Form 3-3-2

Japan-U.S. Science and Technology Cooperation Project: category of “brain research”
Report of the fiscal 2014 information exchange seminar
Research category: (3) behavior; system; cognition.

Modeling Neural Activity: Statistics, Dynamical Systems, and Networks (MONA)

2. Seminar period: 06/26/2013-06/28/2013

3. Venue and Address
Kaua'i Marriott Resort
Kalapaki Beach, 3610 Rice Street
Lihue - Kauai, Hawaii 96766 USA

4. Seminar representatives: Affiliation, Rank, and Name
Japan: Assoc. Prof. Shigeru Shinomoto, Grad. Sch. of Science, Kyoto Univ.
U.S.: Prof. Robert E. Kass, Carnegie Mellon Univ.

5. Number of participants
Japan: 8 guests and 11 general participants
(Affiliations of the guests, rank, and name)

Riken Brain Science Institute	PI	Shun-ichi Amari
Riken Brain Science Institute	PI	Hiroyuki Nakahara
Riken Brain Science Institute	PI	Shigeyoshi Fujisawa
Riken Brain Science Institute	Research fellow	Hideaki Shimazaki
ATR Dept. of Neuroinformatics	PI	Yukiyasu Kamitani
Grad. Sch. of Informatics, Kyoto Univ.	Prof.	Shin Ishii
Dept. of Bioinformatic Engineering, Grad. Sch. of Information Science and Technology, Osaka Univ.	Assoc. Prof.	Jun-nosuke Teramae
Grad. Sch. of Information Science and Technology, the Univ. of Tokyo	Assoc. Prof.	Naoki Masuda

U.S.: 12 guests and 15 general participants
(Affiliations of the guests, rank, and name)

University of Pittsburgh	Assist. Prof.	Brent Doiron
University of Pittsburgh	Assist. Prof.	Anne-Marie Oswald
Boston University	Assist. Prof.	Uri Eden
Boston University	Assist. Prof.	Kyle Lepage
Boston University	Assist. Prof.	Mark Kramer
UC Berkeley	Assist. Prof.	Gautam Agarwal
UC San Diego	Assoc. Prof.	Todd P. Coleman
Harvard University	Assist.	Robert Haslinger
Harvard Medical School	Assist.	Patrick Purden
University of Washington	Assoc. Prof.	Eric Shea-Brown
Weill Cornell Medical College	Prof.	Jonathan Victor
University of Hawaii	Assoc. Prof.	Susanne Still

6. Outline of aims and significance of this seminar

The aim of this seminar was to create an opportunity for top scientists, both established and young promising scientists, at the forefront of theoretical neuroscience and statistical analysis from Japan and the U.S. to meet, present their research in theoretical modeling and/or novel data analysis methods for neurophysiological data, share cutting-edge information, and exchange new ideas; these activities will foster interactions both in the present and future and create the basis for future collaborative research across the two countries.

In neuroscience, it is the dawn of "the era of big data." Rapid advancement in experimental methodologies has led to an unprecedented large amount of neural recording data (e.g., large-scale simultaneous multi-unit recording.) Correspondingly, there is currently a strong need to develop a set of new methods for statistical analyses, e.g., automatic collection of large-scale data, automatic model selection, dissection of underlying causes for temporal dynamics, identification of interaction structure among neurons and prediction of future phenomena based on a systematic theory. In the US, a biennial workshop called "Statistical Analysis of Neural Data (SAND)" has been held since 2002 and has been regarded as one of the most important meetings in theoretical neuroscience, focusing on the aforementioned issues. It was organized by Prof. Robert Kass and Prof. Emery Brown, who are also organizing committee members of this seminar in the U.S. side. With their cooperation, we organized this seminar to achieve the aims described above.

7. Achievement of the seminar and future expectations

The success of the seminar exceeded our expectations, as it achieved the aims stated above and its impact was evident throughout the 3 days. Top scientists in this field from both countries (see participants' list) came together and reported on their most recent research achievements as well as their unpublished works. Representative topics were: Bayesian statistics, point process formulation with generalized linear models, adaptive filtering, state-space model, and information geometry for data analysis on neural spike signals, local field potentials, MEG, and fMRI. The quality of presentations and discussions was at the highest level. Guest speakers delivered a 20-min lecture followed by a 10-min discussion, while young researchers were given 7 min for the lecture and 5 min for discussion. All parties had productive discussions both during the pre-designated talk, Q & A, and discussion sessions as well as during the unscheduled time such as lunch and dinner. During the 3 days, friendships deepened. We saw various combinations of scientists sit together for discussion during unscheduled time. During the designated sessions, when an important issue was raised, we allowed time to discuss the issue while loosening the original schedule, so that useful feedback could be made.

The seminar was extremely satisfactory for the participants from both Japan and the U.S. A considerable number of participants insisted that the seminar be held again in two to three years. To this end, discussions to promote collaborative research between Japan and the U.S. were made. Indeed, sharing data and analytical methods among the participants was considered highly valuable. We believe that the seminar triggered productive collaborative studies in future.

8. Others (problems of the seminar)

As the Diet session was delayed, determination of the budget after adoption was delayed to the extent that accounting preparation could not be initiated until just before the opening of the seminar. It was of concern at the time; however, in the end, there was no problem.