CURRICULUM VITAE

Juan F. Vivanco, Ph.D.

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Facultad de Ingeniería y Ciencias
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Adjunct Assistant Professor
Department of Mechanical and Materials Engineering
Faculty of Engineering and Applied Science
Queen's University - Canada

CARRER OBJECTIVE AND HIGHLIGHTS

To apply my multidisciplinary understanding of mechanical engineering, materials science and human musculoskeletal system, in order to develop strategies to value the use of natural and artificial biomaterials for potential biotechnological and biomedical applications.

- Specialized in bone scaffold biomechanics and biomaterials, particularly by using both experimental and mathematical modeling techniques.
- Over 20 years' experience in bone and bone surrogate biomechanics and biomaterials: 9 years at Adolfo Ibáñez University UAI), Chile and 11 years at University of Wisconsin – Madison, USA as a research associate, lecturer and as a graduate student.
- Ph.D. in Materials Science with emphasis in biomechanics, 2011.
- Established "Biological, Bioinspired and Biomaterials B3MAT" research group in 2014 at UAI.
- Advised 38 Highly Qualified Personnel- *HQP* (5 Postdocs, 2 Ph.D., 17 M.Sc., and 18 Professional Degree in Engineering) in Bioengineering, Mechanical Engineering, Civil Engineering and Materials Science & Engineering.
- Over 80 research papers and conference proceedings.
- US$1,429,700 in research funding as a PI in UAI (US$679,700 B3MAT-Lab Allocation)

EDUCATION

12/2011	UNIVERSITY OF WISCONSIN-Madison, USA **Ph.D. in Materials Science (Biomechanics Emphasis)** Thesis: "Investigation of Fabrication and Environmental Effects on Bioceramic Bone Scaffolds".
05/2007	UNIVERSITY OF WISCONSIN-Madison, USA **M.Sc. in Materials Science** Thesis: "The Mechanical Behavior of a Direct Compression Molded Porous Tantalum-UHMWPE Construct: A Microstructural Model".
05/2006	UNIVERSITY OF WISCONSIN-Madison, USA **M.Sc. in Mechanical Engineering** Course-based degree.
12/2005	UNIVERSITY OF WISCONSIN-Madison, USA. **M.Sc. in Civil Engineering** Thesis: "The Transition to a Performance Grading System for Asphalt Binders in South America".
12/2000	UNIVERSIDAD TÉCNICA FEDERICO SANTA MARÍA, Chile. **B.Sc. and Professional Degree in Civil Engineering** Thesis: "Fragility in Concrete Pavement Structures through Fracture Mechanics".

ACADEMIC APPOINTMENTS

For the last 15 years I have been professor in Bioengineering, Mechanical and Civil Engineering in Chile and USA. In this role I have established a successful research programme in artificial and natural biomaterials and 3D printed-implant design; I have an active service record on campus and internationally; and, I have taught undergraduate and graduate students.
My teaching objectives are to expose engineering students to non-traditional applications of engineering design with interfaces between bioengineering, orthopedic medicine, and mechanical/materials engineering; and inspire under-represented students to pursue engineering majors. My research goal is to develop strategies to value the use of natural and artificial biomaterials for potential biotechnological and biomedical applications. For that, I have established a multiscale and integrative technological platform of experimental biomechanical models, *in vitro* biological models and computational models. My research projects include basic science research as well as applied industry projects.

08/2014 – present ADOLFO IBÁÑEZ UNIVERSITY – Chile
Faculty of Engineering and Sciences – Bioengineering
Associate Professor 01/2018 – present
Assistant Professor 08/2014 – 01/2018
Chair of Bioengineering (undergraduate program) 08/2015 – 12/2017

Teaching*:*

- Bioengineering: 3rd Year Core: Biomaterials; 3rd Year: Technology Innovation – Conceive & Design; 4th Year Core: Biomechanics; 4th Year Elective: Research Thesis and Independent Study; Graduate Level: Experimental Techniques in Biomaterials.
- Mechanical and Civil Engineering: 2nd Year Core: Mechanics of Materials, Intro to Materials Science.
- Industrial Engineering: 1st Year Core: Introduction to Engineering; 3rd Year: Technology Innovation– Conceive & Design; 4th Year: Capstone Projects.

Research:

- **Group Director** 08/2014 - present
  Research Group: "Biological, Bioinspired and Biomaterials" B3MAT
  https://www.b3matchile.com/

01/2004 – 07/2014 UNIVERSITY OF WISCONSIN-Madison – USA

Associate Lecturer - College of Engineering 01/2013 – 07/2014

- *Introduction to Engineering Design:* approximately 30 freshman students from the college of engineering to provide the students with first-hand experience working in teams on a design project for real-world clients. Lectured.

Research Associate / Post-Doctoral Training 01/2012 – 07/2014

- *Dept. of Mechanical Engineering/Materials Science*
  - *Research Interests*: silver nano particles on bone cement for joint replacements; nanomechanical properties of bone tissue; loading on trabecular bone; bone bioreactor and loading system.

Graduate Research Assistant 01/2004 – 12/2011

- *Dept. of Mechanical Engineering 01/2006 – 12/2011*
  Bone and Joint Biomechanics Laboratory & Polymer Center.
  - *Research Interests*: bioceramic bone scaffolds; multi-scale mechanical/material characterization; orthopedic implants; *ex-vivo* bone loading and culture system; finite element simulation.
- *Dept. of Civil Engineering 01/2004 – 12/2005*
  - *Research Interests*: Superpave-technology testing on asphalt/polymeric materials.

12/2000 – 01/2004 UNIVERSIDAD TÉCNICA FEDERICO SANTA MARÍA - Chile
Academic Instructor (Full Time Lecturer), Dept. of Civil Engineering

- Courses in Civil Engineering/Construction Engineering: Strength of Materials, Static of Structures, Intro. to Civil Engineering; Structures I, Structures II.
- Head of the academic undergraduate program of Civil Engineering.

03/1996 – 12/2000 UNIVERSIDAD TÉCNICA FEDERICO SANTA MARÍA - Chile
Coordinator of Teaching Assistants, Dept. of Physics

- *General Physics:* trained junior teaching assistants; developed problem sets and experimental work.

Teaching Assistant:

- Dept. of Physics: *General Physics; Classical Mechanic; Optics; and Thermodynamics*. Lecturer, performed experimental work, developed problem sets, and graded.
- Dept. of Civil Engineering: *Strength of Materials; Static of Structures; Steel Structures; Tridimensional Geometry*. Lecturer, performed experimental work, developed homework, and graded.

HONORS AND AWARDS

- **Outstanding Contribution to the Internationalization of the Faculty of Engineering.** Faculty of Engineering and Sciences, Adolfo Ibáñez University, Chile. 2023.
- **Committee Member** of the "Engineering 1" FONDECYT study group (Chilean NSF), Chile 2023-present.
- **Adjunct Assistant Professor** in Department of Mechanical and Materials Engineering in the Faculty of Engineering and Applied Science at Queen's University, Canada. 2023-present.
- **Outstanding Contribution to the Internationalization of the University.** Significant contribution to the consolidation of the internationalization strategy of the University. Adolfo Ibáñez University, Chile. 2023.
- **Best Poster Presentation Award.** Research work presented by Raúl Vallejos (postdoctoral researcher) at the 28th Annual Congress of the European Orthopaedic Research Society (online-EORS), Turkish. 2020.
- **Ambassador of Viña del Mar City.** Named by the City Hall of Viña del Mar to represent the city in key areas of knowledge and education and to promote it as a host for future events. Viña del Mar, Chile. 2018.
- **Best Researcher in the area of Engineering and Technology**. Adolfo Ibáñez University, Chile. 2017.
- **Outstanding Contribution in Research**. Faculty of Engineering and Sciences, Adolfo Ibáñez University, Chile. 2014.
- **Honorary Fellow**. Department of Mechanical Engineering, University of Wisconsin-Madison. 2014.
- **Future Leaders Program.** Nominated for the American Ceramic Society in recognition of exemplary work and potential as a future leader in the ceramics and glass industry. 4th Ceramic Leadership Summit, Baltimore, Maryland. 2014.
- **International Student Academic Achievement Award**. Wisconsin Alumni Association, in recognition of exceptional academic performance and achievements after completing doctoral degree at the University of Wisconsin-Madison. 2012.
- **President of the Republic Scholarship**. Full tuition and expenses for doctoral studies in USA, Chilean Government. 2005-2009.
- **Graduate Research Assistantship**. Dept. of Mechanical Engineering, University of Wisconsin-Madison. 2006-2011.
- **Graduate Research Assistantship**. Dept. of Civil Engineering, University of Wisconsin-Madison. 2004-2005.
- **Eduardo Neale Silva Scholarship**. Full tuition and expenses for outstanding Chilean students for one year at the University of Wisconsin-Madison. 2004.
- **Federico Santa María Scholarship**. Full tuition and expenses for outstanding undergraduate academic performance, Universidad Técnica Federico Santa María, Valparaiso, Chile. 1993-1998.

INDUSTRIAL WORK

08/2014 – present	**Consulting in Mechanical/Bio Engineering** – Worked as a project engineer in mechanical and material engineering projects.
05/2007 – 12/2007	ZIMMER, INC., Warsaw IN - USA **Intern Engineer:** Structural Design and Analysis Research Group – Research: "Tantalum-UHMWPE orthopedic implants"; microstructural model of a porous structure using FEA.
01/2000 – 01/2007	**Consulting in Civil Engineering** – Worked as a project engineer in structural and solid mechanics engineering projects.

PROJECTS

CURRENT

[1]	04/2024 – 04/2027	FONDECYT Chilean National Fund for Scientific and Technological Development "Artificial Intelligence Aided Cell–Instructive Biomaterial Scaffolds for Bone Regeneration" Role: Co-Principal Investigator (PI: Jorge Farías, UFRO)
[2]	04/2023 – 04/2026	FONDECYT Chilean National Fund for Scientific and Technological Development "An Integrated Biomechanical Design and Manufacturing Process of 3D Scaffolds with Structural Gradient Evaluated with a Stem Cell Culture Model for Bone Tissue Engineering Applications" Role: Principal Investigator
[3]	07/2024 – 12/2024	Research Contract – Geodbone (PUC-Chile) "Biocompatibility and Biomechanical Evaluation of Particles Made of Calcium Sulfate" Role: Principal Investigator
[4]	01/2023- 12/2025	International Research Agreement – Rush University Medical Center (IL, USA) "Medical Image Analysis for Femoroacetabular Impingement Syndrome" Role: Principal Investigator (Chilean counterpart)
[5]	04/2023- 04/2025	Postdoctoral Research - ANID Chilean National Fund for Scientific and Technological Development

"Development of Exchange Coupled Magnetodielectric Ferrite Composite: An Efficient Microwave Antenna Substrate"
Role: Sponsor

[6] 04/2023-04/2025 Postdoctoral Research – ANID
Chilean National Fund for Scientific and Technological Development
"Development of Novel M1M2 Substituted Hydroxyapatitie/PCL/CNF Composite on Ti6Al4V Implant for Orthopedic Application"
Role: Sponsor

[7] 04/2022-12/2025 Research and Development Agreement Empa (Switzerland)/UAI
Joint collaboration for doctoral students
"Investigating the mechanical and biological properties of seeded 3D-Bioplotted composite scaffold in an *in-vitro* dynamic bone culture model"
Granted by Faculty of Engineering and Sciences, Adolfo Ibáñez University and Empa Switzerland
Role: Thesis Director (Chilean counterpart)

COMPLETED

[8] 05/2023 – 07/2023 Research Contract – Geodbone (PUC-Chile)
"Evaluation of Biocompatibility Properties of Particles Made of Calcium Sulfate"
Role: Principal Investigator

[9] 11/2021-11/2022 Research Contract – Raven Industries (SD, USA)
"Modeling Spray Dispersion due to Boom Leveling"
Role: Principal Investigator (Chilean counterpart)

[10] 07/2021 – 06/2022 Intramural Research Grant – Postdoctoral Research
"3D Printing of Bioactive Scaffolds with Controlled Geometry for Bone Tissue Engineering"
Granted by Faculty of Engineering and Sciences, Adolfo Ibáñez University
Role: Sponsor

[11] 12/2020 – 12/2021 Research Seed Funds Program – International Collaboration
"Development and Characterization of Bio-scaffold Structures with Controlled Porosity for Musculoskeletal Tissue Applications using Advanced Additive Manufacturing Techniques"
Granted by Faculty of Engineering and Sciences, Adolfo Ibáñez University
Role: Principal Investigator

[12] 03/2019 – 02/2021 Research and Development Agreement – Empa (Switzerland)/UAI
Empa Contract No 2020-063-C01
"Development and Characterization of PCL-Bioactive Glass-Ceramic Composite-based Bio-Scaffolds for Bone Tissue Applications: a Pilot Study".
Role: Principal Investigator (Chilean counterpart)

[13] 01/2018 – 06/2021 ANILLO – Collaborative Research Program
Associative Research Program to promote research of excellence in Chile
"Integrating Structure and Function of Ecological, Mechanical and Mineralogical Properties of Marine Calcifiers: Shell Carbonate as Source of Bio-Inspiration (Carbo-Nat-Lab)"
Role: Principal Investigator (Director: Nelson Lagos)

[14] 11/2017 – 11/2020 FONDECYT – Initiation for Research
Chilean National Fund for Scientific and Technological Development
"Design and Evaluation of Porous Scaffolds for Bone Regeneration: Development of a Biomechanical Platform"
Role: Principal Investigator

[15] 03/2018 – 12/2018 Intramural Research Grant – Postdoctoral Research
"Interacción Celular y Biomecánica de Estructuras Porosas Tridimensionales Utilizadas para Regeneración Ósea"
Granted by Vicerrectoría Académica, Adolfo Ibáñez University
Role: Sponsor

[16] 03/2018 – 12/2018 Intramural Research Grant – Undergraduate Student Research Training Program
"Determinación Experimental de Propiedades Mecánicas y Geométricas de Estructuras Poliméricas Fabricadas con Impresoras 3D"
Granted by Vicerrectoría Académica, Adolfo Ibáñez University
Role: Principal Investigator

[17] 07/2015 – 05/2017 Intramural Research Grant - A new engineering for 2030 program, CORFO
"Bioengineering-based Materials: Multiscale Modeling and Experimentation"

Granted by Adolfo Ibáñez University, Faculty of Engineering and Sciences
Role: Principal Investigator

[18] 07/2013-07/2014 University of Wisconsin Graduate School
"Silver-Doped Antimicrobial Bone Cement for Use in Total Joint Replacement"
Role: Principal Investigator (Sponsor: Heidi-Lynn Ploeg)

[19] 01/2012-12/2012 Universidad Técnica Federico Santa María
"Efecto de las Temperaturas de Sinterización de los Implantes Óseos"
Role: Principal Investigator - International collaborator

PATENTS

[1] Orthopedic Component of Low Stiffness - 07-30-2009
Inventors: Clarence M. Panchison, Alicia Rufner, Archie W, Newsome Kirt L, Case Zhibin Fang, Juan Vivanco, Oludele O. Popoola, Robby Kissling, Brion R. Mimnaugh, Dirk L. Pletcher, Randy L. Schlemmer. IPC8 Class: AA61F228FI, USPC Class: 623 1611.

[2] Medical Implants and Methods for Delivering Biologically Active Agents - 04-30-2009
Inventors: Zhibing Fang, Yang W. Son, Juan Vivanco, Kai Zhang, Danny L. Levine. IPC8 Class: AA61F202FI, USPC Class: 623 1111.

PUBLICATIONS

Journal Publications (indicates current or former student/postdoc from my lab) (35 published):

In Preparation, In Review, Accepted or In Press (5)

[1] Vertically Oriented Parts Fabricated with a Self-Assembled Open-Sourced 3D printer Have Higher Tensile Mechanical Properties. *Under review*.

[2] Biocompatibility Assessment by Cell Adhesion of hGMSC on Shell Surfaces from Argopectum Purpuratus. *Under review.*

[3] Effect of Processing Parameters on the Printability and Mechano-Biological Properties of Polycaprolactone–Bioactive Glass Composites for 3D Printing of Scaffolds. *Under review*.

[4] Improved magnetic and K_u-band microwave response in $Ba_{0.85}La_{0.15}Fe_{12-x}Co_xO_{19}$ hexaferrites. *Under review*.

[5] Decreasing cytotoxicity of complex MED610™ 3D-printed constructs for long-term cell and tissue culture studies. *Under review.*

Published (35)

[1] Arumugam G., Sivaraj D., Gonçale J.C., Henrique P., Terra Garcia M, Soares da Silva N., Montanari B., Vieira Loures F, **Vivanco J.F**., Ghosh D, Campos J. "Silver Nanoparticle-Embedded Carbon Nitride: Antifungal Activity on *Candida Albicans* and Toxicity Towards Animal Cells". *ACS Applied Materials & Interfaces*. **2024**.

[2] Loyo, C.; Cordoba, A.; Palza, H.; Canales, D.; Melo, F.; **Vivanco, J.F**.; Baier, R.V.; Millán, C.; Corrales, T.; Zapata, P.A. "Effect of Gelatin Coating and GO Incorporation on the Properties and Degradability of Electrospun PCL Scaffolds for Bone Tissue Regeneration". *Polymers 16*, 129. **2023.**

[3] Sivaraj D., Ramachandran K, Sudhakar K, Arulraj A, Mangalaraja R.V., Srinivasan M, Muthu Senthilpandian, **Vivanco J.F**, Ramasamy P. "Efficient Photocatalytic Degradation of Direct Blue 15 Dye Using Samarium Doped Bismuth Tungstate Nanosheets: A Sustainable Approach Towards Wastewater Treatment". Chemosphere (140414). **2023**.

[4] Labra F. A., San Martín V., Jahnsen N., Fernández C., Zapata J., Garcia-Huidobro R., Duarte C., García C., **Vivanco J.F.**, Lardies M., Lagos N.A. "Metabolic Rate Allometry in Intertidal Mussels Across Environmental Gradients: The Role of Coastal Carbonate System Parameters in Mediating the Effects of Latitude and Temperature". *Marine Pollution Bulletin (184).* **2022.**

[5] Contreras-Raggio J., Toro C., Millán C., Ploeg H.L., Aiyangar A., **Vivanco J.F.** "Height-to-Diameter Ratio and Porosity Strongly Influence Bulk Compressive Mechanical Properties of 3D-Printed Polymer Scaffolds". *Polymers*. 14(22) 5017. **2022**.

[6] Martel S.I., Fernández C., Lagos N.A., Labra F., Duarte C., **Vivanco J.F.**, García C., Lardies M.A. "Acidification and High-Temperature Impacts on Energetics and Shell Production of the Edible Clam Ameghinomya Antiqua". *Frontiers in Marine Science*. **2022.**

[7] Vallejos R., Contreras J., Millán C., Burda, I., Terrasi, G., Siqueira, G., Weisse, B., Palza, H., Nyström, G., Aiyangar. A., **Vivanco J.F.** "Shape Fidelity, Mechanical and Biological Performance of 3D Printed Polycaprolactone-Bioactive

Glass Composite Scaffolds *Materials Science and Engineering C: Materials for Biological Applications*. 123 (112540). **2021.**

[8] Vallejos R., Contreras J., Toro C., Bustamante M., Pérez L., Aiyangar A., **Vivanco J.F.**, "Structure-Function Assessment of 3D-Printed Porous Scaffolds by a Low-Cost/open-source Fused Filament Fabrication Printer" *Materials Science and Engineering C: Materials for Biological Applications*. 123 (111945). **2021.**

[9] García-Huidobro R., Poupin M.J., Urrutia C., Rodriguez-Navarro A., Grenier C., **Vivanco J.F.**, Ramajo L., Benjumeda I., Lagos N.A., Lardies M.A. "An Intrapopulational Study of Organic Compounds and Biomechanical Properties of the Shell of the Antarctic Bivalve Laternula Elliptica (P. P. King, 1832) at King George Island". *Polar Biology.* **2021**.

[10] Lagos N.A., Benítez S., Grenier C., Rodriguez-Navarro A., García C., Abarca A., **Vivanco J.F.**, Benjumeda I., Vargas C., Duarte C., Lardies M.A. "Plasticity in Organic Composition Maintains Biomechanical Performance in Shells of Juvenile Scallops Exposed to Altered Temperature and pH Conditions" *Scientific Reports.* **2021**.

[11] Benjumeda W., Vallejos R., Santibáñez J., Millán C., **Vivanco J.F.** "Analysis of cell-biomaterial interaction through cellular bridge formation in the interface between hGMSCs and CaP bioceramics" *Scientific Reports*. **2020**.

[12] Norambuena-Contreras J., Arteaga-Perez L., Guadarrama-Lezama A., Briones R., **Vivanco J.F.**, Gonzalez-Torre I. "Microencapsulated Bio-Based Rejuvenators for the Self-Healing of Bituminous Materials". *Materials.* 13(6) 1446. **2020.**

[13] Vallejos R., Irribarra V., Benjumeda-Wijnhoven I., Millán C., **Vivanco J.F.** "Microporosity Clustering Assessment in Calcium Phosphate Bioceramic Particles". *Frontiers in Bioengineering and Biotechnology.* **2019**.

[14] Vukasovic T., García C., **Vivanco J.F.**, Celentano D. "Characterization of the Mechanical response of thermoplastic parts fabricated with 3D printing". *The International Journal of Advanced Manufacturing Technology*. 104: 4207–4218. **2019**.

[15] Millán C., **Vivanco J.F.**, Benjumeda-Wijnhoven I.M., Bjelica S., Santibáñez J.F. "Mesenchymal Stem Cells and Calcium Phosphate Bioceramics: Implications in Periodontal Bone Regeneration". *Advances in Experimental Medicine and Biology*. *Springer.* **2018**.

[16] Ruggeri F., Leiva V., Saulo H., **Vivanco J.F.**, "A Methodology Based on the Birnbaum-Saunders Distribution for Reliability Analysis Applied to Nano-materials". *Reliability Engineering & System Safety*. **2017**.

[17] Slane J., **Vivanco J.F.**, Squire M., Ploeg H.L., "Characterization of the Quasi-Static and Viscoelastic Properties of Orthopaedic Bone Cement at the Macro and Nanoscale". *Journal of Biomedical Materials Research: Part B Applied Biomaterials.* **2016.**

[18] Norambuena-Contreras J., Gonzalez-Torre I., **Vivanco J.F.**, Gacitúa W., "Nanomechanical Properties of Polymeric Fibres Used in Geosynthetics Composites". *Polymer Testing.* **2016**.

[19] Burgers T., **Vivanco J.F.**, Bart W., "Mice with a Heterozygous Lrp6 Deletion Have Impaired Fracture Healing". *Bone Research.* **2016**.

[20] Meyer L, Johnson M., Cullen D., **Vivanco J.F.**, Blank R., Smith E., Ploeg H.L. "Combine Exposure to Big Endothelin-1 and Mechanical Loading in Bovine Sternal Cores Promotes Osteogenesis". *Bone.* **2016**.

[21] Marchant C., Leiva V., Cysneiros F., **Vivanco J.F.**, "Multivariate Birnbaum-Saunders Regression Models: Diagnostic Analysis and Application" *Journal of Applied Statistics.* **2016.**

[22] Collins C., **Vivanco J.F.**, Burgers T., Ploeg H.L. "Fracture Healing in Mice Lacking Pten in Osteoblasts: A Micro-Computed Tomography Image-Based Analysis of the Mechanical Properties of the Femur". *Journal of Biomechanics.* 48(2): 310-317. **2015**.

[23] Slane J., **Vivanco J.F.**, Squire M., Ploeg H.L. "Mechanical, Material, and Antimicrobial Properties of Acrylic Bone Cement Impregnated with Silver Nanoparticles" *Materials Science and Engineering C: Materials for Biological Applications*. 48: 188-196. **2015.**

[24] **Vivanco J.F.**, Burgers T., García S., Ploeg H.L. "Estimating the Density of Human Trabecular Bone Using Clinical CT Scan Data". *Journal of Engineering in Medicine.* 228: 616-626. **2014**.

[25] **Vivanco J.F.**, Jakes J., Slane J., Ploeg H.L. "Accounting for Structural Compliance in Nanoindentation Measurements of Bioceramic Bone Scaffolds". *Journal of Ceramics International.* **2014**.

[26] Slane J., **Vivanco J.F.**, Ploeg H.L., Squire M. "The Influence of Low Concentration a Water Soluble Porogen on the Material Properties, Antibiotic Release, and Biofilm Inhibition of an Acrylic Bone Cement". *Materials Science and Engineering C: Materials for Biological Applications.* 42:168-176. **2014**.

[27] Aiyangar A., **Vivanco J.F.**, Au, A., Smith E., Ploeg H.L. "Axial and Transverse Compressive Properties of Human Lumbar Vertebral Trabecular Bone". *Journal of Biomechanical Engineering*. **2014.**

[28] Slane J., **Vivanco J.F.**, Ebenstein D., Squire M., Ploeg H.L. "Multiscale Characterization of Acrylic Bone Cement Modified with Functionalized Mesoporous Silica Nanoparticles". *Journal of Mechanical Behavior of Biomedical Materials.* 37:141-152. **2014.**

[29] Slane J., **Vivanco J.F.**, Meyer J., Ploeg H.L., Squire M. "Modification of Acrylic Bone Cement with Mesoporous Silica Nanoparticles: Effects on Mechanical, Fatigue and Absorption Properties". *Journal of Mechanical Behavior of Biomedical Materials.* 29: 451-461. **2014.**

[30] **Vivanco J.F.**, García S., Ploeg H.L., Alvarez G., Cullen D., Smith E. "Apparent Elastic Modulus of Ex Vivo Trabecular Bovine Bone Increases with Dynamic Loading". *Journal of Engineering in Medicine.* 27(8): 902-910. **2013.**

[31] **Vivanco J.F.**, Aiyangar A., Araneda A., Ploeg H.L., "Mechanical Characterization of Injection-Molded Macro Porous Bioceramic Bone Scaffolds". *Journal of Mechanical Behavior of Biomedical Materials*. 9:137-152. **2012**.

[32] **Vivanco J.F.,** Araneda A., Ploeg H.L., "The Effect of the Sintering Temperature on Microstructural Properties of Bioceramic Bone Scaffolds". *Biomaterials Science: Processing, Properties and Applications II. John Wiley & Sons, Inc.* 101-109. **2012.**

[33] **Vivanco J.F.**, Slane J., Nay R., Simpson A., Ploeg H.L., "The Effect of Sintering Temperature on the Microstructure and Mechanical Properties of a Bioceramic Bone Scaffold*". Journal of Mechanical Behavior of Biomedical Materials*. 4:2150-60. **2011.**

[34] **Vivanco J.F.**, Smith B., Blake A., Ploeg H.L., Turner K. "3D Elastomeric Scaffolds- Fabricated by Casting in Micro End Milled Molds". *Journal of Biomimetics, Biomaterials and Tissue Engineering*. 9:17-23. **2011.**

[35] **Vivanco J.F.**, Fang Z., Levine D., Ploeg H.L. "Evaluation of the Mechanical Behavior of a Direct Compression Molded Porous Tantalum-UHMWPE Construct: a Microstructural Model". *Journal of Applied Biomaterial and Biomechanics*. 7: 34-42. **2009.**

Conference Proceedings (indicates current or former student/postdoc from my lab) (47):

[1] Santhoshkumar Mahadevan, Puneet Sharma, Ramalinga Viswanathan, M; **Vivanco J.F.**," Enhanced Magnetic and Microwave Properties of La-Co co-substituted Barium Hexaferrite", Pan American Ceramics Congress and Ferroelectrics Meeting of Americas (PACC-FMAs) Panama City, Panama. April **2024**.

[2] **Vivanco J.F.**, Benjumeda I., Lardies M., Lagos N., Ebenstein D., "Micro and Nano-Level Mechanical Properties of the Intertidal Mussel *Perumytilus purpuratus* exposed to Ocean Acidification". 9th International Conference on Mechanics of Biomaterials and Tissues (ICMOBT), Waikoloa Beach, HI. December **2023**.

[3] Correa Belloso A., Kunath B., **Vivanco J. F.**, Ploeg H.L., Rainbow R., "Biological Viability of Complex Med610™ 3d-Printable Constructs: Perfusion Bioreactor Chambers". XV Congreso Iberoamericano de Metalurgia y Materiales; Viña del Mar, Chile, November **2023**.

[4] Campillo M., Chicardi E, **Vivanco J.F.**, Perez Pozo L., "Estudio Numérico del Comportamiento Elástico de Espumas Metálicas de Titanio Fcc-Bcc con Porosidad Funcionalmente Dirigida Mediante una Metodología DEM-FEM". XXI Jornadas de Mecánica Computacional, Santiago, Chile. October **2023**.

[5] Badillo San Juan J., **Vivanco J.F.**, Campillo M., Pérez Pozo L., "Caracterización Numérica y Experimental de Materiales Porosos Basados en Superficies Mínimas Triplemente Periódicas (TPMS)" XXI Jornadas de Mecánica Computacional, Santiago, Chile. October **2023**.

[6] Contreras Raggio J., Pardo M., Núñez P., **Vivanco J.F.**, Aiyangar A., "The Effect of Processing Parameters on the Printability and Mechano-biological Properties of Polycaprolactone–Bioactive Glass Composites for Direct Ink Writing of Scaffolds: a Fractional Design Approach". European Society for Biomaterials (ESB), Davos, Switzerland, September **2023.**

[7] Contreras Raggio J., Pardo M., Núñez P., **Vivanco J.F.**, Aiyangar A., "Pre-Printing and in situ Characterization of Biocompatible Composite Inks for Direct Ink Writing of Finite Sized Scaffolds with Highly Controlled Porous Structures". European Society for Biomaterials (ESB), Davos, Switzerland, September **2023.**

[8] Correa A., Zojaji M., Parkhill A., Kunath B., **Vivanco J.F.,** Rainbow R., Ploeg H.L."Mechanical Loading of ex-vivo Bovine Trabecular Bone in 3D-Printed Bioreactor" European Society of Biomechanics (ESB), Maastricht, Netherlands, July **2023**.

[9] Bustamante M, **Vivanco J.F**., Burgers T., "The Effect of Boom Leveling on Spray Dispersion". American Society of Agricultural and Biological Engineers (ASABE), Annual International Meeting, Omaha, NE, July **2023**.

[10] Zojaji M., Correa A., Parkhill A., Kunath B.A., **Vivanco J.F.**, Rainbow R., Ploeg H.L. "Validation of Finite Element Analysis for Bone Remodeling Simulation With Ex Vivo Mechanical Testing Of Bovine Trabecular Bone". Canadian Connective Tissue Conference (CCTC), Toronto, ON, Canada, June **2023**.

[11] Beloglowka K., **Vivanco J.F.**, García-Rodríguez S., Pilkey A.K., Lievers W.B., Ploeg H.L. "Finite Element Mesh Sensitivity Analysis for Trabecular Bone Modelling". North American Congress on Biomechanics (NACOB), Ottawa, ON, Canada, August **2022**.

[12] Pérez-Pozo L., Prieto C., Campillo M., Ploeg H.L., **Vivanco J.F.** "Finite Element Analysis of µ-CT Trabecular Bone Model: A Numerical Methodology to Evaluate the Influence of Structural Adaptation on Biomechanical Response". North American Congress on Biomechanics (NACOB), Ottawa, ON, Canada, August **2022**.

[13] Contreras-Raggio J., Toro C., Correa A., Angulo-Pineda C., Ploeg H.L., Aiyangar A., **Vivanco J.F.**, "Compressive Properties of 3D-Printed Porous Bone Surrogate Polymer Scaffolds". North American Congress on Biomechanics (NACOB), Ottawa, ON, Canada, August **2022**.

[14] Zojaji M., Collins C, **Vivanco J.F.**, Burgers T., Ploeg H.L. "Homogeneous vs. Heterogeneous Finite Element Analyses of Mice Femur from Different Genotypes". Orthopaedic Research Society (ORS 2022) Annual meeting, Tampa, FL, February **2022**.

[15] Benjumeda I., Ebenstein D., Ramajo L., Millán C., **Vivanco J.F.** "Nanomechanical Evaluation Of Argopecten Purpuratus Under Upwelling Scenarios" 26th Congress of the European Society of Biomechanics (ESB), (virtual conference). Milan, Italy July **2021**.

[16] Funk J.V., Kunath B., **Vivanco J.F.**, Ploeg H.L., "FEA Simulation of Parametric Trabecular Bone Scaffolds", Orthopaedic Research Society (ORS 2021) Annual meeting (virtual conference), February **2021**.

[17] Labra F.A., San Martín V., Jahnsen N., Fernández C., Zapata J., Duarte C., García C., **Vivanco J.F.**, Lagos N.A., Lardies M.A. "Modelling the effect of environmental variation in multiple stressors on physiological traits of the intertidal ecosystem engineer Perumytilus purpuratus (Lamarck 1810) along a geographical ocean acidification gradient in the South Eastern Pacific". Festival of Ecology from British Ecological Society (virtual conference). December **2020**.

[18] Benjumeda I., Lardies M.A., Lagos N., Ploeg H.L., **Vivanco J.F.** "Micromechanical Analyses of Argopecten Purpuratus Exposed to a Climate Change Scenario by Depth Sensing Indentation". Festival of Ecology from British Ecological Society (virtual conference). December **2020**.

[19] Vallejos R., Contreras J., Aiyangar A., Palza H., **Vivanco J.F.** "Effect of 45S5 Bioglass on the Mechanical and Biological Performance of 3D Printed PCL Scaffolds". European Orthopaedic Research Society (EORS) 28th Annual Meeting (virtual conference). Turkey, September **2020**.

[20] Vallejos R., Contreras J., Toro C., Ploeg H., Pérez L., **Vivanco J.F.** "Biomechanical Evaluation of low-cost 3D Printed Scaffolds as in vitro Tissue Engineering Models". European Orthopaedic Research Society (EORS) 28th Annual Meeting (virtual conference). Turkey, September **2020**.

[21] Benjumeda I., Millán C., Muñoz A., Lardies M, Ploeg H., **Vivanco J.F.** "Marine Biomaterials for Bone Tissue Regeneration: a Biocompatible evaluation with Stem Cells". European Orthopaedic Research Society (EORS) 28th Annual Meeting (virtual conference). Turkey, September **2020**.

[22] Urrutia F., Vallejos R., Ploeg H., Aiyangar A., **Vivanco J.F.** "Mechanical evaluation of 3D-printed scaffolds: A 3^3 full-factorial analysis of geometrical parameters". International Society of Biomechanics (ISB), Calgary, Canada, August **2019**.

[23] Benjumeda I., Millán C., **Vivanco J.F.**, "Microarquitecture of Calcium Phosphate Bioceramics as a Determinant Parameter for in vitro Osteogenic Differentiation of Human Gingival Mesenchymal Stem Cells". 8th World Congress of Biomechanics (WCB), Dublin, Ireland, July **2018**.

[24] Abarca A., García C., **Vivanco J.F.**, Lagos N., Lardies M., "Mechanical Behavior on Shell Characteristics of the Juvenile Scallops (Argopecten purpuratus) Subject to Climate Change Scenarios". 8th World Congress of Biomechanics (WCB), Dublin, Ireland, July **2018**.

[25] **Vivanco J.F.**, Aiyangar A., Ploeg H., "Bioactivity of a Macro-porous Bioceramic Bone Scaffold Fabricated at Two Sintering Temperatures". 8th World Congress of Biomechanics (WCB), Dublin, Ireland, July **2018**.

[26] Irribarra V., Chen Z., Benjumeda I., Palza H., Millán C., **Vivanco J.F.**, "Analysis of Mesenchymal Stromal Cells in Combination with Bioglass as a Structural and Functional Basis for Bone Tissue Engineering". 1st National Congress of Tissue Engineering and Regenerative Medicine, Santiago, Chile, November, **2017**.

[27] **Vivanco J.F.**, Benjumeda I., Irribarra V., Millán C, "Ca-P Bioceramics as Bioactive Support for Human Gingival Mesenchymal Stem Cell Osteogenic Differentiation in vitro". 2017 Annual Meeting & Exposition of the Society for Biomaterials, Minneapolis, MN, April **2017**.

[28] **Vivanco J.F.**, "Characterization of Multiscale Material Properties of Bioceramic Bone Scaffolds". 7th International Conference on Multiscale Modelling and Methods: Upscaling in Engineering and Medicine, Santiago, Chile, January **2017**.

[29] **Vivanco J.F.**, Ploeg H., "Bioactivity and Biomechanical Characterization of Bioceramic Bone Scaffolds". 14th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE), Tel Aviv, Israel, September **2016**.

[30] Meyer L., **Vivanco J.F.**, Ploeg H., "Multi-scale Mechanical Analysis of Injection Molded Beta Tricalcium Phosphate Bone Scaffolds". 13th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE), Montreal, Canada, September **2015**.

[31] **Vivanco J.F.**, Slane J., Aiyangar A., Ploeg H., "Multiscale Properties of a Macro-Porous Bioceramic Bone Scaffold Fabricated at Two Sintering Temperatures". 7th World Congress of Biomechanics (WCB), Boston, MA, July **2014**.

[32] Slane J**.**, **Vivanco J. F.,** Squire M., Ploeg H., "Silver-Doped Antimicrobial Bone Cement for use in Total Joint Replacement". 7th World Congress of Biomechanics (WCB), Boston, MA, July **2014**.

[33] Collins C., Skon S., Burgers T., **Vivanco J.F.**, Ploeg H. "Fracture Healing in Mice Lacking Pten in Osteoblasts: A Micro-Computed Tomography Image-Based Analysis of Bone Strength". 7th World Congress of Biomechanics (WCB), Boston, MA, July **2014**.

[34] Meyer L., Johnson M., **Vivanco J.F.,** Ploeg H., Cullen D., Smith E. "Mechanical Loading and Exposure to Big Endothlin-1 Increases Bone Formation in Ex Vivo Bovine Trabecular Cores". 7th World Congress of Biomechanics (WCB), Boston, MA, July **2014**.

[35] **Vivanco J.F.**, Slane J., Ploeg H., Crenshaw T. "Regional Differences in the Nanoscale Static and Creep Properties of Porcine Bone Subjected to Different Dietary Conditions". 3rd Global Congress on NanoEngineering for Medicine and Biology (NEMB), San Francisco, CA, February **2014**.

[36] Slane J., **Vivanco J.F.**, Ploeg H., Squire M. "The Dynamic and Static Properties of an Acrylic Bone Cement Modified with Mesoporous Silica Nanoparticles". 5th International Conference on Mechanics of Biomaterials and Tissues, Sitges, Spain, December **2013**.

[37] Cullen D., Alvarez G., Johnson M., **Vivanco J.F.**, Ploeg H., Smith E. "Mechanical Loading and Big Endothelin-1 in Trabecular Bone Cores". American Society of Bone and Mineral Research (ASBMR), Baltimore, MD, October **2013**.

[38] Aiyangar A., **Vivanco J.F.**, Au A., Anderson P., Smith E., Ploeg H. "Dependence of Human Lumbar Vertebral Trabecular Bone Mechanical Anisotropy Ratio on QCT-Based Apparent Density. Proceedings of the American Society of Mechanical Engineering- Summer Bioengineering Conference, Sunriver, OR, June **2013**.

[39] **Vivanco J.F.**, Aiyangar A., Collins C., Ploeg H. "Bioactivity of Bioceramic Bone Scaffolds Fabricated at Two Sintering Temperature". Proceeding of the Innovations in Biomedical Materials, Raleigh, NC, September **2012**.

[40] Meyer L., Johnson M., **Vivanco J.F.**, Ploeg H., Blank R., Smith E. "Exposure to Big Endothlin-1 in Bovine Sternal Cores Mimics Some Aspects of Mechanical Loading". American Society for Bone and Mineral Research (ASBMR), Minneapolis, MN, October **2012**.

[41] **Vivanco J.F.**, Araneda A., Ploeg H. "Effect of the Sintering Temperature on Microstructural Properties of a Bioceramic Bone Scaffold". Proceeding of the Materials Science & Technology Conference (MS&T), Columbus, OH, October **2011**.

[42] **Vivanco J.F.**, Slane J., Ploeg H. "Nano-mechanical properties of bioceramic bone scaffolds fabricated at three sintering temperatures". Proceedings of the American Society of Mechanical Engineering- Summer Bioengineering Conference, Farmington, PA, June **2011**.

[43] **Vivanco J.F.**, García S., Smith, E., Ploeg H. "Dynamic Loading Increases Apparent Elastic Modulus of Ex Vivo Trabecular Bovine Bone". American Society for Bone and Mineral Research (ASBMR), Toronto, Canada, October **2010**.

[44] **Vivanco J.F.**, Smith B., Blake A., Ploeg H., Turner K. "3D Elastomeric Scaffolds- Fabricated by Casting in Micro End Milled Molds". Proceedings of the 5th International Conference on MicroManufacturing (ICOMM/4M), Madison, WI, April **2010**.

[45] **Vivanco J.F.**, Garcia-Rodriguez S., Smith E., Ploeg H. "Material and Mechanical Properties of Tricalcium Phosphate-based (TCP) Scaffolds". Proceedings of the American Society of Mechanical Engineering- Summer Bioengineering Conference, Lake Tahoe, CA, June **2009**.

[46] Fang Z., **Vivanco J.F.**, Rufner A., Levine D., Johnson T. "The Effect of Poly Thickness on Contact Stress in low Stiffness Porous Metal-backed Acetabular Component: Is 4mm minimum thickness poly a gold standard?" Orthopaedic Research Society, 54th annual meeting, San Francisco, CA, **2008**.

[47] **Vivanco J.F.**, Fang Z., Levine D., Ploeg H.L. "Microstructural Mechanical FE Analysis of Compression Molded Porous Tantalum-UHMWPE". 16th Congress of the European Society of Biomechanics (ESB), Lucerne, Switzerland, July **2008.**

Peer reviewed book chapters

[1] Millán C., **Vivanco J.F.**, Benjumeda-Wijnhoven I.M., Bjelica S., Santibáñez J.F. "Mesenchymal Stem Cells and Calcium Phosphate Bioceramics: Implications in Periodontal Bone Regeneration". Chapter from book: *Advances in Experimental Medicine and Biology*. *Springer, New York, NY*. **2018**.

[2] **Vivanco J.F.**, Aiyangar A., Slane J., "Multiscale Biomechanical Characterization of Bioceramic Bone Scaffolds. Chapter from Book: *Experimental Methods in Orthopaedic Biomechanics*. **2017**.

[3] Leiva V., **Vivanco J.F.**, "Fatigue Models". *Wiley StatsRef: Statistics Reference Online*. **2015**.

INVITED SEMINARS, TALKS, PANELS

- "Biomechanical Technological Platform in Chile for the Design and Evaluation of Porous Scaffolds for Bone Tissue Engineering", Keynote speaker at the International Conference on Recent Advancements in Materials Science and Technology (ICRAMST'24)–Coimbatore, Tamil Nadu, India –January 2024.
- "Mechanics of Materials Approach for Research in Bone Tissue Engineering", Keynote speaker at the Introduction to Dental Science and Clinic Seminar (virtual), Dept. of Biomedical Engineering, University of Illinois Chicago. January 2024.
- "Oportunidades de Desarrollo Tecnológico en Base a Biomateriales (la experiencia de B3MAT)" (Spanish), Keynote speaker at the launch of first university entrepreneurship festival in the Valparaiso region, organized by UAI Startup School. July 2023.
- "Biomateriales en Ingeniería de Tejidos Biológicos: una Mirada desde la Biomecánica", (Spanish), Dept. de Ingeniería Química, Universidad de la Frontera, Chile. May 2023.
- "Mechanics of Materials Approach for Research in Bone Tissue Engineering Collaborative Projects", Keynote speaker at the CU Denver's Engineering Seminar (virtual), College of Engineering, Design and Computing, University of Colorado Denver. April 2023.
- "Mecánica de Materiales en Bioingeniería" (Spanish), Keynote speaker at XXII Congreso Nacional de Estudiantes de Ingeniería Civil, Valparaíso, Chile, November 2021.
- "Aplicaciones de la Mecánica de Materiales en Ingeniería de Tejidos Óseos" (Spanish), Seminario Virtual de Doctorado de Ingeniería Mecánica, Dept. de Ingeniería Mecánica, Universidad Técnica Federico Santa María, Chile. June 2021.
- "Valparaíso Tecnológico: Desde la impresión 3D hasta la (Bio)-Ingeniería", (Spanish), Keynote speaker at Museo de Historia Natural de Valparaíso, Chile. November 2018.
- "Análisis Biomecánico de Exoesqueletos Calcáreos: el caso de *Argopecten Purpuratus*", (Spanish), Keynote speaker at XXXVIII Congreso de Ciencias del Mar, Valdivia, Chile. May 2018.
  "Comportamiento Biomecánico de Materiales en Traumatología", (Spanish), Dept. de Ingeniería Mecánica, Universidad de Santiago, Chile. November 2017.
- "Comportamiento Mecánico de Biomateriales Utilizados en Medicina Ortopédica" (Spanish), Dept. de Física, Pontifica Universidad Católica, Chile. March 2017.
- "Aplicaciones en Biomecánica Ortopédica", (Spanish), Dept. de Ortopedia y Traumatología, Pontifica Universidad Católica, Chile. October 2014.
- "Comportamiento Mecánico de Biomateriales en Implantes", (Spanish), Centro de Biotecnología, Universidad Federico Santa María, Chile. October 2014.
- "Mechanical Behavior of Orthopedic Biomaterials", First International Workshop on Statistical Models for Engineering of Advanced Materials, Universidad Adolfo Ibáñez, Chile. October 2014.
- "Mechanical Behavior of Biomaterials: Applications in Bone Biomechanics", Bioengineering Seminar, Dept. of Aerospace and Mechanical Engineering, University of Notre Dame. October 2013.
- "Bone Bioreactor and Loading System", Wisconsin Alumni Research Foundation, UW-Madison. August 2011.
- "Bioceramic Bone Scaffolds", Graduate Seminar Lecture, Dept. of Civil Engineering and Mechanics, UW-Milwaukee. April 2011.

OUTREACH SERVICE

- Organizer: "B3MAT OpenLab Workshop in Bioengineering"; hands-on experience around biomaterials, biochemistry and cell biology. Universidad Adolfo Ibáñez, Chile. October 2021.
- Organizer: Webinar: "Descubriendo la Bioingeniería: Aplicaciones en Regeneración de Tejidos Biológicos". Universidad Adolfo Ibáñez, Chile. October 2020.
- Organizer: Winter School for high school teachers and students "Descubriendo la Bioingeniería". Universidad Adolfo Ibáñez, Chile. July 2019.
- Organizer: Workshop: "Biomaterials Day Workshop", Universidad Adolfo Ibáñez, Chile. November 2015.
- Faculty advisor of the student association: "Engineering Global Health-UAI". Universidad Adolfo Ibáñez, Chile. 2015.
- Organizer: Workshop: "Design of Medical Devices and Manufacturing", Universidad Adolfo Ibáñez, Chile. May 2015.
- Organizer of first international workshop on statistical models for engineering of advanced materials, Universidad Adolfo Ibáñez, Chile. October 2014.
- Host to High School students participating in research projects in my laboratory.
- Host to Visiting International Students and Faculty in my laboratory: Amit Nimunkar, Professor from Univ. Wisconsin-Madison, USA, 2015; José Norambuena, Professor from Univ. del Bío-Bío, 2016; Heidi Lynn Ploeg, Professor from Queen's University, Canada, 2018; Ameet Aiyangar, senior researcher from Empa-Switzerland, 2019; Juan F. Santibáñez, Professor from University of Belgrade, Serbia, 2020, 2022; Erin Huitema MS student from Queen's University, Canada 2023.

- Host to Research Students from Chile in my laboratory: Summer Undergraduate Research Experience and Research Experience for Undergraduates Students. Participants conduct a research project under the direction of faculty mentors and work as members of laboratory research teams investigating problems in engineering and the physical sciences in an academic environment. Felipe Muñoz and Matías Fuentes, civil engineering students from Univ. del Bío-Bío, 2020.
- Organizer: "How do we recognize when a multidisciplinary approach is necessary? An interface colloquium on technology, science, and society", Madison, WI, https://sites.google.com/site/interfacecolloquiumuwmadison/
- Student Mentoring: Trained undergraduate and beginning graduate students from engineering and medical school with laboratory research practices, structural analysis and offered advice for on-going research projects, University of Wisconsin-Madison, WI, 8/2006- 11/ 2011.
- Served as student professional development and as coordinator for part-time faculties at Department of Civil Engineering, Universidad Técnica Federico Santa María, Chile, 12/2002 – 1/2004.

Reviewer Technical Journals:

- Orthopedic Biomechanics
- Acta Biomaterialia
- Plos ONE
- Journal of Biomechanics
- Composite Structures
- Frontiers in Bioengineering
- ACS Biomaterials Science & Engineering
- Marine Biology
- Materials Science and Engineering C: Materials for biological Applications
- Journal Mechanical Behavior of Biomedical Materials
- Scientific Reports
- Journal of Orthopaedic Research

Reviewer of Grant Applications

- CONICYT, Chilean National Science Foundation
- Intramural grants of different Chilean universities and Chilean Government (FONDEF, FONIS, CORFO)

PROFESSIONAL MEMBERSHIPS

- American Society of Mechanical Engineering
- American Society of Biomechanics
- The American Ceramic Society
- American Society of Bone Mineral Research
- Canadian Society for Biomechanics

TRAINING OF HIGHLY QUALIFIED PERSONNEL (HQP) - MENTORING EXPERIENCE (42)

Post-Doctoral Trainees (Director/Sponsor)

[1] 04/2023-04/2025 Sivaraj Durairaj, Ph.D.
Project: "Development of Novel M1M2 Substituted Hydroxyapatitie/PCL/CNF Composite on Ti6Al4V Implant for Orthopedic Application"

[2] 04/2023-04/2025 Santosh Mahadevan, Ph-D.
Project: "Development of Exchange Coupled Magnetodielectric Ferrite Composite: An Efficient Microwave Antenna Substrate"

[3] 07/2021-06/2022 Carolina Angulo, Ph.D.
Project: "3D Printing of Bioactive Scaffolds with Controlled Geometry for Bone Tissue Engineering"

[4] 03/2018-12/2019 Raúl Vallejos, Ph.D.
Project: "Interacción Celular y Biomecánica de Estructuras Porosas Tridimensionales Utilizadas Para Regeneración Ósea"

[5] 10/2015-10/2016 Isabel Benjumeda, Ph.D.
Project: "In Vitro Analysis of the Proliferation and Osteogenic Differentiation of hGMSCs in a CaP Bioceramic"

Doctoral Students (Director)

[1] 03/2022-present José Contreras, PhD in Complex Systems Engineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Investigating the Mechanical and Biological Properties of Seeded 3D-Bioplotted Composite Scaffold in an *in-vitro* Dynamic Bone Culture Model"

[2] 09/2024-present Alejandra Correa, PhD in Mechanical Engineering, QUEEN'S UNIVERSITY, CANADA.
Thesis: "Bioreactor system in Bone Biomechanics" (co-director, director: Heidi Ploeg)

Master's Students (Director)

[1] 08/2023-present Benjamín Rodríguez, M.S. Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Software para el Diagnóstico y Planificación del Tratamiento del Pinzamiento Femoroacetabular usando Aprendizaje Profundo"

[2] 01/2022-present M. Fernanda Álamos, M.S. Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Biocompatibility Analysis of Bioactive Materials".
-*Research stay: EMPA-Switzerland (2022)*

[3] 09/2021-present Roberto Quinteros, M.S Mechanical Engineering, UTFSM.
Thesis: "Estudio Numérico/Experimental de las Propiedades Mecánicas de Modelos Porosos" (co-director, director: Luis Pérez P.)

[4] 03/2024-present Mariajesús Garrido, M.S. Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "PCL scaffolds in a bioractor system".

[5] 03/2024-present Vincenzo Marchese, M.S. Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Mechanical Properties of TPMS Polymers Based Scaffolds"

[6] 01/2024 Alejandra Correa, M.S. Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: " Improvement and Evaluation of a 3D Printable Bioreactor Chamber for *Ex Vivo* Trabecular Bovine Bone Core Testing with Mechanical Stimulation"
-*Research stay: Queen's University, Canada (2022)*

[7] 01/2024 Sebastián Llano, M.S. Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Caracterización y Comparación de Propiedades de Andamios Tridimensionales de Polímeros Termoplásticos con Diferentes Técnicas de Fabricación para la Ingeniería de Tejidos"

[8] 08/2023 Aline Bär, M.S. Civil Engineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Análisis Mecánico Mediante de Elementos Finitos de Andamios Porosos Biocompatibles"
- *Research stay: EMPA-Switzerland (2023)*

[9] 07/2023 Fabiola Vásquez, M.S. Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Aplicación y Evaluación del Post Proceso de Sinterizado y Recubrimiento Sobre Partículas en Base a Sulfato de Calcio Obtenidas mediante Impresión 3D"

[10] 01/2023 Pablo Núñez, M.S. Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Comparison of Tensile, Bending and Compressive Properties of PCL-BG Composites for Bone Scaffold Applications"
-*Research stay: EMPA-Switzerland (2020)*

[11] 01/2023 Miguel Pardo, M.S. Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "PCL-Bioglass Composite Biomaterial Characterization for 3D-Printing of Scaffolds for Bone Tissue Engineering"
-*Research stay: EMPA-Switzerland (2021)*

[12] 07/2022 Ignacia Muñoz, M.S. Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Evaluación de la Adhesión Temprana y la Morfología Celular de Células Madre Mesenquimales (MSC) en Fragmentos de Argopecten Purpuratus Para su Uso Como Biomaterial Sustentable (co-director, director: Carola Millán)
-*Research stay: Queen's University, Canada (2022)*

[13] 04/2022 José Contreras, M.S. Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Diseño y Evaluaciones Mecánicas y Biológicas de Andamios Poliméricos Reforzados con Partículas Bioactivas"
-*Research stay: EMPA-Switzerland (2019; 2021)*

[14] 07/2022 Carlos Toro, M.S. Industrial Engineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Análisis Factorial de Parámetros de Fabricación de Manufactura 3D-FDM en Propiedades Mecánicas de Polímeros"

[15] 11/2018 Tomás Vukasovic, M.S. Mechanical Engineering, PUC – CHILE.
Thesis: "Análisis Experimental y Computacional de la Propiedades Mecánicas de Polímeros Utilizados en Impresión 3D" (co-director, director: Diego Cellentano)

[16] 09/2020 Víctor Irribarra, M.S. Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Interacción de Biovidrios con Células Madres" (director, co-director: Carola Millán)

[17] 01/2019 Zhuo Chen, M.S. Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Desempeño Biomecánico de Biovidrios para el uso en Ingeniería de Tejidos Biológicos"

Professional Degree in Engineering, Undergraduate Students (Director)

[1] 08/2024 Camilo Maturana Rozas, Mechanical Engineering. UTFSM.
Thesis: "Caracterización numérica de las propiedades mecánicas de un material basado en superficies mínimas triplemente periódicas (TPMS) con porosidad funcionalmente dirigida: Aplicación en ingeniería de tejidos óseos" (co-director, director: Luis Pérez P.)

[2] 03/2024 Javier Badillo San Juan, Mechanical Engineering. UTFSM.
Thesis: "Determinación Numérica y Experimental de Módulo de Elasticidad en Materiales Porosos Basados en Superficies Mínimas Triplemente Periódicas" (co-director, director: Luis Pérez P.)

[3] 12/2024 Catalina Araya Vallejos, Mechanical Engineering. UTFSM.
Thesis: "Determinación Experimental de Módulo de Elasticidad en Estructuras TPMS" (co-director, director: Luis Pérez P.)

[4] 03/2021 Carlos Prieto López, Mechanical Engineering. UTFSM.
Thesis: "Estudio Numérico/Experimental de las Propiedades Mecánicas de Modelos Porosos Fabricados con Impresoras 3D del tipo FDM de Alta Resolución a Partir de Imágenes de Microtomografía Computacional de Tejidos Óseos" (co-director, director: Luis Pérez P.)

[5] 07/2020 Juan Pablo Carrasco, Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Desarrollo de una Plataforma de Códigos de Color para Personas con Discapacidad Visual para una posterior aplicación en Conchas de Moluscos Chilenos" (co-director, director: Carola Millán).

[6] 04/2020 Matías Fuentes, Civil Engineering, UNIVERSIDAD DEL BÍO-BÍO.
Thesis: "Microencapsulación de Agentes Rejuvenecedores para la Auto-Reparación de Materiales Asfálticos" (co-director, director: José Norambuena)

[7] 04/2020 Felipe Muñoz, Civil Engineering, UNIVERSIDAD DEL BÍO-BÍO.
Thesis: "Síntesis y Caracterización de Microcápsulas Biopoliméricas para la Auto-Reparación de Materiales Asfálticos" (co-director, director: José Norambuena)

[8] 11/2019 Rafaela Urrutia, Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Investigación Sobre Cómo la Variación de las Propiedades Geométricas en Términos de Porosidad y Tamaño de Poro Afectan el Desempeño Biomecánico de Estructuras Porosas".

[9] 11/2019 Carlos Toro, Industrial Engineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Estudio de la Calidad de Manufacturación de Muestras Fabricadas Mediante Impresión 3D Sometidas a Ensayos Mecánicos".

[10] 11/2019 Juan Pablo Hasche, Mechanical Engineering. UTFSM.
Thesis: "Estudio Numérico de la Influencia del Porcentaje de Relleno Sobre las Propiedades Mecánicas de Piezas de Ti-6al-4v Fabricadas Mediante Manufactura Aditiva Usando la Tecnología de Sinterización Directa por Láser de Metal. Aplicación en Implante Mandibular" (co-director, director: Luis Pérez P.).

[11] 11/2018 Luis Carreño, Mechanical Engineering. UTFSM.
Thesis: "Caracterización Numérica de las Propiedades Mecánicas de las Muestras de Tejido Óseo Impresas por Manufactura Aditiva a Partir de Imágenes de μ-CT" (co-director, director: Luis Pérez).

[12] 01/2017 Nicolás Aránguiz, Valentina Arenas, Ricardo Cavada, Felipe Rodrigo, Industrial Engineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Project: "Sistema de Inteligencia Wearable para sanatorio Marítimo de Viña del Mar".

[13] 01/2017 Thomas Vielma, Civil Engineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Efecto de la Microarquitectura en la Respuesta Mecánica de Estructuras Porosas: Un Análisis Estructural Utilizando Modelos de Prototipo Rápido".
-*Research stay: EMPA-Switzerland (2017)*

[14] 04/2013 Giorgio Blanco, Industrial Engineering, UTFSM.
Thesis: "Diagnóstico de los Bancos de Sangre en Chile para la Incorporación de Identificación por Radio Frecuencia en su Cadena de Suministros" (co-director).

[15] 12/2012 Ricardo Daniel Astudillo, Industrial Engineering, UTFSM.
Thesis: "Evaluación de Tecnología RFID como Ventaja Competitiva en el Sector de Diagnóstico Clínico" (co-director).

[16] 12/2011 Benjamín Valencia, Industrial Engineering, UTFSM.
Thesis: "Identificación De Oportunidades Para Investigación en Bioingeniería, Osteoporosis y Fractura en Chile" (co-director).

[17] 10/2003 Juan Saavedra, Civil Engineering, UTFSM.
Thesis: "Análisis Mecanicista De Pavimentos De Hormigón De Tipo Portuario".

[18] 10/2003 Claudia Casanova, Construction Engineering, UTFSM.
Thesis: "Diseño con Cono de Penetración en vías Secundarias".

Committee Member - Doctoral Students

[1] 09/2023-present María Elena Gamboa Arancibia, Ph.D. in Pharmaceutical Sciences, UNIVERSIDAD DE CHILE.
Thesis: "Desarrollo de un Nanosistema de Entrega Selectiva de Metformina y Mirna 145 a Células de Cáncer de Ovario Epitelial"

[2] 08/2024-present Aloyma Lugo Calas, Ph.D. in Applied Science in Cellular and Molecular Biology, UFRO.
Thesis: "Efecto de la Composición de la Biotinta en las Propiedades Funcionales de Andamios de Hidrogel con Células Madre Mesenquimales Encapsuladas para su Potencial Aplicación en la Regeneración Ósea**".**

[3] 08/2024-present Luis Jiménez Almaguer, Ph.D. in Applied Science in Cellular and Molecular Biology, UFRO.
Thesis: "Diseño y Caracterización de Andamios Obtenidos por Bioimpresión 3D para Ingeniería de Tejido Óseo a partir de Células Madre de Pulpa Dental"**.**

[4] 06/2023-present César Hernández Vielma, Ph.D. in Mechanical Engineering, UTFSM.
Thesis: "Estudio Numérico de la Interacción Bit-Rock Usando el Método de Elementos Discretos".

[5] 10/2022-present Francisco Fernández Gil, Ph.D. in Materials Science, UNIVERSIDAD DE CHILE.
Thesis: "Andamios Piezoeléctricos Impresos en 3D de Policaprolactona con Nanopartículas de Óxido de Zinc y Grafeno para la Osteogénesis de co-cultivos Celulares Mediante Estimulación por Ultrasonido".

[6] 05/2022-present Estefanía Correa Muñoz, Ph.D. in Materials Science, UNIVERSIDAD DE CHILE.
Thesis: "Efecto de la Carga Superficial de Fibras Electrohiladas de Polieterimida Sulfonada sobre la Cristalización de $CaCO_3$ mediante Titulación Potenciométrica".

[7] 10/2023 Daniela Acuña, Ph.D. in Materials Science, UNIVERSIDAD DE CHILE.
Thesis: "Fabricación y Caracterización de Membranas Reabsorbibles Híbridas de Biovidrio, Gelatina y Nanocristales de Celulosa Bacteriana, para Regeneración Ósea Guiada Mediante Electrospinning".

[8] 05/2023 Mauricio Campillo Canto, Ph.D. in Mechanical Engineering, UTFSM.
Thesis: "Estudio Numérico del Comportamiento Mecánico de Espumas Metálicas de una Aleación ($\beta+\gamma$)-TiNbTa con Porosidad Funcionalmente Dirigida para Aplicaciones Biomédicas".

[9] 11/2022 Baixuan Yang, Ph.D in Mechanical and Materials Engineering, QUEEN'S UNIVERSITY, CANADA
Thesis: "Primary Fixation and Anchorage of Dental Implants in Bone Surrogate".

[10] 04/2022 Carlos Loyo, Ph.D in Materials Science, UNIVERSIDAD DE SANTIAGO.
Thesis: "Biomateriales Nanocompuestos de Policaprolactona y Óxido de Grafeno Recubiertos con Colágeno para Aplicaciones de Regeneración de Tejido Óseo".

[11] 12/2021 Matías Pacheco, Ph.D. in Mechanical Engineering, UNIVERSIDAD DE SANTIAGO.
Thesis: "Caracterización del Comportamiento Elastoplástico de Chapas de Cobre".

[12] 10/2021 Francisco Alister, Ph.D. in Mechanical Engineering, PUC – CHILE.
Thesis: "Plastic Anisotropy and Formability Estimation in Zinc Sheets".

[13] 08/2020 Daniel Canales, Ph.D. in Materials Science, UNIVERSIDAD DE SANTIAGO.
Thesis: "Preparación y Caracterización de Biomateriales Basados En Poli (Ácido Láctico) ¨PLA¨ con la Incorporación de Nanopartículas para Aplicaciones en Biomedicina".

[14] 05/2014 Josh Slane, Ph.D. in Materials Science, UNIVERSITY OF WISCONSIN-Madison, USA.
Thesis: "The Use of Micro and Nano Particulate Fillers to Modify the Mechanical and Material Properties of Acrylic Bone Cement".

Committee Member - Master´s Students

[1] 04/2019 Luiggi Pessoa, M.S. Mechanical Engineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: "Experimental Investigation of the Influence of Bulk Properties on the Ignition of Surrogate Porous fuel beds".

[2] 11/2017 Camilo Cisternas, M.S. Mechanical Engineering, UNIVERSIDAD DE SANTIAGO.
Thesis: "Análisis Experimental, Analítico y Numérico del Comportamiento de un Mecanismo Biomimético Plano Bajo Desplazamientos Cíclicos".

[3] 09/2017 Diego González, M.S. Mechanical Engineering, UNIVERSIDAD DE SANTIAGO.
Thesis: "Análisis Experimental y Numérico del Comportamiento Bajo Desplazamientos Cíclicos de un Mecanismo Biomimético Plano".

[4] 04/2017 Matías Pacheco, M.S. Mechanical Engineering, UNIVERSIDAD DE SANTIAGO.
Thesis: "Caracterización del Comportamiento Elastoplástico de Chapas de Cobre".

[5] 05/2016 Gastón González, M.S. Bioengineering, UNIVERSIDAD ADOLFO IBÁÑEZ.
Thesis: “Producción Controlada de Celulosa en la Cepa Sinorhizobium meliloti 1021”.

[6] 05/2014 Jeongki Lee, M.S. Civil Engineering, UNIVERSITY OF WISCONSIN-Madison, USA.
Thesis: “Evaluation Of Diatomaceous Earth Content For Potential Engineering Applications In Natural Soils”.