Milton O. Candela-Leal

milton_candela@hotmail.com
miltoncandela.github.io

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)

Research Experience

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

-

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)
- Engineering education through project-based learning and research simulators
- Designed a project: Influence of auditive noise in chess learning environments
- 2 grants with six universities on three continents via U21 Health Sciences Group
- 5 journal articles, 2 book chapters, 8 conf. proceedings, +10 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

Journal Articles

(indicates equal contribution)*

10. **Candela-Leal, M.O.**, Henrico, K., Monteiro, S., Villagrán-Gutiérrez, I.A., Mandrusiak, A. *et al.* (*in prep*). Emotional Response Analysis of Students in Clinical Simulations through Computer Vision.
9. **Candela-Leal, M.O.**, Henrico, K., Monteiro, S., Villagrán-Gutiérrez, I.A., Mandrusiak, A. *et al.* (*in prep*). Cross-Cultural Variations in Emotional Reactions and Student Experiences during Clinical Simulations.
8. **Candela-Leal 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.
7. **Candela-Leal, M.O.**, Martínez-Hernández, A., Calderón-Gurubel, J.E., Moreno-Salazar, I.E., Lozoya-Santos, J.J. *et al.* (*in prep*). Enhanced Real-Time EEG-based Emotion Recognition using an Spherical VAD Model.
6. Gondová, A., Zhang, J., You, S., Jeong, S., **Candela-Leal, 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.
5. **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

4. Mandujano-Granillo, J.A., **Candela-Leal, M.O.**, Ortiz-Vazquez, J.J., Ramírez-Moreno, M.A., Tudon-Martínez, J.C. *et al.* (2024). Human-Vehicle Interfaces: A Review for Autonomous Electric Vehicles. *IEEE Access*, 12, 121635–121658. doi:10.1109/ACCESS.2024.3450439
3. 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
2. **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
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

Book Chapters

3. **Candela-Leal, M.O.**, Lozoya-Santos, J.J., Zavala-Yoe, R., Félix-Herrán, L.C., & Ramírez-Moreno, M.A. (*under review*). Biometric Tools for Stress Evaluation in the Workplace.
2. Ramírez-Moreno, M.A., Hernández-Mustieles, M.A., **Candela-Leal, M.O.**, Tudon-Martínez, J.C., & Lozoya-Santos, J.J. (2025). Workplace Measures of Mental Fatigue. In C.R. Martin, V.R. Preedy, V. Patel, & R. Rajendram (Eds.), *The Scientific Basis of Fatigue* (1st ed.). Academic Press. ISBN: 9780443240812
1. Lozoya-Santos, J.J., Ramírez-Moreno, M.A., Diaz-Armas, G.G., Acosta-Soto, L.F., **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, L.M. Alonso-Valerdi, R. Morales-Menendez *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

Conference Proceedings (Lead Author)

6. **Candela-Leal, M.O.**, Wong-Cantú, C.G., Arceo, A., Veléz-Saboyá, C.S., Félix-Herrán, L.C. *et al.* (*under review*). Brain–Body Dynamics in Dance Improvisation: Effects of Emotion and Immersion.
5. **Candela-Leal, M.O.**, Marrufo-Franco, L.A., Ruiz-de-la-Fuente, B.H., Cruz-Gómez, C.F., & Ramírez-Moreno, M.A. (2025). Closed-Loop Haptic Neurofeedback BCI for Real-Time Student Attention Regulation. In *Proceedings of the XLVIII National Congress of Biomedical Engineering*. Monterrey, Mexico: Springer
4. **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]
3. **Candela-Leal, M.O.**, Aguilar-Herrera, A.J., Ramírez-Moreno, M.A., Lozoya-Santos, J.J., Félix-Herrán, L.C. *et al.* (2024). Conscious Technologies Projects as a Hub for Real Life Challenges in Engineering Education. In *Proceedings of the 15th Global Engineering Education Conference (EDUCON)*. Kos, Greece: IEEE. doi:10.1109/EDUCON60312.2024.10578738
2. **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

1. **Candela-Leal, M.O.**, García-Briones, J.M., Olivas-Martínez, G., Abrego-Ramos, R., Alvarez-Espinoza, G.J., *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 **(best undergraduate paper award)**. doi:10.46254/NA06.20210487

Invited Talks

6. **Guest Lecturer** (2025). Physiological-based Emotion Recognition: Objective Emotions for Real-time Environments; Real-Time Emotion Prediction from EEG using a VAD Framework. Presented to graduate students at Interdisciplinary Innovation in Neuroengineering, AI, and Arts, University of Houston (Houston, TX)
5. **Invited Lecturer** (2025). Brainwaves and Biometrics: Sensing STEM Motivation. Presented to graduate Neuroeducation students at Educational Research course, Universidad José Martí (Monterrey, Mexico)
4. **Panelist** (2025). Panel: From the Classroom to the Real World - EXATEC Testimonies. Presented with B.S. Valeria Ceja Morales, B.S. Salma Ruíz, B.S. Gerardo Fumagal González, and B.S. Cristian Hernández at Biomedical Engineering Week, Tecnológico de Monterrey (Monterrey, Mexico)
3. **Panelist** (2025). Panel: Neuroscience Laboratories @ Tec. Presented with Prof. Pedro Cortes, Prof. Manuel Cebral, Prof. Andrés Ayala, Prof. Luis Morán, and Prof. Luz María Alonso at NeuroTalks@Tec: Meet the Experts, Tecnológico de Monterrey (Monterrey, Mexico)
2. **Guest Lecturer** (2024). Decoding Cognitive Performance: From Chess Puzzles to STEM Classrooms. Presented to senior undergraduate students at Cognitive Neuroscience minor, Tecnológico de Monterrey (Monterrey, Mexico)
1. **Invited Lecturer** (2023). Computer Vision and Facial Recognition. Presented to senior undergraduate Computer Science students at Computing Seminar course, Universidad Autónoma de Nuevo León (UANL) [one of Mexico's top eight universities] (Monterrey, Mexico)

Poster & Oral Presentations (Lead Author)

11. **Candela-Leal, M.O.**, Ramírez-Moreno, M.A., & Lozoya-Santos, J.J. (2025). Expertise-Driven Variations in Cognitive Load as Response to Environmental Noise: A Chess EEG Study. *SACNAS National Diversity in STEM Conference (NDiSTEM)* (Colombus, Ohio)
10. **Candela-Leal, M.O.**, Gondová, A., You, S., Grant, P.E., & Im, K. (2024). FALCONS: Fetal Automatic Landmark Computation and Optimization for Neuroimaging Segmentation. *27th International Conference on MICCAI* (Marrakesh, Morocco)
9. **Candela-Leal, M.O.**, & Valdivia-Padilla, A. (2024). 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)**
8. **Candela-Leal, M.O.**, Lemus-Aguilar, M., Mondragon-Estrada, E., Hereida-Marin, I.B., Tafoya-Milo, G. *et al.* (2024). High-resolution Fetal Subplate Automatic Segmentation. *FNNDSC Research Symposium*, Boston Children's Hospital (Boston, MA)
7. **Candela-Leal, M.O.**, Ramírez-Moreno, M.A., & Lozoya-Santos, J.J. (2023). 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)
6. **Candela-Leal, M.O.**, Ramírez-Moreno, M.A., & Lozoya-Santos, J.J (2023). Talent Detection Tool for Early Engineering Education. *NSF IUCRC BRAIN 2023 Annual Meeting*, Arizona State University (Phoenix, AZ)
5. **Candela-Leal, M.O.**, Cebral-Loureda, M., Presbítero-Espinosa, G., Ramírez-Moreno, M.A., &

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

4. **Candela-Leal M.O.**, Martínez-Díaz, D., Ramírez-Moreno M.A., & Lozoya-Santos J.J. (2022). Digital Twin modeling for Human Biomechanics and Office Spaces. *NSF IUCRC BRAIN 2022 Annual Meeting*, University of Houston (Houston, TX)
3. **Candela-Leal, M.O.**, Ortiz-Padilla, V.E., Rodríguez-Hernández, K.L., Aguilar-Herrera, A.J., Guitérrez-Flores, E.A. *et al.* (2021) Digital Twin of Biomechanics: Joint Force Prediction using Video and AI. *NSF IUCRC BRAIN 2021 Annual Meeting* (Virtual)
2. **Candela-Leal, M.O.**, Ramírez-Moreno, M.A., & Lozoya-Santos, J.J. (2021). Biomechanics for the Digital Twin of Performance: Study Cases. *Conscious Technologies for Smart Communities Workshop* (Virtual)
1. **Candela-Leal, M.O.**, Prado-Maillard, E.C., Avendaño-Arredondo, B.J., Otálora-Millán, M.P., & Jasso-Ayala, J.C. (2021). *Harry Potter and the Prisoner of Azkaban* (2004), a Cultural and Ideological Instructor of the Millennial Viewer. *51th Research and Development Congress* (Virtual)

Grants

2025-2026 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)

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

Teaching Experience

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