**Luis David Davila**

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**Education**

**University of Texas at El Paso**

* M.S. in Computational Science **Graduation:** Aug 2025
* B.S. in Computer Science with Concentration in Data Analytics **Graduation:** May 2023

**Research Experience**

***Spike sorting with dimension selection selection-based algorithm* (2024-2025)**

<https://github.com/lddavila/clustering_neuron_spikes_with_deep_learning>

* Designed 10 deep learning models to rate the quality of neuron identification using image processing which ranging from 70-92% accurate
* Added parallel processing to an existing algorithm increasing algorithm speed by up to 3900%
* Developed a novel algorithm to identify 99% of neurons on simulated recordings

***A Decision-Space Model Explains Context-Specific Decision-Making* (2024-2025)**

<https://github.com/dirkbeck/DM_space_model>

* Trained a Wiener Process model to simulate mice decision making
* Created a method to measure the difficulty of task which contributed to the findings of the paper

***Computational Primitives for Cost-Benefit Decision-Making* (2023-2024)** [*https://github.com/lddavila/human\_dec\_making*](https://github.com/lddavila/human_dec_making)

* Discovered a method of identifying behavior differences between male and female rats which is featured in the paper

***RECORD …* (2020-2024)** <https://github.com/lddavila/UTEP-Brain-Computation-Lab-Remote-Databases-and-Serendipity-App>

* Developed a custom desktop application to parse 200,000+ trials of experiments data
* Built a database using PostgreSQL to house 500+ gigabytes of experiment data

***Microsoft Research Internship* (2022-2022)** [*https://github.com/kseverso/als-disease-progression/tree/main*](https://github.com/kseverso/als-disease-progression/tree/main)

* Used Scikit-Learn’s random forest model to predict the progression of Amyotrophic Lateral Sclerosis in patients to prove

**Publications**

1. **Luis D**.#; Ibanez-Alcala, Rodrigo J.#; Salcido, Macias, Andrea Y.#; Alexis A.#; Reyes, Neftali F.; Batson, Serina A.#; Negishi, Kenichiro#; Giri, Atanu#; Davila, Heaton, Cory N.#; Beck, Dirk W.#; Rakocevic, Lara I.#; Moschak, Travis M., Goosens, Ki A.; Friedman, Alexander. Spike sorting with dimension selection based clustering algorithm. In preparation Communication Biology-invited
2. Ibáñez Alcalá RJ, Beck DW, Salcido AA, **Davila LD**, Giri A, Heaton CN, Villarreal Rodriguez K, Rakocevic LI, Hossain SB, Reyes NF, Batson SA, Macias AY, Drammis SM, Negishi K, Zhang Q, Umashankar Beck S, Vara P, Joshi A, Franco AJ, Hernandez Carbajal BJ, Ordonez MM, Ramirez FY, Lopez JD, Lozano N, Ramirez A, Legaspy L, Cruz PL, Armenta AA, Viel SN, Aguirre JI, Quintanar O, Medina F, Ordonez PM, Munoz AE, Martínez Gaudier GE, Naime GM, Powers RE, O'Dell LE, Moschak TM, Goosens KA, Friedman A. RECORD, a high-throughput, customizable system that unveils behavioral strategies leveraged by rodents during foraging-like decision-making. Commun Biol. 2024 Jul 6;7(1):822. doi: 10.1038/s42003-024-06489-8. PubMed PMID: 38971889; PubMed Central PMCID: PMC11227549. Featured by NSF <https://new.nsf.gov/news/making-strides-understanding-decision-making>
3. Dirk W. Beck, Cory N. Heaton, **Luis D. Davila,** Lara I. Rakocevic, Sabrina M. Drammis, Danil Tyulmankov, Paulina Vara, Atanu Giri, Shreeya Umashankar Beck, Qingyang Zhang, Michael Pokojovy, Kenichiro Negishi, Serina A Batson, Alexis A. Salcido, Neftali F. Reyes, Andrea Y. Macias, Raquel J. Ibanez-Alcala, Safa B. Hossain, Graham L. Waller, Laura E. O’Dell, Travis M. Moschak, Ki A. Goosens, Alexander Friedman. A Decision-Space Model Explains Context-Specific Decision-Making. Will be featured by NSF. doi: <https://doi.org/10.1101/2024.07.29.605535>
4. Giri A, Heaton CN, Batson SA, Macias AY, Reyes NF, Salcido AA, **Davila LD (co-first)**, Rakocevic LI, Beck DW, Ibañez Alcalá RJ, Hossain SB, Vara P, Drammis SM, Negishi K, O'Dell LE, Rosales AE, Moschak TM, Goosens KA, Friedman A. Effect of acute alcohol consumption in a novel rodent model of decision-making. Alcohol Alcohol. 2025 Mar 25;60(3):agaf017. doi: 10.1093/alcalc/agaf017. PMID: 40229991.
5. Lara I. Rakocevic#, **Luis D. Davila (co-first),** Cory N. Heaton#, Dirk W. Beck#, Raquel J. Ibanez-Alcala#, Safa B. Hossain#, Neftali F. Reyes#, Andrea Y. Macias#, Alexis A. Salcido#, Danil Tyulmankov#, Serina A. Batson#, Sabrina M. Drammis#, Kenichiro Negishi#, Paulina Vara#, Atanu Giri, Sofia M. Gutierrez#, Travis M. Moschak, Ki A. Goosens, Alexander Friedman Computational Primitives for Cost-Benefit Decision-Making.

https://www.biorxiv.org/content/10.1101/2024.12.09.627657v1

Nature under review

1. Salcido, Alexis A.#; Reyes, Neftali F.; Batson, Serina A.#; Macias, Andrea Y.#; Negishi, Kenichiro#; Hossain, Safa B.#; Giri, Atanu#; **Davila, Luis D. (co-first);** Heaton, Cory N.#; Ibanez-Alcala, Rodrigo J.#; Beck, Dirk W.#; Rakocevic, Lara I.#; Villarreal Rodriguez, Kryssia#; Joshi, Arnav#; Hernández, Bianca#; Ordonez, Miguel#; Armenta, Abril#; Quintanar, Odalys#; Medina, Fernanda#; Ordonez, Pablo#; O'Dell, Laura E., Moschak, Travis M., Goosens, Ki A.; Friedman, Alexander. Striosome Ghrelin interaction mediates cost-benefit decision-making state. Cell-invited.
2. Ibanez-Alcala, Rodrigo J.#; **Luis D**. (co-first); Salcido, Macias, Andrea Y.#; Alexis A.#; Reyes, Neftali F.; Batson, Serina A.#; Negishi, Kenichiro#; Giri, Atanu#; Davila, Heaton, Cory N.#; Beck, Dirk W.#; Rakocevic, Lara I.#; Moschak, Travis M., Goosens, Ki A.; Friedman, Alexander. Implant for long-term electrophysiological recordings using multiple neuropixel probes. In preparation Communication Biology-invited.

**Skills**

* *Programing Languages*: Java, C++, C, Python, MATLAB, PostgreSQL, SQL
* *Machine/Deep Learning Frameworks*: MATLAB Deep Learning Toolbox, PyTorch, TensorFlow/Keras
* *Data Handling/Visualization*: Pandas, SQL, PostgreSQL, matplotlib
* Other Tools**:** GitHub, VS Code, Jupyter