

Report for **ISN SYMPOSIA**:

**a. Basic information (title of the Symposium and meeting, dates, organizer, venue, etc.)**

The 6th Annual Molecular Psychiatry Meeting  
Kauai, September 27th to 29th, 2018

September 27, 11:30 AM to 1:30 PM: Grand Ballroom 5

ISN Symposium: Molecular insights on organoid and 3D models to study brain diseases and development.

Chair, Orly Reiner, Weizmann Institute of Science; Co-chair, Jeremy Crook, University of Wollongong

**b. Speakers**

Mandy Johnstone, University of Edinburgh, UK  
Jeremy Crook, University of Wollongong, Australia  
Orly Reiner, Weizmann Institute of Science, Israel  
Aaron Gordon, UCLA, USA

**c. A short description of the highlights of the symposium**

The symposium started with a short introduction by the chair, emphasizing the internationality of the symposium (4 speakers = 4 continents!), and the scope of the symposium at the forefront of science.

Each talk was followed with a 5' discussion, including questions from the audience.

The first talk by Mandy Johnstone presented a combination of behavioral and imaging studies conducted with patients from the same pedigree exhibiting a mutation in the *NDE1* gene as well as studies conducted in brain organoids derived from iPSCs from the patients. Pathway analysis allowed to identify that the NFkB pathway is perturbed and treatments with a suitable agent rescued the effect in the organoids.

The second talk by Jeremy Crook showed their unique approach using bioengineering and novel materials to form 3D neuronal cultures suitable for modeling of psychiatric diseases.

The third talk by Orly Reiner showed a novel on-chip brain organoid system which enables long term imaging. This system was used to model lissencephaly, and they showed the cell biology and physical parameters which are affected in the case of this severe disease.

The forth talk by Aaron Gordon, a postdoctoral fellow from the Geschwind lab presented a study done in close collaboration with the Pasca lab, where they started to generate from iPSCs 3D cortical spheroids in a directed manner. They also generated both ventral and dorsal forebrain. The aim of their study was to model post-natal brain using in vitro cortical spheroids. They cultured for more than 2 years and examined gene expression. They used a novel methylation marker to predict the tissue age and also by using gene expression. The combination of these two systems agreed and demonstrated "birth" around 280 days of differentiation. Gene expression was compared with brain span data that is a transcriptomic atlas of the human brain from 4 weeks post conception into adulthood. It was possible to visualize key gene expression changes that occur around "birth" in vitro.

**d. Number of attending people:** ~50. The meeting was held in two rooms (parallel sessions) and the total number of registrants was 110.

**e. Travel subsidies for the speakers of the ISN symposium**

All the speakers provided additional funds to cover travel costs.

**f. Budget; detailed ISN budget, how the ISN funds were utilized**


Total budget from ISN: 8000 USD.

80% = 6400 USD was transferred prior to the meeting.

Following the transfer of the rest of the funds, they will be utilized to cover all the registration costs of the speakers, and partial costs for travel and accommodations.

Participant	Registration	flight	Local transport	Accommodations	notes	total	For reimbursement
Jeremy Crook	495	1518.9	-	2118.55		4132.45	2000
Mandy Johnstone	495	1795.93	512.3	1163.26	Shared accommodations	3966.49	2000
Orly Reiner	495	1705.81	482.91	2326.52		5010.24	3500
Aaron Gordon	150	309.51	53.7	1296.52	Student registration	1809.73	500
total	1635	5330.15	1048.91	6904.85		14918.91	8000

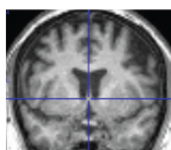
- g. **Photos:** Slides from the introduction by the chair and all four presentations indicating ISN support.



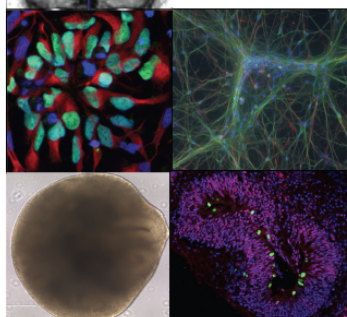
**Molecular insights on organoid and 3D models to study brain diseases and development**

Chair, Orly Reiner, Weizmann Institute of Science  
Co-chair, Jeremy Crook, University of Wollongong

- Using human brain organoids to model ASD and schizophrenia – Mandy Johnstone, University of Edinburgh, UK
- Modeling of major mental disorders using tissue engineering approaches – Jeremy Crook, University of Wollongong, Australia
- Live-imaging of human brain organoids for disease modeling – Orly Reiner, Weizmann Institute of Science, Israel
- Long term maturation of human cortical forebrain spheroids models post-natal brain development – Aaron Gordon, UCLA, USA



## *Using human organoids to model Autism Spectrum Disorders and Schizophrenia*



Mandy Johnstone

*BSc(Hons), MB ChB, PhD, MRCPsych  
Clinical Research Fellow  
& Consultant Psychiatrist*

*University of Edinburgh*

**wellcome**trust  
Fellow



## MODELING OF MAJOR MENTAL DISORDERS USING TISSUE ENGINEERING APPROACHES

Jeremy M. Crook

Molecular insights on organoid & 3D models to study brain diseases  
& development

6<sup>th</sup> Annual Molecular Psychiatry Meeting, Kauai, HI, USA

27<sup>th</sup> September 2018



## Long term maturation of human cortical spheroids models post-natal brain development

Aaron Gordon  
UCLA

**MPA** *Molecular Psychiatry Association*

6<sup>th</sup> Annual Molecular Psychiatry Meeting



Twitter: Aaron\_Gordon1

### h. Comments of at least 3 attendants about the Symposium

Dr. Tracey Petryshen, MGH, Harvard, attendant and co-organizer of the meeting:  
“Excellent symposium, very international! I am so glad that the support from the ISN enabled this session.”

Dr. Sue K. O’Shea, University of Michigan, Ann Arbor: “Great opportunity to hear about interesting new brain organoid models”.

Dr. Anindita Sarkar, Salk Institute, San Diego: “Interesting new systems that can be applied for disease modeling.”

### i. The budget used for each speaker must be specified separately

- Note, the money will be transferred following the receipt of the remaining 20% of the funds.

Mandy Johnstone, University of Edinburgh, UK, 2000 USD.

Jeremy Crook, University of Wollongong, Australia, 2000 USD.

Orly Reiner, Weizmann Institute of Science, Israel, 3500 USD.

Aaron Gordon, UCLA, USA, 500 USD.