Gido Martijn van de Ven

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I am a researcher at the intersection of deep learning, computational neuroscience and cognitive science. My current main focus is on the problem of continual learning. Contributions I have made include proposing the influential "three scenarios" framework for continual learning and developing the brain-inspired replay algorithm, which alleviates catastrophic forgetting by replaying self-generated, abstract memory representations. For my award-winning PhD in neuroscience, I used optogenetics and electrophysiological recordings in mice to study the role of replay in memory consolidation in the brain.

I am looking for a new challenge!

Professional Affiliations

Postdoctoral Associate
KU Leuven (Belgium), Mar 2022 – now
Studying the fundamental challenges of continual/incremental/sequential learning, predominantly in the context of deep learning. Supported by two prestigious personal fellowships.

Postdoctoral Associate
Baylor College of Medicine (Houston), Oct 2017 – Feb 2022
Applying insights and experimental observations from neuroscience to state-of-the-art deep neural networks to make their performance more human-like, with special focus on continual learning.

Visiting Researcher
University of Cambridge, Oct 2018 – Feb 2022
Leading the deep learning research for a large collaborative grant from DARPA's Lifelong Learning Machines (L2M) program, with neuroscience labs at NYU and Columbia University.

Education

PhD	University of Oxford, Neuroscience Dissertation: "Reactivation and reinstatement of hippocampal assemblies" ***National PhD Thesis Award*** from the British Neuroscience Association	2013-2017
MSc	University of Oxford, Neuroscience ***Sherrington Prize in Neuroscience*** for best performance	2011-2012
MA	UC Berkeley, Statistics ***Elizabeth Scott Memorial Award*** for outstanding performance	2009-2011
BSc	Erasmus University Rotterdam, Econometrics Graduated ***cum laude***, top of class	2005-2008

Funding / Grants / Fellowships

Senior fundamental research project, FWO – €565,167 2025-2028
National funding supporting two PhD students for four years. The project studies and compares social cognition *in vivo* (humans) and *in silico* (neurosymbolic AI systems), with special focus on neuropsychiatric disorders. Collaboration with Profs Jan Van den Stock and Joost Vennekens.

C1 project, KU Leuven – €353,383 2023-2027
Internal funding supporting a PhD student for four years and a postdoc for one year, awarded after international peer review. The project studies the stability gap in continual learning. My role is Co-PI (due to internal regulations I cannot be PI), but I wrote the application almost fully myself.

MSCA Postdoctoral Fellowship – €191,760 2022-2024
Two-year personal fellowship for postdoc at the KU Leuven.

FWO Senior Postdoctoral Fellowship – €250,000 (estimate) 2022-2025
Three-year personal fellowship for postdoc at the KU Leuven *[only taken up in final year]*.

DARPA's Lifelong Learning Machines (L2M) Program – $2,904,658 (total) 2018-2021
"Continual Learning Across Synapses, Circuits & Brain Areas" (PI: Andreas Tolias; collaboration with NYU & Columbia), I am listed as key personnel and had an important role securing this grant.

IBRO-ISN Research Fellowship – €35,000 2017-2018
One-year personal fellowship for postdoc at the Baylor College of Medicine.

Other Awards

MRC DTP Supplementary Funding Award (£19,697)	2017
FENS travel grant, to attend Annual Meeting of the Japan Neuroscience Society (€1,000)	2017
FENS, IBRO-PERC and The Brain Prize stipend (€1,000)	2017
Vice-Chancellors' Fund Award, University of Oxford (£3,000)	2016
CSNII grant, for Computational Neuroscience Course in Okinawa (£2,500, estimate)	2015
Gotch Memorial Prize, for 1st year DPhil report (£1,000)	2014
MRC Research Studentship, to finance DPhil at University of Oxford (£102,674)	2013
RIKEN Brain Science Institute summer program grant (£3,500, estimate)	2013
Vreedefonds, to finance Master at University of Oxford (€6,000, partly loan)	2011
International House Berkeley Scholarship ($4,100)	2010
Huygens Scholarship, to finance Master at UC Berkeley (€37,800)	2009

Teaching

Keynote & Tutorial at CCN Aug 2024
Tutorial on continual learning at the top conference on cognitive computational neuroscience

INVICTA Spring School, Porto Mar 2024
Lecturer, introduction to continual learning and coding tutorial

NeurIPS tutorial Dec 2022
Online tutorial on "Lifelong Learning Machines"

NeuroMatch Academy (deep learning summer school) Aug 2021
Coding tutorial and online lecture on benchmarks for continual learning

UC Berkeley 2009-2011
Graduate Student Instructor for:
- STAT2: introductory course in Statistics
- STAT151B: advanced upper-division course in Machine Learning
- STAT248: graduate course in Time Series Analysis

Recipient of *Outstanding Graduate Student Instructor Award* (awarded to <10% of GSIs)

Erasmus University Rotterdam 2009-2011
Teaching assistant for introductory courses on Calculus and Linear Algebra

Supervision of Graduate Students

Milan Van Maldegem – PhD student, *KU Leuven*	2024 - now
Timm Hess – PhD student, *KU Leuven*	2022 - now
Dipam Goswami – visiting PhD student, *KU Leuven*	2025
Michał Zając – visiting PhD student, *KU Leuven*	2023
Sergi Masip – visiting Master student, *KU Leuven*	2023
Roman Rothaermel – Master student, *University of Oxford*	2017

Peer-reviewed Publications

Google Scholar profile: https://scholar.google.com/citations?user=3k0l15MAAAAJ

van de Ven GM (2025) "On the computation of the Fisher Information in continual learning", *ICLR Blogposts*.

Hemati H, Pellegrini L, Duan X, Zhao Z, Xia F, Masana M, Tscheschner B, Veas E, Zheng Y, Zhao S, Li SY, Huang SJ, Lomonaco V, **van de Ven GM** (2025), "Continual learning in the presence of repetition", *Neural Networks*, **183**: 106920.

Zając M, Tuytelaars T, **van de Ven GM** (2024), "Prediction error-based classification for class-incremental learning", *International Conference on Learning Representations (ICLR)*.

Verwimp E, Aljundi R, Ben-David S, Bethge M, Cossu A, Gepperth A, Hayes TL, Hüllermeier E, Kanan C, Kudithipudi D, Lampert C, Mundt M, Pascanu R, Popescu A, Tolias AS, van de Weijer J, Liu B, Lomonaco V, Tuytelaars T, **van de Ven GM** (2024), "Continual learning: applications and the road forward", *Transactions on Machine Learning Research (TMLR)*.

Hess T*, Verwimp E*, **van de Ven GM**, Tuytelaars T (2024), "Knowledge accumulation in continually learned representations and the issue of feature forgetting", *Transactions on Machine Learning Research (TMLR)*.

Masip S, Rodriguez P, Tuytelaars T, **van de Ven GM** (2024), "Continual learning of diffusion models with generative distillation", *Conference on Lifelong Learning Agents (CoLLAs)*.

Dziadzio S, Yıldız Ç, **van de Ven GM**, Trzciński T, Tuytelaars T, Bethge M (2024), "Disentangled continual learning: separating memory edits from model updates", *Conference on Lifelong Learning Agents (CoLLAs)*.

Hess T, Tuytelaars T, **van de Ven GM** (2023) "Two complementary perspectives to continual learning: ask not only what to optimize, but also how", *Proceedings of the 1st ContinualAI Unconference*, pre-registered report, PMLR **243**: 37-61.

De Lange M, **van de Ven GM**, Tuytelaars T (2023), "Continual evaluation for lifelong learning: identifying the stability gap", *International Conference on Learning Representations (ICLR)*, spotlight (top 25%).

van de Ven GM, Tuytelaars T, Tolias AS (2022), "Three types of incremental learning", *Nature Machine Intelligence*, **4**(12): 1185-1197.

Kudithipudi D, Aguilar-Simon M, Babb J, Bazhenov M, Blackiston D, Bongard J, Brna A, Chakravarthi Raja S, Cheney N, …, **van de Ven GM**, …, Siegelmann HT (2022), "Biological underpinnings for lifelong learning machines", *Nature Machine Intelligence*, **4**(3): 196-210.

Li S, Du Y, **van de Ven GM**, Mordatch I (2022), "Energy-based models for continual learning", *Proceedings of the 1st Conference on Lifelong Learning Agents (CoLLAs)*, PMLR **199**: 1-22.

van de Ven GM, Zhe L, Tolias AS (2021), "Class-incremental learning with generative classifiers", *Proceedings of the Conference on Computer Vision and Pattern Recognition Workshops*, p3611-3620.

Lomonaco V, Pellegrini L, Cossu A, Carta A, Graffieti G, Hayes TL, De Lange M, Masana M, Pomponi J, **van de Ven GM**, Mundt M, She Q, …, Maltoni D (2021), "Avalanche: an end-to-end library for continual learning", *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops*, p3600-3610.

Kao TC*, Jensen KT*, **van de Ven GM**, Bernacchia A, Hennequin G (2021), "Natural continual learning: success is a journey, not (just) a destination", *NeurIPS,* 34.

van de Ven GM, Siegelmann HT, Tolias AS (2020), "Brain-inspired replay for continual learning with artificial neural networks", *Nature Communications*, **11**: 4069.

van de Ven GM, Tolias AS (2019), "Three scenarios for continual learning", *NeurIPS workshop*.

Lopes-dos-Santos V, **van de Ven GM**, Morley A, Trouche S, Campo-Urizza N, Dupret D (2018), "Parsing hippocampal theta oscillations by nested spectral components during spatial exploration and memory-guided behavior", *Neuron*, **100**(4): 940-952.

van de Ven GM, Trouche S, McNamara CG, Allen K, Dupret D (2016), "Hippocampal offline reactivation consolidates recently formed cell assembly patterns during sharp wave-ripples", *Neuron*, **92**(5): 968-974.

Trouche S, Perestenko PV, **van de Ven GM**, Bratley CT, McNamara CG, Campo-Urizza N, Black SL, Reijmers LG, Dupret D (2016), "Recoding a cocaine-place memory engram to a neutral engram in the hippocampus", *Nature Neuroscience*, **19**(4): 564-567.

Möttönen R, **van de Ven GM**, Watkins KE (2014), "Attention Fine-Tunes Auditory-Motor Processing of Speech Sounds", *The Journal of Neuroscience*, **34**(11): 4064-4069.

PREPRINTS

Ilievski F, Hammer B, van Harmelen F, Paassen B, Saralajew S, Schmid U, Biehl M, Bolognesi M, Dong XL, Gashteovski K, Hitzler P, Marra G, Minervini P, Mundt M, Ngonga Ngomo A, Oltramari A, Pasi G, Saribatur ZG, Serafini L, Shawe-Taylor J, Shwartz V, Skitalinskaya G, Stachl C, **van de Ven GM**, Thomas Villmann T (2024), "Aligning generalisation between humans and machines", *arXiv preprint*, arXiv:2411.15626.

Yoo J, He Y, Naderiparizi S, Green D, **van de Ven GM**, Pleiss G, Wood F (2024), "Lifelong learning of video diffusion models from a single video stream", *arXiv preprint*, arXiv:2406.04814.

van de Ven GM*, Soures N*, Kudithipudi D (2024), "Continual learning and catastrophic forgetting", *arXiv preprint*, arXiv:2403.05175.

Vogelstein JT*, Dey J*, Helm HS, LeVine W, Mehta RD, Tomita TM, Xu H, Geisa A, Wang Q, **van de Ven GM**, Gao C, Yang W, Tower B, Larson J, White CM, Priebe CE (2020), "Ensembling representations for synergistic lifelong learning with quasilinear complexity", *arXiv preprint*, arXiv:2004.12908.

van de Ven GM, Tolias AS (2018), "Generative replay with feedback connections as a general strategy for continual learning", *arXiv preprint*, arXiv:1809.10635.

Open Science / Programming Skills

Continual learning library: github.com/GMvandeVen/continual-learning (>1600 stars)
Contributor to Avalanche project: avalanche.continualai.org (>1800 stars)

Invited Talks

NICE Workshop, "A new direction for continual learning", 25-28 March 2025
CVC Seminar, "Two complementary perspectives to continual learning", 23 May 2024
Dagstuhl Seminar "Generalization by People and Machines", 5-8 May 2024
Guest lecture (UMass Amherst), "Continual learning with deep neural networks", 7 Mar 2023
Sony &inCSL Seminar, "Three types of incremental learning: a framework", 1 Mar 2023
Guest lecture (University of Pisa), "Using generative models for continual learning", 20 Dec 2021
ContinualAI Seminar, "Class-Incremental Learning with Generative Classifiers", 21 May 2021
Reading Group of Simons Institute (UC Berkeley), "Brain-inspired replay", 11 Nov 2020
ContinualAI Meetup, "Robustness and Generalization in Continual Learning", 30 Oct 2020
Cambridge Memory Meeting, "The role of replay in stabilizing memories", 4 April 2019
Memory Reactivation Workshop (Cardiff), 8 May 2017

Professional Service

Peer-reviewed for:

- Nature, Nat Mach Intell, Nat Hum Behav, Nat Commun, PLoS Comp Biol, Neural Networks, IEEE TPAMI, IEEE TNNLS, Artificial Intelligence, PNAS, TMLR
- ICLR (top reviewer 2022 and 2023), NeurIPS, CVPR, ICML, CoLLAs

Area Chair for:

- AISTATS

Organizer of scientific meetings:

- CVPR Workshop "Continual Learning in Computer Vision", 18 June 2024, Seattle
- Continual AI Un-Conference, Talks Chair, 19 October 2023, virtual
- CVPR Workshop "Continual Learning in Computer Vision", 18 June 2023, Vancouver
- Dagstuhl Seminar "Deep Continual Learning", 19-24 March 2023, Germany
- CVPR Workshop "Continual Learning in Computer Vision", 20 June 2022, New Orleans

References

Prof. Tinne Tuytelaars
Postdoctoral mentor (Mar 2022 – now)
Address: ESAT-PSI – bus 02441, KU Leuven, Kasteelpark Arenberg 10, 3001 Leuven, Belgium
E-mail: tinne.tuytelaars@esat.kuleuven.be

Prof. Andreas S. Tolias
Postdoctoral mentor (Oct 2017 – Feb 2022)
Address: Dept Ophthalmology, Stanford University, 318 Campus Drive, Stanford, CA 94305, USA
E-mail: tolias@stanford.edu

Prof. David Dupret
PhD supervisor (Oct 2013 – Sep 2017)
Address: MRC Brain Network Dynamics Unit, Univ of Oxford, Mansfield Rd, OX1 3TH, UK
E-mail: david.dupret@bndu.ox.ac.uk