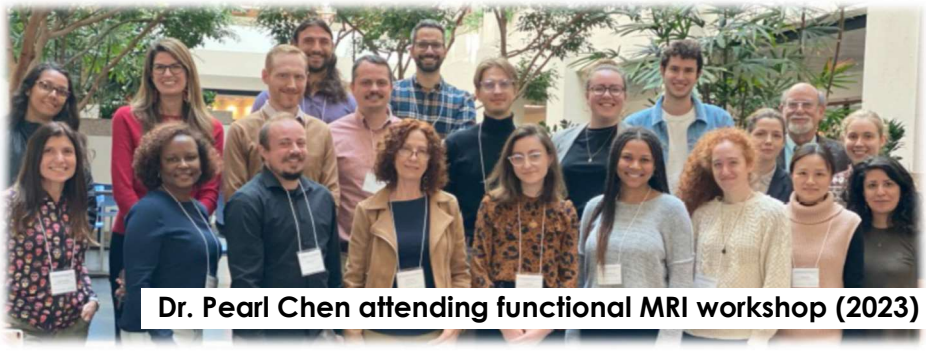
UBSN
University Research Facility in Behavioral and Systems Neuroscience
神經科學中心實驗室

NEWSLETTER
ISSUE 08 (DEC 2023)

Dr. Pearl Chen's Neurogenetic Studies on Polymorphisms and Neurodegeneration in the Human Brain

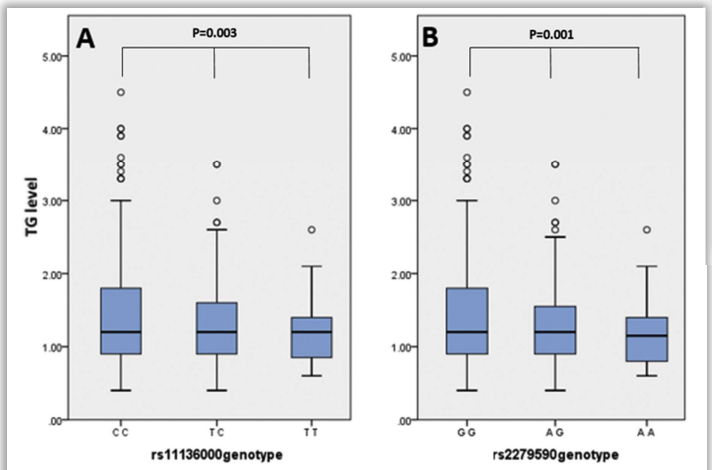


Dr. Pearl Chen attending functional MRI workshop (2023)

Dementia, caused primarily by Alzheimer's disease (AD), leads to cognitive impairments. It has become a rising public health concern. As drug treatment options are limited, non-pharmacological interventions are crucial in slowing disease progression.

Cognitive Stimulation Therapy (CST) is a non-pharmacological intervention that helps alleviate cognitive decline in dementia. CST improves cognitive function and enhances the quality of life in patients. However, research on CST in Hong Kong is limited.

Dr. Chen Lu Hua, Pearl, a clinical geneticist at Hong Kong Polytechnic University, studies the genetic and environmental factors in neuropsychiatric disorders. Dr. Chen's research centres around genetic polymorphisms in the clusterin (*CLU*) gene, which increases the risk of AD and affects cognitive function through cholesterol levels. A study by Dr. Chen involving 689 subjects found significant correlations between *CLU* polymorphisms, memory performance (using the Delayed Word Recall Test - DWRT), and serum lipid levels (TG, HDL-c and LDL-c).



Distributions of serum triglyceride (TG) levels across genotypes of rs11136000 and rs2279590. Showing correlation between genotypes and TG levels. (source: doi: 10.1016/j.jpsychires.2020.07.015)

Dr. Chen's team is conducting a pilot genetic study to investigate the effects of CST in dementia patients. The study, funded by the University Start-up Fund for Research Assistant Professors, aims to recruit British elderly individuals above 50 years old with early dementia. Trained occupational therapists and nurses will administer CST to the participants. Additionally, Dr. Chen is exploring a neuroimaging approach to expand the original study, characterising genetic polymorphisms, brain function, and pathophysiology in dementia.

To pursue this objective, Dr. Chen participated in the UBSN Capacity Building Scheme 2023 and received sponsorship to attend the "Functional MRI Workshop: A Five-Day Intensive Introduction" in the United States. This workshop enhanced Dr. Chen's understanding of MR imaging physics, haemodynamic responses, fMRI experimental design, and data analysis using various software tools, among other topics. The acquired knowledge and skills in fMRI will assist Dr. Chen in designing cognitive experiments using fMRI and writing research proposals for grant applications.

Athinoula A. Martinos Centre for Biomedical Imaging, in MA, USA.

By investigating the mechanisms of CST in dementia patients through genetic and neuroimaging approaches, Dr. Chen aims to enhance the understanding of disease heterogeneity and improve personalised medical and clinical care for individuals with dementia.

Dr. Pearl CHEN

Research Assistant Professor
Dept of Rehabilitation Sciences

Recipient/ beneficiary of UBSN's Capacity Building Scheme 2023 *

*Our Capacity Building Scheme application is open **only for FH and FHSS principal investigators.** For more info on the scheme, please visit: https://www.polyu.edu.hk/ubsn/internal/capacity-building-scheme/scheme-detail/

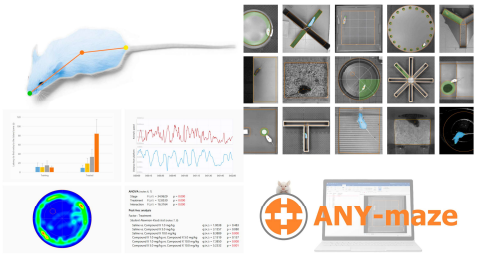
Introducing UBSN's new animal equipment updates

Microelectrode Array (MED64) Multiplex Upgrade

The ***Microelectrode Array (MED64)*** system is used for *In Vitro* electrophysiology. Its 64-channel probe is suitable for measuring spontaneous and evoked signals from acute brain slices. Having a ***multiplexer*** allows 4 plates to be tested within the same session.

Specifications:

- Acquire signal from 64 electrodes simultaneously
- Stimulation through any of the 64 electrodes (up to 2 electrodes simultaneously)
- Large current-driven stimulation via any electrode
- Unrivaled signal-to-noise ratio 0.8 µV RMS noise level
- Sampling Rate: up to 20 kHz/ channel
- Analyze data online during your experiment or offline after
- Suitable for acute slices



ANY-maze Animal Behaviour Tracking Software

The ***ANY-maze*** Behaviour Tracking Software is a comprehensive yet easy-to-use video-tracking system for recording and analysing animal activity and movement during virtually any behavioral tests, such as light/dark box, plus-maze, Barns maze, water maze, etc.

ANY-maze supports live or offline video analyses, data grouping for control and treatment groups, custom definition of arena boundary and zones, whole-animal tracking to detect position and orientation of the animal. ANY-maze also generates visualisation of common metrics such as location heatmaps, distance and velocity. Data can be further analysed within ANY-maze or exported to other softwares such as EXCEL or SPSS for other statistical analyses.

Specifications:

- Can analyse real-time or recorded videos
- Flexible and easy to use
- Compatible with virtually any behavioural tests and mazes: e.g. open field, water-maze, Y-maze, plus-maze, fear conditioning, novel object, Barnes maze, radial arm maze, forced swim test, light/ dark box, many more.

Officer-in-charge: Dr. Howard CHAN (howardhw.chan@polyu.edu.hk)
More information on UBSN equipment: https://www.polyu.edu.hk/ubsn/facilities/equipment/

UBSN Mock MR Scanner Room Just Received a Child-Friendly Upgrade

UBSN is pleased to announce that our Mock MR Scanner has gone even more child-friendly!

A carefully designed wallpaper has been installed on all walls of the scanner room, to provide a more colourful and approachable experience for mock-scanning participants.

In practice, failed MRI scans and unusable data caused by claustrophobia, anxiety, and excessive head and body motion cost significant time and resources. Acclimating participants to the environment with a mock scanner will increase the rate of successful data acquisition and quality of fMRI data. The mock scanner is also extremely useful for young children to orient them to the MRI environment and for training for in-scanner tasks. The mock MR system is designed to provide participants an experience similar to what they will experience in the real MRI scanner.

For enquiries, please contact our officer-in-charge:
Dr. Celia DONG (celia.dong@polyu.edu.hk)

UBSN Management Committee Professors Ranked Top 2% Most Cited Scientists in 2023

Stanford University has recently updated a database that represented top-cited scientists worldwide†.

The Stanford research team retrieved Scopus publication data up to end-of-2022 provided by Elsevier and standardised citation data using metrics, e.g., h-index, co-authorship hm-index. The calculation resulted in a list of 100,000 top scientists across the world from 22 scientific fields and 174 sub-fields.

We are very excited to share the news with you that our UBSN management committee professors have ranked among the world's top 2% most-cited scientists.

Name	Subject field	Percentile	Metric Criteria
Prof. **Marco Pang** Director of UBSN	Rehabilitation	Top 1%	Career and Single-year
Prof. **Ping Li** Associate Director of UBSN	Psychology & Cognitive Sciences	Top 2%	Single-year
Prof. **Benjamin Yee** Member of UBSN Management Committee	Neurology & Neurosurgery	Top 2%	Career
Prof. **Yongping Zheng** Member of UBSN Management Committee	Biomedical Engineering	Top 2%	Career and Single-year

†Ioannidis, John P.A. (2023) 'October 2023 data-update for "Updated science-wide author databases of standardized citation indicators"', Mendeley Data, V6, https://elsevier.digitalcommonsdata.com/datasets/btchxktzyw/6

UBSN's First MRI Lab awarded PolyU OSH Excellence Silver Award 2023

The PolyU Occupational Safety and Health (OSH) Excellence Award is intended to recognize exceptional workers who have made significant contributions to the university's work safety culture.

The award's typical focus is on the nominee's accomplishments and those provided in their role as university staff members. Safety achievements outside of the nominee's usual job scope may also be taken into consideration.

This recognition emphasizes the significance of improving occupational safety and health at work and motivates the awardees to keep continue their efforts in creating a safer workplace for everyone.

This year, UBSN's MRI facility has been awarded the 2023 PolyU OSH Excellence Award - Silver Award:

Project:	**UBSN - Building the First MRI Laboratory in PolyU**
Award Class:	**Silver**
Cash Prize:	**HK$3,000**
Project Members: (Surname alphabetical order)	**Dr. Celia DONG, Ms. Sophia HO, Ms. Karena WONG**

Congratulations to UBSN and especially its participating members!
More photos: https://www.polyu.edu.hk/ubsn/news-and-events/photo-gallery/20230922-osh-excellence-ceremony/
More info: https://www.polyu.edu.hk/ubsn/news-and-events/news/2023/polyus-first-mri-lab_ubsn-awarded-polyu-osh-excellence-silver-award-2023/

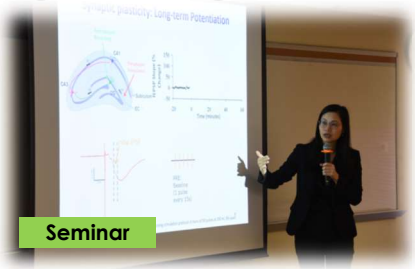
Recent events at UBSN

In October, UBSN was awarded PolyU OSH Excellence Silver Award 2023; UBSN hosted an animal lab induction for School of Optometry research users.

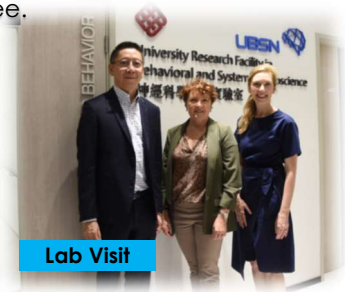
PolyU OSH Excellence Ceremony 2023
UBSN's First MRI Lab awarded Silver Award

User induction with School of Optometry
Animal Lab Induction for School of Optometry research users

In November, UBSN organised a seminar with Dr. Sonata YAU for the Microelectrode Array (MED64); UBSN also warmly received Prof. Sandy BRAUER (University of Queensland), and Delegates from Dongguan Songshanhu Management Committee.



Microelectrode Array (MED64) Research Seminar
Speaker: Dr. Sonata YAU



Visitor from University of Queensland
Visitor: Prof. Sandy BRAUER

Visitors from Dongguan Songshanhu Management Committee
Invited by RIO

In December, UBSN organised a workshop for the Microelectrode Array (MED64) jointly with Bio-Gene Technology Ltd; UBSN also was visited by Prof. Alex MIHAILIDIS (University of Toronto) and Prof. WANG Xinjun (Zhengzhou University).

Microelectrode Array (MED64) Workshop & Lab Visit
Instructor: UBSN & Bio-Gene Technology Ltd

Visitor from University of Toronto
Visitor: Prof. Alex MIHAILIDIS

Visitor from Zhengzhou University
Visitor: Prof. WANG Xinjun

At UBSN, we hope to bring users useful knowledge regularly and inspire more innovative research at PolyU. If you have any requests or suggestions on an equipment, please drop us a message!
For more UBSN news, please visit our website: https://www.polyu.edu.hk/ubsn/news-and-events/news/

Upcoming Events at UBSN

A selected piece of UBSN equipment is featured every few months.

This bimester featured "**MED64**" (Animal *In Vitro* electrophysiology);
Up next in January and March we will have a workshop and a PI seminar about **VEP/VECP ERG** (Animal *In Vitro* electrophysiology).
We also have our first-ever **Open Day** in 2024. Seminars, lab tours and souvenirs will be organised! Stay tuned to our website and Instagram!

More UBSN news and events:
https://www.polyu.edu.hk/ubsn/news-and-events/

Follow on Instagram:

@UBSN.POLYU

Have any questions? Interested in using our equipment? Please contact us!
Website: https://www.polyu.edu.hk/ubsn **E-mail: ubsn.enquiry@polyu.edu.hk**