



## FACULTY FULL NAME: Mohammed Amin Barajaa

POSITION: Assistant Professor

### Personal Data

Nationality | Saudi

Date of Birth | 16-12-1990

Department | Biomedical Engineering

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### Language Proficiency

Language	Read	Write	Speak
Arabic	Mother tongue	Mother tongue	Mother tongue
English	Fluent	Fluent	Fluent

### Academic Qualifications (Beginning with the most recent)

Date	Academic Degree	Place of Issue	Address
2023	Doctor of Philosophy	U of Connecticut	Connecticut, USA
2017	Masters of Science	U of Connecticut	Connecticut, USA
2014	Bachelor of Science	U of Hartford	Connecticut, USA

### Ph.D., Master or Fellowship Research Title: (Academic Honors or Distinctions)

Ph.D.	Regenerative Engineering Using Novel Hydrogel-based Skeletal Muscle Constructs: from Conception to Regeneration
Master	Preparation and in vitro Characterization of an Integrated Graft System for Regenerative Engineering

### Professional Record: (Beginning with the most recent)

Job Rank	Place and Address of Work			Date
Vice Dean for Development and Community Partnership	Imam Abdulrahman Bin Faisal University	College of Engineering	Dammam – Saudi Arabia	May. 2025 – Present
Head of Public Relationship Committee	Imam Abdulrahman Bin Faisal University	College of Engineering	Dammam – Saudi Arabia	Dec. 2024 – Present
Quality and Accreditation Committee	Imam Abdulrahman Bin Faisal University	College of Engineering	Dammam – Saudi Arabia	Sept. 2024 – Present



Chairman of the Quality and Accreditation Committee	Imam Abdulrahman Bin Faisal University	Biomedical Engineering	Dammam – Saudi Arabia	Sept. 2024 – Present
Chairman of the National Biomedical Engineering Summit	Imam Abdulrahman Bin Faisal University	Biomedical Engineering	Dammam – Saudi Arabia	Oct. 2023 – Present
Scientific Research Committee	Imam Abdulrahman Bin Faisal University	College of Engineering	Dammam – Saudi Arabia	Sept. 2023 – Present
Professional Development and Continuous Education Committee	Imam Abdulrahman Bin Faisal University	Biomedical Engineering	Dammam – Saudi Arabia	Sept. 2023 – Present
Scientific Research and Innovation Committee	Imam Abdulrahman Bin Faisal University	Biomedical Engineering	Dammam – Saudi Arabia	Sept. 2023 – Present
Assistant Professor	Imam Abdulrahman Bin Faisal University	Biomedical Engineering	Dammam – Saudi Arabia	Jan. 2023 – Present
Lecturer	Imam Abdulrahman Bin Faisal University	Biomedical Engineering	Dammam – Saudi Arabia	Jan. 2021- Jan 2023
Ph.D. Research Assistant	University of Connecticut	Biomedical Engineering	Farmington, CT, USA	Jan. 2018 – Jan. 2023
Research Assistant	University of Connecticut	Biomedical Engineering	Farmington, CT, USA	Jan. 2016 – Dec. 2017
Teaching Assistant	Imam Abdulrahman Bin Faisal University	Biomedical Engineering	Dammam – Saudi Arabia	Aug. 2015 – Jan. 2021
Treasure	Saudi Student Club at the University of Hartford	N/A	West Hartford, CT, USA	April. 2011 – April. 2012
Treasure	Muslim Student Association at the University of Hartford	N/A	West Hartford, CT, USA	April. 2012 – April. 2013

### Scientific Achievements

#### Published Refereed Scientific Researches

(In Chronological Order Beginning with the Most Recent)

#	Name of Investigator(s)	Research Title	Publisher and Date of Publication
1	Mohammed A Barajaa, Takayoshi Otsuka, Cato T Laurencin	A novel protocol for the direct isolation of a highly pure and regenerative population of satellite stem cells	<i>PNAS</i> . (2025).
2	Mohammed A. Barajaa	هندسة الطباعة الحيوية ثلاثية الأبعاد لطباعة الأنسجة والأعضاء: هندسة المستقبل	<i>BMET</i> . (2024)
3	Mohammed Barajaa, Debolina Ghosh, Takayoshi Otsuka, Ho-Man Kan, Cato T. Laurencin	Development of Porcine Skeletal Muscle Extracellular Matrix-Derived Hydrogels with	<i>PNAS</i> . (2024).



		Improved Properties and Low Immunogenicity	
	Jorge Escobar Ivirico, Maumita Bhattacharjee, Chinedu C Ude, Ho-Man Kan, Dylan Carey, <b>Mohammed Barajaa</b> , Naveen Nagian, James Chapman, Cato T. Laurencin	Type I Collagen/Hyaluronic acid Hydrogels as Delivery System for Adipose-Derived Stem Cells for Osteoarthritis Treatment	<i>Regen. Eng. Transl. Med.</i> (2024).
4	<b>Mohammed A. Barajaa</b> , Debolina Ghosh, Cato T. Laurencin	Decellularized Extracellular Matrix-derived Hydrogels: A Powerful Class of Biomaterials for Skeletal Muscle Regenerative Engineering Applications	<i>Regen. Eng. Transl. Med.</i> (2023).
5	<b>Mohammed A. Barajaa</b>	الهندسة التجديدية: مقدمة عامة	<i>BMET.</i> (2023)
6	Nikoo Saveh Shemshaki, <b>Mohammed A Barajaa</b> , Takayoshi Otsuka, Elnaz S Mirdamadi, Lakshmi S Nair, Cato T Laurencin	Electroconductivity, a Regenerative Engineering Approach to Reverse Rotator Cuff Muscle Degeneration	<i>Regenerative Biomaterials</i> (2023)
7	Nikoo Saveh Shemshaki, Ho-Man Kan, <b>Mohammed A Barajaa</b> , Amir Lebaschi, Takayoshi Otsuka, Neha Mishra, Lakshmi S Nair, Cato T Laurencin	Efficacy of a Novel Electroconductive Matrix To Treat Muscle Atrophy and Fat Accumulation in Chronic Massive Rotator Cuff Tears of the Shoulder	<i>ACS Biomater. Sci. Eng.</i> (2023)
8	Guleid M Awale, <b>Mohammed A Barajaa</b> , Ho-Man Kan, Amir Seyedsalehi, Ga Hie Nam, Fatemeh S Hosseini, Chinedu C Ude, Tannin A Schmidt, Kevin W-H Lo, Cato T Laurencin	Regenerative engineering of long bones using the small molecule forskolin	<i>PNAS.</i> (2023)
9	<b>Mohammed A. Barajaa</b>	Regenerative Engineering Using Novel Hydrogel-based Skeletal Muscle Constructs: from Conception to Regeneration	(2023). <i>Ph.D. Dissertation.</i>
10	Nikoo Saveh Shemshaki, Ho-Man Kan, <b>Mohammed Barajaa</b> , Takayoshi Otsuka, Amir Lebaschi, Neha Mishra, Lakshmi S Nair, Cato T Laurencin	Muscle degeneration in chronic massive rotator cuff tears of the shoulder: Addressing the real problem using a graphene matrix	<i>PNAS.</i> (2022)
11	Guleid M Awale, <b>Mohammed A Barajaa</b> , Ho-Man Kan, Kevin W-H Lo, Cato T Laurencin	Single-dose induction of osteogenic differentiation of mesenchymal stem cells using a cyclic AMP activator, forskolin	<i>Regen. Eng. Transl. Med.</i> (2022).
12	Maumita Bhattacharjee, Jorge L. Escobar Ivirico, Ho-Man Kan, Shiv Shah, Takayoshi Otsuka, Rosalie Bordett, <b>Mohammed Barajaa</b> , Naveen Nagiah, Rishikesh Pandey, Lakshmi S. Nair, and Cato T. Laurencin	<b>Injectable amnion hydrogel mediated delivery of adipose-derived stem cells for osteoarthritis treatment</b>	<i>PNAS.</i> (2022)



13	Kenneth S Ogueri, Kennedy S Ogueri, Aneesah McClinton, Ho-Man Kan, Chinedu C Ude, <b>Mohammed A Barajaa</b> , Harry R Allcock, Cato T Laurencin	In Vivo Evaluation of the Regenerative Capability of Glycylglycine Ethyl Ester-Substituted Polyphosphazene and Poly(lactic-co-glycolic acid) Blends: A Rabbit Critical-Sized Bone Defect Model	<i>ACS Biomater. Sci. Eng.</i> 2021, 7, 4, 1564–1572
14	Amir Seyedsalehi, Leila Daneshmandi, <b>Mohammed Barajaa</b> , John Riordan, Cato T. Laurencin	Fabrication and characterization of mechanically competent 3D printed polycaprolactone-reduced graphene oxide scaffolds	<i>Nature Sci Rep</i> 10, 11739 (2021)
15	Xiaoyan Tang, Nikoo Saveh Shemshaki, Varadraj N Vernekar, Anupama Prabhath, Emmanuel Kuyinu, Ho-Man Kan, <b>Mohammed Barajaa</b> , Yusuf Khan, Cato T Laurencin	The Treatment of Muscle Atrophy After Rotator Cuff Tears Using Electroconductive Nanofibrous Matrices	<i>Regen. Eng. Transl. Med.</i> (2020).
16	L Daneshmandi, <b>M Barajaa</b> , A Tahmasbi Rad, SA Sydlík, CT Laurencin	Graphene-Based Biomaterials for Bone Regenerative Engineering: A Comprehensive Review of the Field and Considerations Regarding Biocompatibility and Biodegradation	<i>Advanced Healthcare Materials</i> , 2001414 (2020)
17	PY Mengsteab, J Freeman, <b>MA Barajaa</b> , LS Nair, CT Laurencin	Ligament regenerative engineering: Braiding scalable and tunable bioengineered ligaments using a bench-top braiding machine	<i>Regen. Eng. Transl. Med.</i> (2020).
18	<b>Mohammed A. Barajaa</b> , Lakshmi S. Nair & Cato T. Laurencin	Robust phenotypic maintenance of limb cells during heterogeneous culture in a physiologically relevant polymeric-based constructed graft system	<i>Nature Sci Rep</i> 10, 11739 (2020)
19	Naveen Nagiah, Maumita Bhattacharjee, Christopher J. Murdock, Ho-Man Kan, <b>Mohammed Barajaa</b> , Cato T. Laurencin	Spatial alignment of 3D printed scaffolds modulates genotypic expression in pre-osteoblasts	<b>Materials Letters</b> Volume 276, 1 October 2020
20	<b>Mohammed A. Barajaa</b> , Lakshmi S. Nair & Cato T. Laurencin	Bioinspired Scaffold Designs for Regenerating Musculoskeletal Tissue Interfaces	<i>Regen. Eng. Transl. Med.</i> (2019).
21	<b>Mohammed A. Barajaa</b>	Preparation and in vitro Characterization of an Integrated Graft System for Regenerative Engineering	(2017). <i>Master's Theses.</i> 1158.



#### Research Interest

#	Research topic
1	Stem cell for musculoskeletal tissue regeneration
2	Volumetric skeletal muscle regeneration
3	Hydrogel-based 3D tissue construct engineering for tissue regeneration
4	ECM-derived hydrogels synthesis for tissue regeneration applications
5	3D printing
6	3D bioprinting
7	Scaffold fabrication for musculoskeletal tissue regeneration application
8	Disease and drug discovery 3D models
9	Drug delivery

#### Contribution to Scientific Conferences and Symposia

#	Conference Title	Place and Date of the Conference	Extent of Contribution
1	Global Students Research Conference	Dhahran, KSA, 2025	Poster contribution
2	Global Students Research Conference	Dhahran, KSA, 2025	Poster contribution
3	Annual Biomedical Engineering Event	Al-Ahsaa, KSA, 2024	Poster contribution
4	Innovative Projects Exhibition at KSAU	Riyadh, KSA, 2024	Poster contribution
5	Regenerative Engineering Society Symposium	Pennsylvania, USA, 2018	Poster contribution
6	Society for Biomaterials Annual Meeting	Georgia, USA, 2018	Poster contribution
7	12th Annual UConn Musculoskeletal Institute Research Day	Connecticut, USA, 2018	Poster contribution
8	11th Annual UConn Musculoskeletal Institute Research Day	Connecticut, USA, 2017	Poster contribution
9	10th Annual UConn Musculoskeletal Institute Research Day	Connecticut, USA, 2016	Poster contribution

#### Membership of Scientific and Professional Societies and Organizations

- Society for Biomaterials (SFB)
- Regenerative Engineering Society (RES)
- Alpha Eta Mu Beta organization for Biomedical Engineers
- Biomedical Engineering Technology Society



### Student Academic Supervision and Mentoring

#	Level	Number of Students	From	To
1	High School	3	June 2025	July 2025
2	Undergraduate	9	Aug 2024	May 2025
3	High School	3	June 2024	July 2024
4	Undergraduate	10	Aug 2023	May 2024
5	Graduate	1	May 2019	Aug 2019
6	Undergraduate	1	Jan 2019	Dec 2019
7	Undergraduate	1	Jan 2019	Dec 2019

### Patents

#	Patent title	Patent office	
1	Tri-Culture system	United States Patent Office	17124728
2	Porcine Muscle Extracellular Matrix-Derived Hydrogel for Muscle Regenerative Engineering Applications	United States Patent Office	63/463,096

### Peer Review Services (10 manuscripts)

#	Name of journal
1	Regenerative Engineering and Translational Medicine
2	ELSEVIER Biomaterials
3	Mary Ann Liebert, Inc. - ASSAY and Drug Development Technologies

### R&D Expertise

Expertise	Specific Expertise	Level of Expertise
<b>Polymer/biopolymers processing for biomedical applications</b>	3D printing	very expert
	3D bioprinting	very expert
	Electrospinning	very expert
	Injectable hydrogel formation and synthesis	very expert
	Microspheres production and sintering	very expert
	Braiding and production or textile grafts	very expert
	Scaffold fabrication	very expert
	Scanning Electron Microscopy (SEM) imaging	very expert



<b>Polymer characterizations for biomedical applications</b>	Confocal laser microscopy imaging	very expert
	X-ray imaging	very expert
	Micro-Computed tomography ( $\mu$ CT) imaging	very expert
	Light microscopy imaging	very expert
	Rheology	very expert
	X-ray Power Diffraction (XRD)	very expert
	X-ray Spectroscopy (EDS)	very expert
	Thermogravimetric Analysis (TGA)	very expert
	Mechanical testing and analysis	very expert
	Degradation and biodegradation	very expert
<b>Drug delivery for biomedical applications</b>	Drug vehicle synthesis	very expert
	Drug encapsulation	very expert
	Drug release analysis	very expert
	ELISA analysis	very expert
<b>In vitro cell work</b>	iPSCs culture (iPSCs-derived muscle and neural progenitor cells)	very expert
	Stem cells isolation and culture (bone marrow and adipose-derived mesenchymal stem cells as well as muscle satellite stem cells)	very expert
	Primary cells isolation and culture (endothelial, skin, bone, muscle, ligament, and tendon cells)	very expert
	Flow cytometry	very expert
	Migration assays	very expert
	Cell attachment crystal violet assay	very expert
	Light microscopy imaging	very expert
	Confocal laser microscopy imaging	very expert
	Immunocytochemistry staining and analysis	very expert
	LIVE/DEAD assay	very expert
	MTS assay	very expert



	Total protein quantification assay	very expert
	DNA quantification assay	very expert
	Alkaline phosphate assay	very expert
	Alizarin red assay	very expert
	Calcium and phosphate release quantification	very expert
	Mineralization assays	very expert
	Electrical stimulation of muscle cells and engineered muscle	very expert
	Tissue-on-a-chip formation	very expert
	Decellurization of tissues and organs	very expert
	Fabrication and synthesis of hydrogels derived from decellurized tissues for biomedical applications	very expert
	Engineering living contractile muscle tissues using primary and induced pluripotent cells	very expert
<b>In vivo animal handling and surgery</b>	Animal handling (restrain, anesthesia, euthanasia)	Very expert
	Tibialis Anterior volumetric muscle loss model surgery on live rat	Very expert
	Subcutaneous transplantation/injection of biomaterials in live rodent models	Very expert
	Hemi limb defect model on live rabbits	Very expert
	Radius critical-sized defect model on live rabbits	Very expert
	Rotator cuff repair surgery on live rats	Good
	Anterior cruciate ligament (ACL) reconstruction surgery on live rabbits	Good
	In vivo X-ray imaging on live animals	Very expert
	In vivo uCT imaging	Very expert
	Biomechanical testing of tissues	Very expert
	Gait pattern analysis	Good



	Muscle force function and production analysis via force transducer-based apparatus	Very expert
<b>Histology expertise</b>	Fixation of tissues	Very expert
	Paraffin, frozen and PMMA embedding of tissues	Very expert
	Embedded tissue blocks sectioning	Very expert
	Routine histology staining	Very expert
	Immunohistochemistry staining	Very expert
	Histology imaging and analysis	Very expert

### Professional expertise

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1	- Conducting scientific research (in vitro and in vivo)
2	- Data analysis (in vitro and in vivo)
3	- Designing, conducting, and monitoring <b>pre-clinical</b> studies on live animals
4	- Collecting and analyzing data from <b>pre-clinical</b> studies
5	- Project management
6	- Laboratory management
7	- Scientific writing of research, reports, and grant proposals
8	- Peer reviewing of scientific research and grant proposals
10	- Teaching and training
11	- CAD modeling: <ul style="list-style-type: none"> <li>o Solidworks</li> <li>o Fusion 360</li> </ul>

### Volunteer Work

#	
1	- Judge at the Scientific Research and Innovation Day, College of Medical Applied Sciences, Imam Abdulrahman bin Faisal University, Dammam. October. 2024.
2	- Biomedical Engineering Technology Society, member and consultant at the Scientific Research and Innovation Division. Apr. 2023 – Present.



3	- Judge at the Handes Hackathon, College of Engineering, Imam Abdulrahman bin Faisal University, Dammam. April. 2024.
4	- Moderator for a discussion Pannel entitled “Commercial Innovation Opportunities in Biotechnology” organized by Monsha'at, College of Medicine, Imam Abdulrahman bin Faisal University, Dammam. March. 2024.
5	- Judge at the 6 <sup>th</sup> Faculty Research and Innovation Day, Prince Sultan Military College of Health Sciences, Dhahran. Jan. 2024.
6	- Judge at the 6 <sup>th</sup> Student Research and Innovation Day, Prince Sultan Military College of Health Sciences, Dhahran. Nov. 2023.
7	- National Biomedical Engineering Summit, Chairman. Oct. 2023 – Present
8	- Blood donation campaign as an assistant, CT, USA. Jan 2015.
9	- FoodBank, prepared more than 2000 meal for homeless. (Organized by US-to-US), CT, USA. April 2014
10	- Hartford Marathon as an assistant, CT, USA. Fall 2013 & 2014

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Last Update

6/8/2025