Center for Computational Neuroscience

Flatiron Institute, Simons Foundation

Eero Simoncelli

Scientific Director

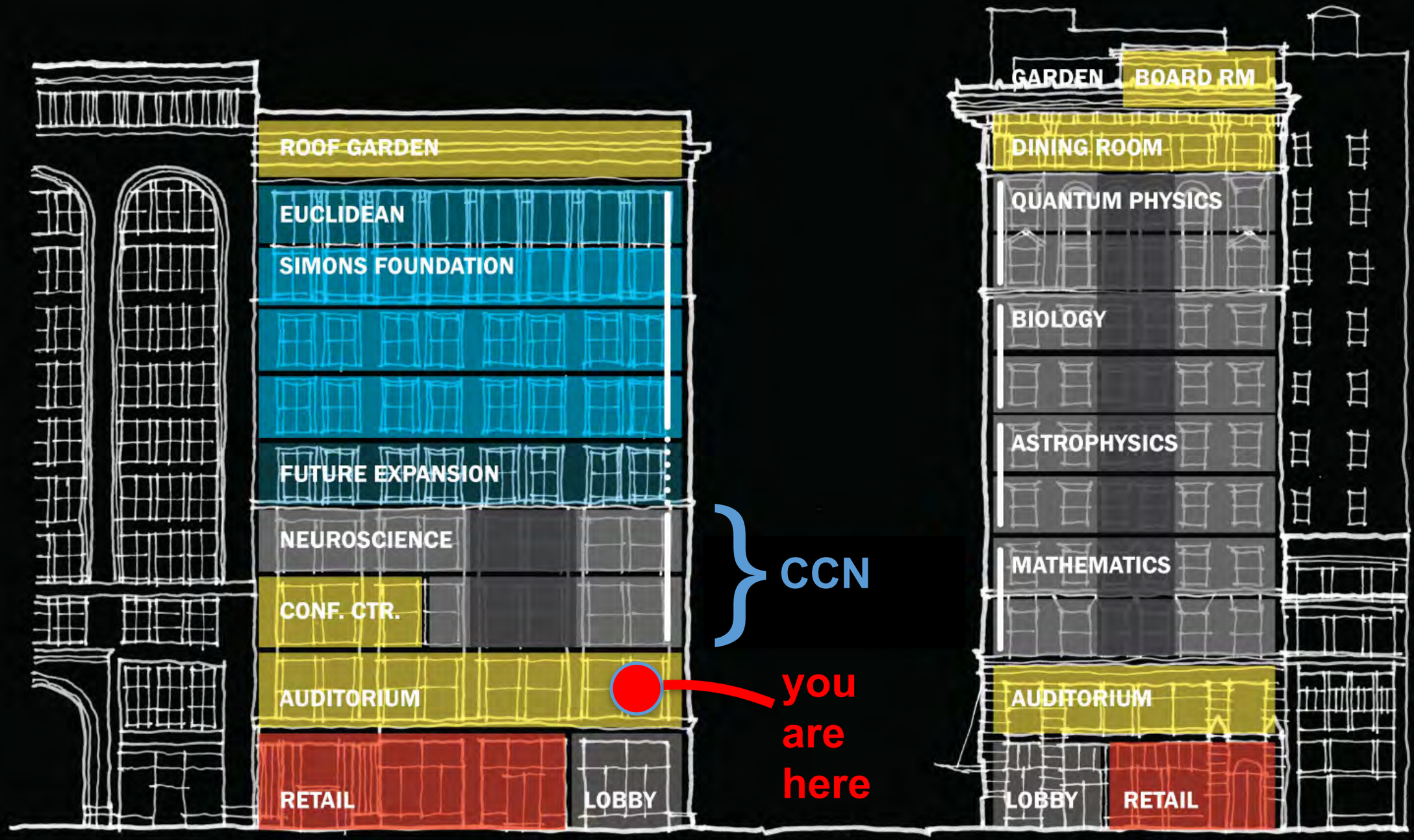
Simons Foundation - co-founded by Jim and Marilyn Simons in 1994, to support research in mathematics and basic sciences.

Flatiron Institute - internal research division, focused on advancing specific branches of science through computational methods.

Center(s) for Computational …

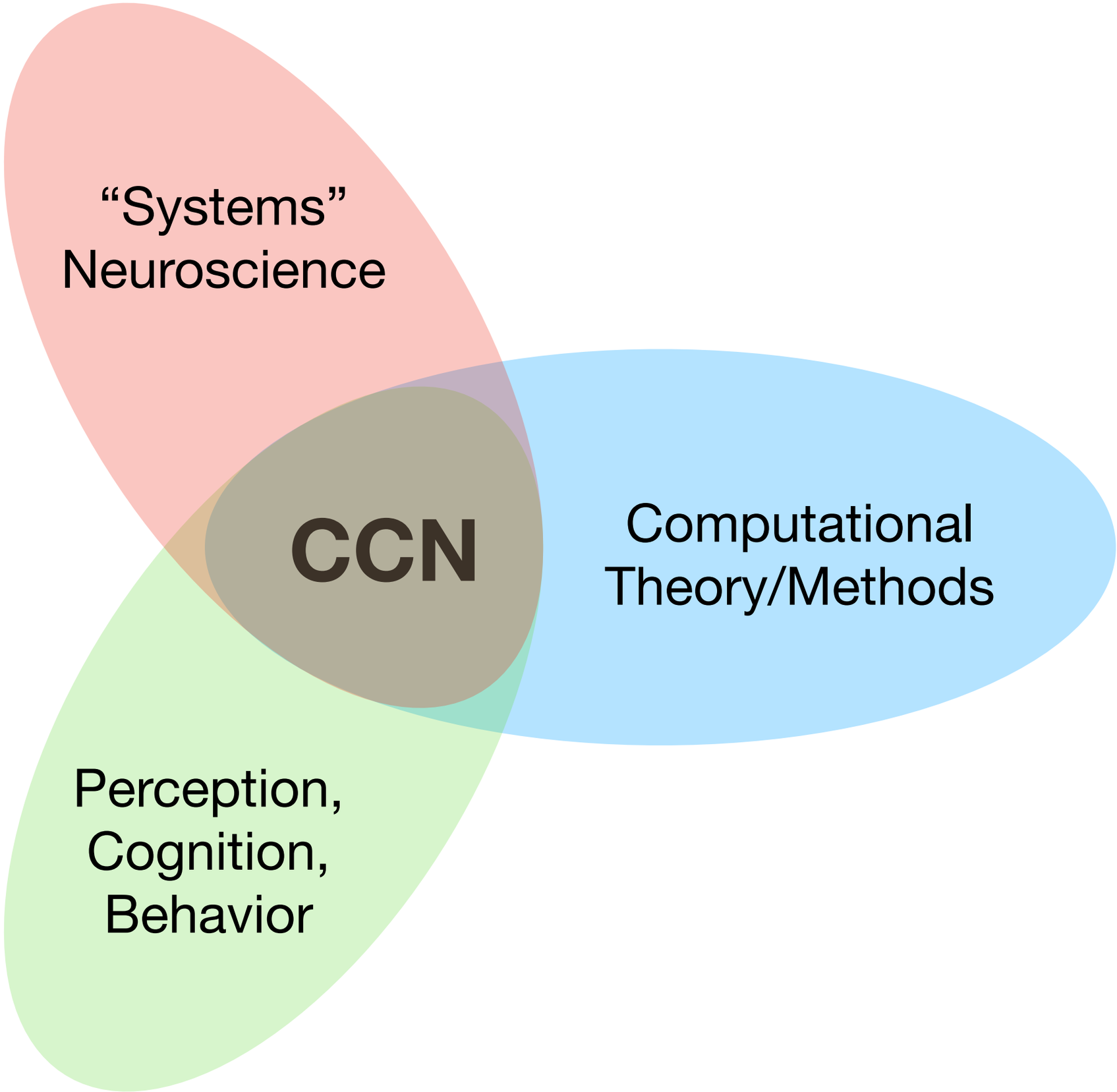
- Biology (2013)
- Astrophysics (2016)
- Quantum Physics (2017)
- Mathematics (2018)
- **Neuroscience (end 2020)**

Scientific Computing Core (2014)

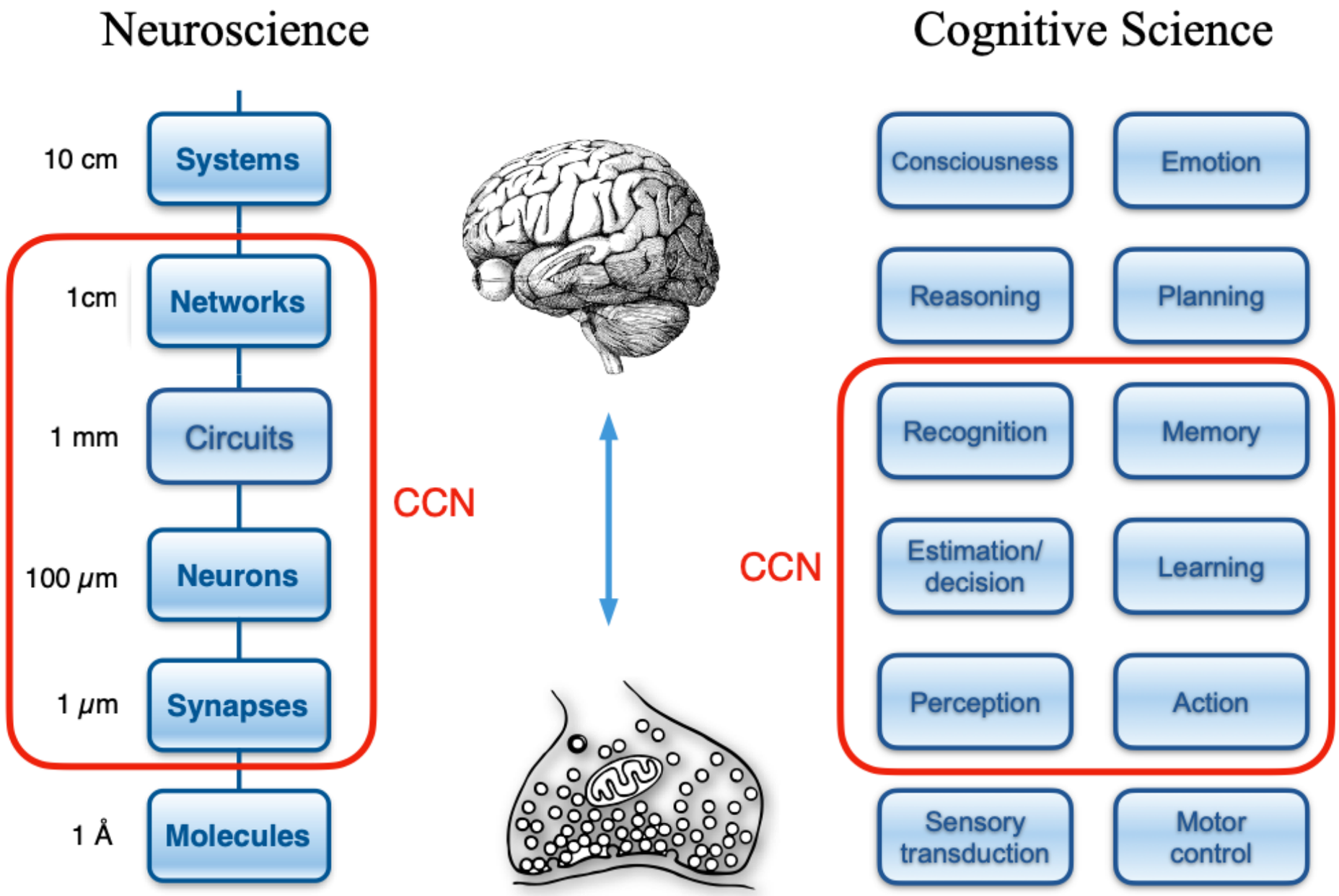


160 5th Ave

162 5th Ave


“Systems”
Neuroscience
CCN
Computational
Theory/Methods
Perception,
Cognition,
Behavior

Scale/Abstraction



[Figure modified from original of T. Sejnowski]

Neuroscience Research: Levels of Abstraction

Principles of neural computation:
adaptive transformation/representation
persistence/storage
inference/prediction/action

Models (math, architectures)
to instantiate these principles

Tools (algorithms, software)
to simulate, fit, and test these models

CCN Research Groups

Neural Circuits & Algorithms (Mitya Chklovskii)

Computational Vision (Eero Simoncelli)

NeuroAI and Geometric Data Analysis (SueYeon Chung)

Statistical Analysis of Neural Data (Alex Williams)

Data Science Team (NeuroRSE)

Edoardo Balzani • William Broderick • Sarah Jo Venditto • Guillaume Viejo

Goals

- Development, maintenance, dissemination of software tools for neural data analysis, modeling, and experimental design
- Standard/mature methods (*not* specialized/cutting-edge)
- Training/collaboration workshops for developers, and users
- Long-term commitment to maintenance/development

Pynapple (Python Neural Analysis Package)

NeMos (Neural Models)

Plenoptic (Model-based experimental stimulus design)

FLATIRON INSTITUTE
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Questions?