ABSTRACTS

William Bechtel: "The Endogenously Active Brain: The Need for an Alternative Cognitive Architecture"
Most proposals of cognitive architectures in cognitive science and accounts of brain processes in neuroscience construe the mind/brain as reactive: processing is initiated by a stimulus and terminates in a response to it. But there is growing evidence that brains are endogenously active: oscillations in electrochemical activity at multiple frequencies are ongoing in the brain even in the absence of stimuli and stimuli serve to modulate these oscillations rather than initiate activity. Moreover, evidence is growing that this endogenous activity is used in various information processing activities. I appeal to evidence from single-cell recording, EEG, and resting state fMRI to support the claim of ongoing oscillatory behavior in the brain and identify several ways it may contribute to cognition. If cognitive science is to understand how we perform cognitive tasks it needs to develop cognitive architectures that incorporate the sort of endogenous dynamic activity exhibited by the brain.

Edmund T. Rolls: "On the relation between the mind and the brain: a neuroscience perspective"
In this paper I show that computational neuroscience provides an important new approach to traditional problems in philosophy such as the relation between mental states and brain states (the mind-body or mind-brain problem), to determinism and free will, and helps one with the 'hard' problem, the phenomenal aspects of consciousness.
One of the themes of the paper and of my book Neuroculture: on the Implications of Brain Science (Rolls (2012c), Oxford University Press) is that by understanding the computationsperformed by neurons and neuronal networks, and the effects of noise in the brain on these, we will gain a true understanding of the mechanisms that underlie brain function. This understanding extends very deep, to the statistical mechanics of networks operating with noise. In this sense, we are developing a truly wonderful 'mechanics of the mind' which is enabling how our brains work to be understood from the level of molecules through neurons with ion channels, through networks of such neurons to the global properties of a system, and thus to an understanding of how processes such as memory, perception, attention, decision-making, and emotion actually are implemented in the brain. Part of the solution proposed to the mind-body problem is that the mind and the brain are different levels of explanation of information processing, the correspondence between which can be understood by understanding the mechanisms involved using the approach of computational neuroscience. But this does leave some 'hard' problems, such as the problem of phenomenal consciousness, and while I have provided new suggestions about this in this paper, one must recognize that there is still somewhat of a gap in our understanding of events in the brain and the subjective experiences that may accompany them. The explanation I offer is that when it 'feels like something' this is just a property of a computational process that has thoughts about its own thoughts (higher order thoughts), and with the thoughts grounded in the world.

Cees van Leeuwen: "Brain and mind"
The debate on mind-brain relationships has been centered on issues of free will. I investigate the debate and conclude that the neurosciences neither have compelling methodological, ontological,

theoretical reasons, nor empirical reasons to reject the notion of free will. At the same time, I concede that the issue is highly contentious, both in science and society. The problem resides in the clash between scientific notions of the brain and pre-scientific notions of mind. I therefore propose to look at mind-brain relationships on a more sound, and uncontroversial, empirical basis, which can be found in psychophysics. I discuss two instances in which the content of a psychophysical experience, and its dynamics, correspond to brain dynamics. In one case, the correspondence is a one: one type-identity, in the other it is a case of radical multiple instantiation: several radically different types of brain activity give rise to the same perceptual dynamics. These two examples illustrate that although type identity is possible, it may often be highly contextualized. Mind brain relationships are therefore more likely to be conquered one by one rather than established wholesale.

Kari Theurer and John Bickle: "What's Old is New Again: Kemeny-Oppenheim Reduction At Work in Current Molecular Neuroscience"
We introduce a new model of reduction inspired by Kemeny and Oppenheim's (1956) model and argue that this model is operative in a "ruthlessly reductive" part of current neuroscience. Kemeny and Oppenheim's model was quickly rejected in mid-20th century philosophy of science and replaced by models developed by Ernest Nagel (1961) and Kenneth Schaffner (1967). We think that Kemeny and Oppenheim's model was correctly rejected, given what a "theory of reduction" was supposed to account for at that time. But their guiding insights about what constitutes scientific reduction—increases in explanatory scope and systematization—reflect actual practices of current reductionistic neuroscience. The key rehabilitative step to make their insights fit current scientific details is to restate them using resources from recent work on causal-mechanistic explanation.

We begin with a scientific case study, drawn from the relatively new field of "molecular and cellular cognition." It provides an explanation of the well-known Ebbinghaus spacing effect on learning and memory in terms of interactions between a transcriptional enhancer protein and its inhibiting phosphatase in neurons recruited into the memory trace. Next we briefly describe some popular models of reduction from mid-20th century philosophy of science. We point out how these models fail to illuminate key features of our scientific case study. Finally we present our causal-mechanistically updated Kemeny and Oppenheim-inspired model and argue that it nicely accounts for the details of our scientific case study. We close with a remark that will hopefully undercut the surprise many may feel to learn that a long-rejected philosophical account of reduction actually is at work in one of the most prominent reductionistic endeavors in current science.

Andrieu: "Sentir son cerveau ? Les dispositifs neuro-expérientiels en 1er personne"
Voir son cerveau en 1er personne s'activer à l'occasion de la réalisation d'une tache semble établir plus qu'une corrélation en décrivant ce qui serait un lien de causalité entre le corps et son cerveau. Le corps est une surface et un résultat dont la conscience ne perçoit le processus vivant qu'en retard sur la vitalité et la mobilité du cerveau. Nous sommes en retard sur notre cerveau mais notre conscience du présent ne peut avoir accès à la temporalité de sa condition. La transparence du cerveau *in-vivo* implique des dispositifs neuro-expérientiels.

Corey Maley and Gualtiero Piccinini: "Get the Latest Upgrade: Functionalism 6.3.1"

Functionalism is a popular solution to the mind-body problem. It has a number of versions. We outline some of the major releases of functionalism, listing some of their important features as well as some of the bugs that plagued these releases. We outline how different versions are related. Many have been pessimistic about functionalism's prospects, but most criticisms have missed the latest upgrades. We end by suggesting a version of functionalism that provides a complete account of the mind.

Paula Droege: "Memory and consciousness"

Philosophical theories of memory rarely distinguish between importantly different sorts of memory: procedural, semantic and episodic. I argue for a temporal representation theory to explain the unique characteristic of episodic memory as the only form of conscious memory. A careful distinction between implicit and explicit representation shows how the past figures in memory. In procedural and semantic memory, the influence of the past is *implicit* by which I mean that the past experience is used but not represented in the skill or knowledge. Episodic memory, in contrast, depends on representing a past experience *as past.* On a temporal representation theory of consciousness, a conscious state represents the present moment, and in the case of episodic memory, it includes a representation of past experience. The *embedded account* of the 'feeling of pastness' takes past experience to be part of the explicit content of a conscious state. An episodic memory is a representation of the present that includes a representation of the past. Whereas a higher-order theory of consciousness can give no reason why only episodic memories are conscious, a temporal theory explains why episodic memories are both higher-order and conscious. Finally, I consider the essential role of episodic memory in the formation of a temporally extended self. The demands of a social environment motivate development of an ability to track the mental states of others and oneself over time. By incorporating past experience (and future experience) into the present, episodic memory extends experience in time to form the sense of self. Through a careful examination of the function of temporal representation, we can see why the past is not consciously represented in procedural and semantic memory and the value of consciously representing the past in episodic memory.

Gabriel Vacariu and Mihai Vacariu: "Troubles with cognitive neuroscience"

In few words, we present the main actual problems of cognitive neuroscience: the binding problem, localization, differentiation-integration in the brain, the troubles created by the brain imaging, and optimism vs. skepticism in cognitive neuroscience. Surprisingly, even if there are more and more experimental results in recent years, we notice no real hope for solving these troubles in the future. Cognitive neuroscience is a science constructed on "correlations" between mental and neuronal states, mainly furnished by the brain imaging - fMRI of the last two decades. We want to suggest that "correlation" lacks any ontological background. In this context, we have to answer the following question: Is cognitive neuroscience a real science or a kind of "new engineering"?