Milton O. Candela-Leal

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Education

Tecnológico de Monterrey *Monterrey, Mexico*
BS in Biomedical Engineering (GPA = 95/100 = 3.8/4.0) 2020 - Dec 2024
- Graduated with highest honors (*Summa Cum Laude*, top 5% of class)
- Top graduate in professional development (*Borrego de Oro*, 1/1500)

Work & Research Experience

Scale AI 2025-*Present*
Operations Specialist
- 2D LiDAR scene segmentation for autonomous vehicles through CV algorithms

NSF IUCRC BRAIN Center, Tecnológico de Monterrey 2021-2023, 2024-2025
Research Assistant
Supervisor: Prof. Mauricio A. Ramírez-Moreno, PhD
- Cognitive state decoding using ML on multi-modal biometrics (EEG, PPG/EDA)
- Force and acceleration prediction through RNN from pose-estimated keypoints
- Autonomous driving and HCI systems via multi-sensor (Camera, Radar, LiDAR)
- Engineering education through project-based learning and research simulators
- Designed a project: Influence of auditive noise in chess learning environments
- 1 grant with six universities on three continents via U21 Health Sciences Group
- 5 journal papers, 2 book chapters, 7 conference proceedings, +10 presentations

Boston Children's Hospital, Harvard Medical School 2023-2024
Research Intern
Supervisor: Prof. Kiho Im, PhD
- Fetal brain (sub)cortical MRI segmentation through attention-gated CNN U-Net
- Congenital disorder prediction via fetal brain features (volumetric, morphological)
- 2 first-author presentations, 4 co-author presentations

NSF IUCRC BRAIN Center, University of Houston 2022
Research Intern
Supervisor: Prof. Jose L. Contreras-Vidal, PhD
- Gaze influence on actors' synchronicity through EEG bispectrum and FC analysis
- 2 co-author presentations

Journal Articles

(indicates equal contribution)*

Candela-Leal M.O., Alanis-Espinosa, M., Murrieta-González, J. *et al.* (2025). Neural Signatures of STEM Learning and Interest in Youth. *Acta Psychologica*, 255, 104949. doi:10.1016/j.actpsy.2025.104949. PubMed PMID:40168892

Mandujano-Granillo, J.A., **Candela-Leal, M.O.**, Ortiz-Vazquez, J.J. *et al.* (2024). Human-Vehicle Interfaces: A Review for Autonomous Electric Vehicles. *IEEE Access*, 12, 121635–121658. doi:10.1109/ACCESS.2024.3450439

Blanco-Ríos, M.A.*, **Candela-Leal, M.O.***, Orozco-Romo, C. *et al.* (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 **(editor's choice, 2024)**

Candela-Leal, M.O., Gutiérrez-Flores, E.A., Presbítero-Espinosa, G. *et al.* (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.** *et al.* (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

Ramírez-Moreno, M.A., Hernández-Mustieles, M.A., **Candela-Leal, M.O.** et al. (2025). Workplace Measures of Mental Fatigue. In C.R. Martin, V.R. Preedy, V. Patel et al. (Eds.), The Scientific Basis of Fatigue (1st ed.). Academic Press. ISBN: 9780443240812

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

Selected Conference Proceedings

Candela-Leal, M.O., Ramírez-Moreno, M.A., & Lozoya-Santos, J.J. (*accepted*). Task Resolution Time Estimation through Cognitive Load: An EEG Study of Chess Players. In Proceedings of the *47th Annual Meeting of the Cognitive Science Society (CogSci)*. San Francisco, CA: Taylor & Francis

Ramírez-Arceo, G.A., **Candela-Leal, M.O.**, Tudon-Martinez, J.C. *et al.* (2025). Innovative Spaces with Advanced Technologies such as Research Activity Simulators for Engineering Education. In Proceedings of the *16th Global Engineering Education Conference (EDUCON)*. London, United Kingdom: IEEE. doi:10.1109/EDUCON62633.2025.11016540

Candela-Leal, M.O., Aguilar-Herrera, A.J., Ramírez-Moreno, M.A. *et al.* (2024). Conscious Technologies Projects as a Hub for Real Life Challenges in Engineering Education. In Proceedings of the *15th EDUCON*. Kos, Greece: IEEE. doi:10.1109/EDUCON60312.2024.10578738

Candela-Leal, M.O., Martínez-Díaz, D., Orozco-Romo, C. *et al.* (2023). Biomechanics Digital Twin: Markerless Joint Acceleration Prediction Using Machine Learning and Computer Vision. In Proceedings of the *Future of Educational Innovation-Workshop Series: Data in Action*. Monterrey, Mexico: IEEE. doi:10.1109/IEEECONF56852.2023.10104757

Candela-Leal, M.O., García-Briones, J.M., Olivas-Martínez, G. *et al.* (2021). Real-time Biofeedback System for Interactive Learning using Wearables and IoT. In Proceedings of the *6th International Conference on Industrial Engineering and Operations Management*. Monterrey, Mexico: IEOM. doi:10.46254/NA06.20210487 **(best undergraduate paper award)**

Olivas-Martínez, G., **Candela-Leal, M.O.**, Ocampo-Alvarado, J.C. *et al.* (2021). Detecting Change in Engineering Interest in Children through Machine Learning using Biometric Signals. In Proceedings of the *Machine Learning-Driven Digital Technologies for Educational Innovation Workshop*. Monterrey, Mexico: IEEE. doi:10.1109/IEEECONF53024.2021.9733772

Aguilar-Herrera, A.J., Delgado-Jimenez, E.A., **Candela-Leal, M.O.** *et al.* (2021). Advanced Learner Assistance System's (ALAS) recent results. In Proceedings of the *Machine Learning-Driven Digital Technologies for Educational Innovation Workshop*. Monterrey, Mexico: IEEE. doi:10.1109/IEEECONF53024.2021.9733770

Invited Talks

Invited Lecturer, Educational Research Seminar, Universidad José Martí	Jun 2025
Panelist, Biomedical Engineering Week, Tecnologico de Monterrey	May 2025
Panelist, NeuroTalks@Tec: Meet the Experts, Tecnologico de Monterrey	Mar 2025
Guest Lecturer, Cognitive Neuroscience Seminar, Tecnologico de Monterrey	Sep 2024
Invited Lecturer, Computing Seminar, UANL	Apr 2023

Selected International Presentations

Oral Presentations

Physiological-based Emotion Recognition: Objective Emotions for Real-time Environments. *Interdisciplinary Innovation in Neuroengineering, AI, and Arts*, University of Houston (Houston, TX) — 2025

Digital Twins in Education: Enhancing Student Well-being and Academic Performance with Biometric Insights and Machine Learning. *U21 Health Sciences Group 2024 Annual Meeting*, Amsterdam University Medical Centers (Amsterdam, Netherlands) **(student speaker award)** — 2024

High-resolution Fetal Subplate Automatic Segmentation. *FNNDSC Research Symposium*, Boston Children's Hospital (Boston, MA) — 2024

CHD Fetal Brain Analysis using Combined Quantitative MRI Features and Custom-build Loss Functions. *FNNDSC Research Symposium*, Boston Children's Hospital (Boston, MA) — 2024

Poster Presentations

FALCONS: Fetal Automatic Landmark Computation and Optimization for Neuroimaging Segmentation. *27th International Conference on MICCAI* (Marrakesh, Morocco) — 2024

Real-time Dual-feature Mental Fatigue State SVM Classification using EEG Delta Bandpower. *19th IEEE-EMBS International Conference on BSN*, MIT Media Lab (Boston, MA) — 2023

Human Machine Interface for Fleet Electric Vehicles. *NSF IUCRC BRAIN 2023 Annual Meeting*, Arizona State University (Phoenix, AZ) 2023

Biometric Cabin for Neurohumanities Lab. *NSF IUCRC BRAIN 2023 Annual Meeting*, Arizona State University (Phoenix, AZ) 2023

Brain on Acting: Neural Dynamics of Actor-Actor Dyads During an Acted Scene. *NSF IUCRC BRAIN 2022 Annual Meeting*, University of Houston (Houston, TX) 2022

Identifying Engineering Interest in Children through Machine Learning using Biometric Signals. *43rd Annual Conference of the IEEE-EMBS* (Virtual) 2021

Digital Twin of Biomechanics: Joint Force Prediction using Video and AI. At the *NSF IUCRC BRAIN 2021 Annual Meeting* (Virtual) 2021

Honors and Awards

Editor's Choice Selection, Frontiers in Human Neuroscience [eBook] 2025
Top 3% of 2024 papers (16/510) based on quality.

Summa Cum Laude, Tecnológico de Monterrey 2024
Top 5% of the graduating class (highest academic honors).

Borrego de Oro, Tecnológico de Monterrey [newsletter] 2024
Top graduate in professional development, among ∼1,500 Fall 2024 graduates.

Excellence Diploma, Tecnológico de Monterrey 2024

International Diploma, Tecnológico de Monterrey 2024

Student Speaker Award, U21 Health Sciences Group [newsletter] 2024
One of the two teams that won funding ($1600 USD) to present at U21 HSG '24, selected from MSc/BSc research projects across 21 universities on all continents.

Outstanding Student Award, Tecnológico de Monterrey 2023, 2024
Top 1% of engineering students (80/8000) with the most outstanding trajectories.

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

Grants

SimEmotions: An Emotion-Centered Collaborative Learning Platform, 2025-2026
Project Groups Funding: Clinical Simulation ($5000 USD), U21 Health Sciences Group, with Prof. Karien Henrico (University of Johannesburg), Prof. Sandra Monteiro (McMaster University), Prof. Ignacio Andrés Villagrán Gutiérrez (PUC Chile), Prof. Allison Mandrusiak (The University of Queensland), and Prof. John Fung (The University of Hong Kong)

Teaching Experience

German A2 Teacher, Mentoor MX 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), R (2 years), MATLAB (1 year), SQL (1 year), Shell (3 months)
English (C1), German (B1), Spanish

Frameworks Numpy, Scipy, Pandas, Matplotlib, Scikit-learn, OpenCV, TensorFlow, Keras, BrainFlow
FreeSurfer, FSL, MRtrix3, NiBabel, ANTs, PyDicom, IRTK, NUC, TochIO, MNE, OSC

Tools Git, Anaconda, CUDA, CMake, Tableau, Microsoft Excel, G*Power, Overleaf, LaTeX

Platforms Linux, Ubuntu, ROS, Windows, Arduino, Raspberry

Press

Conecta, The EXATEC who integrates AI in the analysis of emotions and diseases 2025

TecScience, Neurohumanities Lab: Detecting Emotions in Real Time to Transform Education 2025

TecScience, Future Classrooms of the Future: Real-Time Monitoring of Students' Brain Activity 2025

NSF IUCRC BRAIN, BRAIN Center Spring Newsletter (pp. 4, 9-10) 2023

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