

SUSHRUT THORAT

CONTACT INFORMATION

EMAIL: sushrut.thorat94@gmail.com WEBSITE: sushrutthorat.com
GITHUB: [novelmartis](#) OTHER INFO: [Short-CV](#)

MISSION

Understanding and building resource-constrained agents that can learn and function in the wild

RESEARCH AREAS

Lifelong learning, decision-making & reasoning, recurrent computations, explainable AI

ACADEMIC TRAJECTORY

Postdoc in Machine Learning 2022 - present
Institute of Cognitive Science, Osnabrück University, Germany
Advisor: Tim Kietzmann

Ph.D. in Cognitive Neuroscience 2017 - 2021
Donders Centre for Cognition, Radboud University, The Netherlands
[Thesis](#): Smart Search - Investigations into human visual search in structured environments
Advisors: Marius Peelen and Marcel van Gerven

M.Sc. (cum laude) in Cognitive Neuroscience 2015 - 2017
Center for Mind/Brain Sciences (CIMEC), University of Trento, Italy
[Thesis](#): Using Convolutional Neural Networks to measure the contribution of visual features to the representation of object animacy in the brain
Advisor: Marius Peelen

B.Tech. in Engineering Physics 2011 - 2015
Department of Physics, Indian Institute of Technology - Bombay (IIT-B), India
[Thesis](#): Quadcopter Flight Control using Modular Spiking Neural Networks
Advisor: Bipin Rajendran

KEY PUBLICATIONS

[Thorat S*](#), [Aldegheri G*](#), [Kietzmann TC](#) (2021). Category-orthogonal object features guide information processing in recurrent neural networks trained for object categorization. *Shared Visual Representations in Human & Machine Intelligence Workshop @ NeurIPS*. *equal contribution.

[Thorat S](#), [Proklova D](#), [Peelen MV](#) (2019). The nature of the animacy organization in human ventral temporal cortex. *eLife* 8: e47142.

[Anthes D*](#), [Thorat S*](#), [Konig P](#), [Kietzmann TC](#) (2024). Keep Moving: identifying task-relevant subspaces to maximise plasticity for newly learned tasks. *Conference on Lifelong Learning Agents (CoLLAs)*. *equal contribution.

[Thorat S](#), [Quek GL](#), [Peelen MV](#) (2022). Statistical learning of distractor co-occurrences facilitates visual search. *Journal of Vision* 22(10), 2-2.

[Thorat S](#), [Peelen MV](#) (2022). Body shape as a visual feature: evidence from spatially-global attentional modulation in human visual cortex. *NeuroImage*: 119207.

~ A full list of publications can be accessed on [Google Scholar](#); short descriptions on my [website](#).

ACHIEVEMENTS/ AWARDS

- Voted **best poster/short-pitch**, among **15 posters**, in the 'Perception, Action, and Control' theme at the annual Donders Poster Session (2020).
- Recipient of the **Merit Award** (2017), awarded to students who achieve remarkable results at the end of their degree, by the University of Trento, Italy.
- Recipient of the **Abstract Award**, awarded to **5 of the 57** accepted abstracts at the Rovereto Workshop on Concepts, Actions and Objects (2017).
- Ranked **721 among 450,000** students in the Joint Entrance Examination (**JEE, 2011**) conducted towards admission to the Indian Institute of Technology (IIT).

- Recipient of the **KVPY scholarship** (2009), awarded to **215 students across India** with talent and aptitude for research, by the Dept. of Science & Technology, Govt. of India.
- Recipient of the **NTSE scholarship** (2007), awarded to **1000 students across India** with high intellect and academic talent, by the National Centre for Educational Research and Technology, Govt. of India.

TECHNICAL EXPERIENCE

Programming languages: Python, MATLAB, Javascript

Machine learning frameworks: TensorFlow, PyTorch, MatConvNet

Experimentation frameworks: PsychToolbox, jsPsych, Pavlovla

Imaging techniques: fMRI, EEG, EyeLink

CONFERENCE TALKS

Category-orthogonal object features guide information processing in recurrent neural networks trained for object categorization

(Talk) *European Conference on Vision Perception (ECVP)*, Nijmegen, 2022

(Flash talk) *Neuromatch conference 4.0*, Online, 2021

Body silhouettes as features in visual search: evidence from spatially-global attention modulation in visual cortex

(Talk) *Neuromatch conference 3.0*, Online, 2020

The functional role of cue-driven feature-based feedback in object recognition

(Talk) *Perception Day*, Nijmegen, 2018

Using convolutional neural networks to measure the contribution of visual features to the representation of object animacy in the brain

(Talk) *Rovereto Workshop on Concepts, Actions and Objects (CAOs)*, Rovereto, 2017

REVIEWING WORK

Nature Human Behavior, Neural Networks, PLOS Computational Biology, Nature Communications, Science Advances, NeurIPS, Memory & Cognition, eLife, CCN

SUPERVISION EXPERIENCE

Supervision of 11 undergraduate, 3 masters, and 3 PhD students. Notable theses are listed.

- (Bachelors) Lotta Piefke: *Investigating the practicality and emergence of the Attention Schema Theory* Osnabrück University, 2023
- (Masters) Jochem Koopmans: *How our predictions do not deceive us: an investigation of the illusory perception of upside-down letters* Radboud University, 2022
- (Bachelors) Sjoerd Meijer & Ilze Thoonen: *Primed modulation of low-level object features using real-world objects and scenes* Radboud University, 2018

TEACHING EXPERIENCE

- **Lecturer:** *Reading group on integrative systems approaches in computational cognitive neuroscience* (design, supervision, & evaluation; Masters) Osnabrück University, 2024
- **Lecturer:** *Topics in cognitive neuroscience* (design, teaching, & evaluation; Masters) Osnabrück University, 23-24
- **Lecturer:** *Machine learning for cognitive computational neuroscience* (teaching, & evaluation; Masters) Osnabrück University, 2023
- **Lecturer:** *Reading group at the intersection of neuroscience & machine learning* (design, supervision, & evaluation; Masters) Osnabrück University, 2023
- Mentor: *Neuromatch Academy (Deep Learning course)* Online, 2022
- Teaching Assistant: *Advanced Academic & Professional Skills* (evaluation; Masters) Radboud University, 2020
- Teaching Assistant: *Neural Networks* (supervision & evaluation; Bachelors) Radboud University, 2019
- Guest Lecturer: *Academic Skills 2* (teaching & evaluation; Bachelors) Radboud University, 18-19

- Teaching Assistant: *Brain for AI* *Radboud University, 2018*
(supervision & evaluation; Bachelors)

**WORKSHOPS
ATTENDED**

Analytical Connectionism (AC) *September, 2023*
London, United Kingdom
Project: Visual feature manifolds in a convolutional RNN.

IBRO-SIMONS Computational Neuroscience Imbizo (ISi-CNI) *January, 2017*
Cape Town, South Africa
[Project](#): Assessing the role of feature attention in object detection with CNNs.

Computational Approaches to Memory and Plasticity (CAMP) *June, 2015*
Bangalore, India
Project: The role of the billions of granule cells in the cerebellum.

INVITED TALKS

Behaving RNNs: Bridging the gap between naturalistic evidence and decision-making
(Lab retreat talk) Cichy lab, FU, Berlin, 2024

Useful scene representations
(Lab meeting talk) Kaiser lab, JLU, Giessen, 2023

Category-orthogonal object features guide information processing in recurrent neural networks
trained for object categorization
(Guest talk) MSc course on *Advanced Neural and Cognitive Modelling*, UvA, Amsterdam, 2022

Representations: Useful, useless or harmful?
(Seminar talk) Foundations of Cognition Series, Donders Institute, Nijmegen, 2019

**OTHER WORK
EXPERIENCE**

General Secretary *2014-15*
Undergraduate division - Department of Physics, IIT Bombay

Content Developer *Summer 2013*
Avanti Fellows, Delhi