



A lens into cognition: The geometry and topology of neural systems

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I study emergent function in dynamic neural systems such as development and cognition, and will describe some recent progress in my ongoing projects. As the human brain develops, it increasingly supports coordinated control of neural activity. The mechanism by which white matter evolves to support this coordination is not well understood. We use a network representation of diffusion imaging data from 882 youth ages 8 to 22 to show that white matter connectivity becomes increasingly optimized for a diverse range of predicted dynamics in development. Notably, stable controllers in subcortical areas are negatively related to cognitive performance. If time permits, I will also discuss how effective learning is accompanied by high dimensional representations of neural activity.

Monday, April 23rd, 2018 at 11:00 am

**MPIDS, Prandtl lecture hall, building AI,
Am Faßberg 11, Göttingen**

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