Hossein Lanjanian

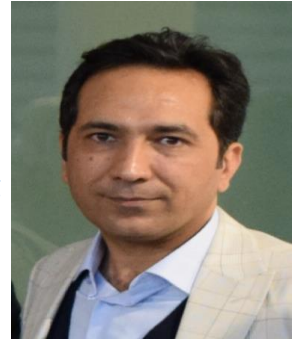Ph.D., **Bioinformatics**, 2019; University of Tehran

MSc, **Theoretical physics**, 2003; University of Tehran

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Background

Since the elementary school days, I was interested in describing phenomena with simple rules. Therefore, I started my university education in physics and got an MSc degree in theoretical physics by focusing on statistical physics and its application in complex systems. In this time I was interested in molecular biology. Therefore, For Ph.D., I studied bioinformatics at the Institute of Biochemistry and Biophysics, University of Tehran. Moreover, I passed some advanced courses at the Faculties of Computer science and Biologies such as Machine learning, Information theory, Dynamical systems, Molecular biology, Biochemistry, Cell signaling, Bioinformatics, Computational genomics, and Neuroscience.

Education

- **Ph.D. |2011-2018| University of Tehran;** Institute of Biochemistry and Biophysics (IBB); **Bioinformatics**

Thesis title: *Genome-scale analysis of DNA catastrophic changes and its effect on genome evolution: a coding theory approach*

For my Ph.D. thesis, I focused on NGS data analysis; moreover, I collaborated with other colleagues on two different subjects; cognitive science including EEG and eye track data analysis; as well as, structural bioinformatics including Molecular Dynamics and Docking.

- **M.sc | 1999 - 2003| University of Tehran; Physics**

Thesis title: *Modeling Evolution of the Genetic Material by Statistical Mechanics*.

My goal in the Master's program was to shift from theoretical physics to computational biology and to prepare for a Ph.D. in bioinformatics. During this time, I did a complete review of the application of the statistical mechanic's modes on the population dynamics and genetic material evolution. Therefore, I studied advanced statistical mechanics techniques such as the Spin-Glass model, Markov chain, Diffusion process, Derrida Random-energy model, Monte Carlo method, and dynamic systems. Besides, I focused

on learning molecular biology, molecular genetics, evolution, development, and population dynamics theories.

- **B.Sc. | 1995 - 1999| University of Isfahan; Physics**

Publications

I have contributed to 23 scientific articles wherein *7 as the first author* and corresponding authors in 2. Moreover, 17 of these publications are in the Q1 quarter ranking journals.

- **Peer-reviewed** journal Publications:

o Maryam S. Daneshpour, Mahdi Akbarzadeh, **Hossein Lanjanian**, Bahar Sedaghati-khayat, Kamran Guity, Sajedeh Masjoudi, Asiyeh Sadat Zahedi, Maryam Moazzam-Jazi…."Cohort profile update: Tehran cardiometabolic genetic study*"; European Journal of Epidemiology (Q1; IF=12.4)* 2023

o **Hossein Lanjanian,** Shadi Hosseini, Zahra Narimani, Sogol Meknatkhah, Gholam Hossein Riazi; "A knowledge-based protein-protein interaction inhibition (KPI) pipeline: an insight from drug repositioning for COVID-19 inhibition"; *Journal of Biomolecular Structure and Dynamics (Q1; IF= 5.24);* 1-14; 2022

o **H Lanjanian**, Leila Najd Hassan Bonab, Mahdi Akbarzadeh, Maryam Moazzam-Jazi, Asiyeh Sadat Zahedi, Sajedeh Masjoudi, Maryam S Daneshpour; "Sex, age, and ethnic dependency of lipoprotein variants as the risk factors of ischemic heart disease: a detailed study on the different age-classes and genders in Tehran Cardiometabolic Genetic Study (TCGS)"; *Biology of sex Differences(Q1; IF=8.81)* 13 (1), 1-10,1; **2022**

o Mahdi Akbarzadeh, Nadia Alipour, Hamed Moheimani, Asieh Sadat Zahedi, Firoozeh Hosseini-Esfahani, **Hossein Lanjanian**, Fereidoun Azizi, Maryam S Daneshpour; "Evaluating machine learning-powered classification algorithms which utilize variants in the GCKR gene to predict metabolic syndrome: Tehran Cardio-metabolic Genetics Study"; *Journal of translational medicine(Q1; IF=8.44)* 20 (1), 1-12,1; **2022**

o Habib MotieGhader, Parinaz Tabrizi-Nezhadi, Mahshid Deldar Abad Paskeh, Behzad Baradaran, Ahad Mokhtarzadeh, Mehrdad Hashemi, **Hossein Lanjanian**, Seyed Mehdi Jazayeri, Masoud Maleki, Ehsan Khodadadi, Sajjad Nematzadeh, Farzad Kiani, Mazaher Maghsoudloo, Ali Masoudi-Nejad; "Drug repositioning in non-small cell lung cancer (NSCLC) using gene co-expression and drug–gene interaction networks analysis"; *Scientific Reports(Q1; IF=4.996)*; 12, Article number: 9417; **2022.**

o   Mahdi Akbarzadeh, Parisa Riahi, Goodarz Kolifarhood, **Hossein Lanjanian**, Nadia Alipour, Leila Najd Hassan Bonab, Mohammad Reza Moghadas, Siamak Sabour, Fereidoun Azizi, Maryam S Daneshpour; "The AGT epistasis pattern proposed a novel role for ZBED9 in regulating blood pressure: Tehran Cardiometabolic Genetic Study (TCGS)"; *Gene(Q2; IF=3.69);* 831, 146560; **2022**

o   Sayyed Sajjad Moravveji, Samane Khoshbakht, Majid Mokhtari, Mahdieh Salimi, **Hossein Lanjanian**, Sajjad Nematzadeh, Mahsa Torkamanian-Afshar, Ali Masoudi-Nejad; "Impact of 5HydroxyMethylCytosine (5hmC) on reverse/direct association of cell-cycle, apoptosis, and extracellular matrix pathways in gastrointestinal cancers"; BMC genomic data **(former title: BMC Genetics; Q3, IF=3.295)** 23 (1), 1-9**, 2022;**

o   **Hossein Lanjanian**, Sajjad Nematzadeh; Shadi Hosseini; Mahsa Torkamanian-Afshar; Farzad Kiani; Maryam Moazzam-Jazi; Nizamettin Aydin; "High-throughput analysis of the interactions between viral proteins and host cell RNAs". *Computers in Biology and Medicine (Q1; IF=6.69)*;135:104611; **2021**.

o   Leila Najd Hassan Bonab, Maryam Moazzam-Jazi, Reyhaneh-Sadat Miri Moosavi, Mohammad-Sadegh Fallah, **Hossein Lanjanian**, Sajedeh Masjoudi, Maryam S Daneshpour; "Low HDL concentration in rs2048327-G carriers can predispose men to develop coronary heart disease: Tehran Cardiometabolic genetic study (TCGS)"; **Gene**(Q2; IF=3.91); 778, 145485; **2021.**

o   **Hossein Lanjanian**, Maryam Moazzam-Jazi, Mehdi Hedayati, Mahdi Akbarzadeh, Kamran Guity, Bahareh Sedaghati-khayat, Fereidoun Azizi, Maryam S Daneshpour; "SARS-CoV-2 infection susceptibility influenced by ACE2 genetic polymorphisms: insights from the Tehran Cardio-Metabolic Genetic Study"; *Scientific Reports(Q1; IF=4.38)*; 11, Article number: 1529; **2021.**

o **Hossein Lanjanian** (Co-First), Moazzam-Jazi Maryam, Maleknia Samaneh, Hedayati Mehdi,daneshpour maryam alsadat; "Interplay between SARS-CoV-2 and human long non-coding RNAs"; *Journal of Cellular and Molecular Medicine(Q1; IF=5.31)*. Jun;25(12):5823-5827; **2021**.

o   Zahrasadat Hosseini, Roya Delpazirian, **Hossein Lanjanian** (corresponding author), Mona Salarifar, Peyman Hassani-Abharian; "Computer gaming and brain physiological changes: an insight from QEEG Complexity analysis"; *Applied Psychophysiology and Biofeedback(Q3; IF=2.0);* **2021**.

o   Faezeh Mottaghitalab, **Hossein Lanjanian**, Ali Masoudi-Nejad; "Revealing transcriptional and post-transcriptional regulatory mechanisms of γ-glutamyl transferase and keratin isoforms as novel cooperative biomarkers in low-grade glioma and glioblastoma multiforme". *Genomics(Q3; IF=5.74)*;113:2623–33; **2021**.

o   Reihane Seifi Moroudi, Saeid Ansari Mahyari, Rasoul Vaez Torshizi, **Hossein Lanjanian**, Ali Masoudi-Nejad: "Identification of new genes and QTLs associated with growth curve parameters in F2 chicken population using genome-wide association study"; *Animal Genetics(Q1; IF=3.17)*; **2021**.

o Mahsa Torkamanian-Afshar,· Sajjad Nematzadeh3,· Maryam Tabarzad,· Ali Najai, **Hossein Lanjanian**, Ali Masoudi-Nejad: "In silico design of novel aptamers utilizing a hybrid method of machine learning and genetic algorithm"; *Molecular Diversity(Q2; IF=2.94)*;1:3, **2021.**

o Shohreh Ariaeenejad, **Hossein Lanjanian**, Elaheh Motamedi, Kaveh Kavousi, Ali A. Moosavi-Movahedi, and Ghasem Hosseini Salekdeh; "The Stabilizing Mechanism of Immobilized Metagenomic Xylanases on Bio-Based Hydrogels to Improve Utilization Performance: Computational and Functional Perspectives". *Bioconjugate Chemistry(Q1; IF=4.48)*; 31:2158–71, **2020**.

o   Abbasi Shayan, Farahani Hoam, **Lanjanian Hossein**, Taheri Mohammad, Firoozpour Loghman, Davoodi Jamshid, Pirkalkhoran Sama, Riazi Gholamhossein, Pooyan Shahriar; Site-"Directed Disulfide PEGylation of Interferon-beta-1b With Fork Peptide Linker"; *Bioconjugate chemistry(Q1; IF=4.48)* 31 (3), 708-720; **2020.**

o   Mahsa Torkamanian-Afshar; **Hossein Lanjanian**; Sajjad Nematzadeh; Maryam Tabarzad; Ali Najafi; Farzad Kiani; Ali Masoudi-Nejad; "RPINaptaBASE: a Database for RNA-Protein Interaction Network Analysis and Aptamer Design"; *Genomics(Q2; IF=6.02)* 112 (3), 2623-2632; **2020**.

o   Pejman, Sina; Riazi, gholamhossein, Pooyan, Shahriar, **Lanjanian, Hossein**; "Peptide LIQ promotes cell protection against zinc-induced cytotoxicity through microtubule stabilization"; *ACS Chemical Neuroscience(Q1; IF=4.2)* 11 (4), 515-534; **2020.**

o   **Hossein Lanjanian**, Abbas Nowzarib, Nazanin Hosseinkhana, Ali Masoudi Nejad; Block Alignment: New Representation and Comparison Method to Study Evolution of *Genomics (Q1; IF=4.04)*111 (6), 1590-1603; **2019.**

o   Fatemeh Mamashli, Jalil Badraghi, Behdad Delavari, **Hossein Lanjanian**, Marjan

Sabbaghian, Morteza Hosseini, Ali Akbar Saboury; "Improvement of versatile peroxidase activity and stability by a cholinium-based ionic liquid"; ***Journal of Molecular Liquids(Q1; IF=6.16)*** 272, 597-608; **2018**.

o Marzieh Dehghan-Shasaltaneh **Hossein Lanjanian** Gholam Hossein Riazi and Ali Masoudi-Nejad; "The importance of α-CT and Salt bridges in the Formation of Insulin and its Receptor Complex by Computational Simulation"; ***Iranian Journal of Pharmaceutical Research (Q4; IF=1.8)***.17(1); Winter **2018**.

o Mortezaei Z, **Lanjanian H**, Masoudi-Nejad A; "Candidate novel long noncoding RNAs, MicroRNAs and putative drugs for Parkinson's disease using a robust and efficient genome-wide association study." ***Genomics(Q1; IF=3.8)***. Jul; 109(3-4):158-164; **2017.**

o **H. Lanjanian**, F. Ziaie, M. Modarresi, M. Nikzad, A. Shahvar S.A. Durrani; "A Technique to Measure the Absorbed Dose in Human Tooth Enamel using EPR Method"; ***Radiation Measurements(Q1; IF=1.9)***, pp S648-S650,Volume 43, August **2008**.

o F. Ziaie; S.M. Tahami S. M; Zareshahi H ; **Lanjanian H**; Durrani S. A; "Influence of environmental factors on some high dose dosimeter responses in Yazd Radiation Processing Center"; ***Radiation Measurements(Q1; IF=1.9)***, pp S643- S647, Volume 43, August **2008**.

• **Presentation and Conference proceedings:**

o Zahra Roozbehi, Mahsa Mohaghegh, **Hossein Lanjanian**, Peyman Hassani Abharian; "Proposing Two Different Feature Extraction Methods from Multi-fractal Detrended Fluctuation Analysis of Electroencephalography Signals: A Case Study on Attention-Deficit Hyperactivity Disorder"; In: Yang H., Pasupa K., Leung A.CS., Kwok J.T., Chan J.H., King I. (eds) Neural Information Processing. ICONIP 2020. Communications in Computer and Information Science, vol 1333. Springer, Cham. **2020**

o Fereshteh Namvar, Mahdi Rezaei Estakhroueieh, Peyman Hasani abharian, **Hossein Lanjanian**; "Autistic Children Skill Acquisition in Sport: An Experimental Stud"; 27th National and 5th International Conference of Biomedical Engineering with the guidance of the Biomedical Engineering Society; ICBME 2020; Amirkabir University of Technology; November 26 and 27; **2020**

o Mousavi, Monireh-Sadat & Imani, Alireza & **Lanjanian, Hossein** & Riazi, Gholamhossein; Application of cardiac electromagnetic rhythmic patterns through the heart rate variability (HRV) index in psychophysiological disorders diagnosis; The 4th Iranian

Conference on Bioelectromagnetics (ICBEM), Tarbiat Modares University, Tehran, Iran; March **2018**.

o   **Hossein Lanjanian**, Abbas Nowzari-Dalini, Ali Masoudi-Nejad; "A top-down approche for representation of biological sequence"; HGV2015: 16th International Meeting On Human Genome Variation And Complex Genome Analysis UCSF Mission Bay Conference Center, San Francisco, California, USA 11th – 13th November **2015**

o   Moradi, M.; K Kavousi; A Morad & **H Lanjanian** "Optimization of drug dosage in cancer patients by using Bees Algorithm and Genetic Algorithm" International Conference on Industrial Engineering and Mechanical Engineering Research New findings; 2015

o   F. Ziaie, **H. Lanjanian**, M. B. Toulabi, S. A. Durrani, "Bone Powder Dosimetry System EPR Response for Electron & GammaRadiation", 23th International Conference on Nuclear Tracks in Solids (ICNTS), pp192-196,sep2006, Beijing-china,

o   **H. Lanjanian**, F. Ziaie, M.Modarresi, M.Nikzad, S.A.Durrani, "A   Technique to Measure the Absorbed Dose in Human Tooth Enamel Using EPR Method", 23th International Conference on Nuclear Tracks in Solids (ICNTS), pp 343- 345, sep2006, Beijing-china,

Experience in Neuroscience:

o   Three years ago, I collaborate with the Brain and Cognition Clinic that is one of the most important cognitive clinics/research centers of Iran. In this collaboration, I do EEG data analysis. During this time, I participate in study design and data analysis of three projects: 1- Is it possible to differentiate the autistic children, their healthy sibling, and a control group by their EEG signals, we aim to find a feature that discriminates the people with the same genetic background but different phenotype. 2- Apply the MDFA method to diagnose ADHD; fortunately, we submit a paper recently from our results. 3- This is a prominent difference between the EEG of people who are addicted to the Computer-games and the control group; we are writing the draft of a paper thus we hope to submit the second paper in few weeks.

o   I also run three Eye-Track projects with the help of Tobii (Sweden) Company. In these projects, the environment of three different Bus terminals of Tehran was analyzed. However, they were done in the order of the Tehran municipality and their results cannot be published.

Current activity:

 As a data analyzer, I am collaborating with two research centers:

1) *Brain & Cognition Clinic*; I work on EEG and Eye tracker data;

2) *Research Institute for Endocrine Science,* this group focusing on Genome-Wide Association Study (GWAS). They are interested in finding new biomarkers for Mendelian and complex disorders using next-generation sequencing data (NGS) data.

In both groups, we are trying to apply deep learning methods for data analysis. However, I am interested in the spiking neural network (SNN) method.

Computer skills:

- Linux (CentOs)
- Python,
- MATLAB
- R
- Some software for Molecular Dynamics analysis like as Gromacs, VMD, Chimera
- Some software for Molecular Docking study like as Haddock, Auto Dock, LIGPLOT
- Some software for NGS study like as Samtools, Bam tools…
- Cystoscope; network analysis
- Numerous bioinformatics Databases and web servers
- EEGLAB
- MNE (Open-source Python software for exploring, visualizing, and analyzing human neurophysiological data: MEG, EEG, sEEG, ECoG, and more.)

Attending the International Short Courses / Workshops

1. The Third International Iran Conference on Quantum Information (IICQI-12); September 8-12, 2012; Sharif University of Technology, Tehran, Iran.
2. 5th Workshop on High Performance and Grid Computing (HPC5); FEBRUARY 12-18, 2013; Institute for Research in Fundamental Sciences (IPM), Tehran, Iran.
3. International Summer School and Workshop on Protein-Protein and Protein-Ligand Interactions; September 1-7, 2013; ITAP Dereözü Campus, Turunc, Marmaris, Turkey.
4. Workshop and Summer School on Protein Structure, Function, and dynamics; September 14-19, 2014; Manavgat, Antalya, Turkey.
5. 2nd International SystemsX.ch Conference on Systems Biology; October 20 – 23, 2014; Swiss Tech Convention Center, Lausanne, Switzerland.
6. Genetic Association Course; June 2015 June 22-26, 2015; Max Delbrück Center (MDC) for Molecular Medicine, Berlin, Germany.
7. International Synthetic and Systems Biology Summer School (SSBSS 2015)-

Biology meets Engineering and Computer Science; July 5 - 9, 2015, Taormina, Sicily, Italy.

8. Conference on Sensing, Information and Decision at the Cellular Level (smr 2757); July 14-17, 2015; ICTP, Trieste, Italy.

9. Lipari School on Bioinformatics and Computational Biology; July 19-25, 2015; Lipari Island, Italy.

10. ICGEB-IUBMB Course "Translational Cancer Research"; October 12 – 16, 2015; Cape Town, South Africa.

11. Techniques of genetic engineering, from gene to protein with an approach to recombinant antibody production; May 28-30, 2016; Tehran, Iran.

12. Introduction to NGS data analysis; September 5-7, 2016; NIGEB, Tehran, Iran.

13. EMBL COURSE: Next Generation Sequencing: RNA Sequencing Library Preparation; 28 Nov - 1 Dec 2016; EMBL Heidelberg, Germany.

14. Workshop on Simulation of Cell Membrane Proteins; July 1, 2017; IBB, Tehran, Iran.

15. EMBO | EMBL Symposia: The Non-Coding Genome EMBL; September 13 – 16, 2017; Heidelberg, Germany.

16. Identifying Genes for Mendelian Traits using Next Generation Sequence Data; September 18-22, 2017; Max Delbrück Center (MDC) for Molecular Medicine, Berlin, Germany.

17. EMBL COURSE: Next Generation Sequencing: Whole Genome Sequencing Library Preparation; 29 Nov - 1 Dec 2017; EMBL Heidelberg, Germany.

18. The 1st International ICOBI Workshop; December 12-14, 2017; Amirkabir University of Technology, Tehran, Iran.

19. Two-day Symposium on Computational Neuroscience (From Biology to AI); December 12-13, 2018, University of Tehran, Tehran, Iran.

20. The International Conference on Contemporary Issues In Data Science; March 5-8, 2019, Institute for Advanced Studies in Basic Sciences (IASBS), ZANJAN, IRAN

Teaching Experience:

o   **National Organization for Development of Exceptional Talents;** The Iranian National Biology Olympiad team for 2023;

o   Bioinformatics;

o   Engineering Mathematics;
     Text Book: Advanced Engineering Mathematics by Peter V. O'Neil

o   Differential Equations;
     Text Book: Differential Equations by George F. Simmons

- o   Fundamentals of Physics I;

    Text Book: Fundamentals of Physics by Holliday, Vol 1
- o   Fundamentals of Physics II;

    Text Book: Fundamentals of Physics by Holliday, Vol 3

Teaching assistant:

o   Bioinformatics (University of Tehran 2013-2018); I was a TA of Prof Ali Masoudi-Nejad in Bioinformatics course at the University of Tehran.

o   Functional Genomics (University of Tehran 2013-2017); I was a TA of Prof Ali Masoudi-Nejad in o Functional Genomics course at the University of Tehran.

o   Workshop on Molecular Docking; Prof Ali Masoudi-Nejad organized 3-days workshops on *Molecular Docking* during 20013-2016. I was the main assistant and instructor for all of the 7 times.

o   Workshop on an advanced course in Molecular Docking; Prof Ali Masoudi-Nejad organized 3-days workshops on an *advanced course in Molecular Docking* during 20013-2016. I was the main assistant and instructor for all of the 5 times.

o   Workshop on Molecular Dynamics; Prof Ali Masoudi-Nejad organized 3-days workshops on *Molecular Dynamics* during 20013-2016. I was the main assistant and instructor for all of the 3 times.

o   Quantum physics (University of Tehran 2002-2003); I was TA of Prof Masoud Alimohammadi in Quantum physics course at the University of Tehran.

Executive and Academic Job Experience:

•   2005-2011: Academic position at UAST; Faculty Member at University of Applied Science & Technology, Pasargadae Campus, Shiraz, Iran.

Experience in Experimental Systems:

Yazd Radiation Processing Center (YRPC) is equipped with a Rhodotron TT200 accelerator, made by IBA, Belgium, with outputs of 5 and 10MeV beam lines and a maximum power of 100 kW. YRPC is expected to play an important role in supporting the medical and polymer industries.

I was sent to this center to serve my compulsory military service (2003-2005). I worked there as a Dosimetrist in quality assurance. I was involved in three extensive experimental projects in the EPR (electron paramagnetic resonance) spectroscopy field.

o   Bone Powder Dosimetry System EPR Response for Electron & Gamma Radiation:

o   A Technique to Measure the Absorbed Dose in Human Tooth Enamel Using EPR Method.

o Influence of Environmental Factors on Some High Dose Dosimeter Responses in Yazd Radiation Processing