



The 9th IFTToMM International Workshop On New Trends In **Medical And Service Robotics**

MeSRob'25

Detailed Program





STÄUBLI



MeSRob 2025 July 2-4, Futuroscope-Poitiers, France

Conference Booklet

CONFERENCE INFORMATION

The 9th IFToMM International Workshop On New Trends In Medical And Service Robotics, MeSRob 2025, was organized by the CoBRA (Cobotics, Bio-Engineering & Robotics for Assistance) Team of the Pprime Institute of the University of Poitiers. It was held at the Futuroscope Technopole, the CNAM-IFMI building, in the city of Poitiers, France, from July 2 to 4 2025.

MESROB is one of the main conferences for the IFToMM Technical Committees on Biomechanical Engineering.

Since the first symposium, in 2012 in Cluj-Napoca, Romania, MESROB has attracted eminent experts and provided a forum for researchers working in the field of medical and service robots. Continuing with the editions: MESROB 2013 in Belgrade, Serbia, MESROB 2014 in Lausanne, Switzerland, MESROB 2015 in Nantes, France, MESROB 2016 in Innsbruck and Graz, Austria, MESROB 2018 in Cassino, Italy, and MESROB 2020 and 2021 in Basel, Switzerland, MESROB 2023 in Craiova, Romania. The workshop experienced a significant increase in both attendance and impact on the scientific community, underscoring its rising significance and relevance within the field.

CONFERENCE CHAIRMAN

Med Amine Laribi (France)

CONFERENCE CO-CHAIRMAN

Giuseppe Carbone (Italy)

Doina Pîslă (Romania)

Saïd Zeghloul (France)

INTERNATIONAL SCIENTIFIC COMMITTEE

Bernard Bayle, France
Hannes Bleuler, Switzerland
Branislav Borovac, Serbia
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Aleksandar Rodic, Serbia
Daniela Tarniță, Romania
Philippe Wenger, France
Akio Yamamoto, Japan
Azhar Zam, Switzerland
Teresa Zielinska, Poland

LOCAL ORGANISING COMMITTEE

Abdelbadiâ Chaker
Marc Arsicault
Laurence Artus
Catherine De Saint Martin
Estelle Ferdinand

REGISTRATION DESK

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

PROCEEDINGS

The proceedings book is included in the registration fee. The proceedings will be published in the Springer book:

New Trends in Medical and Service Robotics - Proceedings of the 9th IFToMM International Workshop On New Trends In Medical And Service Robotics, MeSRob 2025



CONFERENCE BADGE

All registrants for MeSRob2025 and Technical staff members will receive a conference badge. Everybody is kindly asked to wear this badge at all sessions and social events.

WIRELESS NETWORK

Wi-Fi network access will be available during the conference.

COFFEE BREAKS AND LUNCHES

Coffee breaks and lunches are included in the registration fee and will be served at IFMI Rooms.

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 MeSRob2025.
- 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 MeSRob 2025 schedule is available at:





PROGRAM OVERVIEW

The 9th IFTOMM International Workshop on New Trends in Medical and Service Robotics - MeSRob'25

Program at a Glance

		Wednesday		Thursday		Friday	
Hour		02/07/2025		03/07/2025		04/07/2025	
8:45		Opening					
9:00 9:45		Plenary Lecture Sunil AGRAWAL Columbia University A		Plenary Lecture Doina PISLA Technical University of Cluj-Napoca A		Plenary Lecture Jean-Charles LE HUEC Bordeaux University Hospital A	
9:45 10:00		Coffee-break					
10:00		S1: Kinematics and dynamics of medical robotics A ID: 9 - 19 - 29 - 33 - 42 - 47 - 50		S4.1: Exoskeletons and prostheses A ID: 2 - 7 - 10 - 17 - 24 - 26 - 27		S3.3: Assistive and social devices A ID: 49 - 54 - 55 - 56	
11:35						S2.3: Design of medical devices B ID: 48 - 51 - 53	
12:20		Plenary Lecture Chieh-Tsai WU Chang Gung Memorial Hospital A					
12:20 14:00		Meeting of the MeSRob ISC		Lunch			
14:00 14:45		S2.1: Design of medical devices A ID: 23 - 35 - 36 - 37 - 40 - 45		S3.1: Assistive and social devices B ID: 21 - 25 - 31 - 38 - 39 - 41		Tutorial Session Daniele SPORTILLO Mathworks A	
14:45		Gala dinner & Awards		S5: Surgical robotics A ID: 4 - 6 - 18 - 30 - 32 - 34		Next Step: Surgical robotics A Diana Potop, David Berjonval and Maxime Vallée	
16:00				S2.2: Design of medical devices B ID: 1 - 5 - 8 - 13 - 15 - 22		Closing session	
16:45 17:00		Futuroscope Visit		Coffee-break			
17:00				S4.2: Exoskeletons and prostheses A ID: 28 - 43 - 44 - 46 - 52		S3.2: Assistive and social devices B ID: 3 - 12 - 14 - 16 - 20	
18:40				Cocktail dinner			
19:00 22:00		Futuroscope Night Show		La Petite France			
						A : Room A B : Room B	

(A) : Room A
 (B) : Room B

MeSRob'25 • DETAILED PROGRAM

WEDNESDAY 02.07.2025

9:00 – 9:45 ■ PLENARY LECTURE:

CHAIRER BY: SAÏD ZEGHLOUL

REHABILITATION ROBOTICS: IMPROVING EVERYDAY HUMAN FUNCTIONS

SUNIL AGRAWAL, COLUMBIA UNIVERSITY

10:00 – 12:20 ■ SESSION 1: KINEMATICS AND DYNAMICS OF MEDICAL ROBOTICS

CHAIRER BY: EDUARDO CASTILLO-CASTANEDA

- 009 FEASIBLE STATIC WORKSPACE OPTIMIZATION OF TENDON DRIVEN CONTINUUM ROBOT BASED ON EUCLIDEAN NORM**
AUTHORS: MOHAMMAD JABARI, CARMEN VISCONTE, GIUSEPPE QUAGLIA, MED AMINE LARIBI
- 019 CENTRE OF MASS KINEMATIC ANALYSIS FOR BALANCE ASSESSMENT USING A MARKERLESS POSE ESTIMATION DEVICE**
AUTHORS: RUBEN VALENZUELA MONTES, JAVIER CORRAL, MIKEL DIEZ, THOMAS PROVOT, FRANCISCO J. CAMPA, SAIOA HERRERO VILLALIBRE, ERIK MACHO, CHARLES PINTO
- 029 EMG CORRELATION WITH ELBOW JOINT KINEMATICS DURING ADL: IMPLICATIONS IN DYNAMIC MODELING OF AN UPPER LIMB ORTHOTIC DEVICE**
AUTHORS: CRISTIAN CHIHAI, DANIELA TARNITA, IONUT DANIEL GEONEA, DANUT NICOLAE TARNITA
- 033 CONTROL PERFORMANCE IMPROVEMENT OF THE EXOSKELETON ARM WITH DECOUPLED DYNAMICS**
AUTHORS: YAODONG LU, VIGEN ARAKELIAN, YANNICK Aoustin
- 042 HYPER- STATE OF RIGID BODY KINEMATICS AND AUTOMATIC DIFFERENTIATION OF TRIDENT NILPOTENT ALGEBRA**
AUTHOR: DANIEL CONDURACHE
- 047 POSITION CONTROL AND ANALYSIS OF A PNEUMATIC ELBOW JOINT UNDER PRESSURE LIMITATIONS**
AUTHORS: SAMUEL OLVERA-ROSALES, GERARDO CERECERO-LÓPEZ, IVAN HERNÁNDEZ-ARAUJO, YAMILE SANDOVAL, CHRISTOPHER D. CRUZ-ANCONA
- 050 DESIGN, FABRICATION, AND KINEMATIC CHARACTERIZATION OF A SOFT PNEUMATIC ACTUATOR**
AUTHORS: EDUARDO CASTILLO, INGRITH YURITSA PAEZ PIDACHE

14:00 – 16:00 ■ SESSION 2.1: DESIGN OF MEDICAL DEVICES

CHAIRER BY: CARL NELSON

- 023 DESIGN AND EXPERIMENTAL VALIDATION OF A GYNECOLOGICAL CONTINUUM ROBOT**
AUTHORS: CLARA KIERBEL, MATTEO RUSSO
- 035 WORKBENCH STATICS EVALUATION OF THE QUASI-SPHERICAL PARALLEL MANIPULATOR**
AUTHORS: DANIEL PACHECO QUINONES, MED AMINE LARIBI, DANIELA MAFFIODO
- 036 OPTIMIZATION OF AN AUGMENTED R-CUBE MECHANISM FOR CERVICAL SURGERY**
AUTHORS: TÉRENCE ESSOMBA, ABDELBADIA CHAKER, MED AMINE LARIBI
- 037 MOTION STABILITY ANALYSIS OF AN ORIGAMI-INSPIRED SOFT PNEUMATIC ACTUATOR**
AUTHORS: KARINA GUADALUPE VELAZQUEZ FLORES, DITZIA SUSANA GARCIA MORALES, ANNIKA RAATZ
- 040 VALIDATION OF A NOVEL GESTURE TRACKING DEVICE FOR LAPAROSCOPY SURGERY TRAINING**
AUTHORS: SIWAR BOUZID, ABDELBADIA CHAKER, MARC ARSICAULT, SAMI BENNOUR, MED AMINE LARIBI
- 045 HAPTIC MODEL OF A REDUNDANT SPHERICAL PARALLEL MANIPULATOR WITH UNLIMITED SELF-ROTATION**
AUTHORS: CHAIMA LAHDIRI, HOUSSEM SAAFI, ABDELFAHAT MLIKA, MED AMINE LARIBI

14:00 – 16:00 ■ SESSION 3.1: ASSISTIVE AND SOCIAL DEVICES

CHAIRER BY: CARMEN VISCONTE

- 021 DEVELOPMENT OF A SOFT END EFFECTOR FOR EFFICIENT HARVESTING OF AGRICULTURAL PRODUCTS**
AUTHORS: SIMONE LEONE, GIUSEPPE CARBONE
- 025 DESIGN OF A SCIENCE TOKYO ANKLE ASSISTING DEVICE FOR WALKING**
AUTHORS: MARCO CECCARELLI, YUKIO TAKEDA, MING JIANG, TAKAMARU SAITO
- 031 DEVELOPMENT OF A SOCIAL HUMANOID ROBOT**

AUTHORS: ZHUMADIL BAIGUNCHEKOV, CAO MAOYONG, MED AMINE LARIBI, GIUSEPPE CARBONE, BEKZAT AMANOV, DAMIR ZHANABERGEN, MUERZHAHAN YEERHATI

038 A FEASIBILITY STUDY FOR A COST-EFFECTIVE WEARABLE SYSTEM FOR REAL-TIME ANKLE MOBILITY MONITORING

AUTHORS: GIOVANNI MASTRANGELO, BETSY D.M. CHAPARRO-RICO, MATTEO RUSSO, MARCO CECCARELLI, DANIELE CAFOLLA

039 DESIGN AND IMPLEMENTATION OF A MULTI-UAV SYSTEM FOR AUTONOMOUS MEDICAL SUPPLY TRANSPORT

AUTHORS: XIANGJUN LI, LINGXIANG HU, YINGQI HUANG, WEIZHE LIU

041 A PNEUMATIC HANDHELD DEVICE FOR FINGER ACTIVE TELE-REHABILITATION

AUTHORS: GIOVANNI COLUCCI, SIMONE DURETTO, GIUSEPPE QUAGLIA

THURSDAY 03.07.2027

9:00 – 9:45 ■ KEYNOTE LECTURE:

CHAIRER BY: DAMIEN CHABLAT

NEW CHALLENGES IN ROBOTIC SURGERY FOR CANCER TREATMENT

DOINA PISLA, TECHNICAL UNIVERSITY OF CLUJ-NAPOCA

10:00 – 12:20 ■ SESSION 4.1: EXOSKELETONS AND PROSTHESES

CHAIRER BY: JUAN SANDOVAL

002 A LEG EXOSKELETON DESIGNED FOR CHILDREN WALKING ASSISTANCE

AUTHORS: CRISTIAN COPILUSI, MARCO CECCARELLI, NICOLAE DUMITRU, SORIN DUMITRU, IONUT DANIEL GEONEA, CRISTIAN MIC

007 DESIGN AND DEVELOPMENT OF A CABLE EXOSKELETON FOR ELBOW REHABILITATION

AUTHORS: SIMONE LEONE, GIUSEPPE CARBONE

010 AN EXPERIMENTAL CHARACTERIZATION OF HUMAN ANKLE MOTION

AUTHORS: GIOVANNI MASTRANGELO, BETSY D.M. CHAPARRO-RICO, MATTEO RUSSO, MARCO CECCARELLI, DANIELE CAFOLLA

017 NONLINEAR STIFFNESS WALKING CANE INSPIRED BY PROSTHETIC LEG DESIGN

AUTHORS: SUKESH JAGANNATHAN RANGANATHAN, MAURICIO FERNANDEZ MONTOYA, MILTON AGUIRRE

024 ANALYSIS OF THE LOWER LIMB PROSTHESIS MARKET AND A RESEARCH OF ADVANCED PROSTHETIC METHODS

AUTHORS: AIDOS SULTAN, NURSULTAN ZHETENBAYEV, YERKEBULAN NURGIZAT, ABU-ALIM AYAZBAY, KASSYMBEK OZHIKENOV, GANI SERGAZIN

026 PHYSIOTHERAPY CONSIDERATIONS FROM TEST RESULTS WITH ASSIST-FEE.V3 ELBOW ASSISTING DEVICE

AUTHORS: FORTUNATO FRISINA, CUAUHTÉMOC MORALES-CRUZ, FRANCESCO SCERBO, ROCCO MAZZOTTA, MARCO CECCARELLI

027 FOOT AND ANKLE PROSTHETICS USING ARTIFICIAL INTELLIGENCE: INNOVATIVE DEVELOPMENTS AND CONCEPTUAL SOLUTIONS

AUTHORS: SAYAT AKHMEJANOV, NURSULTAN ZHETENBAYEV, AIDOS SULTAN, YERKEBULAN NURGIZAT, ARMAN ZBEKBAYEV, KASSYMBEK OZHIKENOV, GANI SERGAZIN

14:00 – 14:45 ■ TUTORIAL SESSION:

CHAIRER BY: ABDELBADIA CHAKER

INNOVATIVE APPROACHES TO MEDICAL DEVICE DEVELOPMENT USING MATLAB® AND SIMULINK®

DANIELE SPORTILLO, MATHWORKS

14:45 – 16:45 ■ SESSION S5: SURGICAL ROBOTICS

CHAIRER BY: CHENG-WEI CHEN

004 ERROR MODELING AND ANALYSIS OF A NOVEL 3R1T PARALLEL ROBOT WITH REMOTE CENTER OF MOTION FOR EYE SURGERY

AUTHORS: RUIHAN YAO, YAN JIN, AISLINN MCALEENAN, ZHIWEI ZHAO, JOHNNY MOORE

006 FORMULATION OF ADMITTANCE CONTROL OF A SURGICAL ROBOT ABOUT REMOTE CENTER OF MOTION

AUTHORS: MEHMET ALP BALKAN, CAN DEDE

018 DESIGN AND CONTROL SYSTEM DEVELOPMENT OF A NEW 3R1T PARALLEL ROBOT FOR MINIMALLY INVASIVE SURGERY

AUTHORS: AISLINN MCALEENAN, YINGLUN JIAN, YAN JIN, DAN SUN, JOHNNY MOORE

030 COMANIPULATED ROBOTIC ASSISTANCE FOR SPINE SURGERY WITH DEEP LEARNING-BASED PATH PLANNING

MeSRob 2025 July 2-4, Futuroscope-Poitiers, France

AUTHORS: ALIZÉE KOSZULINSKI, JUAN SANDOVAL, SHENG-HAN HUANG, TÉRENCE ESSOMBA, TANGUY VENDEUVRE, CHIEH-TSAI WU, MED AMINE LARIBI, SAID ZEGHLOUL

032 DESIGN ANALYSIS OF AN INNOVATIVE PARALLEL ROBOT FOR MINIMALLY INVASIVE PANCREATIC SURGERY

AUTHORS: DOINA PISLA, ALEXANDRU-VASILE PUSCA, ANDREI CAPRARIU, BOGDAN GHERMAN, CALIN VAIDA, DAMIEN CHABLAT

034 CNN-BASED ASSESSMENT OF CANNULA PLACEMENT FOR AUTOMATED SUBRETINAL INJECTION PROCEDURES

AUTHORS: NING-YU WANG, CHENG-WEI CHEN

14:45 – 16:45 ■ SESSION S2.2: DESIGN OF MEDICAL DEVICES

CHAIRER BY: MEHMET İSMET CAN DEDE

001 DESIGN AND ANALYSIS OF A REDUNDANT PLANAR PARALLEL ROBOT WITH VARIABLE STIFFNESS

AUTHORS: CARL NELSON, MED AMINE LARIBI

005 REVIEW ON RETRACTOR DESIGN TO ENHANCE MINIMALLY INVASIVE PANCREATICTOMY: ADDRESSING CHALLENGES IN DEEP TISSUE ACCESS

AUTHORS: PIERRE MOUGENOT, BOGDAN GHERMAN, CALIN VAIDA, DOINA PISLA, DAMIEN CHABLAT

008 A 6 DOF PARALLEL HAPTIC DEVICE FOR INITIAL ECHOGRAPHY TRAINING

AUTHORS: MYKHAILO RIABTSEV, MED AMINE LARIBI, JEAN-MICHEL GUILHEM, VICTOR PETUYA, MONICA URIZAR, MARC ARSICAULT, SAID ZEGHLOUL

013 ROBOT-ASSISTED SIMULATION FOR EPIDURAL ANESTHESIA

AUTHORS: KEVIN GAITAN, PIERRE-PHILIPPE ROBET, JUAN SANDOVAL, MAXIME GAUTIER, YANNICK Aoustin

015 A GENERATIVE DESIGN FRAMEWORK FOR ROBOT-ASSISTED OPHTHALMIC SURGERY

AUTHORS: CAITLIN SANDS, YAN JIN, MARK PRICE, FRANK KIRKLAND, ZHIWEI ZHAO

022 TOWARDS A 6-DOF PARALLEL MANIPULATOR FOR PRECISE AND ATRAUMATIC COCHLEAR IMPLANTATION

AUTHORS: ONEEBA AHMED, XIANGYU AN, MINGFENG WANG, XINLI DU

17:00 – 18:40 ■ SESSION S4.2: EXOSKELETONS AND PROSTHESES

CHAIRER BY: DANIELE CAFOLLA

028 DESIGN AND PERFORMANCE ANALYSIS OF ALMATY ANKLE EXOSKELETON V.2

AUTHORS: NURSULTAN ZHETENBAYEV, MARCO CECCARELLI

043 DYNAMIC STUDY AND PROTOTYPE MANUFACTURE OF AN EXOSKELETON ROBOTIC SYSTEM FOR LOCOMOTOR REHABILITATION

AUTHORS: IONUT DANIEL GEONEA, CRISTIAN COPILUSI, DANIELA TARNITA

044 WRIST EXOSKELETON ACTUATED BY A PARALLEL MANIPULATOR WITH LINEAR SERVOMOTORS

AUTHORS: NARCIS-GRATIAN CRACIUN, CRISTIAN CIAPA, ELIDA-GABRIELA TULCAN, ROBERT KRISTOF, DOREL BUNCIANU, ERWIN-CHRISTIAN LOVASZ

046 HUMAN-EXOSKELETON INTERACTION FORCE MEASUREMENT IN A WEARABLE DEVICE FOR HAND ACTUATION

AUTHORS: MIHAI DRAGUSANU DRAGUSANU, ALESSIO PIROLI, MONICA MALVEZZI

052 SIDE EFFECTS OF TRUNK EXOSKELETON DURING WALKING

AUTHORS: ELISA PANERO, STEFANO PASTORELLI, LAURA GASTALDI

17:00 – 18:40 ■ SESSION S3.2: ASSISTIVE AND SOCIAL DEVICES

CHAIRER BY: LAURA GASTALDI

003 PROBLEMS AND REQUIREMENTS FOR A NEUROSURGERY ASSISTING DEVICE

AUTHORS: KARLA SILVA, CHRISTOPHER RENÉ TORRES-SAN MIGUEL, MARCO CECCARELLI

012 PROBLEMS AND REQUIREMENTS FOR THE DESIGN OF A GUIDE ROBOT FOR BLIND AND ELDERLY PEOPLE

AUTHORS: MARÍA GARROSA, MARCO CECCARELLI, BOWEN YANG

014 EVALUATING ARM MOBILITY RECOVERY USING AI AND SERIOUS GAMES: A ROBOTHERAPY APPROACH

AUTHORS: EDUARDO CASTILLO, LUIS DANIEL FILOMENO AMADOR, PAULA ANDREA CASTRO-BARRERA, MARIA PAULA GÓMEZ-NIÑO

016 BI-MODAL HAPTIC FEEDBACK WALKING CANE WITH DYNAMIC DATA ACQUISITION

AUTHORS: MAURICIO FERNANDEZ MONTOYA, SUKESH JAGANNATHAN RANGANATHAN, MILTON AGUIRRE

020 MULTIMODAL ESTIMATION OF 2-DOF WRIST MOTION USING PNEUMATIC RESERVOIR COMPUTING

AUTHORS: SHO SUGIMOTO, TETSURO MIYAZAKI, KENJI KAWASHIMA

FRIDAY 04.07.2025

MeSRob 2025 July 2-4, Futuroscope-Poitiers, France

9:00 – 9:45 ■ KEYNOTE LECTURE:

CHAIRER BY: MED AMINE LARIBI

ROBOT IN SPINE SURGERY

JEAN-CHARLES LE HUEC, BORDEAUX UNIVERSITY HOSPITAL

10:00 – 11:20 ■ S3.3: ASSISTIVE AND SOCIAL DEVICES

CHAIRER BY: TÉRENCE ESSOMBA

049 FACADE INSPECTION: DESIGN, PROTOTYPING, AND TESTING OF A HYBRID CABLE-DRIVEN PARALLEL ROBOT GINNA
AUTHORS: M. GARCÍA RODRÍGUEZ, ANTONIO PAGLIA, MANUEL TRIPODI, ABDELBADIA CHAKER, GIUSEPPE CARBONE, EDUARDO CASTILLO, MED AMINE LARIBI

054 EXPERIMENTS ON DOCKING TASK OF MOBILE ROBOT BASED ON IMAGE VISUAL SERVOING
AUTHORS: HOUSSEIN LAMINE, LOTFI ROMDHANE

055 DESIGN OF A MECHANICAL SPIDER FOR VITAL SEARCH IN EARTH-QUAKES
AUTHORS: HABIB HADAD-MELCHOR, ALAN MENDOZA-OLAGUEZ, OMAR LEÓN-GARCÍA, VALENTINA HERNÁNDEZ-MIRANDA, ARACELI ZAPATERO-GUTIÉRREZ, ERNESTO CHRISTIAN OROZCO-MAGDALENO, JOSUE GARCIA-AVILA

056 MODEL-BASED DEVELOPMENT AND INTEGRATION OF A DIGITAL TWIN FOR A COBOTIC SPINAL SURGERY SYSTEM
AUTHORS: ASMA CHAIEB, FAIDA MHENNI, ABDELFAH MLIKA, JEAN-YVES CHOLEY

10:00 – 11:20 ■ S2.3: DESIGN OF MEDICAL DEVICES

CHAIRER BY: DANIELA MAFFIODO

048 CONCEPTUAL DESIGN OF A FLEXIBLE INSTRUMENT FOR ROBOT-ASSISTED LAPAROSCOPIC PANCREATIC SURGERY
AUTHORS: BOGDAN GHERMAN, NADIM AL HAJJAR, IONUT-MARIAN ZIMA, VASILE BULBUCAN, CORINA RADU, DRAGOS SEBENI, CALIN VAIDA, ANDREI CAPRARIU, DOINA PISLA

051 GEOMETRICAL DESIGN ANALYSIS OF A URRR-URR PARALLEL MECHANISM FOR PERCUTANEOUS INTERVENTIONS
AUTHORS: KEVIN GAITAN, JUAN SANDOVAL, STÉPHANE CARO

053 MASTER/SLAVE SYSTEM WITH NON-HOMOTHEIC KINEMATICS FOR SURGICAL TELEOPERATION
AUTHORS: MAJDI MESKINI, HOUSSEM SAAFI, ABDELFAH MLIKA, MARC ARSICAULT, MED AMINE LARIBI

9:00 – 9:45 ■ KEYNOTE LECTURE:

CHAIRER BY: TERENCE ESSOMBA

ADVANCING SPINE AND BRAIN SURGERY WITH ROBOTIC ASSISTANCE: A TAIWANESE PERSPECTIVE

CHIEH-TSAI WU, CHANG GUNG MEMORIAL HOSPITAL

14:00 – 14:45 ■ NEXT STEP: SURGICAL ROBOTICS

CHAIRER BY: TANGUY VENDEUVRE

THE NEXT STEP IN PEDIATRIC ROBOTIC SURGERY,
DIANA POTOP, DR MARIE AUGER-HUNAUT, PR AURELIEN BINET

THE NEXT STEP IN VISCERAL ROBOTIC SURGERY,
DAVID BERJONVAL, DR JEROME DANION, PR JEAN PIERRE-FAURE

THE NEXT STEP IN UROLOGICAL ROBOTIC SURGERY,
MAXIME VALLEE, DR PIERRE-OLIVIER DELPECHE, DR SIMON BERNARDEAU

PLENARY LECTURES

TITLE: REHABILITATION ROBOTICS: IMPROVING EVERYDAY HUMAN FUNCTIONS

ABSTRACT:

Neural disorders, old age, and traumatic brain injury limit activities of daily living. Robotics can be used in novel ways to characterize human neuromuscular responses and retrain human functions. Columbia University Robotics and Rehabilitation (ROAR) Laboratory designs innovative mechanisms/robotics with these goals and performs scientific studies to improve human functions such as standing, walking, stairclimbing, trunk control, head turning, and others. Human experiments have targeted individuals with stroke, cerebral palsy, Parkinson's disease, spinal cord injury, ALS, and elderly subjects. The talk will provide an overview of these robotic technologies and scientific studies performed with them to demonstrate strong potential of rehabilitation robotics to improve human functions and quality of life of people



SPEAKER: SUNIL K. AGRAWAL, PH.D., PROFESSOR
DEPARTMENT OF MECHANICAL ENGINEERING
DEPARTMENT OF REHABILITATION AND REGENERATIVE MEDICINE
COLUMBIA UNIVERSITY, NEW YORK
NY 10027, USA

TITLE: NEW CHALLENGES IN ROBOTIC SURGERY FOR CANCER TREATMENT

ABSTRACT:

In parallel with the continuous evolution and discovery of new medical techniques, the evolution of technology has enabled the introduction of robotic systems in medical applications. Surgical robotics is one of the most important subdomains of medical robotics, with a high potential worldwide, and its development is correlated with increased life expectancy. The already achieved surgical robotic systems for cancer treatment have shown a continuous evolution in this challenging and difficult research field. The latest advancements in technology and medicine have successfully increased survival rates and quality of life for many cancer patients. The European Research Strategies are considering cancer as one of the most important areas in need of fundamental innovation emphasizing the curative role of Precision Surgery and the importance of personalized instrumentation in the fight for higher survival rates and quality of life. Therefore, it is very important to develop European relevant solutions in the field on oncologic surgery in the form of new smart and adaptive robotic medical devices that will overcome the current frontiers through a new paradigm focused on personalised, minimally invasive interventions that can maximize the therapeutic effects.



SPEAKER: DOINA PISLA, PROFESSOR
DIRECTOR - RESEARCH CENTER OF ROBOTS SIMULATION AND TESTING,
TECHNICAL UNIVERSITY OF CLUJ-NAPOCA (UTCN),
ROMANIA

TITLE: WHAT ARE THE EXPECTATIONS TODAY AND IN THE NEAR FUTURE?

ABSTRACT:

Spine robots today are limited to target the right place for screw positioning. There is evidence of accuracy and safety. But surgeons expect more with co-robot to facilitate complex tasks and execute surgical gestures with accuracy and precision using dedicated tools like unsound scalpel or another surgical instrument. Surgical approach is also a fully open perspective.



SPEAKER: JEAN-CHARLES LE HUEC, MD, PROFESSOR
ORTHOPAEDICS AND TRAUMATOLOGY,
CHIEF OF SPINE UNIT AND CHAIRMAN OF DEPARTMENT OF ORTHOPAEDIC
AND TRAUMATOLOGY AT THE BORDEAUX UNIVERSITY HOSPITAL,
FRANCE

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**TITLE: ADVANCING SPINE AND BRAIN SURGERY WITH ROBOTIC ASSISTANCE: A TAIWANESE PERSPECTIVE**

**ABSTRACT:**

This presentation highlights the integration of robotic systems in spine and brain surgery, with a focus on Taiwan's clinical application and innovations. Drawing on over 300 cases performed at Chang Gung Memorial Hospital, we demonstrate significant advancements in surgical accuracy, workflow efficiency, and training. Experimental work on cervical spine applications using 3D-printed models further illustrates future directions. Robotic assistance is evolving from a tool to a transformative element in neurosurgical theatre.



SPEAKER: CHIEH-TSAI WU, MD, PROFESSOR  
DEPARTMENT OF NEUROSURGERY NEUROSURGICAL,  
CHANG GUNG MEMORIAL HOSPITAL,  
TAIWAN

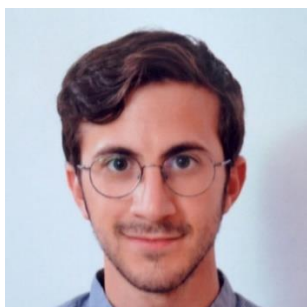
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TUTORIAL SESSION:

TITLE: INNOVATIVE APPROACHES TO MEDICAL DEVICE DEVELOPMENT USING MATLAB® AND SIMULINK®

ABSTRACT:

MATLAB® and Simulink® provide a complete functional workflow for designing, prototyping, and testing medical devices and digital health applications. By emphasizing compliance with industry standards such as IEC 62304, we demonstrate how our engineering design workflow tools facilitate the creation of robust, reliable, and safe medical devices. Key topics include the development of sensor data algorithms, real-time image processing, AI model integration, and rapid prototyping with hardware-in-the-loop platforms. Case studies highlight successful implementations, showcasing the significant reduction in development time and enhancement of device performance.



SPEAKER: DANIELE SPORTILLO, PH.D
MATHWORKS, USA

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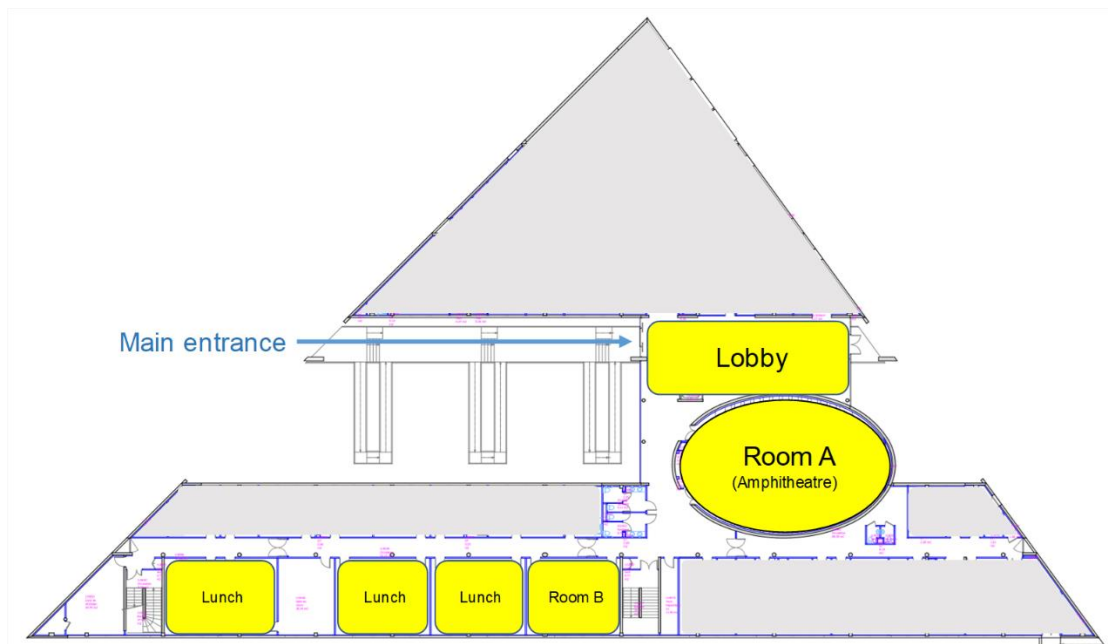
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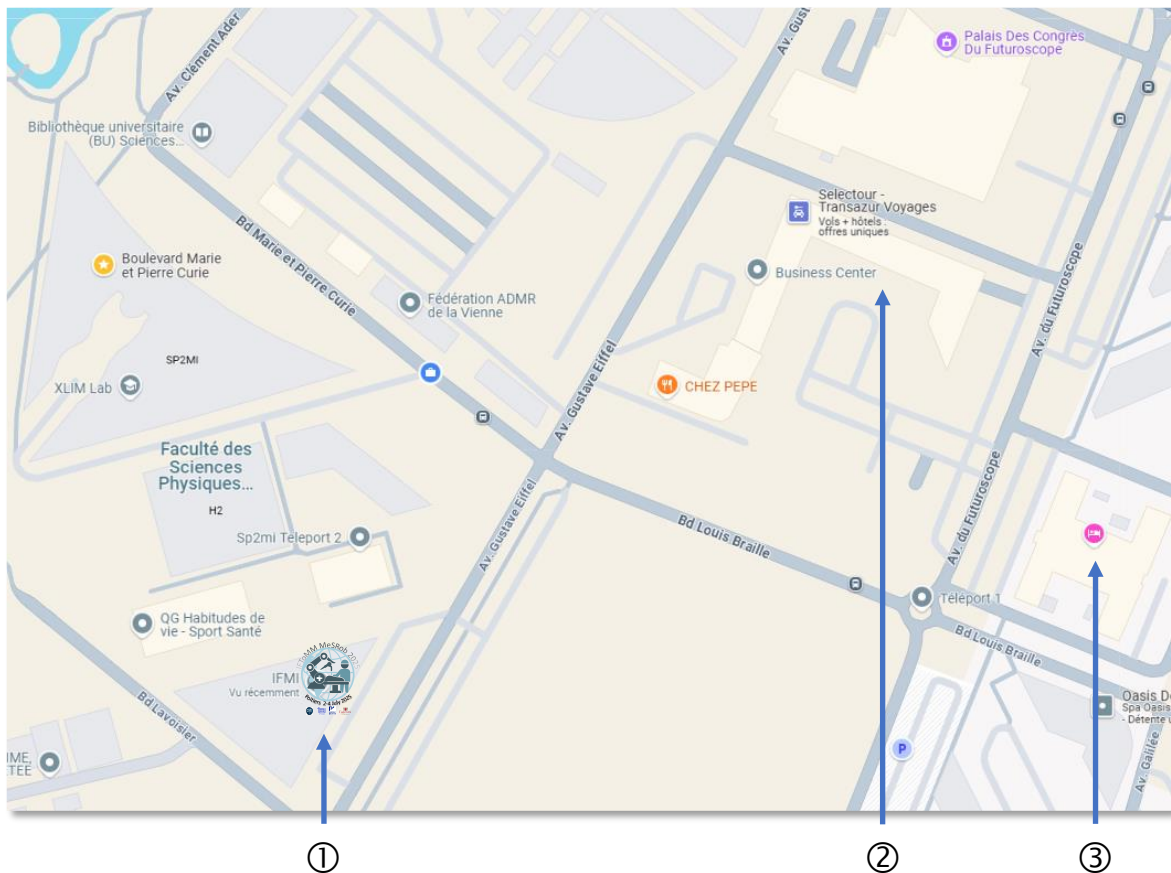
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①: Localization of MeSRob'25 ②: Hotel Plaza ③: Hotel Alteora



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