Alberto Barradas

Cognitive Science Engineering and Behavioral Data Analyst (M. Sc.)

Graz, Austria

ORCID:0000-0001-6756-5485

English (Native)

Spanish (Native)

German (Working Prof.)

Esperanto (Working Prof.)

Skills

Linux 15+ yrs.

Neuroengineering 15+ yrs.

Scientific Programming 10+ yrs.

Distributed Scientific Computing 10+ yrs.

Data Analysis 8 yrs.

Machine Learning, Statistical Modeling 8 yrs.

Cognitive Experimental Design 7 yrs.

Generative AI 5 yrs.

Biography

Luis Alberto Barradas Chacón is a PhD candidate at the Technische Universität Graz: A Cognitive Scientist, with Data Analysis and Engineering backgrounds; a certified Mindfulness facilitator, and a member of the Mexican Society for Bio- and Neurofeedback, and the Mexican Biosignals Society. He is an Open Science Researcher in the field of Cognitive Science, with a focus on Cognitive Modeling. A wide range of interests and skills, as well as a professional network of scientific collaborators, Alberto's work is characterized by a strong interdisciplinary approach, combining knowledge from various fields such as neuroscience, psychology, computer science, and engineering, working together on remote locations with networks of Cognitive, Neuro, and Sports psychologists, Cognitive Scientists, and Engineers. For this reason, he is a strong advocate for Open Science, and the use of Open Source Software in scientific research. He has a passion for teaching and mentoring, and enjoys sharing his knowledge with others. He is particularly interested in working with interdisciplinary teams, where he can apply his skills and knowledge to solve complex problems. Alberto's scientific toolkit includes a wide range of skills and knowledge, such as experimental design, data analysis, software development, scientific Dev-Ops, AI-Ops, statistical modeling, machine learning, explicit knowledge management, electronic circuit design, biosignal recording, psychological and psychometric task evaluation, teaching, laboratory management and training, scientific communication, community engagement, and Open Science.

Since such a wide range of skills and knowledge is uncommon and difficult to imagine, here is a list of features Alberto can bring to a cognitive science laboratory, or a cognitive science project:

- **Experimental Design:** Using Pyschopy, enable the implementation of common cognitive experimental designs in high resolution, no software subscriptions for E-Prime or Presentation needed. A library of open source cognitive tasks is also available, including N-Back, Attentional Networks Task, Dual Task, Random Dot Motion Task, Face Oddball, and Five Facet Mindfulness Questionnaire.
- **Data Analysis:** Distributed, heterogenous, and high performance computing capabilities, enable the analysis of large datasets, online continuous recording, and real-time data analysis. Using open scientific programming initiatives like Julia and Numpy, enable data- and model-driven analysis of cognitive science data, including statistical modeling, machine learning, and generative AI techniques.
- **Cognitive Modeling:** Using open source libraries, enable the implementation of state of the art cognitive models, including Drift Diffusion Models, and Cognitive Architectures.
- **Software Development:** As a Linux maintainer, having Alberto in a team integrates the team to an international network of independent scientific software developers. This includes the knowhow of software development and NixOS package management, enabling the development of scientific software in a reproducible and maintainable way.
- **Distributed Scientific Computing:** As an administrator of several distributed computing clusters, and a personal swarm of servers, agents, and services, Alberto can provide the necessary infrastructure for distributed scientific computing, including high performance computing, cloud computing, and edge computing.
- **Scientific Dev-Ops:** The deployment and management of very specific scientific software stacks, including Local LLM servers, Scientific Knowledge Management Systems, Project Management Systems, and Software Development Environments that include the state-of-the-art open source scientific stack. Alberto uses technology similar to that developed at the Human Brain Project, and other similar large scale scientific projects, to enable the deployment and management of scientific software stacks in a reproducible and maintainable way.
- **AI-Ops:** With even the smallest computational resources, Alberto can provide the infrastructure for chatting locally about your documents and knowledge bases with Large Language Models, and other AI models, enabling tools like bibliometrics, scientific search tools, and specialized Prompt Engineering for scientific tasks.

Education

2020 - 2025 (expected)

Brain-Computer Interfaces/Cognitve Modeling (Ph.D.)

Graz University of Technology

Cognitive Modeling ▪ Affective Computing
Topic: „Cognitive Modeling for Affective Computing".

2017 - 2020

Data Analytics (M.Sc.)

University of Hildesheim

Natural Language Processing ▪ Affective Computing of Biosignals
Master's thesis: „Emotion Representation in Large Language Model Embeddings".

2014 - 2017

Information Systems (B.Sc.)

Natural Language Processing ▪ Artificial Intelligence
Bachelor's thesis: „Emotion Sonification in Social Networks".

Volunteering

- Volunteer Sysadmin at local religious center
- Co-organizer and promoter of OpenSpaces
- Member of the local hackerspace, focused on Fair Technology Transfer

Contact

- Graz, Austria
- abcsds@gmail.com
- Website
- github.com/abcsds
- Google Scholar
- ResearchGate

- **Explicit Knowledge Management:** For laboratories with implicit practices looking to transition to more scalable, reproducible, and maintainable practices, Alberto can provide the necessary infrastructure and personal training for explicit knowledge management, including documentation, version control, and project management systems, but also mindful attention and best practices for scientific development.
- **Electronic Circuit Design:** With basic knowledge but practical experience, Alberto can design and implement electronic sensors for laboratory use.
- **Biosignal Recording:** A wide range of biosignal devices has been managed by Alberto. Any EEG device, ECG, or Pupillometry device in the market can be maintained.
- **Psychological and Psychometric Task Evaluation:** Alberto can implement and evaluate standardized psychological and psychometric tasks, such as questionnaires, cognitive tasks, and other psychological assessments.
- **Teaching, Mentoring and Training:** Most common enabling implementations are Laboratory Onboardings, Statistics for Psychologists, Bibliometrics and Technology for Science.
- **Scientific Communication:** Alberto loves to talk about science, and will actively find opportunities to communitcate science to the public, as well as to other scientists.
- **Community Engagement:** As an active citizen of Graz, Alberto is in contact with local makers, hackers, artists, religious and social leaders, and other community members. Laboratories looking for local exposure, or industrial partners, can benefit from Alberto's community engagement skills.
- **Generative AI:** On top of Large Language Models and ChatAIs, Alberto has research experience in the training and use of generative AI models for cognitive science applications, enabling the use of AI generated faces of emotional expressions, and other cognitive science applications.

Work experience

Research Assistant | PhD student — **2020 - 2022**
Institute of Neural Engineering
Graz University of Technology

Duties included: Experimental Design, Data Analysis, Scientific Project Administration, Scientific Communication, Community Engagement, and Teaching.

Part-time Behavioral Data Analyst — **2018 - 2019**
Institute of General Psychology (Prof. Pamela Baess)
Hildesheim University

Duties included: Experimental Design Implementation, Technological development, Student Training, and Data Analysis.

Intern Data Analyst — **2016 - 2017**
Center for Neuroscience (Prof. Leticia Chacón)
LaSalle Bajío University

Duties included: Data Analysis for EEG, ECG, and physiological biosignals, as well as questionnaires.

Technology Consultant — **2015 - 2016**
School of Government and Public Transformation (Prof. Edgar Barroso)
Tecnológico de Monterrey

Duties included: Technological development for startups, as well as consulting for high profile decision makers.

Publications

- Barradas-Chacón, L. A., Sánchez Gamma, M. J., & Chacón Gutriérrez, L. (2025). "Mental Demand without brain signals: a practical approach to modeling the N-Back task". Poster presentation at the *International Conference on Cognitive Modeling (ICCM)*, 2025, Ohio, USA.
- Barradas-Chacón, L. A. (2025). "High Performance Computing for Dynamical Systems and Bayesian Estimation with On-Demand Computing Resources". Workshop for the *International Conference on Cognitive Modeling (ICCM)*, 2025, Ohio, USA.
- Barradas-Chacón, L. A., Brunner, C., & Wriessnegger, S. C. (2023). "Stylized faces enhance ERP features used for the detection of emotional responses". In: *Frontiers in Human Neuroscience*, 17, 1160800.
- Wriessnegger, S. C., Autengruber, L. M., Chacón, L. A. B., Pirker, J., & Safikhani, S. (2022, October). "The influence of visual representation factors on bio signals and its relation to Presence in Virtual Reality Environments". In *2022 IEEE International Conference on Metrology for Extended Reality, Artificial Intelligence and Neural Engineering (MetroXRAINE)* (pp. 199-204). IEEE.
- Barradas Chacon, L. A., Fedoskin, A., Shcheglakova, E., Neamsup, S., & Rashed, A. (2019). "Emotion analysis using heart rate data". In *Database and Expert Systems Applications: DEXA 2019 International Workshops BIOKDD, IWCFS, MLKgraphs and TIR*, Linz, Austria, August 26–29, 2019, Proceedings 30 (pp. 147-154). Springer International Publishing.

Open Source Projects

- **DFA.jl** - Detrended Fluctuation Analysis: a Julia package for the analysis of long-range correlations in time series.
  github.com/abcsds/DFA.jl
- **HRBand-LSL** - A high precission biosignal acquisition tool for heart rate data using Lab Streaming Layer.
  github.com/abcsds/HRBand-LSL
- **VizHRV** - A biosignal visualization tool for heart rate data using Makie.jl and Lab Streaming Layer.
  github.com/abcsds/VizHRV
- **DDMViz** - A visualization tool for the Drift Diffusion Model.
  github.com/abcsds/DDMViz
- **NBack** - A cognitive task for the assessment of working memory.
  github.com/abcsds/Nback
- **ANT** - Attentional Networks Task. A cognitive task for the assessment of attentional networks.
  github.com/abcsds/ANT
- **DualTask** - A cognitive task for the assessment of divided attention.
  github.com/abcsds/DualTask
- **RDM** - Random Dot Motion Task: A cognitive task for the assessment of perceptual decision making.
  github.com/abcsds/RDM
- **FFMQ** - A cognitive task for the digital assessment of mindfulness using the Five Facet Mindfulness Questionnaire.
  github.com/abcsds/FFMQ
- **FaceOddball** - An oddball cognitive task using faces as target stimuli.
  github.com/abcsds/FaceOddball