

*Symposium*

# EEG biomarkers of brain health and dementia:

Advances from the Latin-American Research Network and ISTAART Electrophysiology Professional Interest Area

**OCTOBER 2021**

Friday **29** & Saturday **30**

10:00 am in Central Time (CST)

**Hosted by:**

BrainLat-UAI | GBHI

**Networks and organizations:**

Latin American Brain Health Institute | Multi-Partner Consortium to Expand Dementia Research In Latin America Brazilian Brain Bank | Latin American and Caribbean Consortium on Dementia | National Institute on Aging Alzheimer's Association | Rainwater Charitable Foundation | Global Brain Health Institute





# Background

Recent international guidelines for research in aging-related neurodegenerative diseases such as Alzheimer's disease and related disorders belonging to dementia encourage the use of biomarkers to ascertain the diagnosis or the risk of the disease as well as the prediction and monitoring of disease progression. Those biomarkers derive from laboratory analysis of cerebrospinal fluid (CSF) collected by lumbar puncture and neuroimaging scans including structural magnetic resonance imaging (sMRI) and positron emission tomography (PET) or single photon emission computerized tomography (SPECT). These techniques are quite informative but invasive and/or expensive for large screening purposes, especially in lower- and middle-income countries. Furthermore, they may be not viable in all regions of Latin American countries (LACs). This raises an important challenge as dementia is one of the most dramatic global health problems. To tackle this challenge, other techniques exploring brain function are under evaluation to produce biomarkers to be used in the field of dementia.

Modern electroencephalographic (EEG) techniques are a promising tool for screening large populations at risk of Alzheimer's disease and related disorders before to apply most invasive or expensive diagnostic procedures. Research on EEG techniques in the field of dementia is witnessing an unprecedented growth with exciting results in terms of robustness, reliability, and scalability. Nevertheless, those results are underrepresented in the scientific programs of many international conferences on dementia. Furthermore, there are barriers to the use of those EEG techniques outside a few academic clinical units, especially in lower- and middle-income countries. Moreover, regional EEG repositories and data sharing procedures are scarce. Finally, there is the need of international consensus about standard operating procedures for harmonization, multicentric replication, computational modelling, and state-of the art data science methodologies for EEG signals.

## Aims of the Symposium

In the present Symposium, representative members of (1) international associations on Alzheimer's disease and related disorders and (2) Latin American research consortia will discuss the current state of the field and recent advances about EEG biomarkers of brain health in aging and dementia. The aims of the Symposium are:

- 1-** To raise awareness about the current state of advanced EEG methods in exploring brain functions related to vigilance and cognition in old persons living with dementia.
- 2-** To review and discuss the recent findings of those methods and related data science developments in Latin-American and Caribbean Consortium on Dementia (LAC-CD), Latin American Brain Health Institute (BrainLat), Alzheimer's Association, ISTAART Electrophysiology professional interest area (PIA), and other Workgroups.
- 3-** To foster collaboration via integration with the mentioned word leading initiatives that can help accelerate developments in the region.
- 4-** To enhance the participation in regional registries and multicentric collaborations.

**ORGANIZERS, CHAIRS & SPEAKERS**



**Mario Parra**



**Lucia Amoruso**



**Josephine Cruzat**



**Agustin Ibañez**



**Claudio Babiloni**



**Görsev Yener**



**Robert Whelan**



**Rebecca Edelmayer**



**Pedro Valdez Sosa**



**Xianghong Arakaki**



**Yang Jiang**



**Javier Escudero**



**Enzo Tagliazucchi**



**Bahar Guntekin**



**Brian Murphy**



**David Sharp**



**Pavel Prado**



**Sebastian Moguilner**



**John Fredy Ochoa**



**Ruaridh Clark**



**Ruben Herzog**



**Francesca Farina**



**Yuri G. Pavlov**



**Irina Campbell**



**Laura Milena Rueda Delgado**



**Alison Buick**

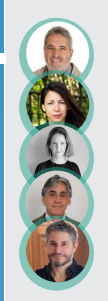


# Agenda Day 1

## OCTOBER, FRIDAY 29

\*All hours are shown in Central Time (CST)

10:00 AM



### *Introduction from Organizers:* “From basic sciences to translational frameworks”

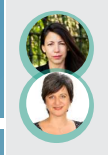
*Mario A Parra (United Kingdom), Lucia Amoruso (Basque Country-Spain, Argentina), Josephine Cruzat (Chile), Claudio Babiloni (Italy), Agustin Ibañez (Ireland, Chile, Argentina)*

### **THEME 1:** **The state-of-art of EEG biomarkers of brain health and dementia**

**Focus:** methods and findings in clinical and research practice; multicentric harmonization, validation, and reproducibility

**Chairs:** *Lucia Amoruso (Basque Country & Argentina) and Görsev Yener (Turkey)*

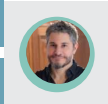
10:10 AM



### *Chair's Introduction*

#### **KEYNOTE SPEAKERS**

10:15 AM



Combining EEG with neurocognitive biomarkers of neurodegeneration in multicultural samples via multi-feature frameworks  
*Agustin Ibanez (Ireland, Chile, Argentina)*

10:30 AM



Analysis of EEG signals for the characterization of Alzheimer's disease: Recent advances and opportunities  
*Javier Escudero (UK)*

#### **EARLY CAREER RESEARCHERS**

10:45 AM



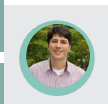
Dementia ConnEEGtome: Towards multicentric harmonization of EEG connectivity in neurodegeneration  
*Pavel Prado (Chile)*

10:50 AM



Machine-Learning methods for EEG dementia characterization  
*Sebastian Moguilner (Argentina)*

10:55 AM



Spatial filters for the study of brain function  
*John Fredy Ochoa (Colombia)*

11:00 AM

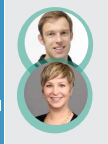
Questions & Discussion

11:15 AM

BREAK

## THEME 2: Promising methodological developments

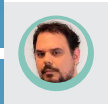
**Focus:** current science, computational modelling interdisciplinary efforts, precision medicine



**Chairs:** Robert Whelan (Ireland) and Rebecca Edelmayer (USA)

### Chair's Introduction

#### KEYNOTE SPEAKER

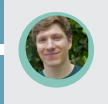


Conditions for dynamic equilibrium in neuroelectric signals and some of their potential clinical applications  
*Enzo Tagliazucchi (Chile & Argentina)*

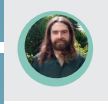
#### EARLY CAREER RESEARCHERS



Evolving spatiotemporal dynamics of brain activity in dementia  
*Josephine Cruzat (Chile)*



Eigenvector alignment: a holistic assessment of functional network changes  
*Ruaridh Clark (Scotland)*



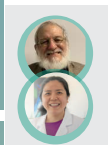
Using whole-brain models to understand the mechanism of neurodegenerative diseases  
*Ruben Herzog (Chile)*

Questions & Discussion

BREAK

## THEME 3: Global initiatives

**Focus:** international initiatives to overcome barriers



**Chairs:** Pedro Valdez Sosa (Cuba) and Xianghong Arakaki (USA)

### Chair's Introduction

#### KEYNOTE SPEAKER



Impact of EEG collaboration networks on dementia phenotyping  
*Mario A Parra (Scotland)*



Strengths, Weaknesses, Opportunities, Threats of International Initiatives for EEG Research  
*Bahar Guntekin (Turkey)*

11:30 AM

11:35 AM

11:50 AM

11:55 AM

12:00 PM

12:05 PM

12:20 PM

13:20 PM

13:25 PM

13:40 PM

## EARLY CAREER RESEARCHERS

13:55 PM



A comparison of resting-state EEG and structural MRI for classifying Alzheimer's disease and mild cognitive impairment  
*Francesca Farina (Ireland)*

14:00 PM



#EEGManyLabs: Investigating the replicability of influential EEG experiments  
*Yuri G. Pavlov (Germany)*

14:05 PM

Questions & Discussion

14:20 PM

BREAK

## THEME 4: Scalability of EEG technologies

**Focus:** Developments from industry

**Chairs:** *Claudio Babiloni (Italy) and Yang Jiang (USA)*

14:35 PM



*Chair's Introduction*

## KEYNOTE SPEAKERS

14:40 PM



Potential of real-world functional neurophysiology as an objective marker in patient management  
*Brian Murphy (Ireland)*

14:55 PM



EEG assessment of amnesia and applications to dementia  
*David Sharp (UK)*

## EARLY CAREER RESEARCHERS

15:10 PM



EEG at home? Possible solution towards automated methods of Alzheimer's disease monitoring  
*Irina Campbell (Scotland)*

15:15 PM



Exploiting repeated measures from at-home EEG experiments  
*Laura Milena Rueda Delgado (Ireland)*

15:20 PM



User acceptance and feasibility of remote EEG technology in a real-world setting  
*Alison Buick (Ireland)*

15:25 PM

Questions & Discussion

15:40 PM

Closing remarks (Organizers)

# Agenda Day 2

## **OCTOBER, SATURDAY 30**

\*All hours are shown in Central Time (CST)

**10:00 AM**

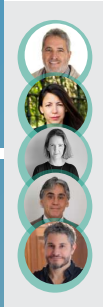
Special Interest Group (SIG) “Latin-American Network for EEG biomarkers of dementia”

Definition of a formal proposal of a SIG called “Latin-American Network for EEG biomarkers of dementia” to be affiliated to the ISTAART Electrophysiology PIA.

Consensus on its mission, representative persons for outreaching in 2021-2023, and goals for 2021-2022.

*Closing remarks (Organizers)*

**12:00 PM**



### **Role of Organisers**

1. Coordinate the necessary actions to meet the aims of the Symposium
2. Identify and invite experts in the field
3. Disseminate the event through appropriate media
4. Review abstracts submitted by ECR
5. Identify chairs for the various themes
6. Chair the symposium

### **Targeted Audience**

All the LAC EEG community. Dissemination via LAC-CD, RedLat, BrainLat, Global Brain Health Institute (GBHI), Electrophysiology PIA, Alzheimer’s Association




**EEG biomarkers of brain health and dementia:**  
Advances from the Latin-American Research Network and ISTAART  
Electrophysiology Professional Interest Area

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