

# Milton O. Candela-Leal

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

## EDUCATION

- Tecnológico de Monterrey** - Monterrey, Mexico Aug 2020 - Dec 2024  
BS in Biomedical Engineering (94.5/100 = 3.8/4.0 GPA)
- International Baccalaureate** - Monterrey, Mexico Aug 2018 - May 2020  
Math HL, Psychology SL, Physics SL, ...  
Thesis: [Film & Psychology] *Harry Potter and the Prisoner of Azkaban* (2004), a Cultural and Ideological Instructor of the Millennial Viewer

## RESEARCH EXPERIENCE

- Boston Children's Hospital** - Boston, MA, USA Aug 2023 - Jul 2024  
*Harvard Medical School*  
Advisor: Kiho Im, PhD  
Projects: Fetal MRI subplate segmentation (attention U-Net), non-linear qMRI for congenital heart disease classification, VAE-GAN for anomaly detection.
- NSF IUCRC BRAIN Center** - Monterrey, Mexico Mar 2021 - Jul 2023  
TMX BRAIN Site - *Tecnológico de Monterrey*  
Advisor: 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 via OpenPose human predicted keypoints and RNN.
- NSF IUCRC BRAIN Center** - Houston, TX, USA Spring 2022  
UH BRAIN Site - *University of Houston*  
Advisor: Jose L. Contreras-Vidal, PhD  
Projects: EEG Functional Connectivity and bispectrum analysis between actors.

## JOURNAL ARTICLES

(† indicates equal contribution)

- Blanco-Ríos, M.A.†, **Candela-Leal, M.O.**†, Orozco-Romo, C., Remis-Serna, P., ... 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. PMID: 38545515. doi:[10.3389/fnhum.2024.1319574](https://doi.org/10.3389/fnhum.2024.1319574)
- Candela-Leal, M.O.**, Gutiérrez-Flores, E.A., Presbítero-Espinosa, G., Sujatha-Ravindran, A., ... 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.**, Alanis-Espinosa, M., ... 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. PMID: 34831645. doi:[10.3390/ijerph182211891](https://doi.org/10.3390/ijerph182211891)
- Candela-Leal, M.O.**, Alanis-Espinosa, M., Murrieta-González, J., Lozoya-Santos, J.J., & Ramírez-Moreno, M.A. (submitted). Neurocognitive Insights into STEM Learning: An Integrated Analysis of Bandpower and Functional Connectivity among Youth. *Thinking Skills and Creativity*

## BOOK CHAPTERS

- Lozoya-Santos, J.J., Ramírez-Moreno, M.A., Diaz-Armas, G.G., **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, L.M. Alonso-Valerdi, ... 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.

## INVITED TALKS

- Candela-Leal, M.O.** (2023, April). Computer Vision and Facial Recognition. Presented to Senior Undergraduate Computer Science Students in *Computing Seminar* at the Universidad Autónoma de Nuevo León (UANL), Monterrey, Mexico

## CONFERENCE PROCEEDINGS

- Candela-Leal, M.O.**, Aguilar-Herrera, A.J., Ramírez-Moreno, M.A., Félix-Herrán L.C., ... Lozoya-Santos, J.J. (2024). Conscious Technologies Projects as a Hub for Real Life Challenges in Engineering Education. *15<sup>th</sup> Global Engineering Education Conference (EDUCON)*. Kos, Greece: IEEE
- Candela-Leal, M.O.**, Martínez-Díaz, D., Orozco-Romo, C., Aguilar-Herrera, A.J., ... Ramírez-Moreno, M.A. (2023). Biomechanics Digital Twin: Markerless Joint Acceleration Prediction Using Machine Learning and Computer Vision. In *2023 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., Abrego-Ramos, R., ... Lozoya-Santos, J.J. (2021). Real-time Biofeedback System for Interactive Learning using Wearables and IoT. In *6<sup>th</sup> North American Industrial Engineering and Operations Management (IEOM)* (pp. 2959-2970). Monterrey, Mexico: IEOM (**best undergrad paper**). doi:[10.46254/NA06.20210487](https://doi.org/10.46254/NA06.20210487)
- Olivas-Martínez, G., **Candela-Leal, M.O.**, Ocampo-Alvarado, J.C., Acosta-Soto, L.F., ... Ramírez-Moreno, M.A. (2021). Detecting Change in Engineering Interest in Children through Machine Learning using Biometric Signals. In *2021 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.**, Olivas-Martinez, G., ... Ramirez-Mendoza, R.A. (2021). Advanced Learner Assistance System's (ALAS) recent results. In *2021 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)

## SELECTED CONFERENCE PRESENTATIONS

- Candela-Leal, M.O.**, Lemus-Aguilar, M., Mondragon-Estrada, E., Hereida-Marin, I.B., ... Im, K. (2024, March). High-resolution Fetal Subplate Automatic Segmentation. **Oral presentation** at the *Fetal Neonatal Neuroimaging and Developmental Science Center (FNNDSC) Research Symposium*, Boston, MA
- Esparza-Esparza, S.A., **Candela-Leal, M.O.**, Yun, H.J., Grant, P.E., Im, K. (2024, March). CHD Fetal Brain Analysis using Combined Quantitative MRI Features and Custom-build Loss Functions. **Oral presentation** at the *Fetal Neonatal Neuroimaging and Developmental Science Center (FNNDSC) Research Symposium*, Boston, MA
- Candela-Leal, M.O.**, Lozoya-Santos, J.J., & Ramírez-Moreno, M.A. (2023, October). Real-time Dual-feature Mental Fatigue State SVM Classification using EEG Delta Bandpower [Poster #35]. **Poster presentation** at the *19<sup>th</sup> IEEE-EMBS International Conference on Body Sensor Networks (BSN)*, Boston, MA

## HONORS AND AWARDS

Outstanding Student Award (top 1% best engineering trajectories)	2023
1 <sup>st</sup> Place - Research and Improvement Proposals at 18 <sup>th</sup> Conexión Tec	Fall 2021
1 <sup>st</sup> Place - Undergraduate Student Paper Competition at 6 <sup>th</sup> NA IEOM	2021
Scholarship for Academic Talent - <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 FSL, FreeSurfer, MRtrix3, ANTs, NiBabel, PyDicom, IRTK
<b>Tools</b>	Git, Anaconda, CUDA, cuDNN, Tableau, Microsoft Excel, Overleaf, $\LaTeX$
<b>Platforms</b>	Linux, Ubuntu, ROS, Windows, Arduino, Raspberry