



Through "IFESS Newsletter", we aim at sharing important information about the IFESS society and also at providing a space where each member can communicate important news or information to our community. Welcome on board and enjoy!

IFESS member can contribute by sending a message to christine.azevedo@inria.fr (150 words max)

Issue 06 – February 2020

NEWS FROM IFESS

⊙ Letter from Thierry Keller

Dear IFESS members, end of December I concluded my 6th year of being IFESS president and would like to thank all that supported me in the transformation process of IFESS to an international association that promotes the awareness, knowledge, and understanding of electrical stimulation technologies and their uses and bridges research, application, and healthcare to enhance quality of life. I felt throughout my two terms a strong support from our board and many members. We reformed our purpose and mission and renewed our structure to better serve the community. Highlights were the joint participation with other rehabilitation technology societies and clinical organizations at two RehabWeeks, the affiliation with IISART and joining the ICRT.

At the last general assembly in Toronto we elected a new executive board and replaced a few former executive members. Our new leadership team, Simona Ferrante (president), Erika G. Spaich (vice-president), Jonathan Jarvis (secretary), and Cesar Marques-Chin (treasurer) have already taken over all duties. With great confidence I handed over the lead to Simona and I'm happy to serve the society further with my colleague board members Ken Yoshida, Christine Azevedo Coste, Thomas W.J. Janssen, Winfried Mayr, Tamsyn Street, Ines Bersch-Porada, Glen Davis, and Milos R. Popovic. Finally let me thank Michael Russold, who left the board having served the society for many years as treasurer and BoD.

- ⊙ **2019, IFESS conference** took place in Toronto, Canada, under the umbrella of RehabWeek 2019 between June 24 and 28. RehabWeek is an event that brings together multiple conferences in the field of rehabilitation technology. In addition to IFESS, five other participating societies were involved, including: the International Conference on Rehabilitation Robotics (ICORR), the International Industry Society in Advanced Rehabilitation Technology (IISART), the American Congress of Rehabilitation Medicine (ACRM), the Rehabilitation Engineering and Assistive Technology Society of North America (RESNA) and the International Society of Prosthetics and Orthotics (ISPO Canada). We were very fortunate to have wonderful keynote speakers for the IFESS Conference including Prof. David Collins (Univ. of Alberta, Edmonton), Prof. Frank Lane (Illinois Institute of Technology), Mr. Paul Meadows (consultant at LivaNova and former VP of R&D and CTO of ImThera Medical, Inc.), Prof. Dejan Popovic (Serbian Academy of Science and Arts), Prof. Dimitry Sayenko (Houston Methodist Research Institute), and Prof. Ken Yoshida (Indiana Univ. - Purdue Univ. Indianapolis). This year's winners of the Vodovnik Award were Mr. Lazar I Jovanovic (1st place), Ms. Christina Salchow-Hömmen (2nd place), and Mr. Atsushi Sasaki (3rd place) in recognition to their outstanding student contributions to the IFESS 2019 Conference. If you were one of the more than 1400 delegates at RehabWeek, we hope you had the opportunity to meet new friends from different fields and professions and that you enjoyed the conference. Until next time!
- ⊙ **2019, Vienna International Workshop on Functional Electrical Stimulation** had its 13th edition on September 23 and 24, followed by post-conference courses and a workshop of the European WEARPLEX initiative on the 25th. 102 registered participants from 19 countries enjoyed sessions on Restoration of Movement; Wearable Technology; Aging, Dystrophic and Denervated Muscles; Advanced Biosignal Analysis; and Hybrid Systems for Exercising Cyclic Functional Movements. The workshops included "Additive manufacturing in FES and Rehabilitation Technology", "FES in Spinal Cord Injury", "FES in Upper Extremity" and "Electrode Suit for Afferent nerve Stimulation in Children with CP". Special Highlights were keynotes by Ines Bersch (Nottwil), Francesco Moscato (Vienna), and Sean Doherty (London). The traditional triannual event was organized under the auspices of the Austrian Society for Biomedical Engineering and with support of IFESS by Manfred Bijak,

Melitta Pichler, Winfried Mayr and colleagues from the Center of Medical Physics and Biomedical Engineering of the Vienna Medical University. Please find details at <https://fesworkshop.org/13th-workshop-2019>

- ② **2020, IFESS conference** will be held in Rovinj, Croatia, between **September 9 and 12**. It is organized by Profs. Dejan Popović and Marinko Rade and will run in parallel to 2 complementary events: “Wearable robotics for rehabilitation” School, and XI External Control of Human Extremities Meeting. <https://3eventrovini.com/>
- ② **IFESS Pod-Casts a Pilot Project** At RehabWeek 2019, Ladan Jiracek, a PhD Student at the University of Florida was sponsored by IFESS to wander through the conference, interview IFESS members and conference participants, and record talks. The idea is to create IFESS branded materials to capture the zeitgeist of what took place at the conference. The materials, in the form of pod-casts, could be used in teaching and for increasing public awareness of FES as well as create a record of what members of the FES community are doing in 2019. Ladan is an experienced pod-caster and has been creating pod-casts at neural engineering conferences for his own site at <http://neuralimplantpodcast.com>. The content he produced is a series of interviews with IFESS members taken during the RehabWeek 2019 conference in Toronto from the 24th - 28th of June 2019. The series of 13 interviews will be released 3-4 at a time through links in the Newsletter. This is a pilot project to see if the initiative is worth continuing in future IFESS meetings, so feedback to the board is appreciated.



Cybathlon:

<http://directory.libsyn.com/episode/index/id/10735529>



Paul Meadows:

<http://directory.libsyn.com/episode/index/id/10735823>



Steven Plymale and Milos Popovic:

<http://directory.libsyn.com/episode/index/id/10774220>

MEMBER'S CORNER

② **NMES-Assisted Gait Network** The NMES-Assisted Gait Network is a group of researchers, engineers, and clinicians motivated to make a difference using multichannel neuromuscular electrical stimulation to improve gait in children with cerebral palsy. The network was founded by Professor Jessica Rose, PhD through an NIH Network Grant R13HD062146 at Stanford University in 2009 and continues with annual lunch meetings held at the American Academy of Cerebral Palsy and Developmental Medicine (AACPDM) Annual Conference, led by Kelly Greve, PT, DPT, PhD, from Cincinnati Children's Hospital Medical Center. During the luncheon, experts in the area of NMES-Assisted Gait present their work to demonstrate advances and discuss progress and challenges. Individuals within the network also collaborate with one another. If you would like to be added to the mailing list, please contact Kelly Greve at kelly.greve@cchmc.org for information.

Selection of recent publications

- ② **End-user and clinician perspectives on the viability of wearable functional electrical stimulation garments after stroke and spinal cord injury.** Moineau B, Myers M, Ali SS, Popovic MR, Hitzig SL. *Disabil Rehabil Assist Technol.* 2019 Oct 8:1-10. doi: 10.1080/17483107.2019.1668974.
- ② **Enhancing functional abilities and cognitive integration of the lower limb prosthesis.** Petrini F, Valle G, Bumbasirevic M, Barberi F, Bortolotti D, Cvancara P, Hiairassary A, Mijovic P, Sverrisson A, Pedrocchi A, Divoux JL, Popovic I, Lechler K, Mijovic B, Guiraud D, Stieglitz T, Alexandersson A, Micera S, Lesic A, Raspopovic S. *Science Translational Medicine*, 11 (512), Oct 2019. doi: 10.1126/scitranslmed.aav8939.
- ② **Sensory feedback restoration in leg amputees improves walking speed, metabolic cost and phantom pain.** Petrini F, Bumbasirevic M, Valle G, Ilic V, Mijovic P, Cvancara P, Barberi F, Katic N, Bortolotti D, Andreu D, Lechler K, Lesic A, Mazic S, Mijovic B, Guiraud D, Stieglitz T, Alexandersson A, Micera S, Raspopovic S. *Nature Medicine*, 25(9):1356–1363, September 2019b. doi: 10.1038/s41591-019-0567-3. URL <https://hal-lirmm.ccsd.cnrs.fr/lirmm-02282558>
- ② **FES-Induced Cycling in Complete SCI: A Simpler Control Method Based on Inertial Sensors.** Sijobert B, Le Guillou R, Fattal C, Azevedo Coste C. *Sensors (Basel)*. 2019 Oct 1;19(19). pii: E4268. doi: 10.3390/s19194268.
- ② **A multimodal training with visual biofeedback in subacute stroke survivors: a randomized controlled trial.** Ambrosini E, Peri E, Nava C, Longoni L, Monticone M, Pedrocchi A, Ferriero G, Ferrante S. *Eur J Phys Rehabil Med.* 2019 Sep 26. doi: 10.23736/S1973-9087.19.05847-7.

- ⊙ [The Effect of Functional Electrical Stimulation and Therapeutic Exercises on Trunk Muscle Tone and Dynamic Sitting Balance in Persons with Chronic Spinal Cord Injury: A Crossover Trial.](#) Bergmann M, Zahharova A, Reinvee M, Asser T, Gapeyeva H, Vahtrik D.
- ⊙ [A foot drop compensation device based on surface multi-field functional electrical stimulation-Usability study in a clinical environment.](#) Imatz-Ojanguren E, Sánchez-Márquez G, Asiain-Aristu JR, Cueto-Mendo J, Jaunarena-Goicoechea E, Zabaleta H, Keller T. *J Rehabil Assist Technol Eng.* 2019 Sep 3;6:2055668319862141. doi: 10.1177/2055668319862141.
- ⊙ [Novel instrumented frame for standing exercising of users with complete spinal cord injuries.](#) Zoulias ID, Armengol M, Poulton A, Andrews B, Gibbons R, Harwin WS, Holderbaum W. *Sci Rep.* 2019 Sep 10;9(1):13003. doi: 10.1038/s41598-019-49237-3.
- ⊙ [Evaluating the Effect of Functional Electrical Stimulation Used for Foot Drop on Aspects of Health-Related Quality of Life in People with Multiple Sclerosis: A Systematic Review.](#) Miller Renfrew L, Lord AC, Warren J, Hunter R. *Int J MS Care.* 2019 Jul-Aug;21(4):173-182. doi: 10.7224/1537-2073.2018-015.
- ⊙ [Kinematic and Functional Gait Changes After the Utilization of a Foot Drop Stimulator in Pediatrics.](#) Karunakaran KK, Pilkar R, Ehrenberg N, Bentley KS, Cheng J, Nolan KJ. *Front Neurosci.* 2019 Jul 30;13:732. doi: 10.3389/fnins.2019.00732.
- ⊙ [Exploring stimulation patterns for electrical stimulation of the larynx using surface electrodes.](#) Feiner M, Gerstenberger C, Mayr W, Hortobagyi D, Gugatschka M. *Eur Arch Otorhinolaryngol.* 2019 Aug 14. doi: 10.1007/s00405-019-05594-3
- ⊙ [Effectiveness of the Combined Treatment of Functional Electrical Stimulation and Deambulation in Diabetic Arteriopathy.](#) Del Río Solá ML, Puerta CV. *Ann Vasc Surg.* 2019 Aug 2. pii: S0890-5096(19)30509-6. doi: 10.1016/j.avsg.2019.05.015.
- ⊙ [Myoelectric signal from below the level of spinal cord injury as a command source for an implanted upper extremity neuroprosthesis - a case report.](#) Heald E, Kilgore K, Hart R, Moss C, Peckham PH. *J Neuroeng Rehabil.* 2019 Aug 2;16(1):100. doi: 10.1186/s12984-019-0571-3.
- ⊙ [Abdominal functional electrical stimulation to assist ventilator weaning in critical illness: a double-blinded, randomised, sham-controlled pilot study.](#) McCaughey EJ, Jonkman AH, Boswell-Ruys CL, McBain RA, Bye EA, Hudson AL, Collins DW, Heunks LMA, McLachlan AJ, Gandevia SC, Butler JE. *Crit Care.* 2019 Jul 24;23(1):261. doi: 10.1186/s13054-019-2544-0.
- ⊙ [Bilateral Contralaterally Controlled Functional Electrical Stimulation Reveals New Insights Into the Interhemispheric Competition Model in Chronic Stroke.](#) Cunningham DA, Knutson JS, Sankarasubramanian V, Potter-Baker KA, Machado AG, Plow EB. *Neurorehabil Neural Repair.* 2019 Sep;33(9):707-717. doi: 10.1177/1545968319863709.
- ⊙ [Relevance of selective neural stimulation with a multicontact cuff electrode using multicriteria analysis.](#) Dali M, William L, Tigra W, Taillades H, Rossel O, Azevedo Coste C, Guiraud D. *PLoS ONE, Public Library of Science,* 2019, 14 (7), doi: 10.1371/journal.pone.0219079.
- ⊙ [Long-term use of implanted peroneal functional electrical stimulation for stroke-affected gait: the effects on muscle and motor nerve.](#) Berenpas F, Weerdesteyn V, Geurts AC, van Alfen N. *J Neuroeng Rehabil.* 2019 Jul 10;16(1):86. doi: 10.1186/s12984-019-0556-2.
- ⊙ [Long-term outcomes of semi-implantable functional electrical stimulation for central drop foot.](#) Buentjen L, Kupsch A, Galazky I, Frantsev R, Heinze HJ, Voges J, Hausmann J, Sweeney-Reed CM. *J Neuroeng Rehabil.* 2019 Jun 11;16(1):72. doi: 10.1186/s12984-019-0542-8.
- ⊙ [A Hybrid Robotic System for Arm Training of Stroke Survivors: Concept and First Evaluation.](#) Ambrosini E, Russold M, Gfoehler M, Puchinger M, Weber M, Becker S, Krakow K, Immick N, Augsten A, Rossini M, Proserpio D, Zajc J, Gasperini G, Molteni F, Pedrocchi A, Ferrante S, Ferrigno G, Gasperina SD, Bulgheroni M, Baccinelli W, Schauer T, Wiesener C. *IEEE Trans Biomed Eng.* 2019 Dec;66(12):3290-3300. doi: 10.1109/TBME.2019.2900525. Epub 2019 Jun 5.
- ⊙ [An Omnidirectional Assistive Platform Integrated with Functional Electrical Stimulation for Gait Rehabilitation: A Case Study.](#) Anaya-Reyes F, Narayan A, Aguirre-Ollinger G, Cheng HJ, Yu H. *IEEE Trans Neural Syst Rehabil Eng.* 2020 Feb 6. doi: 10.1109/TNSRE.2020.2972008.
- ⊙ [Balance Training with Electromyogram-Triggered Functional Electrical Stimulation in the Rehabilitation of Stroke Patients.](#) Lee K. *Brain Sci.* 2020 Feb 2;10(2). pii: E80. doi: 10.3390/brainsci10020080.
- ⊙ [TetraGrip - a four channel upper limb FES device for people with C5/C6 tetraplegia: device design and clinical outcome.](#) Venugopalan L, Taylor PN, Cobb JE, Swain ID. *J Med Eng Technol.* 2020 Jan;44(1):38-44. doi: 10.1080/03091902.2020.1713239.
- ⊙ [Electrically induced cycling and nutritional counseling for counteracting obesity after spinal cord injury: A pilot study.](#) Dolbow DR, Credeur DP, Lemacks JL, Stokic DS, Pattanaik S, Corbin GN, Courtney AS. *J Spinal Cord Med.* 2020 Jan 23;1-8. doi: 10.1080/10790268.2019.1710939
- ⊙ [Home FES: An Exploratory Review.](#) Taylor MJ, Schils S, Ruys AJ. *Eur J Transl Myol.* 2019 Nov 12;29(4):8285. doi: 10.4081/ejtm.2019.8285