

Soha Niroumandijahromi

University of Southern California
Viterbi School of Engineering

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[Google Scholar](#)



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EDUCATION

- | | |
|----------------|--|
| 2021 – Present | University of Southern California , Los Angeles, CA
Ph.D. Mechanical and Medical Engineering |
| 2023 – 2025 | University of Southern California , Los Angeles, CA
M.Sc. Computer Science |
| 2021 – 2023 | University of Southern California , Los Angeles, CA
M.Sc. Mechanical Engineering |
| 2016 – 2019 | University of Tehran , Tehran, Iran
M.Sc. Aerospace and Mechanical Engineering |
| 2011 – 2016 | Yazd University , Yazd, Iran
B.S. Mechanical Engineering |

RESEARCH INTERESTS

Smartphone-Based Physiological Signal Acquisition · Non-Invasive Cardiovascular and Cerebrovascular Diagnostics · Signal Processing for Health Monitoring · Machine Learning for Mobile Health · Camera-Based Biometrics · Biofluid Mechanics · Physics-Informed AI · Soft Tissue Biomechanics · Scientific Computing in Healthcare

ACADEMIC AND PROFESSIONAL EXPERIENCE

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| 2023 – Present | AHA Research Fellow
Department of Mechanical Engineering,
University of Southern California, Los Angeles, CA |
| 2021 – 2023 | Research Assistant
Department of Mechanical Engineering,
University of Southern California, Los Angeles, CA |

AWARDS AND ACHIEVEMENTS

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| 2025 | Phi Kappa Phi Student Recognition Award |
| 2024 | American Heart Association Predoctoral Fellowship Award |
| 2023 | American Heart Association Travel Grant Award (Basic Cardiovascular Sciences Council) |

JOURNAL PUBLICATIONS

9. **Niroumandi S**, Alavi R, Wolfson AM, Vaidya AS, Pahlevan NM. Assessment of aortic characteristic impedance and arterial compliance from non-invasive carotid pressure waveform in the Framingham heart study. *The American Journal of Cardiology*. 2023 Oct 1;204:195-9.
8. Alavi R, Aghilinejad A, Wei H, **Niroumandi S**, Wieman S, Pahlevan NM. A coupled atrioventricular-aortic setup for in-vitro hemodynamic study of the systemic circulation: Design, fabrication, and physiological relevancy. *PLOS ONE*. 2022 Nov 4;17(11):e0267765.
7. Shojaeifard M, **Niroumandi S**, Baghani M. Swelling of pH-sensitive hydrogel pressure vessel under altered-pH coupled with inflation, extension, and torsion. *Meccanica*. 2022 Jun;57(6):1391-411.
6. Shojaeifard M, **Niroumandi S**, Baghani M. Programmable self-folding of trilayer and bilayer-hinge structures by time-dependent swelling of tough hydrogels. *Journal of Intelligent Material Systems and Structures*. 2022 Sep;33(16):2106-20.
5. Shojaeifard M, **Niroumandi S**, Baghani M. pH-Responsive Hydrogel Bilayer with Reversible, Bidirectional Bending Behavior. *Frontiers in Materials*. 2022 May 26;9:865652.
4. **Niroumandi S**, Shojaeifard M, Baghani M. On single and multiple pH-sensitive hydrogel micro-valves: a 3D transient fully coupled fluid–solid interaction study. *Transport in Porous Media*. 2022 Mar;142(1-2):295-316.
3. **Niroumandi S**, Shojaeifard M, Baghani M. PH-sensitive hydrogel-based valves: A transient fully-coupled fluid-solid interaction study. *Journal of Intelligent Material Systems and Structures*. 2022 Jan;33(1):196-209.
2. Shojaeifard M, **Niroumandi S**, Baghani M. Programming shape-shifting of flat bilayers composed of tough hydrogels under transient swelling. *Acta Mechanica*. 2022 Jan;233(1):213-32.
1. **Niroumandi S**, Shojaeifard M, Baghani M. Finite deformation of swollen pH-sensitive hydrogel cylinder under extension and torsion and its Poynting effect: analytical solution and numerical verification. *International Journal of Applied Mechanics*. 2021 Jul 20;13(06):2150071.

PEER-REVIEWED CONFERENCE PROCEEDING PUBLICATIONS

7. Vaidya A, **Niroumandi S**, Mazandarani SP, Wolfson A, Pahlevan NM. Single Pressure Waveform Calculation of Total Arterial Compliance Predict Heart Failure Events in Framingham Heart Study. *Journal of the American College of Cardiology*. 2024 Apr 2;83(13):712-.
6. Vaidya A, **Niroumandi S**, Mazandarani SP, Wolfson A, Pahlevan NM. Left Ventricle Pulsatile Workload from A Single Pressure Waveform Using Physics-Based Machine Learning Approach and Cardiovascular Disease Events in The Framingham Heart Study. *Journal of the American College of Cardiology*. 2024 Apr 2;83(13):2451-.
5. Vaidya A, **Niroumandi S**, Mazandarani SP, Wolfson A, Pahlevan NM. Prognostic Value of Aortic Characteristic Impedance Calculated from A Single Carotid Waveform Using Hybrid Intrinsic Frequency-Machine Learning Approach. *Journal of the American College of Cardiology*. 2024 Apr 2;83(13):1988-.
4. Liu J, **Niroumandi S**, Petrasek D, Pahlevan NM. Non-Invasive Insulin Resistance Evaluation Using Carotid Pressure Waveforms in Framingham Heart Study. *Circulation*. 2023 Nov 6;148: A16533- A16533
3. **Niroumandi S**, Rinderknecht D, Bilgi C, Wolfson A, Vaidya A, King KS, Pahlevan NM. A Noninvasive Smartphone Assessment of Aortic Arch Pulse Wave Velocity and Total Arterial Compliance. *Circulation*. 2023 Nov 6;148:A18846-A18846.
2. **Niroumandi S**, Wolfson A, Vaidya A, Pahlevan NM. Abstract P367: Evaluation of Left Ventricular Pulsatile Workload in Heart Failure with Preserved Ejection Fraction Using a Single Pressure Waveform Form Framingham Heart Study. *Hypertension*. 2023 Sep;80: AP367- AP367.
1. **Niroumandijahromi S**, Vaidya A, Pahlevan NM. Hybrid Intrinsic Frequency Machine Learning Approach for Calculation of Total Arterial Compliance and Aortic Characteristic Impedance from A Single Carotid Waveform in Heart Failure With Preserved Ejection Fraction. *Hypertension*. 2022 Sep;79:A039-A039.

PATENTS

1. Alavi R, Amlani F, Gorji H, **Niroumandijahromi S**, Heng Wei H, and Pahlevan NM. (2024). "Sequentially-Reduced Artificial Intelligence Based Systems And Methods For Cardiovascular Transfer Functions" (US-20230138773-A1).
<https://ppubs.uspto.gov/dirsearch-public/print/downloadPdf/20240138773>

GRANTS

1. American Heart Association (AHA) predoctoral fellowship award
Period: 01/01/2024-12/31/2025
Amount: \$67,388.00
Role: PI
Title: A Noninvasive Smartphone-based Approach for Assessment of Dementia Risk Predictors Using Arterial Pressure Waveform

CLINICAL TRIALS AND STUDIES

1. "A Noninvasive, inexpensive intervention for heart failure patients to reduce morbidity, hospitalizations, and improve quality of life"
Location: University of Southern California,
Keck Medical School and Viterbi School of Engineering
Time Period: 2023-2027
Role: Co-Investigator
Principal Investigators: Ajay Vaidya, MD, Niema Pahlevan, PhD
Collaborating Investigator: Aaron Wolfson MD

CONFERENCE PRESENTATIONS

4. **Niroumandi S**, Amlani F, Matthews R, Pahlevan N. The Influence of Left Ventricle and Aorta Interactions on the Coronary Blood Flow Using One-Dimensional Model of Hemodynamics and Wave Propagation in the Entire Circulatory System. Bulletin of the American Physical Society. 2023 Nov 19.
3. Alavi R, Aghilinejad A, Wei H, **Niroumandi S**, Wieman S, Pahlevan N. In-vitro coupled left atrioventricular-aortic hemodynamic simulator for systemic circulation. In APS Division of Fluid Dynamics Meeting Abstracts 2021 (pp. E28-003).
2. **Niroumandi S**, Alavi R, Pahlevan N. A Machine Learning Methodology for estimation of vascular characteristics using a single carotid waveform. In APS Division of Fluid Dynamics Meeting Abstracts 2021 (pp. H14-003).
1. **Niroumandi S**, Jafari A, Vakilipour S. 3-D simulation of pulsatile blood flow using a haemorheological model. In AERC 2019.

MENTORING

University of Southern California K-12 STEM Center Outreach 12 High School Students from 2022-2024

NSF Summer Research Program 2 High School Students 2023

ACADEMIC SERVICES

NSF Outreach 4 visits for Gardena Highschool students starting 2023