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, ...
Thesis: [Film & Psychology] *Harry Potter and the Prisoner of Azkaban* (2004), a Cultural and Ideological Instructor of the Millennial Viewer

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 bisprectrum 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

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. PubMed PMID: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

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. PubMed PMID: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 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

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

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

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

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

Invited Talks

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

Oral Presentations

Digital Twins in Education: Enhancing Student Well-being and Academic Performance with Biometric Insights and Machine Learning. At the *U21 Health Sciences Group 2024 Annual Meeting*, Amsterdam University Medical Centers, Amsterdam, Netherlands **(student speaker award)** 2024

High-resolution Fetal Subplate Automatic Segmentation. At the *FNNDSC Research Symposium*, Boston, MA 2024

CHD Fetal Brain Analysis using Combined Quantitative MRI Features and Custom-build Loss Functions. At the *FNNDSC Research Symposium*, Boston, MA 2024

Biomechanics for the Digital Twin of Performance: Study Cases. At the *Conscious Technologies for Smart Communities Workshop*, Virtual 2021

Harry Potter and the Prisoner of Azkaban (2004), a Cultural and Ideological Instructor of the Millennial Viewer. At the *51th Research and Development Congress*, Virtual 2021

Poster Presentations

FALCONS: Fetal Automatic Landmark Computation and Optimization for Neuroimaging Segmentation. At the *27th Conference on MICCAI*, Marrakesh, Morocco 2024

Real-time Dual-feature Mental Fatigue State SVM Classification using EEG Delta Bandpower. At the *19th IEEE-EMBS Conference on BSN*, Boston, MA 2023

Talent Detection Tool for Early Engineering Education. At the *NSF IUCRC BRAIN 2023 Annual Meeting*, Arizona State University, Phoenix, AZ 2023

Human Machine Interface for Fleet Electric Vehicles. At the *NSF IUCRC BRAIN 2023 Annual Meeting*, Arizona State University, Phoenix, AZ 2023

Biometric Cabin for Neurohumanities Lab. At the *NSF IUCRC BRAIN 2023 Annual Meeting*, Arizona State University, Phoenix, AZ 2023

Digital Twin modeling for Human Biomechanics and Office Spaces. At the *NSF IUCRC BRAIN 2022 Annual Meeting*, University of Houston, Houston, TX 2022

Brain on Acting: Neural Dynamics of Actor-Actor Dyads During an Acted Scene. At the *NSF IUCRC BRAIN 2022 Annual Meeting*, University of Houston, Houston, TX 2022

Identifying Engineering Interest in Children through Machine Learning using Biometric Signals. At the *43rd Annual Conference of the IEEE-EMBS*, Virtual 2021

ALAS: Advanced Learner Assistance System for Engineering Education using Wearable Sensors. At the *43rd Annual Conference of the IEEE-EMBS*, Virtual 2021

Digital Twin of Biomechanics: Joint Force Prediction using Video and AI. At the *NSF IUCRC BRAIN 2021 Annual Meeting*, 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
1st Place - Undergraduate Student Paper Competition	6th North American IEOM	2021
1st Place - R&D Improvement Proposals ($250 USD)	18th 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