



Co-located with
IEEE Sensors Conference 2017

Brain Data Bank Challenge

Glasgow, United Kingdom
October 31, 2017

N. Nan Chu, IEEE Brain Initiative

Brain Data Bank Challenge Program

Oct. 31, 2017 - Crowne Plaza Glasgow, , adjacent to SC-2017, 2 minute walk from the Scottish Event Campus (SEC) in Glasgow, Scotland

October 31	On-site Registration	Advanced Registration
9:00 – 9:30	Filling out form on-site	Work area setup
9:30 – 12:00	Tutorial – BDB Challenge : Nan Chu	Working on specified Challenge project
12:00 – 12:20	Working lunch and exchange of issues and obstacles encountered in individual projects	
12:20 – 13:00	Keynote: Walter Besio: " The Journey from the Brain and Back: Two-Way Communication "	
13:00 – 15:30	Experiment with UCSF dataset : Nan Chu	Continuing working on Challenge project
16:00 – 17:50	Project Presentation to Judge Panel : Walter Besio, Amir Hussain, and Aaron Weinroth	
18:00	Conclusion of Challenge Day – departing for SC-17 Gala Banquet	
November 1, 2017 at the Sensors Conference, SEC		
9:30 am	Awards Announcement immediately after SC-17 Plenary Keynote	

Tutorial by Dr. Nan Chu

Brain Data Bank Challenges on Usability & Analytics

Outline

- Brain EEG datasets
 - Brain Computer Interface
 - EEG Data Extraction and Processing
 - Interpretation, Contrasting, Sharing and Presentation
- Variations
 - Metadata Considerations
 - User-centered Iterative Data Requirements
 - Early Attempts for Brain Signal Data Interoperability
- Case Evaluation – UCSF Dataset and others
- Environment and Tools for Exploration
- Example Challenges

N. Nan Chu – Tutorial Instructor

Co-founder, CWLab International , USA & Visiting Professor, National Central University, Taiwan

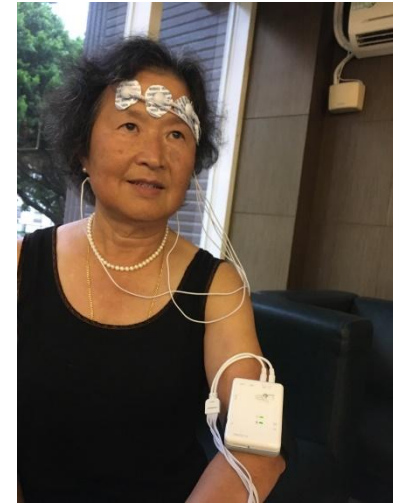
Dr. N. Nan Chu, 朱南玉, worked in AT&T Bell Labs, Rockwell International, Tellabs International, Comcast/Motorola/Verizon and Thomson Multimedia, started as Senior Member of Technical Staff and promoted through the ranks to Executive Program Manager of Advanced Technology, Product Development and Service Deployment. Her technical contributions have followed the transformation from digital voice, Internet data, to digital video distribution and processing, where she was involved in encryption, conditional access, digital rights management, Intellectual Property protection as well as content processing and user interface.

While heavily engaged with the telecom and consumer electronics industry, Dr. Chu has forged collaboration with the academia by grant management and adjunct teaching in University of Illinois - Chicago, Widener University - Philadelphia, California Lutheran University - Thousand Oaks, DeVry University Keller School of Management, on multiple campuses in the USA, and National Central University in Taiwan. She was also the Director of Research & Services at California State University – Northridge. She has started 2 companies and currently is the principal of CWLab International, among other entrepreneurial activities throughout Chicago, Southern California, and Asia.

She has published more than 50 papers in areas related to digital communication/networking technology evolutions, and edited 2 books. She has been credited as the co-author of Digital Set-top Box Standards in American SCTE and United Nations' CCITT Study Group 9, and received awards for the early digital cable conversion standardization. Her current interests in research and product development include social networking, cloud computing, data security, and Internet technology to eHealthcare, concentrating on brain communication interfaces.

Dr. Chu has volunteered in IEEE professional services since the 1980's, serving as Board of Governors in Consumer Electronics Society, Executive Industry Chairs for GLOBECOM, IGIC, and many other Communications/Computer/Consumer Electronics Society conferences and Section/Chapter meetings.

She received her B.S. from National Tsing Hua University, M.S. from Iowa State University, and Ph.D. from Northwestern University, major in Nuclear Engineering, in 1972, 1973, and 1977, respectively. Her career in the nuclear industry was short-lived. Her career in Telecommunications, Networking Software Systems and eHealth Consumer Electronics has thrived for 30+ years and continued till today.



CWLab International
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Keynote by Dr. Walter Besio

The Journey from the Brain and Back: Two-Way Communication

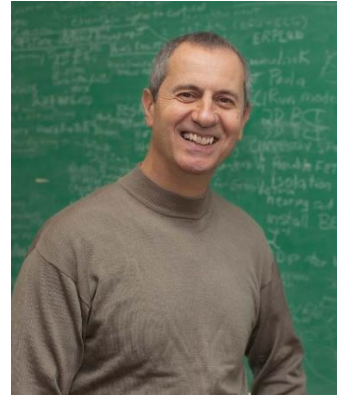
Abstract

Electroencephalography (EEG) signals are spatio-temporal in nature. EEG has very good temporal resolution but typically does not possess high spatial resolution. EEG at times has poor signal quality. The EEG signals recorded with Dr. Besio's unique tripolar concentric ring electrode (TCRE) system, tEEG, have significantly higher SNR than from bipolar concentric ring electrode and conventional disc electrode emulations. The tripolar electrodes have also shown significantly better spatial resolution (10x) as well as mutual information (0.1x). The high-frequency oscillations (HFOs) in the tEEG prior to seizures in 14 patients were found not present in concurrent EEG. The tEEG was also shown significantly better for real-time center-out cursor control. In the opposite direction, the Speaker will discuss the scenarios that transcranial focal electrical stimulation (TFS) via the TCREs from the scalp surface has stopped: penicillin, pilocarpine, and pentylenetetrazol induced seizures, protected the brain, increased GABA, decreased glutamate, prevented/delayed brains from becoming epileptic, and protected brains in a Parkinson's model.

Walter Besio – Keynote Speaker

Professor- University of Rhode Island, and CEO/Founder- CREmedical Corp. Kingston, RI, USA

Dr. Besio, Professor in the Dept. of Electrical, Computer, and Biomedical Engineering at the Univ. of Rhode Island (URI). received his M.S. and Ph.D. degrees in biomedical engineering from the Univ. of Miami and a B.S. in EE from the Univ. of Central Florida. Prior to joining academia, Dr. Besio worked 12 years in the biomedical device and electronics industries. Dr. Besio specializes in research to develop innovative neural engineering instrumentation for diagnosis and therapies that enhance the lives of persons with neurological disease and disability. This work involves unique patented concentric electrodes for neuromodulation and brain computer interfacing (bidirectional). Dr. Besio is a co-founder of the URI Interdisciplinary Neuroscience Program that spawned the new Ryan Institute for Neuroscience with a gift. His building proposal was instrumental in starting the new College of Engineering (COE) campaign that resulted in a bond approved by Rhode Islanders for the new COE building. He is an IEEE Senior Member, with Engineering in Medicine and Biology Society (EMBS) (representative in Sensors Council and North American Administrative Committee, chaired Wearable Biomedical Sensors & Systems Technical Committee and Providence Chapter, past Vice President of Finance, and Faculty Advisor URI Student Chapter), IEEE T-BioCAS and BioCAS Steering Committee member, and an active member of the American Epilepsy Society (Technical Committee). Dr. Besio has also developed intellectual property that forms the basis for his medical device startup company CREmedical Corporation. Dr. Besio is passionate about moving his research beyond the laboratory to help relieve disease, disability, pain, and suffering.



UCSF Brain Dataset

Authors

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