

HAMED GHANE

Control Engineer & Neurotech Researcher | Closed-Loop BCI and Neural Interfaces

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SUMMARY

Control engineer and neurotech researcher focused on real time closed loop systems at the software and hardware boundary. I design experiments, identify dynamics, build usable models, and deploy feedback or adaptive controllers that run on hardware under tight timing and safety constraints. My work spans multimodal EEG/ECG/EMG BCI and neural interfaces, robotics and mechatronics, satellite Control, and power electronics. Day to day I use Python and MATLAB, SIL and HIL when useful, and AI assisted workflows to turn ideas into robust, testable prototypes and reusable tools.

CORE TECHNICAL SKILLS

- Time-series ML: classification/regression, event detection, segmentation, temporal/sequence models; causal / streaming inference
- Biosignal processing (EEG/EMG/ECG): filtering, artifact handling, feature extraction (band power, envelope), source separation
- Real-time stacks: LSL integration, low-latency profiling, buffered & async I/O, online calibration/feedback
- Experiment design & stats: human-in-the-loop studies / psychophysics; GLM & mixed models; permutation/bootstraping; reproducible analysis
- Software & tools: Python (PyTorch, scikit-learn, NumPy/SciPy, pandas), MATLAB; Git
- Control & modelling: linear & nonlinear control, observers, system modelling/identification, HIL/SIL validation, real-time implementation

PROFESSIONAL EXPERIENCE

Research Associate - University of Glasgow

Apr 2024 - Present | Glasgow

- Built and maintain a modular closed-loop BCI stack (stimulus → acquisition → online inference) in Python + LSL for EEG/EMG/ECG.
- Latency engineering: profiled I/O, buffering, model runtime; verified with SIL/HIL; reduced end-to-end delay; published internal benchmarks.
- Projects:
 - Multimodal real-time BCI platform: architecture + deployment.
 - Latency optimisation: measurement + reduction via SIL/HIL.
 - Two studies: EMG-based decision-dynamics; ECG-based feedback-timing for learning.
 - Audio-neural interface (earbud) to enhance recalibration rate: pipeline + funding applications.
 - HMI & neurotech ethics/law: paradigms + proposals.
- Implemented signal processing (artifact handling, band-limited features) and time-series ML (event detection, segmentation/decoding) with PyTorch / scikit-learn / NumPy / SciPy.
- Shipped reusable LSL utilities & analysis modules with READMEs; supported lab reproducibility.

Postgraduate Researcher - Center for Brain and Cognition

2022 - 2024 | Barcelona

- Prototyped a real-time, ML-based EEG BCI that detected motor intention and adapted outcome timing to probe sense of agency; used causal time-series models with fully reproducible analysis.

Assistant Professor – Islamic Azad University

2014 - 2022 | Iran

- Taught advanced courses in control systems, electrical engineering, dynamics, and modelling; supervised applied research in electrical, control and mechanical engineering.

EDUCATION

MSc, Brain Computer Interface **2022 - 2023 | Spain**

- Focused on cognitive neuroscience and realtime BCI

PhD - Control Engineering **2009 - 2013 | Iran**

- Focused on complex system modelling, stochastic time-series analysis, algorithmic control theory

COLLABORATION & REPRODUCIBILITY

- Coordinated multidisciplinary neuroscience, control and software work on BCI tools
- Managed small delivery pipelines from prototype to regular use
- Enforced reproducible workflows and mentored others on Python/LSL and tests