



Estefano Matías Muñoz Moya

PH.D. BIOMECHANICS STUDENT • EARLY STAGE RESEARCHER • DISC4ALL ITN MARIE SKŁODOWSKA-CURIE ACTIONS

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Presentation

I'm the Early Stage Researcher 14 - Ph.D. candidate in the European Project Disc4All MSCA-2020-ITN-ETN GA: 955735. I have a degree in Engineering Sciences with a mention in Mechanical Engineering (2017) and obtained my Master's degree in Mechanical Engineering (2020) from the University of Santiago de Chile. I have dedicated my previous research to two Chilean projects through experimental tests and numerical simulations. My current research focuses on systematizing multiscale modeling of intervertebral disc regularization during degeneration.

Education

Universitat Pompeu Fabra (UPF)

Barcelona, Spain

◇ DOCTORAL DEGREE | IN PROGRESS

Oct. 2021 - **PRESENT**

- Ph.D. Information and Communication Technologies.

Universidad de Santiago de Chile (USACH)

Santiago, Chile

◇ MASTER DEGREE | AWARDED | GPA: 6.9/7.0 | **HIGHEST DISTINCTION**

2018 - 2020

- M.Sc. Mechanical Engineering | [Diploma Link](#)

◇ BACHELOR DEGREE | AWARDED | GPA: 6.2/7.0

2013 - 2021

- Professional Degree Civil Mechanical Engineering | [Diploma Link](#)
- B.Sc. Mechanical Engineering | [Diploma Link](#)

Experience

Research Work

◇ JOURNAL REVIEWER

- CLINICAL BIOMECHANICS ([JCLB](#)) | [CERTIFICATE LINK](#)

Jul. 2024 - **PRESENT**

◇ UNIVERSITAT POMPEU FABRA ([UPF](#)) | BARCELONA, SPAIN

Oct. 2021 - **PRESENT**

EARLY STAGE RESEARCHER (ESR) | [DISC4ALL](#) | [DISC4ALL MSCA-2020-ITN-ETN GA: 955735](#) | PI: JÉRÔME NOAILLY

- Project: *Training network to advance integrated computational simulations in translational medicine, applied to intervertebral disc degeneration.*
- Numerical computational research on intervertebral discs under disc degeneration.

◇ UNIVERSIDAD SANTO TOMÁS (UST) | CENTRE FOR CLIMATE CHANGE RESEARCH AND INNOVATION ([CiCC](#)) | SANTIAGO, CHILE

Oct. 2018 - Jun. 2021

RESEARCH ASSISTANT | [CARBONATLAB](#) | [PROJECT PIA-ANID ANILLO ACT 172037](#) | PI: NELSON A. LAGOS

- Project: *Interacting structure and function of ecological, mechanical and mineralogical properties of marine calcifiers: Shell carbonates as sources of bio-inspiration (Carbo-Nat-Lab).*
- Experimental and numerical computational research on the shell skeleton structure from the Chilean coast, subject to climate change scenarios.

◇ UNIVERSIDAD DE SANTIAGO DE CHILE (USACH) | LAB. BIOMECÁNICA Y BIOMATERIALES ([BIOMatLAB](#)) | SANTIAGO, CHILE

Oct. 2018 - Jun. 2021

RESEARCH ASSISTANT | [PROJECT FONDECYT 1170608F](#) | PI: CLAUDIO M. GARCÍA-HERRERA & DIEGO J. CELENTANO

- Project: *Biomechanical Behaviour of Arteries from Chronic Hypoxic Animals: Experiments, Modelling, Numerical Simulation and Validation.*
- Biomechanical characterization of arteries to observe adverse effects, such as hypoxia suffered by Chilean mining workers. In collaboration with the veterinary medical center of the University of Chile ([FAVET](#)).

Visiting Researcher

◇ TAMPERE UNIVERSITY ([TAU](#)), DECISION SUPPORT FOR HEALTH ([DSH](#)) | TAMPERE, FINLAND

Jan. 2024 - **PRESENT**

PROJECT: [DISC4ALL](#) | [DISC4ALL MSCA-2020-ITN-ETN GA: 955735](#) | PI: MARK VAN GILS | RECOMMENDATION LETTER: [LINK](#)

- Linking [NFBC](#) data with mechano-transport simulations of Intervertebral Disc (IVD), disc degeneration, and low back pain qualitative levels using the Disease State Fingerprint ([DSF](#)).

◇ OULU UNIVERSITY ([OULU](#)), RESEARCH UNIT OF HEALTH SCIENCES AND TECHNOLOGY ([HST](#)) | OULU, FINLAND

Nov. 2022 - Jan. 2023

PROJECT: [DISC4ALL](#) | [DISC4ALL MSCA-2020-ITN-ETN GA: 955735](#) | PI: SIMO SAARAKKALA

- Clinical and Psychological data extraction from the Northern Finland Birth Cohorts ([NFBC](#)).

Teaching

◇ POMPEU FABRA UNIVERSITY ([UPF](#)), INFORMATION AND COMMUNICATIONS TECHNOLOGIES ([DTIC](#)) | BARCELONA, SPAIN

• PART-TIME TEACHER: *Foundations of Physics* | PRACTICES.

Apr. 2023 - **PRESENT**

◇ UNIVERSIDAD DE SANTIAGO DE CHILE ([USACH](#)), DEPARTAMENTO DE INGENIERÍA MECÁNICA ([DIMEC](#)) | SANTIAGO, CHILE

• PART-TIME TEACHER: *Engineering Drawing* | THEORY.

Apr. 2021 - Aug. 2021

• PART-TIME TEACHER: *Strength of Materials* | LABORATORY.

Apr. 2021 - Aug. 2021

• PART-TIME TEACHER: *Introduction to Mechanical Engineering* | THEORY.

Apr. 2021 - Aug. 2021

• PART-TIME TEACHER: *Computational Mechanical Design* | THEORY.

Oct. 2020 - Mar. 2021

• PART-TIME TEACHER: *Engineering Drawing* | LABORATORY.

Oct. 2020 - Mar. 2021

• TEACHING ASSISTANCE: *Introduction to Mechanical Engineering*.

Mar. 2020 - Sep. 2020

• TEACHING ASSISTANCE: *Strength of Materials*.

Mar. 2019 - Aug. 2019

• TEACHING ASSISTANCE: *Applied Mathematics*.

Aug. 2018 - Aug. 2019

• TEACHING ASSISTANCE: *Thermal Systems (Thermodynamics II)*.

Jul. 2017 - Jan. 2019

Publications | estefano23.github.io/publications.html

UNDER REVIEW | **FRONTIERS: BIOENGINEERING AND BIOTECHNOLOGY** | DOI [10.3389/FBIOE.2024.1384599](#)

First Author | 2024

• Unveiling Interactions Between Intervertebral Disc Morphologies and Mechanical Behavior through Personalized Finite Element Modeling

PUBLISHED | **ORS: JOR SPINE** | DOI [10.1002/JSP2.1294](#)

Co-Author | 2023

• Cartilaginous endplates: A comprehensive review on a neglected structure in intervertebral disc research

PUBLISHED | **FRONTIERS: CELL AND DEVELOPMENTAL BIOLOGY** | DOI [10.3389/FCCELL.2022.924692](#)

Co-Author | 2022

• Immuno-Modulatory Effects of Intervertebral Disc Cells

PUBLISHED | **FRONTIERS: BIOENGINEERING AND BIOTECHNOLOGY** | DOI [10.3389/FBIOE.2021.813537](#)

Second Author | 2022

• Biomechanical Characterization of Scallop Shells Exposed to Ocean Acidification and Warming

PUBLISHED | **NATURE: SCIENTIFIC REPORTS** | DOI [10.1038/S41598-021-04414-1](#)

First Author | 2022

• Evaluation of remodeling and geometry on the biomechanical properties of nacreous bivalve shells

Conferences estefano23.github.io/work.html#conferences

50th International Society for the Study of the Lumbar Spine (ISSLS 2024), Quark Hotel.

Milano, Italy

INTERNATIONAL | SPEAKER PRESENTATION | [CERTIFICATE LINK](#)

May. 2024

• Unveiling the interaction between IVD local morphologies and mechanical behavior through a novel morphing process: A step towards personalized medicine.

31st European Orthopaedic Research Society (EORS 2023), Minho University.

UM, Porto, Portugal

INTERNATIONAL | SPEAKER & POSTER PRESENTATION | [CERTIFICATE LINK](#) | [POSTER LINK](#)

Sep. 2023

• Mining of biomechanical and geometry data of IVD FE simulations.

28° Congress of the European Society of Biomechanics (ESB 2023), Maastricht Congress Center.

UM, Maastricht, The Netherlands

INTERNATIONAL | SPEAKER PRESENTATION | [CERTIFICATE LINK](#)

Jul. 2023

• A cohort of patient-specific and virtual finite element models of intervertebral discs and model validation

18th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering (CMBBE 2023), Arts et Métiers Institute of Technology.

IAM, Paris, France

INTERNATIONAL | SPEAKER PRESENTATION | [CERTIFICATE LINK](#)

May. 2023

• A cohort of patient-specific and virtual finite element models of intervertebral discs

XI Capítulo Español: Sociedad Europea de Biomecánica (ESB-ESP 2022), Universidad de Zaragoza.

UNIZAR, Zaragoza, Spain

SPAIN | SPEAKER PRESENTATION | [CERTIFICATE LINK](#)

Oct. 2022

• GENERACIÓN DE UNA COHORTE DE MODELOS DE ELEMENTOS FINITOS DE DISCOS INTERVERTEBRALES ESPECÍFICO DE PACIENTES, CON EXTENSIÓN A COHORTE VIRTUAL.

VPHi Conference (VPHi 2022), Universidade do Porto.

UPORTO, Porto, Portugal

INTERNATIONAL | POSTER PRESENTATION | [CERTIFICATE LINK](#) | [POSTER LINK](#)

Sep. 2022

• TOWARDS A REPOSITORY OF PATIENT-SPECIFIC INTERVERTEBRAL DISC FINITE ELEMENT MODELS.

27° Congress of the European Society of Biomechanics (ESB 2022), Universidade do Porto.

UPORTO, Porto, Portugal

INTERNATIONAL | SPEAKER PRESENTATION | [CERTIFICATE LINK](#) | [PODIUM CERTIFICATE LINK](#)

Jun. 2022

• TOWARDS A REPOSITORY OF PATIENT-SPECIFIC INTERVERTEBRAL DISC FINITE ELEMENT MODELS.

- 1st Taulí Health symposium - ARTIFICIAL INTELLIGENCE, Investigación e Innovación Parc Taulí.** *I3PT, Catalunya, Spain*
INTERNATIONAL | SPECTATOR | [CERTIFICATE LINK](#) Jun. 2022
• AI for Health and Wellness
- 6th Barcelona VPH Summer School (VPH SC 2022), Universitat Pompeu Fabra.** *UPF, Barcelona, Spain*
INTERNATIONAL | POSTER PRESENTATION | [CERTIFICATE LINK](#) | [POSTER LINK](#) May. 2022
• TOWARDS A REPOSITORY OF PATIENT-SPECIFIC INTERVERTEBRAL DISC FINITE ELEMENT MODELS.
- IX International Conference on Computational Bioengineering (ICCB 2022), ULisboa.** *ULisboa, Lisboa, Portugal*
INTERNATIONAL | SPEAKER PRESENTATION | [CERTIFICATE LINK](#) Apr. 2022
• TOWARDS A REPOSITORY OF PATIENT-SPECIFIC INTERVERTEBRAL DISC FINITE ELEMENT MODELS.
- X Capítulo Español: Sociedad Europea de Biomecánica (ESB-ESP 2021), Universidad de Granada.** *UGR, Granada, Spain*
SPAIN | SPEAKER PRESENTATION | [CERTIFICATE LINK](#) Oct. 2021
• COMPORTAMIENTO BIOMECÁNICO DE LAS CONCHAS DE LOS MEJILLONES: DEGRADACIÓN DURANTE LA REMODELACIÓN DE LAS PROPIEDADES MECÁNICAS Y SISTEMA DE DEFENSA.
- XL Congreso de Ciencias del Mar, Universidad de Magallanes, SCHCM.** *UMAG, Magallanes, Chile, Virtual*
CHILE | SPEAKER PRESENTATION | [CERTIFICATE LINK](#) May. 2021
• COMPORTAMIENTO MECÁNICO SIMÉTRICO DE LA RESISTENCIA DE LAS CONCHAS DEL MEJILLÓN *PERUMYTIUS PURPURATUS*.
- 11° World Biomaterials Congress (WBC 2020), University of Glasgow, IUSBSE.** *Glas, Glasgow, Scotland, Virtual*
INTERNATIONAL | POSTER PRESENTATION | [CERTIFICATE LINK](#) | [POSTER LINK](#) Dec. 2020
• MECHANICAL BEHAVIOR SYMMETRY OF MUSSEL SHELLS AND NUMERICAL METHOD FOR BIOMATERIAL ORTHOTROPY DIRECTIONS.
- 2° Congreso de Estudiantes de Postgrado USACH (USACH 2020), Universidad de Santiago de Chile.** *USACH, Santiago, Chile, Virtual*
CHILE | SPEAKER PRESENTATION | [CERTIFICATE LINK](#) Nov. 2020
• *PERUMYTIUS PURPURATUS*: SIMETRÍA DE VALVAS Y CARACTERIZACIÓN DE DIRECCIÓN ORTÓTropa.
- Congreso Chileno de Biomecánica y Biomateriales (CBIO 2020), Universidad de Santiago de Chile.** *USACH, Santiago, Chile, Virtual*
CHILE | SPEAKER PRESENTATION | ORGANIZER | [CERTIFICATE LINK](#) Oct. 2020
• *PERUMYTIUS PURPURATUS*: SIMETRÍA DE VALVAS Y CARACTERIZACIÓN DE DIRECCIÓN ORTÓTropa.
- Congreso Internacional de Metalurgia y Materiales (CONAMET 2019), Universidad Austral de Chile.** *UACH, Valdivia, Chile*
INTERNATIONAL | SPEAKER PRESENTATION | [CERTIFICATE LINK](#) Nov. 2019
• ANÁLISIS DE LA RESPUESTA BIOMECÁNICA DE *PERUMYTIUS PURPURATUS* ANTE ESCENARIOS DE CAMBIO CLIMÁTICO.
- 1° Congreso de Estudiantes de Postgrado USACH (USACH 2019), Universidad de Santiago de Chile.** *USACH, Santiago, Chile*
CHILE | SPEAKER PRESENTATION | [CERTIFICATE LINK](#) Aug. 2019
• MODELOS CONSTITUTIVOS DE CRECIMIENTO APLICADOS A LA CONCHA DEL *PERUMYTIUS PURPURATUS*.
- 25° Congress of the European Society of Biomechanics (ESB 2019), TU Wien.** *TU Wien, Vienna, Austria*
INTERNATIONAL | 2 SPEAKER PRESENTATIONS | [CERTIFICATE LINK](#) | [PODIUM CERTIFICATE LINK](#) Jul. 2019
• BIOMECHANICAL BEHAVIOUR ON SHELL CHARACTERISTICS (*PERUMYTIUS PURPURATUS*) ALONG THE CHILEAN COAST.
• NUMERICAL ANALYSIS OF THE BIOMECHANICAL RESPONSE OF OYSTER SHELLS SUBJECTED TO CLIMATE CHANGE SCENARIOS.

Courses

- The Human Digital Twin Summer School Barcelona, Universitat Pompeu Fabra (UPF).** *Barcelona, Spain*
TRAINING PROGRAM | TEACHER | [CERTIFICATE LINK](#) Mar. 2024
• HandsOn: Patient-specific intervertebral disc modelling for biological stratification with clinical data.
- 7th Barcelona VPH Summer School (VPH SC 2023), Universitat Pompeu Fabra (UPF).** *Barcelona, Spain*
TRAINING PROGRAM | POSTER | [POSTER LINK](#) May. 2022
• Poster: Towards a repository of patient-specific intervertebral discs finite element models.
- 6th Barcelona VPH Summer School (VPH SC 2022), Universitat Pompeu Fabra (UPF).** *Barcelona, Spain*
TRAINING PROGRAM | TEACHER & POSTER | [CERTIFICATE LINK](#) | [POSTER LINK](#) May. 2022
• HandsOn: Surrogate modeling of IVD simulation under physiological sports loading conditions.
- 5th Barcelona VPH Summer School: Stratification of patients with complex phenotypes** *Universitat Pompeu Fabra, Virtual*
TRAINING PROGRAM | STUDENT | [CERTIFICATE LINK](#) Jun. 2021
• Transversal training of *in silico* medicine. Dictated by BCN MedTech, Virtual Physiological Human Institute (VPHi), and QUAES Foundation.
- Structure, form, and function of calcifying organisms** *CIMARQ UNAB, Valparaíso, Chile*
POSTGRADUATE COURSE | STUDENT | [CERTIFICATE LINK](#) Nov. 2018
• Dictated by the academics Ph. D. Antonio Checa (Universidad de Granada, Spain) and Ph. D. Fabio Labra (Universidad Santo Tomás, Chile).

Memberships

Virtual Physiological Human institute (VPHi)

STUDENT MEMBER | [CERTIFICATE LINK](#)

- Membership UPF

Europe
Sep. 2022 - **PRESENT**

European Society of Biomechanics (ESB)

STUDENT MEMBER | [CERTIFICATE LINK](#)

- Membership ID: 3263

Europe
Jul. 2020 - **PRESENT**

STEM Preeschoolar USACH-DIMEC (Science, Technology, Engineering, and Mathematics)

MEMBER | [CERTIFICATE LINK](#)

- Scientific popularization for preschool children with a gender perspective.

Santiago, Chile
Oct. 2019 - Sep. 2021

Awards

6th Barcelona VPH Summer School (VPH SC 2022), Universitat Pompeu Fabra (UPF).

BEST HANDSON | [CERTIFICATE LINK](#)

- HandsOn: Surrogate modeling of IVD simulation under physiological sports loading conditions.

Barcelona, Spain
May. 2022

European Union to study in Universitat Pompeu Fabra (UPF).

SCHOLARSHIP | [CERTIFICATE LINK](#)

- Full Ph.D. scholarship. EARLY STAGE RESEARCHER DISC4ALL ITN MARIE SKŁODOWSKA-CURIE ACTIONS

Barcelona, Spain
Oct. 2013 - 2021

Government of Chile to study in University of Santiago de Chile (USACH).

SCHOLARSHIP | [CERTIFICATE LINK](#)

- Full Master scholarship. BECA ARANCEL

Santiago, Chile
Oct. 2018 - 2020

Government of Chile to study in University of Santiago de Chile (USACH).

SCHOLARSHIP | [CERTIFICATE LINK](#)

- Full Undergraduate scholarship. BECA BICENTENARIO

Santiago, Chile
Oct. 2013 - 2021

Science Popularization

Science Festival - Festival de la Ciencia (FECI of PAR Explora RM Sur Poniente), Universidad de Chile

EXPERT SCIENTIFIC COLLABORATOR | [CERTIFICATE LINK](#)

- Science experiments for children.

UCHILE, Virtual
Nov. 2020

Science Festival - 10° Feria Científica USACH, Universidad de Santiago de Chile

EXPERT SCIENTIFIC COLLABORATOR | [CERTIFICATE LINK](#)

- Exhibition of biomechanical tests for children.

USACH, Santiago, Chile
Oct. 2019

Exhibition - Mollusca, espiral del cambio - CiiCC, Museo de Historia Natural de Valparaíso (MHNv)

EXPERT SCIENTIFIC COLLABORATOR | [CERTIFICATE LINK](#)

- Exhibition of the consequences of climate change in the oceans.

MHNv, Valparaíso, Chile
Oct. 2019

Exhibition - XII Fiesta de la ciencia y la tecnología (PAR Explora RM Sur Oriente), Universidad de Chile

EXPERT SCIENTIFIC COLLABORATOR | [CERTIFICATE LINK](#)

- Exhibition of the mechanical properties of the mollusk shells subject to climate change scenarios.

PARQUEMET, Santiago, Chile
Oct. 2018

About me

Full name: Estefano Matías Muñoz Moya

BASIC INFORMATION

- Birth: 23th of September of 1994 | Santiago, RM, Republic of Chile
- email: estefano.munoz.moya@gmail.com
- Languages: Native Spanish | Advanced English

PROGRAMMING LANGUAGES AND SOFTWARE USAGE

- Programming languages: : Fortran | Python | Matlab/Octave | C/C++ | HTML |
- Software usage: In-House FEM Softwares | AutoCAD | Solidworks | Ansys | Inventor | Mathcad | Fusion360 | SAM | Latex | Arduino | Ubuntu | EDEM | GiD | InVesalius | Office (Word, PowerPoint, Excel, Project) |

References

Ph. D. Jérôme Noailly | [ResearchGate Link](#), Principal investigator, ESR supervision, and project coordinator of Disc4All - Universitat Pompeu Fabra (UPF).
email: jerome.noailly@upf.edu

Ph. D. Gemma Piella | [ResearchGate Link](#), She lead the research areas of Medical Image Analysis and Machine Learning for Personalised Medicine in BCN Medical Technologies. She is also the coordinator of the Master of Computational Biomedical Engineering - Universitat Pompeu Fabra (UPF).
email: gemma.piella@upf.edu

Ph. D. Mark van Gils | [ResearchGate Link](#) | [Recommendation Letter](#), Principal investigator, Decision Support for Health supervision - Tampere University (TAU).
email: mark.vangils@tuni.fi

Ph. D. Claudio M. García-Herrera | [ResearchGate Link](#), Director of the Mechanical Engineering Department, Associated Professor, and Researcher - University of Santiago de Chile (USACH).
email: claudio.garcia@usach.cl

Ph. D. Nelson A. Lagos | [ResearchGate Link](#), Director of the Centre for Climate Change Research and Innovation (CiiCC), Associated Professor, and Researcher - Santo Tomás University (UST).
email: nlagoss@santotomas.cl

Ph. D. Diego J. Celentano | [ResearchGate Link](#), Full Professor and Researcher of Mechanical and Metallurgical Engineering Department, Pontifical Catholic University of Chile (PUC Chile).
email: dcelentano@ing.puc.cl