

Julio Cesar Enciso-Alva, PhD

Applied Mathematician & Data Scientist

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EXECUTIVE SUMMARY

- Certified in data handling: maintenance, visualization, analysis, modeling, prediction, and decision making.
- Qualified to analyze, implement, and develop algorithms tailored for specific purposes.
- My definition of success is the practical capacity to help others.

KEY SKILLS

- Data engineering/analytics, math/statistical modeling, machine learning.
- Object oriented programming, data management.
- Interdisciplinary research, report generation, problem solving.
- People management, project development and deployment.
- Teaching and mentoring, diversity in higher education.
- Graphic design, publication-quality and educational purposes.
- **Programming:** Matlab, Python, R, C++, MySQL, MS Office macros.
- **Software:** GNU Linux, MS Office, Tableau, Git, Jupyter, LaTeX, ggplot2, GeoGebra.
- **Libraries:** Sci-kit, PyTorch, Tensorflow, CUDA, Shiny (R).

EDUCATION

- **[2024] PhD. in General Mathematics**
 - University of Texas at Arlington.
 - Arlington, Texas, USA.
 - **Thesis:** New Methods in EEG Source Localization based on EEG and Post-Mortem Pathology Data.
 - **[2019-2024]** Graduate Teaching Assistant.
 - **[2024]** Graduate Dissertation Fellowship.
 - **[2023]** Outstanding Graduate Student Researcher.
- **[2023] M.Sc. in General Mathematics**
 - University of Texas at Arlington.
 - Arlington, Texas, USA.
 - Degree awarded for credit completion.
- **[2017] B.S. in Applied Mathematics with minor in Biology**
 - Universidad Autónoma del Estado de Hidalgo.
 - Pachuca, Hidalgo, Mexico.
 - **Thesis:** Weak Stationarity in Polysomnography Recordings of Older Adults as a Marker for Mild Cognitive Impairment.

CERTIFICATIONS

- Meta Database Engineer Specialization.
- IBM Data Engineering Professional Certificate.
- Google Data Analytics Professional Certificate.
- IBM Data Analytics with Excel and R Professional Certificate.

WORKSHOPS

- Grant Development and Management Workshop for Hispanic Serving Institutions.
- Strategies for Planning, Developing, and Writing Large Center Proposals.

LEADERSHIP AND MENTORING

- Student Organization Officer.
 - Society for Industrial and Applied Mathematics (SIAM) Graduate Student Chapter at UT Arlington.
 - [2021-2022] President.
 - [2020-2021] Vice-President.
 - Managed a bi-weekly research seminar. Average attendance was 12 graduate students.
 - Established *Mathposium Fair*, a department-wide research symposium. Estimated attendance was 70 people in 2022 and 120 people in 2023.
- Graduate Peer Mentor.
 - Supervised integration of mentees into the PhD program.
 - Successfully trained mentees for Preliminary Exams in Analysis and Linear Algebra.
 - List of mentees:
 - Olusola Dehinsilu.
 - Enoch Jesse Dangbe.
 - Emran Hossen.
- Co-mentor at Research Experience for Undergrads.
 - NSF-funded collaboration between Tarrant County College and UT Arlington.
 - Trained mentees in algorithm development and Matlab programming.
 - **Research topic:** Measuring coherence of EEG recordings during a cognitive task.

PROFESSIONAL AFFILIATIONS

- SIAM, Society for Industrial and Applied Mathematics.
- AMS, American Mathematical Society.
- MAA, Mathematical Association of America.
- SACNAS, Society for the Advancement of Chicanos and Native Americans in Sciences.

COURSES TAUGHT

- [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.
 - Instructor of Record. 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 Final Exam.

RESEARCH PROJECTS (SELECTED)

Electrical Source Imaging (ESI) is a technique in Neuroscience to locate neural sources of electrical activity, which may be related to normal or pathological states –such as epilepsy.

Enhancement of ESI requires non-smooth Convex Optimization, Numerical Linear Algebra, and Probabilistic modeling of functional and anatomical data.

- Non-invasive monitoring of ictal activity in infants with Glut deficiency.
 - By using ESI, the use of intra-cranial electrodes was avoided resulting in a less invasive procedure.
 - Results were consistent with similar studies; thus, no loss of quality was introduced.
- Evaluation of Virtual Electrodes (VEs) from ESI data.
 - VEs are simulations of hypothetical electrodes inside the brain; they are constructed from ESI data.
 - Analysis of data from VEs and real Intra-cranial electrodes lead to equivalent conclusions ($p < 0.01$).
 - Modern formulation of VEs is a recent concept, our work was a pioneer in this sub-field.
- Enhancement of ESI using pathology data (stroke approximate location).
 - Localization error was reduced by 60% when compared to ESI methods with similar runtime.

PRESENTATIONS (SELECTED)

- [Jan 2024] Joint Mathematics Meetings (JMM).
 - San Francisco, 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.

PUBLICATIONS

- [Enciso-Alva JC](#), Dobariya A, Johnson TE, Mickey B, Pascual JM, Su J.
(submitted). A Robust ECoG Source Localization Method Using Brain Data Analytics Validated by Pig Intracerebral Recordings.
NeuroImage.
- 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.abn2956
- 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

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