DINAME 2023

Final Program

XIX International Symposium on Dynamic Problems of Mechanics

26 FEB-03 MAR | Pirenópolis Brazil

Organization UnB

Promotion ABCM

Support CNPq

Programa de Pós-Graduação em Ciências Mecânicas

SIb

CAPES

GENERAL PROGRAM AT A GLANCE

Time	Sunday 26/02/23	Monday 27/02/23	Tuesday 28/02/23	Wednesday 01/03/23	Thrusday 02/03/23	Friday 03/03/23
07:00-08:00		Registration				
08:00-08:15	ARRIVAL	Opening Cerimony	Keynote: Prof. Walter Lacarbonara	Keynote Prof. Ekaterina Pavloskaia	Keynote Prof. Janko Slavič	0084
08:15-08:30		*Panel* "Dynamics: Past, present and future"				0019
08:30-08:45						0023
08:45-09:00						0099
09:00-09:15			Prof. Tomasz Kapitaniak 0178	Prof. Fadi Dohnal 0131	Prof. Alberto Paiva 0053	0026
09:15-09:30		Prof. Josue Labaki 0010	0020	0007	0063	Prof. Hans Weber
09:30-09:45		0128	0006	0004	0106	
09:45-10:00		0183	0167	0159	0057	
10:00-10:30		POSTER PRESENTATION AND NETWORKING COFFEE BREAK				
10:30-10:45		0014	0058	Prof. Rubens Sampaio 0013	Prof. Daniel Castello 0043	Prof. Juan Camino 0160
10:45-11:00		0059	0095	0074	0179	0180
11:00-11:15		0055	0060	0027	0176	0129
11:15-11:30		0147	0139	0009	0035	0162
11:30-11:45		0003	0138	0083	0124	0042
11:45-12:00		0115	0105	0130	0127	0030
12:00-12:15		LUNCH				Closing Cerimony
12:15-14:00						LUNCH
14:00-14:15		Keynote: Prof. Alper Erturk	Prof. Helio Fiori de Castro 0047	SOCIAL EVENT	Prof. Fabricio Almeida 0144	DEPARTURE
14:15-14:30			0048		0045	
14:30-14:45			0038		0052	
14:45-15:00			0036		0070	
15:00-15:15	Registration	0148	0087		0103	
15:15-15:30		0146	0051		0117	
15:30-15:45		0069	0112		0005	
15:45-16:00		0173	0033		0111	
16:00-16:30		COFFEE BREAK			COFFEE BREAK	
16:30-16:45		0064	Prof. Edson de Miranda Jr. 0011		*Hofer Prize Special Session*	
16:45-17:00		0096	0169		Profª. Roberta Lima	
17:00-17:15		*Invited talk about JBSMSE and Topical Collection*	0170		Prof. Adriano Fabro Prof. Aldemir Cavallini Jr.	
17:15-17:30		Tribute to CDIN Fellows	0039		Prof. Thiago Ritto	
17:30-17:45			0120		Profª. Aline de Paula	
17:45-18:00					**Hofer Award 2023**	
18:00-20:30	Welcome Cocktail (18:00-20:00)			ABCM Committee of Dynamics Meeting (18:30)		
					Special DINAME Dinner (19:00-22:00)	

	Dynamics of metamaterials
	Structural dynamics and vibrations
	Nonlinear Dynamics
	Rotordynamics
	Acoustics and vibroacoustics
	Uncertainty Quantification and Stochastic Dynamics
	Inverse problem, parameter estimation and identification
	Damage detection and structural health monitoring
	Smart structures
	Control of Mechanical and Robotic Systems Robotics and Mechatronic Systems
	Hans Weber 80th Anniversary session

Poster Presentation and Networking

27/02:
Metamateriais: 0040; 0091.
Structural dynamics and vibrations: 0041; 0065; 0069; 0081; 0089; 0102; 0113; 0126; 0136 .
Uncertainty Quantification and Stochastic Dynamics: 0150.

28/02:
Rotodynamics: 0012; 0061; 0075; 0076; 0110; 0153.
Nonlinear Dynamics: 0008; 0072; 0182.

01/03:
Acoustics and vibroacoustics: 0118; 0133; 0159; 140.
Uncertainty Quantification and Stochastic Dynamics: 0046; 0132; 0150.

02/03:
Inverse problem, parameter estimation and identification: 0056; 0119; 0137; 0168; 0165.
Damage detection and structural health monitoring: 0100; 0141; 0143; 0172.
Smart structures: 0016; 0031; 0079.

03/03:
Control of Mechanical and Robotic Systems: 0024; 0101; 0107; 0108; 0109; 0134; 0142; 0175; 0177.
Robotics and Mechatronic Systems: 0163.

DETAILED PROGRAM

Sunday, February 26, 2023				
Arrival, 08:00 - 15:00				
Registration, 15:00 - 18:00				
Welcome Cocktail, 18:00 - 20:00				
Monday, February 27, 2023				
Opening ceremony, 08:00 - 08:15				
Panel **"Dynamics: past, present and future"** 08:15 - 09:15 **Chair: Domingos Rade**				
Structural dynamics and vibrations 09:15 - 10:00 **Chair: Fernando Rochinha**				
09:15 - 09:30	**DINAME2023 - 0010**	**1**	**Protecting vibration-sensitive structures against ground vibration via the installation of heavy walls**	**Josue Labaki**
09:30 - 09:45	DINAME2023 - 0128	2	A topology optimization study of structural foundations considering dynamic loading	Renato Picelli
09:45 - 10:00	DINAME2023 - 0183	3	Programmable metamaterials for human limb tremor suppression: advancements in attenuation and control	Marcela Rodrigues Machado
Poster session, Networking and Coffee break 10:00 - 10:30				
Dynamics of metamaterials	DINAME2023 - 0040	1	Investigation of a rainbow metastructure for broadband vibration attenuation in a crankshaft	Nícolas da Silva Dias
Dynamics of metamaterials	DINAME2023 - 0091	2	Wave and modal analysis of band gap formation in periodic rotors	Patrick Bueno Lamas
Structural dynamics and vibrations	DINAME2023 - 0041	3	Model mixing with frequency based substructuring: 4 DOF half-vehicle analysis	Lucas Costa Arslanian
Structural dynamics and vibrations	DINAME2023 - 0065	4	Dynamic response of wind turbine tower induced by wheel unbalance	Lucas Menezes
Structural dynamics and vibrations	DINAME2023 - 0081	5	Assessment of damage in a reinforced beam by k-nearest neighbor algorithm	Amanda Aryda Silva Rodrigues de Sousa
Structural dynamics and vibrations	DINAME2023 - 0089	6	Design of a tuned mass damper for a suspension bridge model	Jose Marcos de Araujo Silva Junior
Structural dynamics and vibrations	DINAME2023 - 0102	7	Dynamic characterization of tubular chemical reactors considering multiphysics parameters	Juliana Cardoso Santos
Structural dynamics and vibrations	DINAME2023 - 0113	8	Characterizing vibration attenuation in Herschel-Quincke beams by transmitted vibration and transmission loss	Gabriel Angelini
Structural dynamics and vibrations	DINAME2023 - 0126	9	Spectral element for vibration analysis of a honeycomb plate	Matheus Canedo Borges
Structural dynamics and vibrations	DINAME2023 - 0136	10	Time domain aeroelastic analysis of the pre-pazy and pazy wings	João Pedro Tavares Pereira dos Santos
Uncertainty quantification and stochastic dynamics	DINAME2023 - 0150	11	Parameter estimation in bolted joints by Bayesian inference	Vitória Carolina Duarte
Structural dynamics and vibrations 10:30 - 12:00 **Chair: Alberto Paiva**				
10:30 - 10:45	DINAME2023 - 0014	4	Invariant solutions to the mode shape equation of uniform rectangular Kirchhoff plates	Afonso Willian Nunes
10:45 - 11:00	DINAME2023 - 0059	5	Structural vibration analysis of a commercial refrigerator	Wolfgang Hörtnagel
11:00 - 11:15	DINAME2023 - 0055	6	Reduction of negative damping effects in the drilling process using active control	Helio Cruz
11:15 - 11:30	DINAME2023 - 0147	7	An experimental investigation of the fluid-structure coupling in horizontal pipes conveying two-phase flows	Daniely Amorim das Neves
11:30 - 11:45	DINAME2023 - 0003	8	Identification of damping with a high-speed camera	Ivan Tomac
11:45 - 12:00	DINAME2023 - 0115	9	Experimental insights on the dynamics of submerged flexible pipes discharging water in post-critical regime	Wagner Antonio Defensor Filho
Lunch, 12:00 - 14:00				
K1. Keynote lecture, 14:00 - 15:00 **Leveraging vibration and wave phenomena in dynamical systems: from energy harvesting and bioinspired robotics to metamaterials and transcranial ultrasound** **Keynote speaker: Prof. Alper Erturk** **Chair: Marcelo Trindade**				
Structural dynamics and vibrations 15:00 - 16:00 **Chair: Giuseppe Vairo**				
15:00 - 15:15	DINAME2023 - 0148	10	On the formation of a super attenuation band in a beam	Paulo José Paupitz Gonçalves
15:15 - 15:30	DINAME2023 - 0146	11	Flutter analysis of a hybrid aero-servo-viscoelastic wing in the time domain	Sergio Carneiro
15:30 - 15:45	DINAME2023 - 0069	12	Digital twin of an offshore riser systems for time series prediction using deep learning models	Stanley Washington Ferreira Rezende
15:45 - 16:00	DINAME2023 - 0173	13	Mechanical vibration of a viscoelastic cantilever beam with oscillating base and eccentric tip mass via generalized integral transform technique	Gianfranco Stieven
Coffee break, 16:00 - 16:30				
Structural dynamics and vibrations 16:30 - 17:00 **Chair: Fernando Rochinha**				
16:30 - 16:45	DINAME2023 - 0064	14	A multi-physical modeling approach to "puffing" in mechanical face seals	Michael Gani
16:45 - 17:00	DINAME2023 - 0096	15	Fatigue analysis in a drillstring under torsional vibrations	Sandro Valente
Invited talk about JBSMSE and Topical Collection, 17:00 - 17:15 **Speaker: Marcelo Trindade**				
Tribute to CDIN Fellows, 17:15 - 17:45 **Chair: Paulo Kurka**				

Tuesday, February 28, 2023				
K2. Keynote lecture, 08:00 - 09:00 **Multi-band gap metamaterials** **Keynote speaker: Prof. Walter Lacarbonara** **Chair: J. Roberto F. Arruda**				
Nonlinear dynamics 09:00 - 10:00 **Chair: Marcelo Savi**				
09:00 - 09:15	**DINAME2023 - 0178**	**1**	**Different coherent states for lightly supported coupled pendula**	**Tomasz Kapitaniak**
09:15 - 09:30	DINAME2023 - 0020	2	Nonlinear normal modes of flexible risers in catenary configuration	Rubens Sampaio
09:30 - 09:45	DINAME2023 - 0006	3	A comparison of two drill-string models that include the dynamics of the cutting at the bit	Hector Eduardo Goicoechea Manuel
09:45 - 10:00	DINAME2023 - 0167	4	Design of a flexible monopile foundation for the offshore wind turbine vibration control by pendulum tuned mass dampers	Gino Colherinhas
Poster session, Networking and Coffee break 10:00 - 10:30				
Rotodynamics	DINAME2023 - 0012	1	Fault identification in rotating systems using convolutional neural networks	Carlos Alberto Alves Viana
Rotodynamics	DINAME2023 - 0061	2	Unsupervised k-means clustering using optimal features for fault classification in rotating machines	João Cassiano
Rotodynamics	DINAME2023 - 0075	3	Adapting deep neural networks for rotating machine balancing without employment of trial weights	Aldemir Aparecido Cavallini Jr.
Rotodynamics	DINAME2023 - 0076	4	Data-driven gear faults diagnostics using Bayesian Neural Networks	Matheus de Moraes
Rotodynamics	DINAME2023 - 0110	5	Kriging approach dedicated to represent electromagnetic forces in salient pole generators	Leonardo Sicchieri
Rotodynamics	DINAME2023 - 0153	6	Application of active hydrodynamic bearings to reduce whirl effect on rotor	Douglas Ramos
Nonlinear dynamics	DINAME2023 - 0008	7	Stability assessment of the resonant linear permanent magnetic generators powered by free piston engines	Vítor Silva Medeiros
Nonlinear dynamics	DINAME2023 - 0072	8	Low-order hypersonic vehicle trajectory simulator	Robert Rafael Araujo Oliveira
Nonlinear dynamics	DINAME2023 - 0182	9	Chaos control in a nonlinear pendulum using a generalized extended time-delayed feedback method	Arthur Rodrigues Queiroz
Nonlinear dynamics 10:30 - 12:00 **Chair: Rubens Sampaio**				
10:30 - 10:45	DINAME2023 - 0058	5	Dynamics of pendula base-excited system for wave energy harvesting application	Alicia Terrero-Gonzalez
10:45 - 11:00	DINAME2023 - 0095	6	Digital twin for the transient operation of a real heat pump	Mariusz Zamojski
11:00 - 11:15	DINAME2023 - 0060	7	Lie symmetries for the spinning top	Cláudio Basquerotto
11:15 - 11:30	DINAME2023 - 0139	8	Spatiotemporal nonlinear dynamics in a Duffing-type system	Eduardo Villela Machado dos Reis
11:30 - 11:45	DINAME2023 - 0138	9	Nonlinear analysis of compensated asymmetric energy harvester	João Pedro Canisso Valese Norenberg
11:45 - 12:00	DINAME2023 - 0105	10	Acoustic characterization of porous ceramic produced via freeze-casting using DMSO as solvent	Tomé Seichi da Nóbrega Guenka
Lunch, 12:00 - 14:00				
Rotordynamics 14:00 - 16:00 **Chair: Katia Lucchesi**				
14:00 - 14:15	**DINAME2023 - 0047**	**1**	**Shaft flexibility effect on the dynamic response of a geared rotor**	**Helio Fiori de Castro**
14:15 - 14:30	DINAME2023 - 0048	2	Influence of shaft flexibilities and unbalance moment on a spur gear pair	Laís Bittencourt Visnadi
14:30 - 14:45	DINAME2023 - 0038	3	Application of Kalman filter as a method to balance rotors without trial masses	Fabio Dalmazzo Sanches
14:45 - 15:00	DINAME2023 - 0036	4	Tie-rod rotor digital twin model - theory & experiment	Fernando Tezza
15:00 - 15:15	DINAME2023 - 0087	5	Malfunction parameters determination using Bayesian Neural Networks applied to a multi-fault rotor	Olympio Belli
15:15 - 15:30	DINAME2023 - 0051	6	Identification of unbalance and shaft bow in a flexible rotor supported by active magnetic bearings	Gilberto Machado da Silva
15:30 - 15:45	DINAME2023 - 0112	7	Francis modeling over generating units applying advanced fluid dynamics methods	Leandro Jose Lemes Stival
15:45 - 16:00	DINAME2023 - 0033	8	The influence of proper orthogonal decomposition and smooth orthogonal decomposition on rotor unbalance fault classification	Leonardo Valero Pereira
Coffee break, 16:00 - 16:30				
Dynamics of metamaterials 16:30 - 17:45 **Chair: Domingos Rade**				
16:30 - 16:45	**DINAME2023 - 0011**	**1**	**Complex band structure of 1-D solid phononic crystals with viscoelasticity**	**Edson Jansen Pedrosa de Miranda Junior**
16:45 - 17:00	DINAME2023 - 0169	2	Flexural wave propagation in metamaterial beams with beam-type resonators and eddy current damping	Thiago de Paula Sales
17:00 - 17:15	DINAME2023 - 0170	3	Numerical investigation of a zig-zag beam-type quasi-periodic structure with multiple defects	Vinícius Santos
17:15 - 17:30	DINAME2023 - 0039	4	Vibration attenuation and chaos in periodic lattices with bi-stable resonators	André Albuquerque Thomas e Brandão
17:30 - 17:45	DINAME2023 - 0120	5	Tremor control in the arm of a Parkinson's disease patient using piezoelectric beam meta-structure	Braion Barbosa

Wednesday, March 01, 2023				
K3. Keynote lecture, 08:00 - 09:00 **Non-smooth dynamical systems and their engineering applications** **Keynote speaker: Prof. Ekaterina Pavlovskaia** **Chair: Marcelo Savi**				
Acoustics and vibroacoustics 09:00 - 10:00 **Chair: José Maria dos Santos**				
09:00 - 09:15	**DINAME2023 - 0131**	**1**	**Acoustophoretic control of microparticles using a multi-wavelength surface acoustic wave device**	**Fadi Dohnal**
09:15 - 09:30	DINAME2023 - 0007	2	Evaluation of wedge-shaped acoustic black holes for vibration damping with different analysis softwares	Max Käfer
09:30 - 09:45	DINAME2023 - 0004	3	Numerical and experimental analyses of sound transmission loss of double-glazed unit	Walid Larbi
09:45 - 10:00	DINAME2023 - 0159	4	Performance analysis of a duct with multiple internal Helmholtz resonators	José Maria Campos dos Santos
Poster session, Networking and Coffee break 10:00 - 10:30				
Acoustics and vibroacoustics	DINAME2023 - 0118	1	Dynamic modes decomposition of the transonic flow around a cylinder	Guilherme Mendes Santana
Acoustics and vibroacoustics	DINAME2023 - 0133	2	Experimental study of the layout of sound absorption materials in a classroom	Leandro Neves de Assis
Acoustics and vibroacoustics	DINAME2023 - 0140	3	General power-flow method for vibro-acoustic mid-frequency problems	Thiago Morhy
Uncertainty quantification and stochastic dynamics	DINAME2023 - 0046	4	Parametric uncertainty applied to the robust control of a 2-DOF planar robotic arm	Guilherme Lacerda
Uncertainty quantification and stochastic dynamics	DINAME2023 - 0132	5	Comparative analysis between tropospheric models for GNSS positioning in Brazilian territory	Ludmila Aparecida de Oliveira
Uncertainty quantification and stochastic dynamics 10:30 - 12:00 **Chair: Daniel Castello**				
10:30 - 10:45	**DINAME2023 - 0013**	**1**	**Nonlinear dynamics of vertical axis washing machines with uncertain unbalance**	**Rubens Sampaio**
10:45 - 11:00	DINAME2023 - 0074	2	Transformers surrogates for vortex-induced vibrations computational simulations	Fernando Rochinha
11:00 - 11:15	DINAME2023 - 0027	3	New anti-symmetric random matrix applied to a simple rotor-dynamic system	Bernardo Fonseca Nogueira
11:15 - 11:30	DINAME2023 - 0009	4	Verification and validation standards on rotor dynamics analysis software	Edgard Porto
11:30 - 11:45	DINAME2023 - 0083	5	Multi-element polynomial chaos in linear structures with nonlinear energy sink and uncertain parameters	Patricia Santana
11:45 - 12:00	DINAME2023 - 0130	6	Representations of the frequency response of linear time-periodic systems: adapting to stochastic excitations	Oscar Sánchez Jiménez
Lunch, 12:00 - 14:00				
Social event 14:00 - 18:00				
ABCM Committee of Dynamics Meeting 18:30 - 19:30				

Thursday, March 02, 2023				
K4. Keynote lecture, 08:00 - 09:00 **Image-based full-field identification in structural dynamics: past, present, and the future** **Keynote speaker: Prof. Janko Slavič** **Chair: Marian Wiercigroch**				
Smart structures 09:00 - 10:00 **Chair: Valder Steffen**				
09:00 - 09:15	**DINAME2023 - 0053**	**1**	**A synergistic vibration absorber using magnetorheological and shape memory alloy**	**Alberto Paiva**
09:15 - 09:30	DINAME2023 - 0063	2	Nonlinear dynamics of an origami-stent	Guilherme Vieira Rodrigues
09:30 - 09:45	DINAME2023 - 0106	3	Vibration energy harvesting using shape memory alloys and piezoelectric materials	Arthur Adeodato
09:45 - 10:00	DINAME2023 - 0057	4	Analysis of mechanical energy harvesters using a nonlinear dynamics perspective	Luã Guedes Costa
Poster session, Networking and Coffee break 10:00 - 10:30				
Inverse problem, parameter estimation and identification	DINAME2023 - 0056	1	System identification and optimal control for COVID-19 epidemiological dynamics in Amazonas State, Brazil	Kamilla Cerdeira de Oliveira
Inverse problem, parameter estimation and identification	DINAME2023 - 0119	2	Parameter identification of Bouc-Wen model for MR damper	Davi Matias Dutra Silva
Inverse problem, parameter estimation and identification	DINAME2023 - 0137	3	Data-driven model for torsional oscillations in slender structures	Ingrid Pires Macedo Oliveira dos Santos
Inverse problem, parameter estimation and identification	DINAME2023 - 0168	4	Design and experimental tests of a smart pitch link with shape memory alloy to vibration reduction in helicopters	Andersson Oliveira
Inverse problem, parameter estimation and identification	DINAME2023 - 0165	5	Nuclear energy generation short-term forecasting based on a decomposition ensemble learning approach	Jorge Gustavo Sandoval Simão
Damage detection and structural health monitoring	DINAME2023 - 0100	6	Crack identification through natural frequencies and fatigue crack propagation modeling of a shaft	Marcelo Martins
Damage detection and structural health monitoring	DINAME2023 - 0141	7	Machine learning based fault detection on belt conveyor idlers	João Lucas Lobato Soares
Damage detection and structural health monitoring	DINAME2023 - 0143	8	Evaluation of a methodology for low-speed bearing fault diagnosis	Thiago Barroso Costa
Damage detection and structural health monitoring	DINAME2023 - 0172	9	Sensitivity analysis of discrete wavelet (DWT) based damage localization on a beam-like structure	José Leandro Cardoso Rivera Vila
Smart structures	DINAME2023 - 0016	10	Fatigue based topology optimization of metallic flexible disc coupling	Gabriel Dantas Gomes
Smart structures	DINAME2023 - 0031	11	Nonlinear dynamics of a magnetic shape memory alloy oscillator	Jean Muniz de Souza
Smart structures	DINAME2023 - 0079	12	Performance investigation of mechanical multimodal energy harvesting designs for multimodal excitations	Marcelo Savi
Inverse problem, parameter estimation and identification 10:30 - 12:00 **Chair: Thiago Ritto**				
10:30 - 10:45	**DINAME2023 - 0043**	**1**	**A deep learning approach for interfacial defect identification based on reduced acoustic scattering models**	**Daniel Castello**
10:45 - 11:00	DINAME2023 - 0179	2	Data compatibility check of an UAS with a flexible wing	Luiz Carlos Goes
11:00 - 11:15	DINAME2023 - 0176	3	Modeling and control for Vector-P UAV	Eder Alves de Moura
11:15 - 11:30	DINAME2023 - 0035	4	Low-cost inertial sensor fusion with the ensemble Kalman filter for ground vehicle position estimation	Flávio Trigo
11:30 - 11:45	DINAME2023 - 0124	5	Reconstructing nanoscale topography using a controlled vibrating fiber and iterative model inversion	Izhak Bucher
11:45 - 12:00	DINAME2023 - 0127	6	Bayesian operational modal analysis with likelihood free methods	Matheus Querino de Souza
Lunch, 12:00 - 14:00				
Damage detection and structural health monitoring 14:00 - 16:00 **Chair: Samuel da Silva**				
14:00 - 14:15	**DINAME2023 - 0144**	**1**	**An experimental study into the effects on leak noise propagation of using extension rods at measurement points on a pipe**	**Fabricio Almeida**
14:15 - 14:30	DINAME2023 - 0045	2	Damage detection using GP-NARX models	Luis Gustavo Giacon Villani
14:30 - 14:45	DINAME2023 - 0052	3	A physics-based machine learning model for fatigue in wind turbines devices	Tiago Bastos Moscon Micco Puntel
14:45 - 15:00	DINAME2023 - 0070	4	Balancing of a rotating machine using the Kriging approach	Marcus Filipe Sousa Reis
15:00 - 15:15	DINAME2023 - 0103	5	Experimental estimation of brake pad wear for passenger cars based on longitudinal dynamics	Kenneth Jensen
15:15 - 15:30	DINAME2023 - 0117	6	Application of the topological derivative method for damage identification in Reissner-Mindlin plate	Andressa Silva
15:30 - 15:45	DINAME2023 - 0005	7	A comparative study of dispersion curves in cylindrical waveguide using the semi-analytical finite element method	Barbara Valeria de Abreu Lavor
15:45 - 16:00	DINAME2023 - 0111	8	Bolt loosening detection based in data-driven of bolted beam connections by support vector machine method	Jefferson Coelho
Coffee break, 16:00 - 16:30				
Hofer Prize Special Session 16:30 - 18:00 **Chair: Paulo Kurka**				
16:30 - 16:45	DINAME2023 - 0034	1	Oscillatory response of the simplest electromechanical system	Roberta Lima
16:45 - 17:00	DINAME2023 - 0174	2	A stochastic model for intermittent two-phase flow in horizontal pipes	Adriano Todorovic Fabro
17:00 - 17:15		3	Dynamics of rotating machines: a perspective from the LMEst-UFU	Aldemir Cavallini Jr.
17:15 - 17:30		4	Model selection and parameter calibration of dynamical systems using the Bayesian approach	Thiago Gamboa Ritto
17:30 - 17:45		5	Recognition of patterns in nonlinear dynamic systems from time series	Aline Souza de Paula
17:45 - 18:00	**Hofer Award 2023**			
Special DINAME Dinner 19:00				

Friday, March 03, 2023				
Hans Weber 80th Anniversary session 08:00 - 10:00 **Chair: Ilmar Santos**				
08:00 - 08:15	**DINAME2023 - 0084**	**1**	**Force estimation of electrically-stimulated rat gastrocnemius: comparison between an optimized biomechanical muscle model and bioimpedance measurements**	**Luciano Menegaldo**
08:15 - 08:30	DINAME2023 - 0019	2	Real-Time capable multibody model of dual truck front axles	Georg Rill
08:30 - 08:45	DINAME2023 - 0023	3	Challenges in rotor dynamics: from identification of uncertain parameters to balancing techniques	Katrin Ellermann
08:45 - 09:00	DINAME2023 - 0099	4	On the experimental identification of jointed structures: parametric and non-parametric modeling perspectives	Rafael de Oliveira Teloli
09:00 - 09:15	DINAME2023 - 0026	5	Analyzed and proposed system recoil models to reduce barrel displacement and mitigate recoil efforts	Gustavo Simão Rodrigues
09:15 - 10:00	Prof. Hans Weber			
Poster session, Networking and Coffee break 10:00 - 10:30				
Control of mechanical and robotic systems Robotics and mechatronic systems	DINAME2023 - 0024	1	Optimal passive orthosis configuration for squat to stand assistance	Denis César Mosconi Pereira
Control of mechanical and robotic systems Robotics and mechatronic systems	DINAME2023 - 0101	2	Optimization and control of a 6x6 military vehicle's active suspension system	Jefferson Gomes de Carvalho Souza
Control of mechanical and robotic systems Robotics and mechatronic systems	DINAME2023 - 0107	3	Control allocation to roll fly-by-wire aircraft with ailerons and roll spoilers	Juliano A. B. Gripp
Control of mechanical and robotic systems Robotics and mechatronic systems	DINAME2023 - 0108	4	Practical application of open loop onset point criterion to predict actuator rate saturation PIO in fly-by-wire aircraft	Juliano A. B. Gripp
Control of mechanical and robotic systems Robotics and mechatronic systems	DINAME2023 - 0109	5	Evaluation of open loop onset point criterion to predict rate saturation PIO using flight simulator	Juliano A. B. Gripp
Control of mechanical and robotic systems Robotics and mechatronic systems	DINAME2023 - 0134	6	Comparison of passive dynamic absorbers in attenuating pathological tremor of human upper limb: an analytical approach	Gabriel Guimarães de Souza Braga de Albuquerque
Control of mechanical and robotic systems Robotics and mechatronic systems	DINAME2023 - 0142	7	Cascaded control for path tracking of autonomous robotic vehicles	Vinícius Macedo
Control of mechanical and robotic systems Robotics and mechatronic systems	DINAME2023 - 0175	8	Standing self-balancing wheelchair	Renan Imamura Marques
Control of mechanical and robotic systems Robotics and mechatronic systems	DINAME2023 - 0177	9	Dynamic model of the human upper limb affected by Parkinson's Disease: finite element approach	Carlos Eduardo Pereira da Silva
Control of mechanical and robotic systems Robotics and mechatronic systems	DINAME2023 - 0163	10	A modular prototype of a pendular accelerometer	Vinicius Maran
Control of mechanical and robotic systems Robotics and mechatronic systems	DINAME2023 - 0160	11	Multiple frozen H2 dynamic output feedback control for a rotor-blade system	Juan Camino
Control of mechanical and robotic systems **Robotics and mechatronic systems** 10:30 - 12:00 **Chair: Agenor Fleury**				
10:30 - 10:45	**DINAME2023 - 0156**	**1**	**Gain-scheduled H2 controller for trajectory tracking of a cart-pendulum**	**Juan Camino**
10:45 - 11:00	DINAME2023 - 0180	2	Power conversion system optimization for an oscillating wave surge converter in a channel via bang-bang control	Giuseppe Vairo
11:00 - 11:15	DINAME2023 - 0129	3	Time-delayed feedback control with adaptive gain for impact oscillator	Dimitri Danulussi Alves Costa
11:15 - 11:30	DINAME2023 - 0162	4	Configuration of aerodynamics model in flight simulator to investigate pilot-induced oscillations and loss of control	Juliano A. B. Gripp
11:30 - 11:45	DINAME2023 - 0042	5	Numerical hazard analysis of torque vectoring system for electric drivetrain considering handling uncertainty	Vinícius Marini
11:45 - 12:00	DINAME2023 - 0030	6	Physics informed machine learning for path planning of space robots	Rogerio Santos
Closing cerimony 12:00 - 12:15				
Lunch, 12:15 - 14:00				
Departure 14:00 - 18:00				

Panel

XIX International Symposium on Dynamic Problems of Mechanics

Panel – Dynamics: past, present and Future

DINAME 2023 will be the first edition of this symposium to feature a Panel Session. In this high-profile session, a panel of four specialists and prestigious researchers will get together to discuss the topic "Dynamics: past, present and future". Prof. Domingos Rade (ITA) will mediate the session. The audience will be welcome to contribute with their questions and points of view.

Invited Speakers

Dr. Quan Wang

Professor Wang is now the Executive President of Shantou University. Prof. Wang was inducted to the Royal Society of Canada and the Canadian Academy of Engineering in 2016 and 2015 respectively. He was also elected as a member of the European Academy of Sciences and Arts in 2018, a member of the European Academy of Science in 2019 as well as a foreign member of the Russian Academy of Science in 2022.

He was awarded the Blaise Pascal Medal of the European Academy of Sciences in Engineering and Ivan Grishmanov Award of the Russian International Academy of Engineering in 2019 and 2020.

He has served as the Deputy Editor-in-Chief of the International Journal of Mechanical Sciences. Prof. Wang is an influential scholar in his research areas of energy harvesting, smart materials, and nanotechnology.

Dr. Marian Wiercigroch

Professor Marian Wiercigroch educated in Poland, US and UK holds a prestigious Sixth Century Chair in Applied Dynamics and he is a founding director of the Centre for Applied Dynamics Research at the University of Aberdeen.

His area of research is theoretical and experimental nonlinear dynamics, which he applies to various engineering problems. Wiercigroch has published extensively (over 400 journal and conference papers) and sits on a dozen editorial boards of peer review journals. He is the Editor-In-Chief of International Journal of Mechanical Sciences and a frequent keynote and plenary speaker at major international conferences.

He is the inventor of new patented drilling technology called Resonance Enhanced Drilling and the Founder and Chief Technology Officer of a spinoff company iVDynamics Ltd. He has established in Aberdeen unique experimental laboratories allowing to investigate complex nonlinear dynamic interactions in mechanical systems with the focus on energy generation.

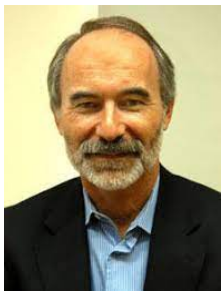
He has received many awards and distinctions including a Senior Fulbright Scholarship (1994), Fellowship of the Royal Society of Edinburgh (2009), DSc honoris causa by the Lodz University of Technology (2013), Distinguished Professorships at the Perm National Research Polytechnic University (2017), Balseiro Institute (2018) and Yanshan University (2021), a Scottish Champion of Knowledge Exchange (2020) and has been a panelist of the Research Excellence Framework (2014, 2021) assessing quality of research in the UK.

Dr. Marcelo A. Savi

Marcelo A. Savi is Ph.D. in Mechanical Engineering and Professor at Federal University of Rio de Janeiro (COPPE – Department of Mechanical Engineering) being the Head of the Center for Nonlinear Mechanics. He has published over 500 journal and conference papers, 5 books and about 15 book chapters. Awards and distinctions were received including: UFRJ solemn tribute to the most influential researchers in the world (Top 2%) based on PLOS Biology publication; COPPE Award Giulio Massarani of the Academic Merit; CNPq Researcher level 1A; Scientist of Rio de Janeiro.

He is actively involved as advisor of graduate and undergraduate students, summing more than 150 works. He has administrative experience as head of department, graduate coordinator, and university committees. He serves as Associate Editor of some journals, where it is important to highlight: International Journal of Mechanical Sciences (2018-present); ASME – Journal of Computational and Nonlinear Dynamics (2019-present); Journal of Vibration and Control (2017-present); Metals (2021-present); Mathematical Problems in Engineering (2018-present); Journal of the Brazilian Society of Mechanical Sciences and Engineering (2006-2016); Journal of Applied Mathematics (2012-2014); and Open Journal of Acoustics (2007-2013). He is member of academic societies including ASME, ABCM and SBF. Research interests are related to nonlinear mechanics where it should be highlighted smart material and structures; nonlinear dynamics, chaos and control; biomechanics and ecology.

Dr. J. Roberto F. Arruda



Roberto F. Arruda holds a Mechanical Engineering degree from the University of Campinas and a Doctor degree from the University of Paris VI (1979). He is currently Full Professor with the Faculty of Mechanical Engineering of the University of Campinas. He was a Visiting Scholar with INSA Lyon in 1986, with Virginia Tech in 1991, with KU Leuven in 1996, with the Acoustics Laboratory of Le Mans in 2004, and with other French institutions since then (ECL, ENSIM, UPMC, ECM/LMA).

He has been the Scientific Director of the Brazilian Society of Mechanical Sciences and Engineering (2009-2013). He is currently a senior advisor to the Scientific Director of the São Paulo State research funding agency (FAPESP), Associate Editor of Acta Acustica, and member of scientific boards of conferences (ISMA, NOVEM, ICEDyn).

He has given Keynote lectures in national and international conferences (ICSV, ISMA, ICEDyn). He is a member of the Brazilian National Academy of Engineering (ANE). His research involves structural dynamics, identification and active control, and, more recently, engineered periodic structures (elastic metamaterials).

Keynote Speakers

XIX International Symposium on Dynamic Problems of Mechanics

Leveraging vibration and wave phenomena in dynamical systems: from energy harvesting and bioinspired robotics to metamaterials and transcranial ultrasound

Speaker: Professor Alper Erturk
Carl Ring Family Chair & Professor
Georgia Institute of Technology, EUA
George W. Woodruff School of Mechanical Engineering

Abstract: This talk will review our recent efforts on exploiting vibration and elastic/acoustic wave phenomena in emerging fields and across disciplines for various applications. The first part will discuss examples from the domain of vibration energy harvesting for small electronic components by using piezoelectric transduction in conjunction with concepts from nonlinear dynamics and fluid-structure interaction. Multifunctional scenarios will also be presented, such as combining energy harvesting and bio-inspired actuation in the same robotic platform, as well as concurrent energy harvesting and metamaterial-based vibration attenuation. In the second part, the focus will first be placed on phononic crystal-based manipulation of 2D elastic and 3D acoustic wave propagation. Specifically, in-air sound wave focusing and underwater ultrasonic wave focusing using 3D-printed phononic crystals with tailored microstructure will be summarized for applications including wireless power transfer. Then, ultrasonic power/data transfer to wireless components in metallic enclosures will be addressed along with the use of phononic crystals for crosstalk minimization via bandgap formation between the piezoelectric channels. Examples will also be given on programmable piezoelectric metamaterials with synthetic impedance circuits. Finally, the leveraging of vibrations and guided waves in the human skull will be discussed briefly for purposes ranging from high-fidelity modeling and parameter identification via vibroacoustic experiments to investigating the role and potential use of guided waves in cranial/transcranial ultrasound.

Bio: Prof. Alper Erturk is the Carl Ring Family Chair in the Woodruff School of Mechanical Engineering at Georgia Tech, where he leads the Smart Structures Dynamical Systems Lab. His theoretical and experimental research interests are in dynamics, vibration, and acoustics of passive and active (smart) structures for various engineering problems. He has published 120 journal papers, 130 conference proceeding papers, 5 book chapters, and 2 books (total citations > 19,000 and h-index: 60). He is a recipient of various awards including an NSF CAREER Award in Dynamical Systems, ASME C.D. Mote Jr. Early Career Award for “research excellence in the field of vibration and acoustics”, ASME Gary Anderson Early Achievement Award for “notable contributions to the field of adaptive structures and material systems”, SEM James Dally Young Investigator Award for “research excellence in the field of experimental mechanics”, and numerous best paper awards including the Philip E. Doak Award of the Journal of Sound and Vibration, and two ASME Energy Harvesting Best Paper Awards, among others. He is an Associate Editor for various journals such as Smart Materials Structures and ASME Journal of Vibration Acoustics. He holds Invited/Adjunct Professor positions at Politecnico di Milano (POLIMI) and at Korea Advanced Institute of Science and Technology (KAIST). He is a Fellow of ASME and SPIE.

Image-based full-field identification in structural dynamics: past, present, and the future

Speaker: Professor Janko Slavič
University of Ljubljana
Faculty of Mechanical Engineering

Abstract: Image-based measurement techniques have steadily been gaining popularity, and have become a viable alternative to conventional methods in many applications. Image-based techniques provide a great spatial density of information and, due to the hardware progress, recently also a very high frequency of image acquisition (e.g. 20k frames per second at megapixel resolution). This contribution will give a short introduction to the origins of the methods, starting from Lucas-Kanade's research in the 1980s. After presenting the original ideas which resulted in the well-established classical method of digital image correlation (DIC), this contribution will focus on the methods developed in particular for the field of structural dynamics. Some of the topics discussed in detail are the optical-flow method, the noise in the image data, the overdetermination in image-date concerning modal identification, and the hybrid methods combining classical sensors and image data. If classical DIC methods have the (image-to-image) accuracy of approx. 1/100th of a pixel, it will be shown that in harmonic motion the identification of amplitude is successful up to approx. 1/100.000th of a pixel. The last part of this contribution will be devoted to selected methods that have a great potential for future research, e.g.: 3D dimensional vibration reconstruction based on the frequency-domain triangulation, spectral optical-flow imaging experimental technique, and the potential of thermoelectricity in structural identification.

Bio: Prof. Dr. Janko Slavič is a full professor at the University of Ljubljana, Faculty of Mechanical Engineering. He supervised 14 finished Ph.D. research projects and is currently supervising 7. His research focused are: image-based structural identification, vibration-fatigue by spectral methods, 3D printed dynamic sensors, and open-source based research in structural dynamics.

Non-smooth dynamical systems and their engineering applications

Speaker: Professor Ekaterina Pavlovskaia
University of Aberdeen
School of Engineering

Abstract: Nonlinear systems with discontinuities or non-smooth systems have complex dynamic behaviour and they are widely used to describe phenomena observed in science and engineering. These systems have been studied extensively over the last few decades and their potential to improve engineering design is started to be recognised. However, there is still a need to improve understanding of their behaviour and verify it experimentally. This keynote lecture will be focussed on the dynamics of non-smooth systems which are used to model some engineering applications.

Bio: Professor Ekaterina graduated with first class degree with distinction in Mechanical Engineering from St.Petersburg State Polytechnical University in 1996, obtained a PhD in Applied Mathematics and Physics from the Russian Academy of Science in 1998, and then held an academic position at St Petersburg State University and had a short research spell at Ford Research Laboratory in the US, before joining the University of Aberdeen as a Research Fellow in 2000. Ekaterina is currently a Personal Chair in the School of Engineering and became the University's first female Head of Engineering in 2021. Her expertise is in mathematical modelling and the applications she has been working on include novel resonance enhanced drilling technology, rotordynamics, and riser mechanics. Ekaterina is an author of more than 180 scientific publications including 70+ refereed journal papers and currently Subject Editor for Journal of Sound and Vibration.

Multi-band gap metamaterials

Speaker: Professor Walter Lacarbonara
Sapienza University of Rome
Dipartimento di Ingegneria Strutturale e Geotecnica

Abstract: The main focus of this talk is on 1D and 2D metamaterials featuring a periodic distribution of highly tunable infinite-dimensional resonators. The embedded resonators are first treated as linear systems exhibiting eigenspectra which cause the appearance of single or multiple band gaps in the hosting metamaterials. The stop-bands sensitivity with respect to the design parameters is discussed. These resonators are then enriched by nonlinearities. The nonlinear wavefrequencies and waveforms away from internal resonances obtained via a perturbation approach are shown to exhibit a high nonlinear tunability which is a key for advanced applications. Various 3D printed metamaterial samples are tested experimentally using 3D laser scanning vibrometry to show very interesting wave propagation properties.

Bio: Walter Lacarbonara is a Professor of Nonlinear Dynamics at Sapienza University and Director of the Sapienza Center for Dynamics. During his graduate education he was awarded a MS in Structural Engineering (Sapienza University) and a MS in Engineering Mechanics (Virginia Tech, USA), and a PhD in Structural Engineering (Sapienza/Virginia Tech). His research interests cover nonlinear structural dynamics; dissipation in carbon nanotube/polymer nanocomposites; asymptotic techniques; nonlinear control of vibrations; experimental nonlinear dynamics; dynamic stability of structures. He is Editor in Chief of Nonlinear Dynamics, former Associate Editor for ASME Journal of Applied Mechanics, Journal of Vibration and Acoustics, Journal of Sound and Vibration. He served as Chair of the ASME Technical Committee on Multibody System and Nonlinear Dynamics, General co-Chair and technical program co-Chair of the ASME 2015 (Boston, USA) and 2013 (Portland, USA) IDETC Conferences. He has organized over 10 international symposia/conference sessions and, very recently, the First, Second, and Third International Nonlinear Dynamics Conferences (NODYCON, www.nodycon.org/2019, www.nodycon.org/2021, www.nodycon.org/2023).

His research is supported by national and international sources (EOARD/AFOSR, NSF, European Commission, Italian Ministry of Science and Education). He has published over 250 papers and conference proceedings, 4 international patents (EU/USA/China), 24 book chapters, 6 co-edited Springer books and a single-authored book (Nonlinear Structural Mechanics, Springer, NY, https://link.springer.com/book/10.1007/978-1-4419-1276-3) for which he received the 2013 Texty Award nomination by Springer US.

Hofer Prize Special Session

XIX International Symposium on Dynamic Problems of Mechanics

Speakers

Roberta de Queiroz Lima
PUC-Rio
Awarded in 2019

Oscillatory response of the simplest electromechanical system

Abstract: This paper discusses the dynamics of the simplest electromechanical system. The system is composed by two interacting subsystems, a mechanical and an electromagnetic. The system was chosen as simple as possible to highlight the mutual interaction between the two subsystems and to show that this interaction provokes an oscillatory response. Different from purely mechanical systems, here the oscillatory response does not occur due to an interplay of kinetic and potential energies. The system analyzed in this paper does not have elements that can storage potential energies, neither mechanical nor electrical. Natural frequency and normal modes are computed for the electromechanical system. The computed parameters involve mechanical and electromagnetic variables, i.e., they are hybrid, a novelty in the literature. Hybrid model coordinates, resonance and frequency responses graphs are discussed. An energetic analysis is developed. It is shown that the hybrid natural frequency determines the frequency at which occurs the interplay of energy between the mechanical and the electromagnetic subsystems.

Adriano Todorovic Fabro
University of Brasília (UnB)
Awarded in 2019

A stochastic model for intermittent two-phase flow in horizontal pipes

Abstract: Intermittent flows are common flow patterns in gas-liquid horizontal flow and attract attention and great research effort due to its importance for industrial and engineering applications. The slug flow is typically modelled based on a unit cell varying from an elongated air bubble with a liquid film in segregated flow pattern and an aerated liquid plug, the slug region, with remarkable stochastic characteristics of its alternating regions. In this paper, a two-state Markov chain model is proposed to represent the stochastic dynamics of developed slug flow in horizontal pipes. Each state represents either the liquid slug or the elongated bubble regions and the transition probabilities dictate the change of the given discrete time measurement to stay at a given state or change. This simple but insightful description of the phenomenon allows an analytical treatment of the statistics of Markov chain stochastic process. Measurement stations with two double wire resistive sensors are used to obtain the void fraction time series and a corresponding two-state representation. It is shown that the Markov chain model can successfully represent second-order statistics of the measurement, such as the autocorrelation and power spectral density, given an appropriate choice of the chain order. Subsequently, statistics of some slug flow features are estimated using the proposed approach and their interpretation as random variables derived from the void fraction stochastic process is discussed.

Thiago Gamboa Ritto
Federal University of Rio de Janeiro (COPPE/UFRJ)
Awarded in 2015

Model selection and parameter calibration of dynamical systems using the Bayesian approach

Abstract: In this talk I will go through some research I have developed with other members of the DINAME community (Savi, Sampaio, Weber, Aguiar, Castello, Rochinha, Pinto, Cavalinli, Cunha Jr, Arruda, Fabro, Silva, Cordioli, Cursi, Lopez, Daniel, Velho,...), which are related to nonlinear dynamics, uncertainty quantification and model calibration. Then, I will show results of a recently published article where Castello and I have used the Bayesian approach to both (i) model selection and (ii) parameter identification in a nonlinear dynamic drill-string problem.

Aldemir Aparecido Cavallini Junior
Federal University of Uberlândia (FEMEC/UFU)
Awarded in 2017

Dynamics of rotating machines: a perspective from the LMEst-UFU

Abstract: This talk is dedicated to presenting an overview of the research on rotordynamics developed in the last years at the LMEst-UFU. Hydrodynamic and magnetic bearings, fault identification, modeling of mechanical and electrical components, and artificial intelligence applications, are some of the topics that will be discussed in this presentation. Some results obtained in the context of performed RD projects at the LMEst-UFU will be presented as well.

Aline Souza de Paula
University of Brasília (UnB)
Awarded in 2013

Recognition of patterns in nonlinear dynamic systems from time series

Abstract: The recognition of patterns in data from a dynamical system response can provide valuable information for classification, prediction and identification, being important to deal with several problems in practical applications. The time series of a single system variable contains information about the entire dynamical system, making it a powerful information source to pattern recognition. In this talk, I will go through the analysis of three different nonlinear dynamical systems in the context of pattern identification using different techniques. At first, I will use recurrence plot to identify different orbits in a nonlinear pendulum. The second analysis consists in the identification of flow regime in a fluidized bed through a spatiotemporal analysis using chaotic invariants. At last, I will present the use of symbolic analysis to identify cardiac pathologies from ECG time series obtained from numerical simulation of a mathematical model.