



WELCOME to the MECSOL 2024

The 9th International Symposium on Solid Mechanics - MECSOL is a biennial conference promoted by the Brazilian Society of Mechanical Sciences and Engineering – ABCM, and organized by its Committee of Solid Mechanics. The edition is being held in Florianópolis, Santa Catarina, Brazil, from October 21 to 23, 2024.

The goal of MECSOL 2024 is to be a platform to present and discuss the most recent problems and solutions in the industry and academy in solid mechanics. In this international platform, we are welcoming scientists, students and professionals working in the vanguard of the most challenging problems in these areas. Participants can take advantage of the productive discussion and collaboration opportunities in application, experimental, numerical and theoretical themes.

The topics of MECSOL 2024 include: Fatigue and Failure Analyses, Composite Materials and Structures, Elasticity, Plasticity, Damage and Fracture Mechanics, Viscoelasticity and Viscoplasticity, Impact Engineering, Structural Reliability Methods and Reliability-based Design Optimization, Optimization of Materials, Fluids and Structures, numerical methods, Nonlinear Analyses, High-performance Computing applied to Solid Mechanics and AI- and Neural Network -supported applications.

This edition of MECSOL involves cooperation between the three following Committees of ABCM: Solid Mechanics, Smart Materials and Structures, and Fracture Mechanics, Fatigue and Structural Integrity. MECSOL 2024 will be a great opportunity for researchers from these communities to share their findings.

ORGANIZING COMMITTEE

Paulo de Tarso R Mendonça (Chair), EMC/UFSC

Eduardo Alberto Fancello (co-Chair)

Carlos Rodrigo de Melo Roesler (Editor) EMC/UFSC

SCIENTIFIC COMMITTEE

| | | |
|--|-------------------------------------|-----------------------------------|
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| Pedro P. Camanho FEUP-Porto, Portugal | Eduardo Chaves EMBRAER | Mariano Arbelo ITA |

PROGRAM OVERVIEW

| time | October 21st | | | October 22nd | | | October 23rd | | | time |
|-------|--------------------------------|-------------------|-----------------|------------------------------------|-------------------|--------------------|---------------------------------------|-------------------------|------------------------------|-------|
| 7:30 | Registration | | | Registration | | | Registration | | | 7:30 |
| 8:00 | Opening Ceremony | | | | | | | | | 8:00 |
| 8:30 | | | | | | | | | | 8:30 |
| 9:00 | Plenary 1 Gerhard Holzapfel | | | Plenary 3 André T. Beck | | | Plenary 5 Reinaldo Rodríguez-Ramos | | | 9:00 |
| 9:50 | Coffee break | | | Coffee break / Posters – section 1 | | | Coffee break | | | 9:50 |
| | S1 Elast. 1 | S2 Stat/Dyn.1 | S3 Fatigue 1 | S7 Elast. 3 | S8 Optim. 1 | S9 Comp. 1 | S13 Const Visc/Const 2 | S14 Num.Met. 2 | S15 Wave/Dyn.2 | |
| 10:20 | 0212 | 0010 | 0094 | 0158 | 0015 | 0069 | 0198 | 0011 | 0053 | 10:20 |
| 10:40 | 0022 | 0031 | 0109 | 0181 | 0017 | 0142 | 0052 | 0037 | 0084 | 10:40 |
| 11:00 | 0061 | 0036 | 0123 | 0183 | 0025 | 0153 | 0099 | 0049 | 0215 | 11:00 |
| 11:20 | 0093 | 0077 | 0172 | 0204 | 0032 | 0166 | 0177 | 0063 | 0233 | 11:20 |
| 11:40 | 0103 | 0088 | 0205 | 0151 | 0035 | 0175 | 0246 | 0076 | 0071 | 11:40 |
| 12:00 | Lunch | | | Lunch | | | Lunch | | | 12:00 |
| 13:40 | Plenary 2 Marcel Bos | | | Plenary 4 Alfredo E. Huespe | | | S16 & S19 Comp. 2&3 | S17 & S20 Optim. 2&3 | S18 & S21 Reliab/Fail.1&2 | |
| | S4 Elast. 2 | S5 Stat/Dyn. 2 | S6 Impact 1 | S10 Visc/Const 1 | S11 Num.Met. 1 | S12 Stat/Dyn. 3 | 0196 | 0073 | 0007 | 13:30 |
| 14:30 | 0111 | 0112 | 0019 | 0026 | 0107 | 0134 | 0199 | 0074 | 0008 | 13:50 |
| 14:50 | 0113 | 0117 | 0057 | 0101 | 0096 | 0178 | 0200 | 0081 | 0045 | 14:10 |
| 15:10 | 0121 | 0119 | 0191 | 0170 | 0197 | 0207 | 0239 | 0091 | 0080 | 14:30 |
| 15:30 | 0140 | 0120 | 0244 | 0152 | 0220 | 0221 | 0240 | 0135 | 0083 | 14:50 |
| 15:50 | 0156 | 0132 | 0067 | 0180 | 0067 | 0242 | Coffee break | | | 15:10 |
| 16:10 | Coffee break | | | Coffee break | | | 0243 | 0150 | 0171 | 15:30 |
| | Round Table | | | ABCM Meeting 16:40 | | | 0206 | 0098 | 0217 | 15:50 |
| 16:30 | | | | | | | Poster Section 2 | | | 0028 |
| | | | | | | | 0018 | 0218 | 0115 | 16:30 |
| | | | | | | | Closing Ceremony | | | 16:50 |

DETAILED PROGRAM

MONDAY MORNING

9:00 – 9:50 KEYNOTE 1: **Gerhard Holzapfel** - *Graz University of Technology (TUG)* . (Room I, Chair: Eduardo A Fancello)

Topic: Modeling fiber-reinforced biosolids with application to artery walls in health and disease

Section S1 – Room 1 – (Elast.1) (Chair: Prof. Marcelo Savi)

Elasticity, Plasticity, Damage and Fracture Mechanics: Models, Experiments and Applications

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|--------------|--|-----------------------|
| 10:20 (0212) | Limit states for materials with density variation | Jose Luis Silveira |
| 10:40 (0022) | Plane stress adaptation of a non-associative elastoplastic model considering volume change in the plastic phase and finite element implementation. | Tiago Morkis Siqueira |
| 11:00 (0061) | Seismic fragility analysis of asymmetric reinforced concrete structures using the lumped damage model. | Rodrigo Carvalho |
| 11:20 (0093) | Numerical modeling of the mechanical strength of 3D-printed sand molds. | Eduardo Gabriel Jung |
| 11:40 (0103) | On a constrained minimization theory to prevent material overlapping in nonlinear elasticity. | Adair Aguiar |

Section S2 – Room 2 – (Static. /Dynam. 1) (Chair: Prof. Arcanjo Lenzi / Dr. Olavo M. Silva)

Structural Statics and Dynamics

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|--------------|--|----------------------------|
| 10:20 (0010) | Heaviside Series: a new semi-analytical method for efficiently solving systems of linear second order ordinary differential equations | Matheus Janczkowski Fogaça |
| 10:40 (0031) | Design and structural analysis of a radially split casing for a test centrifugal compressor operating with supercritical CO ₂ | Diego Zilli Lima |
| 11:00 (0036) | Dynamic simulations and vibration measurements of the gantry rotor of a photon counting computed tomography | Alexandre Schalch Mendes |
| 11:20 (0077) | On the replacement of steel by nitinol as sealing gaskets for high pressure pipes | Victor Gomes Bittencourt |
| 11:40 (0088) | Mechanical energy multi-harvesting: on the performance enhancement of mechanical energy harvesters | Luã Guedes Costa |

Section S3 – Room 3 – (Fatigue 1) (Chair: Prof. Fabio Comes de Castro)

Fatigue and Failure Analyses

| | | |
|--------------|---|-------------------------|
| 10:20 (0094) | Analysis of extrapolation methods for calculating hot spot stresses in welded joints. | Vinicius de Faria |
| 10:40 (0109) | Residual stress influence on the fatigue life of yielded mechanical parts | Paulo Pedro Kenedi |
| 11:00 (0123) | A comparative study of fatigue life estimation procedures for welded tubular joints across international codes | Henrick Moura Emerick |
| 11:20 (0172) | Procedure for estimating fatigue life induced by vibration in small diameter branches from measured vibration spectra | Jonas Bernardi |
| 11:40 (0205) | Application of a Degradation Tensor Phase-field Model to Reinforced Concrete Beams | Marco Lucio Bittencourt |

MONDAY AFTERNOON

13:40 – 14:30 KEYNOTE 2: **Marcel Bos** - Royal Netherlands Aerospace Centre. (Room I, Chair: Carlos Chaves)

Topic: Development of a physics-based variable amplitude fatigue crack growth model that eliminates the need for rainflow counting and which, therefore, is highly suitable for application in digital twins of high-value platforms such as aircraft and ships

Section S4 – Room 1 – (Elast. 2) (Chair: Prof. Miguel Vaz)

Elasticity, Plasticity, Damage and Fracture Mechanics: Models, Experiments and Applications

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|--------------|--|-------------------------------|
| 14:30 (0111) | Analysis of lateral resistance of buried pipes by limit analysis considering dead-loads | Fabio da Costa Figueiredo |
| 14:50 (0113) | Verification of a material model and estimation of the friction coefficient on the contouring of Ti rods | Arthur Sanchez de Almeida |
| 15:10 (0121) | Diminishing residual stresses by applying a proper curvature sequence | Paulo Pedro Kenedi |
| 15:30 (0140) | Use of phenomenological models to determine sensitivity to friction | Eduardo Rech |
| 15:50 (0156) | A physically-based predictive model for hydrogen-assisted cracking: an integrated approach with FEniCS | Arthur Prates Santos Baptista |

Section S5 – Room 2 – (Static. /Dynam. 2) (Chair: Prof. Rogério Marczak)

Structural Statics and Dynamics

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|--------------|---|-------------------------|
| 14:30 (0112) | A Rate-Dependent Description of Martensitic Phase Transformation of Shape Memory Alloys | Marcelo Savi |
| 14:50 (0117) | Transient response of bar structures interacting with layered soil profiles | Lucas Agatti Pacheco |
| 15:10 (0119) | Numerical models of deepwater steel catenary riser and steel lazy wave riser | Igor Fortuna |
| 15:30 (0120) | Dynamics of a rotor-frame-soil system: transient response by iterative coupling | Amauri Coelho Ferraz |
| 15:50 (0132) | Numerical modeling of a cable-stayed structure - Comparison of approaches for structural assessment | Danilo de Santana Nunes |

Section S6 – Room 3 – (Impact 1) (Chair: Marcilio Alves)

Impact Engineering

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|--------------|---|------------------------------|
| 14:30 (0019) | Analysis of a Frontal Collision of a Light Rail Vehicle - LRV against a Deformable Obstacle in accordance with Scenario 3 of DIN EN15227 Standard | Bruno Gabriel Menino |
| 14:50 (0057) | A proposal to improve the safety of small urban vehicles. | Márcio Schneider de Castro |
| 15:10 (0191) | Response of a virtual catamaran model subjected to underwater explosion | César Augusto Bernardi Werle |
| 15:30 (0244) | Low-velocity Impact on CFRP/Nomex Sandwich Panels | Pouria Bahrami Ataabadi |
| 15:50 (0067) | Multiscale modeling of solid media featuring random distribution of voids | Pablo Blanco |

MONDAY EVENING

16:30 – 18:00 **ROUNDTABLE** – Room 1

Theme: Teaching Solid Mechanics in Graduate Courses: Core Concepts vs. Real-world Applications

Moderator: Marcílio Alves

Context: It is observed that in most undergraduate engineering programs, the curriculum structure consists of two well-defined groups: one focused on fundamental knowledge, such as mathematics, physics, calculus, statics, solid mechanics, among others, and the other on applied content and activities.

Traditionally, fundamental knowledge is introduced through initial courses so that these concepts can later be applied to real-world problems. However, in recent years, partly due to the increase in foundational knowledge, educational institutions have reversed this logic, promoting structures in which students are challenged with real, everyday problems, and, from these, they seek the necessary fundamentals to solve them.

Questions to the Panelists: Panelists are requested to take 5 to 6 minutes (total) to discuss the following topics:

1. What is the structure of education in the area of Solid Mechanics used in the undergraduate program at the institution (or the country) where you work? (Information about courses, prerequisites, the order of presenting fundamental and applied content, internships in companies, laboratory research activities, etc., is welcome. Slides may be used to support the presentation)
2. What is your personal view/experience regarding these two approaches?

Discussion Dynamics: All panelists will make a brief presentation on the above topics, using 5-6 minutes each. After this stage, the floor will be open for questions and debates between the panel members and the audience. The estimated total time for the activity is 1 hour and 30 minutes.

18:15 **Cocktail Reception** – Hall of the Convention Center UFSC

TUESDAY MORNING

9:00 – 9:50 **KEYNOTE 3: André Beck** - São Carlos School of Engineering - USP. (Room 1, Chair: Paulo de Tarso R Mendonça

Topic: Optimal redundancy of structural systems under low probability high consequence events

9:50 – 10:20 **POSTER SECTION 1** (Hall of the Convention Center UFSC)

| | | |
|------|---|----------------------------|
| 0044 | An analytical solution for the first passage problem as a function of the process irregularity factor | Edison da Rosa |
| 0051 | Thermostructural Analysis of a Steel Truss Subjected to Fire | Ana Claudia dal Prá Vasata |
| 0055 | Bidirectional evolutionary stress-based topology optimization considering static failure theories | joão gonçalves lima neto |
| 0066 | Improving Mechanical Properties of Auxetic Materials through Modified Re-entrant Cellular Structures: Experimental and Numerical Analysis | Almir Silva Neto |
| 0081 | Topology multimaterial optimization in thermal problem with alternative phase algorithm and heaviside threshold function filter | Herbert Gomes |
| 0100 | A prototype numerical model to detect damage in frame structures using the finite element method and artificial neural networks | Halyson da Costa Silva |

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|------|---|-------------------------------|
| 0102 | Numerical implementation of a phase-field model applied to stress corrosion cracking with open-source tools | Paula Souza |
| 0124 | Assessing Fatigue Life Estimates: A Comparative Study of Spectral Frequency Domain Versus Rainflow in the time domain | Fabrina Maria Soares Tiburcio |
| 0129 | Prediction of structural responses to earthquake events using machine learning techniques | Isabelly Oliveira Nalesso |
| 0167 | Analysis by Newmark's Numerical Method with Experimental Comparison of Vehicle Dynamics | Tarik Aziz Saded Din de Souza |
| 0182 | Effect of phase distribution of a random signal on fatigue damage | Edison da Rosa |
| 0184 | Evaluate the influence of wind on the structural stability of the metal roofing of a building in the city of Jequié. | Barbara guimarães |
| 0202 | The Quasi Plane Strain state of stress. Definition and consequences. | Jonas Bernardi |
| 0205 | Application of a Degradation Tensor Phase-field Model to Reinforced Concrete Beams | Marco Bittencourt |
| 0229 | Analytical and numerical study of composite material with circular holes | Antonio Faria Neto |
| 0245 | Finite element analysis of the sound absorption coefficient of flexible origami-based acoustic panels with constant complex impedance | Jose Fernando Portilla Rosero |

Section S7 – Room 1 – (Elast.3) (Chair: Prof. Miguel Vaz)

Elasticity, Plasticity, Damage and Fracture Mechanics: Models, Experiments and Applications

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|--------------|--|----------------------------------|
| 10:20 (0158) | Crack growth analysis in a cylindrical tubular geometry containing mixtures of natural gas and H ₂ using the phase-field method | Luis Felipe Souza Braga Carreira |
| 10:40 (0181) | Elastic effects on metal hydride phase transition kinetics: a continuum theory | Natanaele Soares Medeiros |
| 11:00 (0183) | Analysis of the influence of rolling direction on fracture toughness of the steel grade ASTM A285C applied in a kraft pulp process continuous digester | Alexandre Nakayama |
| 11:20 (0204) | Fluid flow through pipes filled with polymer gels: The role of elasticity | Antônio da Cruz |
| 11:40 (0151) | Analysis of stress concentration in pseudoelastic plates using digital image correlation (DIC) and finite element method. | Bruno Felipe Silva |

Section S8 – Room 2 – (Optimiz. 1) (Chair: Prof. Helio Emmendoerfer Jr)

Optimization of Materials, Fluids and Structures

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|--------------|--|--------------------------------------|
| 10:20 (0015) | Topology optimization of two-dimensional fiber-reinforced structures considering geometric nonlinearity | Gabriel Queiroz |
| 10:40 (0017) | Parametric and shape optimization of plane truss structures by heuristic algorithms and the positional FEM | Gabriel Queiroz |
| 11:00 (0025) | Integrating Penalty Methods with Dung Beetle Optimizer for Structural Optimization | Paulo de Souza Silva |
| 11:20 (0032) | Noise Handling in Kriging-Based Optimization Algorithms Applied to Sequential Decision Problems in Infrastructure Planning | Cibelle Dias de Carvalho Dantas Maia |
| 11:40 (0035) | Minimization of Structural Dynamic Compliance in 3D Multicomponent Systems: A Topological Optimization Approach | Rafael Ferro |

Section S9 – Room 3 – (Compos. 1) (Chair: Prof. Rogério Marczak)

Composite Materials and Structures

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|--------------|---|-------------------------------|
| 10:20 (0069) | Analysis of flamability and mechanical properties of polyester tiles reinforced with fiberglass additive with alumine trihydrate | Diego Alves de Miranda |
| 10:40 (0142) | Analysis of FGM plates in cylindrical bending using simple semi-analytical solutions | Paulo de Tarso R Mendonça |
| 11:00 (0153) | On the influence of transverse normal and shear stresses on fatigue life predictions for laminated composites | Jorge Alberto Rodriguez Duran |
| 11:20 (0166) | Computational analysis of variable-angle tow filament-wound composite cylinders: Macromechanical modeling considering winding pattern | Volnei Tita |
| 11:40 (0175) | Reinforcing metal structures with carbon fiber/epoxy: economic viability vs. load capacity gain | Bárbara Minosso |

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TUESDAY AFTERNOON

13:40 – 14:30 KEYNOTE 4: **Alfredo Edmundo Huespe** CIMEC (CONICET-Univ.Nac.Litoral) Argentina

(Room 1, Chair: Lavinia M.S.A. Borges, UFRJ)

Topic: Spinodal decomposition in mechanical metamaterials and systems with coupled chemo-Mechanical interactions

Section S10 – Room 1 – (Visco. / constit. 1) (Chair: Prof. Marco L.Bitencourt)

Viscoelasticity and Viscoplasticity: Models, Experiments and Applications / Constitutive models

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|--------------|---|----------------------------|
| 14:30 (0026) | About RVE size objectivity of multiscale analysis of porous media. | Javier Mroginski |
| 14:50 (0101) | Preisach model to describe the hysteretic temperature-dependent behavior of shape memory alloys. | Sergio Oliveira |
| 15:10 (0170) | Second-order computational homogenization scheme for large deformation poromechanics | José Luís Medeiros Thiesen |
| 15:30 (0152) | Predictive modeling of heterogeneous materials using homogenization and morphology-based methods. | Lívia Nogueira |
| 15:50 (0180) | Analyzing flexural strength in fiber-reinforced laminated composite structures with progressive failure assessment. | Ricardo de Medeiros |

Section S11– Room 2 – (Num.Met. 1) (Chair: Prof. Eduardo Lenz Cardoso)

Numerical Methods: FEM, XFEM, GFEM, BEM and other methods

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|--------------|---|--------------------------------|
| 14:30 (0107) | Fixed grid structure for Retaining "Matacos" blocks in Iron Ore Primary Crushing Installations Using MED and MEF: Case Study in the Carajás Mineral | José Cléber Rodrigues da Silva |
| 14:50 (0096) | Investigation of PSO strategies applied to aeroelastic optimization of composite wings with variable stiffness laminates | Carlos Eduardo de Souza |
| 15:10 (0197) | Comparison Between Numerical, Analytical and Experimental Methods in Bolts and Nuts Threads Stress Analysis | Juan Carlos Romero Albino |
| 15:30 (0220) | An implementation of a finite difference scheme for heat transfer analyses in parametrized I-shaped beams' cross-sections | Luana Crozatti Rocha |
| 15:50 (0067) | Multiscale modeling of solid media featuring random distribution of voids | Pablo Blanco |

Section S12 – Room 3 – (Static. /Dynam. 3) (Chair: Prof. Humberto Coda)

Structural Statics and Dynamics

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|--------------|---|----------------------------------|
| 14:30 (0134) | Numerical analysis of multi-cable mooring system coupled with a floating structure | Gabriel Garden |
| 14:50 (0178) | Experimental results on the damping ratio in sample of a real umbilical | Luiz Guilherme de Oliveira Appel |
| 15:10 (0207) | Nonlinear dynamics of spatial structures – Actuated mechanisms and origami | Humberto Coda |
| 15:30 (0221) | Numerical Comparison of Kinetic Energy Harvesting between Simple and Double Pendula under Parametric Excitation | Alberto Paiva |
| 15:50 (0242) | The Effect of Poisson’s ratio and soil damping on the dynamic response of sandwich foundations using a coupled IBEM-FEM Model | Josue Labaki |

TUESDAY EVENING

16:10 – 17:10 **POSTER SECTION 2** (Hall of the Convention Center UFSC)

See the list of manuscripts of Section 1.

16:30 – 18:00 ABCM MEETING – Room 1

Host: Paulo de Tarso R Mendonça

This is a regular meeting of the Brazilian Society of Mechanical Sciences and Engineering (ABCM), hosted by its Committee of Solid Mechanics. The committee will then update attendees on its activities and work through other items on the agenda, including announcement of the host for MECSOL 2026.

Everyone is welcome!

19:00 **CONFERENCE BANQUET**

This is the main social event of the conference. **Transportation** will be provided for all attendees, leaving from the Conference Center, at UFSC, at 18:30 hours. Please make sure to be at the Conference Center before this time.

The **venue** for the Conference Banquet is: Majestic Palace Hotel, av. Rubens de Arruda Ramos, 2746 (known as avenida Beira Mar Norte).

Attendance for the registered conference participants is granted with the payment of a symbolic fee, detailed as follows:

- Categories: Professional and Professional – ABCM Member R\$ 95,00
- Category: Students R\$ 45,00

Payment is made by bank transfer PIX. The participant will receive by email a Google Forms link, where he/she will enter the data and the transfer record.

The **menu** we have selected is the following.

Cocktail table

- Noble Cheese and Cold Meat Table
- Cold cuts: Salami, ham and turkey breast.
- Noble cheeses: Gouda, Provolone, Parmesan, Brie, Gorgonzola and Colonial.
- Bread and Toast Table
- Dried Tomato and Shrimp P

Buffet

- Mustard and Pesto Sauce
- Green Leaves with Walnuts and Gorgonzola with Red Fruit Coulis
- Caprese Salad with Basil Leaves
- Japanese Cucumber Salad with Fruit & Kani Kama
- Waldorf Salad

Main course

- Entrecote in Green Pepper Sauce & Dijon Mustard
- Sea Bream Fillet with Mango Vinaigrette and Plantain Puree
- Cassava “Escondidinho” with Dried Meat
- Rice with Cashew Nuts
- Shrimp Risotto
- Gnocchi with Mushroom Sauce

Desserts

- Coconut Manjar with Plum Syrup
- Passion Fruit Tart
- Chocolate Mousse Tart
- Laminated Fruit

Soft drinks and beer

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WEDNESDAY MORNING

9:00 – 9:50 **KEYNOTE 3: Reinaldo Rodriguez Ramos** – Facultad de Matematica y Computación,
 Universidad de La Habana, Cuba & UFF. Room 1, Chair: Volnei Tita)
 Topic: Prediction of properties in fiber-reinforced composites using multiscale homogenization method

Section S13 – Room 1 – (Visco. / constit. 2) (Chair: Jakson Manfredini)

Viscoelasticity and Viscoplasticity: Models, Experiments and Applications / Constitutive models

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|--------------|---|--------------------|
| 10:20 (0198) | An Eshelbian micromechanics approach to non-saturated porous media | Javier Mroginski |
| 10:40 (0052) | Study to characterize PA6 through stress relaxation testing varying temperature and water absorption | Jakson Vassoler |
| 11:00 (0099) | Mechanical characterization of pmma acrylic bone cements with a nonlinear viscoelastic model | Mário Vargas Ceron |
| 11:20 (0177) | Viscoelastoplastic approaches to model nonlinear polymeric materials | Andre Kuhl |
| 11:40 (0246) | Experimental and numerical study to better understand the deformation behavior and contact mechanisms of Gecko-inspired adhesive grippers | Eric Euchler |

Section S14 – Room 2 – (Numer. Meth. 2) (Chair: Prof Pablo Blanco)

Numerical Methods: FEM, XFEM, GFEM, BEM and other methods

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|--------------|---|------------------------------|
| 10:20 (0011) | Modal analysis of periodic truss structures using the extended multiscale | Debora Cristina Brandt |
| 10:40 (0037) | Finite element modeling of the friction stir welding process | Gabriel Aguirre |
| 11:00 (0049) | Numerical constitutive responses of geomaterials sample using discrete elements | Luiz Sanches |
| 11:20 (0063) | FEM-based inverse analysis for bushings static stiffness correlation | Luiz Felipe S.Simioni |
| 11:40 (0076) | Efficient frequency response analysis of Mindlin plates using the spectral element method | Jose Maria Campos dos Santos |

Section S15 – Room 3 – (Wave /Dynam. 2) (Chair: Prof. Josue Labaki)

Wave Propagation / Structural Statics and Dynamics

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|--------------|--|---------------------------------------|
| 10:20 (0053) | Building upon Rayleigh's research on the propagation of waves on a string endowed with periodically attached masses | Carolyne Valentin |
| 10:40 (0084) | Topological interface states in interconnected piezoelectric metamaterials | Luis Alfredo Pérez Martínez |
| 11:00 (0215) | Acoustic and electromagnetic imaging of hidden structures from multi-static data | Wagner B Muniz |
| 11:20 (0233) | Band structures and forced response analysis of phononic crystals utilizing quasi-sierpinski fractals with geometric defects | Victor Gustavo Ramos Costa dos Santos |
| 11:40 (0071) | Evaluation of a control system on the dynamic behavior of off-road vehicle suspension using a quarter car model. | Laura Lavinnya Lago de Almeida |

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WEDNESDAY AFTERNOON

Section S16 – Room 1 – (Compos. 2) (Chair: Prof. Volnei Tita)

Composite Materials and Structures

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|--------------|---|----------------------------|
| 13:30 (0196) | Prediction of effective properties of a heterogeneous cylinder with an elliptical cross-section | Reinaldo Rodríguez |
| 13:50 (0199) | Optimization of fiber paths embedded in elastomeric matrices | Rogério Marczak |
| 14:10 (0200) | Experimental characterization of fiber reinforced elastomers | Rogério Marczak |
| 14:30 (0239) | Computational homogenization for the estimation of overall properties in linear viscoelastic composites | Panters Rodríguez Bermúdez |
| 14:50 (0240) | Influence of the initial time on the effectiveness of composite repair systems for metallic pipes with through-thickness damage | Bernardo Santiago Areias |

Section S17 – Room 2 – (Optimiz. 2) (Chair: Prof. Eduardo Lenz Cardoso)

Optimization of Materials, Fluids and Structures

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|--------------|---|-------------------------|
| 13:30 (0073) | Topology optimization of structures subjected to design-dependent pressure loads and self-weight using the TOBS-GT Method | Lucas Oliveira Siqueira |
| 13:50 (0074) | Bimaterial topology optimization with local stress constraints via a level set approach | Helio Emmendoerfer Jr |
| 14:10 (0081) | Topology multimaterial optimization in thermal problem with alternative phase algorithm and Heaviside threshold function filter | Herbert Gomes |
| 14:30 (0091) | Stress minimization subject to the combination of surface and self-weight loads: material interpolation model analysis | Gisele Garcez |
| 14:50 (0135) | Evaluation of 3D auxhex structure by finite element analysis | Eduardo Silva |

Section S18 – Room 3 – (Reliab. 1) (Chair: Prof. André T. Beck)

Structural Reliability Methods and Reliability-Based Design Optimization

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|--------------|---|------------------------------|
| 13:30 (0007) | Drive-by damage detection on railway bridges using deep sparse autoencoders | Leonardo Minski |
| 13:50 (0008) | Uncertainty quantification in buriti laminate composite plate bending problems | Roberto Mauro Felix Squarcio |
| 14:10 (0045) | Structural reliability assessment of an existing guyed transmission tower through an active learning deep gaussian process regression | Gabriel Padilha Alves |
| 14:30 (0080) | surrogate models with infill samples applied to the reliability of composite materials | Tomás Santana |
| 14:50 (0083) | Study of the behavior of a steel building under the effect of progressive collapse | Junior Fernando Pires |

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WEDNESDAY EVENING

Section S19 – Room 1 – (Compos. /Nonlinear 3) (Chair: Prof. Volnei Tita)

Composite Materials and Structures / Nonlinear Analyses: Buckling, Post-Buckling and Contact Analyses

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|--------------|--|------------------------|
| 15:30 (0243) | Examining airless tire spoke concepts | Tales de Vargas Lisboa |
| 15:50 (0206) | EVALUATION OF STRUCTURAL HEALTH MONITORING IN COMPOSITE MATERIAL: EXPLORING THE USAGE OF A NEW KIND OF SENSOR | Mateus Carpena Neto |
| 16:10 (0028) | A Study Comparing Simultaneous and Sequential Approaches for VSCs Plates Compliance Optimization. | Rogério Marczak |
| 16:30 (0018) | Nonlinear finite element formulation for unbonded prestressed concrete beam with tendon sliding contact discretization and anchorage modelling | Tiago Morkis Siqueira |

Section S20 – Room 2 – (Optimiz. 3) (Chair: Prof. Daniel Milbrath De Leon)

Optimization of Materials, Fluids and Structures

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|--------------|---|---------------------------|
| 15:30 (0150) | Topology optimization applied to the simulation and design of casting components | Pablo Bagatini |
| 15:50 (0098) | Numerical accuracy of meshless commercial software for nonlinear applications | Juan Carlos Romero Albino |
| 16:10 (0147) | Efficiency analysis in energy conversion using piezoelectric materials with different positions in acoustic black holes | Tatiane Weimann |
| 16:30 (0218) | The assessment of extreme stresses values by the coupling of optimization algorithms and the Boundary Element Method | Mário César Filho |

Section S21 – Room 3 – (Reliab. /Failure /Dynam. 2) (Chair: Prof. André T. Beck)

Structural Reliability Methods and Reliability-Based Design Optimization / Failure Criteria / Structural Statics and Dynamics

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| 15:30 (0171) | Failure probability minimization of structures under seismic excitations with passive viscous dampers | Giancarlo Mantovani |
| 15:50 (0217) | The application of reliability and optimization approaches to design codes of tensioned steel structures | Mário César Filho |
| 16:10 (0224) | Convolutional neural network for highway bridge indirect structural health monitoring | Pedro Gasparotti |
| 16:30 (0115) | Effective strength of ductile porous materials with transversely isotropic matrix and cylindrical voids | Tiago dos Santos |

Closing Ceremony Room 1 – 16:50 h

During the Closing Ceremony, it will also be announced the **Award for the best student paper.**

LUNCH OPTIONS

When picking a place to have lunch, please keep in mind that our lunch break is only 1 hour and 30 minutes long. We suggest choosing buffet style (self-service) lunch, instead of *à la carte* service. Here are some suggestions of buffet restaurants around the Campus. These are all within a 10 minutes walk from the Convention Center.

- La Bohème Restaurante. Rua Lauro Linhares, 1903 – Trindade. Phone: +55 48 3028-7647.
- Restaurante e churrascaria tradição. R. João Pio Duarte Silva, 277 - Córrego Grande. Phone: +55 48 3233-2525. Closed on Mondays.
- Restaurante da Família. Rua João Pio Duarte Silva, 332 - Córrego Grande. Phone: +55 48 3335-0405. Only lunch.
- Novo Oriente. Chinese food. Trindade Shopping. Rua Lauro Linhares, 2123 - Loja 59 - Trindade, Phone: +55 48 998293858.
- Restaurante Rocco. Trindade Shopping. Rua Lauro Linhares, 2123 - Loja 59 - Trindade, Phone: +55 48 3024-8859.
- Napoli Pizzeria. Rua Deputado Antônio Edu Vieira, 1940 – Pantanal. Phone: +55 48 3238-4852.
- Vila Romana Shopping Center. There is a large variety of restaurants. It is located 1 km from the Convention Center.

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