Narges Nikoofard

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Personal Information

Birth: 1985, Tehran.

Female, Married, One child.

Education

- Continuous PhD (This is a seamless course which goes directly to PhD), Institute for Advanced Studies in Basic Sciences (IASBS), Zanjan, Iran, Sep 2003 – Apr 2012.

Honors

- Ranked 48 in the Iranian universities entrance exams (Among around 400,000 participants), 2003.
- Ranked first among students of the continuous PhD course, 2003 – 2012.
- The “Physical Society of Iran” award, for outstanding young researcher, 2012.
- Outstanding researcher for publishing in the journal with the highest impact factor, University of Kashan, 2016.
- Collaboration with different companies in Kashan and Tehran, to introduce new technologies into industries.

Publications

1. *Free-energy barrier for electric-field-driven polymer entry into nanoscale channels*, Narges Nikoofard and Hossein Fazli, Physical Review E (Rapid Communications) **83**, 050801 (2011).
2. *Electric-field-driven polymer entry into asymmetric nanoscale channels*, Narges Nikoofard and Hossein Fazli, Physical Review E **85**, 021804 (2012).
   (Also, selected for publication in Virtual Journal of Nano-scale Science and Technology, Volume 25, Issue 10)
3. *Distribution of counterions and interaction between two similarly charged dielectric slabs: Roles of charge discreteness and dielectric inhomogeneity*, Weria Pezeshkian, Narges Nikoofard, Davood Noroozi, Farshid Mohammad-Rafiee, and Hossein Fazli, Physical Review E **85**, 061925 (2012).
4. *Directed translocation of a flexible polymer through a cone-shaped channel*, Narges Nikoofard, Hamidreza Khalilian, and Hossein Fazli, Journal of Chemical Physics **139**, 074901 (2013).
5. *Accuracy of the blob model for single flexible polymers inside nanoslits that are a few monomer sizes wide*, Narges Nikoofard, S. Mohammad Hoseinpoor, and Mostafa Zahedifar, Physical Review E **90**, 062603 (2014).
6. *A Flexible polymer confined inside a cone-shaped nano-channel*, Narges Nikoofard and Hossein Fazli, Soft matter **11**, 4879 (2015).
7. Amphiphilic Block Copolymer Nano-micelles: Effect of Length Ratio of the Hydrophilic Block, Narges Nikoofard and Fahimeh Maghsoodi, Physical Chemistry Research **3**, 239 (2015).
8. Topology sorting and characterization of folded polymers using nano-pores, Narges Nikoofard and Alireza Mashaghi, Nanoscale 8, 4643 (2016).
9. Accuracy Limits of the Blob Model for a Flexible Polymer Confined Inside a Cylindrical Nano-Channel, S. Mohammad Hoseinpoor, Narges Nikoofard, and Mostafa Zahedifar, Journal of Statistical Physics **163**, 593-603 (2016).
10. Dynamic stability of nano-fibers self-assembled from short amphiphilic A6D peptides, Narges Nikoofard and Fahimeh Maghsoodi, The Journal of Chemical Physics **148**, 134903 (2018).

11. Implications of Molecular Topology for Nanoscale Mechanical Unfolding, Narges Nikoofard and Alireza Mashaghi, The Journal of Physical Chemistry B **122**, 9703-9712 (2018).
12. Mechanism of rectification of polymer motion in an asymmetric nano-channel, Maedeh Heidari, Mahdieh Mikani, Narges Nikoofard, Journal of Nanostructure in Chemistry **10**, 131–142 (2020).

13. نانوحسگرهای بر پایه آلومینای آندایز نانومتخلخل، نرگس نیکوفرد و محسن محمدعلیزاده، نشریه دنیای نانو (۱۳۹۹)

14. Ejection Time of a Semi-Flexible Polymer from Strong Confinement inside a Nano-slit, Fatemeh Hafizi, S Mohammad Hoseinpoor, Narges Nikoofard, Physical Chemistry Research 8, 775-765 (2020).
15. Movement of polymers in an asymmetric nano-channel under various parameters, F Taghavi, V Bianco, P Malgaretti, N Nikoofard, IOP Conference Series: Materials Science and Engineering 1067 (1), 012144 (2021).
16. Characteristic time for the end monomers of a spherically confined polymer to find a nano-pore, SM Hoseinpoor, N Nikoofard, BY Ha, The Journal of Chemical Physics 154 (11), 114901 (2021).

17. نانوذرات برای مقابله با کووید-۱۹، نرگس نیکوفرد و نرگس کریمی‌زاده، نشریه دنیای نانو (۱۴۰۰)

18. Prediction of SARS-CoV-2 spike protein mutations using Sequence-to-Sequence and Transformer models, H Ahmadi, V Nikoofard, H Nikoofard, R Abdolvahab, N Nikoofard, etc , bioRxiv, 2023.01. 23.525130 (2023).
19. Ejection dynamics of a semiflexible polymer from a nanosphere, F Moazemi, S Ghanbari-Kashan, F Moharaminezhad, N Nikoofard, PRE 108, 044501 (2023).

20. مروری بر ویژگی های ترابرد الکترونی در بوروفین، مرجان دهقان، حسین نیکوفرد، نرگس نیکوفرد و مهدی اسماعیل‌زاده، نشریه نانومقیاس (۱۴۰۲)

21. Spin and valley filtering properties in a ferromagnetic 8-pmmn borophene monolayer, FIM Bidgoli, H Nikoofard, N Nikoofard, M Esmaeilzadeh, Journal of Physics and Chemistry of Solids, 111933 (2024)

22. مروری بر راهکارهای مبتنی بر نانوفناوری برای افزایش کیفیت فرآورده‌های لبنی، فریبا شفیعی، نرگس نیکوفرد، حسین نیکوفرد، دنیای نانو (۱۴۰۳)

Conference Proceedings in English

1. *Extension of a Flexible Polymer Confined inside a Nano-Channel*, S. Mohammad Hoseinpoor, Narges Nikoofard and Mostafa Zahedifar, Proceedings of the 5th International Conference on Nanostructures (ICNS5), Kish Island, March 2014.
2. M Mohamadalizade, N Nikoofard, M Noormohammadi, A Ramezani, Transport of the protein lysozyme through asymmetric nano-porous alumina membrane in constant and alternative electric fields, Nanomedicine and Nanosafety Conference, Tehran University of Medical Sciences, Tehran (2017)
3. Maedeh Heydari, N Nikoofard, Study of Directed Motion of Polymers in a Cone-shaped Nano-structure as a Method of Polymer Separation, 6th International Biennial Conference on Ultrafine Grained and Nanostructured Materials, University of Tehran, Kish (2017)
4. S M Hoseinpoor, N Nikoofard, Attempt time of a spherically confined polymer to find a nano-pore, 8th International Conference on Nanostructures, Sharif University of Technology, Tehran (2020)
5. Movement of polymers in an asymmetric nano-channel under various parameters, F Taghavi, V Bianco, P Malgaretti, N Nikoofard, IOP Conference Series: Materials Science and Engineering 1067 (1), 012144 (2021).
6. Ghanbari and Nikoofard, A description of the semi-flexible polymer configuration inside the nanosphere and how it ejects, 9th International Conference on Nanoscience and Nanotechnology (ICNN2023), University of Tehran
7. Moharaminejad, Ghanbari, and Nikoofard, Study of ejection dynamics of a semi-flexible polymer from a nano-sphere using molecular dynamics simulation compared with theory, 9th International Conference on Nanoscience and Nanotechnology (ICNN2023), University of Tehran
8. Imanian Mofrad Bidgoli, H Nikoofard, N Nikoofard, Spin and valley transport in n-p-n junction of borophene, 9th International Conference on Nanoscience and Nanotechnology (ICNN2023), University of Tehran
9. Shafiee, Nikoofard and Mehran Vaezi, Exploring Different Approaches for Stabilizing DNA Polymerase on Graphene: Voltage Reduction as a Measurement Criterion, 10th

International Congress on Nanoscience & Nanotechnology (ICNN2024), Vali-e-Asr University of Rafsanjan, Iran

Selected Presentations

- Oral: *Free-energy barrier for electric-field-driven polymer entry into nanoscale channels*, 18th Spring Physics Conference, School of Physics, Institute for Research in Fundamental Sciences (IPM), Tehran, June 2010.
- Contributed Speaker: *Electric-field-driven polymer entry into asymmetric nanoscale channel,* 18th Annual IASBS Meeting on Condensed Matter Physics, Institute for Advanced Studies in Basic Sciences, Zanjan, June 2012.
- Poster: *Polymer Translocation through Asymmetric Nano-channels*, Institute of Computational Physics, University of Stuttgart, Germany, Oct 2012.
- Oral: *Polymer Translocation through Asymmetric Nano-channels,* Group of Dr. Ulrich Rant, Technical University of Munich, Germany, Oct 2012.
- Oral: *Polymer Translocation through Asymmetric Nano-channels,* Group of Prof. Tim Liedl, Ludwig-Maximilians University of Munich, Germany, Oct 2012.
- Invited Speaker: *Single Polymer Dynamics and Polymer Translocation*, Workshop on Physics of Polymers and Biopolymers, Institute for Research in Fundamental Sciences (IPM), Tehran, Oct 2013.
- Invited Speaker: *Polymers Confined to Nano-Structures*, 7th Conference on Statistical Physics, Soft Condensed Matter and Complex Systems, University of Zanjan, Dec 2014.

Supervised Theses

- MSc Thesis: Investigating Nano-structures from Self-Assembly of A6D peptides using Molecular Dynamics Simulations, Ms Fazhimeh Maghsoodi, Aug 2015.
- MSc Thesis: Rectified Motion of Polymer in Asymmetric Nano-channels, Ms Mahdieh Mikani, Jan 2016.

- MSc Thesis: Investigating Statics and Dynamics of a Semi-flexible Polymer Confined in a Nano-Slit Using Molecular Dynamics Simulation, Ms Fatemeh Hafizi, May 2016.
- MSc Thesis: Statics of a Polymer under the Simultaneous Action of Confinement and Tension Using Molecular Dynamics Simulation, Mr S. Mohammad Emadi, Jun 2016.
- PhD Thesis, Statics and Dynamics of Polymers Confined in Nano-Scale Geometries, Dr S. Mohammad Hoseinpoor, Nov 2016.
- MSc Thesis: Rectification of Polymer Motion in Asymmetric Nano-Channels, Ms Maedeh Heydari, Sep 2017.
- MSc Thesis: Polymer Separation in Asymmetric Nano-Channels, Ms Parisa Asadi, Jan 2019.
- MSc Thesis: Ejection Time of a Semi-Flexible Polymer Confined in a Spherical Nano-Cavity, Ms Zeynab Hajikhani, May 2019.
- MSc Thesis: Polymer Separation in Nano-channels Composed of Consecutive Nano-cones, Ms Firoozeh Taghavi, October 2021.
- MSc Thesis: Semiflexible Polymer Ejection from Spherical Nano-sphere, Ms Farzaneh Moazemi, October 2021
- Study and investigation of the charge current of monolayer borophene in the presence of electric and magnetic fields, Mr Hossein Golfeshan, 2022, Jointly with Dr. Hossein Nikoofard
- Spin and valley transport in borophene p-n junction, Fatemeh Imanian M Bidgoli, 2022, Jointly with Dr. Hossein Nikoofard
- Comparative study of the ejection of a semi-flexible polymer confined in a nano-sphere, Fatemeh Moharaminezhad, 2023
- Using Graphene Nanopores for DNA Sequencing, Fariba Shafiee, 2023, Advisor: Dr. Mehran Vaezi

Completed Research Projects

- “Asphaltene Precipitation in Reservoir Fluids” and “Miscible Gas Injection into oil reservoirs”, Dr. MohammadReza Razvan group, Ide-pardazan-e Javan (Young Idea-Makings) group, Research Institute of Petroleum Industry, Summer 2005.

- “Molecular Dynamics Simulation of Granular Media under a Periodic Force, and Comparison with Experiment”, with Dr. Mania Maleki, Autumn 2007.
- Studying the stability of the Covid-19 virus in air at different temperatures and humidity
- Manufacturing and analyzing antibacterial containers with minimal environmental impact (2024)
- Feasibility of nanopore sequencing (2025)

Attended Workshops

- 9-11th School of Physics (entitled: High Energy, Statistical Mechanics, Condensed
- Matter), Institute for Advanced Studies in Basic Sciences, Zanjan, Winter 2003-2005.
- The 2nd Workshop on High Performance Computing (HPC09), Institute for Research in Fundamental Sciences (IPM) and Shahid Beheshti University, Tehran, Jan 2009.
- The LAMMPS Workshop, Sharif University of Technology, Tehran, Dec 2009.
- Casimir Workshop, Institute for Research in Fundamental Sciences (IPM), Jul 2010.
- Mini workshop on Biological Physics, Physics Department, Sharif University of Technology, Dec 2011.
- Summer School on “Simulating Soft Matter with ESPResSo, ESPResSo++ and VOTCA”, Institute of Computational Physics, University of Stuttgart, Germany, Oct 2012.
- Workshop on "Molecular Dynamics simulation using LAMMPS", Sharif University of Technology, Dec 2013.
- Workshop on Spintronics, Institute for Research in Fundamental Sciences (IPM), Nov 2015.

Skills

- Programming with Fortran, Tcl, C, Python, MATLAB.
- Professional in ESPResSo and experienced with LAMMPS, GROMACS and NAMD.
- Molecular Dynamics Simulation of Soft Matter Systems.
- Experienced with Intel Math Kernel Library (MKL).

- Familiar with Bash Scripting and High Performance Computing.
- Translating, writing and speaking English very well.

Membership

- Member of the Iranian Physical Society
- Member of Iranian Nanotechnology Society

Current Research Interests

- Covid-19 mutations
- Stability of lipid membranes
- DNA Sequencing using Nano-pores
- Active packaging

Current Collaborators

- Dr Mehdi Vaez Allae, University of Tehran, Tehran
- Dr Weria Pezeshkian, University of Copenhagen, Denmark
- Dr Hamidreza Akhavan, Shahid Bahonar University, Kerman

Past Collaborators

- Prof Hossein Fazli, Institute for Advanced Studies in Basic Sciences, Iran.
- Dr Alireza Mashaghi, Harvard Medical School, USA; Leiden University, Netherlands.
- Prof Bae Yeun Ha, University of Waterloo, Canada
- Dr Paolo Malgaretti, Max Planck Institute for Intelligent Systems, Stuttgart, Germany
- Dr Mehdi Esmaelzadeh, Iran Science and Technology University, Tehran