

## DETAILED PROGRAM – Monday 2 September

### PLENARY SPEAKER 1 – Shoji Takeuchi ([Neue Aula, 9:40 – 10:30](#))



***Title: Innovating Biohybrid Robotics: Integration of Biological and Artificial Systems for Robotic Advancements***

**Bio:** Shoji Takeuchi received the B.E, M.E., and Dr. Eng. degrees in mechanical engineering from the University of Tokyo, Tokyo, Japan, in 1995, 1997, and 2000, respectively. He is currently a Professor in the Department of Mechano-Informatics, Graduate School of Information Science and Technology, University of Tokyo. He has authored more than 230 peer-reviewed publications and filed over 140 patents. He has been recognized with numerous honours including Young Scientists' Prize, the JSPS prize from the Japan Society for the Promotion of Science in 2010, ACS Analytical Chemistry Young Innovator Awards in 2015, and UNESCO Netexplo Award Winner 2019. JSME Micro-Nano Science & Technology Achievement Award in 2022. His current research interests include cultivated meat, 3D tissue fabrication, bioMEMS, implantable devices, artificial lipid bilayer systems, and biohybrid machines.



## PARALLEL ORAL SESSIONS MORNING

**Morning ORAL Sessions (11:00 – 12:15): Parallel oral sessions (talks: 10 min + 2 min Q&A).**

### [Exoskeletons and exosuits] EE-MO2 – Room HS 1

**Chair: Matteo Laffranchi, Co-Chair: Leonardo Cappello**

<u>7</u>	Swaminathan, Krithika; Lee, Christina; Schmitz, Dylan; Baker, Teresa; Chin, Andrew; Wendel, Nicholas; Awad, Louis; Ellis, Terry; Thelen, Darryl; Walsh, Conor James	Propulsion Modulation Methods in People Post-stroke during Resistive Ankle Exosuit Use
<u>79</u>	Dezman, Miha; Marquardt, Charlotte Dorothea; Üğür, Adnan; Asfour, Tamim	Influence of Motion Restrictions in an Ankle Exoskeleton on Gait Kinematics and Stability in Straight Walking
<u>121</u>	HAFS, Abdelwaheb; Verdel, Dorian; burdet, etienne; BRUNEAU, Olivier; Berret, Bastien	A Finite-Horizon Inverse Differential Game Approach for Optimal Trajectory-Tracking Assistance with a Wrist Exoskeleton
<u>128</u>	Pruyn, Kai; Murray, Rosemarie; Gabert, Lukas; Lenzi, Tommaso	Autonomous Powered Ankle Exoskeleton Improves Foot Clearance and Knee Hyperextension After Stroke: A Case Study
<u>136</u>	Miskovic, Luka; Tricomi, Enrica; Zhang, Xiaohui; Missiroli, Francesco; Krstanovic; Kristina; Petric, Tadej; Masia, Lorenzo	Coupling Rigid Pneumatic Knee Exoskeleton with Soft Tendon-Driven Hip Exosuit: First Insights
<u>157</u>	Pericu, Valentina; Vassallo, Christian; Zinni, Gaia; Hinterlang, Wiebke; Lencioni, Tiziana; Ferrarin, Maurizio; Jonsdottir,	A novel assistive controller for gait rehabilitation through the TWIN lower-limb exoskeleton in individuals with residual motor functionalities

Johanna; De Michieli, Lorenzo; Semprini, Marianna;  
 Maludrottu, Stefano; Laffranchi, Matteo

## [Neural control of movement and biomechanics] NC-MO2 – Room HS 4

**Chair: Tadej Petric, Co-Chair: Tomislav Bacek**

<u>161</u>	Zhang, Jianxi; Zeng, Hong; Wang, Jiajin; Wang, Xin; Song, Aiguo	Human Movement Compensation Control for Supernumerary Limb in Overhead Support Task: A Non-cooperative Game Theory Approach
<u>204</u>	Anwar, Eisa; Abeywardena, Sajeeva; Miller, Stuart; Farkhatdinov, Ildar	Design and Validation of a Wearable Robotic Tail for Human Balance Support
<u>81</u>	Sun, Mingrui; Horst, Fabian; Slijepcevic, Djordje; Oetomo, Denny; Tan, Ying; Bacek, Tomislav	The Uniqueness of Gait Patterns Differs Across Data Modalities and Walking Conditions
<u>84</u>	Edraki, Mahdiar; Lokesh, Rakshith; Krotov, Aleksei; Ramezani, Alireza; Sternad, Dagmar	Human-Inspired Control of a Whip: Preparatory Movements Improve Hitting a Target
<u>86</u>	Yang, Qihan; Gloumakov, Yuri; Spiers, Adam	Multi-modal Compensatory Motion Analysis for Reaching Motions Over a Discretely Sampled Workspace
<u>94</u>	Lan, Bangyu; Stramigioli, Stefano; Niu, Kenan	Anatomical Region Perception and Real-time Bone Tracking Methods by Dynamically Decoding A-Mode Ultrasound Signals

### **[Surgical and medical robotics] SR-MO2 – Room HS 7**

**Chair: Franziska Mathis Ulrich, Co-Chair: Nili Krausz**

<u>203</u>	Alagi, Hosam; Fischer, Nikola; Behrends, Kai Lennart; Fürst-Walter, Iris; Becker, Juergen; Beigl, Michael; Mathis-Ullrich, Franziska; Hein, Björn	Enhancing Force Sensing Capabilities in Exoskeleton Interfaces Using Compliant Actuator-Sensor Units: A User Study
<u>216</u>	Beck, Adrian; Tomita, Yoshihide; Miyazaki, Tetsuro; Kawashima, Kenji	A Pneumatically Driven Arm Muscle Training System Realizing Wide Motion Range and Large Moment Arm
<u>340</u>	Jenkinson, George; Conn, Andrew; Tzemanaki, Antonia	Braille-tip: Structured Small-Footprint Tactile Sensor for High Acuity Dynamic Tactile Tasks
<u>338</u>	Ito, Jin; Murakami, Toshiyuki	Robust Position and Force Control in Series Elastic Actuator for Human Assistance Systems
<u>348</u>	Guachi, Lorena de los Angeles; Sorriento, Angela; Cafarelli, Andrea; Restaino, Francesco; Spinnato, Paolo; Ricotti, Leonardo	A Portable Ultrasound Procedure to Enable Remote Management of Tennis Leg Injuries

### **[Bionic prostheses] BP-MO2 – Room HS 8**

**Chair: Renaud Ronsse, Co-Chair: Enrica Tricomi**

<u>206</u>	Wang, Fengyi; Fu, Xiangyu; Thakor, Nitish V.; Cheng, Gordon	Object Classification Utilizing Neuromorphic Proprioceptive Signals in Active Exploration: Validated on a Soft Anthropomorphic Hand
<u>250</u>	Grignaffini, Luca; Van der Kooij, Herman; Sadeghi, Ali	A New Approach for Multi-Material Additive Manufacturing of a Sensorized Hybrid Soft Robotic Hand

<u>281</u>	Spiegeler Castaneda, Theophil; Capsi Morales, Patricia; Zhang, Xiaoqian; Piazza, Cristina	Soft Artificial Hand with Configurable Stiffness through Bio-inspired Spherical Joints
<u>71</u>	Guiaux Brinon, Julien; Ronsse, Renaud	A novel concept of passive knee prosthesis with multiple stiffnesses to support overground walking and sit-to-stand
<u>103</u>	Boccardo, Nicolò; Canepa, Michele; Sacchi, Lorenzo; Marinelli, Andrea; Di Domenico, Dario; De Michieli, Lorenzo; Laffranchi, Matteo	Identification of the most significant tactile sensing pressure points towards biomimetic sensory prosthetic design

**[IEEE RAL Session 1 of 2] RAL1-MO2 – Room HS 9**

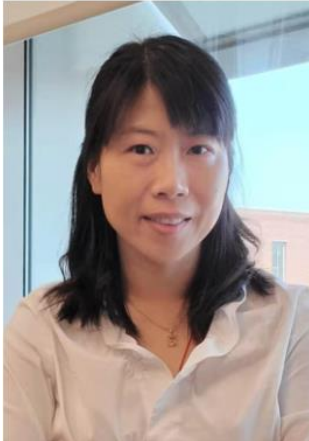
***Chair: Francisco Valero-Cuevas, Co-Chair: Anne D. Koelewijn***

<u>3</u>	Hu, Xuhui, Song, Aiguo*, Zeng, Hong, Wei, Zhikai, deng, hanjie, Chen, Dapeng	Bridging Human-Robot Co-adaptation via Biofeedback for Continuous Myoelectric Control
<u>4</u>	Habibollahi, Zahra, Zhou, Yue, Jenkins, Mary, Garland, S. Jayne, Naish, Michael D., Trejos, Ana Luisa*	Multimodal Tremor Suppression of the Wrist Using FES and Electric motors—A Simulation Study
<u>6</u>	He, Shaoying, Sun, Langlang, Xu, Yunwen*, Li, dewei	A Modeling and Data-driven Control Framework for Rigid-soft Hybrid Robot with Visual Servoing
<u>11</u>	Hadi Hosseinabadi, Amir Hossein*, Black, David Gregory, Salcudean, Septimiu E.	Multi-Axis Force Sensing in Laparoscopic Surgery
<u>19</u>	Luciani, Beatrice*, Roveda, Loris, Braghin, Francesco, Pedrocchi, Alessandra, Gandolla, Marta	Trajectory Learning by Therapists' Demonstrations for an Upper Limb Rehabilitation Exoskeleton
<u>392</u>	Wu, Man I*, Stirling, Leia	Emergent gait strategies defined by cluster analysis when using imperfect exoskeleton algorithms

393 Leestma, Jennifer\*, Mathur, Snehil, Anderton, Maximillian, Sawicki, Gregory, Young, Aaron

Dynamic duo: Design and validation of an autonomous frontal and sagittal actuating hip exoskeleton for balance modulation during perturbed locomotion

PLENARY SPEAKER 2 – Helen Huang ([Neue Aula, 14:00 – 14:50](#))



**Title: Towards Symbiotic Robotic Prostheses**

**Bio:** Dr. Helen Huang is the Jackson Family Distinguished Professor in the Joint Department of Biomedical Engineering at North Carolina State University (NC State) and the University of North Carolina at Chapel Hill (UNC) and the Director of the Closed-Loop Engineering for Advanced Rehabilitation (CLEAR) core. She is also the co-director of NIDILRR funded Rehabilitation Engineering Research Center. Her research interest lies in neural-machine interfaces, wearer-robot interaction and co-adaptation, robotic prosthetics and exoskeletons, and human motor control/biomechanics. She was awarded with many prizes among which the Delsys Prize for Innovation in Electromyography, the NSF CAREER Award, and the NC State ALCOA Foundation Distinguished Engineering Research Award. She is a member of numerous scientific societies, and she is the incoming Editor-in-Chief for the IEEE Transactions on Neural Systems and Rehabilitation Engineering and an Editorial Board Member for IEEE Transactions on Biomedical Engineering.



KEY INNOVATOR 1 – Hugh Herr ([Neue Aula, 14:50 – 15:10](#))**Title: On the Design of Bionic Limbs: The Science of Tissue-Synthetic Interface**

**Bio:** Hugh Herr is a pioneering scientist in the field of Biomechatronics, blending human physiology with electromechanics to create advanced bionic limbs. A double amputee himself, he has developed groundbreaking technologies, such as the EmPower Ankle-Foot Prosthesis, which allows amputees to walk with a natural gait. He is a Professor at MIT, where he directs the Biomechatronics Group and co-directs the K. Lisa Yang Center for Bionics. With over 350 publications and numerous patents, Herr's innovations include powered exoskeletons, neural interfacing technologies, and advanced prosthetic limbs. Herr's MIT group has also invented novel mechanoneural Interfaces to the peripheral nervous system, surgical amputation procedures combined with neural interfacing technologies that enable persons with limb loss to neurally control their synthetic limbs, as well as to experience natural proprioceptive and cutaneous sensations. He has received numerous awards for his contributions, and his story has been featured in various media, including National Geographic and CNN.



## POSTER SESSION 1

### **Afternoon Poster Sessions (15:40 – 17:00).**

Panel	ID	Authors	Title
1	<a href="#">62</a>	Devillez, Louis; Herman, Benoît; Ronsse, Renaud	Design of a compact active hip prosthesis with human-like range of motion and torque
2	<a href="#">112</a>	Heremans, François; Evrard, Jeanne; Langlois, David; Ronsse, Renaud	A lightweight and compact lockable parallel spring enhances the performance of a powered ankle-foot prosthesis
3	<a href="#">109</a>	Fagioli, Ilaria; Mazzarini, Alessandro; Baldoni, Andrea; Dell'Agnello, Filippo; Gruppioni, Emanuele; Trigili, Emilio; Crea, Simona; Vitiello, Nicola	A Lightweight Robotic Knee Prosthesis with Torsional Series Elastic Actuation
4	<a href="#">337</a>	Ceccarelli, Alessandro; Nini, Ludovica; Taffoni, Fabrizio; Zollo, Loredana; Tagliamonte, Nevio Luigi	Mechanical Design of a Bioinspired and Customized Prosthetic Hand Finger Based on Six-Bar Linkage
5	<a href="#">356</a>	Borja Inga, Rolando; Mio, Renato Alonso; Narayan, Jyotindra	A Low-Cost Upper-Limb Prosthetic Tool for Handlebar-Driven Vehicles
6	<a href="#">43</a>	Evrard, Jeanne; Heremans, François; Ronsse, Renaud	Validation of a heuristic intention detection algorithm for a powered ankle prosthesis across various ambulation tasks
7	<a href="#">163</a>	Mariani, Giulia; Dominici, Chiara; Tessari, Federico; Freddolini, Marco; Traverso, Simone; De Giuseppe, Samuele; Cherubini, Andrea; Gruppioni, Emanuele; De	Social Tasks in a Spatial Augmented Training for the Embodiment of Prosthetic Lower Limbs

		Michieli, Lorenzo; Ferraresi, Carlo; Laffranchi, Matteo; Barresi, Giacinto	
8	<a href="#">241</a>	Arfaie, Omid; Unal, Ramazan	Comparison of Different Actuation Concepts for the Knee Joint During Stair-Climbing
9	<a href="#">354</a>	Pirritano, Marissa; Neuman, Ross Michael; Molitor, Stephanie; Klute, Glenn; Neptune, Richard R.; Fey, Nicholas	Ability of a Robotic Ankle Prosthesis to Augment Effective Foot-Ankle Stiffness relative to Standalone Prosthetic Feet
10	<a href="#">390</a>	Chengxiang, Liu; Tagliabue, Gregorio; Raveendranathan, Vishal; Houdijk, Han; Carloni, Raffaella	Control Architecture of a Variable Stiffness Prosthetic Knee for Energy Absorption and Restoration
11	<a href="#">51</a>	Reginaldi, Irene; Puliti, Marco; Bunt, Alessandro; Franconi, Benedetta; Martulli, Luca Michele; Bernasconi, Andrea; Frigo, Carlo Albino; De Michieli, Lorenzo; Laffranchi, Matteo	Effect of Prosthetic Mass Reduction on Metabolic Cost and Walking Symmetry: a Case Study on Lower Limbs
12	<a href="#">284</a>	Nini, Ludovica; Ceccarelli, Alessandro; Tagliamonte, Nevio Luigi; Zollo, Loredana; Taffoni, Fabrizio	Parametric 3D Modeling of a Customized Prosthetic Hand Finger for Additive Manufacturing
13	<a href="#">233</a>	Stefanelli, Enrica; Lapresa, Martina; Cordella, Francesca; D'Accolti, Daniele; Cipriani, Christian; Zollo, Loredana	A hand-wrist control strategy based on human upper limb kinematics
14	<a href="#">80</a>	Marquardt, Charlotte Dorothea; Dezman, Miha; Asfour, Tamim	Influence of Motion Restrictions in an Ankle Exoskeleton on Force Myography in Straight and Curve Walking
15	<a href="#">166</a>	Moreira, Luís; Figueiredo, Joana; Cerqueira, João; Santos, Cristina P.	Assist-As-Needed Electromyography-based Control for a Wearable Ankle Robotic Orthosis

<u>16</u>	<u>199</u>	Bottin-Noonan, Joel; Alici, Gursel; Sreenivasa, Manish	Characterization of stiffness and damping properties of a Soft Torque Assistive Bio-inspired Lower Limb Exosuit (STABLE)
<u>17</u>	<u>175</u>	Bodo, Giulia; Giannattasio, Raffaele; Ramadoss, Vishal; Tessari, Federico; Laffranchi, Matteo	A Modular, Time-Independent, Path-Based Controller for Assist-As-Needed Rehabilitative Exoskeletons
<u>18</u>	<u>212</u>	Gantenbein, Jessica; Dittli, Jan; Meyer, Jan Thomas; Linke, Anita Dorothea; Curt, Armin; Lambercy, Olivier; Gassert, Roger	A helping hand at home: a case study on the unsupervised use of a robotic hand orthosis in people with tetraplegia
<u>19</u>	<u>246</u>	Vinzenz, Gerhard; Miskovic, Luka; Nanni, Alex; Tricomi, Enrica; Missiroli, Francesco; Palmerini, Luca; Chiari, Lorenzo; Masia, Lorenzo	Design of a High Bandwidth Wearable Actuation for seamless Assistance in Walking and Running
<u>20</u>	<u>106</u>	Ingraham, Kimberly; Feldner, Heather; Steele, Katherine	An Instrumented 'Explorer Mini' for Quantitative Analysis of Toddlers Using Powered Mobility for Exploratory, Mobile, and Digital Play
<u>21</u>	<u>343</u>	Arciniegas-Mayag, Luis; Ranjan Das, Adip; CASAS, DIEGO; Otalora, Sophia; Jiménez Hernández, Mario Fernando; Segatto, Marcelo; Diaz, Camilo; Munera, Marcela; Cifuentes, Carlos A.	Cable-Driven Exosuit to Assist Affected Upper-Limb Users with Hemiparesis
<u>22</u>	<u>360</u>	Dragusanu, Mihai; Troisi, Danilo; Suthar, Bhivraj; Prattichizzo, Domenico; Malvezzi, Monica	Development of a soft actuated glove based on twisted string actuators for hand rehabilitation
<u>23</u>	<u>389</u>	Durfee, William; Gustafson, Kimberly	A Muscle-Powered Exoskeleton for Weight-Bearing Exercise after a Spinal Cord Injury

<u>24</u>	<u>139</u>	Hjorth, Sebastian; Mobedi, Emir; Ajoudani, Arash	A Power-Based Load Decoupling Method for Wearable Assistive Systems
<u>25</u>	<u>144</u>	Sampaio Pinheiro, Cristiana Filipa; Figueiredo, Joana; Cerqueira, João; Santos, Cristina	A pilot study on wearable multimodal robotic biofeedback for personalized physical training
<u>26</u>	<u>155</u>	Bodo, Giulia; De Angelis, Agnese; Taglione, Elisa; Capitta, Gianluca; De Guglielmo, Luca; Buccelli, Stefano; Laffranchi, Matteo	Human Exoskeleton Interfaces and Precision Robotic-Human Joint Alignment for Enhanced Upper Limb Rehabilitation
<u>27</u>	<u>237</u>	Baselli, Camilla; Missiroli, Francesco; Buatier de Mongeot, Lucia; Rominger, Julius; Krzywinski, Jens; Altinsoy, Ercan; Fitzek, Frank; Cappello, Leonardo; Controzzi, Marco; Masia, Lorenzo	Tendon-Driven Haptic Glove for Force Feedback Telemanipulation
<u>28</u>	<u>306</u>	Pitzalis, Roberto Francesco; Cartocci, Nicholas; Di Natali, Christian; Caldwell, Darwin G.; Berselli, Giovanni; Ortiz, Jesus	Development of a ML-Control Strategy for a Wrist Exoskeleton based on EMG and Force measurements with Sensor Strategy Optimisation
<u>29</u>	<u>332</u>	Fanti, Vasco; Leggieri, Sergio; Caldwell, Darwin G.; Di Natali, Christian	Proprioceptive-Based Control Strategy to Assist Walking and Carrying Tasks in Back-Support Exoskeletons
<u>30</u>	<u>45</u>	Mosconi, Denis; Moreno, Yecid; Moreira, Melkzedekue; Siqueira, Adriano	HUMAN-EXOSKELETON INTERACTION DURING KNEE FLEXION-EXTENSION WITH ROBOT SETUP IN RESISTIVE MODE
<u>31</u>	<u>100</u>	Liu, Yali; Zhou, Xingjian; Liu, Yue; Zhang, Jingyi; Song, Qiuzhi	The kinetics modeling of a 3 powered joint exoskeleton for lifting and transferring heavy loads
<u>32</u>	<u>129</u>	Hofmann, Veronika; Bölke, Nico; Maufroy, Christophe; Schneider, Urs; Pott, Peter	Development and evaluation of a passive lower body exoskeleton for agriculture

<u>33</u>	<u>310</u>	Khatiwada, Denish; Sanders, Quentin	Design, Characterization, and Testing of Rigid Chain Actuator for an Under-Actuated, Tendon Driven Hand Exoskeleton
<u>34</u>	<u>232</u>	Garzas-Villar, Alberto; Boersma, Caspar; Derumigny, Alexis; Zgonnikov, Arkady; Marchal-Crespo, Laura	Personality Traits Modulate the Effect of Haptic Guidance during Robotic-assisted Motor Training
<u>35</u>	<u>150</u>	Poignant, Alexis; Morel, Guillaume; Jarrasse, Nathanael	Hands-free teleoperation of a nearby manipulator through a virtual body-to-robot link
<u>36</u>	<u>217</u>	Pierella, Camilla; Freccero, Aurora; Biasotti, Giulia; Traverso, Nicolo; Bellitto, Amy; Ricci, Serena; Sante, Filippo; Carlini, Giorgio; Canessa, Andrea; Massone, Antonino; Casadio, Maura	Driving Skills Assessment in Individuals with Spinal Cord Injuries: A Pilot test of ADRIS 3.0 Simulator
<u>37</u>	<u>219</u>	Bellitto, Amy; Girardo, Ermanno; Casadio, Maura; Mastrogiovanni, Fulvio; Moro, Matteo; Pierella, Camilla; Carfı, Alessandro	TIAGo Robot Teleoperation via Body-Machine Interface: Enhancing Assistance for Cervical Spinal Cord Injured Individuals
<u>38</u>	<u>299</u>	Buscaglione, Silvia; Noccaro, Alessia; Provenzale, Cecilia; Chiara, Bonsignori; Ivanova, Ekaterina; Sparaci, Laura; Taffoni, Fabrizio; burdet, etienne; Formica, Domenico	A Human-Human Physical Interaction System for Training Handwriting
<u>39</u>	<u>167</u>	Higashikawa, Kouki; Hong, Jing-Chen; Tsuruta, Chihiro; Nagashima, Ryo; Takeuchi, Ryohei; Gunbe, Tsubasa; Iwata, Hiroyasu	Development of a Foot Center of Pressure Biofeedback System for the Prevention of Bowleg Redeformation: A Feasibility Study in Patients after Tibial Osteotomy
<u>40</u>	<u>165</u>	Hoefflin, Niklas; Spulak, Tim; Jeworutzki, Andre; Schwarzer, Jan	Real-time Lateral Sitting Posture Detection using YOLOv5

## PARALLEL ORAL SESSIONS AFTERNOON

**Afternoon ORAL Sessions (17:00 – 18:15): Parallel oral sessions (talks: 10 min + 2 min Q&A).**

### [Exoskeletons and exosuits] EE-AF2 – Room HS 1

**Chair: Edwin van Asseldonk, Co-Chair: Carlos A. Cifuentes**

<u>184</u>	Chen, Chih-Yu; Martins Frejat, Julia; Vaidyanathan, Ravi; Drechsler, Klaus	Biomechanical Joint Design of Patient-Specific Rehabilitative Knee Exoskeletons for Misalignment Correction
<u>197</u>	Tomc, Matej; Olenšek Andrej; Matjaz Zadavec; Matjacic, Zlatko	Inherent Synchrony Between an Ankle Exoskeleton and its Wearer Achieved Through Mechanical Design
<u>230</u>	Su, Huimin; Missiroli, Francesco; Zhang, Xiaohui; Becchio, Cristina; Park, Hyung-Soon; Masia, Lorenzo	Advanced Soft Wearable Robotics for Rehabilitation: Incorporating Forearm Rotation in a Glove Exosuit to Augment Grasping Capabilities and Improve Therapeutic Outcomes
<u>249</u>	Missiroli, Francesco; Ferrazzi, Francesco; Tricomi, Enrica; Casadio, Maura; Masia, Lorenzo	Assistive Force Myography Controlled Exoglove
<u>256</u>	Capitani, Stefano Laszlo; Peperoni, Emanuele; Kuang, Lisheng; Fiumalbi, Tommaso; Baldoni, Andrea; Dell'Agnello, Filippo; Creatini, Ilaria; Taglione, Elisa; Vitiello, Nicola; Trigili, Emilio; Crea, Simona	H-PhlEx $\alpha$ : a compact SEA-based hand exoskeleton with active methacarpophalangeal joints

<u>154</u>	Sugino, Tomotaka; Shimoda, Yusuke; Okui, Manabu; Nishihama, Rie; Nakamura, Taro	Exoskeleton-type Assist Device Focusing on the Variable Viscosity Characteristics of the Knee Joint During Stair Descent
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**[Neural control of movement and biomechanics] NC-AF2 – Room HS 4**

***Chair: Lorenzo Masia, Co-Chair: Guillaume Durandau***

<u>105</u>	McArthur, Daniel; Branyan, Callie; Tansel, Derya; Eric Vincent, Liu, Eric; Mazumdar, Anirban; Miera, Alexandria; Rittikaidachar, Michal; Spencer, Steven J.; Wood, David; Wheeler, Jason	Dynamic Shear and Normal Force Detection in a Soft Insole Using Hybrid Optical & Piezoresistive Sensors
<u>126</u>	Bunz, Elsa Katharina; Pawusch, Louisa Helen; Schmitt, Syn	Optimizing reflex-based neuromusculoskeletal walking model on rough terrain reveals increased robustness and key stabilizing reflexes
<u>132</u>	Sapounaki, Maria; Schumacher, Pierre; Ilg, Winfried; Giese, Martin; Maufroy, Christophe; Bulling, Andreas; Schmitt, Syn; Haeufle, Daniel Florian Benedict; Wochner, Isabell	Quantifying human upper limb stiffness responses based on a computationally efficient neuromusculoskeletal arm model
<u>191</u>	berjis, mahshad; LeBel, Marie-Eve; Lizotte, Daniel; Trejos, Ana Luisa	Selecting Muscles for Detection of Upper-limb Compensatory Motions Using s-EMG Sensors
<u>193</u>	Jaberi Miandoab, Mahan; Rogers-Bradley, Emily	Passive Dynamic Walking with Arms: Sagittal Plane Bifurcation and Stability
<u>200</u>	Terada, Ryohei; Hirai, Hiroaki; Sasaki, Kosei; Kuga, Hirokazu; Furukawa, Keisuke; Matsui, Kazuhiro; Nishikawa, Atsushi; Krebs, Hermano Igo	Transverse Pelvic/Saddle Rotation Characterizing Push-off Initiation during Saddle-seat-type Body-weight-supported Treadmill Walking

**[Soft robotics] SR-AF2 – Room HS 7**

**Chair: Edoardo Milana, Co-Chair: Federico Masiero**

<u>268</u>	Tosi, Beatrice; Nazeer, Muhammad Sunny; Falotico, Egidio	Behavior Cloning from Observations with Domain Mapping for the Control of Soft Robots
<u>384</u>	Osawa, Keisuke; Nakamura, Seishiro; Duan, Kaiwen; Ueda, Akiyo; Tanaka, Eiichiro	Modeling of Gummy Gears for Self-Propelled Edible Robots
<u>228</u>	Kalpathy Venkiteswaran, Venkatasubramanian; Bos, Jurrien; Dannana, Dimple; Sadeghi, Ali	An LMPA-based Magnetically-Actuated Growing Robot for Medical Applications
<u>357</u>	Nassour, John; Pei, Guanran; Menzel, Nicholas Daniel; Berberich, Nicolas; Gigl, Sandra; Wilke, Manuel; Koch, Kathrin; Cheng, Gordon	MRI Compatible Valve Enables Fast Actuation of Soft Hand Exoskeleton in Medical Imaging
<u>331</u>	Donato, Enrico; George Thuruthel, Thomas; Falotico, Egidio	Towards Interpretable Visuo-Tactile Predictive Models for Soft Robot Interactions
<u>50</u>	Lizotte, Alex; Daemi, Parisa; DiFabio, Brendan; Trejos, Ana Luisa	Improving the Cooling Time of Twisted Coiled Actuators in Soft Robotics
<u>95</u>	Nagase, Jun-ya; Unno, Yo	Cylindrical Elastic Crawler with Active Steering Using Sliders for Pipe Inspection



**[Haptics] HP-AF2 – Room HS 6**

**Chair: Yeongmi Kim, Co-Chair: Domenico Formica**

<u>8</u>	van Riessen, Huibert A. J.; Vardar, Yasemin	Relocating thermal stimuli to the proximal phalanx may not affect vibrotactile sensitivity on the fingertip
<u>15</u>	Tiseo, Carlo; Rouxel, Quentin; Asenov, Martin; Kouhkiloui Babarahmati, Keyhan; Ramamoorthy, Subramanian; Li, Zhibin (Alex); Mistry, Michael	Achieving Dexterous Bidirectional Interaction in Uncertain Conditions for Medical Robotics
<u>77</u>	Cheng, Ching Hei; Eden, Jonathan; Oetomo, Denny; Tan, Ying	Exploring the Influence of Displacement, Velocity and Actuation Duration on Skin Stretch Perception
<u>311</u>	Eder, Jasmin; Mauracher, Dorothea; Freiherr von Stein-Liebenstein zu Barchfeld, Ruben; Zamarian, Laura; Kim, Yeongmi	Enhancing sensory memory through multi-modal stimulation on a finger training and assessment device
<u>339</u>	Way, Joel; Buscaglione, Silvia; Giovannetti, Giorgia; Formica, Domenico	Design and Testing of a Planar Device for haptic interactions during handwriting teaching and learning.

## Forum 1 – Sensorimotor control of upper limb prostheses

### Abstract



Christian Cipriani

[Room HS 14](#)

[Afternoon Session:](#)  
[17:00 – 18:15](#)

This Forum aims to discuss the emerging, current, and historical trends and challenges in the field of sensorimotor control of upper limb prostheses from an interdisciplinary perspective. Over the past 20 years, advancements in bionic hand reconstruction have significantly improved motor and sensory functions for individuals with upper limb amputations. Combining advanced surgical procedures with complex prosthetic technologies, experts are striving for more intuitive and biomimetic control of artificial limbs, including the restoration of proprioceptive and exteroceptive sensations. These recent developments have opened up new perspectives for all stakeholders involved in the field of upper limb prostheses and have offered researchers valuable insights for compelling discussion.

This Forum is an opportunity for young researchers to learn from leaders in the field and for senior researchers to inspire new projects and collaborations. We will explore the latest advances in invasive and non-invasive technologies and strategies for probing control signals and restoring sensation, their integration with state-of-the-art surgical interventions, and discuss hardware modifications needed to adapt current prosthetic solutions to these new scenarios.

The format is highly interactive: we will present a series of provocative research statements or questions, and the audience will be invited to discuss the topic and engage in open discussion, fostering effective and critical opinion exchanges on key topics in the field.

## Contributors

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