Abstract for talk given by Gina Kuperberg at Saarbrucken University, Distinguished Lecture Series, June 13

**A predictive architecture of language comprehension:**
**Insights from temporal-spatial neuroimaging**
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It is well established that we are able to draw upon our real-world knowledge to activate relevant semantic knowledge, and, under some circumstances, to predict upcoming events, and even specific lexical items. In this talk, I will argue that that the neurocognitive mechanisms engaged as we use real-world knowledge to retrieve conceptual information associated with incoming words are quite distinct from those engaged when specific event and lexical predictions, based on such knowledge, are disconfirmed by the input. I will suggest that the engagement of these distinct neurocognitive systems allows for comprehension that is both highly efficient and highly flexible.

I will begin by discussing evidence that, during sentence and discourse comprehension, an event representation of the context interacts with event knowledge, stored within long-term memory, to activate conceptual features associated with that event or event structure. If these activated conceptual features match the conceptual features associated with an incoming word, that word's processing is facilitated. This facilitated retrieval of the incoming word's semantic features is reflected by an attenuation of the N400 ERP component and by reduced activity within the left anterior temporal cortex.

Importantly, however, an event-constraining context does more than simply activate conceptual features within long-term memory. It can also activate stored event structures and sometimes even specific word-forms. This means that, in certain situations, we may begin to predictively map or *link* activated semantic features on to particular semantic-thematic roles ('event predictions') and sometimes on to specific word forms ('lexical predictions'), ahead of fully accessing and integrating the semantic, syntactic or form features of the incoming word. I will argue that this type of predictive linking across levels of representation entails some *commitment* to a working memory space that is distinct from long-term memory, and that, if the input violates such predictive links, the resulting *prediction error* triggers enhanced and prolonged neural activity as working memory is updated. This activity is reflected by a group of positive-going ERP components that extend past the N400 time window, and by an increased recruitment of the inferior parietal and frontal cortices.

The advantages of predicting correctly have been extensively discussed. In the final part of my talk, I will draw broad links with computational models conceptualizing language comprehension as an incremental process of belief updating, and will argue that the costs incurred when we predict incorrectly may also play an important role in successful and flexible comprehension. First, I will discuss the hypothesis that the neurocognitive response reflected by the P600/fronto-parietal activity can rescue us from interpretation errors in noisy environments. Second, I will suggest that it may allow us to recover novel meanings in sentences that at first appear to make no sense. Finally, I will argue that the neural response to prediction errors plays a crucial role in enabling us to learn novel events and to flexibly adjust our comprehension strategies in response to ever-changing task and environmental demands.