

# Milton O. Candela-Leal

milton.candela@hotmail.com  
[miltoncandela.github.io](https://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

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**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., Cebal-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](https://doi.org/10.1016/j.actpsy.2025.104949). PMID:[40168892](https://pubmed.ncbi.nlm.nih.gov/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](https://doi.org/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](https://doi.org/10.3389/fnhum.2024.1319574). PMID:[38545515](https://pubmed.ncbi.nlm.nih.gov/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](https://doi.org/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](https://doi.org/10.3390/ijerph182211891). PMID:[34831645](https://pubmed.ncbi.nlm.nih.gov/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](https://doi.org/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 47<sup>th</sup> 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 15<sup>th</sup> Global Engineering Education Conference (EDUCON)*. Kos, Greece: IEEE. doi:[10.1109/EDUCON60312.2024.10578738](https://doi.org/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](https://doi.org/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 6<sup>th</sup> International Conference on Industrial Engineering and Operations Management*. Monterrey, Mexico: IEOM (**best undergraduate paper award**). doi:[10.46254/NA06.20210487](https://doi.org/10.46254/NA06.20210487)

## Invited Talks

- 2025 **Universidad Jose Marti**, Educational Research Seminar
- 2025 **Tecnologico de Monterrey**, Biomedical Engineering Week
- 2025 **Tecnologico de Monterrey**, NeuroTalks@Tec: Meet the Experts
- 2024 **Tecnologico de Monterrey**, Cognitive Neuroscience Seminar
- 2023 **Universidad Autónoma de Nuevo León (UANL)**, Computing Seminar

## Poster & Oral Presentations (Lead Author)

13. **Candela-Leal, M.O.**, López, D.C., Moreno-Salazar, I.E., Lozoya-Santos, J.J., Ramírez-Moreno, M.A. *et al.* (2025). Real-Time Emotion Prediction from EEG using a VAD Framework. *Interdisciplinary Innovation in Neuroengineering, AI, and Arts, University of Houston* (Houston, TX)
12. **Candela-Leal, M.O.**, Lozoya-Santos, J.J., Ramírez-Moreno, M.A., & Cebal-Loureda, M. (2025). Physiological-based Emotion Recognition: Objective Emotions for Real-time Environments. *Interdisciplinary Innovation in Neuroengineering, AI, and Arts, University of Houston* (Houston, TX)
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)* (Columbus, 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. *27<sup>th</sup> 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.**, Cebal-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. *51<sup>th</sup> Research and Development Congress* (Virtual)

## 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)

## 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**, 6<sup>th</sup> 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