# Julio Cesar Enciso-Alva

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## GENERAL SKILLS

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|---|---|
| Programming | Matlab, R, Python, C++, MySQL |
| Software | GNU Linux, MS Office, Git, Jupyter, LaTeX, Tableau, ggplot |
| Research Areas | Constrained Optimization, Inverse Problems, Medical Signal Analysis, Bayesian Hierarchical Models |
| Languages | English, Spanish, German |
| Miscellanea | Graphic Design, Latino American Studies |

## EDUCATION

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|---|---|---|
| 2019 – 2024 | **PhD, General Mathematics** | UT Arlington, Texas, USA |
| 2023 | **Masters-in-passing, General Mathematics** | UT Arlington, Texas, USA |
| 2012 – 2018 | **BS, Applied Mathematics + Biology** | UAEH, Hidalgo, Mexico |

## ACADEMIC APOINTMENTS

2019 – 2024 **Graduate Teaching Assistant** UT Arlington

- Taught multiple college-level classes as either Lab Instructor or Instructor of Record.
- Showed applications of mathematics by using example problems related to different majors.
- Adapted lectures to format during COVID-19 Pandemic.

2021 – 2023 **Graduate Peer Mentor** UT Arlington

- Guided first-year fellow graduate students, until they selected a research advisor.
- Co-supervised integration of fellow students to duties as Lab Instructors.
- Co-trained fellow students for Preliminary Examinations, obtaining a passing grade.

2020 – 2023 **Officer at SIAM Graduate Chapter at UT Arlington**

- Served as Vice-president (2020 – 2021) and as President (2020 – 2023).
- Coordinated a monthly seminar for alumni and professors.
- Directed review sessions for midterm exams as a fundraiser activity.
- Initiated a department-wide research symposium.

Aug 2023 **Assessment of Core Curriculum** UT Arlington

- Served as rater in the assessment of core curriculum objectives.
- Deidentified works from students were graded to investigate consistency.

## COURSES TAUGHT

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|---|---|---|
| Fall 2019 | **MATH 1301 Contemporary Mathematics** | |
| | Instructor of Record; 2 sections, 101 students. | |
| Sum 2020 | **MATH 1421 Preparation for Calculus** | |
| | Lab Instructor; 1 section, 35 students. | |
| Fall 2020 | **MATH 1301 Contemporary Mathematics** | |
| | Instructor of Record; 2 sections, 95 students. | |
| Sum 2021 | **MATH 1301 Contemporary Mathematics** | |
| | Instructor of Record; 1 section, 8 students. | |
| Fall 2021 | **MATH 1301 Contemporary Mathematics** | |
| | Instructor of Record; 2 sections, 93 students. | |
| Spr 2022 | **MATH 1315 College Algebra for Economics and Business** | |
| | Instructor of Record; 1 section, 52 students. | |
| Sum 2022 | **MATH 1316 Calculus for Economics and Business** | |
| | Instructor of Record; 1 section, 52 students. | |
| Fall 2022 | **MATH 1421 Preparation for Calculus** | |
| | Lab Instructor; 2 sections, 59 students. | |
| Sum 2023 | **MATH 1316 Calculus for Economics and Business** | |
| | Instructor of Record; 1 section, 13 students. | |
| Fall 2023 | **MATH 1316 Calculus for Economics and Business** | |
| | Instructor of Record; 1 section, 64 students. | |

* Number of students corresponds to the rooster at time of the Final Exam.

## RESEARCH PROJECTS

Electrical Source Imaging (ESI) is a family of methods for estimating the location of neural electrical sources inside the brain, based on recordings from electrodes located either at the scalp (EEG), brain cortex (ECoG), or stylets inside the brain (SEEG). Applications of ESI include non-invasive detection of epileptogenic zones.

Electrode recordings are known to have a high resolution in time and a poor resolution in space, and ESI inherits these characteristics. The inclusion of additional modalities of data, such as fMRI, could be integrated in the ESI formulation to increase its resolution, speed, and robustness to noise.

Novel applications of ESI include Virtual Electrodes (VEs): estimates for recordings from inserted electrodes which are computed from ESI data. VEs are relatively inexpensive and non-intrusive in comparison with inserted electrodes, and their characteristics and limitations are similar as the data modalities they're based on.

My current research is focused on generating better multi-modal ESI methods, optimized for clinical applications and its requirements –better resolution, more robustness to noise, improved speed, etc.

Past research projects are listed below:

- Novel ESI methods with regional Bayesian priors, with applications to Virtual Electrodes.
- Evaluation of fMRI-informed EEG-based ESI techniques.
- Validation of ESI techniques from ECoG data in a pig model.
- ESI from EEG during epilepsy on infants.

## HONORS

Apr 2023 **Outstanding Graduate Student Researcher** UT Arlington

## PUBLICATIONS

- Enciso-Alva JC, Dobariya A, Johnson TE, Mickey B, Pascual JM, Su J.
  **(in review). A Robust ECoG Source Localization Method Using Brain Data Analytics Validated by Pig Intracerebral Recordings.**
  *NeuroImage*. Manuscript number: NIMG-23-1554
- Rajasekaran K, Ma Q, Good LB, Kathote G, Jakkamsetti V, Liu P, Avila A, Enciso-Alva JC, Markussen KH, Marin-Valencia I, Sirsi D, Hacker PMS, Gentry MS, Su J, Lu H, Pascual, JM.
  **(2022). Metabolic modulation of synaptic failure and thalamocortical hypersynchronization with preserved consciousness in Glut1 deficiency.**
  *Science Translational Medicine*, 14(665), eabn2956. DOI: 10.1126/scitranslmed.abn295
- Rosales-Lagarde A, Rodriguez-Torres EE, Itzá-Ortiz BA, Miramontes P, Vázquez-Tagle G, Enciso-Alva JC, García-Muñoz V, Cubero-Rego L, Pineda-Sánchez JE, Martínez-Alcalá CI, Lopez-Noguerola JS.
  **(2018). The Color of Noise and Weak Stationarity at the NREM to REM Sleep Transition in Mild Cognitive Impaired Subjects.**
  *Frontiers in Psychology*, 9, 1205. DOI: 10.3389/fpsyg.2018.01205

## ACADEMIC PRESENTATIONS (SELECTED)

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|---|---|---|
| Jan 2024 | Joint Mathematics Meetings (JMM) | San Franciso, CA |
| | [Talk] New Methods in EEG Source Localization based on EEG and Post-Mortem Pathology Data. | |
| Nov 2023 | Mathposium Fair, UT Arlington | Arlington, TX |
| | [Poster] New Methods in EEG Source Localization based on EEG and Post-Mortem Pathology Data. | |
| Jun 2023 | AIMS Conference on Dynamical Systems, Diff. Equations and Applications | Wilmington, NC |
| | [Poster] Evaluation of Methods for fMRI-Informed Electrical Source Reconstruction from EEG | |
| Jan 2023 | Joint Mathematics Meetings (JMM) | Boston, MA |
| | [Talk] Evaluation of Methods for fMRI-Informed Electrical Source Reconstruction from EEG | |

*These presentations were possible thanks to awarded travel fundings, except for the one at UTA.

## LINK DUMP

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|---|---|
| **Personal site** | encisoalva.github.io |
| **LinkedIn** | www.linkedin.com/in/julio-enciso-alva |
| **GitHub** | github.com/EncisoAlva |
| **ORCiD** | orcid.org/0000-0002-8315-6849 |
| **G. Scholar** | scholar.google.com/citations?hl=en&user=qqw6kegAAAAJ |