

# Neurobiology Commission



Aristeia Galanopoulou

## Chair

Aristeia Galanopoulou (USA)

## Members

Marco de Curtis (Italy), Past-Chair

Terence O'Brien (Australia)

Kathryn Davis (USA)

Marcio Moraes (Brazil)

## Management Committee Liaison

Edward Bertram (USA)

## Purpose

To promote neurobiology research in epilepsy through advocacy, education, training, proposals of optimal methodologies, and infrastructure improvements.

## Activities

We have had zoom conferences with the members of the Neurobiology Commission (NBC) and the chairs of its task forces (TF) regularly, and also face-to-face meetings at the International Epilepsy Congress (IEC) in Bangkok (June 22nd, 2019). The following activities were held in 2019:

- A **neurobiology symposium** was held during the IEC in Bangkok on “*Biological Rhythms that Modulate the Risk of Seizures*,” chaired by Christophe Bernard and Aristeia Galanopoulou on June 23, 2019. The symposium included lectures on rhythms modulating seizure risk (Maxime Baud), circadian control of seizures and seizure forecasting (Philippa Karoly), circadian regulation in the pathophysiology and treatment of temporal lobe epilepsies (Christophe Bernard), and the loss of *CLOCK* in focal epilepsies (Judy Liu).
- The 2019 **Harinarayan Young Neuroscientist Awards** were given to young epilepsy researchers with the best basic and clinical research presented at the IEC. The NBC members selected Gautham Bhargava (India) and Sarah Buck (United Kingdom) as this year’s awardees. Mr. Bhargava is a PhD candidate, and reported his findings on the potential of phase amplitude coupling of low frequencies with high frequency oscillations to localize epileptogenic zone in magnetoencephalography. Dr. Buck presented her findings on dynamic changes in episodic memory functional connectivity after temporal lobe resections.
- The NBC instituted for the first time the **Neurobiology Commission Bursaries**, which are awarded after competitive selection to young investigators, to provide support for attending scientific meetings or visiting training fellowships that will help expand their skills in epilepsy research and care. In 2019, four applicants were selected to receive bursaries to attend scientific meetings (Annick Melanie Magnerou, Ashwini Sri Hari, Victor Navarette Modesto, and Lionel Nyamurenje). In addition, three bursaries were awarded for visiting fellowships (Amit Agarwal, Thomas, and Amartey Tagoe). The initiative was well-received based on the number of applications, and the feedback by the awardees and a new cycle is planned for 2020.
- The NBC received several applications seeking **sponsorship of scientific workshops or training courses** with relevance to epilepsy. The following activities were selected by the NBC and proposed for financial sponsorship by the ILAE, based on their content, educational and scientific merit, and relevance to the strategic and educational goals of the ILAE and NBC: (a) San Servolo Epilepsy Course, 2020: Bridging Basic with Clinical Epileptology – Accelerating Translation in Epilepsy Research (July 20-31, 2020, San Servolo, Italy), (b) Gordon Research Conference and Seminar on Mechanisms of Neuronal synchronization and excitability (August 15-21, 2020, Spain), (c) Latin America Workshop on Neurobiology of Epilepsy (May 23, 2020, Medellin, Colombia), (d) Post-

# Neurobiology Commission *(continued)*

traumatic Epilepsy, models, common data elements and optimization (June 11-12, 2020, Bethesda, MD, USA). The final decisions are currently pending final review by the ILAE.

## WONOE Task Force

### Co-Chairs

Terence O'Brien (Australia)  
Aristea Galanopoulou (USA)

### Members

Marco de Curtis (Italy), Past-Chair  
Ozlem Akman (Turkey)  
Marcia Moraes (Brazil)  
Tomonori Ono (Japan)  
Raman Sankar (USA), liaison to Advocacy TF of the NBC

### Aim

Organize the WONOE meetings prior to the IECs.

The **2019 Workshop on Neurobiology of Epilepsy (WONOE 2019)** was organized with the theme of “*What is a seizure?*” The workshop took place at the Krungsri River hotel in Ayutthaya, Thailand (June 16-20, 2019), thanks to generous financial support from the ILAE, the Harinarayan Family, and the UCB. This year, the WONOE was dedicated to Uwe Heinemann, who was one of the founders of the workshop and an integral contributor to the success of WONOE over the years. The keynote WONOE lecture was therefore named “Uwe Heinemann Keynote Lecture.” Forty participants were selected to attend, with international representation and a mixed preclinical, basic science and clinical epilepsy expertise. The sessions included presentations of original research and discussions, which are currently being prepared for submission for publication. To facilitate the attendance of young investigators, the WONOE TF awarded four bursaries, named “*Raman Sankar WONOE Bursaries*,” to honor the continuous fundraising efforts by Professor Sankar for this workshop. The awardees were: Pablo Casillas-Espinosa, Diego Jimenez-

Jimenez, Hiroki Nariai, and Jennifer Wong.

The NBC and WONOE TFs were approached by young investigators to support the organization of regional WONOE meetings in the Latin American region, encourage the engagement of young epilepsy researchers in neuroscience, and increase their presence and participation in the regional neuroscience and epilepsy meetings. Given the relevance of this initiative to the mission of the NBC and WONOE TF, the TF members unanimously voted to support the organization of a planning workshop that will help identify the needs, formulate the infrastructure, and plan for such a future workshop in Latin America.

## ILAE/AES Joint Translational TF

### Members

*AES Co-Chairs:*  
Aristea Galanopoulou (USA) and Greg Worrell (USA)

*AES Nominees:*  
Richard Staba (USA), Anne Anderson (USA), Manisha Patel (USA), Kevin Kelly (USA)

*ILAE Co-Chairs:*  
Terence O'Brien (Australia) and Matthew Walker (UK)

*ILAE Nominees:*  
Gunther Sperk (Austria), Rudiger Koehling (Germany), Heidrun Potschka (Germany), Steven Petrou (Australia)

*Liaison to MC:*  
Ed Bertram (USA)

### Initiatives

TF. Multiple zoom conferences, as well as two face-to-face meetings, were organized in Bangkok (IEC, June 2019) and Baltimore (AES meeting, December 2019). The TASK1-WGs have started their work towards the creation of an online atlas of rodent EEGs, a system for the interpretation of the rodent EEGs, and classification of seizures and epilepsy models in rodents. TASK2 is continuing the systematic review of outcome measures in epilepsy models.

# Neurobiology Commission *(continued)*

TASK3-WGs are working toward the creation of additional common data elements and case report forms for general pharmacology studies, models used for the development of epilepsy therapies, epilepsy phenotyping, omics, imaging, pathology, and electronic databases. CURE (Citizens United for Research in Epilepsy) has offered to co-sponsor the efforts to create electronic modules of the case report forms which are currently created by LONI at the University of South California. Several reports are being planned on the activities of the various WGs.

## Genetics/Epigenetics TF:

### Chair

David Henshall (Ireland)

### Members

Katsuhiko Yamakawa (Japan)

Albert Becker (Germany)

Chris Reid (Australia)

Alica Goldman (USA)

Erwin van Vliet (Netherlands)

Iscia Lopes-Cendes (Brazil)

Annapurna Poduri (USA)

Michael Johnson (UK)

Hela Mrabet (Tunisia)

Katja Kobow (Germany), liaison to Big Data TF

Steven Petrou (Australia), liaison to ILAE/AES Joint Translational TF

### Aims

Discuss scientific and clinical research priorities of the TF, and commission review(s) that would focus on promoting the TF, promote priority Genetics-Epigenetics topics at key epilepsy meetings, organize training, create infrastructure and promote industry-academia research interactions and developments, and collaborate with the ILAE/AES Joint Translational TF on CDEs in genetics-epigenetics.

### Activities

During 2019, the Epigenetics-Genetics TF worked on four of its five original tasks. Under Task I, Publications,

the TF had its first paper accepted for publication, entitled “Epigenetics explained: A report of the Genetics/Epigenetics Task Force and topic “primer” for the epilepsy community” which was co-written by the entire membership and will be published in *Epileptic Disorders*\*. The paper is designed to provide a broad, but nevertheless substantial, overview of the topic and includes explanations and definitions, the main epigenetic mechanisms, evidence for these as contributors to mechanisms of epilepsy, and future directions of the field. Planning for the next publication, based on how mutations in genes with known epigenetic functions cause epilepsy, is underway. Work also included liaising with other task force chairs to identify gaps and avoid duplication of efforts.

Under Task II, Promoting the Topic, the TF led submissions for symposia, and provided speaker suggestions for various major meetings, and were successful in the inclusion of the topic at several key meetings, including the 2020 Gordon Conference and 14th European Congress on Epileptology. Applications to the IEC in Paris, 2021 are under review. We began work on developing suitable material about the topic for inclusion on ILAE and related websites such as a “Wiki” page on epigenetics.

Under Task III, Training Activities, the TF is planning a workshop on epigenetic methods for the epileptologist, to be hosted by ICL in the UK. The TF collaborated with the YES (Young Epilepsy Section) Task Force on the topic of climate change, discussed how members can implement more sustainable research practices, and is participating in a planned first-ever “virtual” epilepsy conference being hosted by UCL in 2020.

Under Task IV, Activities on Resources and Infrastructure, members of the TF are working on the development of common data elements for preclinical research. This will now include a specific module for collecting “omics” data.

### \*Publications

Katja Kobow, Christopher A. Reid, Erwin A. van Vliet, Albert J. Becker, Alica M. Goldman, Shinichi Hirose, Iscia Lopes-Cendes, Hela Mrabet Khiari, Annapurna Poduri, Michael R. Johnson and David C. Henshall. Epigenetics Explained: A topic “primer” for the epilepsy community. A report of the Genetics/Epigenetics Task Force. *Epileptic Disorders*, Accepted.

# Neurobiology Commission *(continued)*

## Young Neurobiologists TF:

### Chair

Premysl Jiruska (Czech Republic)

### Members

Joseph Raimondo (South Africa)

Kathryn Davis (USA)

Nigel Jones (Australia)

Liankun Ren (China)

Vadym Gnatkovsky (Italy)

Shilpa Kadam (USA)

Nihan Carcak (Turkey)

Erwin van Vliet (Netherlands)

Christos Panagiotis Lisgaras (Greece), liaison to Next Generation Task Force and Young Epilepsy Section (YES)

### Aims

To evaluate the current environment for attracting, sustaining, and advancing talented young neurobiologists in epilepsy research across regions, cultures, and genders, as well as identify areas in need of improvement, challenges, and possible solutions. To promote opportunities that will cultivate leadership qualities and identify future young leaders among young epilepsy neurobiologists. To collaborate with the other members of the NBC and its TFs, so as best to integrate the expertise of this TF with the initiatives and goals of the NBC and its TFs.

### Activities

In 2019, the TF continued activities focused on attracting, sustaining, and advancing young neurobiologists. TF members have explored the possibilities of promoting education and training in epilepsy research by creating undergraduate and postgraduate programs to train epilepsy research specialists of the 21st century.

One opportunity is the European Universities Initiative, set up by the European Council and the European Commission. This initiative aims to create pan-European high-quality curricula on specific topics. The curricula should have

following features: a flexible and personalized curriculum with embedded mobility leading to a degree; innovative pedagogies with a challenged-based transdisciplinary approach to foster entrepreneurial mindsets and civic engagement; enhanced staff mobility between partner institutions to teach/do research and equip students with a broad range of forward-looking skills. The initiative could represent an opportunity where ILAE could support creating a Master's program on Epilepsy. This program would be available to students from all over the world. It would cover various aspects associated with epilepsy, ranging from science and clinical epileptology to social, ethical issues, etc. Such a training program would represent a systemic approach/solution on how to recruit future epilepsy scientists. The TF has initiated initial negotiations about the possibility of opening the undergraduate program with representatives of the 4EU+ Alliance who are involved in European Universities Initiative.

Another possibility for creating future epilepsy leaders that warrants attention is the Marie Skłodowska-Curie Innovative Training Networks, which aims to train a new generation of creative, entrepreneurial, and innovative early-stage researchers. Recently, a consortium composed of multiple European epilepsy research laboratories, led by Dr. de Curtis from the NBC, submitted a proposal for an international Ph.D. training program in epilepsy. The proposed network brings together world-leading scientists and teachers in epilepsy, neurology, neuroscience, genetics, and a myriad of other fields. One of the core strengths of the program is the training of students in a systems approach to thinking and solving problems. This program could represent a foundation for future Ph.D. training under the auspices of ILAE.

We continued our collaboration with the Next Generation Task Force (NGTF), Leadership Task Force, Congress Council, and especially with the Young Epilepsy Section (YES). Liaisons from YNTF regularly participate in teleconferences of these groups. Here, YNTF members keep advocating for basic science and neurobiology, and provide valuable advice about various aspects related to experimental epilepsy research. NGTF and YES, with the strong support of YNTF, propose the opening of five fellowships for short-term visits at clinical centers or basic science laboratories.

# Neurobiology Commission *(continued)*

## Advocacy TF of the NBC

### Co-Chairs

Raman Sankar (USA)

Solomon (Nico) L. Moshé (USA)

### Members

Terence O'Brien (Australia)

Vicky Whittemore (USA)

Akio Ikeda (Japan)

Janet Mifsud (Malta)

Kathryn Davis (USA)

### Management Committee Liaison

Ed Bertram (USA)

In 2019, the TF submitted two blogs on the *Living Well with Epilepsy* website. The TF is mindful to highlight content that relates to women who are the typical users of this site or the caregivers for people with epilepsy. In addition, an ILAE Neurobiology Commission email has been established for the blog. The TF has published content developed with Dr. Astrid Nehlig related to Caffeine in Epilepsy. Another article focused on climate change and how this might affect people with epilepsy, and was developed with Dr. Sanjay Sisodiya. To increase the coverage of epilepsy advances that would be useful for the general public to learn, there is a plan to recruit a medical writer and collaborate with the editorial board of the open access ILAE journal, *Epilepsia Open*, to highlight published research in lay language.

## Aims

To evaluate the current funding environment for neurobiology research in epilepsy. To advocate for the value of neurobiology research toward improving knowledge on epilepsy and translating basic science discoveries to better therapies. To advocate for initiatives that will improve research infrastructure, and the initiatives of the NBC and its TFs, including research, educational, and training initiatives. To advise the NBC and the Research Advocacy TF on matters related to advocating for neurobiology research.

Report by Aristeia Galanopoulou, MD, PhD, Neurobiology Commission Chair

## Activities

Initial work has focused on giving the epilepsy patient and caregiver community access to translational neurobiology research. The TF initially decided to work with *Living Well with Epilepsy*, a blog run by Jessica Kennan Smith. Kate Davis has been leading this effort. The TF is now in discussions on how to consistently develop content in lay language to bring new scientific findings to patients and the caregiver community.