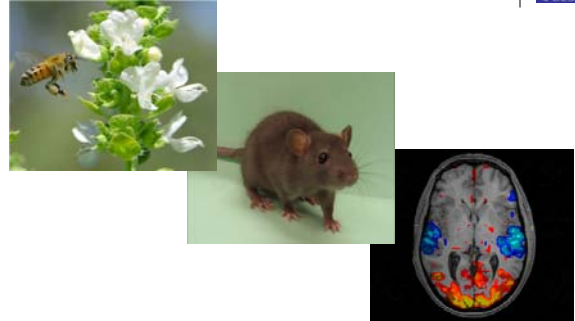


Thinking Systems: Navigating through Real and Conceptual Spaces

- The study of navigation in biological systems can be used to develop navigation algorithms in artificial systems (physical and conceptual)
- Algorithms for navigation in physical space can be used to navigate conceptual space



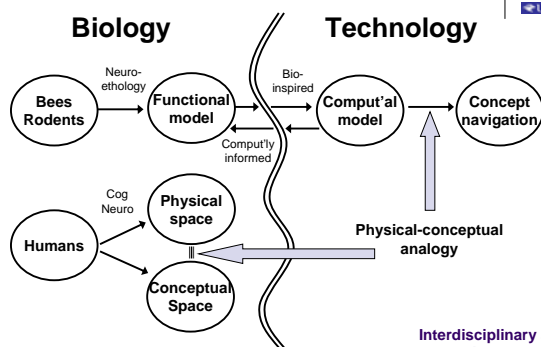
Navigation in Physical and Conceptual Spaces



Interdisciplinary and Innovative Approach



Bridging the Bio-Techno Divide Navigating through Real and Conceptual Spaces



Interdisciplinary and Innovative Approach



Scientific Impact

- Foundational science in understanding how information is processed in physical and conceptual space
 1. Neurogenesis in navigation
 2. Common principles of insect and mammal navigation
 3. Novel algorithms for robot navigation
 4. Neural underpinnings of conceptual maps
 5. Navigation in information spaces



Practical outcomes

- Biological outcomes
 - Principles underlying memory formation and memory degradation
 - Mechanistic understanding of mental health
- Biologically-inspired robotics
 - Navigation algorithms for highly unstructured environments
 - Construction sites, other planets, teenagers' bedrooms
- Automated information systems
 - Navigation in concept space (finding connecting paths between concepts)
 - Solving crimes, debating public policy, regional planning



Potential Practical Applications

Challenges



Theme 1: How does the odometer work in bees?



Theme 2: What do new brain cells do in hippocampus?



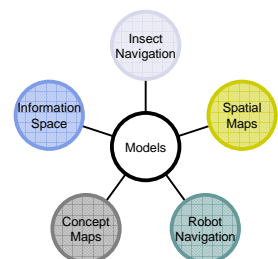
Theme 3: Build a bio-inspired mobile robot



Theme 4: What brain systems are used in symbolic navigation?

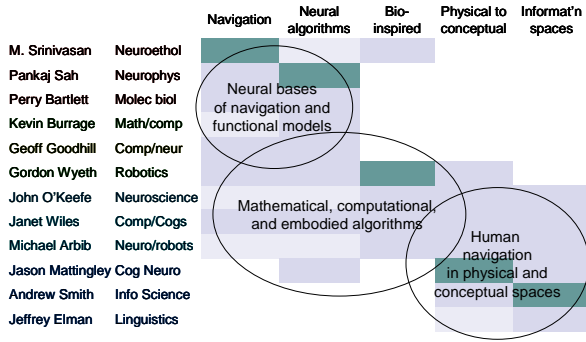


Theme 5: Build bio-inspired navigation into information spaces



The overarching challenge is to understand navigation in physical and conceptual spaces.

"Top scientists who want to work together with a seamless exchange of results and ideas to bridge the neural and computational divide"



Governance

