

Alejandro Ortiz-Bernardin

Associate Professor

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1. Research Interests

My research interests lie in the area of computational solid mechanics with emphasis on the formulation of numerical methods and their implementation for computational modeling and simulation of engineering solids and structures, and for applications in real-time structural health monitoring. The formulation of these methods is developed based on numerical methods such as the finite element method, polygonal finite element methods, virtual element methods, generalized finite element methods, and meshfree methods.

Recently, I have been involved in the development of computational libraries for the virtual element method (collaborative work with Dr. Alessandro Russo from Università di Milano-Bicocca), cell-based integration techniques for meshfree Galerkin methods using the virtual element framework (collaborative work with Dr. Alessandro Russo from Università di Milano-Bicocca and Dr. Natarajan Sukumar from University of California at Davis) and nodal integration schemes using the virtual element framework (collaborative work with Dr. Edoardo Artioli from Università degli Studi di Modena e Reggio Emilia).

2. Teaching Interests

My primary teaching interests are closely related to my research activities, focusing on theoretical, computational and applied aspects of numerical methods at both undergraduate and graduate levels. I offer courses on these topics on a regular basis. My secondary teaching interests are related to my professional experience in mechanical and structural design. I offer a course on machine elements every semester.

3. Education

Doctor of Philosophy Degree in Civil & Environmental Engineering. Department of Civil & Environmental Engineering at the University of California at Davis, March 2011. Thesis title: "*Maximum-Entropy Meshfree Method for Linear and Nonlinear Elasticity*." Thesis Advisor: Professor Natarajan Sukumar.

Master of Engineering Degree in Civil Engineering. Department of Strength of Materials and Structures in Engineering at Universitat Politècnica de Catalunya, Barcelona, Spain, November 2006. Thesis title: "*The Meshless Finite Element Method in Two-Dimensional Linear Elasticity*." Thesis Advisors: Professors Eugenio Oñate and Sergio Idelsohn.

Bachelor of Science Degree in Mechanical Engineering. Department of Mechanical Engineering at Universidad Técnica Federico Santa María, Valparaíso, Chile, December 2002. Final Project: "*Análisis de Restricción en Probetas $C(T)$ con Metal de Soldadura*." Advisors: Professors Fernando Labbé and Juan Donoso.

4. Academic Experience

Research Professor, Centro NOXIS, Clínica MEDS, Santiago, Chile, 2025 - present.

Associate Professor, Department of Mechanical Engineering, University of Chile, Santiago, Chile, April 2020 - present.

Assistant Professor, Department of Mechanical Engineering, University of Chile, Santiago, Chile, January 2011 - March 2020.

Reader, Department of Civil and Environmental Engineering, University of California, Davis, U.S.A., September 2010 - December 2010.

Graduate Research Assistant, Department of Civil and Environmental Engineering, University of California, Davis, U.S.A., September 2007 - September 2010.

5. Professional Experience

Structural Engineer Consultant, FONROCHE Lighting America Latina S.p.A, Santiago, Chile, 2021 - present.

Structural Engineer Consultant, TAKRAF Chile S.p.A, Santiago, Chile, 2025 - present.

Seismic Reviewer, Metso, Santiago, Chile, 2020 - present.

Seismic Reviewer, MOR Tanks Ltda., Santiago, Chile, 2020 - 2025.

Seismic Reviewer, Tenova-Delkor, Santiago, Chile, 2014 - 2015.

Seismic Reviewer, Delkor Americas, Santiago, Chile, 2012 - 2013.

Seismic Reviewer, Outotec (Chile) S.A., Santiago, Chile, 2011 - 2015.

Specialist Engineer, Comecsa-Rall Conveyor, Santiago, Chile, 2017 - 2021.

General Manager/Owner, Comecsa Ltda., Santiago, Chile, 2006 - present.

Consultant, Minera Centinela S.A., Santiago, Chile, 2016 - present.

Consultant, Kinross Mining Chile Ltda., Santiago, Chile, 2012 - present.

Consultant, Outotec (Chile) S.A., Santiago, Chile, 2011 - 2020.

Consultant, Tenova Delkor, Santiago, Chile, 2007 - present.

Chief Engineer, Delkor South America Ltda., Santiago, Chile, January 2006 - August 2007.

Project and Design Engineer, Delkor South America Ltda., Santiago, Chile, March 2005 - December 2005.

Structural Engineer, Tersainox S.A., Santiago, Chile, December 2003 - March 2005.

6. Teaching Experience

- Department of Mechanical Engineering, University of Chile, Santiago, Chile, January 2011 - present.

Graduate Courses

- **"Advanced Methods in Computational Solid Mechanics"** (ME-7800): Fall 2018, 2020, 2022; Spring 2024
- **"Finite Element Procedures in Applied Mechanics"** (ME-708): Fall 2012, 2014, 2017, 2019, 2021, 2023, 2024, 2025, 2026
- **"Generalized Finite Element Methods"** (ME-705): Fall 2011, 2013, 2015, 2016; Spring 2011

Undergraduate Courses

- **"Mechanics Statics"** (ME-3130): Fall 2024, 2025, 2026; Spring 2023, 2024, 2025

- **“Machine Elements”** (ME-5500): Fall 2016, 2017, 2018, 2019, 2020, 2021; Spring 2015, 2016, 2017, 2018, 2019, 2020, 2021
- **“Design of Mechanical Elements”** (ME-5600): Fall 2012, 2013, 2014, 2015; Spring 2011, 2012, 2013, 2014

7. Research Grants

Development and assessment of a combined nodal integration and virtual element method for small and large deformation solid mechanics simulations, ANID/FONDECYT # 1221325, Principal Investigator, 2022–2025, Amount awarded: 54,860,000 CLP equivalent to 70,000 EUR.

Mathematical modelling of the mechanical behaviour of rock and concrete using implicit constitutive relations and their subclasses, FONDECYT # 1210002, co-Investigator, 2021–2024.

Toward zeolite and zeolite-like osteoinductive materials for bone tissue engineering, FONDECYT # 1211314, co-Investigator, 2021–2025.

Enhancing the robustness of meshfree Galerkin methods for solid mechanics simulations using the virtual element decomposition, CONICYT-FONDECYT # 1181192, Principal Investigator, 2018–2021, Amount awarded: 87,894,000 CLP equivalent to 110,000 EUR.

Improving algorithms for the generation of polygonal and polyhedral meshes, CONICYT-FONDECYT # 1181506, co-Investigator, 2018–2021.

Gestión de inspecciones en puentes de acero basado en monitoreo y pronóstico de daño mediante integración de sensores y procesamiento de imágenes, CONICYT-FONDEF ID17I10018, co-Investigator, 2018–2020.

On the use of implicit constitutive relations to model the behaviour of elastic and inelastic deformations in continua: Applications to the mathematical modelling of rock, CONICYT-FONDECYT # 1160030, co-Investigator, 2016–2020.

Equipo de prototipado rápido para producción de scaffolds mediante diseño asistido por computadora: 3D Bioplotter, CONICYT-FONDEQUIP EQM140012, co-Investigator, 2015–2016.

Adquisición de un sistema de correlación digital de imágenes de alta velocidad para medición de forma, deformación y vibraciones en objetos tridimensionales, CONICYT-FONDEQUIP EQM13026, co-Investigator, 2013–2014.

Study of some new constitutive laws for elastic bodies, CONICYT-FONDECYT # 1120011, co-Investigator, 2012–2016.

Development and assessment of an efficient numerical method for simulation of nearly incompressible large deformations problems in solid mechanics, CONICYT-FONDECYT # 11110389, Principal Investigator, 2011–2014, Amount awarded: 47,147,000 CLP equivalent to 60,000 EUR.

8. Advising and Supervising Activities

Students

Ph.D. Student Mr. Bruno Rebolledo Gutiérrez, (2025-present), Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.

- Ph.D. Student** Mr. Edgardo Olate Sanzana (2022-present), Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- Ph.D. Student** Mr. Rodrigo Silva Valenzuela, (2019-2025) *Desarrollo de un método de integración nodal para problemas en mecánica de sólidos lineal y no lineal basado en la descomposición del elemento virtual*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Carlos Toro Riveros, (2026) *Estudio de cargas en pacientes con luxación de patela sometida a reforzamiento de cirugía patelar*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Renato Loyola Castro, (2025) *Evaluación de integridad de tobera para cohete de 122 mm*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mrs. Nicole Ortiz Reyna, (2025) *Diseño, modelamiento y análisis computacional de un stent autoexpandible de nitinol*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Alonso Aguado Gómez, (2022) *Evaluación biomecánica mediante análisis por elementos finitos de dientes premolares con diferentes accesos endodónticos*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Tomás Hansen Ibáñez, (2022) *Evaluación mecánica mediante análisis por elementos finitos de la remodelación ósea en dientes con pérdida de soporte*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Samuel Madera Ruiz, (2022) *Análisis por elementos finitos de la reconstrucción del ligamento cruzado anterior (L.C.A.)*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- M.Sc. Student** Mr. Sebastián Luza Vega, (2019-2022) *Desarrollo de una plataforma interactiva de mallado y remallado para su uso en un esquema de integración nodal basado en el método del elemento virtual*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- M.Sc. Student** Mr. Bruno Rebolledo Gutiérrez, (2019-2022) *Desarrollo de un método de integración nodal en mallas tetraédricas utilizando la descomposición del elemento virtual*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- M.Sc. Student** Mr. Joaquín Torres Paris, (2020) *Geometric Packing for Rock Accumulation Analysis*, co-Advisor, Department of Computer Science, University of Chile, Santiago, Chile.
- M.Sc. Student** Mr. Edgardo Olate Sanzana, (2017-2019), Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- M.Sc. Student** Mr. Rodrigo Silva Valenzuela, (2018) *Desarrollo de un método de integración nodal para problemas de mecánica de sólidos lineal utilizando la descomposición del elemento virtual*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Antonio Suárez Rojas, (2018) *Diseño funcional de aditamento de herramienta multi-propósito, para cambio de conjuntos eje trasero completo y diferencial trasero, de equipos Caterpillar series 854K y 992K*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- M.Sc. Student** Mrs. Catalina Álvarez Inostroza, (2017) *Virtual element method for linear elasticity problems in modifiable meshes*, co-Advisor, Department of Mechanical Engineering and Department of Computer Science, University of Chile, Santiago, Chile.

- B.Sc. Student** Mr. Philip Köbrich Echeverría, (2017) *Esquema numérico de proyección nodal para la placa de Reissner-Mindlin utilizando métodos sin malla*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Pascual Prado Souza, (2016) *Diseño de una Fatigadora de Cables de Acero a Flexión Sobre Poleas*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Rubén Torres Verdugo, (2016) *Paralelización de Algoritmo Numérico para Resolución de Problemas en Mecánica de Sólidos*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Mario Cerda Toro, (2016) *Implementación Computacional de un Modelo Numérico-Teórico para Determinar Cargas Transientes en una Correa Transportadora*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mrs. Camila Velásquez Salinas, (2015) *Cálculo Numérico de los Modos de Vibración en un Panel Compuesto Tipo Panal de Abeja Mediante Análisis Isogeométrico*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mrs. Daniela Lorca Puebla, (2015) *Análisis de la Respuesta Sísmica de un Estanque Industrial Apoyado Sobre Columnas*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- M.Sc. Student** Mr. Ramón Bugeño, (2015) *Análisis Hidrodinámico en Pilas de Lixiviación*, Advising committee, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- M.Sc. Student** Mr. Patricio Arrué Cornejo, (2014) *Solución de Algunos Problemas de Valor de Frontera Para un Nuevo Tipo de Ecuación Constitutiva Considerando Pequeñas Deformaciones y Comportamiento No Lineal del Sólido*, Advising committee, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- M.Sc. Student** Mr. Sebastián Montero Guarda, (2014) *Solución Numérica de Algunos Problemas de Valor de Frontera Para un Nuevo Tipo de Ecuación Constitutiva Considerando Pequeñas Deformaciones y Comportamiento No Lineal del Sólido*, Advising committee, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- M.Sc. Student** Mr. Richard Wendler Ernst, (2014) *Variations on the Double-Multiple Streamtube Model for Darrieus Straight-Bladed Vertical-Axis Wind Turbines to Improve Predictions of Performance and Flow Expansion*, Advising committee, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mrs. Camila Orellana Sotelo, (2014) *Identificación de Daño en Estructuras Complejas Utilizando una Aproximación Lineal Mediante el Principio de la Máxima Entropía*, co-Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Hernán Nilo Vásquez, (2014) *Distribución Óptima de Sensores para Detección de Fallas en Una Estructura Compleja*, co-Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Sven Harfagar Mandiola, (2014) *Desarrollo de un Programa Computacional para la Determinación de las Reacciones en los Apoyos de un Espesador para la Minería*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Carlos Alvear Buccioni, (2014) *Estudio de la Fatiga Térmica en Zonas de Mezcla Aplicado en Centrales Nucleares*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.

- M.Sc. Student** Mrs. Valentina Del Fierro Aguirre, (2014) *Detección de Daños en Una Placa de Material Compuesto Tipo Panal de Abeja Mediante Métodos de Aprendizaje Supervisado*, Advising committee, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- M.Sc. Student** Mr. Juan Osses Márquez, (2014) *Modelamiento Hidrodinámico de Celdas Solares*, Advising committee, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Pablo Apaoblaza Augsburg, (2014) *Diseño Estructural de una Turbina de Eje Vertical para Aplicaciones Urbanas*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Diego Sepúlveda Ávila, (2014) *Análisis Fluidodinámico de Una Turbina Eólica Darrieus de Eje Vertical para Aplicaciones Urbanas*, co-Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Sebastián Maggi Silva, (2013) *Modelamiento Térmico de un Panel Fotovoltaico con Disipador de calor Operando en el Norte de Chile*, co-Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Juan Facusse Saavedra, (2013) *Análisis Mediante Simulación Fluidodinámica Computacional del Flujo de Relaves de Minería en Desgaste de Cajones Disipadores*, co-Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Sebastián Barrera Morales, (2013) *Análisis de Integridad Estructural de Unión Flange-Tubería para un Mineroducto de Cobre Mediante Método de Elemento Finito*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Rual Sebastián Saldes Arias, (2013) *Determinación de Coeficientes de Amortiguación de Rigidez de un Descanso Hidrodinámico*, co-Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Francisco Abarca González, (2012) *Análisis Computacional del Torque en Función de la Tasa de Giro en la Turbina Tesla de Aire*, co-Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- M.Sc. Student** Mr. Celso Rangel Thomaz Junior, (2012) *Desempeño Aerodinámico de Turbinas Eólicas de Eje Vertical en Función de Temperatura de Superficie de Álabes*, Advising committee, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mr. Rodrigo García Madrid, (2012) *Evaluación por Modelación CFD del Proceso de Flotación en una Celda de Agitación Mecánica y del Efecto de la Granulometría en la Recuperación del Mineral*, co-Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mrs. Francisca Pinet Cabezón, (2012) *Simulación Fluidodinámica Computacional para la Determinación de la Variación de Energía en Tramos Rectos de Tuberías de Transporte de Flujos Bifásicos*, co-Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.
- B.Sc. Student** Mrs. Mónica Zamora Zapata, (2012) *Análisis Fluidodinámico en una Turbina Helicoidal GHT para Generación de Energía Mareo-Motriz*, Advisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.

Research Engineers

- Mr. Felipe Marchant Jara, (2013) *Variationally-Consistent Numerical Integration Schemes for Meshfree Methods*, Supervisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.

Mr. Eduardo Salas Lillo, (2013) *Meshfree Volume-Averaged Nodal Projection Methods for Nearly-Incompressible Elasticity*, Supervisor, Department of Mechanical Engineering, University of Chile, Santiago, Chile.

Visiting Researchers

Dr. Edoardo Artioli, (October 2018) *Nonlinear Virtual Element Methods*, Department of Mechanical Engineering, University of Chile, Santiago, Chile.

Dr.-Ing. Christian J. Cyron, (September 2013) *Second-Order Maximum-Entropy Meshfree Methods*, Department of Mechanical Engineering, University of Chile, Santiago, Chile.

Dr. Jack S. Hale, (October 2012) *Maximum-Entropy Meshfree Method for Nearly-Incompressible Nonlinear Elasticity*, Department of Mechanical Engineering, University of Chile, Santiago, Chile.

9. Professional Activities

Conferences

Co-Chair, XVIII Jornadas de Mecánica Computacional, October 3–4, 2019, Santiago, Chile

Co-Chair, Fourteenth Pan-American Congress of Applied Mechanics, March 24–28, 2014, Santiago, Chile

Journal Reviewer

Computer Methods in Applied Mechanics and Engineering

International Journal for Numerical Methods in Engineering

Computational Mechanics

Engineering Computations

Finite Elements in Analysis and Design

Frontiers of Structural and Civil Engineering

Numerical Algorithms

Results in Applied Mathematics

10. Professional Society Affiliations

Vice President, Chilean Society of Computational Mechanics (2025-2027)

Board of Directors, Chilean Society of Computational Mechanics (2021-present)

Member, American Society of Mechanical Engineers

Member, NAFEMS The International Association for Engineering Modelling, Analysis & Simulation Community

Member, International Association for Computational Mechanics

Vice President, Chilean Society of Computational Mechanics (2018-2020)

11. Services to the University

Department Administration

Computing Resources Coordinator, 2025 - present, Department of Mechanical Engineering, University of Chile.

Vice Head of Department, 2021 - 2022, Department of Mechanical Engineering, University of Chile.

Advising Committees

Member of the Department Academic Evaluation Committee, 2021 - present, Department of Mechanical Engineering, University of Chile.

Member of the Department Advising Committee, 2025 - present, Department of Mechanical Engineering, University of Chile.

Member of the Department Advising Committee, 2020 - 2022, Department of Mechanical Engineering, University of Chile.

Member of the Department Advising Committee, 2014 - 2015, Department of Mechanical Engineering, University of Chile.

Thesis Committees

Member, Ph.D. committee, Mr. Rodrigo Silva Valenzuela, 2025, University of Chile.

Member, M.Sc. committee, Mr. Nicolás Muñoz Guamán, 2025, University of Chile.

Member, M.Sc. committee, Mrs. Magdalena Álvarez Piña, 2025, University of Chile.

Member, M.Sc. committee, Mr. Rafael Inostroza Azócar, 2023, University of Chile.

Member, M.Sc. committee, Mr. Sebastián Luza Vega, 2022, University of Chile.

Member, M.Sc. committee, Mr. Bruno Rebolledo Gutiérrez, 2022, University of Chile.

Member, M.Sc. committee, Mr. Joaquín Torres Paris, 2020, University of Chile.

Member, M.Sc. committee, Mr. Rodrigo Silva Valenzuela, 2018, University of Chile.

Member, M.Sc. committee, Mrs. Catalina Álvarez Inostroza, 2017, University of Chile.

Chair, M.Sc. committee, Mr. Ramón Bugeño, 2015, University of Chile.

Chair, M.Sc. committee, Mr. Patricio Arrué Cornejo, 2014, University of Chile.

Chair, M.Sc. committee, Mr. Sebastián Montero Guarda, 2014, University of Chile.

Chair, M.Sc. committee, Mr. Richard Wendler Ernst, 2014, University of Chile.

Chair, M.Sc. committee, Mrs. Valentina Del Fierro Aguirre, 2014, University of Chile.

Chair, M.Sc. committee, Mr. Juan Osses Márquez, 2014, University of Chile.

Member, M.Sc. committee, Mr. Celso Rangel Thomaz Junior, 2012, University of Chile.

12. Honors and Awards

Reconocimiento a la investigación, innovación y creación artística, University of Chile, 2021.

Reconocimiento a la investigación, innovación y creación artística, University of Chile, 2018.

Reconocimiento a la investigación, innovación y creación artística, University of Chile, 2016.

Finalist, 22nd Annual Robert J. Melosh Medal Competition for the Best Student Paper on Finite Element Analysis, Duke University, Durham, NC, USA, 2010.

Student Travel Award, 10th U.S. National Congress on Computational Mechanics, Columbus, Ohio, USA, 2009.

Graduate Research Assistantship, Department of Civil and Environmental Engineering, University of California, Davis, USA, 2007-2010.

13. Technical Meetings

XVII International Conference on Computational Plasticity. Fundamentals and Applications (COMPLAS 2023), September 5-7, 2023, Barcelona, Spain.

CSF Workshop on Generalized Barycentric Coordinates in Computer Graphics and Computational Mechanics, June 1-4, 2022, Monte Verità, Ascona, Switzerland.

XV International Conference on Computational Plasticity. Fundamentals and Applications (COMPLAS 2019), September 3-5, 2019, Barcelona, Spain.

Sixth Chilean Workshop on Numerical Analysis of Partial Differential Equations (WONAPDE 2019), January 21-25, 2019, Universidad de Concepción, Concepción, Chile.

XVII Jornadas de Mecánica Computacional, 4-5 octubre 2018, Universidad de Magallanes, Punta Arenas, Chile.

POEMS 2017: Workshop on Polytopal Element Methods in Mathematics and Engineering, July 5-7, 2017, Milano, Italy

Encuentro de Elasticidad No Lineal, Homogenización y Fractura, June 23-24, 2015, Pontificia Universidad Católica de Chile, Santiago, Chile.

1st Pan-American Congress on Computational Mechanics, April 27-29, 2015, Buenos Aires, Argentina.

11th World Congress on Computational Mechanics (WCCM XI), July 20-25, 2014, Barcelona, Spain.

12th U.S. National Congress on Computational Mechanics (USNCCM12), July 22-25, 2013, Raleigh, NC, USA.

Theory and Practice of the Generalized/eXtended Finite Element Method, Short Course, 12th U.S. National Congress on Computational Mechanics (USNCCM12), July 21, 2013, Raleigh, NC, USA.

XI Jornadas de Mecánica Computacional, October 4-5, 2012, Valparaíso, Chile.

10th World Congress on Computational Mechanics (WCCM2012), July 8-13, 2012, Sao Paulo, Brazil.

22nd Annual Robert J. Melosh Medal Competition for the Best Student Paper on Finite Element Analysis, April 30, 2010, Duke University, Durham, NC, USA.

10th U.S. National Congress on Computational Mechanics, Symposium on Applications of Meshfree Methods, July 16 - 19, 2009, Columbus, OH, USA.

14. Technical Presentations

- "A Node-Based Uniform Strain Virtual Element Method for Elastoplastic Solids (with E. Artioli),"** XVII International Conference on Computational Plasticity. Fundamentals and Applications (COMPLAS 2023), September 6, 2023, Barcelona, Spain.
- "A node-based uniform strain virtual element method for elastic and inelastic small deformation problems,"** CSF Workshop on Generalized Barycentric Coordinates in Computer Graphics and Computational Mechanics, June 2, 2022, Monte Verità, Ascona, Switzerland.
- "A meshfree nodal integration method for elastic and elastoplastic applications using the virtual element decomposition (with E. Artioli and R. Silva-Valenzuela),"** XV International Conference on Computational Plasticity. Fundamentals and Applications (COMPLAS 2019), September 3, 2019, Barcelona, Spain.
- "The virtual element decomposition: a new paradigm for developing nodal integration schemes for meshfree Galerkin methods (with R. Silva-Valenzuela, N. Sukumar and E. Artioli),"** Sixth Chilean Workshop on Numerical Analysis of Partial Differential Equations (WONAPDE 2019), January 22, 2019, Universidad de Concepción, Concepción, Chile.
- "El método del elemento virtual: teoría y aplicaciones usando la librería VEMLab (con E. Olate-Sanzana y R. Silva-Valenzuela),"** XVII Jornadas de Mecánica Computacional, 5 octubre 2018, Universidad de Magallanes, Punta Arenas, Chile.
- "Consistent and stable meshfree Galerkin methods using the virtual element decomposition,"** (Lightning talk) POEMS 2017: Workshop on Polytopal Element Methods in Mathematics and Engineering, July 6, 2017, Milano, Italy.
- "Robust meshfree methods for solid mechanics simulations,"** Encuentro de Elasticidad No Lineal, Homogenización y Fractura, June 24, 2015, Pontificia Universidad Católica de Chile, Santiago, Chile.
- "Consistent, accurate and stable meshfree Galerkin methods based on the virtual element decomposition (with A. Russo and N. Sukumar),"** 1st Pan-American Congress on Computational Mechanics, Contributed Session on Advanced Numerical Methods, April 29, 2015, Buenos Aires, Argentina.
- "Meshfree volume-averaged nodal projection method for incompressible media problems (with J. S. Hale and C. J. Cyron),"** 11th World Congress on Computational Mechanics, Mini-Symposium on Meshless and Related Methods, July 21, 2014, Barcelona, Spain.
- "Meshfree volume-averaged nodal projection methods for nearly incompressible elasticity,"** 12th U.S. National Congress on Computational Mechanics, Mini-Symposium on Meshfree Particle and Isogeometric Technologies, July 23, 2013, Raleigh, NC, USA.
- "Desarrollo de un método numérico para el análisis de sólidos incompresibles en grandes deformaciones,"** XI Jornadas de Mecánica Computacional, October 4, 2012, Valparaíso, Chile.
- "Maximum-entropy meshfree method for nearly incompressible nonlinear elasticity,"** 10th World Congress on Computational Mechanics, Mini-Symposium on Meshless and Related Methods, July 9, 2012, Sao Paulo, Brazil.
- "Maximum-entropy meshfree method for incompressible media problems (with M. A. Puso and N.**

Sukumar),” 22nd Annual Robert J. Melosh Medal Competition for the Best Student Paper on Finite Element Analysis, April 30, 2010, Duke University, Durham, NC, USA.

“Maximum-entropy meshfree method for compressible and near-incompressible elasticity (with M. A. Puso and N. Sukumar),” 10th U.S. National Congress on Computational Mechanics, Mini-Symposium on Applications of Meshfree Methods, July 18, 2009, Columbus, OH, USA.

15. Publications

Papers in Refereed Journals

1. R. Silva-Valenzuela, A. Ortiz-Bernardin, and E. Artioli (2025). A node-based uniform strain virtual element method for elastoplastic solids. *Computational Mechanics* **76**, 23–44.
2. R. Yañez, R. Silvestre, M. Roby, A. Neira, C. Azar, S. Madera, A. Ortiz-Bernardin, F. P. Carpes, and C. De la Fuente (2024). Finite element graft stress for anteromedial portal, transtibial, and hybrid transtibial femoral drillings under anterior translation and medial rotation: an exploratory study. *Scientific Reports* **14**, 11922.
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