Azadeh Sepahvandi

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University of South Carolina
Department of Mechanical Engineering
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SKILL SUMMARY

Biomedical Engineering and Biophysics: 10+ years of extensive exposure to Biomedical Engineering; Extensive background in biomaterials; Extensive background in bioengineering systems ; Extensive background in biophysics; Extensive background in Retinal tissue engineering and tissue regeneration; Strong knowledge in thermodynamics ; Experience in bioceramics drug delivery systems; working knowledge in cell signaling; Working knowledge in biomimetic.

Biomechanics and Tissue Engineering: Extensive background in bone implants mechanical properties; Extensive background in soft tissue mechanical characteristics; Extensive background in regenerated cartilage mechanical characteristics; Extensive background in mechanical properties of retinal engineered tissue; Experience in composite scaffolds mechanical reinforcement; Experience in 3D printing scaffolds mechanical properties; Experience in electrospun scaffolds mechanical reinforcement; Experience in hydrogel scaffolds mechanical characteristics.

Analyzing Work: Atomic Force Microscopy(AFM) imaging; Rheological testing; Optical coeherence tomography(OCT) imaging; Espectophotometry; Fluorescence microscopy imaging; flowcytometry; Experience in western blotting and nanodrop; RT-PCR and data analysis; biochemical assays; Excellent analytical and review writing skills.

Experimental Work: Spectrophotometry for biophysical and biochemical analysis; cell culture (mesenchymal stem cells (MSCs) and retinal pluripotent cells (RPCs)); 3D culture of cells in synthetic and natural hydrogels; stem cell differentiation to chondrogenic, osteogenic, and vasculogenic lineages; RNA, DNA, and protein extraction; immunofluorescent staining of cells in 2D and 3D cultures.
Computer Skills: Professional in modeling with CREO Parametric; expert in MATLAB, C++, and Microsoft Office (Word, Excel, and PowerPoint); mastered AI applications in biomedical research.

EDUCATION

Doctor of Biomedical Engineering, 2016

Polytechnic University, Tehran, Iran.

Thesis: analyzing the effect of luminescence nanoparticles on retinal tissue engineering.

Master of Biomedical engineering, 2010

Polytechnic University, Tehran, Iran.

Thesis: Detecting the formation of calcium phosphate Nano layer in biomimetic method.

Bachelor of Biomedical Engineering, 2007

Polytechnic University, Tehran, Iran.

Thesis; Designing an antibody HIV rapid test.

EMPLOYMENT HISTORY

Instructor, 12/2020 - Present
Employer: University of South Carolina – Mechanical Engineering Department

- Teaching CAD, Mechanical engineering lab, Thermodynamics and Project management in engineering.

Postdoctoral researcher, 08/2017 – 08/2020
Employer: University of South Carolina - Chemical Engineering Department (Biomedical engineering Program)

- Researched Cartilage tissue engineering

Patent review expert, 10/2015 – 08/2016
Employer: Iranian research organization for science and technology (IROST)
(Tehran – Iran).

- Evaluating the patent proposals (In medical engineering)

Consultant of creativity in master theses, 08/2013 – 08/2015
Employer: Medical engineering department of Amirkabir University of Technology (Tehran – Iran).

- Advising master students for novel thesis ideas

Research Specialist, 12/2009 — 06/2011
Employer: National Institute of Genetic Engineering and Biotechnology(Tehran-Iran).

- Researched human mesenchymal stem cell (MSCs)

TEACHING

Mechanical engineering department of University of South Carolina, Columbia, SC
- **Thermodynamics (From 2020)**

Mechanical engineering department of University of South Carolina, Columbia, SC
- **Computer Aided Design (From 2020)**

Mechanical engineering department of University of South Carolina, Columbia, SC
- **Project Management (Fall 2022 - 2023)**

Mechanical engineering department of University of South Carolina, Columbia, SC
- **Mechanical Engineering Lab II (From 2021)**

Chemical engineering department of University of South Carolina, Columbia,USA
- **Tissue Engineering, Ungraduate students, 2019 (TA)**

Chemical engineering department of University of South Carolina, Columbia,USA
- **Biomaterials, Ungraduate students, 2018 (TA)**

Biomedical Engineering Department of Amirkabir University of Technology,Tehran, Iran
- **Tissue Regenerating, Graduate students, (2015-2016) (TA)**

Biomedical Engineering Department of Amirkabir University of Technology,Tehran, Iran
- **Cell signaling, Graduate students, 2014 (TA)**

Biomedical Engineering Department of Amirkabir University of Technology,Tehran, Iran
- **Biophysics, Ungraduate students, 2013 (TA)**

CERTIFICATIONS

Best PhD Theses among all university majors,2016
Amirkabir University of Technology

Top Ten Winners IBRIDGEs Berlin Innovation Festival, 2015
IBRIDGE Innovation, Berlin, Germany

Iran Nanotechnology Initiative Council scholarship, 2013
Iran Nanotechnology Initiative Council

3rd ranked among all fellow under students in the Biomedical Engineering program, 2012
Amirkabir University of Technology

Ranked 101 Among One Million Participants in the National Exam, 2006
Iranian Nationwide Universities

PATENTS

Use of $SrAl_2O_4$:Eu,Dy luminescence particles in retina tissue regeneration, 2020

U.S Patent 10,569,100

Use of $SrAl_2O_4$:Eu,Dy luminescence particles for bone regeneration, 2016

Estate Registration Organization of Iran Patent

Use of $SrAl_2O_4$:Eu,Dy luminescence particles for skin regeneration, 2015

Estate Registration Organization of Iran Patent

Cold and warm soothing eye glasses, 2012

Estate Registration Organization of Iran Patent

Early detection of coated hydroxyapatite on titanium implants by photoluminescence properties, 2011

Estate Registration Organization of Iran Patent

CONFERENCE PAPERS

1. Mana Yasaeia, Maryam Ghaffaria*, Ali Zamanianb, Fatollah Moztarzadeha, **Azadeh Sepahvandi**." A Characterization of calcium hydroxide cements modified by addition of nanohydroxyapatite", 4th International Conference on Nanostructures (ICNS4). 2012, Kish Island, Iran.
2. **Azadeh Sepahvandi**., F.Moztarzadeh, M.Mosafari, M.Ghaffari. " Early detection of coated hydroxyapatite on titanium implants by photoluminescence properties ", Nano Technology Iranian Student Conference".2012, Tehran, Iran.
3. **Azadeh Sepahvand**i, F.Moztarzadeh, M.Mosafari, M.Ghaffari. "Photoluminescence in the characterization and early detection of biomimetic bone-like apatite formation on the surface of alkaline-treated titanium implant", Euromat 2011,Paris,France.
4. **Azadeh Sepahvandi**, F.Moztarzadeh, M.Mosafari, M.Ghaffari. "Photoluminescence in the characterization and early detection of biomimetic bone-like apatite formation on the surface of alkaline-treated titanium implant", 8th Iranian Ceramic Congress .2011, Tehran, Iran.
5. Masoud Mozafari ,F.Moztarzadeh**, A.Sepahvandi**, M.Ghaffari, S.Naghavi Alhosseini. "Self-assembly of PbS hollow spheres with strong photoluminescence properties via gas-bubble technique", 16th International Conference on Luminescence Ann Arbor,(Oral lecture at Ann Arbor), 2011, Ann Arbor,USA.

6. Fathollah Moztarzadeh, Masoud Mozafari**, Azadeh Sepahvandi**, M,Ghaffari, SanazNaghavi Alhosseini." Controllable synthesis and luminescence properties of novel PbS/gelatin core-shell quantum dots for biomolecular recognition", 16th International Conference on Luminescence Ann Arbor.2011, Ann Arbor, USA.

SELECTED PUBLICATIONS

1. **A Sepahvandi**, J Johnson, A Arasan, R Cataldo, SM Ghoreishian, "Hydrogels in Simulated Microgravity: Thermodynamics at Play", Gels, 11(5), 342, 2025.

2. AH Bahmanpour, SM Ghoreyshian, **A Sepahvandi,** "Electromagnetic Modulation of Cell Behavior: Unraveling the Positive Impacts in a Comprehensive Review", Annals of Biomedical Engineering, 2024.

3. AH Bahmanpour, M Mollazadeh-Bajestani, F Moztarzadeh, **A Sepahvandi,** "Hydrogel-Based Formulations for Drug Delivery to the Posterior Segment of the Eye", Annals of Biomedical Science, 2023.

4. AH Bahmanpour, M Mollazadeh-Bajestani, F Moztarzadeh, **A Sepahvandi**,"Reviewing the Bio-Applications of SrAl2O4 Phosphor", Peertechz, 2023.

5. **Azadeh Sepahvandi** and Esmaiel Jabbari, "Decellularized Articular Cartilage Microgels as Microcarriers for Expansion of Mesenchymal Stem Cells", Gels, 2022.

6. **Azadeh Sepahvandi**, M.monavarian, S.Kader, E. Jabbari. "Decellularized Articular Cartilage Microparticles for Expansion of Mesenchymal Stem Cells and Zonal Regeneration of Articular Cartilage".Biorxiv, 2021.

7. **Azadeh Sepahvandi***,* M.Ghaffari, B.Butler, M.Mozaffari. "COVID-19: insights into virus–receptor interactions", Molecular biomedicine, 2021.

8. **Azadeh Sepahvandi***,* F.Moztarzadeh, M. Eskandari. "Drug delivery systems to the posterior segment of the eye: Implants and Nanoparticles (Review)",Bionanoscience. 2016, 276-283.

9. **Azadeh Sepahvandi**, M.Eskandari, F.Moztarzadeh. "Fabrication and characterization of SrAl2O4: Eu2+Dy3+/CS-PCL Electrospun Nanocomposite Scaffold for Retinal Tissue Regeneration", material science and engineering C: Materials for Biological Applications. 2016, 306-314.

10. **Azadeh Sepahvandi**, M.Eskandari, F.Moztarzadeh. "Photoluminescence and decay characteristics of PEGilated long lasting nanophosphors for tissue engineering applications", Biointerface Research in Applied Chemistry. 2016, 78-90.

11. Maryam Ghaffari, F.Moztarzadeh, **A.Sepahvandi**, M.Mosafari, Sh.Faghihi. “How bone marrow-derived human mesenchymal stem cells respond to poorly crystalline apatite coated orthopedic and dental titanium implants”, Ceramics International. 2013, 7793-7802.

12. **Azadeh Sepahvandi**, F.Moztarzadeh, M.Mozafari, M.Ghaffari. “Photoluminescence in the characterization and early detection of biomimetic bone-like apatite formation on the surface of alkaline-treated titanium implant”, State of the art, Colloids and Surfaces B: Biointerfaces In Press. 2011, 390-396.

13. Book of "Retinal Tissue Engineering", F. Moztarzadeh and **A. Sepahvandi** ,2017, Amirkabir University of Technology Publication.