

SEEWIESEN

LECTURE SERIES

FALL/WINTER 2019/2020



THURSDAY | March 5th, 2020 | 13.00 | HOUSE 4 LECTURE ROOM

MARK S. BLUMBERG

University of Iowa, USA | Host: Rattenborg Research Group

Active sleep promotes functional connectivity and sensorimotor integration throughout the developing nervous system

During active (REM) sleep in mammals and birds, skeletal muscles twitch throughout the body, causing jerky movements of limbs, whiskers, wings, and eyes. These spontaneous, discrete movements are particularly prominent during the perinatal period, when active sleep predominates. As demonstrated in newborn rats, the triggering of a twitch is followed by a cascade of sensory feedback (reafference) through the sensorimotor system, resulting in coherent oscillatory activity in such structures as sensorimotor cortex, hippocampus, and red nucleus. Critically, whereas these coherently organized oscillations are apparent when pups are asleep, they are nearly absent when they are awake. In light of the functional significance ascribed to brain oscillations for learning and plasticity, these findings suggest that active sleep provides a critical context for the expression of organized activity in cortical and subcortical structures, ultimately producing a brain that is functionally integrated with its body.

WHO IS MARK BLUMBERG?

1988	Doctorate in Biopsychology, University of Chicago USA
1992	Assistant Professor, Department of Psychological and Brain Sciences, University of Iowa USA
2009	F. Wendell Miller Professor, University of Iowa USA
2017	Chair, Department of Psychological and Brain Sciences, University of Iowa USA

SELECTED PUBLICATIONS

- Blumberg, M. S., Lesku, J. A., Libourel, P. A., Schmidt, M. H., Rattenborg, N. C. What is REM sleep? *Current Biology*, 30: R38-49, 2020.
- Del Rio-Bermudez, C., Kim, J., Sokoloff, G., & Blumberg, M. S. Active sleep promotes coherent oscillatory activity in the cortico-hippocampal system of infant rats. *Cerebral Cortex*, bhz223, 2020.
- Dooley, J. C., & Blumberg, M. S. Developmental "awakening" of primary motor cortex to the sensory consequences of movement. *eLife*, 7: e41841, 2018.
- Del Rio-Bermudez, C., Kim, J., Sokoloff, G., and Blumberg, M. S. Theta oscillations during active sleep synchronize the developing rubro-hippocampal sensorimotor network. *Current Biology*, 27: 1413-1424, 2017.
- Blumberg, M. S. *Freaks of Nature: What Anomalies Tell Us about Development and Evolution*. New York: Oxford University Press, 2009.

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