systems: Linux and Windows.

References

- **Prof sir A. Geim**, Nobel Prize laureate in physics 2010, department of physics, university of Manchester, UK , Andre.K.Geim@manchester.ac.uk
- **Prof. A.T. Charlie Johnson,** Department of Physics and Astronomy, University of Pennsylvania, Philadelphia, USA, *cjohnson@physics.upenn.edu*
- **Prof. A. Iraji zad**, Department of Physics, Sharif University of Technology, Tehran , Iran, iraji@sharif.edu
- **Dr. O. Akhavan**, Department of Physics, Sharif University of Technology, Tehran , Iran, *oakhavan@sharif.edu*
- **Prof. K. Pourrezaei**, School of Biomedical Engineering, Science and Health Systems, Drexel University, Philadelphia, USA, *kambiz@drexel.edu*