Ali Marjaninejad

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Education

Ph.D., Biomedical Engineering — **University of Southern California (USC)**
GPA: **3.95**/4.0 — Spring 2020 (expected)

M.Sc., Electrical Engineering (DataScience**)** — **University of Southern California (USC)**
GPA: **3.88**/4.0 — Summer 2017

M.Sc., Biomedical Engineering (Signal Processing**)** — **Amirkabir University of Technology (AUT)**
GPA: **4.0**/4.0 — Fall 2015

B.Sc., Electrical Engineering (Bioelectrics**)** — **Sahand University of Technology (SUT)**
GPA: **3.83**/4.0 (Junior/Senior: **3.96**/4.0) — Fall 2012

Honors & Awards

- Being featured on the cover of the march 2019 issue of the *nature machine intelligence*
- USC Provost's fellowship; the most prestigious fellowship at USC (2015 – 2019)
- USC Grad. School's Research Advancement fellowship recipient; The most competitive project award at USC (2018 – 2019)
- Society for Brain Mapping & Therapeutics (SBMT) and Brain Mapping Foundation Student Outstanding Leadership and Service Award (2019)
- USC Grad. Student Government's International Student Recognition Award (2018)
- Finalist in Maseeh Entrepreneurship Prize Competition, USC Stevens Innovation Awards, and the Creating Reality Hackathon (Won the Sponsor award)
- Appeared on the Wired magazine for my role in the neuromorphic quadruped robot project (2018)
- Featured on USC news for instructing MATLAB classes for students in the SHINE program (2016)
- Honor student privilege package award (Iran ministry of science and technology 2012)
- Awarded the Certificate of Appreciation from the Deputy Minister of Science for my active role in the "Bioelectric" journal (awarded as the best national student journal of the year – Iran, 2009)

Peer-reviewed Publications

1. Marjaninejad, Ali, Urbina-Meléndez, D., & Valero-Cuevas, F. J. (2019). Simple Kinematic Feedback Enhances Autonomous Learning in Bio-Inspired Tendon-Driven Systems. *ArXiv Preprint ArXiv:1907.04539*.
2. A. Marjaninejad, D. Urbina-Meléndez, B. A. Cohn, and F. J. Valero-Cuevas, "Autonomous functional movements in a tendon-driven limb via limited experience," *Nat. Mach. Intell.*, vol. 1, no. 3, pp. 144–154, 2019.
3. "Should Anthropomorphic Systems be 'Redundant,'?" | A Marjaninejad, FJ Valero-Cuevas | *Biomechanics of Anthropomorphic Systems, Springer Tracts in Advanced Robotics (STAR) series, Springer, 2019*
4. "Model-Free Control of Movement in a Tendon-Driven Limb via a Modified Genetic Algorithm" | A Marjaninejad, R Annigeri, FJ Valero-Cuevas | *Proceedings of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBS, 2018 – In publication*
5. "An Analytical Approach to Posture-Dependent Muscle Force and Muscle Activation Patterns" | A Marjaninejad, J Berry, FJ Valero-Cuevas | *Proceedings of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBS, 2018 – In publication*
6. "Quantifying and attenuating pathologic tremor in virtual reality." | Cohn, Brian A., Dilan D. Shah, Ali Marjaninejad, Martin Shapiro, Serhan Ulkumen, Christopher M. Laine, Francisco J. Valero-Cuevas, Kenneth H. Hayashida, and Sarah Ingersoll | *arXiv preprint arXiv:1809.05970 (2018)*
7. "Blood Glucose Regulation Using Adaptive Fuzzy Sliding Mode Control in Type I Diabetic Patients" | M Khazaei, A Geramipour, S Sadat-Hosseini, A Marjaninejad | *International Journal of Mechatronics, Electrical and Computer Technology (IJMEC), 2018*
8. "Finger movements are mainly represented by a linear transformation of energy in band-specific ECoG signals" | A Marjaninejad, B Taherian, FJ Valero-Cuevas | *Proceedings of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBS, 2017.*
9. "A Radial Basis Function Neural Network approximator with fast terminal sliding mode-based learning algorithm and its application in control systems" | *M Khazaei, H Sadat-Hosseini, A Marjaninejad, S Daneshvar | Iranian Conference on Electrical Engineering (ICEE), 2017*
10. "A model-based exploration of the role of pattern generating circuits during locomotor adaptation" | A. Marjaninejad and J. M. Finley | *Proceedings of the Annual International Conference of the IEEE Engineering in Medicine and Biology Society, EMBS, 2016.*
11. "Online signal to noise ratio improvement of ECG signal based on EEMD of synchronized ECG beats" | A Marjaninejad, F Almasganj, AJ Sheikhzadeh | *Iranian Conference on Biomedical Engineering (ICBME) 2014*
12. "A low-cost real-time wheelchair navigation system using electrooculography" | A Marjaninejad, S Daneshvar | *Iranian Conference on Electrical Engineering (ICEE), 2014*
13. "Design of FPGA-based Digital PID controller using Xilinx SysGen® for regulating blood glucose level of type-i diabetic patients" | *A Geramipour, M Khazaei, A Marjaninejad, M Khazaei | International Journal of Mechatronics, Electrical and Computer Technology (IJMEC), 3 (7), 56-69, 2013*

Professional Experiences

- Research Assistant at Brain-Body Dynamics Lab: Exploring the neuromechanics of the hand and its representation in human cortex (2015 – present)
  - Finding sensory motor representations on human brain in EEG, ECoG, and Single Unit Activity (SUA) signals
  - Showed that a linear mapping can efficiently describe the relationship between finger positions (joint angles) and signal power in different frequency bands of ECoG recordings
  - Used Genetic Algorithm (GA) to find optimal tendon excursion values in a tendon-driven robotic limb (with unknown parameters) to follow a desired trajectory
  - Addressed the long-standing problem of redundancy in the anthropomorphic neuromechanics using optimization and dimensional reduction approaches
  - Developed the Neuromechanics toolbox in MATALB environment as a complementary toolbox for the book: Fundamentals of Neuromechanics
  - Led two groups of interns in hardware and software development projects; resulted in peer-reviewed publications and raising research grant funding
- Internship as a Data Scientist at Neural Analytics (Summer 2018)
  - Worked on algorithms to improve the search speed and efficiency of the robotic brain scanner
  - Designed machine learning protocols to enable robotic system to make data driven clinical decisions
- Trained in Computational Sensory Motor Neuroscience (CoSMo) and Health Data Exploration (HDE) summer schools (2017, 2018)
  - Received competitive, merit-based fellowships to attend each program
  - Trained to work with bigdata, neural data, and health related data by the most famous leaders of the field
- Research Assistant at Intelligent Signal and Data Processing Lab: Biological and Array Signal Processing (2012 – 2015)
  - Used SVM and Neural Network regressors to predict the direction of arrival of a sound wave to a microphone array system
  - Collected a database of microphone array recordings using Persian vocabulary and implemented a MATLAB toolbox that increased speech recognition ratio using beamforming; the project was later integrated successfully in industry
- Internship at the MRI section of the exclusive service provider for the General Electric Healthcare in Iran (Pishrafteh Co., 2011)
  - Contributed to both hardware and software Installation, repair, and maintenance
  - Mastered the general principles of physics of imaging modalities especially the MRI

Teaching Experiences

- Course Instructor
  - *Electronics I Laboratory (at AUT)*
  - *Electrical Circuits Laboratory (at AUT)*
  - *Microprocessors Laboratory (at AUT)*
- *Teaching Assistantships*
  - *BME/BKN 504 - Neuromuscular Systems (at USC) | Supervisor: Dr. Francisco Valero-Cuevas*
  - *Digital Signal Processing (at AUT) | Supervisor: Dr. Farshad Almasganj*
  - *Microprocessors (at AUT) | Supervisor: Dr. Farshad Almasganj*
  - *Signals and Systems (at SUT) | Supervisor: Dr. Mousa Shamsi*
  - *Bio-statistics (at AUT) | Supervisor: Dr. Mousa Shamsi*
- *Workshop Instructor*
  - *Introduction to MATLAB (at SUT, AUT, and USC)*
  - *Pspice Electronic Circuit Optimization & Simulation Software (SUT)*
  - *Advanced MATLAB Courses (at SUT and AUT):*
    - *Neural Networks*
    - *Fuzzy Inference Systems*
    - *Genetic Algorithm*
    - *Digital Signal Processing*
    - *Digital Image Processing*
    - *Adaptive Neuro-fuzzy Inference Systems*
  - *How to prepare an academic publication using Endnote and MS-Word (at AUT)*
- *Invited Talks*
  - *On the new generation of bio-inspired robots – MATLAB EXPO 2019*
  - *Bio-plausible mechanics, learning, and control for robots – Google Brain / Robotics*
  - *Principles and the future of Biomedical Signal Processing (BSP) – Amirkabir University of Technology*

Professional Skills

- *Programming Languages*
  - *MATLAB*
  - *Python*
  - *C*
  - *C++*
  - *VHDL*
  - *Assembly*
- *Other Engineering software packages*
  - *Pspice*
  - *ModelSim*
  - *CodeVision (AVR)*
  - *ATMEL Studio (AVR)*
  - *Chart (ADinstruments)*
  - *Protel*
  - *Xilinx ISE (FPGA)*
  - *Proteus*
- *General software packages*
  - *Microsoft Office (Word, Excel, PowerPoint)*
  - *Adobe Suite*
  - *Latex*
  - *Mendeley*

Professional Certificates

- Health, Technology, and Engineering (HTE) Technology Commercialization certificate, USC
- Data Scientist with Python accomplishment certificate, DataCamp (in progress)
- ISO 13485 Internal audit training certificate, Oxfordcert. Registration Number: TIA1331509010

Services and Memberships

- Assistant editor of Paladyn, Journal of Behavioral Robotics – De Gruyter
- President of the student branch of the Society for Brain Mapping & Therapeutics (SBMT) at USC (2018)
- Chairing the "Biorobotics and Biomechanics & Computational Systems & Synthetic Biology; Multiscale modeling " session at IEEE EMBC (2018)
- Vice president of the organizing committee for the Grodins conference (2018)
- Vice president of the Iranian Graduate Student Association (IGSA) at USC (2016)
- Editor of the Student Journal of Biomedical Engineering at Amirkabir University of Technology (2014)
- IEEE Student member
- Society for Neuroscience (SfN) student member
- American Society of Biomechanics (ASB) student member

GRE Scores

- Quantitative: 168 / 170
- Verbal: 155 / 170
- Analytical Writing: 4 / 6

Languages

- English (Fluent)
- Persian (Native)
- Turkish (Fluent)

References can be provided upon request