Highlights

At the Interface of Statistics and Brain Science

We are very pleased to be writing this highlights section for the *Statistica Sinica* special issue on Statistical Challenges and Advances in Brain Science. As the first major statistics journal to have a special issue devoted to this exciting area, we were very excited by the number of high quality submissions we received. We had over 40 submissions, a record by far for a special issue of the journal, and the very best 18 appear in this issue (As a part of *Statistica Sinica*'s effort to reduce its backlog, this issue also includes seven additional general articles.)

The range of topics within brain science represented here is extremely wide. Many submissions had a focus on brain imaging applications of statistics, an area where statistical methodology has had a major impact in the last decade or so. However, this was not exclusively the case, and also included in this issue are papers that examine statistical methods in neuropathology and neural spike train data, indicating the very diverse applications of statistics within the field of brain science. It is also very satisfying to see so many different modalities of brain imaging represented. Papers included in the issue address problems in Magnetic Resonance Imaging, both structural and functional, Positron Emission Tomography, Electroencephalography (EEG), functional near infrared spectroscopy and optical signals, which comprehensively cover the spectrum of methods currently employed in brain imaging research.

We are also extremely fortunate to have two invited editorials along with the contributed papers in this special issue. Professor Karl Friston has revolutionised brain science through countless contributions but

probably is most well known for the Statistical Parametric Mapping (SPM) Software, which allows his many deep ideas to be easily used by others. We are very fortunate to have his overview of the current status and future outlook of the joint development of statistics and brain science. Secondly, we have an editorial from Professor Nicholas Lange, a distinguished statistician who is also an accomplished brain scientist. His dual perspective provides extremely interesting insights into the overlaps and challenges in successfully combining the two fields.

Our hopes for this special issue are threefold. We firstly hope that the issue will develop further interest in brain science for statisticians in all areas. However, we also hope that it will be of interest to brain scientists and encourage the best practice use of statistics in brain science, as evidenced by these papers. The synergy of brain science and statistics will lead researchers in many exciting directions, providing highly profitable research for both disciplines. We finally very much hope that you will enjoy this very special issue.

— John A.D. Aston[1], Emery N. Brown[2], Wei Liem Loh[3],
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