

2nd DCPM Workshop
at the IFAC World Congress 2023

Control Mechatronics and Imaging for Medical Devices and Systems in Medicine
track

organized by the DCPM partners (four sessions)

Wednesday July 12, 2023 10:00-12:00

Room 423

Open Invited Session WeA22

Control, Mechatronics, and Imaging for Medical Devices and Systems in Medicine I

WeA22

Room 423

Control, Mechatronics, and Imaging for Medical Devices and Systems in Medicine I

Open Invited Session

Chair: [Desaive, Thomas](#)

University of Liege

Co-Chair: [Chase, J. Geoffrey](#)

University of Canterbury

Organizer: [Desaive, Thomas](#)

University of Liege

Organizer: [Chase, J. Geoffrey](#)

University of Canterbury

Organizer: [Schauer, Thomas](#)

Technische Universitaet Berlin

Organizer: [Tsuzuki, Marcos de Sales Guerra](#)

University of Sao Paulo

Organizer: [Benyo, Balazs](#)

Budapest University of
Technology and Economics

Organizer: [Moeller, Knut](#)

Furtwangen University

Organizer: [Pretty, Christopher](#)

University of Canterbury

Organizer: [Chiew, Yeong Shiong](#)

Monash University

10:00-10:20, Paper WeA22.1

Electrical Impedance Tomography Hardware with Demodulation (I)

[Benetti, Rafael](#)

EPUSP

[Cavalheiro, André](#)

EPUSP

[Nasiri, Hossein](#)

EPUSP

[Takimoto, Rogerio Yugo](#)

Escola Politecnica Da
Universidade De Sao Paulo

[Duran, Guilherme C.](#)

EPUSP

[Ueda, Edson Kenji](#)

Escola Politecnica Da
Universidade De Sao Paulo

[Okamura Ferro, Rafael Akira](#)

Escola Politécnica Da USP

[Barari, Ahmad](#)

University of Ontario Institute of
Technology

[Martins, Thiago de Castro](#)
[Tsuzuki, Marcos de Sales Guerra](#)

University of Sao Paulo
University of Sao Paulo

10:20-10:40, Paper WeA22.2

[Influence of Reconstruction Algorithms on Harmonic Analysis in Electrical Impedance Tomography \(I\)](#)

[Stein, Erik](#)
[Chen, Rongqing](#)
[Battistel, Alberto](#)
[Lovas, András](#)
[Benyo, Balazs](#)
[Moeller, Knut](#)

Institute of Technical Medicine (ITeM), Hochschule Furtwangen
Furtwangen University
Furtwangen University
Kiskunhalas Semmelweis Hospital
Budapest University of Technology and Economics
Furtwangen University

10:40-11:00, Paper WeA22.3

[Critical Assessment of Mammography Accuracy \(I\)](#)

[Fitzjohn, Jessica Louise](#)
[Zhou, Cong](#)
[Chase, J. Geoffrey](#)

University of Canterbury
University of Canterbury
University of Canterbury

11:00-11:20, Paper WeA22.4

[Surgical Tool Classification & Localisation Using Attention and Multi-Feature Fusion Deep Learning Approach \(I\)](#)

[Jalal, Nour Aldeen](#)
[Abdulbaki Alshirbaji, Tamer](#)
[Docherty, Paul D](#)
[Arabian, Herag](#)
[Neumuth, Thomas](#)
[Moeller, Knut](#)

Institute of Technical Medicine (ITeM), Furtwangen University
Institute of Technical Medicine (ITeM), Furtwangen University
University of Canterbury
Hochschule Furtwangen University, Institute of Technical Medicine
Universität Leipzig
Furtwangen University

11:20-11:40, Paper WeA22.5

[Influence of the Patient-Specific Structural Prior Mask on Image Reconstruction Using the Discrete Cosine Transform-Based EIT Algorithm \(I\)](#)

[Chen, Rongqing](#)
[Battistel, Alberto](#)
[Krueger-Ziolek, Sabine](#)
[Stein, Erik](#)

[Fairbairn, Katharine](#)

[Chase, J. Geoffrey](#)
[Rupitsch, Stefan](#)
[Moeller, Knut](#)

Furtwangen University
Furtwangen University
Furtwangen University
Institute of Technical Medicine
(ITeM), Hochschule Furtwangen
James Watt School of
Engineering, University of
Glasgow
University of Canterbury
University of Freiburg
Furtwangen University

11:40-12:00, Paper WeA22.6

[Two U-Net Architectures for Infant Brain Tissue Segmentation from Multi-Spectral MRI Data \(I\)](#)

[Dénes-Fazakas, Lehel](#)
[Kovacs, Levente](#)
[Eigner, György](#)
[Szilagyi, Laszlo](#)

Óbuda University
Obuda University
Óbuda University
Obuda University

Wednesday July 12, 2023 16:00-18:00

Room 423

Open Invited Session WeC22

Control, Mechatronics, and Imaging for Medical Devices and Systems in Medicine II

WeC22

Control, Mechatronics, and Imaging for Medical Devices and Systems in Medicine II

Chair: [Moeller, Knut](#)

Co-Chair: [Tsuzuki, Marcos de Sales Guerra](#)

Organizer: [Desaive, Thomas](#)

Organizer: [Chase, J. Geoffrey](#)

Organizer: [Schauer, Thomas](#)

Organizer: [Tsuzuki, Marcos de Sales Guerra](#)

Organizer: [Benyo, Balazs](#)

Organizer: [Moeller, Knut](#)

Organizer: [Pretty, Christopher](#)

Organizer: [Chiew, Yeong Shiong](#)

Room 423

Open Invited Session

Furtwangen University

University of Sao Paulo

University of Liege

University of Canterbury

Technische Universitaet Berlin

University of Sao Paulo

Budapest University of
Technology and Economics

Furtwangen University

University of Canterbury

Monash University

16:00-16:20, Paper WeC22.1

Convolution Method: Model-Less Perfusion Analysis Using Back Propagation Method (I)

[Saka, Tomoki](#)

Kanazawa Institute of
Technology

[Iwasawa, Tae](#)

Kanagawa Cardiovascular and
Respiratory Center

[Tsuzuki, Marcos de Sales Guerra](#)

University of Sao Paulo

16:20-16:40, Paper WeC22.2

Fourier Series Model for Facial Feature Point Land-Marking (I)

[Arabian, Herag](#)

Hochschule Furtwangen
University, Institute of Technical
Medicin

[Ding, Ning](#)

Furtwangen University

[Chase, J. Geoffrey](#)

University of Canterbury

[Moeller, Knut](#)

Furtwangen University

16:40-17:00, Paper WeC22.3

Wearable Tidal Volume Determination Via One Circumferential Measurement and Three Strain

Gauges – a Pilot Study (I)

Laufer, Bernhard

Institute of Technical Medicine
(ITeM), HFU Furtwangen
Universit

Jalal, Nour Aldeen

Institute of Technical Medicine
(ITeM), Furtwangen University

Docherty, Paul D

University of Canterbury

Krueger-Ziolek, Sabine

Furtwangen University

Busch, Christoph

Institute of Technical Medicine
(ITeM), Furtwangen University

Hoeflinger, Fabian

Department of Microsystems
Engineering, University of
Freiburg

Chase, J. Geoffrey

University of Canterbury

Reindl, Leonhard

Department of Microsystems
Engineering, University of
Freiburg

Moeller, Knut

Furtwangen University

17:00-17:20, Paper WeC22.4

Thoracic and Abdominal Breathing Volumes in Various Body Positions (I)

Al-Hammadi, Abdullah

Furtwangen University

Mukherjee, Devanshu

Furtwangen University

Laufer, Bernhard

Institute of Technical Medicine
(ITeM), HFU Furtwangen
Universit

Moeller, Knut

Furtwangen University

17:20-17:40, Paper WeC22.5

Surface Projection of CT Reconstructed Lung Volume for Regional Lung Mechanics Estimation: A Preliminary Analysis (I)

Zhou, Cong

University of Canterbury

Chase, J. Geoffrey

University of Canterbury

17:40-18:00, Paper WeC22.6

Machine Learning Applied to EIT: Image Reconstruction, Displaced Electrodes and Boundary Shape (I)

Ueda, Edson Kenji

Escola Politecnica Da
Universidade De Sao Paulo

Takimoto, Rogerio Yugo

Duran, Guilherme C.

Sato, Andre Kubagawa

Martins, Thiago de Castro

Tsuzuki, Marcos de Sales Guerra

Escola Politecnica Da
Universidade De Sao Paulo
EPUSP

Escola Politecnica Da
Universidade De Sao Paulo
University of Sao Paulo
University of Sao Paulo

Thursday July 13, 2023 10:00-12:00
Room 423
Open Invited Session ThA22

ThA22

[Control, Mechatronics, and Imaging for Medical Devices and Systems in Medicine III](#)

Chair: [Desaive, Thomas](#)

Co-Chair: [Chase, J. Geoffrey](#)

Organizer: [Desaive, Thomas](#)

Organizer: [Chase, J. Geoffrey](#)

Organizer: [Schauer, Thomas](#)

Organizer: [Tsuzuki, Marcos de Sales Guerra](#)

Organizer: [Benyo, Balazs](#)

Organizer: [Moeller, Knut](#)

Organizer: [Pretty, Christopher](#)

Organizer: [Chiew, Yeong Shiong](#)

Room 423

Open Invited Session

University of Liege

University of Canterbury

University of Liege

University of Canterbury

Technische Universitaet Berlin

University of Sao Paulo

Budapest University of
Technology and Economics

Furtwangen University

University of Canterbury

Monash University

10:00-10:20, Paper ThA22.1

[An Estimation Perspective on Breathing Effort Disturbances in Mechanical Ventilation \(I\)](#)

[van de Kamp, Lars](#)

Eindhoven University of
Technology

[Hunnekens, Bram](#)

Eindhoven University of
Technology

[van de Wouw, Nathan](#)

Eindhoven Univ of Technology

[Oomen, Tom](#)

Eindhoven University of
Technology

10:20-10:40, Paper ThA22.2

[Consideration of Tissue Deformation through an Electrode Displacement in a Monopolar Coagulation Model \(I\)](#)

[Busch, Christoph](#)

Furtwangen University

[Rupitsch, Stefan](#)

University of Freiburg

[Moeller, Knut](#)

Furtwangen University

10:40-11:00, Paper ThA22.3

[The Effect of Feature Space Separation at Different Training States of CNN \(I\)](#)

[Ding, Ning](#)

Furtwangen University

[Arabian, Herag](#)

[Moeller, Knut](#)

Hochschule Furtwangen
University, Institute of Technical
Medicin
Furtwangen University

11:00-11:20, Paper ThA22.4

[Endotracheal Tube Cuffs for Neonates: Novel Cuff Design to Minimise Tracheal Damage \(I\)](#)

[Edmonds, Alexandra](#)

[Clifton, Jaimey A.](#)

[Wilkins, Elliott L.](#)

[Smith, Chris](#)

[Caljé-van der Klei, Trudy](#)

[Guy, Ella F. S.](#)

[Lerios, Theodore](#)

[Chase, J. Geoffrey](#)

University of Canterbury
University of Canterbury
University of Canterbury
University of Canterbury
Mechanical Engineering,
University of Canterbury
University of Canterbury
University of Canterbury,
Christchurch
University of Canterbury

11:20-11:40, Paper ThA22.5

[Effects of Velocity Profile and Plate Usage on Identified Bone Strength During Instrumented Screw Insertion \(I\)](#)

[Wilkie, Jack Abraham](#)

[Bhave, Ashish](#)

[Rauter, Georg](#)

[Moeller, Knut](#)

Hochschule Furtwangen
University
Institute of Technical Medicine,
Hochschule Furtwangen Universit
University of Basel
Furtwangen University

11:40-12:00, Paper ThA22.6

[Finite Element Analysis of a High Compliant Balloon with Strain Sensing Segments for the Identification of Biomechanical Properties within Tubular Vessels \(I\)](#)

[Bhave, Ashish](#)

[Sittkus, Benjamin](#)

[Rupitsch, Stefan](#)

[Mescheder, Ulrich](#)

[Moeller, Knut](#)

Institute of Technical Medicine,
Hochschule Furtwangen Universit
Furtwangen University
University of Freiburg
Furtwangen University
Furtwangen University

Thursday July 13, 2023 13:30-15:30
Room 423
Open Invited Session ThB22

ThB22

Control, Mechatronics, and Imaging for Medical Devices and Systems in Medicine IV

Chair: [Benyo, Balazs](#)

Co-Chair: [Moeller, Knut](#)

Organizer: [Desaive, Thomas](#)

Organizer: [Chase, J. Geoffrey](#)

Organizer: [Schauer, Thomas](#)

Organizer: [Tsuzuki, Marcos de Sales Guerra](#)

Organizer: [Benyo, Balazs](#)

Organizer: [Moeller, Knut](#)

Organizer: [Pretty, Christopher](#)

Organizer: [Chiew, Yeong Shiong](#)

Room 423

Open Invited Session

Budapest University of
Technology and Economics
Furtwangen University
University of Liege
University of Canterbury
Technische Universitaet Berlin
University of Sao Paulo
Budapest University of
Technology and Economics
Furtwangen University
University of Canterbury
Monash University

13:30-13:50, Paper ThB22.1

Novel Assistive Devices for Umbilical Artery Catheterisation (I)

[Dixon, Josephine](#)

[Chase, J. Geoffrey](#)

[Budgett, Rachel](#)

[Caljé-van der Klei, Trudy](#)

[Pooke, Francis Craig](#)

[Wallenstien, Matthew](#)

University of Canterbury
University of Canterbury
Mechanical Engineering,
University of Canterbury
Mechanical Engineering,
University of Canterbury
University of Canterbury
Christchurch Women's Hospital

13:50-14:10, Paper ThB22.2

Frequency Decomposition of Actuated Breast Tissue to Provide Diagnostic Insight (I)

[Fitzjohn, Jessica Louise](#)

[Zhou, Cong](#)

[Chase, J. Geoffrey](#)

University of Canterbury
University of Canterbury
University of Canterbury

14:10-14:30, Paper ThB22.3

Design and Validation of a Low-Cost, Low-Power, Clockwork Insulin Pump (I)

[Pooke, Francis Craig](#)
[Payne, Matthew](#)
[Holder-Pearson, Lui](#)
[Chase, J. Geoffrey](#)

University of Canterbury
University of Canterbury
University of Canterbury
University of Canterbury

14:30-14:50, Paper ThB22.4

[Insulin Pump Accuracy at Low and Minimum Delivery Rates, in Relation to Paediatric Diabetes Care \(I\)](#)

[Payne, Matthew](#)
[Pooke, Francis Craig](#)
[Holder-Pearson, Lui](#)
[Chase, J. Geoffrey](#)

University of Canterbury
University of Canterbury
University of Canterbury
University of Canterbury

14:50-15:10, Paper ThB22.5

[Modeling the Correlation of Human Vertebral Body Volumes \(I\)](#)

[Szabó, Bálint](#)

[Szlávecz, Ákos](#)

[Bazso, Sandor](#)

[Somogyi, Péter](#)

[Kovács, Katalin](#)

[Viola, Arpad](#)

[Benyo, Balazs](#)

Budapest University of
Technology and Economics
Budapest University of
Technology and Economics
Budapest University of
Technology and Economics
Budapest University of
Technology and Economics
Széchenyi István University
Department of
Neurotraumatology,
Semmelweis University,
Budapest
Budapest University of
Technology and Economics