# Victoria Laura Bosch

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| Current Position: | **Ph.D. student \| Cognitive Computational Neuroscience** |
| | Kietzmann Lab, Machine Learning Group |
| | Institute for Cognitive Science, University of Osnabrück, Germany |
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| | GitHub |
| | OrcID |

## Education

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| Nov 2022 – Current: | Ph.D. student at the University of Osnabrück. |
| | Advisor: Prof. Dr. Tim C Kietzmann |
| | Funded by ERC project 'It's about time: Towards a dynamic account of natural vision'. |
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| Sep 2020 – Jul 2022: | MSc. in Cognitive Computing (Artificial Intelligence). *Cum laude*. Radboud University (Donders Institute). |
| | Thesis: '*Topographic Neural Networks show neural recycling of labile units during reading acquisition*' |
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| Sep 2016 – Jul 2020: | BSc. in Liberal Arts & Sciences (i.e., interdisciplinary studies). Major in Artificial Intelligence and minor in Philosophy. University of Utrecht. Thesis: '*A Bayesian perspective on the interaction between numerical and temporal perception*' |

### Other education

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| Sept 2023: | Participation in the Analytical Connectionism Summer School at the Gatsby Computational Neuroscience Unit, UCL, London. |

## Positions

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| 2021- 2022: | Member of the Degree Programme Committe (master student representative) of the Artificial Intelligence programme, Radboud University |
| 2019-2021: | Editor in-Chief and Board Member at De Focus, Student platform for science communication and outreach |

## Publications

### Publications in peer-reviewed scientific journals

Lu, Z.[†], Doerig, A.[†], **Bosch, V.**[†], Krahmer, B., Kaiser, D., Cichy, R. M., & Kietzmann, T. C. (2025). End-to-end topographic networks as models of cortical map formation and human visual behaviour. *Nature Human Behaviour*, 1-17.
Open access link: https://doi.org/10.1038/s41562-025-02220-7

**Bosch V.** and Mecacci G. (2023) Eyes on the road: brain computer interfaces and cognitive distraction in traffic. *Front. Neuroergon.* 4:1171910. doi: 10.3389/fnrgo.2023.1171910

### Preprints

**Bosch, V.**, Anthes, D., Doerig, A., Thorat, S., König, P., Kietzmann, T.C. (2025). Brain-language fusion enables interactive neural readout and in-silico experimentation. *Arxiv https://arxiv.org/pdf/2509.23941*

Lu, Z.[†], Doerig, A.[†], **Bosch, V.**[†], Krahmer, B., Kaiser, D., Cichy, R., Kietzmann, T.C. (2023). End-to-end topographic networks as models of cortical map formation and human visual behaviour: moving beyond convolutions. *Arxiv*. https://arxiv.org/abs/2308.09431

### Peer-reviewed conference proceedings

**Bosch, V.**, Anthes, D., Doerig, A., Thorat, S., König, P., Kietzmann, T.C. (2025). CorText-AMA: brain-language fusion as a new tool for probing visually evoked brain responses. *Computational Cognitive Neuroscience (CCN)*.

**Bosch, V.**, Gütlin, D., Doerig, A., Anthes, D., Thorat, S., König, P., Kietzmann, T.C. (2024). CorText: large language models for cross-modal transformations from visually evoked brain responses to text captions. *Computational Cognitive Neuroscience (CCN)*.

Lu, Z.[†], Doerig, **Bosch, V.**[†], A.[†], Krahmer, B., Kaiser, D., Cichy, R., Kietzmann, T.C. (2023). The brain can't copy-paste: End-to-end topographic neural networks as a way forward for modelling cortical map formation and behaviour. *Computational Cognitive Neuroscience (CCN)*.

**Bosch V.**[†], Diehl A.[†], Smits D.[†], Toeter A.[†] and Kwisthout J. (2021). Implementation of a Distributed Minimum Dominating Set Approximation Algorithm in a Spiking Neural Network. *BNAIC/BeneLearn*.

### Conference contributions

*Talks*

Implementation of a Distributed Minimum Dominating Set Approximation Algorithm in a Spiking Neural Network. **V. Bosch**, A. Diehl, D. Smits, A. Toeter and J. Kwisthout. BNAIC/BeneLearn 2021, Luxembourg.

*Posters*

**Bosch, V.**, Gütlin, D., Doerig, A., Anthes, D., Thorat, S., König, P., Kietzmann, T.C. (2025). CorText: large language models for cross-modal transformations from visually evoked brain responses to text captions. *NEAT: NeuroAI Talks conference, Osnabrück.*

**Bosch, V.**, Gütlin, D., Doerig, A., Anthes, D., Thorat, S., König, P., Kietzmann, T.C. (2024). CorText: large language models for cross-modal transformations from visually evoked brain responses to text captions. *Computational Cognitive Neuroscience (CCN), Boston.*

Lu, Z.[†], Doerig, A.[†], **Bosch, V.**[†], Krahmer, B., Kaiser, D., Cichy, R., Kietzmann, T.C. (2023). The brain can't copy-paste: End-to-end topographic neural networks as a way forward for modelling cortical map formation and behaviour. *Computational Cognitive Neuroscience Conference, Oxford.*

Lu, Z.[†], Doerig, A.[†], **Bosch, V.**[†], Krahmer, B., Kaiser, D., Cichy, R., Kietzmann, T.C. (2023). The brain can't copy-paste: End-to-end topographic neural networks as a way forward for modelling cortical map formation and behaviour. *Analytical Connectionism Summer School, Gatsby Unit UCL London.*

Lu, Z.[†], Doerig, A.[†], **Bosch, V.**[†], Krahmer, B., Kaiser, D., Cichy, R., Kietzmann, T.C. (2023). The brain can't copy-paste: End-to-end topographic neural networks as a way forward for modelling cortical map formation and behaviour. *NEAT: NeuroAI Talks conference, Osnabrück.*

Lu, Z.[†], Doerig, A.[†], **Bosch, V.**[†], Krahmer, B., Kaiser, D., Cichy, R., Kietzmann, T.C. (2023). The brain can't copy-paste: End-to-end topographic neural networks as a way forward for modelling cortical map formation and behaviour. *The Interdisciplinary Computational Cognition Conference (ComCo), Osnabrück.*

Emergence of topographic organization in a non-convolutional deep neural network. Doerig, A., Krahmer, B., **Bosch, V.**, & Kietzmann, T.C., NVP Winter Conference on Brain and Cognition, 2021

[†] Equal contributions

## Invited scientific talks

Invited talk at the Computational Neuroscience research group of Thomas Naselaris, University of Minnesota, 2025. *Brain-language fusion enables interactive neural readout and in-silico experimentation.*

Invited talk at the Predictive Processing Lab, Donders Institute, 2024. *CorText: large language models for cross-modal transformations from visually evoked brain responses to text captions.*

## Outreach

**Bosch, V.,** *Het voorspellende brein: perceptie als hypotheses over de werkelijkheid* (2021). Popular science article about predictive processing at De Focus.

## Teaching

*Teaching assistant:*

2025:     *Projects at the intersection of neuroscience and machine learning* (advanced bachelors, masters), University of Osnabrück. (three projects: gaze-informed object co-occurrence embeddings to predict neural data, mechanistic interpretability for multimodal brain-to-text transformer, and using sparse autoencoders to decode from MEG data).

2024:     *Projects at the intersection of neuroscience and machine learning* (advanced bachelors, masters), University of Osnabrück. (two projects: path integration in ANNs and the emergence of grid cells).

2023:     *Machine Learning for Cognitive Computational Neuroscience* (advanced bachelors, masters), University of Osnabrück.

2022:     *Cognitive Computational Neuroscience* (advanced bachelors), Radboud University, Nijmegen.

*Supervision:*

Thesis supervisor for bachelor and master's students at the University of Osnabrück.

Emilly Sidaine-Daumiller (BSc., 2023-2024)
Stefan Balle (MSc., 2023-2024)
Sabine Scholle (BSc., 2023-2024)
Tara Schuchort (BSc., 2024-2025)
Linda Ariel Ventura (BSc., 2025)
Henning Stegemann (MSc., 2025)

## Reviewing

Cognitive Computational Neuroscience

Cognitive Computational Neuroscience Proceedings

PLOS Computational Biology

Scientific Reports

ICML 2025 World Models

## Organisation

NeuroAI Talks (NEAT) at the University of Osnabrück (2024).

NeuroAI Talks (NEAT) at the University of Osnabrück (2023).

Performing Robots Conference (2019, Panel Assistant).

## Technical skills

*Areas of expertise:* Cognitive computational neuroscience, machine learning, deep learning, large language and multimodal transformer models, interdisciplinary research, analytic philosophy.

*Programming languages*: Fluent in Python. Experience with R, C#, Netlogo, Javascript, HTML and Solidity.

*Deep learning frameworks*: PyTorch, TensorFlow, HuggingFace.

*Data analysis and tools*: SciPy, NumPy, Scikit-Learn, Git and LaTeX software. Experienced with a wide range of data analysis methods for neuroscience and machine learning. Experience with High Performance Computing, SLURM.

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*Languages:* Dutch (mother tongue), English (native), German (basic), French (beginner).