



The 12th IFTOMM International
Symposium on Science of Mechanisms
and Machines - SYROM'2017

November 02 - 03, 2017, Iasi, Romania



CONFERENCE PROGRAM

THE 12th IFTOMM International Symposium on Science of
Mechanisms and Machines



SYROM'2017

November 02 – 03, 2017
IAȘI, ROMANIA



Organized by:

**ROMANIAN ASSOCIATION FOR THE SCIENCE OF MECHANISMS AND MACHINES –
ARoTMM**

and

MECHANICAL ENGINEERING FACULTY

**“GHEORGHE ASACHI” TECHNICAL UNIVERSITY OF
IASI**



With the support of:

**INTERNATIONAL FEDERATION FOR THE PROMOTION OF MECHANISM AND MACHINE
SCIENCE - IFTOMM**



The 12th IFToMM International
Symposium on Science of Mechanisms
and Machines - SYROM'2017

November 02 - 03, 2017, Iasi, Romania



CONFERENCE PROGRAM OUTLINE

Wednesday, November 01, 2017

18:00 – 20:00 Get Together (University Restaurant)

Thursday, November 02, 2017

09:00 – 10:00 Participants registration

10:00 – 10:30 Welcome, Opening Addresses

(Conference Chair, Rector, IFToMM President)

10:30 – 12:30 Plenary Session (University Conference Hall)

1. Service Robots for Cultural Heritage Applications

G. CARBONE, Italy

2. Designing Robots for Human-Robot & Robot-Robot Collaboration - Applications to Civil Engineering, Factory for the Future and Payload Transport

J.-C. FAUROUX, France

3. Kinematically Redundant Octahedral Motion Platform for Virtual Reality Simulations

G. NAWRATIL, Austria

12:30 – 14:30 Lunch Break

14:30 – 15:45 Sections Session (for location, see detailed program)

Poster Session (Mechanical Engineering, Mechatronics and Robotics

Department - IMMR, 1st floor)

15:45 – 16:15 Coffee Break

16:15 – 17:30 Sections Session

19:00 Conference Gala Dinner

(Cosmopolitan Restaurant at Ramada hotel)

Friday, November 03, 2017

09:00 – 09:45 Sections Session

09:45 – 10:00 Coffee Break

10:00 – 10:15 Conference Closing Ceremony (M3 Room, IMMR Department)

10:30 – 12:30 ARoTMM General Assembly (M3 Room, IMMR Department)

12:30 – 14:30 Lunch

15:00 – 17:00 Visit to “The Palace of Culture”.

Conference Chairman

Ioan DOROFTEI (Romania)
President of ARoTMM

Co-Chairmen

Doina PISLA (Romania)
Erwin-Christian LOVASZ (Romania)

International Scientific Committee

Catalin ALEXANDRU (Romania)
Paun ANTONESCU (Romania)
Virgil ATANASIU (Romania)
Ioan ARDELEAN (Romania)
Karsten BERNS (Germany)
Ion BOSTAN (Rep. of Moldova)
Tobias BRUCKMANN (Germany)
Marco CECCARELLI (Italy)
Burkhard CORVES (Germany)
Giuseppe CARBONE (Italy)
Ioan DOROFTEI (Romania)
Cezar DUCA (Romania)
Valeriu DULGHERU (Rep. of Moldova)
Jean-Christophe FAUROUX (France)
Paulo FLORES (Portugal)
Grigore GOGU (France)
Shuo HUNG CHANG (Taiwan)
Manfred HUSTY (Austria)
Zhao JUN (China)
Codruta JALIU (Romania)
Dirk LEFEBER (Belgium)
Erwin-Christian LOVASZ (Romania)
Dan MANDRU (Romania)
Vistrian MATIES (Romania)
Vasile MERTICARU (Romania)
Karl-Heinz MODLER (Germany)
Mircea NEAGOE (Romania)
Cezar OPRISAN (Romania)
Nicolae ORLANDEA (USA)
Victor PETUYA (Spain)
Doina PISLA (Romania)
Annita RAATZ (Germany)
Alexandru RUS (Romania)
Stefan STAICU (Romania)
Daniela TARNITA (Romania)
Bram VANDERBORGHT (Belgium)
Ion VISA (Romania)
Philippe WENGER (France)
Teresa ZIELINSKA (Poland)

Organizing Committee Chairman

Cezar OPRISAN (Romania)

Organizing Committee

Virgil ATANASIU (Romania)
Dumitru LEOHCHI (Romania)
Emil BUDESCU (Romania)
Florentin BUIUM (Romania)
Eugen MERTICARU (Romania)

Session 1: Mechanism Design 1

Thursday, November 02, 2017

Chairmen: *Prof. Marco CECCARELLI* and *Prof. Ion VISA*

Paper no.	Title of the papers and authors	Hours	Room
041	Solar Tracking Parallel Linkage Applicable for all Latitudes <i>I. VISA, M. NEAGOE, M. MOLDOVAN, M. COMSIT</i>	14.30 - 14.45	M3 IMMR Dep.
018	On the Design of the Gravity Balancer Using Scotch Yoke Derivative Mechanism <i>H.-N. NGUYEN, W.-B. SHIEH</i>	14.45 - 15.00	
019	Structural synthesis of planar 10-link 1-DOF kinematic chains with up to pentagonal links with all possible multiple joint assortments for mechanism design <i>V. POZHBELKO, E. KUTS</i>	15.00 - 15.15	
033	Kinematic-Dynamic Analysis of the Cam-Worm Mechanism for Humanoid Robots Shrug <i>M. PENČIĆ, M. ČAVIĆ, M. RACKOV, B. BOROVIĆ, Z. LU</i>	15.15 - 15.30	
038	Drive System of the Robot Eyeballs and Eyelids with 8 DOFs <i>M. PENČIĆ, M. ČAVIĆ, M. RACKOV, B. BOROVIĆ, Z. LU</i>	15.30 - 15.45	

COFFEE BREAK: 15.45 – 16.15

Session 2: Mechanism Design 2

Thursday, November 02, 2017

Chairmen: *Prof. Paun ANTONESCU* and *Prof. Cezar DUCA*

Paper no.	Title of the papers and authors	Hours	Room
059	Forces Transmission at Structural Group 0/4/2 <i>C. DUCA, F. BUIUM</i>	16.15 - 16.30	M3 IMMR Dep.
048	Topological structure of the actuating mechanisms of the urban buses doors <i>D. ANTONESCU, C. BREZEANU, O. ANTONESCU</i>	16.30 - 16.45	
049	Geometric synthesis of the actuating mechanisms of urban bus doors <i>D. ANTONESCU, I. POPESCU, O. ANTONESCU</i>	16.45 - 17.00	
060	Synthesis of the mechanisms used to actuate the cabinet doors <i>D. ANTONESCU, F. GASPAR, P. ANTONESCU</i>	17.00 - 17.15	

Session 3: Biomechanics and Rehabilitation 1

Thursday, November 02, 2017

Chairmen: *Prof. Daniela TARNITA* and *Prof. Erwin LOVASZ*

Paper no.	Title of the papers and authors	Hours	Room
030	Design and Finite Element Analysis of a New Spherical Prosthesis-Elbow Joint Assembly <i>D. TARNITA, C. BOBORELU, D.-L. POPA, D.-N. TARNITA</i>	14.30 - 14.45	M4 IMMR Dep.
040	Experimental Method for Dynamic Evaluation of Spinal Column Deformation Exercises <i>A.-M. VUTAN, V. CIUPE, C. GRUESCU, E.-Chr. LOVASZ</i>	14.45 - 15.00	
042	Kinematic design of a parallel robot for elbow and wrist rehabilitation <i>B. GHERMAN, G. CARBONE, N. PLITEA, A. BANICA, M. CECCARELLI, D. PISLA</i>	15.00 - 15.15	
044	Preliminary Design for a Spherical Parallel Robot for Shoulder Rehabilitation <i>C. VAIDA, G. CARBONE, I. ULINICI, N. PLITEA, D. PISLA</i>	15.15 - 15.30	
046	Study on the effects of rotation axis misalignment in an exoskeleton-human hip joint <i>C. MOLDOVAN, I. MANIU, E.-Chr. LOVASZ, A. M. STOIAN</i>	15.30 - 15.45	

COFFEE BREAK: 15.45 – 16.15

Session 4: Biomechanics and Rehabilitation 2

Thursday, November 02, 2017

Chairmen: *Prof. Doina PISLA* and *Prof. N. DUMITRU*

Paper no.	Title of the papers and authors	Hours	Room
009	Children Locomotion Rehabilitation Test Bed Designed from Kinematic Considerations <i>C. COPILUSI, N. DUMITRU, A. MARGINE</i>	16.15 - 16.30	M4 IMMR Dep.
017	Design and Simulation of an Underactuated Mechanism for Leg Exoskeleton <i>S. YAO, M. CECCARELLI</i>	16.30 - 16.45	
026	Design, Numerical Simulation and Manufacturing of a Powered Wheelchair <i>I. D. GEONEA, N. DUMITRU, A. ROSCA, A. DIDU</i>	16.45 - 17.00	
029	Methodology for determining the positions of the human spine vertebrae <i>S. BUTNARIU, C. ANTONYA</i>	17.00 - 17.15	
056	Neurorobotic Investigation into the Control of Artificial Eye Movements <i>A. MUSSINA, M. CECCARELLI, G. BALBAYEV</i>	17.15 - 17.30	

Session 5: Mobile Robots

Thursday, November 02, 2017

Chairmen: *Prof. Jean-Christophe FAUROUX* and *Prof. Ioan DOROFTEI*

Paper no.	Title of the papers and authors	Hours	Room
037	Dimensional Synthesis of a Robotic Arm for Mobile Manipulator Using an Interactive Geometric Software <i>S. MARAJE, J.-C. FAUROUX, B.-C. BOUZGARROU, L. ADOUANE</i>	14.30 - 14.45	103 IMMR Dep.
012	Design and Simulation of a Snake Like Robot <i>L.-M. CIUREZU-GHERGHE, N. DUMITRU, C. COPILUSI</i>	14.45 - 15.00	
043	Single DoF Leg Mechanisms Analysis using GIM Software <i>F. POP, C. POP, E.-Chr. LOVASZ, S. M. GRIGORESCU, I. CARABAS</i>	15.00 - 15.15	
055	Design and Simulation of a Novel Hybrid Leg Mechanism for Walking Machines <i>M. DEMIREL, G. CARBONE, M. CECCARELLI, G. KIPER</i>	15.15 - 15.30	
031	Velocity Variation Analysis of an Autonomous Vehicle in Narrow Environment <i>T. GIRBACIA, Gh. MOGAN</i>	15.30 - 15.45	

COFFEE BREAK: 15.45 – 16.15

Session 6: Mechanism Theory

Thursday, November 02, 2017

Chairmen: *Prof. S. ZAWISLAK* and *Prof. Daniel CONDURACHE*

Paper no.	Title of the papers and authors	Hours	Room
045	Charts of relative and absolute velocities of chosen parts of plane biplanetary gear <i>J. DREWNIAK, J. KOPEĆ, J. MARSZAŁEK, K. STAŃCO, S. ZAWIŚLAK</i>	16.15 - 16.30	103 IMMR Dep.
008	Modelling of the static response of a wind / hydro turbine with two rotors and a 1DOF speed increaser <i>R. SAULESCU, M. NEAGOE, C. JALIU</i>	16.30 - 16.45	
034	Higher-Order Cayley Transforms for SE(3) <i>D. CONDURACHE</i>	16.45 - 17.00	
024	Kinetostatic of Knife Edge Translating Follower under Dry Friction Conditions <i>S. ALACI, F.-C. CIORNEI, E.-V. ALEXANDRU, C. FILOTE</i>	17.00 - 17.15	
025	Tetrapod coupling <i>S. ALACI, F. BUIUM, F.-C. CIORNEI, D.-I. DOBINĂ</i>	17.15 - 17.30	

Session 7: Manipulators 1

Friday, November 03, 2017

Chairmen: *Prof. Giuseppe CARBONE* and *Prof. Iosif CARABAS*

Paper no.	Title of the papers and authors	Hours	Room
001	Design and simulation of a parallel-serial LARMbot arm <i>M. RUSSO, M. CECCARELLI</i>	09.00 - 09.15	M3 IMMR Dep.
039	Kinematic Analysis of a 3-RRPS Manipulator <i>S. M. GRIGORESCU, E.-Chr. LOVASZ, C. POP</i>	09.15 - 09.30	
063	Dynamic Modeling and Simulation of Sliding Mode Control for a Cable Driven Parallel Robot <i>F. INEL, Z. MANSOURI, M. CECCARELLI, G. CARBONE</i>	09.30 - 09.45	

Session 8: Manipulators 2

Friday, November 03, 2017

Chairmen: *Prof. Catalin ALEXANDRU* and *Prof. Silviu BUTNARIU*

Paper no.	Title of the papers and authors	Hours	Room
027	Optimization of a spatial 2 DOF parallel mechanism used for orientation <i>C.-I. BOANTA, S. BESOIU, C. BRISAN</i>	09.00 - 09.15	M4 IMMR Dep.
014	Tensioned carbon fiber winding on a collaborative robots cell. Part 2 (tests) <i>M.-P. SBANCA, Gh. MOGAN</i>	09.15 - 09.30	
015	Tensioned carbon fiber winding on a collaborative robots cell. Part 1 (system) <i>M.-P. SBANCA, Gh. MOGAN</i>	09.30 - 09.45	

Session 9: Experimental Mechanics

Friday, November 03, 2017

Chairmen: *Prof. Cezar OPRISAN* and *Prof. Stelian ALACI*

Paper no.	Title of the papers and authors	Hours	Room
013	Use of Hypocycloidal Motion in the Study of Rolling Friction <i>S. TODERAS SIRETEAN, I. MUSCA, S. ALACI, F.-C. CIORNEI</i>	09.00 - 09.15	103 IMMR Dep.
028	Experimental Bench for Spur Gears Efficiency Measurement <i>N. DUMITRU, E. DRAGUT, N. CRACIUNOIU, I.D. GEONEA</i>	09.15 - 09.30	
023	Design, Development and Testing of a Dynamometer for Drill Force Measurement <i>I.D. GEONEA, A. ROSCA, P. RINDERU</i>	09.30 - 09.45	

SYROM'2017 Poster Session

Thursday, November 02, 2017

Paper no.	Title of the papers and authors	Hours	Room
002	Frictional contact study of the chain link / polyamide contact <i>M.T. LATES, C.C. GAVRILA, R. PAPUC</i>	14.30 - 17.30	IMMR Dept. 1 st floor
003	Design of a Class of Novel 3T1R Parallel Mechanisms with Low Coupling Degree <i>H. SHEN, H. QIANG, Y. SHEN, T.-LI YANG</i>		
005	Influence of number of teeth and centrifugal force on forces distribution on silent chain transmissions <i>L. JURJ, R. VELICU</i>		
007	Influence of chain pitch increase on bush-sprocket contact for bush chain drives <i>R. VELICU, R. SAULESCU, L. JURJ</i>		
011	Method for the Kinetostatic Analysis of the Road Vehicles Axle Suspensions <i>C. ALEXANDRU</i>		
032	Increasing the Resistance of Scuffing for HCR External Helical Gearing <i>M. RACKOV, M. ČAVIĆ, M. PENČIĆ, M. VEREŠ</i>		
036	Modular reconfigurable robots <i>M. O. TATAR, C. I. CIREBEA</i>		
050	Mechanical system for determining the shot force at football <i>E. MERTICARU, L. POPESCU, E. BUDESCU</i>		
057	New Concepts of Ankle Rehabilitation Devices <i>C. RACU (CAZACU), I. DOROFTEI</i>		
058	Some Specific Aspects of Internal Gears with Small Teeth Numbers Difference <i>O. CRIVOI, I. DOROFTEI</i>		
061	An IKP-DKP approach emphasizing singularities of 9R(3-RRR) mechanisms <i>F. BUIUM, D. LEOHCHI, C. DUCA</i>		



1 – University Conference Hall; 2 – IMMR Department; 3 – University Restaurant