

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, VAE-GAN for anomaly detection.

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 bispectrum analysis between actors.

JOURNAL ARTICLES

(† indicates equal contribution)

Blanco-Ríos, M.A.†, **Candela-Leal, M.O.†**, Orozco-Romo, C., Remis-Serna, P., ... 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](https://doi.org/10.3389/fnhum.2024.1319574). PubMed PMID:[38545515](https://pubmed.ncbi.nlm.nih.gov/38545515)

Candela-Leal, M.O., Gutiérrez-Flores, E.A., Presbítero-Espinosa, G., Sujatha-Ravindran, A., ... 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](https://doi.org/10.3390/app12115424)

Ramírez-Moreno, M.A., Carrillo-Tijerina, P., **Candela-Leal, M.O.**, Alanis-Espinosa, M., ... 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](https://doi.org/10.3390/ijerph182211891). PubMed PMID:[34831645](https://pubmed.ncbi.nlm.nih.gov/34831645)

BOOK CHAPTERS

Lozoya-Santos, J.J., Ramírez-Moreno, M.A., Diaz-Armas, G.G., **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, L.M. Alonso-Valerdi, ... 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](https://doi.org/10.1201/9781003145240-1). ISBN: 9781003145240

CONFERENCE PROCEEDINGS

Candela-Leal, M.O., Aguilar-Herrera, A.J., Ramírez-Moreno, M.A., Félix-Herrán, L.C., ... Lozoya-Santos, J.J. (2024). Conscious Technologies Projects as a Hub for Real Life Challenges in Engineering Education. In 15th Global Engineering Education Conference (EDUCON). Kos Island, Greece: IEEE. doi:[10.1109/EDUCON60312.2024.10578738](https://doi.org/10.1109/EDUCON60312.2024.10578738)

Candela-Leal, M.O., Martínez-Díaz, D., Orozco-Romo, C., Aguilar-Herrera, A.J., ... Ramírez-Moreno, M.A. (2023). Biomechanics Digital Twin: Markerless Joint Acceleration Prediction Using Machine

Learning and Computer Vision. In 2023 Future of Educational Innovation-Workshop Series Data in Action (pp. 142-150). Monterrey, Mexico: IEEE. doi:[10.1109/IEEECONF56852.2023.10104757](https://doi.org/10.1109/IEEECONF56852.2023.10104757)

Candela-Leal, M.O., García-Briones, J.M., Olivas-Martínez, G., Abrego-Ramos, R., ... Lozoya-Santos, J.J. (2021). Real-time Biofeedback System for Interactive Learning using Wearables and IoT. In 6th North American Industrial Engineering and Operations Management (IEOM) (pp. 2959-2970). Monterrey, Mexico: IEOM (**best undergraduate paper award**). doi:[10.46254/NA06.20210487](https://doi.org/10.46254/NA06.20210487)

Olivas-Martínez, G., **Candela-Leal, M.O.**, Ocampo-Alvarado, J.C., Acosta-Soto, L.F., ... Ramírez-Moreno, M.A. (2021). Detecting Change in Engineering Interest in Children through Machine Learning using Biometric Signals. In 2021 Machine Learning-Driven Digital Technologies for Educational Innovation Workshop (pp. 33-40). Monterrey, Mexico: IEEE. doi:[10.1109/IEEECONF53024.2021.9733772](https://doi.org/10.1109/IEEECONF53024.2021.9733772)

Aguilar-Herrera, A.J., Delgado-Jimenez, E.A., **Candela-Leal, M.O.**, Olivas-Martínez, G., ... Ramirez-Mendoza, R.A. (2021). Advanced Learner Assistance System's (ALAS) recent results. In 2021 Machine Learning-Driven Digital Technologies for Educational Innovation Workshop (pp. 26-33). Monterrey, Mexico: IEEE. doi:[10.1109/IEEECONF53024.2021.9733770](https://doi.org/10.1109/IEEECONF53024.2021.9733770)

INVITED TALKS

Digital Twins in Education, U21 HSG, Amsterdam University Medical Centers (UMC) (speaker travel award)	2024
Computer Vision and Facial Recognition, Computing Seminar, Universidad Autónoma de Nuevo León (UANL)	2023

CONFERENCE PRESENTATIONS

Oral Presentations

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

Poster Presentations

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

HONORS AND AWARDS

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

TEACHING

German A2 Teacher - <i>Mentoor</i>	2022-2024
Middle School Math and Spanish Teacher - <i>Aprendamos Juntos</i>	2021-2022
Independent High School Physics Teacher	Fall 2019
FIRST® LEGO® League Mentor - <i>Little Minds</i>	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
Tools	FreeSurfer, FSL, MRtrix3, NiBabel, ANTs, PyDicom, IRTK, NUC, ToChIO
Platforms	Git, Anaconda, CUDA, cuDNN, Tableau, Microsoft Excel, G*Power, Overleaf, \LaTeX Linux, Ubuntu, ROS, Windows, Arduino, Raspberry