



## PSTR236.14 / VV17 - Prefrontal ensemble dynamics in spatial working memory in marmosets

November 13, 2023, 8:00 AM - 12:00 PM

WCC Halls A-C

### Presenter at Poster

Mon. Nov. 13, 2023 9:00 AM - 10:00 AM

### Session Type

Poster

### Grant Support

Canada research chair

### Grant Support

VISTA, York university

### Citation

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Prefrontal ensemble dynamics in spatial working memory in marmosets.

Program No. PSTR236.14.

2023 Neuroscience

Meeting Planner.

Washington, D.C.: Society for Neuroscience, 2023, Online.

### Presentation Number

PSTR236.14

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### Disclosures

**N. Katyare:** A. Employment/Salary (full or part-time); York university. **R. Wong:** A. Employment/Salary (full or part-time); Western University, London, ON, Canada. **S. Everling:** A. Employment/Salary (full or part-time); Western University, London, ON, Canada. **L. Ma:** A. Employment/Salary (full or part-time); York university.

### Abstract

Neurons in the lateral prefrontal cortex (IPFC) are known to play a role in spatial working memory. Single unit recordings from the IPFC of marmosets during a delayed-match-to-location task confirmed that like Macaques, marmoset IPFC neurons exhibit directional tuning, which correlated with task performance (Wong et al., 2022). Not much, however, is known about population coding in the IPFC of marmosets. Here, we re-analyzed data from Wong et al. (2022), focusing on the coding of spatial information in neuronal ensembles using support vector machines, using 2 different approaches: Best unit and Optimized (Leavitt et al., 2017). In the Best-unit approach, we first sorted neurons based on their decoding accuracy. We then calculated decoding accuracy of top-N neuron ensembles at each size. In the Optimized approach, we identified the N+1 neurons that together with the top neuron, achieved the best performance. As previously reported in macaques, the Optimized approach significantly out-performed the Best-unit approach; and ensembles of size 5-15 performed superior to full ensembles. We next analyzed the ensemble performance separately for broad-spiking and narrow-spiking neurons (BSNs and NSNs). Although BSNs dominated the ensembles, the NSNs contribute substantially to the decoding, especially in the Optimized ensembles, indicating a significant role of interneurons in spatial coding. Analysis of signal and noise correlations revealed a population of non-tuned neurons that were present in Optimized but not in the Best-unit ensembles, and 80-100 % of these exhibited significant noise correlations with tuned neurons. This observation supports a role of noise correlations in enhancing spatial coding. Finally, we observed that the average inter-unit distance for a 10-neuron ensemble was significantly shorter than the average inter-unit distance among the population. This indicates colocalization of neurons that play key roles in spatial coding in IPFC. Our results provide the first evidence that population-level coding properties in the IPFC can be generalized across primate species. References Leavitt ML, Pieper F, Sachs AL, Martinez-Trujillo JC (2017) PNAS 114:E2494-E2503. Wong RK, Selvarajayagam J, Johnston KD, Everling S (2022) Cerebral Cortex: bhac289.

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## **Table of Contents Society For Neuroscience Abstracts**

1. Understanding the eBook Society For Neuroscience Abstracts
  - The Rise of Digital Reading Society For Neuroscience Abstracts
  - Advantages of eBooks Over Traditional Books
2. Identifying Society For Neuroscience Abstracts
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Society For Neuroscience Abstracts
  - User-Friendly Interface
4. Exploring eBook Recommendations from Society For Neuroscience Abstracts
  - Personalized Recommendations
  - Society For Neuroscience Abstracts User Reviews and Ratings
  - Society For Neuroscience Abstracts and Bestseller Lists
5. Accessing Society For Neuroscience Abstracts Free and Paid eBooks

- Society For Neuroscience Abstracts Public Domain eBooks
- Society For Neuroscience Abstracts eBook Subscription Services
- Society For Neuroscience Abstracts Budget-Friendly Options
- 6. Navigating Society For Neuroscience Abstracts eBook Formats
  - ePub, PDF, MOBI, and More
  - Society For Neuroscience Abstracts Compatibility with Devices
  - Society For Neuroscience Abstracts Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Society For Neuroscience Abstracts
  - Highlighting and Note-Taking Society For Neuroscience Abstracts
  - Interactive Elements Society For Neuroscience Abstracts
- 8. Staying Engaged with Society For Neuroscience Abstracts
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Society For Neuroscience Abstracts
- 9. Balancing eBooks and Physical Books Society For Neuroscience Abstracts
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Society For Neuroscience Abstracts
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Society For Neuroscience Abstracts
  - Setting Reading Goals Society For Neuroscience Abstracts
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Society For Neuroscience Abstracts
  - Fact-Checking eBook Content of Society For Neuroscience Abstracts
  - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development

- Exploring Educational eBooks

#### 14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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