Milton Candela

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Education

Tecnológico de Monterrey, Monterrey, Mexico — Dec 2024
Bachelor of Science in Biomedical Engineering — GPA: 3.8/4.0

- Graduated with highest honors (*Summa Cum Laude*, top 5% of class)
- Top graduate in professional development (*Borrego de Oro*, 1/1500)

Summary

BME graduate with 5 years of research in real-time, non-invasive decoding of human cognitive states and closed-loop neurofeedback integrating haptic, TMS, and electrical stimulation. Experienced in high-density EEG/EMG and fetal MRI analysis, biostatistics, machine learning, and deep learning (RNN/CNN) with Python, MATLAB, and R. Author of 15+ publications and 20+ international presentations on: (1) BCIs for neuroeducation, (2) biomechanical modeling, (3) fetal brain imaging, and (4) spinal cord injury rehabilitation. Research interests include modeling spatiotemporal neural dynamics underlying cognitive decline, focusing on memory and decision-making, to develop adaptive closed-loop systems for cognitive enhancement and rehabilitation in neuropsychiatric disorders such as Alzheimer's and dementia.

Research Experience

Houston Methodist — 08/2025 - *Present*
Research Assistant I
Supervisor: Prof. Dimitry G. Sayenko, PhD

- Closed-loop motor execution BCI for SCI upper-limb rehabilitation using ESS

Tecnologico de Monterrey — 03/2021 - 07/2023, 08/2024 - 07/2025
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)
- Designed a project: Influence of auditive noise in chess learning environments
- 2 grants with six universities on five continents via U21 Health Sciences Group
- 5 journal articles, 3 book chapters, 8 conf. proceedings, +15 intl. presentations

Boston Children's Hospital — 08/2023 - 07/2024
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

Selected Publications

(indicates equal contribution)*

12. **Candela, M.O.***, Calderón-Gurubel, J.E.*, Lozoya-Santos, J.J., Cebral-Loureda, M., & Ramírez-Moreno, M.A. (*in prep*). Feeling Fear? Psychophysiological Stress Responses in Semi-Immersive Environments.
11. Gondova, A., Zhang, J., You, S., Jeong, S., **Candela, M.O.**, et al. (*under review*). Typical Development of the Human Fetal Subplate: Regional Heterogeneity, Growth, and Asymmetry Assessed by *in vivo* T2-weighted MRI.
10. **Candela, M.O.**, Wong-Cantú, C.G., Arceo, A., Veléz-Saboyá, C.S., Félix-Herrán, L.C., et al. (*under review*). Toward Emotionally Adaptive Learning Spaces: Brain–Body Engagement in Immersive Dance Improvisation.

9. Ramírez-Moreno, M.A., Hernández-Mustieles, M.A., **Candela-Leal, M.O.**, Tudon-Martínez, J.C., & Lozoya-Santos, J.J. (2026). Workplace Measures of Mental Fatigue. In C.R. Martin, V.R. Preedy, V.B. Patel, & R. Rajendram (Eds.), *The Scientific Basis of Fatigue* (1st ed., pp. 209-218). London, United Kingdom: Academic Press. doi:10.1016/B978-0-443-24080-5.00005-9. ISBN: 9780443240805
8. **Candela-Leal, M.O.**, Marrufo-Franco, L.A., Ruiz-de-la-Fuente, B.H., Cruz-Gómez, C.F., & Ramírez-Moreno, M.A. (2026). Closed-Loop Haptic Neurofeedback BCI for Real-Time Student Attention Regulation. In *Proceedings of the XLVIII National Congress of Biomedical Engineering*. Monterrey, Mexico: Springer
7. **Candela-Leal, M.O.**, Ramírez-Moreno, M.A., & Lozoya-Santos, J.J. (2025). 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: eScholarship. [URL]
6. **Candela-Leal M.O.**, Alanis-Espinosa, M., Murrieta-González, J., Lozoya-Santos, J.J., & Ramírez-Moreno, M.A. (2025). Neural Signatures of STEM Learning and Interest in Youth. *Acta Psychologica*, 255(104949), 104949. doi:10.1016/j.actpsy.2025.104949. PMID:40168892
5. Blanco-Ríos, M.A.*, **Candela-Leal, M.O.***, Orozco-Romo, C., Remis-Serna, P., Vélez-Saboyá, C.S., 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. PMID:38545515
4. **Candela-Leal, M.O.**, Martínez-Díaz, D., Orozco-Romo, C., Aguilar-Herrera, A.J., Martínez-Herrera, J.E., 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
3. **Candela-Leal, M.O.**, Gutiérrez-Flores, E.A., Presbítero-Espinosa, G., Sujatha-Ravindran, A., Ramírez-Mendoza, R.A., 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
2. Olivas-Martínez, G., **Candela-Leal, M.O.**, Ocampo-Alvarado, J.C., Acosta-Soto, L.F., Aguilar-Herrera, A.J., 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
1. Ramírez-Moreno, M.A., Carrillo-Tijerina, P., **Candela-Leal, M.O.**, Alanis-Espinosa, M.A., Tudon-Martínez, J.C., 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. PMID:34831645

Honors and Awards

2025 **Editor's Choice Selection**, Frontiers in Human Neuroscience (top 3% of 2024 papers)
2024 **Summa Cum Laude**, Tecnologico de Monterrey (top 5% of the graduating class)
2024 **Excellence Diploma for Comprehensive Training**, Tecnologico de Monterrey
2024 **Best in Professional Development**, Tecnologico de Monterrey (among ∼1,500 graduates)
2024 **International Diploma**, Tecnologico de Monterrey
2024 **Student Speaker Award ($1600 USD)**, U21 Health Sciences Group (among 21 universities)
2023 **Outstanding Student Award**, Tecnologico de Monterrey (1% of all engineering students)
2021 **Best Undergraduate Paper**, 6th North American IEOM, IEOM Society International
2020 **Academic Talent Scholarship**, Tecnologico de Monterrey

Grants

2026-2027 Emotions in Action: Cross-Cultural Exploration of Student Experiences in Clinical Simulation, *Research Development Fund ($15k USD)*, U21 HSG

2025-2026 SimEmotions: An Emotion-Centered Collaborative Learning Platform, *Project Groups Funding: Clinical Simulation ($5k USD)*, U21 HSG, 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)