

# Vikram Pal Singh, Ph.D.

## Assistant Project Scientist-I

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### Research interests:

- Dynamics of body, head and eye coordination in active vision.
- **Multi-sensory integration** in freely behaving primates.
- Neural mechanisms of **learning and memory** in primates across multiple brain regions.
- Visually guided **decision-making** and its neural computation.
- Allocentric visual **space representation** in primate hippocampus

### Academic appointments:

2020 – Postdoctoral fellow, Dept. of Psychology, University of California, San Diego

2019 - Senior Research Associate, Centre for Neuroscience, Indian Institute of Science

### Education:

**Ph.D.** Cognitive Science, Indian Institute of Science, India, 2020

Dissertation: *Role of mental schema in learning, memory and problem-solving*

Committee members: Balaji Jayaprakash, Aditya Murthy, Naresh Ramanan

**M.Sc.** Cognitive Science, Indian Institute of Science, India, 2020

**B.Sc.** General Microbiology, University of Pune, India, 2012

### Academic Service:

2025: Unit chair for Academic Researchers Union UCSD

2022-24: SimCo (primate advocacy) abstract submission organizer  
USA

2022-23: Marmoset bio symposium abstract submission organizer  
Society for Neuroscience Meeting (San Diego and Chicago)

2017: Spikes speaker series organizer  
Indian Institute of Science, Bangalore, India

2013 &18: Cognition workshop organizer  
Indian Institute of Science, Bangalore, India

2015-17: General Secretary for Sports and culture,  
Indian Institute of Science, Bangalore, India

## Advising:

### Undergraduate/ master's Students:

2018-2020: Yagika Kaushik (CNS, Indian Institute of Science)  
*now pursuing PhD under Prof. Bruce McNaughton*  
2018-2020: Shruthi Sankaranarayanan (CNS, Indian Institute of Science)  
*now pursuing MSc with Prof. Robert M. G. Reinhart*  
2020: Vaibhav Chippalkatti (CNS, Indian Institute of Science)  
*now pursuing PhD with Prof. Anthony Holtmaat*  
2022-23: Seamus McGarvy (University of California, San Diego)  
2022-24: Max Gibson (University of California, San Diego)  
2023-24: Kana Dawson (University of California, San Diego) for URH Summer Scholarship

## Patents:

Provisional patent application no: **US 20230404467 A1** filed by the Regents of the University of California entitled "*Head Mounted Camera and Eye Track System for Animals.*"

## Invited Talks, Colloquiums, and Awards:

2023 - NIH Brain Behavior Quantification and Synchronization Workshop  
*Head-mounted eye tracking in freely behaving animals*

2022- Junior Scientist Talk, Marmoset symposium 2022  
*Active vision in common marmoset*

2020 & 2024- Marmoset PI Meeting, Boulder, CO  
*Organizers: Kuo-Fen Lee (Salk) and Cory Miller (UCSD)*  
*Discussions to standardize care and use of marmoset in research*

2019- Zeiss Microscopy Conclave 2019, Bangalore

*Multiphoton microscopy: Bench to brain.*

2012- Student of the year for all round performance, 2012, AGC, Pune

2011- Represented Pune city at Zonal Archery competition

2010- Most deserving student award, AGC, Pune

2010- Chemiad-2010 Pune district 2nd Rank

Research and Work-Related Experiences:

2013: Doctoral mini-project, Indian Institute of Science, Bangalore  
*Differentiating cardiac and skeletal actin proteins in Zebrafish using immunohistochemistry and confocal microscopy*  
Advisor: Upendra Nongthomba

2012: Doctoral mini-project, Indian Institute of Science, Bangalore  
*p47/p53 ratio in various cancerous cell lines*  
Supervisors: Saumitra Das

2012: Doctoral mini-project, Indian Institute of Science, Bangalore  
*Pulse width measurement of ultrafast LASERs using interferometry*  
Advisor: Balaji Jayaprakash

2011: PICC-NNT scholarship, University of Pune, India  
*Comparison of microbial gut flora of wild and captive animals using 16S rRNA gene sequencing.*  
Advisor: Yogesh Shouche

Research Articles under review:

**Singh, Vikram Pal**, Shruti Shridhar, Shankanava Kundu, Richa Bhatt, and Balaji Jayaprakash. 2024. "Mental Schema Reduces Cognitive Load and Facilitates Emergence of Novel Responses in Mice and Artificial Neural Networks." BioRxiv.  
<https://doi.org/10.1101/2024.10.23.619968>.

Lefevre Arthur, **Singh Vikram Pal Singh**, Tyree Timothy, Li Jingwen, Duhamel Jean-Rene, Cory Miller. 2025. "Primate ACC encodes natural vocal interactions in a 'cocktail party'."

## Peer-reviewed Research Articles:

1. **V.P. Singh**, J. Li, K. Dawson, J.F. Mitchell, & C.T. Miller. "Active vision in freely moving marmosets using head-mounted eye tracking". PNAS. U.S.A. 122 (6) e2412954122, <https://doi.org/10.1073/pnas.2412954122> (2025).
2. Michelle R Farkas, Shanelle Dorn, Liam Muller, **Vikram Pal Singh**, Yadira J Sepulveda, Raymond T Suhandynta, Jeremiah D Momper, Koichi Masuda, Philip J Richter. "Pharmacokinetics, Fecal Output, and Grimace Scores in Rabbits Given Long-acting Buprenorphine or Fentanyl for Postsurgical Analgesia". JAALAS. **2024** Mar
3. Miguel R. Chuapoco, Nicholas C. Flytzanis, Nick Goeden, J. Christopher Octeau, Kristina M. Roxas, Ken Y. Chan, Jon Scherrer, Janet Winchester, Roy J. Blackburn, Lillian J. Campos, Kwun Nok Mimi Man, Junqing Sun, Xinhong Chen, **Vikram Pal Singh**, Arthur Lefevre, Cynthia M. Arokiaraj, Timothy F. Miles, Julia Vendemiatti, Min J. Jang, John Miche, Yeme Bishaw, Bryan Gore, Victoria Omstead, Naz Taskin, Natalie Weed, Jonathan Ting, Cory T. Miller, Benjamin E. Deverman, James Pickel, Lin Tian, Andrew S. Fox, Viviana Gradinaru; "Intravenous functional gene transfer throughout the brain of non-human primates using AAV". Nature nanotechnology. **2023** Jul
4. Shridhar S, **Singh VP**, Bhatt R, Kundu S, Balaji J; "A new paradigm for investigating temporal order memory shows higher order associations are present in recent but not in remote retrieval." Exp Brain Res. 2022 Feb;240(2):611-629. (**2022**)
5. Singh A, Kumar S, **Singh VP**, Das A and Balaji J; "Flavor Dependent Retention of Remote Food Preference Memory". Frontiers in Behavioral Neuroscience 11:7(**2017**)

## Peer-reviewed Review Articles:

1. **Singh VP**, Singh A, Balaji J; "Estimating the Limiting Speed of Acquisition in Next Generation In-Vivo Imaging at Mesoscales". iScience Notes Vol. 4 Article 4 (**2019**)
2. Singh A, Kumar S, **Singh VP**, Balaji J; "Optical microscopy methods for understanding learning and memory". Current Science 105, 1537–1548 (**2013**)

## Conference Poster Presentations:

1. **V Singh**, J LI, C Miller; "Behavioral correlates of active vision in freely moving marmosets using head mounted eye-tracking" Washington DC: **Society for neuroscience**, **2023**

2. **V Singh**, J Li, C Miller; *“Embedded system-based neurophysiology coupled head mounted eye tracking in freely moving marmosets.”* San Diego: **Society for Neuroscience, 2022**
3. **V Singh**, R Bhatt, S Kundu, S Shridhar, A Singh, S Sam, B Jayaprakash; *“Bayesian nature of remote memory assisted learning (Mental Schema) and its role in problem solving in mice.”* Washington, DC: **Society for Neuroscience, 2017**
4. **V Singh**, R Bhatt, S Kundu, S Shridhar, A Singh, S Sam, B Jayaprakash; *“Acquisition dependent influence of mental schema on problem solving in mice.”* San Diego: **Society for Neuroscience, 2016**
5. **V Singh**, S Shridhar, S Kundu, R Bhatt, S Sam, A Singh, S Kumar, J Balaji; *“Differential influence of neocortical networks (mental schema) in relational and abrupt learning.”* Chicago: **Society for Neuroscience, 2015**