

# Milton O. Candela-Leal

milton\_candela@hotmail.com

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

## 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

## RESEARCH EXPERIENCE

**MIT Media Lab** - Boston, MA, USA Summer 2024  
*Massachusetts Institute of Technology*  
Advisor: Samantha Chan, PhD  
Project: EEG slow wave brain analysis for sleep quality improvement.

**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.

**Tecnológico de Monterrey** - Monterrey, Mexico Mar 2021 - Jul 2023  
*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.

**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*

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

**Candela-Leal, M.O.**, Lozoya-Santos, J.J., Ramírez-Moreno, M.A. (*accepted*). Task Completion Time Estimation via EEG Theta Bandpower during Chess-Based Problem-Solving. In *IEEE-EMBS BHI*. Houston, TX: 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 3<sup>rd</sup> FEI-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 6<sup>th</sup> 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 1<sup>st</sup> FEI-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 1<sup>st</sup> FEI-WS (pp. 26-33). Monterrey, Mexico: IEEE. doi:[10.1109/IEEECONF53024.2021.9733770](https://doi.org/10.1109/IEEECONF53024.2021.9733770)

## INVITED TALKS

Digital Twins in Education, U21 HSG, Amsterdam UMC - Faculty of Medicine ( <b>speaker travel award</b> )	2024
Computer Vision and Facial Recognition, Computing Seminar, UANL - School of Physics and Mathematics	2023

## CONFERENCE PRESENTATIONS

### Oral Presentations

27 <sup>th</sup> <u>International</u> Conference on MICCAI	(Marrakesh, Morocco)	2024
FNNDSC Research Symposium	(Boston, MA)	2024
Conscious Technologies for Smart Communities Workshop	(Virtual)	2021
51 <sup>th</sup> Research and Development Congress	(Virtual)	2021

### Poster Presentations

SACNAS NDiSTEM <u>International</u> Conference	(Phoenix, AZ)	2024
19 <sup>th</sup> IEEE-EMBS <u>International</u> Conference on BSN	(Boston, MA)	2023
NSF BRAIN Summer Annual IAB Meeting	(Phoenix, AZ)	2023
BMEX: Engineering and Health Sciences Symposium	(Monterrey, Mexico)	2023
21 <sup>st</sup> Expo Ingenierías at Conexión Tec	(Monterrey, Mexico)	2023
NSF BRAIN Summer Annual IAB Meeting	(Houston, TX)	2022
19 <sup>th</sup> & 20 <sup>th</sup> Expo Ingenierías at Conexión Tec	(Monterrey, Mexico)	2022
43 <sup>rd</sup> Annual <u>International</u> Conference of the IEEE-EMBS	(Virtual)	2021
17 <sup>th</sup> & 18 <sup>th</sup> Expo Ingenierías at Conexión Tec	(Virtual)	2021

## HONORS AND AWARDS

Student Speaker Travel Award (\$1600 USD) - <i>U21 Health Sciences Group</i>	2024
Outstanding Student Award (top 1% engineering trajectories) - <i>Tecnológico de Monterrey</i>	2023
1 <sup>st</sup> Place - Undergraduate Student Paper Competition - <i>6<sup>th</sup> North American IEOM</i>	2021
1 <sup>st</sup> Place - R&D Improvement Proposals (\$250 USD) - <i>18<sup>th</sup> Conexión Tec</i>	2021
Academic Talent Scholarship - <i>Tecnológico de Monterrey</i>	2020

## TEACHING

German A2 Teacher - <i>Mentoor</i>	2022-2024
Middle School Math and Spanish Teacher - <i>Aprendamos Juntos</i>	2021-2022
Independent High School Physics Teacher	Fall 2019
FIRST® LEGO® League Mentor - <i>Little Minds</i>	Spring 2019

## SKILLS SUMMARY

<b>Languages</b>	Python (3 years), MATLAB (2 years), R (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 Lattice, Dplyr, TidyR, Caret, GA, Ggplot, Shiny FreeSurfer, FSL, MRtrix3, NiBabel, ANTs, PyDicom, IRTK, NUC, TochIO
<b>Tools</b>	Git, Anaconda, CUDA, CMake, Tableau, Microsoft Excel, G*Power, Overleaf, $\LaTeX$
<b>Platforms</b>	Linux, Ubuntu, ROS, Windows, Arduino, Raspberry