



Neuroengineering is a growing field in which much of its progress stems from advances in signal processing, machine learning, and deep learning techniques. These methods are very popular for extracting and detecting meaningful information and patterns within biomedical signals, images, and video data. In addition, signal processing can be applied in control systems for medical robotic and neuromodulation devices. For instance, these systems can assist upper and lower-limb movements of locked and amputated people through artificial end-effectors, such as exoskeletons and prostheses. Furthermore, the epilepsy event inhibition by applying neuromodulation in closed-loop is becoming an emerging research topic for alternative treatments.

The following challenge aims to stimulate innovation in biomedical signal processing through two different competitions. The first one focuses on the gait phase decoding by using brain signals. The second competition looks at new contributions addressed to detect epilepsy events



## Submission Guidelines:

Code submissions are accepted only through kaggle as explained below. Each team must submit a paper of two pages in length, explaining their approach. See below for more details.

- Data availability:
  - Epilepsy Detection  
(<https://www.kaggle.com/competitions/ix-neuroengineering-symposium-epilepsy-challenge>)
  - Gait phase decoding  
(<https://www.kaggle.com/competitions/gait-data-processing/>)
- The paper (**2 pages**) must follow the template:  
<https://www.overleaf.com/latex/templates/ifmbe-proceedings-series-template-and-instructions-for-authors/gpgftmvrqvjd>
- **SUBMISSION FORM for papers:** <https://forms.gle/gK86LaTPEA5Q1DtI8>

## Rules:

- Each team must have at least one and the maximum of five participants;
- Only kaggle submissions with its code will be considered for publication in the journal.
- Winning teams of each challenge will be invited to present the results at the IX Neuroengineering Symposium.



### Deadlines:

- Task announcement (Data availability and challenge details):
  - June 7th, 2023
- Competition deadline:
  - ~~September 1st, 2023~~ September 9th, 2023
- Nominees Announcement
  - September 15th, 2023
- Award Ceremony
  - October 19th, 2023

### Evaluation Metrics:

- F1 score in the Epilepsy challenge
- Root Mean Square Error (RMSE) in the EEG gait decoding challenge.

### Scientific Committee:

- Abner Cardoso Rodrigues Neto, Instituto Santos Dumont, Brazil
- André Felipe Oliveira de Azevedo Dantas, Instituto Santos Dumont, Brazil
- Denis Delisle Rodriguez, Instituto Santos Dumont, Brazil
- Sri Krishnan, Toronto Metropolitan University, Canada
- Teodiano Freire Bastos Filho, Universidade Federal do Espírito Santo, Brazil

