Milton O. Candela-Leal

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Education

Tecnológico de Monterrey - Monterrey, Mexico 2020 - Dec 2024
BSc in Biomedical Engineering (95/100 = 3.8/4.0 GPA)
International Baccalaureate - Monterrey, Mexico 2018 - 2020
Math HL, Psychology SL, Physics SL, ...

Research Experience

MIT Media Lab - Boston, MA, USA Summer 2024
Massachusetts Institute of Technology
Advisor: Samantha Chan, PhD
Project: EEG slow wave brain analysis for sleep quality improvement.

Harvard Medical School - Boston, MA, USA Aug 2023 - Jul 2024
Boston Children's Hospital
Advisor: Prof. Kiho Im, PhD
Projects: Fetal MRI subplate segmentation (attention U-Net), non-linear qMRI for congenital heart disease classification, MICCAI FeTA Challenge 2024.

Tecnológico de Monterrey - Monterrey, Mexico Mar 2021 - Jul 2023
NSF IUCRC BRAIN Center
Advisor: Prof. Mauricio A. Ramírez-Moreno, PhD
Projects: Cognitive state prediction via biometrics (EEG, ECG, Computer Vision) and machine learning: Mental fatigue, interest in STEM, emotion.
- Force prediction employing Computer Vision's keypoints and RNN.

University of Houston - Houston, TX, USA Spring 2022
NSF IUCRC BRAIN Center
Advisor: Prof. Jose L. Contreras-Vidal, PhD
Project: EEG functional connectivity and bisprectrum analysis between actors.

Journal Articles

(† indicates equal contribution)

Blanco-Ríos, M.A.†, **Candela-Leal, M.O.**†, Orozco-Romo, C., ... Ramírez-Moreno, M.A. (2024). Real-time EEG-based Emotion Recognition for Neurohumanities: Perspectives from Principal Component Analysis and Tree-based Algorithms. Frontiers in Human Neuroscience, 18, 1319574. doi:10.3389/fnhum.2024.1319574. PubMed PMID:38545515

Candela-Leal, M.O., Gutiérrez-Flores, E.A., Presbítero-Espinosa, G., ... Ramírez-Moreno, M.A. (2022). Multi-Output Sequential Deep Learning Model for Athlete Force Prediction on a Treadmill Using 3D Markers. Applied Sciences, 12(11), 5424. doi:10.3390/app12115424

Ramírez-Moreno, M.A., Carrillo-Tijerina, P., **Candela-Leal, M.O.**, ... Lozoya-Santos, J.J. (2021). Evaluation of a Fast Test Based on Biometric Signals to Assess Mental Fatigue at the Workplace—A Pilot Study. International Journal of Environmental Research and Public Health, 18(22), 11891. doi:10.3390/ijerph182211891. PubMed PMID:34831645

Book Chapters

Lozoya-Santos, J.J., Ramírez-Moreno, M.A., **Candela-Leal, M.O.**, ... Ramirez-Mendoza, R.A. (2022). Current and Future Biometrics: Technology and Applications. In R.A. Ramirez-Mendoza, J.J. Lozoya-Santos, R. Zavala-Yoé, ... H.G. Gonzalez-Hernandez (Eds.), Biometry: Technology, Trends and Applications (1st ed., pp. 1–30). Boca Raton, FL: CRC Press. doi:10.1201/9781003145240-1 ISBN: 9781003145240

Conference Proceedings

Candela-Leal, M.O., Aguilar-Herrera, A.J., Ramírez-Moreno, M.A., ... Lozoya-Santos, J.J. (2024). Conscious Technologies Projects as a Hub for Real Life Challenges in Engineering Education. In 15th EDUCON (pp. 665-675). Kos, Greece: IEEE. doi:10.1109/EDUCON60312.2024.10578738

Candela-Leal, M.O., Martínez-Díaz, D., Orozco-Romo, C., ... Ramírez-Moreno, M.A. (2023). Biomechanics Digital Twin: Markerless Joint Acceleration Prediction Using Machine Learning and Computer Vision. In FEI-WS Data in Action (pp. 142-150). Monterrey, Mexico: IEEE. doi:10.1109/IEEECONF56852.2023.10104757

Candela-Leal, M.O., García-Briones, J.M., Olivas-Martínez, G., ... Lozoya-Santos, J.J. (2021). Real-time Biofeedback System for Interactive Learning using Wearables and IoT. In 6th NA-IEOM (pp. 2959-2970). Monterrey, Mexico: IEOM **(best undergrad paper)**. doi:10.46254/NA06.20210487

Olivas-Martínez, G., **Candela-Leal, M.O.**, Ocampo-Alvarado, J.C., ... Ramírez-Moreno, M.A. (2021). Detecting Change in Engineering Interest in Children through Machine Learning using Biometric Signals. In ML-DT Edu. Innovation Workshop (pp. 33-40). Monterrey, Mexico: IEEE. doi:10.1109/IEEECONF53024.2021.9733772

Aguilar-Herrera, A.J., Delgado-Jimenez, E.A., **Candela-Leal, M.O.**, ... Ramirez-Mendoza, R.A. (2021). Advanced Learner Assistance System's (ALAS) recent results. In ML-DT Edu. Innovation Workshop (pp. 26-33). Monterrey, Mexico: IEEE. doi:10.1109/IEEECONF53024.2021.9733770

Invited Talks

Digital Twins in Education, 2024
U21 HSG, Amsterdam University Medical Centers (UMC) **(speaker travel award)**

Computer Vision and Facial Recognition, 2023
Computing Seminar, Universidad Autónoma de Nuevo León (UANL)

Conference Presentations

Oral Presentations

FNNDSC Research Symposium	(Boston, MA)	2024
Conscious Technologies for Smart Communities Workshop	(Virtual)	2021
51th Research and Development Congress	(Virtual)	2021

Poster Presentations

19th IEEE-EMBS International Conference on BSN	(Boston, MA)	2023
NSF BRAIN Summer Annual IAB Meeting	(Phoenix, AZ)	2023
21st Expo Ingenierías at Conexión Tec	(Monterrey, Mexico)	2023
BMEX: Engineering and Health Sciences Symposium	(Monterrey, Mexico)	2023
20th Expo Ingenierías at Conexión Tec	(Monterrey, Mexico)	2022
NSF BRAIN Summer Annual IAB Meeting	(Houston, TX)	2022
19th Expo Ingenierías at Conexión Tec	(Monterrey, Mexico)	2022
18th Expo Ingenierías at Conexión Tec	(Virtual)	2021
43rd Annual International Conference of the IEEE-EMBS	(Virtual)	2021
17th Expo Ingenierías at Conexión Tec	(Virtual)	2021

Honors and Awards

Student Speaker Travel Award ($1600 USD) - *U21 Health Sciences Group* 2024
Outstanding Student Award (top 1% engineering trajectories) - *Tecnológico de Monterrey* 2023
1st Place - Undergraduate Student Paper Competition - *6th North American IEOM* 2021
1st Place - R&D Improvement Proposals ($250 USD) - *18th Conexión Tec* 2021
Academic Talent Scholarship - *Tecnológico de Monterrey* 2020

Teaching

German A2 Teacher - *Mentoor* 2022-2024
Middle School Math and Spanish Teacher - *Aprendamos Juntos* 2021-2022
Independent High School Physics Teacher Fall 2019
FIRST® LEGO® League Mentor - *Little Minds* Spring 2019

Skills Summary

Languages	Python (3 years), MATLAB (2 years), R (1 year), Shell (3 months), SQL (3 months) English (C1), German (B1), Spanish
Frameworks	Numpy, Scipy, Pandas, Matplotlib, Scikit-learn, OpenCV, TensorFlow, Keras, BrainFlow Lattice, Dplyr, Tidyr, Caret, GA, Ggplot, Shiny FreeSurfer, FSL, MRtrix3, NiBabel, ANTs, PyDicom, IRTK, NUC, TochIO
Tools	Git, Anaconda, CUDA, cuDNN, Tableau, Microsoft Excel, G*Power, Overleaf, LaTeX
Platforms	Linux, Ubuntu, ROS, Windows, Arduino, Raspberry

Audited Courses

MIT - Department of Brain and Cognitive Sciences (BCS)

9.014 Quantitative Methods and Computational Models in Neuroscience - *M. Jazayeri* Fall 2023
9.66 Computational Cognitive Science - *J. Tenenbaum* Fall 2023