

NSC3270 / NSC5270

Computational Neuroscience

Tu/Th 9:35-10:50am
Featheringill Hall 129

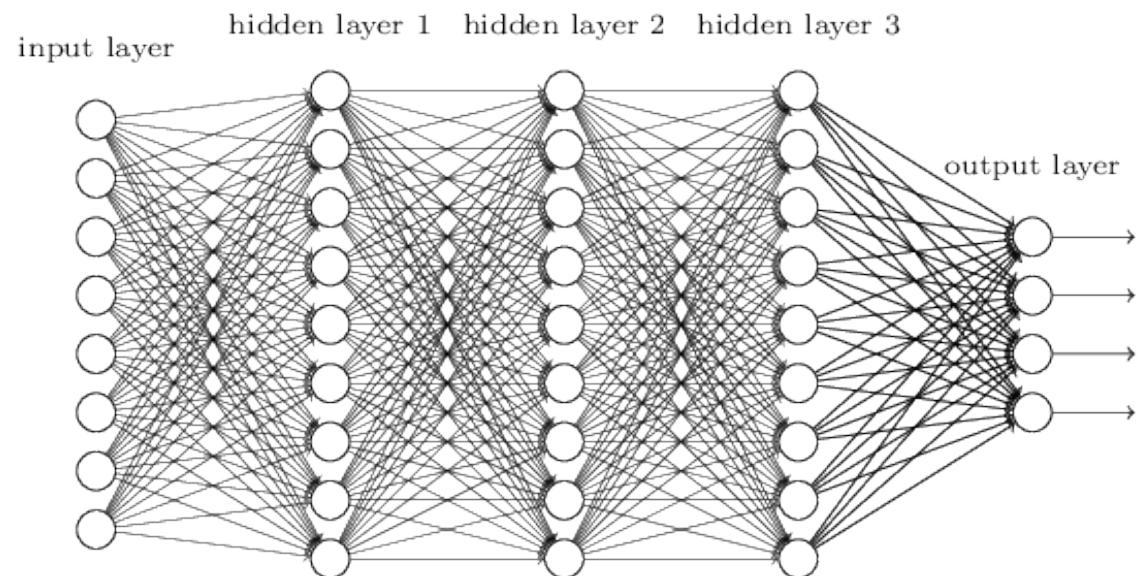
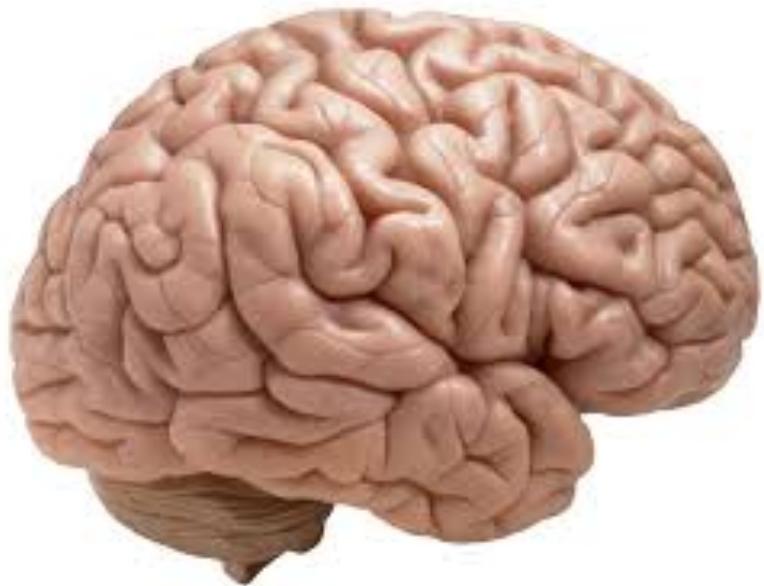
Professor Thomas Palmeri
Professor Sean Polyn

Computational Neuroscience

Theoretical, mathematical, and simulation models of neurons, neural networks, or brain systems. Computational approaches to analyzing and understanding data such as neurophysiology, electrophysiology, or brain imaging.

Computational Neuroscience

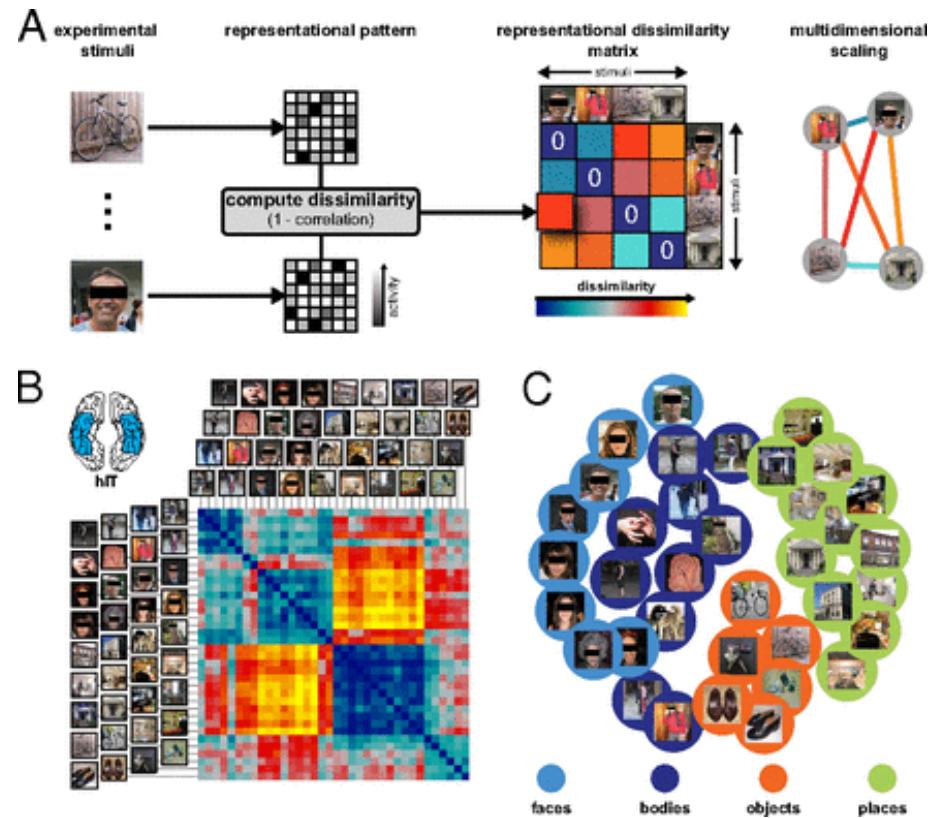
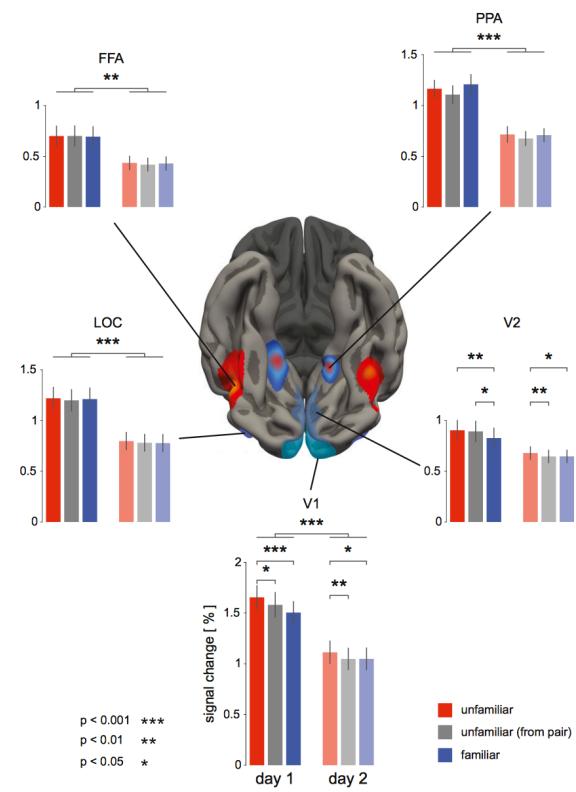
Theoretical, mathematical, and simulation models of neurons, neural networks, or brain systems. Computational approaches to analyzing and understanding data such as neurophysiology, electrophysiology, or brain imaging.



Part One : neural network models

Computational Neuroscience

Theoretical, mathematical, and simulation models of neurons, neural networks, or brain systems. **Computational approaches to analyzing and understanding data such as neurophysiology, electrophysiology, or brain imaging.**



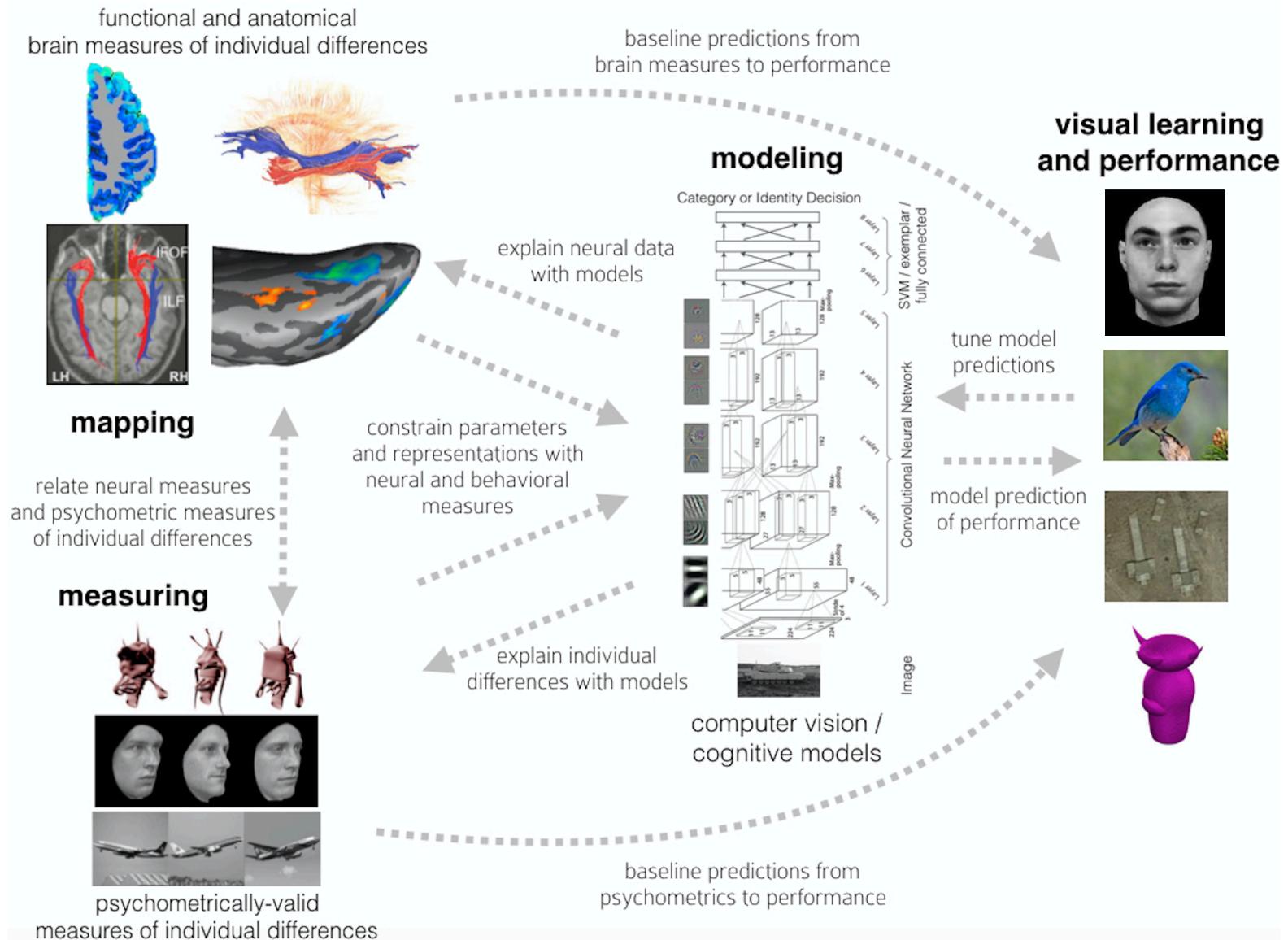
Part Two : computational neural analyses

About Us

Thomas Palmeri

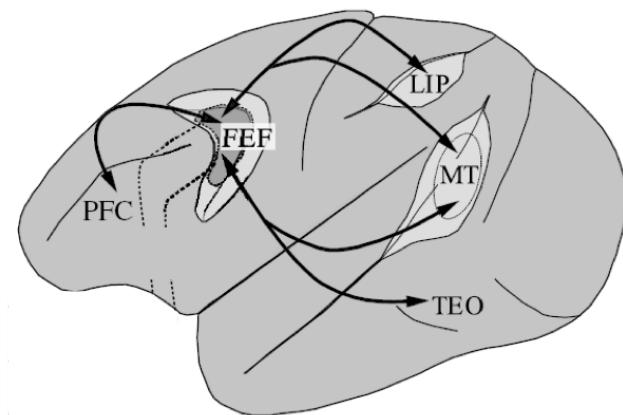
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cognitive and neural models of object and face recognition,
visual categorization and memory, and the development of perceptual expertise

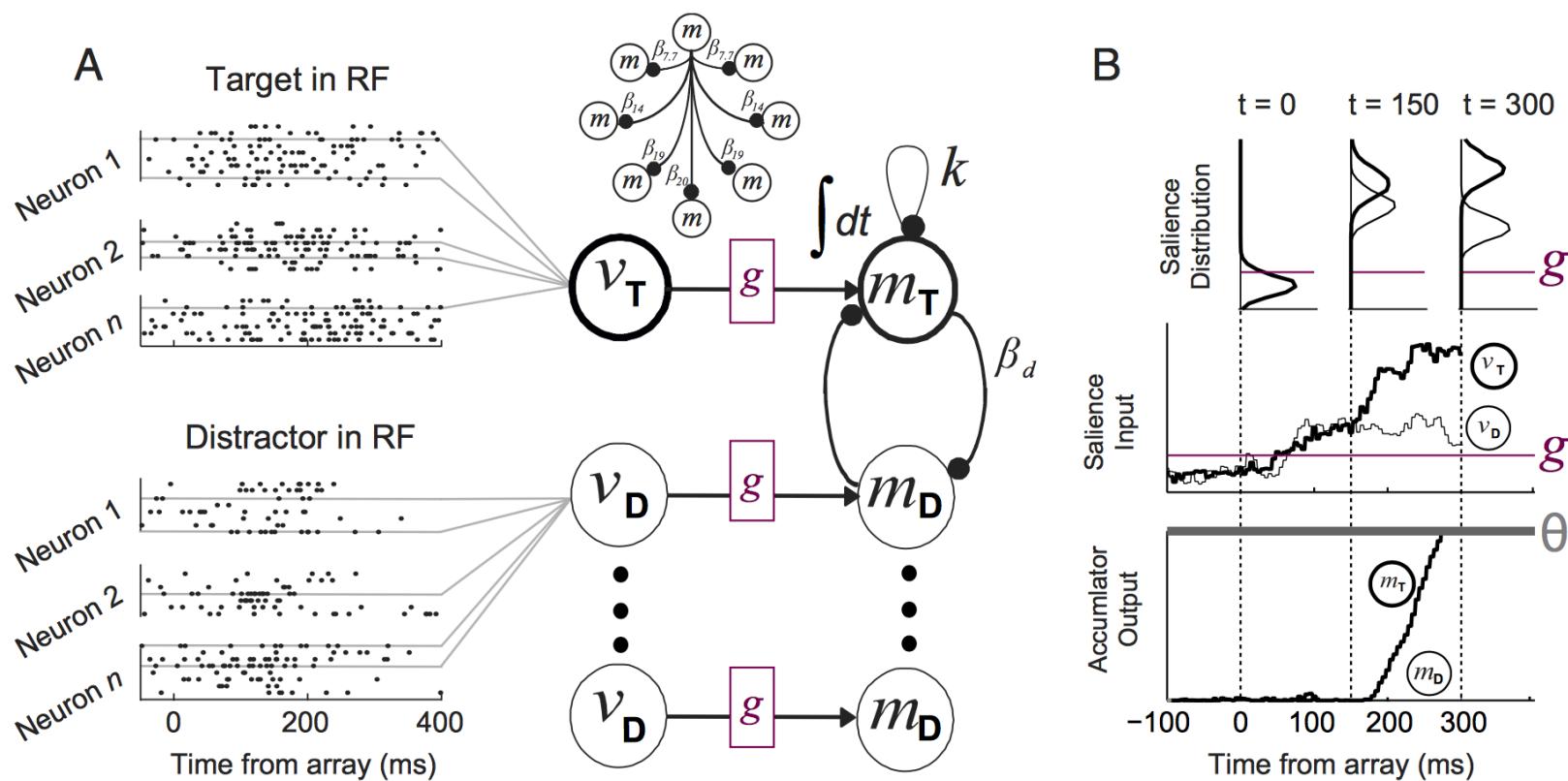


Thomas Palmeri

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neurocognitive models of perceptual decision making; models that predict and are constrained by neurophysiology



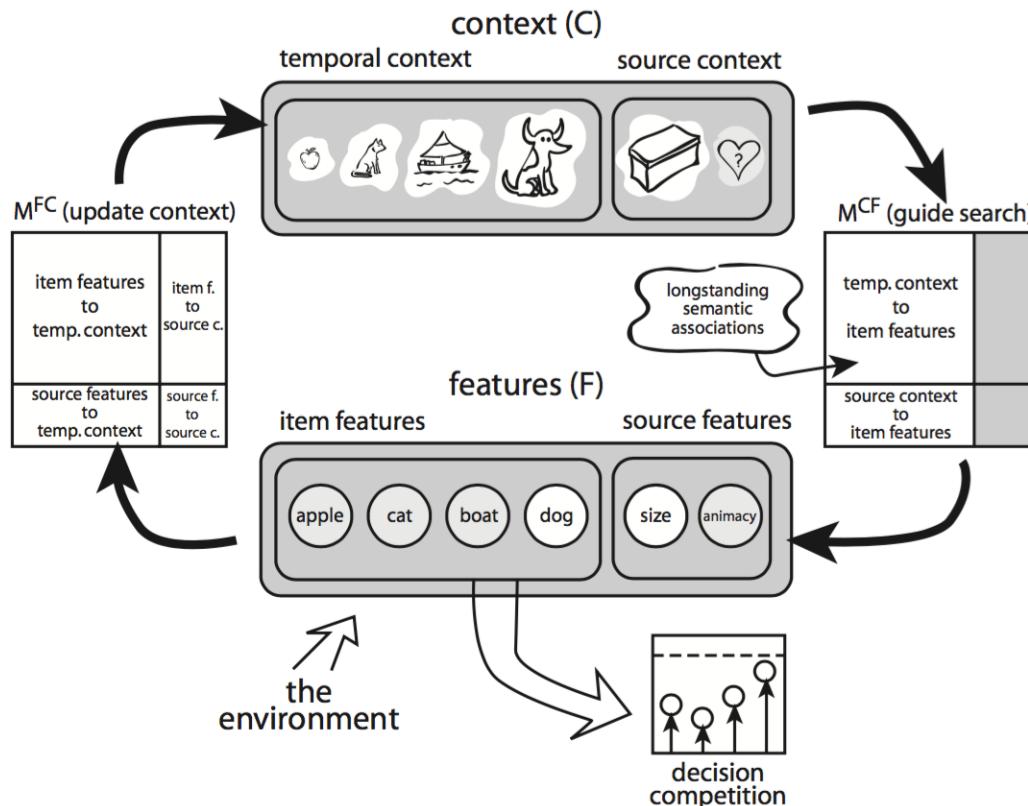
Thomas Palmeri

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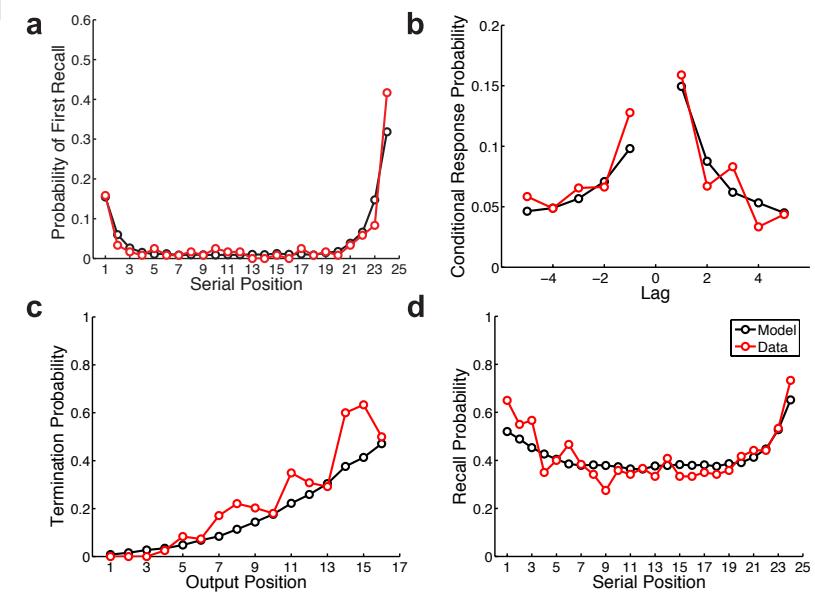
Sean Polyn

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Computational models of memory search: How do we target and retrieve relevant information from amongst thousands and thousands of memories?



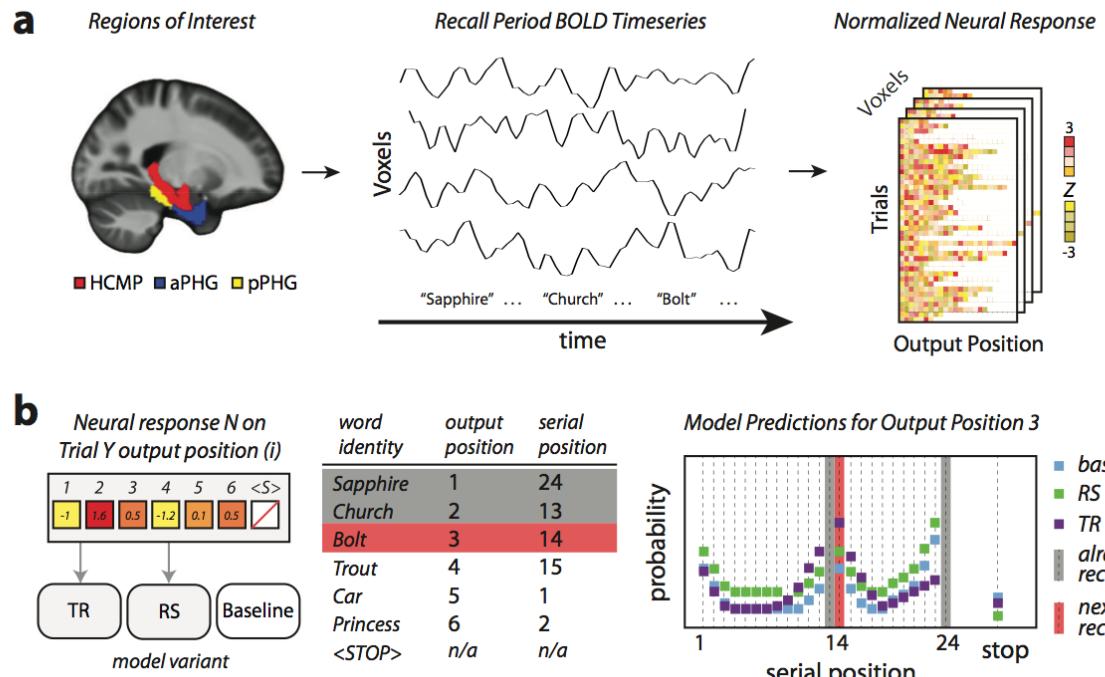
Simplified neural network models using basic cognitive mechanisms for integration of information, association formation, and decision making.



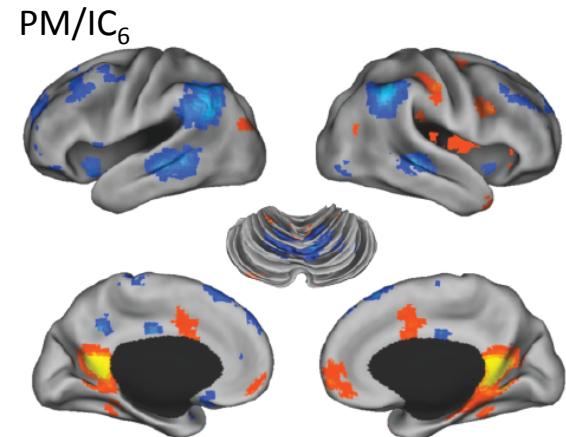
Sean Polyn

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Relating the model's computational mechanisms
to the dynamics of neural circuitry



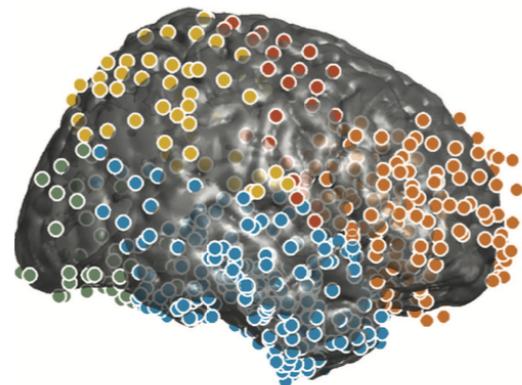
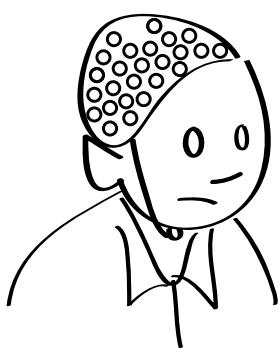
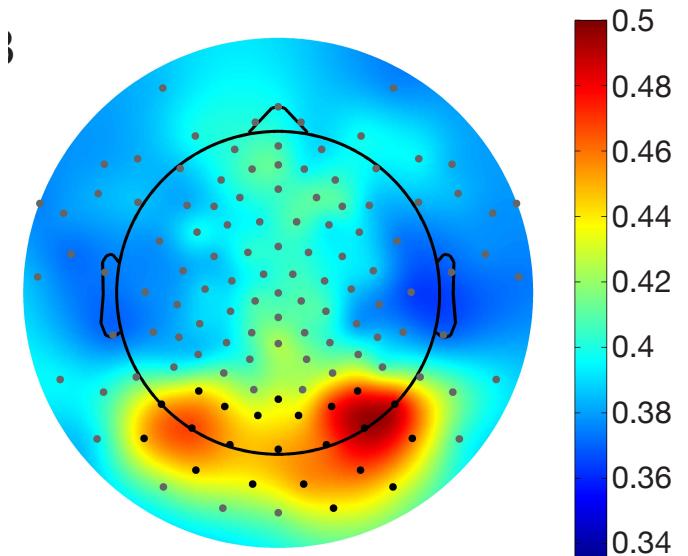
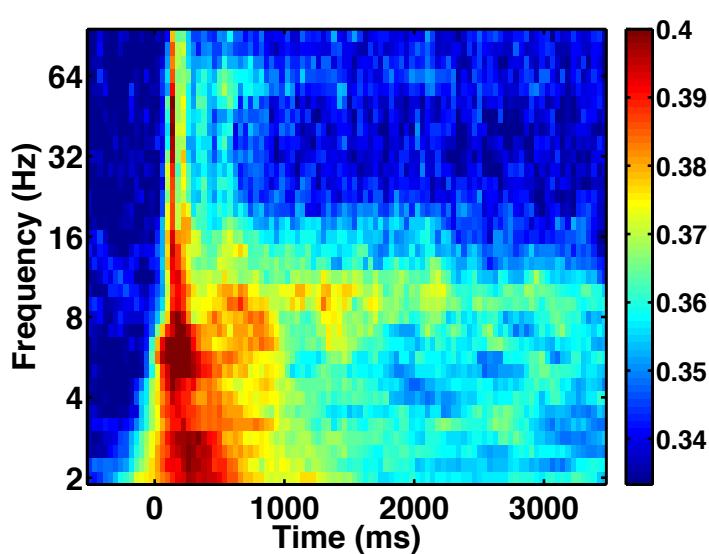
Identifying and tracking the activity in large-scale brain networks during study and memory search



Sean Polyn

About Us

Examining category-specific signals in oscillatory brain activity



Sean Polyn

Syllabus on Brightspace



NSC 3270-01 Computational Neuroscience (2019S)



Thomas Palmeri
as Student

Content Activities & Assessments ▾ Classlist Class Progress Media Gallery Library Resources Help ▾



Announcements ▾

[NSC3270/5270 course location](#)



NSC3270/5270 meets Tu/Th 9:35-10:50am in Featheringill Hall 129.

[Show All Announcements](#)

Brightspace Support Site ▾

Calendar ▾

Sunday, January 6, 2019



Upcoming events

JAN 9:35 AM
10 Homework 1 :
Installing Python,
Wing, and
Keras/TensorFlow -
Due

Computational Neuroscience

- **Mathematics**

basic calculus (derivatives and integrals)

basic linear algebra (vectors and matrices)

- **Computation**

knowledge of programming concepts

knowledge of a high-level programming language

we will use Python in this course

- **Neuroscience**

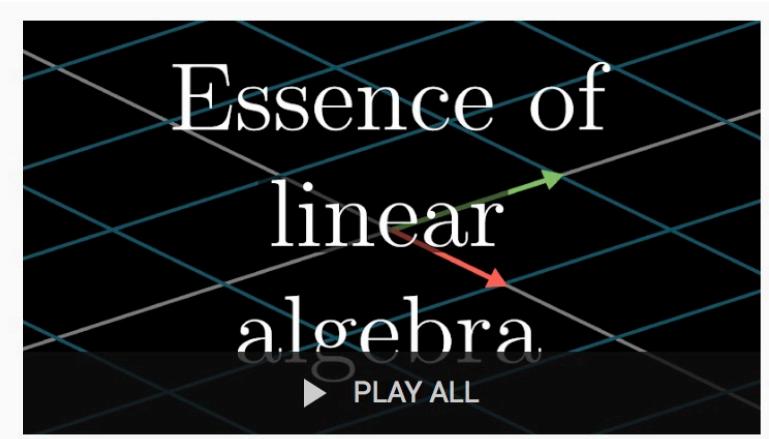
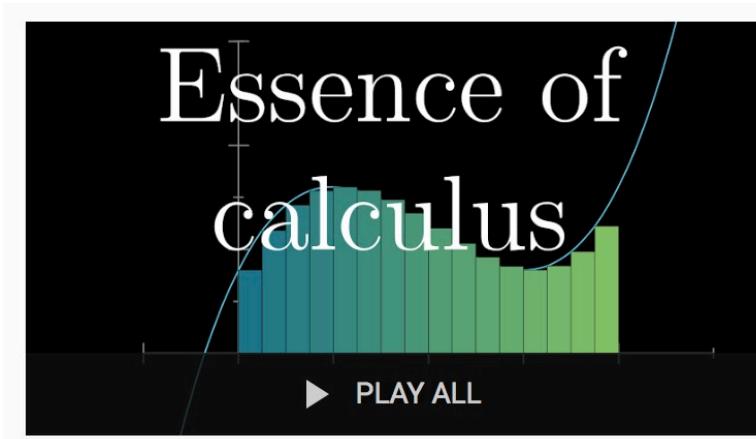
basic knowledge of structure and function

we will provide overviews of key concepts as necessary

- **Mathematics**

basic calculus (derivatives and integrals)

basic linear algebra (vectors and matrices)



links on Brightspace

try to review videos over the next couple of weeks

- **Computation**

knowledge of programming concepts

knowledge of a high-level programming language

we will use Python in this course



Python Resources:

[A Whirlwind Tour of Python](#) by Jake VanderPlas

[Python Data Science Handbook](#) by Jake VanderPlas

links on Brightspace (lots of other online resources)

cover key elements of Python this week

(quick to learn if you know Java or Matlab)

**Today and Thursday:
Installing/Configuring Python and Tools
Overview of Python**

First Homework Assignment: Download and Install Python 3.6.x Wing IDE, Keras / TensorFlow

we encourage you to bring laptops to class for running Python code and doing class-related work

Other Course Logistics

- **Readings**
 - no textbook, course readings / videos on Brightspace
- **Brightspace**
 - required and/or suggested readings
 - copies of class slides (after class)
 - homework assignments (handed out and turned in)
 - code used in class and/or used for homeworks
- **Course Grade**
 - almost entirely based on homework assignments
 - about one homework assignment per week
 - graded by running Python code and by evaluating written answers to questions
 - 10% penalty per day for late homeworks
 - graduate students have a small additional "project"

don't be shy about asking for help

- start homework assignments early
- email us with questions
- come to office hours (see Brightspace)
- schedule an appointment
- we may follow up by sending email to the class clarifying concepts or providing additional information
- ask other students for help
 - you benefit from learning from a peer
 - they benefit from teaching a concept to a peer
 - homework assignments must be independent

For Today

Required Readings

Chapter 1 of Churchland, P.S., & Sejnowski, T.J. (2017). *The Computational Brain* (25th Anniversary Edition). MIT Press.

For Thursday

Required Readings

Chapter 2 of Churchland, P.S., & Sejnowski, T.J. (2017). *The Computational Brain* (25th Anniversary Edition). MIT Press.

links on Brightspace