

JHONATAN A. GUTIERREZ-RIVERA

Ph.D. Student in Biomedical Engineering, University of Miami
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RESEARCH INTERESTS

Biomaterials, Tissue Engineering, Regenerative Medicine, Injectable Hydrogels, Dynamic Hydrogels, Electrospinning, Nanofibrous Biomaterials, Stem Cell Engineering, Cartilage Regeneration, Cell–Material Interactions, Mechanobiology, Biofabrication.

EDUCATION

Ph.D. in Biomedical Engineering, GPA: 4/4

Jan 2025 – Present

University of Miami, Miami, FL, USA

Advisor: David A. Castilla-Casadiegos, Ph.D.

Research Topic: Injectable Dynamic Nanofibrous Hydrogels for Cartilage Regeneration

B.Sc. in Chemical Engineering, GPA: 4.2/5.0

Feb 2018-Aug 2024

Universidad del Atlántico, Barranquilla, Colombia

Advisor: Alberto Albis, Ph.D.

Graduated among the top three students in the Chemical Engineering program. Recipient of three merit-based academic excellence scholarships.

Thesis: Evaluation of Nanofibrous Membranes Obtained by Electrospinning for Membrane Distillation of Aqueous Sodium Chloride Solutions

RESEARCH EXPERIENCE

Graduate Research Assistant

Jan 2025 – Present

Castilla-Casadiegos Laboratory

Department of Biomedical Engineering

University of Miami, Miami, FL

- Lead the development of injectable nanofibrous hydrogel systems for cartilage regeneration and stem cell-based therapies.
- Design dynamic and photo-crosslinkable hydrogel platforms to investigate cell-material interactions and regenerative processes.
- Synthesize, fabricate, and characterize hydrogel biomaterials using rheological, mechanical, and spectroscopic techniques.
- Perform human mesenchymal stem cell culture and evaluate cellular responses through viability, morphology, proliferation, and cytokine secretion analyses.
- Conduct immunofluorescence staining, confocal microscopy imaging, and quantitative image analysis.

- Support collaborative research projects involving injectable biomaterials, nanofibrous scaffolds, and regenerative medicine applications.
- Train students and laboratory personnel in hydrogel fabrication, electrospinning, nanofiber fragmentation, cell culture, and biomaterial characterization techniques.

Undergraduate Research Assistant

Oct 2022 – Aug 2024

Bioprocesses Research Group
Department of Chemical Engineering
Universidad del Atlántico, Barranquilla, Colombia

- Developed electrospun nanofibrous membranes for membrane distillation and water treatment applications.
- Optimized electrospinning parameters to produce uniform nanofibrous membrane architectures.
- Participated in the design, fabrication, and validation of a low-cost electrospinning system with bidirectional collector motion.
- Characterized membrane morphology and performance using microscopy and physicochemical analyses.
- Contributed to experimental design, data analysis, scientific writing, and dissemination of research findings.

INDUSTRY EXPERIENCE

Technical Formulation Specialist

Sep 2023 – Abr 2024

Procaps S.A. Barranquilla, Colombia

- Developed and optimized pharmaceutical formulations for solid and liquid dosage forms.
- Evaluated formulation performance through laboratory testing and comparative studies.
- Participated in formulation scale-up and technology transfer processes for manufacturing implementation.
- Generated technical documentation and supported regulatory compliance activities.
- Collaborated with multidisciplinary teams to improve product performance, manufacturability, and process efficiency.

PEER-REVIEWED PUBLICATIONS

1. **Gutierrez-Rivera, J.A.**, Roca-Arroyo, A.F., Morton, L.D., & Castilla-Casadiegos, D.A. (2025). Hydrogel Network Architecture Design Space: Impact on Mechanical and Viscoelastic Properties. *Gels*, 11(8), 588. Editor's Choice.
2. **Gutierrez-Rivera, J.A.**, Roca-Arroyo, A.F., Castilla-Casadiegos, D.A., & Albis, A. (2025). Development of a Low-Cost Electrospinning System with a Bidirectional Collector for Uniform Nanofibrous Membrane Fabrication. *HardwareX*.
3. Deihl, A.C., Odibo, A.O., **Gutierrez-Rivera, J.A.**, Roca-Arroyo, A.F., Maduka, C.V., Castilla-Casadiegos, D.A., & Rodriguez Rivera, G. (2026). The Impact of Biomaterial Charge on Cells' Bioelectrical Signaling. *Cells Tissues Organs*.

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4. Roca-Arroyo, A.F., **Gutierrez-Rivera, J.A.**, Mejia-Rosales, L.M., Morton, L.D., & Castilla-Casadiegos, D.A. (2026). Nanofibrous Composite Hydrogels for Modulating Stem Cell Behavior. Cells Tissues Organs.

CONFERENCE PRESENTATIONS

1. **Society For Biomaterials Annual Meeting & Exposition (2026)**. Poster Presentation. Engineering Nanofibrous Hydrogels for Human Mesenchymal Stem Cell Manufacturing.
2. **University of Miami College of Engineering Research Symposium (2025)**. Poster Presentation. Engineering Nanofibrous Hydrogels for Human Mesenchymal Stem Cell Manufacturing.
3. **5th Annual LatinXChem Poster Conference (2024)**. Poster Presentation. Evaluation of Nanofibrous Membranes Obtained by Electrospinning for Membrane Distillation of Aqueous Sodium Chloride Solutions.
4. **2nd Annual Virtual Symposium of LatinX in Chemical Engineering (2024)**. Poster Presentation. Evaluation of Nanofibrous Membranes Obtained by Electrospinning for Membrane Distillation of Aqueous Sodium Chloride Solutions.
5. **XXI Departmental Meeting of Research Groups RedCOLSI Atlántico (2024)**. Poster Presentation. Evaluation of Nanofibrous Membranes Obtained by Electrospinning for Membrane Distillation of Aqueous Sodium Chloride Solutions.

LEADERSHIP, MENTORSHIP, AND SERVICE

Research Mentor

2025 – Present

Castilla-Casadiegos Laboratory
University of Miami, Miami, FL

- Mentor three master's students, six undergraduate students, and three high-school students in biomaterials research.
- Guide students in experimental design, laboratory techniques, data analysis, scientific communication, and professional development.

Laboratory Training Coordinator

2025 – Present

Castilla-Casadiegos Laboratory
University of Miami, Miami, FL

- Train new laboratory members in electrospinning, nanofiber fragmentation, hydrogel fabrication, cell culture, and biomaterial characterization techniques.
- Contribute to laboratory standardization, safety practices, and experimental reproducibility.

HONORS AND AWARDS

Graduated Among the Top Three Students in Chemical Engineering Universidad del Atlántico, Barranquilla, Colombia	2024
Recipient of Three Merit-Based Academic Excellence Scholarships Universidad del Atlántico, Barranquilla, Colombia	2024
Perfect Score in Oral Presentation XXI Departmental Meeting of Research Groups RedCOLSI Universidad del Atlántico, Barranquilla, Colombia	2024
Research Project Selected for Funding Internal Call for the Strengthening of Research Groups with Tools for Creation, Innovation, and Research Universidad del Atlántico, Barranquilla, Colombia	2022

PROFESSIONAL MEMBERSHIPS

- Sigma Xi, The Scientific Research Honor Society
- Alpha Eta Mu Beta (AEMB), National Biomedical Engineering Honor Society
- The National Society of Leadership and Success (NSLS)

TECHNICAL SKILLS

Experimental Techniques

- Cell Culture (Human Mesenchymal Stem Cells)
- Hydrogel Synthesis and Characterization
- Rheological Characterization
- Mechanical Testing
- Electrospinning
- Immunofluorescence Staining
- Image Analysis
- Fourier Transform Infrared Spectroscopy (FTIR)
- Nuclear Magnetic Resonance (NMR)

Software

- GraphPad Prism
- MATLAB
- ImageJ
- Microsoft Office Suite

LANGUAGES

- Spanish, Native Proficiency
- English, Professional Working Proficiency

PROFESSIONAL REFERENCES

David A. Castilla-Casadiegos, Ph.D.
Assistant Professor
Department of Biomedical Engineering, University of Miami
Email: dac439@miami.edu

Alberto Albis, Ph.D.
Associate Professor
Department of Chemical Engineering, Universidad del Atlántico
Email: albertoalbis@mail.uniatlantico.edu.co