Elham Asadian, PhD of Nanoscience & Nanotechnology

Assistant Professor

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Research Interests

Biosensors, Drug Delivery, Theranostics, 2D materials, Bioelectrochemistry

Education

Postdoc. 2016-2019	**Sharif University of Technology** Institute for Nanoscience and Nanotechnology (INST) **Project*:*** "*Metal-organic frameworks (MOFs) and their applications in electrochemical sensors design and fabrication*" Three years postdoctoral fellowship awarded by Iran Nanotechnology Initiative Council (INIC)	*Tehran, Iran*
PhD 2010-2016	**Sharif University of Technology** Institute for Nanoscience and Nanotechnology (INST) **Thesis Title:** "*Synthesis of hybrid graphene nanostructures and their application in design and fabrication of electrochemical sensors for pharmaceutical and biological applications*" **Thesis Degree:** Excellent **Supervisors:** Prof. Shahrokhian, Prof. Iraji Zad **Co-supervisor:** Prof. Mohajerzadeh **Graduated with Honors:** 1st rank among PhD candidates (GPA 19/20)	*Tehran, Iran*
Sabbatical 2014-2015	Visiting scholar at **Nanyang Technological University (NTU)** School of Material Science and Engineering (MSE) **Project*:*** "*Design and fabrication of 3D graphene networks (3DGNs)/metal oxide composites for sensing applications*" **Supervisor*:*** Prof. Hua Zhang	*Singapore*
M.SC 2007-2009	**Sharif University of Technology** Chemistry Department, Analytical Chemistry **Thesis*:*** "*Chemically modified electrodes based on conducting polymers and carbon nanotubes in clinical and pharmaceutical applications*" **Supervisor*:*** Prof. Shahrokhian **Thesis note*:*** 19.90/20	*Tehran, Iran*
B.SC 2002-2006	**Kharazmi University** Chemistry Department, Pure Chemistry	*Tehran, Iran*

Honors & Awards

- **Winner of Kazemi Ashtiani Award from the National Elite Foundation, 2019**
- **Selected in a World-wide Competition as a Young Scientist for Participation in Lindau Nobel Laureate Meeting 2017, 24-30 June, Lindau Germany (The only representative from Iran)**
- **Winner of Baden-Wurttemberg Program of the Lindau Nobel Laureate Meeting 2017, 1-7 July, Baden-Wurttemberg State, Germany (5000 Euro)**
- Three years postdoctoral scholarship from the Iranian Nanotechnology Initiative Council
- 1st rank in the PhD entrance exam and first ranked PhD graduated student from INST
- 2nd rank in master national entrance exam among 11000 participants, 2007

Journal Papers

- M. Jannesaria, **E. Asadian***, F. Ejehi, N. J. English, R. Mohammadpour, P. Sasanpour, “Boosting on-demand antibacterial activity using electrical stimulations from polypyrrole-graphene oxide triboelectric nanogenerator”, *Nano Energy*, 112 (**2023**) 108463.
- Nazari-Vanani, R., Vafaiee, M., **Asadian, E.**, Mohammadpour, R., Rafii-Tabar, H., & Sasanpour, P. “Enhanced proliferation and migration of fibroblast cells by skin-attachable and self-cleaning triboelectric nanogenerator”. *Biomaterials Advances*, 149 (**2023**): 213364.
- Ahmadi, M., Khoramjouy, M., Dadashzadeh, S., **Asadian, E**., Mosayebnia, M., Geramifar, P., ... & Ghorbani-Bidkorpeh, F. “Pharmacokinetics and biodistribution studies of [99mTc]-Labeled ZIF-8 nanoparticles to pave the way for image-guided drug delivery and theranostics”. *Journal of Drug Delivery Science and Technology*, 81 (**2023**): 104249.
- Afsharara, H., **Asadian, E.**, Mostafiz, B., Banan, K., Bigdeli, S. A., Hatamabadi, D., ... & Ghorbani-Bidkorpeh, F. "Molecularly imprinted polymer-modified carbon paste electrodes (MIP-CPE): A review on sensitive electrochemical sensors for pharmaceutical determinations." *TrAC Trends in Analytical Chemistry* (**2023**): 116949.
- H. Tianhe, G. Wang, MA. Shahbazi, Y. Bai, J. Zhang, G. Feng, **E. Asadian** et al. "Surface Decoration of Peptide Nanoparticles Enables Efficient Therapy toward Osteoporosis and Diabetes." *Advanced Functional Materials* (**2023**): 2210627.
- R. Masoudifar, N. Pouyanfar, D. Liu, M. Ahmadi, B. Landi, M. Akbari, S. Moayeri-Jolandan, F. Ghorbani-Bidkorpeh, **E. Asadian***, MA. Shahbazi. "Surface engineered metal-organic frameworks as active targeting nanomedicines for mono-and multi-therapy." *Applied Materials Today* 29 (**2022**): 101646.
- E. Afjeh-Dana, **E. Asadian**, MR. Razzaghi, H. Rafii-Tabar, P. Sasanpour. "Deflection-based laser sensing platform for selective and sensitive detection of H2S using plasmonic nanostructures." *Scientific Reports* 12, no. 1 (**2022**): 1-10.
- F. Ejehi, L. Shooshtari, R. Mohammadpour, **E. Asadian**, P. Sasanpour. "Self-powered ultraviolet/visible photodetector based on graphene-oxide via triboelectric nanogenerators performing by finger tapping." *Nanotechnology* 33, no. 47 (**2022**): 475205.
- R. Nazari-Vanani, R. Mohammadpour, **E. Asadian**, H. Rafii-Tabar, P. Sasanpour. "A computational modelling study of excitation of neuronal cells with triboelectric nanogenerators." *Scientific Reports* 12, no. 1 (**2022**): 1-10.
- L. Yidan, A. Naseri, T. Li, A. Ostovan, **E. Asadian**, R. Jia, L. Shi, L. Huang, A. Z. Moshfegh. "Shape-Controlled Photochemical Synthesis of Noble Metal Nanocrystals Based on Reduced Graphene Oxide." *ACS Applied Materials & Interfaces* (**2022**) 14, 16527-16537.
- S. Y. Rahnamaee, R. Bagheri, M. Vossoughi, **E. Asadian**, S. Ahmadi Seyedkhani, A. Samadikuchaksaraei. "A new approach for simultaneously improved osseointegration and antibacterial activity by electrochemical deposition of graphene nanolayers over titania nanotubes." *Applied Surface Science* (**2022**) 580, 152263.
- N. Pouyanfar, S. Zare Harofte, M. Soltani, S. Siavashy, **E. Asadian**, F. Ghorbani-Bidkorbeh, R. Keçili, Ch. Mustansar Hussain, "Artificial intelligence-based microfluidic platforms for the sensitive detection of environmental pollutants: Recent advances and prospects." *Trends in Environmental Analytical Chemistry* (**2022**): e00160.
- F. Ejehi, R. Mohammadpour, **E. Asadian,** S. Fardindoost, P. Sasanpour, “Enhancement of self-powered humidity sensing of graphene oxide–based triboelectric nanogenerators by addition of graphene oxide nanoribbons”, *Microchimica Acta* (**2021**) 188, 1-13.
- M. Vafaiee, R. Mohammadpour, M. Vossoughi, **E. Asadian**, M. Janahmadi, P. Sasanpour, “Carbon Nanotube Modified Microelectrode Array for Neural Interface”. *Frontiers in Bioengineering and Biotechnology* (**2021**) 8, 1465.
- A. Naseri, M. R. Hormozi-Nezhad, S. Shahrokhian, **E. Asadian,** “Silver nanowires immobilized on gold-modified glassy carbon electrode for electrochemical quantification of atorvastatin”. *Journal of Electroanalytical Chemistry* (**2020**) 876, 114540.

- H. Ahmadvand, R. Mohammadpour, S. H. Hosseini-Shokouh, E. Asadian, “Room temperature and high response ethanol sensor based on two-dimensional hybrid nanostructures of WS_2/GONRs”, *Scientific Reports* (**2020**) 10 (1), 1-9.
- F. Ejehi, R. Mohammadpour, **E. Asadian**, P. Sasanpour, S. Fardindoost, O. Akhavan, "Graphene Oxide Papers in Nanogenerators for Self-Powered Humidity Sensing by Finger Tapping", *Scientific reports* 10 (**2020**) 1-11.
- Z. Hosseindokht, R. Mohammadpour, **E. Asadian,** M. Paryavi, H. Rafii-Tabar, P. Sasanpour, “Low-cost flexible pressure sensor using laser scribed GO/RGO periodic structure for electronic skin applications”, *Superlattices and Microstructures* (**2020**) 106470.
- **E**. **Asadian,** S. Shahrokhian, A. Iarji Zad, “ZIF-8/PEDOT@ flexible carbon cloth electrode as highly efficient electrocatalyst for oxygen reduction reaction”, *International Journal of Hydrogen Energy* 45 (**2020**) 1890-1900.
- **E. Asadian,** M. Ghalkhani, S. Shahrokhian, "Electrochemical Sensing Based on Carbon Nanoparticles: A Review", *Sensors and Actuators B: Chemical* 293 (**2019**) 183-209.
- R. Khoramian, SA. Ramazani, M. Hekmatzadeh, R. Kharrat, **E. Asadian**, “Graphene Oxide Nanosheets for Oil Recovery”, *ACS Applied Nano Materials* 2 (**2019**) 5730-5742.
- Kheirabadi, M., Samadi, M., **Asadian, E**., Zhou, Y., Dong, C., Zhang, J., Moshfegh, A. Z, "Well-designed Ag/ZnO/3D Graphene Structure for Dye Removal: Adsorption, Photocatalysis and Physical Separation Capabilities", *Journal of Colloid and Interface Science* 537 (**2019**) 66-78.
- E. Jokar, S. Shahrokhian, **E. Asadian**, H. Hosseini, “An Efficient Two-step Approach for Improvement of Graphene Aerogel Characteristics in Preparation of Supercapacitor Electrodes” *Journal of Energy Storage* 17 (**2018**) 465-473.
- **E. Asadian,** S. Shahrokhian, A. Iraji Zad, “Highly Sensitive Nonenzymetic Glucose Sensing Platform based on MOF-derived NiCo LDH Nanosheets/Graphene Nanoribbons Composite”, *Journal of Electroanalytical Chemistry* 808 (**2018**) 114-123.
- Z. Hosseindokht, M. Paryavi, **E. Asadian,** R. Mohammadpour, H. Rafii-Tabar, P. Sasanpour, “Pressure Sensor Based on Patterned Laser Scribed Reduced Graphene Oxide; Experiment & Modeling”, *IEEE*, (**2017**) International Conference on Orange Technologies (ICOT) (pp. 15-17)
- **E. Asadian**, S. Shahrokhian, A. Iraji zad, F. Ghorbani-Bidkorbeh, “Glassy Carbon Electrode Modified with 3D Graphene/CNT Network for Sensitive Electrochemical Determination of Methotrexate”, *Sensors and Actuators B: Chemical* 239 (**2017**) 617-627 (**Top cited & Hot article**).
- **E. Asadian**, A. Iraji zad, S. Shahrokhian, “Voltammetric Studies of Azathioprine on the Surface of Graphite Electrode Modified with Graphene Nanosheets Decorated with Ag Nanoparticles”, *Materials Science and Engineering: C* 58 (**2016**) 1098–1104.
- **E. Asadian**, S. Shahrokhian, A. Iraji zad, “Hierarchical Core-shell Structure of ZnO Nanotube/MnO_2 Nanosheet Arrays on 3D Graphene Network as a High-Performance Biosensing Platform”, *RSC Advances* 6 (**2016**) 61190-61199.
- R. Mohammadi, S. Shahrokhian, **E. Asadian**, “One-step Fabrication of Electrochemically Reduced Graphene Oxide/Nickel Oxide Composite for Binder-free Supercapacitors”, *International Journal of Hydrogen Energy* 41 (**2016**) 17496-17505.
- M. Kheirabadi, R. Bagheri, K. Kabiri, D. A. Ossipov, E. Jokar, **E. Asadian,** "Improvement in Mechanical Performance of Anionic Hydrogels Using Full-Interpenetrating Polymer Network Reinforced with Graphene Oxide Nanosheets" *Advances in Polymer Technology* 35(**2016**) 386-395.
- **E. Asadian**, S. Shahrokhian, A. Iraji zad, E. Jokar, “In-situ Electro-polymerization of Graphene Nanoribbon/Polyaniline Composite Film: Application to Sensitive Electrochemical Detection of Dobutamine”, *Sensors and Actuators B: Chemical* 196 (**2014**) 582-588.
- S. Shahrokhian, **E. Asadian**, “Simultaneous Voltammetric Determination of Ascorbic acid, Acetaminophen and Isoniazid using Thionine Immobilized Multi-Walled Carbon Nanotube Modified Carbon Paste Electrode”, *Electrochimica Acta* 55 (**2010**) 666-672 (**Top Cited Paper**)

- S. Shahrokhian, **E. Asadian**, "Electrochemical Determination of L-dopa in the Presence of Ascorbic Acid on the Surface of the Glassy Carbon Electrode Modified by a Bilayer of Multi-walled Carbon Nanotube and Polypyrrole Doped with Tiron", *Journal of Electroanalytical Chemistry* 636 (**2009**) 40-46.

Book Chapters:

- **E. Asadian***, M. Jannesari, M.A. Shahbazi, "Application of infra-red wave in cancer therapy", In Electromagnetic waves-based cancer diagnosis and therapy. Principles and applications of nanomaterials. Elsevier, (**2023**).
- **E. Asadian**, R. Masoudifar, N. Pouyanfar, F. Ghorbani-Bidkorbeh, "Nanotechnology-based therapies for skin wound regeneration", In *Emerging Nanomaterials and Nano-Based Drug Delivery Approaches to Combat Antimicrobial Resistance*, pp. 485-530. Elsevier, (**2022**).
- **E. Asadian**, M. Ahmadi, R. Keçili, F. Ghorbani-Bidkorbeh, "Emerging Metal-Organic Framework Nanomaterials for Cancer Theranostics", In *Cancer Nanotheranostics*, pp. 231-274. Springer, Cham, (**2021**).

Conferences

- **E. Asadian***, "Improved bacterial inhibition by electrical stimulations produced from polypyrrole-graphene oxide triboelectric nanogenerator", *Virology and Advances in Clinical and Cellular Immunology*, 11-12 September **2023**, London, **UK** (Invited speaker)
- **E. Asadian***, "Perspiration Analysis using a Self-powered Wearable Lactate Biosensor based on NiCo Nanosheets@CoFe Hollow Nanocubes", 3rd International Conference on *Future of Preventive Medicine & Public Health (PMPH)*, 30-31March **2023**, Barcelona, **Spain** (Invited speaker)
- **E. Asadian***, "Graphene-based Electrochemical Sensors for Pharmaceutical and Clinical Applications", *21st International Conference on Nanotechnology*, 27-28 May **2022**, Zurich, **Switzerland** (Invited speaker)
- **E. Asadian***, "Nanomaterials for Drug Delivery", *5th International Congress of Pharmacy-Updates & 4th Annual Conference of IPharms*, **2022**, Shahid Beheshti University of Medical Sciences, **Iran** (Invited speaker)
- **E. Asadian***, "Graphene and Graphene-based Materials and their Application in Fabrication of Electrochemical Sensors for Pharmaceutical and Biological Determinations", *INN international Conference in Nanotechnology and Nanomedicine*, **2017**, Materials and Energy Research Center (MERC), Alborz, **Iran** (Invited speaker)
- **E. Asadian***, S Shahrokhian, A. Irajizad, "Glassy Carbon Electrode Modified with CNT Doped 3D Graphene Network: Application to the Highly Sensitive Electrochemical Determination of Methotrexate", *6th International Conference on Nanostructures (ICNS6)*, **2016**, Kish Island, **Iran** (Oral presentation)
- **E. Asadian***, S Shahrokhian, A. Irajizad, "Hierarchical Structure of ZnO Nanotubes@MnO_2 Nanosheets on 3D Graphene Network as a Sensing Platform", *6th International Conference on Advanced Nanomaterials (ANM2015)*, **2015**, Aveiro, **Portugal** (Oral presentation, Session Chair)
- **E. Asadian***, S. Shahrokhian, A. Iraji zad, "Graphene Nanosheets Decorated with Ag Nanoparticles: Application to the Highly Sensitive Electrochemical Determination of Azathioprine Drug", *Seminar on Sensor Science and Technology (SSST2015)*, **2015**, Sharif University of Technology, Tehran, **Iran** (Poster presentation)
- **E. Asadian***, S. Shahrokhian, A. Iraji zad, "In-situ Electropolymerized Graphene Nanoribbon/Polyaniline Composite Film for Sensing Applications", *5th International Conference in Nanostructures (ICNS5)*, **2014**, Kish Island, **Iran** (Poster presentation)
- **E. Asadian***, S. Shahrokhian, "Simultaneous Voltammetric Determination of Ascorbic acid, Acetaminophen and Isoniazid Using Thionine Immobilized Multi-walled Carbon Nanotube Modified Carbon Paste Electrode", International Congress of Young Chemists '*YoungChem2011*', **2011**, Cracow, **Poland** (Poster presentation)
- **E. Asadian***, S. Shahrokhian, "Electrochemical Determination of L-dopa on the Surface of the Glassy Carbon Electrode Modified by a Bilayer of MWCNT and Polypyrrole Doped with Tiron",*60th Annual Meeting of the International Society of Electrochemistry (ISE)*, **2009**, Beijing, **China** (Oral presentation)

Workshops

- 3rd PAM International School on Applications of Nanomaterials in Medicine, 2-4 November **2016**, Sharif University of Technology, Tehran, Iran.
- 2nd PAM International School on Emergent Quantum Phenomena in Graphene, **2015**, Department of Physics, Sharif University of Technology, Tehran, Iran (By Prof. K. Novoselov)
- "Nanocrystal Growth and Characterization", By Prof. Luis M. Liz-Marzán (Ikerbasque Research Professor, Scientific Director of CIC biomaGUNE), 6th International Conference on Nanostructures (ICNS6), **2016**, Kish Island, Iran
- "Non-Traditional Synthetic Methods", By Prof. Kenneth S. Suslick (Professor of Chemistry, Professor of Materials Science & Engineering, - University of Illinois at Urbana-Champaign), 6th International Conference on Nanostructures (ICNS6), **2016**, Kish Island, Iran.
- "Advances in Electrospinning", By Prof. Seeram Ramakrishna (National University of Singapore), 4th International Conference in Nanostructures (ICNS4), **2012**, Kish Island, Iran

Teaching Experiences

Shahid Beheshti University of Medical Sciences (SBMU)

- Synthesis of Nanomaterials
- Characterization of Nanomaterials
- Nanobiotechnology
- Advanced Nanomedicine
- Drug delivery systems
- Applications of Nanotechnology in Tissue Engineering & Cell Therapy
- Synthesis and Characterization of Scaffolds

From 2019-

Sharif University of Technology

- Institute for Nanoscience and Nanotechnology (INST)
  Nanoscience Laboratory for PhD students — **2016-2019**
- Analytical Chemistry, Chemical Engineering Department (Undergraduate) — **2018-2022**

Islamic Azad University of Pharmaceutical Science (IAUPS)

Chemistry Department (Undergraduate)

- Analytical Chemistry
- Electrochemistry
- English for Chemistry Students

2012-2013

Academic Activities

- Cooperating with ONS group (Optic, Nano, Surface) in surface physics and thin-film labs, Physics department, Sharif University of Technology, 2014-2019
- Executive member of the organizing committee of 4th International Conference on Nanostructures (ICNS4), 12-14 March 2012, Kish Island, Iran
- Executive member of the organizing committee of 6th International Conference on Nanostructures (ICNS6), 7-10 March 2016, Kish Island, Iran
- Member of organizing committee of 3rd PAM International School (Applications of Nanomaterials in medicine), 2-4 November 2016, Sharif University of Technology, Tehran, Iran
- Executive member of the scientific committee of 7th International Conference on Nanostructures (ICNS7), 27 Feb. -1 March 2018, Iran
- Executive member of the scientific committee of 8th International Conference on Nanostructures (ICNS8), 18-20 November 2020, Iran

Skills & Expertise

Language Skills

- Persian: Mother language
- English: Fluent (TOEFL score 100/120)
- French: Fluent (Le niveau C1)

Experimental Skills

Chemical Synthetic Protocols

- Over 15 years' experience working in synthesis Lab on various nanomaterials such as carbon nanostructures (CNT, Graphene, Graphene Nanoribbons, 3D graphene hydrogels), Hydrothermal synthesis of nanomaterials, Metal oxides, SPIONs (Fe3O4), Metal-organic Frameworks (MOFs)

Cell Culture

Electrochemical Analysis Technique

- Including CV, DPV, LSV, SWV, Amperometry and EIS
- 8 years of experience working with various electrochemical workstations including Autolab, Metrohm (797 & 757), CH Instrument and IVIUM Potentiostat
- Electrochemical polymerization and deposition
- Familiar with NOVA, GPES, FRA and electrochemical data processing software

Thin Film Deposition Systems

- E-beam evaporation, chemical evaporation (CVD), Plasma-enhanced chemical vapor deposition (PECVD)

Thin Films and Materials Characterization Methods

- AFM, XRD, PL & UV-Vis spectroscopy, HPLC

IT Skills

- Operating systems: Windows XP/7/10
- Office: Word, Excel, PowerPoint
- Familiar with Photoshop and Illustrator

Grants:

As Principal Investigator (PI)

1- "Design and Fabrication of a Self-powered Wearable Biosensor Based on Electrochemical Energy Storage/Conversion Devices", National Institute for Medical Research Development (NIMAD), Young Researcher Grant, Technology and Innovation in Medical Sciences, Sep. 2020- May 2022

2- "Design and Fabrication of All-Polymeric Self-Powered Electrically Triggered Drug Delivery System based on Triboelectric Nanogenerator", Iran National Science Foundation (INSF), Sep. 2020- March 2022