

Pouyan Ebrahimbabaie, Ph.D.

Research Assistant and Teaching Assistant

University of Liège, Department of Electrical Engineering and Computer Science, B-4000, Liège, Belgium; cell: +32 493 70 51 74; e-mail: p.ebrahimbabaie@uliege.be

POSITIONS

Research Assistant, Department of Electrical Engineering and Computer Science (Institut Montefiore), Faculty of Applied Sciences, University of Liège, Belgium, September 2014–present.

Teaching Assistant, Department of Electrical Engineering and Computer Science (Institut Montefiore), Faculty of Applied Sciences, University of Liège, Belgium, September 2014–present.

EDUCATION

Ph.D. degree in Engineering Science and Technology (Electricity, Electronics, and Informatics), Department of Electrical Engineering and Computer Science (Institut Montefiore), Faculty of Applied Sciences, University of Liège, Belgium, September 2014–December 2020.

M.S. degree in Electrical Engineering, Department of Electrical Engineering and Computer Science (Institut Montefiore), Faculty of Applied Sciences, University of Liège, Belgium, September 2012–June 2014.

One-year preliminary program leading to the Master in Electrical Engineering, Department of Electrical Engineering and Computer Science (Institut Montefiore), Faculty of Applied Sciences, University of Liège, Belgium, September 2009–September 2011.

TEACHING

As a Teaching Assistant at University of Liège, I organized and led the exercise and laboratory sessions for 10-80 students for the following courses offered by the Department of Electrical Engineering and Computer Science:

ELEN0071-1: Applied Digital Signal Processing, Prof. Pierre Sacré, spring semester, 2021.

ELEN0078-2: Acoustics and Electroacoustics, Prof. Jean-Jacques Embrechts, fall semester, 2020.

ELEN0002-2: Introduction to Audio and Video Techniques, Prof. Jean-Jacques Embrechts, fall semester, 2020.

ELEN0071-1: Applied Digital Signal Processing, Prof. Pierre Sacré, spring semester, 2020.

ELEN0078-2: Acoustics and Electroacoustics, Prof. Jean-Jacques Embrechts, fall semester, 2019.

ELEN0002-2: Introduction to Audio and Video Techniques, Prof. Jean-Jacques Embrechts, fall semester, 2019.

ELEN0037-1: Microelectronics and IC Design, Prof. Jean-Michel Redouté, spring semester, 2019.

ELEN0071-1: Applied Digital Signal Processing, Prof. Pierre Sacré, spring semester, 2019.

ELEN0002-2: Introduction to Audio and Video Techniques, Prof. Jean-Jacques Embrechts, spring semester, 2019.

ELEN0071-1: Applied Digital Signal Processing, Prof. Guillaume Drion, spring semester, 2018.

ELEN0078-2: Acoustics and Electroacoustics, Prof. Jean-Jacques Embrechts, fall semester, 2017.

ELEN0037-1: Microelectronics and IC Design, Prof. Michael Kraft, spring semester, 2017.

ELEN0071-1: Digital Signal Processing, Prof. Jacques G. Verly, spring semester, 2017.

ELEN0070-2: Signal Processing, Prof. Jacques G. Verly, spring semester, 2017.

ELEN0072-1: Statistical Signal Processing, Prof. Jacques G. Verly, fall semester, 2016.
 ELEN0037-1: Microelectronics and IC Design, Prof. Michael Kraft, spring semester, 2016.
 ELEN0071-1: Digital Signal Processing, Prof. Jacques G. Verly, spring semester, 2016.
 ELEN0070-2: Signal Processing, Prof. Jacques G. Verly, spring semester, 2016.
 ELEN0072-1: Statistical Signal Processing, Prof. Jacques G. Verly, fall semester, 2015.
 ELEN0070-2: Signal Processing, Prof. Jacques G. Verly, spring semester, 2015.
 ELEN0071-1: Digital Signal Processing, Prof. Jacques G. Verly, spring semester, 2015.

PATENTS

Granted:

Verly, J. G. and Ebrahimbabaie, P., 2020. *Real time prediction device*, JP. Patent: JP 66,60,405.

Verly, J. G. and Ebrahimbabaie, P., 2019. *Real time prediction device*, U.S. Patent: US 10,457,144 B2.

Pending:

Verly, J. G. and Ebrahimbabaie, P., 2020. *A real time prediction device*, Australian Patent Application: 2016310035. Australian Government: IP Australia.

Verly, J. G. and Ebrahimbabaie, P., 2017. *A prediction device*, European Patent Application: EP 3 131 038 A1. European Patent Office.

Verly, J. G. and Ebrahimbabaie, P., 2017. *A real time prediction device*, WIPO International Patent Application: WO 2017/029068 A1. World International Property Organization (WIPO).

PUBLICATIONS

Peer-reviewed abstracts in journals:

Ebrahimbabaie, P. and Verly, J. G., 2017. Geometric Brownian motion (GBM) random process model appears to be an excellent choice for modeling realizations of PERCLOS signals. *Sleep Medicine*, Volume 40 (1), e86, DOI: <http://dx.doi.org/10.1016/j.sleep.2017.11.246>.

Ebrahimbabaie, P. and Verly, J. G., 2017. Prediction of level of drowsiness using an adaptive geometric Brownian motion model, with application to drowsy driving accident prevention. *Sleep Medicine*, Volume 40 (1), e86, DOI: <http://dx.doi.org/10.1016/j.sleep.2017.11.247>

Kermi, S., Ebrahimbabaie Varnosfaderani, P. and Verly, J. G., 2017. Preliminary investigation of the applicability of geometric Brownian motion (GBM) to model the evolution with time of the level of drowsiness of narcoleptic subjects. *Sleep Medicine*, 40(1), p.e156. DOI: <https://doi.org/10.1016/j.sleep.2017.11.457>

Peer-reviewed papers in books and proceedings:

Ebrahimbabaie Varnosfaderani, P. and Verly, J. G., 2018. Excellent potential of geometric Brownian motion (GBM) as a random process model for level of drowsiness signals. In Proceedings of the *11th International Joint Conference on Biomedical Engineering Systems and Technologies*, Funchal, Madeira, Portugal. 19-21 January. SciTePress, DOI: 10.5220/0006545101050112.

Verpoorten, D., Devyver, J., Duchâteau, D., Mihaylov, B., Agnello, A., Ebrahimbabaie Varnosfaderani, P., Focant, J.F., Charlier, R., Delfosse, A., Bertrand, F. and Megherbi, S., 2017. Decoding the disciplines – A pilot study at the University of Liège (Belgium). In Proceedings of the *2nd EuroSoTL Conference - Transforming patterns through the scholarship of teaching and learning* (pp. 263-267), Lund, Sweden. 8-9 June. Lund University Press.

PRESENTATIONS

Peer-reviewed presentations:

Ebrahimbabaie Varnosfaderani, P. and Verly, J. G., 2018. Excellent potential of geometric Brownian motion (GBM) as a random process model for level of drowsiness signals. Paper presented at the *11th International Joint Conference on Biomedical Engineering Systems and Technologies*, Funchal, Madeira, Portugal. 19-21 January.

Ebrahimbabaie, P. and Verly, J. G., 2017. Prediction of level of drowsiness using an adaptive geometric Brownian motion model, with application to drowsy driving accident prevention. Paper presented at the *Joint Congress of Association of Sleep Medicine and World Sleep Federation (World Sleep)*. Prague, Czech Republic, 7-11 October.

Ebrahimbabaie, P. and Verly, J. G., 2017. Geometric Brownian motion (GBM) random process model appears to be an excellent choice for modeling realizations of PERCLOS signals. Poster presented at the *Joint Congress of Association of Sleep Medicine and World Sleep Federation (World Sleep)*. Prague, Czech Republic, 7-11 October.

Kermi, S., Ebrahimbabaie Varnosfaderani, P. and Verly, J. G., 2017. Preliminary investigation of the applicability of geometric Brownian motion (GBM) to model the evolution with time of the level of drowsiness of narcoleptic subjects. Poster presented at the *Joint Congress of Association of Sleep Medicine and World Sleep Federation (World Sleep)*. Prague, Czech Republic, 7-11 October.

Verpoorten, D., Devyver, J., Duchâteau, D., Mihaylov, B., Agnello, A., Ebrahimbabaie Varnosfaderani, P., Focant, J.F., Charlier, R., Delfosse, A., Bertrand, F. and Megherbi, S., 2017. Decoding the disciplines – A pilot study at the University of Liège (Belgium). Paper presented at the *2nd EuroSoTL Conference - Transforming patterns through the scholarship of teaching and learning*, Lund, Sweden. 8-9 June.

Ebrahimbabaie, P. and Verly, J. G., 2017. Discovery that a person's level of drowsiness appears to evolve in time according to a geometric Brownian motion (GBM) random process model. Paper presented at the *10th International Conference on Managing Fatigue*. San Diego, CA, USA, 20-23 March.

Ebrahimbabaie, P. and Verly, J. G., 2016. Prediction of future values of a level of drowsiness derived from images of an eye based on its past values, with application to drowsy driving. Paper presented at the *International Symposium on Somnolence, Vigilance, and Safety (SomnoSafe)*. Brussels, Belgium. 21-23 February.

Ebrahimbabaie, P. and Verly, J. G., 2016. Prediction of future values of the eye PERCLOS based on its past values, with application to drowsiness monitoring. Paper presented at the *International Symposium on Somnolence, Vigilance, and Safety (SomnoSafe)*. Brussels, Belgium. 21-23 February.

Non-peer-reviewed presentations:

Ebrahimbabaie, P. and Verly, J. G., 2017. Geometric Brownian motion (GBM) as a promising random process model of the time evolution of the level of drowsiness. Paper presented at the *Annual Meeting of the IEEE-EMBS Benelux Chapter, jointly with 16th Belgian National Day on Biomedical Engineering*. Brussels, Belgium. 30 November.

Ebrahimbabaie, P. and Verly, J. G., 2017. Geometric Brownian motion (GBM) as a promising random process model of the time evolution of the level of drowsiness. Poster presented at the *Annual Meeting of the IEEE-EMBS Benelux Chapter, jointly with 16th Belgian National Day on Biomedical Engineering*. Brussels, Belgium. 1 December.

Ebrahimbabaie, P. and Verly, J. G., 2015. Random process modeling of an optooculography-based level of drowsiness, with application to drowsy driving. Poster presented at the *Joint Meeting of the IEEE-EMBS*

Benelux Chapter and the 14th Belgian National Day on Biomedical Engineering. Brussels, Belgium. 26-27 October.

BOOKS

Ebrahimbabaie, P., 2021. *Drowsiness: modeling, prediction, and early detection systems.* Amazon (Kindle Direct Publishing), ISBN 979-8724207416.

THESES

Ebrahimbabaie, P., 2020. *Prediction of risk of an event using sensor signals, with application to the prevention of driving accidents due to drowsiness* (Ph.D. thesis). University of Liège, Liège, Belgium. <http://hdl.handle.net/2268/250646>.

Ebrahimbabaie, P., 2014. *Sensitivity analysis in the electromagnetic modeling of human tissues* (M.S. thesis). University of Liège, Liège, Belgium. <http://hdl.handle.net/2268/241097>.

SERVICE

Chair or Co-chair of sessions at conferences:

International Conference on 3D Immersion (IC3D), technically co-sponsored by the IEEE Signal Processing Society, Brussels, Belgium, December 2019.

Stereopsia (World Immersion Forum): Thematic conference on "XR in LBE (location-based entertainment)", Brussels, Belgium, December 2019.

Stereopsia (World Immersion Forum): Thematic conference on "Spatial 3D sound", Brussels, Belgium, December 2019.

Stereopsia (World Immersion Forum): Thematic conference on "Spatial computing & AR cloud", Brussels, Belgium, December 2019.

Stereopsia (World Immersion Forum): Thematic conference on "Volumetric imaging", Brussels, Belgium, December 2019.

Stereopsia (World Immersion Forum): Thematic conference on "XR for brand experience", Brussels, Belgium, December 2019.

Stereopsia (World Immersion Forum): Thematic conference on "XR for social interaction", Brussels, Belgium, December 2019.

Stereopsia (World Immersion Forum): Thematic conference on "XR for healthcare", Brussels, Belgium, December 2019.

International Conference on 3D Immersion (IC3D), technically co-sponsored by the IEEE Signal Processing Society, Brussels, Belgium, December 2018.

Stereopsia (World Immersion Forum): Thematic conference on "AR for AEC & industry 4.0", Brussels, Belgium, December 2018.

Stereopsia (World Immersion Forum): Thematic conference on "Cinematic VR & video games", Brussels, Belgium, December 2018.

Stereopsia (World Immersion Forum): Thematic conference on "Directing in VR by Randal Kleiser", Brussels, Belgium, December 2018.

Stereopsia (World Immersion Forum): Thematic conference on "Emerging XR tech & apps", Brussels, Belgium, December 2018.

Stereopsia (World Immersion Forum): Thematic conference on "Location-based XR", Brussels, Belgium, December 2018.

Stereopsia (World Immersion Forum): Thematic conference on "OpenXR standard by NVIDIA", Brussels, Belgium, December 2018.

Stereopsia (World Immersion Forum): Thematic conference on "Spatial 3D sound", Brussels, Belgium, December 2018.

Stereopsia (World Immersion Forum): Thematic conference on "Trends in stereo 3D", Brussels, Belgium, December 2018.

Stereopsia (World Immersion Forum): Thematic conference on "XR & artificial intelligence", Brussels, Belgium, December 2018.

Stereopsia (World Immersion Forum): Thematic conference on "XR for health & wellness", Brussels, Belgium, December 2018.

BIOSIGNALS, Funchal, Madeira, Portugal, January 2018.

International Conference on 3D Imaging (IC3D), technically co-sponsored by the IEEE Signal Processing Society, Liège, Belgium, December 2016.

SomnoSafe, Brussels, Belgium, February 2016.

International Conference on 3D Imaging (IC3D), technically co-sponsored by the IEEE Signal Processing Society, Liège, Belgium, December 2015.

Reviewer:

Multiscale Modeling and Simulation (MMS), September 2020.

International Conference on 3D Immersion (IC3D), technically co-sponsored by the IEEE Signal Processing Society, Brussels, Belgium, December 2018.

International Journal of SLEEP, May 2017.

Consultant:

Provide expertise to a world-leading company in monitoring of drowsiness and operator cognitive states, in the area of prediction of future levels of drowsiness and calculation of associated risk, 2014–present.

Provide expertise to the team of the educational OUFTI-1 nanosatellite (a 1U CubeSat) of the University of Liège, Liège, Belgium, to derive the expressions giving the precise telecommunication Doppler frequency shift for operation in low Earth orbit (LEO), 2015–2016. (OUFTI-1 is the first-ever satellite fully developed and constructed in Belgium under fully-Belgian management.)

PROFESSIONAL SOCIETIES

Member of the following societies:

Bernoulli Society for Mathematical Statistics and Probability

Cognitive Neuroscience Society (CNS)

Institute of Electrical and Electronics Engineers (IEEE)

IEEE Engineering in Medicine and Biology Society (EMBS)

IEEE Signal Processing Society (SPS)

IEEE Young Professionals Society

World Sleep Society (WSS).

AWARDS AND HONORS

Fellow of the "Belgian American Educational Foundation (B.A.E.F.)", since January 2020.

Magna cum laude; M.S. degree in Electrical Engineering, Department of Electrical Engineering and Computer Science (Institut Montefiore), Faculty of Applied Sciences, University of Liège, Belgium, September 2012–June 2014.

COURSES TAKEN

Extra-curricular courses taken recently include:

Russian language and Tatar culture, July 2019, Summer course, Kazan Federal University, Kazan, Russian Federation.

Russian language, Level 2, 2018-2019, Institut Supérieur des Langues Vivantes (ISLV), University of Liège, Liège, Belgium.

Russian language, Level 1, 2017-2018, Institut Supérieur des Langues Vivantes (ISLV), University of Liège, Liège, Belgium.

Teaching methods, 2016–2017, Institut de Formation et de Recherche en Enseignement Supérieur (IFRES), University of Liège, Liège, Belgium.

Academic English, 2016-2017, Institut Supérieur des Langues Vivantes (ISLV), University of Liège, Liège, Belgium.

LANGUAGES

Fluent:

English, French, Persian

Limited proficiency:

Arabic, Russian

KEY TECHNICAL SKILLS

Signal processing (analog, digital, and statistical).

Stochastic modeling; risk prediction.

Analysis of biological signals; drowsiness analysis, prediction, and monitoring.