Raymundo
Cassani Gonzalez

Curriculum Vitae

800 rue de la Gauchetière Ouest, Suite 6900
Montréal, QC, Canada. H5A-1K6
raymundo.cassani@gmail.com
https://www.castoriscausa.com
+1 (514) 627-5443

Education

May 2013 – Nov 2018 **INRS-EMT, University of Quebec**
Multimedia/Multimodal Signal Analysis and Enhancement (MuSAE Lab),
Ph.D. in Telecommunications.
Research topic: Digital signal processing for EEG-based Alzheimer's disease assessment

Aug 2010 – Dec 2012 **National Polytechnic Institute (IPN), Mexico**
Department of Graduate Studies and Research (SEPI),
M. Sc. in Microelectronics Engineering
CONACyT scholarship.
Research topic: Use of adaptive filters to remove respiration-induced noise from ECG signal

Aug 2003 – Dec 2007 **National Polytechnic Institute (IPN), Mexico**
School of Electrical and Mechanical Engineering (ESIME) Culhuacan,
Bachelor's in Electronics and Communications Engineering
Harp Helu scholarship.
Thesis project: Electrocardiogram signal generator. First place, category Project-Prototype.

Work Experience

Dec 2018 – Present **INRS-EMT, University of Quebec**
Multimedia/Multimodal Signal Analysis and Enhancement (MuSAE Lab),
Postdoctoral Researcher.

- Biomedical signal processing with applications in health diagnostics
- Integration of physiological signals and VR / AR
- EEG-based brain-computer interfaces

May 2015 – Aug 2015 **Sensaura Tech**, *Canadian start-up with expertise in affective computing using wearable devices*.

- Hardware and signal processing consultant

Jan 2013 – Apr 2013 **TKME Monitoreo S.A.P.I. de C.V.**, *Mexican company with expertise in monitoring facilities for data centers*.

- Designed and developed TKmE 5.0 software
- Assessed new GUI for the TKmE 5.0
- Implemented RFCode technologies to TKmE 5.0 core

Mar 2010 – Jul 2010 **IGSA Solutions S.A de C.V. by Dalkia Mexico**, *Company dedicated to electric energy services*.

- Worked as maintenance engineer in UPS, backup electric generators and HVAC equipment
- Updated proceedings for UPS equipment, and data acquisition using Cellwatch software

Dec 2007 – Feb 2009 **Teksar Labs S.A de C.V.**, *Mexican company focused on computer networks, satellite technology, facilities for data centers and autonomous monitoring*.

- Designed and developed TKME 3.0 software
- Designed and definition of proprietary monitoring technology of Teksar Labs named PTL 1.0 and 2.0

Internships

Jan 2012 – Jul 2012 **Research Centre at Sacré-Coeur Hospital, Montreal, Canada**, *Multidisciplinary research centre associated with the Université de Montréal*.

- Researched on quantification and comparison of the sensitivity of QT heart-rate correction of different methods for detecting drug-induced QTc changes in thorough QT studies
- Participated in the project for QT interval measurement and correction in patients with atrial flutter

Feb 2007 – Dec 2007 **National Institute of Cardiology, Mexico**, *Main research institute in cardiology topics in Latin America*.

- Designed of medical devices to measure blood pressure, heart rate and ECG signal
- Researched, designed and built of an ECG signal generator presented as Bachelor's thesis project
- Designed and built a USB Data Acquisition System (SIEVARTWIN)

May 2006 – Aug 2006 **Teksar Labs S.A de C.V.**, *Mexican company focused on computer networks, satellite technology, facilities for data centers and autonomous monitoring*.

- Assessed electric power quality in facilities of the Government of Baja California
- Coordinated, tested and certified signal strength of more than 200 VSATs installed all over Mexico. Trained 10+ personnel on troubleshooting satellite reception issues

Honours and Awards

2018 Best paper award at QoMEX 2018

2015 Awarded finalist at hackathon anglehacks, Montreal, project **MyoDowntime**

2014 Most creative project at hackathon WearHacks 2014, Montreal, project **neuralDrift**

Workshops and Talks

2016 (Talk) MuLES: quick and simple prototyping for multimodal data, at McGill University

2015 (Workshop) LabVIEW fundamentals, 6 hours; part of the Perswade program, at INRS-EMT

2015 (Workshop) Brain-Computer Interfaces, 5 hours; at District3, Concordia University

2012 (Workshop) LabVIEW design patterns, 20 hours; at IPN

Affiliations

2016 – Present **Canadian Medical and Biological Engineering Society**, *Member and volunteer*, Involved in the creation and update of the online CMBEC proceedings.

2015 – Present **NeuroTechX**, *Member and volunteer*, Involved as instructor in workshops and prepared material for diffusion of neurotechnologies.

2010 – Present **IEEE**, *Member*.

Languages

Spanish, *written and spoken at a native proficiency level.*

English, *written and spoken at a full professional proficiency level.*

French, *written and spoken at a working professional proficiency level.*

Patents

Mar 2009 **Monitor Enterprise, Monitoring System for Energy and Environmental Variables in Data Centers**, *Author Protection Rights Agency of Mexico (IMPI) Reg. Number 03-2009-0223101706000-01*, **Cassani Gonzalez Raymundo** and Santoyo Delgado Raúl.

Publications

2020 **R. Cassani**, M.-A. Moinnereau, L. Ivanescu, O. Rosanne, and T. H. Falk, "Combining a Body/Brain-Machine Interface with an Off-the-Shelf Virtual Reality Headset for Next-Generation Immersive Applications" in *IEEE Systems, Man, and Cybernetics Magazine, in press.*

2020 E. M. dos Santos, **R. Cassani**, T. H. Falk, and F. J. Fraga, "Improved motor imagery brain-computer interface performance via adaptive modulation filtering and two-stage classification," *Biomedical Signal Processing and Control*, vol. 57, p. 101812, Mar. 2020

2020 B Jesus, **R. Cassani**, M. Cecchi, K. Fadem, W. McGeown, and T. H. Falk, "Exploring predictive models of Alzheimer's disease severity based on resting state EEG and MRI features," in *Poster Presentations at the 10th Canadian Conference on Dementia (CCD)* Québec City, October 3, 2019.

2019 **R. Cassani** and T. H. Falk, "Alzheimer's Disease Diagnosis and Severity Level Detection Based on Electroencephalography Modulation Spectral 'Patch' Features," in *IEEE J. Biomed. Health Inform., pp. 1–1,* 2019.

2019 **R. Cassani**, I. Albuquerque, J. Monteiro, and T. H. Falk, "AMA: An Open-source Amplitude Modulation Analysis Toolkit for Signal Processing Applications," in *2019 IEEE global conference on signal and information processing (GlobalSIP), Nov. 2019, pp. 1–4,* 2019.

2019 **R. Cassani**, A. Horai, L. Gheorge, T. H. Falk, "Evaluating the Measurement of Driver Heart and Breathing Rates from a Sensor-Equipped Steering Wheel using Spectro-temporal Signal Processing," in *22nd IEEE Intelligent Transportation Systems Conference*, 2019.

2019 **R. Cassani** and T. H. Falk, "Automated Alzheimer's Disease Diagnosis using a Low-Density EEG Layout and New Features based on the Power of Modulation Spectral 'Patches'," in *2019 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, 2019.

2019 A. Tiwari, **R. Cassani**, S. Narayanan, and T. H. Falk, "A Comparative Study of Stress and Anxiety Estimation in Ecological Settings Using a Smart-shirt and a Smart-bracelet," in *2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Berlin, Germany, 2019, pp. 2213–2216.*

2019 W. McGeown, **R. Cassani**, T. H. Falk, M. Cecchi, K. Fadem, "Neuroanatomical and Neuropsychological Correlates of Resting State EEG Diagnostic Features in Patients with Alzheimer's Disease," abstract *AAIC*, 2019.

2018 **R. Cassani**, M. Estarellas, R. San-Martin, F. J. Fraga, and T. H. Falk, "Systematic Review on Resting-State EEG for Alzheimer's Disease Diagnosis and Progression Assessment," *Disease Markers*, vol. 2018, 2018.

2018 L. R. Trambaiolli, **R. Cassani**, C. E. Biazoli Jr, A. M. Cravo, J. a. R. Sato, and T. H. Falk, "Resting-Awake EEG Amplitude Modulation Can Predict Performance of an fNIRS-Based Neurofeedback Task," in *2018 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, Oct. 2018.

2018 **R. Cassani**, M.-A. Moinnereau, and T. H. Falk, "A Neurophysiological Sensor-Equipped Head-Mounted Display for Instrumental QoE Assessment of Immersive Multimedia," in *2018 Tenth International Conference on Quality of Multimedia Experience (QoMEX)*, May 2018. Best paper award.

2018 **R. Cassani**, S. Narayanan, and T. H. Falk, "Respiration Rate Estimation From Noisy Electrocardiograms Based on Modulation Spectral Analysis," in *CMBES Proceedings*, vol. 41, 2018.

2018 **R. Cassani** and T. H. Falk, "Spectrotemporal Modeling of Biomedical Signals: Theoretical Foundation and Applications," in *Reference Module in Biomedical Sciences*, Elsevier, 2018.

2017 M. Estarellas, **R. Cassani**, and T. H. Falk, "Assessment of EEG-based biomarkers of Alzheimer's disease progression," in *Mechanisms, Clinical Strategies, and Promising Treatments of Neurodegenerative Diseases. 13th International Conference AD/PDTM Vienna, Austria, March 29 to April 2, 2017: Abstracts, Neurodegenerative Diseases.*

2017 **R. Cassani**, T. H. Falk, F. J. Fraga, M. Cecchi, D. K. Moore, and R. Anghinah, "Towards automated electroencephalography-based Alzheimer's disease diagnosis using portable low-density devices," *Biomedical Signal Processing and Control*, vol. 33, pp. 261–271, Mar. 2017.

2015 **R. Cassani** and T. H. Falk, "Automated Alzheimer's Disease Diagnosis Using a Portable 7-Channel Electroencephalography Device," Abstract in *IUPESM World Congress*, (Toronto), 2015.

2015 **R. Cassani**, H. Banville, and T. H. Falk, "MuLES: An Open Source EEG Acquisition and Streaming Server for Quick and Simple Prototyping and Recording," in *Proceedings of the 20th International Conference on Intelligent User Interfaces Companion*, IUI Companion '15, (New York, NY, USA), pp. 9–12, ACM, 2015.

2014 **R. Cassani** and T. H. Falk, "Gaze and BCIs as Gaming Inputs: Opportunities and Open Challenges," in *EyePlay Workshop, CHI-PLAY2014*, p. 4, 2014.

2014 T. H. Falk, H. Banville, S. Bishundayal, **R. Cassani**, A. Clerico, L. Dahmani, R. Gupta, A. Ratnarajah, N. Phillips, and V. D. Bohbot, "EEG-theta modulation is greater in spatial learners than response learners: A scalp-EEG study in young adults tested on a virtual navigation task," in *Neuroscience 2014*, 2014.

2014 **R. Cassani**, T. H. Falk, F. J. Fraga, P. A. Kanda, and R. Anghinah, "Towards automated EEG-Based Alzheimer's disease diagnosis using relevance vector machines," in *5th ISSNIP-IEEE Biosignals and Biorobotics Conference (2014): Biosignals and Robotics for Better and Safer Living (BRC)*, pp. 1–6, May 2014.

2014 **R. Cassani**, T. H. Falk, F. J. Fraga, P. A. M. Kanda, and R. Anghinah, "The effects of automated artifact removal algorithms on electroencephalography-based Alzheimer's disease diagnosis," *Frontiers in Aging Neuroscience*, vol. 6, p. 55, 2014.

2014 V. Jacquemet, **R. Cassani González**, M. Sturmer, B. Dubé, J. Sharestan, A. Vinet, O. Mahid-dine, A. R. LeBlanc, G. Becker, T. Kus, and R. Nadeau, "QT interval measurement and correction in patients with atrial flutter: A pilot study," *Journal of Electrocardiology*, vol. 47, pp. 228–235, Mar. 2014.

2013 V. Jacquemet, **R. Cassani Gonzalez**, B. Dubé, A. Vinet, A. L. Blanc, M. Sturmer, G. Becker, T. Kus, and R. Nadeau, "Relevance of individualized qt interval correction in subjects with large heart rate fluctuations," *Journal of Electrocardiology*, vol. 46, no. 4, p. e34, 2013.

2013 **R. Cassani**, J. C. Sanchez, and R. Martinez, "Implementation and evaluation of an adaptive method for reduce the respiration influence on Heart Rate Variability," in *Circuits and Systems (LASCAS), 2013 IEEE Fourth Latin American Symposium On*, pp. 1–4, IEEE, 2013.

2012 **R. Cassani González**, E. B. Engels, B. Dubé, R. Nadeau, A. Vinet, A. R. LeBlanc, M. Sturmer, G. Becker, T. Kus, and V. Jacquemet, "Assessment of the sensitivity of detecting drug-induced QTc changes using subject-specific rate correction," *Journal of Electrocardiology*, vol. 45, pp. 541–545, Nov. 2012.

2011 **R. Cassani**, P. Mejia, J. A. Tavares, J. C. Sanchez, and R. Martinez, "Adaptive filtering for respiration influence reduction on Heart Rate Variability," in *Electrical Engineering Computing Science and Automatic Control (CCE), 2011 8th International Conference On*, pp. 1–5, IEEE, 2011.

2007 **R. Cassani**, R. Martinez, and O. Infante, "Data acquisition system SIEVARTWIN (in Spanish)," in *30th National Congress of Biomedical Engineering*, 2007.