

# PhD Industrial Engineering University Rome Tor Vergata

**“ENGINEERING METHODOLOGIES FOR MEDICINE AND SPORT”**

**7, 8, 9 February 2024**

**Aula Leonardo – Area Ingegneria  
University of Rome Tor Vergata  
Via del Politecnico 1**

(last update 30<sup>th</sup> January 2024)

**Wednesday 7.02.2024 – Aula Leonardo**

**8.30 Registration**

**9.15 Welcome**

## **Materials**

*Chairperson Alessandra Varone*

9.30 R. Montanari, R. Narducci, A. Palombi, **M. Richetta**, A. Varone: Applications of LDHs to biomedicine: state of the art and future challenges.

10.00 **E. Marin**: From ancient remedies to modern contraptions: tracing the evolution of biocompatible materials.

10.15 A. Varone, A. Fabrizi, M. Peron, **P. Ferro**, R. Montanari, F. Berto, F. Bonollo: AZ31 Mg Alloy processed by Equal Channel Angular Pressing for bio-medical applications: the role of microstructure.

10.30 **N. M. Gurramkonda**, T. Bala Narsaiah: Synthesis of bio-inspired self-cleaning hydrophobic surfaces using ZnO nanoparticles.

10.45 **A. Mezzi**: Surface investigation of biomaterials by photoelectron spectroscopies.

**11.00 Coffee break**

*Chairperson Alex Lanzutti*

11.30 **S. Schintke**, S. del Rossi: Flexible nanocomposites for sensor applications.

12.00 **A. Acquesta**, P. Russo, T. Monetta: Surface engineering of magnesium alloys for the next generation of biodegradable devices.

12.15. **T. Monetta**, A. Acquesta: Designing the surface of medical devices

12.30 C. de Crescenzo, A. Fava, R. Montanari, **A. Palombi**, A. Varone: Mechanical spectroscopy of biocompatible metal alloys.

#### **12.45 Lunch**

*Chairperson Maria Richetta*

14.00 A. Marzola, L. Puggelli, M. Servi, **F. Buonamici**, M. Carfagni: Modular prosthesis design for additive manufacturing.

14.30 A. Fava, R. Montanari, T. Romano, **A. Varone**, M. Vedani: Novel degradable Zn-based alloys for biomedical applications.

14.45 **M. Tocci**, F. Cantaboni, P. Ginestra: Metallic lattice structures for prosthesis: applications and experimental characterization.

15.00 **M.B. Abrami**, M. Tocci, A. Pola: Perspective on the use of additive manufacturing for Nitinol biomedical devices.

15.15 **M. Tatullo**, G. Ambrogio, R. Chiesa, G. Palumbo, E. Cascardi, R.M. Marano, R. Ruggiero, F. Paduano: Translational strategies to functionalize magnesium alloys with osteoinductive and antibacterial coatings. Preliminary in-vitro results.

15.30 **T. Döhler**, M. Hofmann, J. Neumann, R. Bochem, A. Böhme, A.H. Foitzik: Extending the variety of applications in micro electroplating by using the dog bone effect.

15.45 **M.T. Hauschultz**, M.H. Friedo, T. Döhler, A. Böhme, M. Richetta, A.H. Foitzik: Evaluation of the properties of SLM-printed lattice structures with a view to potential applications in medical prosthetics.

#### **16.00 Coffee break**

*Chairperson Roberto Montanari*

16.30 **A. Lanzutti**, F. Sordetti, M. Magnan, N. Picco, F. Michelon, F. Sciarretta, S. Roncari, C. Zanetti, W. Pennè, L. Fedrizzi: Effect of surface finish on fatigue properties of Ti gr.23 alloy produced by L-PBF and to be used for human implants.

17.00 **M.H. Friedo**, M.T. Hauschultz, T. Döhler, A. Böhme, M. Richetta, A.H. Foitzik: Material and feature-dependent injection moulds for medical products optimized via the capabilities of metal 3d printing.

17.15 **A. Engels**, L. Shopperly, L. Bruder, K. Bagci, A. Greiner, W. Ertel, M. Sittinger, J. Spinnen, T. Dehne: SVEn – an economical open-source approach for syringe based direct ink writing of biomaterials comparable with bed slinger 3D printers.

## Thursday 8.02.2024 – Aula Leonardo

### Sports

*Chairperson Bruno Ruscello*

9.30 **C.M. Verrelli**, V. Bonaiuto: Cyclic human movements and time-harmonic structures: the role of the Golden Ratio.

10.00 L. Caprioli, F. Campoli, S. Edriss, E. Padua, **C. Romagnoli**, V. Bonaiuto, G. Annino: A DAQ System Suited for performances monitoring on flatwater olympic sprint Kayaking and Canoeing.

10.15 **T. Caporaso**, F. Esposito, M. Richetta, A. Lanzotti: Definition and evaluation of football specific technical skills: a systematic review.

10.30 E. Mainer-Pardos, S. Mahmoudzadeh Khalili, F.M. Clemente, **H. Nobari**, O. Kamis: The effects of resisted sprint training programs on vertical jump, linear sprint and change of direction speed in male soccer players: a systematic review and meta-analysis.

10.45 **R.P. Rossi**, M. Richetta, M. Esposito, B. Ruscello, G. Colucci: Biomechanical-postural assessment in motorsport.

#### 11.00 Coffee break

*Chairperson Vincenzo Bonaiuto*

11.30 M. Porta, C. Filetti, A. Chiari, I. Leo, E. Padua, G. Briotti, G. Messina, W. Moalla, **B. Ruscello**: Relationship between velocity and muscular activity (measured by sEMG) in shuttle running: a pilot study.

12.00 **D. Delgado Bueno**: Sprint kayak propulsion and kinematic proportionality rules.

12.15 **Nallagatla Venkateshwarlu**, E. M. Staderini, N. Kumar Balne: Measurement of muscle flexibility and speed in sprinters following stretching applicability of a new Range of Motion Instrument.

12.30 **A. Zanela**, L. Caprioli, V. Bonaiuto: Integrative analysis of movement: AI-enhanced video and inertial sensors in sports context.

#### 12.45 Lunch

### Medicine

*Chairperson Andreas Foitzik*

14.00 **C. Verona**, A. Raso, G. Verona Rinati: Single crystal diamond-based microdosimeters for ion-beam therapy applications.

14.30 **G. Verona Rinati**, M. Marinelli, C. Verona: Novel diamond-based dosimetric systems for FLASH radiotherapy.

14.45 E. Cappa, A. Giovannelli, E. Martinelli, A. Mencattini, M. Minieri, A. Terrinoni, **M. Pieri**, S. Bernardini: Automated recognition of monoclonal components in serum immunofixation electrophoresis through AI modeling.

15.00 M. Basilicata, **G. Bruno**, S. Bernardini: The use of finite element analysis to study stress distribution on temporo-mandibular joints and teeth using mandibular advancement devices for obstructive sleep apnea treatment.

15.15 **C. Beddies**, G. Verona Rinati, M. Gelfusa, B. Eylert, S. Kubica: The necessity of secure IT infrastructures in healthcare through AI vulnerability analysis.

15.30 **G. Renna**, P. Leo, R. Nobile, M. Laurenziello, D. Ciavarella: Overview of Mini-screws in Orthodontics.

15.45 **E.M. Staderini**, S. Natale, S. Mugnaini, S. Gentili, A. Magrini: Muscle fatigue assessment with a new EMG zero-crossing signal analysis.

## **16.00 Coffee break**

*Chairperson Massimiliano Febbi*

16.30 **A.H. Foitzik**, R. Werner, C.H. Edel, V. Just, A. Böhme: Electronic speckle pattern interferometry for life science.

17.00 **P. Massone**, A. Angelucci, A. Aliverti: On the measurement of minute ventilation with wearable devices

17.15 **A. Angelucci**, A. Aliverti: A Wearable body sensor network for personal monitoring during daily life: technology and applications.

## Friday 9.02.2024 – Aula Leonardo

### Medicine

*Chairperson Enrico Maria Staderini*

9.30 M. Febbi, M. Vandoni, P. Patanè, S. Ballarin, V. Carnevale Pellino, A. Gatti, E. Caldarella, F. de Caro, **L. Marin**: Lower limb arthroplasty: effects of a tele-prehabilitation program with indirect electrostimulation. Feasibility study.

10.00 C. Cavallo, A. Gatti, V. Carnevale Pellino, A. Pirazzi, G. Panin, A. de Nunzio, M. Schmid, **M. Vandoni**: The effects of one month of lower limb powered exoskeleton gait training compared to the conventional gait training performed on treadmills in Multiple Sclerosis patients: a pilot study.

10.15 **M. Ceccarelli**, V. Ambrogi, A. Patirelis, M. Russo: A laboratory experimental characterization of surgical rib retraction.

10.30 **V. Carnevale Pellino**, A. Gatti, M. Vandoni, P. Patanè, M. Febbi, S. Ballarin, E. Caldarella, F. de Caro, L. Marin: Comparative efficacy of leg pneumatic compression and antithromboembolic exercise in managing lower limb edema after total hip arthroplasty. Feasibility trial.

10.45 **R. Werner**, P. Proposito, A. Böhme, A.H. Foitzik: Conception of a new Hydrogen sensor on semiconductor basis.

### **11.00 Coffee break**

*Chairperson Gianluca Verona Rinati*

11.30 **E.M. Staderini**, Kambampati: Cognitive and neurosensory skills assessment by the identification of the human-in-the-loop control function.

12.00 **P.P. Moritz Heinrich**, V. Skakun, A. Böhme, M.L. Di Vona, R. Pizzoferrato, A.H. Foitzik: Influence of a combined treatment process on sterilization performance in UV-C water disinfection.

12.15. **B. Knie**, V. Rocco, S. Kubica: Safe Integration of Artificial Intelligence into medical practices.

12.30 E. Nicolai, Y. Li, A. Valerio, A. Catini, C. Di Natale, **R. Pizzoferrato**: Quantitative detection of microplastics in water through real-time analysis of fluorescence signal.

12.45 **N. Rutigliano**, L. Martellucci, A. Puleio, P. Gaudio: Horizontal lidar environmental monitoring: from system design to experimental application.

### **13.00 Closure**

## **Poster session**

**The posters will be displayed for the whole length of the conference in the main hall.  
They must be printed on A1 size paper (841 x 594 mm).**

1. L. Caprioli, F. Campoli, S. Edriss, E. Padua, C. Romagnoli, V. Bonaiuto, G. Annino: Effects of whole-body vibration on sports performance: a literature review.
2. F. Campoli, V. Bonaiuto, L. Caprioli, S. Edriss, M. Panzarino, C. Romagnoli, G. Annino, E. Padua: The fat mass in elderly.
3. F. Campoli, A. Iovane, A. Fabris, V. Francavilla, P. Proia, L. Caprioli, G. Annino, E. Padua, G. Messina: Acute effects of nanotechnological devices for the muscle and joint pain treatment.
4. L. Caprioli, S. Materazzi, A. Castellani: An experimental attempt of a numerical assessment of mental performance in tennis: Egograms.
5. M. Basilicata, C. De Crescenzo, R. Montanari, M. Richetta: Mechanical tests of biological materials. The case of dentine.
6. M. Febbi, L. Marin, M. Vandoni, V. Carnevale Pellino, C. Cavallo, M. Chiodaroli, P. Patanè, A. Gatti: Acute effects of Core activation exercises on spine alignment and balance of patients undergoing spine surgery. Feasibility study
7. L. Bottini, P. Patanè, M. Vandoni, A. Gatti, V. Carnevale Pellino, A. Pirazzi, M. Febbi, L. Marin: Comparison of two biofeedback interventions to support the running mechanics of the medium-long runner.
8. S. Eichstedt: Decision making approaches in aviation and medicine.
9. J.S. Kostova, M. Wellmann, J. Strauch, R. Pizzoferrato, A.H. Foitzik, A. Böhme: Development of a wearable device to integrate a skin moisture sensor.
10. G. Secolo, C. Romagnoli, T. Dell'Amico, R. Ciobotaru, V. Francavilla, E. Padua, A. Iovane, G. Messina: Manual rehabilitation therapy with stable Ozioles in the professional tennis player.
11. M. Sileo: What Artificial Intelligence means for sports medicine.
12. E.M. Staderini, S. Mugnaini, S. Gentili, A. Magrini: Smart wearable sensors for occupational medicine.
13. S. Böhme, C.M. Kracht, M. Richetta, A. Böhme, A.H. Foitzik: Brackets fabrication by additive manufacturing process of modern digital orthodontic.
14. S. Speck, C. Verona, A. Böhme, A.H. Foitzik: Development of new hydrogels for organ simulation.
15. A. Böhme, J. Kostova, A.H. Foitzik: Development and manufacture of a multi-bench cultivator for bioreactors.
16. C. Schattschneider, M. Müller, H. Jacobs, C. Sirena, A. Böhme, A.H. Foitzik: Innovative wastewater treatment: dismantling Naproxen with cavitation and plasma discharge.
17. E.M. Staderini, S. Mugnaini, S. Gentili, A. Magrini: Heart rate analysis in workers under extreme heat environments.

## Satellite workshop

### Thursday 8.02.2024 – Aula Galileo

9.30 L. Molinaro – *Sensor Medica*: Spine 3D new technologies for spine assessment

10.00 D. Mazza – *Sensor Medica*: Technologies in Sports Rehabilitation from surgery to performance

10.30 M. Febbi – *Fisioterapia Italia*: New frontiers for physiotherapy profession

#### 11.00 Coffee Break

11.30 S. Ballarin – *I-Tech*: Magnetotherapy Devices and Tele-rehabilitation: Bridging the Gap in Healthcare

12:00 Vaswani R.: Use of surface electromyography and inertial sensors to assess impact of kinesiophobia on movement in chronic low back pain patients: a research proposal

#### 12.45 Lunch

14.00 – 17.00 *I-Tech, Fisioterapia Italia*: Practical Workshop

