

Florian Kolbl

ASSOCIATE PROFESSOR

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🌐 linkedin.com/in/florian-kolbl-072947203/ | 🎓 Florian Kolbl



Current position and responsibilities

Associate Professor at Bordeaux INP:

- **Teaching:** ENSEIRB-MATMECA (engineering school) - Electrical Engineering department, Head of first-year engineering studies
- **Research:** IMS Laboratory - BioElectronics group.

Experience

Bordeaux INP

Associate professor

Talence - France

Since Sept. 2023

- Teaching: ENSEIRB-Matmeca, mostly in analog electronics
- Research: IMS lab, BioElectronique group - TIPS. keywords: bioelectronics, instrumentation for bio-sciences, multiphysics and modeling of bio-electronic interfaces

CY Cergy Paris Université

Associate professor

Cergy - France

Sept. 2016 - Sept. 2023

- Teaching: IUT - GEII department (Electrical Engineering) ; mostly in electronics, control theory and mathematics
- Research: ETIS lab, CELL group

LIRMM lab

French CNRS sabbatical year

Montpellier - France

Sept. 2020 - Sept. 2021

- Micro-électronique department
- SmartIES group

University of Essex

Research Officer - Brain Computer Interfaces and Neural Engineering Lab

Colchester - United Kingdom

Sept. 2015 - Sept. 2016

Multiphysics modeling of micro-electrode implantation and electrical stimulation of peripheral nerve for sensorimotor rehabilitation.

University of Bordeaux

PhD student then Assistant Professor

Talence - France

Sept. 2011 - Sept. 2015

- Teaching: 2011-2012 ENSEIRB-Matmeca, 2012-2015 IUT GEII (Electrical Engineering department) University of Bordeaux
- Research: Design and modeling of circuits and systems for neural stimulation in different pathologic an experimental contexts.

Education

University of Bordeaux

PhD in Electronics

Talence, France

2014

- Design of electrical adaptive stimulators for different pathological contexts: a global approach
- Under the supervision of Sylvie RENAUD and Noëlle LEWIS

ENS Rennes

French 'Agrégation Externe de Génie Électrique'

Bruz - France

2011

- french national highest grade competitive examination for teaching - Electrical Engineering
- valedictorian

Master's Degree - Teaching

2011

- Electrical Engineering
- with honors

ENSEIRB-Matmeca

Master's Degree in Engineering

Talence - France

2010

- Electronics (specialisation in microelectronics)
- with honors

- Electrical Engineering with specialisation in microelectronics
- with honors

Scientific Publications

JOURNALS

- [J01]** Couppey, T., Regnacq, L., Giraud, R., Romain, O., Bornat, Y., & Kölbl, F. (2024). NRV: An open framework for in silico evaluation of peripheral nerve electrical stimulation strategies. *bioRxiv*.
- [J02]** Regnacq, L., Bornat, Y., Romain, O., & Kolbl, F. (2022). BIMMS: A versatile and portable system for biological tissue and electrode-tissue interface electrical characterization. *HardwareX*, e00387.
- [J03]** Kolbl, F., Bornat, Y., Castelli, J., Regnacq, L., N'kaoua, G., Renaud, S., & Lewis, N. (2021). Ic-based neuro-stimulation environment for arbitrary waveform generation. *Electronics*, 10(15), 1867.
- [J04]** Tibar, H., Naudet, F., Kölbl, F., Ribot, B., Faggiani, E., N'kaoua, G., ... & Benazzouz, A. (2020). In vivo validation of a new portable stimulator for chronic deep brain stimulation in freely moving rats. *Journal of Neuroscience Methods*, 333, 108577.
- [J05]** De Roux, E., Terosiet, M., Kölbl, F., Boissière, M., Histace, A., & Romain, O. (2019). OFDM-based electrical impedance spectroscopy technique for pacemaker-induced fibrosis detection implemented in an ARM microprocessor. *Microprocessors and microsystems*, 70, 38-46.
- [J06]** De Roux, E., Degache, A., Terosiet, M., Kölbl, F., Boissière, M., Pauthe, E., ... & Romain, O. (2019). Orthogonal Multitone Electrical Impedance Spectroscopy (OMEIS) for the Study of Fibrosis Induced by Active Cardiac Implants. *Journal of Sensors*, 2019.
- [J07]** Kölbl, F., N'Kaoua, G., Naudet, F., Berthier, F., Faggiani, E., Renaud, S., ... & Lewis, N. (2014). An embedded deep brain stimulator for biphasic chronic experiments in freely moving rodents. *IEEE transactions on biomedical circuits and systems*, 10(1), 72-84.

INTERNATIONAL CONFERENCES WITH COMITY

- [C01]** Couppey, T., Kolbl, F., Quoy, M., Romain, O., Regnacq, L., & Giraud, R. (2022, July). Conduction block stimulation optimization by envelope modulation toward the reduction of onset response. In *FENS*.
- [C02]** Bailleul, A., Claudel, J., De Gannes, F. P., N'Kaoua, G., Kolbl, F., Soulier, F., ... & Renaud, S. (2021, November). In vitro impedance spectroscopy: A MEA-based measurement bench for myoblasts cultures monitoring. In *2021 XXXVI Conference on Design of Circuits and Integrated Systems (DCIS)* (pp. 1-6). IEEE.
- [C03]** Regnacq, L., Giraud, R., Sanabria, A., Thota, A., Roversi, L., Rouhani, M., ... & Kolbl, F. (2021, October). Evaluation of Stimulation Waveforms for Safe and Efficient Peripheral Nervous System Activation. In *2021 Biomedical Circuits and Systems Conference (BioCAS 2021): "Restoring Vital Functions by Electronics—Achievements, Limitations, Opportunities, and Challenges"*.
- [C04]** Kölbl, F., Boulboul, N., Commereuc, M., & Bourdel, E. (2018, December). A microstrip resonator based sensor for GHz characterization of in vitro cell culture. In *2018 12th International conference on sensing technology (ICST)* (pp. 319-323). IEEE.
- [C05]** Sotière, J., Terosiet, M., De Roux, E., Von Chong, A., Kölbl, F., Histace, A., & Romain, O. (2018, November). Versatile SAR-ADC for Biomedical Applications. In *2018 New Generation of CAS (NGCAS)* (pp. 9-12). IEEE.
- [C06]** Regnacq, L., Degache, A., Castelli, J., N'Kaoua, G., Bornat, Y., de Gannes, F. P., ... & Bernus, O. (2018, September). Preliminary Investigation Towards Embedded Impedance Spectroscopy in Implanted Stimulators. In *International Workshop on Impedance Spectroscopy (IWIS)*.
- [C07]** Degache, A., N'Kaoua, G., Lewis, N., Kolbl, F., & Bernus, O. (2018, September). Preliminary Study of Fibrotic Cardiac Tissues Characterization Using Impedance Spectroscopy. In *International Workshop on Impedance Spectroscopy (IWIS)*.
- [C08]** De Roux, E., Terosiet, M., Kölbl, F., Boissière, M., Pauthe, E., Histace, A., & Romain, O. (2018, September). Toward an embedded OFDM-based system for living cells study by electrochemical impedance spectroscopy. In *2018 IEEE 20th International Conference on e-Health Networking, Applications and Services (Healthcom)* (pp. 1-6). IEEE.

- [C09]** De Roux, E., Terosiet, M., Kölbl, F., Boissière, M., Histace, A., & Romain, O. (2018, August). Toward an OFDM-Based Technique for Electrochemical Impedance Spectroscopy. In 2018 21st Euromicro Conference on Digital System Design (DSD) (pp. 484-487). IEEE.
- [C10]** De Roux, E., Terosiet, M., Kölbl, F., Chrun, J., Aubert, P. H., Banet, P., ... & Romain, O. (2017, August). Wireless and portable system for the study of in-vitro cell culture impedance spectrum by electrical impedance spectroscopy. In 2017 Euromicro Conference on Digital System Design (DSD) (pp. 456-461). IEEE.
- [C11]** Capllonch-Juan, M., Kölbl, F., & Sepulveda, F. (2017, July). Unidirectional ephaptic stimulation between two myelinated axons. In 2017 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) (pp. 230-233). IEEE.
- [C12]** Castelli, J., Kölbl, F., Siu, R., N'Kaoua, G., Bornat, Y., Mangalore, A., ... & Lewis, N. (2017, July). An IC-based controllable stimulator for respiratory muscle stimulation investigations. In 2017 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) (pp. 1970-1973). IEEE.
- [C13]** Kölbl, F., Juan, M. C., & Sepulveda, F. (2016, October). Impact of the angle of implantation of transverse intrafascicular multichannel electrodes on axon activation. In 2016 IEEE Biomedical Circuits and Systems Conference (BioCAS) (pp. 484-487). IEEE.
- [C14]** Juan, M. C., Kölbl, F., & Sepulveda, F. (2016, September). Optimisation of the spatial discretisation of myelinated axon models. In 2016 8th Computer Science and Electronic Engineering (CEECE) (pp. 216-221). IEEE.
- [C15]** Kölbl, F., & Demosthenous, A. (2015, August). A figure of merit for neural electrical stimulation circuits. In 2015 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) (pp. 2075-2078). IEEE.
- [C16]** Kölbl, F., Guillaume, R., Hasler, J., Joucla, S., Yvert, B., Renaud, S., & Lewis, N. (2014, October). A closed-loop charge balancing fpaa circuit with sub-nano-amp dc error for electrical stimulation. In 2014 IEEE Biomedical Circuits and Systems Conference (BioCAS) Proceedings (pp. 616-619). IEEE.
- [C17]** Kölbl, F., Sabatier, J., N'Kaoua, G., Naudet, F., Faggiani, E., Benazzouz, A., ... & Lewis, N. (2013, October). Characterization of a non linear fractional model of electrode-tissue impedance for neuronal stimulation. In 2013 IEEE Biomedical Circuits and Systems Conference (BioCAS) (pp. 338-341). IEEE.
- [C18]** Kölbl, F., Zbrzeski, A., Syed, E., & Renaud, S. (2010, November). In vivo electrical characterization of deep brain electrode and impact on bio-amplifier design. In 2010 Biomedical Circuits and Systems Conference (BioCAS) (pp. 210-213). IEEE.
- [C19]** Zbrzeski, A., Hasler, P., Kölbl, F., Syed, E., Lewis, N., & Renaud, S. (2010, November). A programmable bioamplifier on FPAA for in vivo neural recording. In 2010 Biomedical Circuits and Systems Conference (BioCAS) (pp. 114-117). IEEE.

NATIONAL CONFERENCES

- [N01]** Regnacq, L., Giraud, R., N'Kaoua, G., Renaud, S., Jung, R., Abbas, J., ... & Romain, O. A model/hardware framework for arbitrary waveform stimulation of peripheral nerve fibers. In Neuro France 2021.
- [N02]** Boulboul, N., Commereuc, M., Kölbl, F., & Bourdel, E. Conception d'un capteur in-vitro de permittivité des tissus biologiques. Gdr Soc2. 2018
- [N03]** Kölbl, F.; Guillaume, R.; Hasler, J.; Joucla, S.; Yvert, B.; Renaud, S.; Lewis, N. Circuit de stimulation nerveuse à contre-réaction d'équilibrage des charges sur FPAA. Gdr Soc-Sip 2014

TALKS

- Mai 2022** Colloque CY : The interplay of complex and coherent dynamics in brain function. Présentation : Stimulation of nervous system with complex waveform stimuli

FETCH 2018 Diagnostic, Impedance-Sensing for imaging

Scientific days of IJL Lab 2017 toward reconfigurable circuits and systems interacting with biology

FETCH 2017 Activ Neuroprosthetics: toward adaptive circuits

Pas and current PhD Student supervision

- L. Regnacq**
 - Funding: International joint French ANR-US NIH BIOTIFS project,
 - Co-supervision: O. Romain (ETIS lab), Y. Bornat (IMS lab),
 - Focus: Improving the selectivity of peripheral nervous system electrical stimulation using Intrafascicular electrodes and non-conventional waveforms,
 - Defended on Sept. 6th, 2023.

- T. Couppey**
 - Funding: CY Cergy Paris University doctoral school funding,
 - Co-supervision: O. Romain (ETIS lab), O. Français (ESYCOM lab),
 - Focus: Modeling and design of a an experimental setup for nervous activity tracking using Electrical Impedance Tomography,
 - expected date of defence: December 2024.

- L. Lecomte**
 - Funding: ANRt CIFRE funding, collaboration with FineHeart,
 - Co-supervision: N. Lewis (IMS lab), M. Maldari (FineHeart), S. Garrigue (FineHeart)
 - Focus: Feature extraction in cardioimpedance measurements,
 - expected date of defence: January 2027.

PhD Commities

- Houssein Mariam** 'Caractérisation hyperfréquence par spectroscopie diélectrique de composés biologiques en environnement microfluidique'.
University Paris East, defended on 16/12/2020 under the supervision of O. Français and E. Richalot.
- Farad Khoyratee** 'Conception d'une plateforme modulable de réseaux de neurones biomimétiques pour l'étude des maladies neurodégénératives'.
University of Bordeaux, defended on 13/12/2019 under the supervision of S. Saïghi and T. Lévi.