

# Milton O. Candela-Leal

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[miltoncandela.github.io](https://miltoncandela.github.io)

## EDUCATION

- Tecnológico de Monterrey** - Monterrey, Mexico 2020 - Dec 2024  
BS in Biomedical Engineering  
- Highest honors (*Summa Cum Laude*) and highest award for co-curricular success (*Excellence Diploma*); *Borrego de Oro* in professional development.
- International Baccalaureate** - Monterrey, Mexico 2018 - 2020  
Math HL, Psychology SL, Physics SL, ...

## RESEARCH EXPERIENCE

- NSF IUCRC BRAIN Center, Tecnológico de Monterrey** Monterrey, Mexico  
Research Assistant Mar 2021 - Jul 2023, Fall 2024  
Advisor: Prof. Mauricio A. Ramírez-Moreno, PhD  
Projects: Biometrics (EEG, ECG, CV) and Machine Learning to predict:  
Mental fatigue (2021); engineering interest (2021); emotion (2023).  
- Force prediction through pose estimation keypoints and RNN (2022).  
- Cognitive load in chess (2023); closed-loop BCI for attention (2024).
- Boston Children's Hospital, Harvard Medical School** Boston, MA, USA  
Research Intern Aug 2023 - Jul 2024  
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.
- NSF IUCRC BRAIN Center, University of Houston** Houston, TX, USA  
Research Intern Spring 2022  
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.**, ... Ramirez-Mendoza, R.A. (2022). Current and Future Biometrics: Technology and Applications. In R.A. Ramirez-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

- Ramírez-Arceo, G.A., **Candela-Leal, M.O.**, Tudon-Martinez, J.C., ... Lozoya-Santos, J.J. (*accepted*). Innovative Spaces with Advanced Technologies such as Research Activity Simulators for Engineering Education. In *16<sup>th</sup> EDUCON*. London, United Kingdom: IEEE

- 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 15<sup>th</sup> 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 Future of Educational Innovation-Workshop Series: Data in Action (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 Proceedings of the 6<sup>th</sup> International Conference on Industrial Engineering and Operations Management (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 Machine Learning-Driven Digital Technologies for Educational Innovation Workshop (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 Machine Learning-Driven Digital Technologies for Educational Innovation Workshop (pp. 26-33). Monterrey, Mexico: IEEE. doi:[10.1109/IEEECONF53024.2021.9733770](https://doi.org/10.1109/IEEECONF53024.2021.9733770)

## INVITED TALKS

- |  |      |
|--|------|
| Decoding Cognitive Performance: From Chess Puzzles to STEM Classrooms,<br><u>Cognitive Neuroscience minor, Tecnológico de Monterrey - School of Humanities and Education</u> | 2024 |
| Computer Vision and Facial Recognition,<br><u>Computing Seminar</u> course, UANL - School of Physics and Mathematics   | 2023 |

## SELECTED PRESENTATIONS

### Oral Presentations

- |   |      |
|---|------|
| Digital Twins in Education: Enhancing Student Well-being and Academic Performance with Biometric Insights and Machine Learning. <i>U21 Health Sciences Group 2024 Annual Meeting</i> , Amsterdam University Medical Centers (Amsterdam, Netherlands) ( <b>student speaker award</b> ) | 2024 |
| High-resolution Fetal Subplate Automatic Segmentation. <i>FNNDSC Research Symposium</i> , Boston Children's Hospital (Boston, MA)   | 2024 |
| CHD Fetal Brain Analysis using Combined Quantitative MRI Features and Custom-build Loss Functions. <i>FNNDSC Research Symposium</i> , Boston Children's Hospital (Boston, MA)   | 2024 |
| Biomechanics for the Digital Twin of Performance: Study Cases. <i>Conscious Technologies for Smart Communities Workshop</i> (Virtual)   | 2021 |
| <i>Harry Potter and the Prisoner of Azkaban</i> (2004), a Cultural and Ideological Instructor of the Millennial Viewer. <i>51<sup>th</sup> Research and Development Congress</i> (Virtual)  | 2021 |

### Poster Presentations

- |   |      |
|---|------|
| FALCONS: Fetal Automatic Landmark Computation and Optimization for Neuroimaging Segmentation. <i>27<sup>th</sup> International Conference on MICCAI</i> (Marrakesh, Morocco)            | 2024 |
| Real-time Dual-feature Mental Fatigue State SVM Classification using EEG Delta Bandpower. <i>19<sup>th</sup> IEEE-EMBS International Conference on BSN</i> , MIT Media Lab (Boston, MA) | 2023 |
| Biometric Cabin for Neurohumanities Lab. <i>NSF IUCRC BRAIN 2023 Annual Meeting</i> , Arizona State University (Phoenix, AZ)  | 2023 |
| Digital Twin modeling for Human Biomechanics and Office Spaces. <i>NSF IUCRC BRAIN 2022 Annual Meeting</i> , University of Houston (Houston, TX)  | 2022 |
| Brain on Acting: Neural Dynamics of Actor-Actor Dyads During an Acted Scene. <i>NSF IUCRC BRAIN 2022 Annual Meeting</i> , University of Houston (Houston, TX)                           | 2022 |
| Identifying Engineering Interest in Children through Machine Learning using Biometric Signals. <i>43<sup>rd</sup> Annual Conference of the IEEE-EMBS</i> (Virtual)                      | 2021 |
| Digital Twin of Biomechanics: Joint Force Prediction using Video and AI. At the <i>NSF IUCRC BRAIN 2021 Annual Meeting</i> (Virtual)  | 2021 |

## HONORS AND AWARDS

<b>Summa Cum Laude</b> , Tecnológico de Monterrey	2024
- Highest academic honors (top 2 in the graduating class).	
<b>Excellence Diploma</b> , Tecnológico de Monterrey	2024
- Highest award for co-curricular and academic excellence.	
<b>Borrego de Oro</b> , Tecnológico de Monterrey	2024
- Top graduate in professional development, among ~1,500 Fall 2024 graduates.	
<b>International Diploma</b> , Tecnológico de Monterrey	2024
- Global leadership and multilingual excellence through academic achievements.	
<b>Student Speaker Award</b> , U21 Health Sciences Group	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.	
<b>Outstanding Student Award</b> , Tecnológico de Monterrey	2023, 2024
- 1% of all engineering students with the most outstanding trajectories [80/8000].	
1 <sup>st</sup> Place - Undergraduate Student Paper Competition, 6 <sup>th</sup> North American IEOM	2021
1 <sup>st</sup> Place - R&D Improvement Proposals (\$250 USD), 18 <sup>th</sup> Conexión Tec	2021
<b>Academic Talent Scholarship</b> , Tecnológico de Monterrey	2020

## TEACHING

German A2 Teacher, Mentoora 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

## PRESS

(Spanish) Conecta: <a href="#">Of gold! Monterrey campus graduates acknowledged for holistic formation</a>	2024
(Spanish) Conecta: <a href="#">They receive recognition for their AI learning project and take it to Amsterdam!</a>	2024
(English) NSF IUCRC BRAIN: <a href="#">BRAIN Center Spring Newsletter</a> (pp. 4, 9-10)	2023

## SKILLS SUMMARY

<b>Languages</b>	Python (3 years), R (2 years), MATLAB (1 year), Shell (3 months), SQL (3 months) English (C1), German (B1), Spanish
<b>Frameworks</b>	Numpy, Scipy, Pandas, Matplotlib, Scikit-learn, OpenCV, TensorFlow, Keras, BrainFlow FreeSurfer, FSL, MRtrix3, NiBabel, ANTs, PyDicom, IRTK, NUC, TorchIO, MNE, OSC Lattice, Dplyr, TidyR, Caret, GA, Ggplot, Shiny
<b>Tools</b>	Git, Anaconda, CUDA, CMake, Tableau, Microsoft Excel, G*Power, Overleaf, $\text{\LaTeX}$
<b>Platforms</b>	Linux, Ubuntu, ROS, Windows, Arduino, Raspberry