



Seewiesen Colloquia

Speaker invited by: Dept. Gahr

Thursday, January 22, 2015, 13h, House 4, Lecture Room

Birdsong in motor coordinates

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Fundamental unresolved problems of motor coding and sensorimotor integration include what information about behavior is represented at different levels of the motor pathway. Insight into this issue is essential for understanding complex learned behaviors such as speech or birdsong. A major challenge in motor coding has been to identify an appropriate framework for characterizing behavior. In this talk we discuss a novel approach linking biomechanics and neurophysiology to explore motor control of songbirds. We developed a model of song based on gestures that can be related to physiological parameters the birds can control. This physical model for the vocal structures allowed a reduction in the dimensionality of the singing behavior. This is a powerful approach for studying sensorimotor integration and represents a significant methodological advantage. Our results also show how dynamical systems models can provide insight into neurophysiological analysis of vocal motor control. In particular, our work challenges the actual understanding of how the motor pathway of the songbird systems works and proposes a novel perspective to study neural coding for song production. It also illustrates the turbulent relationship between physics and biology

Who is Gabriel Mindlin?

1992 PhD Drexel University, Philadelphia, USA

1993 Professor, University of Navarra, Spain

1995- Professor, Universidad de Buenos Aires and Conicet, Principal Investigator

2003 Research Associate, UCSD, California

Selected publications:

- Amador, A., Perl, Y. S., Mindlin, G. B., & Margoliash, D. (2013). Elemental gesture dynamics are encoded by song premotor cortical neurons. *Nature*, 495(7439), 59-64.
- Gardner, T., Cecchi, G., Magnasco, M., Laje, R., & Mindlin, G. B. (2001). Simple motor gestures for bird-songs. *Physical review letters*, 87(20), 208101.
- Laje, R., & Mindlin, G. B. (2005). *The Physics of Birdsong*. Springer-Verlag Berlin Heidelberg.