

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

- Tecnológico de Monterrey** - Monterrey, Mexico Mar 2021 - Jul 2023, Fall 2024
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.
- 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, MICCAI FeTA Challenge 2024.
- 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)

- Mandujano-Granillo, J.A., **Candela-Leal, M.O.**, Ortiz-Vazquez, J.J., ... Lozoya-Santos, J.J. (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)
- Blanco-Ríos, M.A.†, **Candela-Leal, M.O.**†, Orozco-Romo, C., ... 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., ... 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.**, ... 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., **Candela-Leal, M.O.**, ... Ramírez-Mendoza, R.A. (2022). Current and Future Biometrics: Technology and Applications. In R.A. Ramírez-Mendoza, J.J. Lozoya-Santos, R. Zavala-Yoé, ... 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., ... Lozoya-Santos, J.J. (2024). Conscious Technologies Projects as a Hub for Real Life Challenges in Engineering Education. In 15th EDUCON (pp. 665-675). Kos, 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., ... Ramírez-Moreno, M.A. (2023). Biomechanics Digital Twin: Markerless Joint Acceleration Prediction Using Machine Learning and Computer Vision. In 3rd IFE-WS (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., ... Lozoya-Santos, J.J. (2021). Real-time Biofeedback System for Interactive Learning using Wearables and IoT. In *6th North American 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., ... Ramírez-Moreno, M.A. (2021). Detecting Change in Engineering Interest in Children through Machine Learning using Biometric Signals. In *1st IFE-WS* (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.**, ... Ramirez-Mendoza, R.A. (2021). Advanced Learner Assistance System's (ALAS) recent results. In *1st IFE-WS* (pp. 26-33). Monterrey, Mexico: IEEE. doi:[10.1109/IEEECONF53024.2021.9733770](https://doi.org/10.1109/IEEECONF53024.2021.9733770)

INVITED TALKS

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| Decoding Cognitive Performance, | 2024 |
| Cognitive Neuroscience minor, Tecnológico de Monterrey - School of Humanities and Education | |
| Computer Vision and Facial Recognition, | 2023 |
| Computing Seminar course, UANL - School of Physics and Mathematics | |

PRESENTATIONS

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| FALCONS: Fetal Automatic Landmark Computation and Optimization for Neuroimaging Segmentation. Poster presentation at the <i>27th Conference on MICCAI</i> , Marrakesh, Morocco | 2024 |
| Digital Twins in Education: Enhancing Student Well-being and Academic Performance with Biometric Insights and Machine Learning. Oral presentation at the <i>U21 Health Sciences Group 2024 Annual Meeting</i> , Amsterdam University Medical Centers, Amsterdam, Netherlands | 2024 |
| High-resolution Fetal Subplate Automatic Segmentation. Oral presentation at the <i>FNNDSC Research Symposium</i> , Boston, MA | 2024 |
| CHD Fetal Brain Analysis using Combined Quantitative MRI Features and Custom-build Loss Functions. Oral presentation at the <i>FNNDSC Research Symposium</i> , Boston, MA | 2024 |
| Real-time Dual-feature Mental Fatigue State SVM Classification using EEG Delta Bandpower. Poster presentation at the <i>19th IEEE-EMBS Conference on BSN</i> , Boston, MA | 2023 |
| Talent Detection Tool for Early Engineering Education. Poster presentation at the <i>NSF IUCRC BRAIN 2023 Annual Meeting</i> , Phoenix, AZ | 2023 |
| Biometric Cabin for Neurohumanities Lab. Poster presentation at the <i>NSF IUCRC BRAIN 2023 Annual Meeting</i> , Phoenix, AZ | 2023 |
| Human Machine Interface for Fleet Electric Vehicles. Poster presentation at the <i>NSF IUCRC BRAIN 2023 Annual Meeting</i> , Phoenix, AZ | 2023 |
| Brain on Acting: Neural Dynamics of Actor-Actor Dyads During an Acted Scene. Poster presentation at the <i>NSF IUCRC BRAIN 2022 Annual Meeting</i> , Houston, TX | 2022 |
| Digital Twin modeling for Human Biomechanics and Office Spaces. Poster presentation at the <i>NSF IUCRC BRAIN 2022 Annual Meeting</i> , Houston, TX | 2022 |
| Identifying Engineering Interest in Children through Machine Learning using Biometric Signals. Poster presentation at the <i>43rd Annual Conference of the IEEE-EMBS</i> , Virtual | 2021 |
| ALAS: Advanced Learner Assistance System for Engineering Education using Wearable Sensors. Poster presentation at the <i>43rd Annual Conference of the IEEE-EMBS</i> , Virtual | 2021 |
| Detection of Engineering Interest in Children Through an Intelligent System Using Biometric Signals. Poster presentation at the <i>NSF BRAIN Summer Annual IAB Meeting</i> , Virtual | 2021 |
| Digital Twin of Biomechanics: Joint Force Prediction using Video and AI. Poster presentation at the <i>NSF IUCRC BRAIN 2021 Annual Meeting</i> , Virtual | 2021 |
| Biomechanics for the Digital Twin of Performance: Study Cases. Oral presentation at the <i>Conscious Technologies for Smart Communities Workshop</i> , Virtual | 2021 |
| Harry Potter and the Prisoner of Azkaban (2004), a Cultural and Ideological Instructor of the Millennial Viewer. Oral presentation at the <i>51th Research and Development Congress</i> , Virtual | 2021 |

HONORS AND AWARDS

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

TEACHING

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), 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 FreeSurfer, FSL, MRtrix3, NiBabel, ANTs, PyDicom, IRTK, NUC, TochIO, OSC Lattice, Dplyr, TidyR, Caret, GA, Ggplot, Shiny
Tools	Git, Anaconda, CUDA, CMake, Tableau, Microsoft Excel, G*Power, Overleaf, \LaTeX
Platforms	Linux, Ubuntu, ROS, Windows, Arduino, Raspberry