„Gießener Abendgespräche Kognition und Gehirn"

Mittwoch, 18 bis 20 Uhr, Raum: F9

02.07.08 Jan Wiener (Universität Freiburg)

" Mechanisms and strategies underlying path integration and path planning "

Abstract:

Successfull navigation is based on multiple cognitive components and processes. Depending on the navigation task, these components play specific roles in the generation of behavior. When exploring novel environments, for example, path integration (i.e, the integration of perceived self motion) plays a key role as it allows keeping track of position and orientation during travel. When planning and navigating novel paths through familiar terrain, on the other hand, navigation behavior mainly depends on internal factors such as spatial representations and reasoning processes.

The first of the talk will present two experiments investigating mechanisms and strategies underlying human path integration. In a behavioral navigation experiment, blindfolded participants were led along two sides of a triangle and were then asked to walk back to the start location. By instructing participants to either concentrate on the trajectory or the position of the start location during travel, we compared the behavioral consequences of two alternative processing modes for updating the start location. In a functional brain imaging study we investigated the underlying neural mechanisms demonstrating that human (visual) path integration recruits a cortical network similar to that of rodents and non-human primates.

In the second part of the talk I will present recent work investigating path planning behavior. Specifically, we investigated the relationship between mentally planning and describing routes, and the routes chosen when actually traveling. The experiment addressed route choice in a familiar urban environment under three different conditions: walking the route, planning and describing the route for oneself, and planning and describing the route for an addressee unfamiliar with the environment.

Results show that the chosen routes differed systematically with respect to efficiency, number of turns and streets, and street size. These findings reflect the impact of incremental optimization by perceptually based updating processes along with aspects of communicability and formulation for an addressee.