The IFToMM International Symposium on Emerging Fields in Mechanism and Machine Science

EFI^{MMS} 2026

Detailed Program

Conference Booklet

CONFERENCE INFORMATION

The International Federation for the Promotion of Mechanism and Machine Science (IFToMM) is one of the largest global scientific communities dedicated to the advancement of mechanism and machine science and its applications. Since its establishment in 1969, IFToMM has been committed and successful to uniting individuals from diverse nationalities and academic systems to move forward scientific and technological knowledge in all areas related of mechanism and machine science, fostering strong international collaboration.

The IFToMM Young Faculty Group, as one of the four IFToMM Cross-Disciplinary groups (CDGs), is a collective of early-career academics working to further this mission. By bringing together young professors and lecturers from around the world, the group seeks to explore how mechanism and machine science can contribute to solving future academic and technological challenges.

After a successful first International Symposium of the IFToMM Young Faculty Group (YFG) in 2023, the YFG launches this Second Edition of **the IFToMM International Symposium on Emerging Fields in Mechanism and Machine Science (EFI^{MMS} 2026)** as first joint symposium together with the Cross Disciplinary Groups "IFToMM Women's Group" (WG) and "IFToMM Graduate Student Group" (GGG) for a stronger global reach. The joint symposium aims at bringing together young researchers and students from the whole spectrum of disciplines covered by IFToMM, offering a focused and engaging environment for participants to present and publish their work, explore collaborative opportunities, and discuss emerging trends and challenges in the field, and also inviting experienced researchers for interaction with the next generations.

CONFERENCE HONORARY CHAIRS

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Said Zeghloul (France)

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Abdelbadia Chaker(France)

Claudio Villegas(Chile)

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REGISTRATION DESK

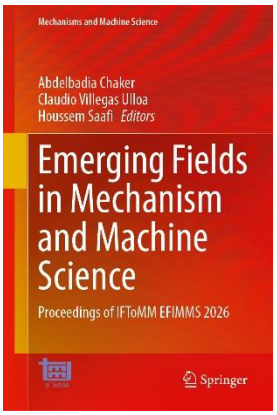
A registration desk will be available during the conference at the hall of the Hotel.

PROCEEDINGS

The proceedings will be published in the Springer book:

Emerging Fields in Mechanism and Machine Science

Proceedings of IFToMM EFIMMS 2026



ORAL PRESENTATIONS

Authors should take into account the following points when preparing their presentations:

- Presentations have to be delivered in English, the official language of EFI^{MMS} 2026.
- Presenters will be given a maximum of 15 minutes for the presentation plus 3 minutes for questions and answers and 2 minutes for transition to the next speaker.
- Oral presentation should be given as a PowerPoint or a PDF. All graphics and text should be in English.
- Presenters should provide their presentation before the start of their session.
- A video projector, PC and microphone will be provided in the conference sessions.

CONFERENCE SCHEDULE

The EFI^{MMS} 2026 schedule is available at:

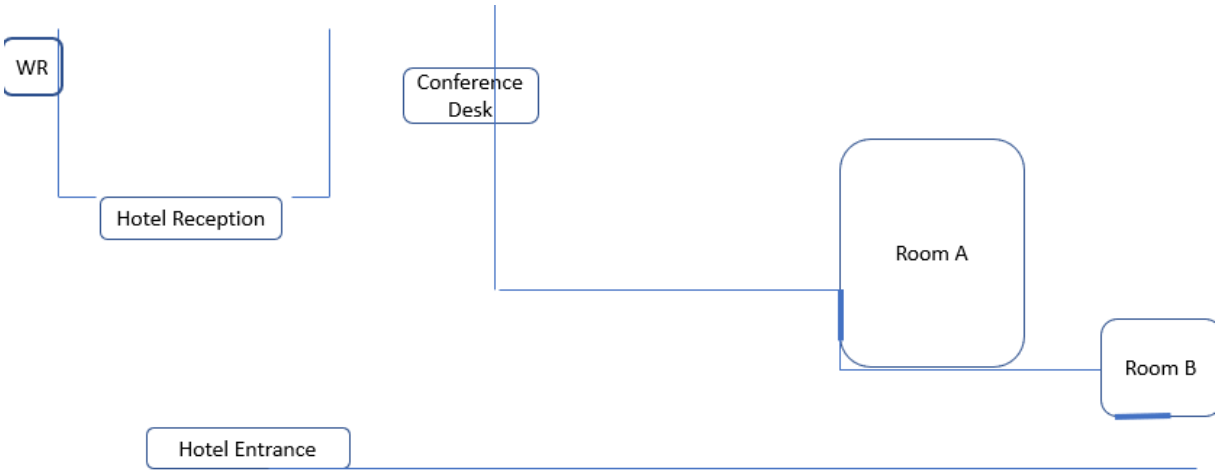
PROGRAM

Program Overview

The IFToMM International Symposium on Emerging Fields in Mechanism and Machine Science (EFIMMS 2026)

Program

Hour		*Tusday* 14/04/2026	*Wednesday* 15/04/2026	*Thursday* 16/04/2026	*Friday* 17/04/2026
8:30					
8:30	8:40		Opening		
8:40	9:30		Keynote Pr Andres Kecskemethy *University Duisburg-Essen, Germ* *IFToMM President*	Keynote Pr Daniele Cafolla *University of Swansea, UK*	S10: Tribology, Materials& Vibration ID: 32, 45, 62, 76, 19 (A)
9:30	10:30		S1: Mechanism Syntheis II ID: 24,40,57 (A)	S4: Parallel Mechanism I ID: 80,21,34 (A)	
10:30	10:50		*Coffee-break*		
10:50	12:30		S2:Mechanism Syntheis II ID: 64,63,52,23,71 (A)	S5: Mechanism Meodologies ID: 26, 70, 66, 79, 67 (A) S6: Tribology, Materials & Vibration ID: 30, 7, 25,58, 59 (B)	S11: Parallel Mechanism II ID: 61,14,9 (A) *Closing Ceremony*
12:30	13:50	Registration	*Lunch*	ISC Meeting *Lunch* *Group Photo*	*Lunch*
13:50	15:00		S3: Bio-inspired Systems & Biomechanics ID: 3, 43, 78, 72, 46 (A)	S7:Control & Planning I ID: 11, 38,69, 6,40 (A) S8: Short papers Session ID:31, 16, 10, 27, 15, 17, 51, 47 (B)	
15:00	15:30	MechDev Workshop Vincent Brünjes RWTH Aachen University, Germany (B)			
15:30	15:50		*Coffee-break*		
15:50	16:40		Round Table (A)	S9:Control & Planning II (A)	
16:40	18:00		Welcome Reception	ID: 29, 35, 65, 18,13 20h: Gala dinner & Awards	(A) Room A (B) Room B
18:00	20:00				



MechDev Workshop : Room B
Pleanary Sessions: Room A
Parallel Sessions: Room B
Gala Dinner : Room A
Welcome reception: WR

EFI^{MMS}'26 ● DETAILED PROGRAM

Day 1: Wednesday 15/04/2026

08:30 – 09:30 **Opening & Keynote**

Session chair: Pr. Claudio Villegas

Pr. Andres Kecskemethy, University of Duisburg Essen, IFTOMM President

Title: IFToMM – Origins, Activities and Visions of our Worldwide Community

09:30 – 10:30 **S1: Mechanism Synthesis I** ***Room A***

Session chair: Pr. Abdelfattah Mlika ;

ID 24: A New Perspective on Number Synthesis: Introduction and Application of Topological Requirements for Kinematic Chain Filtering
Souza, G., Murai, E., Piga Carboni, A., Martins, D.

ID 40: Design optimization of redundant spherical parallel manipulator with an unlimited self-rotation
Lahdiri, C., Saafi, H., Mlika, A.

ID 57: Structural Synthesis of Platform Type Manipulators via Connection-Based Adjacency Matrix
Uslu, T., Yazici, M., Koçak, M., Gezgin, E.

10:30 – 10:50 **Coffee Break**

10:50 – 12:30 **S2: Mechanism Synthesis II** ***Room A***

Session chair: Pr Pau Català Calderón / Pr Tianwei Zhang

ID 64: Design and Kinematic Geometric Analysis of a Reconfigurable Bricard Mechanism with Rolling Joints
Xu, T., Li, H., Li, L., Lyu, S.

ID 63: A Novel 1-DOF Deployable Unit Consisting of Four Parallelogram Linkages
Meng, Q., Kecskeméthy, A.

ID 52: On the Design of an Underactuated Vaccine Administration Robot Manipulator: Kinematic Synthesis and Optimization
Koçak, M., Uslu, T., Arıcı, A., Yazici, M., Gezgin, E.

ID 23: Dimensioning Human Operated Balanced Manipulators for Material (Un)Loading Operations
Bozdemir, İ., Dana, Ü., Gezgin, E., Çetin, L.

ID 71: Friction Torque and Energy Loss Prediction of Single Degree-of-Freedom Mechanisms Considering the Effects of Variable Inertia
Català Calderón, P., Veciana, J., Jordi Nebot, L.

12:30 – 13:50 **Lunch**

13:50 – 15:30 **S3: Bio-inspired Systems & Biomimetics** ***Room A***

Session chair: Pr Med Amine Laribi / Pr. Paulo Flores

ID 3: Experimental test of a Wave Energy Converter with a Bioinspired Negative Stiffness Mechanism
Alarcon, C., Villegas, C., Pierart-Vásquez, F., Carrasco, D., Delgado, R.

ID 43: A Bio-inspired Tendon-Driven Morphing Hydrofoil: Design, Modeling, and Variable Stiffness Characterization
Wang, X., Chen, B., Ling, J., Zhang, T., Shen, Y.

ID 78: Numerical analysis of a variable stiffness actuator intended for exoskeleton use
Bermeo Calderon, J., Castillo Castañeda, E., Chaker, A., Laribi, A.

ID 72: Motion Simulation for the Anatomical Reconstruction of Facial Muscles and Skulls with a Spherical 3D Printer
Micle, L., Tulcan, E., Sticlaru, C., Oarcea, A., Lovasz, E.

ID 46: Capability Mapping of a Tendon-Driven Continuum Robot Using Task-Space Sampling and PSO-Based IK
Jabari, M., Visconte, C., Quaglia, G., Chaker, A., Laribi, A.

15:30 – 16:40 **Round table** ***Room A***

Moderators: Claudio Villegas & Michal Olinski

17:00 – 19:00 **Welcome Reception**

Day 2: Thursday 16/04/2026

08:30 – 09:30 **Keynote**

Session chair : Pr. Abdelbadia Chaker

Pr. Daniele Cafolla, Swansea University

To 'Beep' or not to 'Beep': Exploring Embodied AI when smart machines meet an unscripted world

09:30 – 10:30 **S5: Parallel Mechanism I** ***Room A***

Session chair : Pr. Houssem Saâfi

ID 80: Mechanism Design and Inverse Kinematics of a 5-DOF Hybrid (Parallel–serial) Manipulator
Novikov, A., Laryushkin, P., Fomin, A.

ID 21: Kinematic Analysis of a Spherical Parallel Mechanism with 3-Degree of Redundancy
Essomba, T.

ID 34: Workspace and energetic performance analysis of a 2-DOF planar parallel manipulator
Scalera, L., Vidoni, R., Gasparetto, A.

10:30 – 10:50 **Coffee Break**

Parallel Sessions

10:50 – 12:30 **S6: Mechanism Methodologies** ***Room A***

Session chair : Pr. Burkhard Corves / Pr Mertcan Koçak

ID 26: Implementing a Student-Centered Teaching Strategy in a Theory of Machines and Mechanisms Course
Flores, P.

ID 70: MECAPUCP: Interactive Teaching Tool for Mechanism Kinematics
Velis, A., Flores Sanchez, M., Tokuda Quiroz, T., Lavayen, D., Hermoza Llanos, E., Carrillo Li, E., Rodriguez, J.

ID 66: The Italian initiative for MMS early career researchers: lessons learned and historical development
Mottola, G., Russo, M., Ida, E.

ID 79: Anomaly detection in scale model trains using LSTM neural networks
Lopez Ramírez, J., Sandoval Valencia, T., Escobar Rangel, H., Huerta-Manzanilla, E., Basaldua-Sanchez, J., Jauregui Correa, J.

ID 67: A Seven-Step Procedure to Model and Simulate Dynamics of Machines and Mechanisms
Flores, P.

10:50 – 12:30 **S7: Tribology, Materials & Vibration** ***Room B***

Session chair: Pr. Dae-Eun Kim / Pr Fernando Viadero Monasterio

ID 30: A Review of Polymer and Steel Gears - Tribology and Modeling
Mustafa, M., Alwattar, M., Abdula, R., Mohammed, O., Wadullah, H.

ID 7: Anisotropic Polyurethane Foams: Evolution of Mechanical Properties under Cyclic Compression
Ben Abdeljelil, D., Chatti, S., Ouled Ahmed Ben Ali, R.

ID 25: Finite Element Analysis of a Novel Active Ankle-Foot Prosthesis for Improved Load Distribution
Zhetenbayev, N., Akhmejanov, S., Sultan, A., Bigaliyeva, Z., Shylmyrza, U., Nurgizat, Y., Sergazin, G.

ID 58: Development and validation of a load equivalence framework for predicting crack growth in Al 2024 T3 aluminum alloy
Bouaziz, B., Eltaief, M., Bouraoui, C.

ID 59: Evaluation of equivalent residual stress under variable loads for fatigue crack propagation
Bouaziz, B., Eltaief, M., Bouraoui, C.

12:30 – 13:50 **Lunch** 13:10 – 13:50 **ISC Meeting**

13:50 – 15:30 **S8: Control & Planning I** ***Room A***

Session chair: Pr. Lorenzo Scalera / Pr Houssein Lamine

ID 11: Travel Path and Trajectory Planning for Robot-Assisted Multidirectional Additive Manufacturing
Witte, M., Yang, Z., Hüsing, M., Corves, B.

ID 38: Actuation Along a Single Linear Axis: The Dynamics of the Single-Rail Tripteron
Boscariol, P., Tamellin, I.

ID 69: Optimization of PID-Controlled Active Suspensions Using Metaheuristic Algorithms for Improved Railway Vehicle Passenger Comfort
Mahmoudi, H., Houidi, A.

ID 6: AI-Augmented Adaptive Control of Lower-Limb Exoskeletons Considering Human Parametric Variations
Khanamiryan, Z., Ulikyan, A.

ID 48: Gait Trajectory Planning for Biped Robots via LIPM and LPM Models
Ajili, R., Kribi, B., Houidi, A.

13:50 – 15:30 **S9: Short Papers Session** ***Room B***

Session chair: Pr. Sami Chatti / Pr Yayi Shen

ID 31: Cyclic Compression Behavior of Rigid Polyurethane Foam at Different Strain Rates
Ouled Ahmed Ben Ali, R., Ben Abdeljelil, D., Chatti, S.

ID 16: Developing a Testing Environment for Parameter Optimization of Dynamic Movement Primitives
Erwig, F., Weidemann, C., Wiartalla, J., Corves, B., Hüsing, M.

ID 10: Investigation of tribological behavior of thin solid films
Kang, W., Kim, D.

ID 27: Preliminary Conceptual Design of a Compliant Forceps to be Utilized for Rotator Cuff Arthroscopic Surgery
Kılıçoğlu, R., Acar, B., Yüce, Y., İşler, Y., Gezgin, E.

ID 15: Sensitivity Analysis of Ultrasonic Plate Sonotrode: Influence of Measurement Accuracy and Manufacturing Tolerances
Bolk, J., Mirz, C., Kirk, E., Corves, B.

ID 17: Skyhook and Groundhook Control for a Robotic Semi-Active Suspension
Olinski, M.

ID 51: Design and Development of a Magnetic Actuation System for Micro/Milli-Robot Manipulation
Ersü, M., Doğanay, S., Turgut, A., Çetin, L.

ID 47: Performance Optimization of Planar Parallel Robot Control Using Meta-Heuristic Methods
Ajili, R., Mahmoudi, H., Kribi, B., Houidi, A.

15:30 – 15:50 **Coffee Break**

15:50 – 17:10 **S10: Control & Planning II** ***Room A***

Session chair: Pr. Eduardo Castillo / Pr Ajmi Houidi

ID 29: LQR Trajectory Tracking Control for Connected and Automated Vehicles in Unsignalized Intersections
Viadero-Monasterio, F., Meléndez-Useros, M., Zhang, N., López Boada, B., López Boada, M.

ID 35: Latency and Safety Assessment of Low-Cost Distance Sensor Integration into ROS2 for Human–Robot Collaboration
Keunecke, S., Ochsendorf, M., Hüsing, M., Corves, B.

ID 65: Experimental Evaluation of Camera-Tag Docking Strategies for Mobile Robot Charging Stations
Lamine, H., Makki, H., Romdhane, L.

ID 18: Automated GPU code generation for rigid-body simulations using SYMKIN symbolic optimizer
Guigon, L., Boudon, B., Mezouar, Y., Bouzgarrou, C., Kecskeméthy, A.

ID 13: About the design and development of the omnidirectional electric powered wheelchair MoviWE.Q
Tagliavini, L., Botta, A., Colucci, G., Baglieri, L., Duretto, S., Amodio, F., Toccaceli, L., Quaglia, G.

20:30 – **Gala Dinner & Awards**

Day3: Friday 17/04/2026

08:30 – 10:30 **S11: Tribology, Materials & Vibration** ***Room A***

Session chair: Pr Chokri Bouraoui / Pr Daniel Lavayen

ID 32: Estimation of Remaining Useful Life (RUL) in Bearings using Fusion of Machine Vision Features and Vibration Analysis
Sandoval Valencia, T., Lopez Ramírez, J., Huerta-Manzanilla, E., Hurtado-Hurtado, G., Jauregui Correa, J.

ID 45: Hybrid Actuator and Sensor Fault Diagnosis for active steering systems
Meléndez-Useros, M., Viadero-Monasterio, F., López Boada, M., López Boada, B.

ID 62: Experimental study of the axial crushing mechanics of Yoshimura tubes
Lavayen, D., Barrueta, J., Gonzales, L., Monge, J., Quispe, M., Requena, E., Hermoza Llanos, E.

ID 76: Numerical study of the effects of thickness and bracing on lute acoustics
Dhokkar, A., Rezgui, M., Trabelsi, A.

ID 19: Residual Vibration Suppression for Arbitrary Move Times using a Novel Fourier-based Profile Tuning
Kütük, M., Kapucu, S.

10:10 – 10:30 **Coffee Break**

10:30 – 11:30 **S12: Parallel Mechanism II** ***Room A***

Session chair: Pr. Terence Essomba

ID 61: Development of a Two-Degree-of-Freedom Model of Forearm for Pronation-Supination Motion
Öksüz, M., Kentel, B.

ID 14: A study of a Remote Center of Motion mechanism as a laparoscopic training tool holder
Doudech, I., Chaker, A., Houidi, A., Mlika, A., Laribi, A.

ID 9: Underactuated Gravity-Assisted Cable Robot for Microphone Transportation
Riabtsev Chestnykh, M., Laribi, A., Petuya, V.

11:30 Closing Ceremony

12:00 – Lunch