Marc van Zee

Senior Research Engineer

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Senior Research Engineer specializing in generative AI and large language models, with lead roles in Google DeepMind's Veo (text-to-video) and Imagen 3 (text-to-image). Led the development of Flax, a widely used neural network library at Google. Extensive research experience in compositional generalization in language, large language models (T5X, CFQ dataset), and other AI subdomains. Published in diverse areas including philosophical logic, multi-agent systems, fairness and bias, and robotics.

Experience

2023–now **Google DeepMind**, *Copenhagen, Denmark*, Senior Research Engineer
Text to image/video. Core contributor of Veo, partial contributor of Imagen 3.

2019–2023 **Google Brain**, *Amsterdam, the Netherlands*, Senior Research Engineer
Flax, a neural network library on JAX. Tech lead since 2021.

2017–2019 **Google Brain**, *Zurich, Switzerland*, Research Engineer
Large language models, compositional generalization in language.

2016 **Google Shopping**, *Pittsburgh, USA*, Software Engineer (PhD internship)
C++ developer.

Education

2014–2017 **PhD in Computer Science**, *University of Luxembourg*, Luxembourg, *5/5 (Outstanding)*
Rational Architecture: Architecture from a Recommender Perspective.
Advisor: Prof. Leon van der Torre

2011-2013 **MSc. in Artificial Intelligence**, *Utrecht University*, the Netherlands, *Cum Laude*
Graduate Project: "Implementing Temporal Action Logics."
Advisors: Prof. John-Jules Meyer, Prof. Patrick Doherty

2005-2009 **BSc. in Industrial Design**, *Eindhoven University of Technology*, the Netherlands
Thesis: "Product Attachment through an Adaptive Lighting System."
Participant in the Honours Programme.

Significant Projects and Accomplishments

2024 **Veo**, Diffusion-based text to video model. Core developer, contributions: architecture development, attention optimizations, large model training.

2024 **Imagen 3**, Diffusion-based text to image model. Contributions: Training infrastructure, implemented optimized flash attention variants for efficient model scaling.

2020-2022 **Flax**, a neural network library used by most large models and frameworks by Google (PaLM, Imagen, Scenic, Big Vision, T5X, ...). We grew from 4 to 10 member and now support most of Google Research. Winner of the Google tech impact award 2021.

2019 **CFQ dataset**, Core developer. A dataset for measuring compositional generalization in language. Related publication: "Measuring Compositional Generalization: A Comprehensive Method on Realistic Data"

Open Source

2022 **T5X**, A modular framework for high-performance training and inference of sequence models at many scales, see repo for a list of co-authors.

2021 **JAX on the Web/Mobile**, A library for converting JAX models to Tensorflow, TFlite (mobile) and TF.js (web), with George Necula

2020-2023 **Flax**, A neural network library on JAX, with Jonathan Heek, Anselm Levskaya, Avital Oliver, Andreas Steiner, Ivy Zheng, and Marcus X.

Publications

Anna van Zee, **Marc van Zee**, and Anders Søgaard. Group fairness in multilingual speech recognition models. In Kevin Duh, Helena Gomez, and Steven Bethard, editors, *Findings of the Association for Computational Linguistics: NAACL 2024*, pages 2213–2226, Mexico City, Mexico, June 2024. Association for Computational Linguistics.

Huimin Dong, **Marc van Zee**, Dragan Doder, Xu Li, and Rėka Markovich andc Leon van der Torre. Rights and practical reasoning in deontic logic. In *Proceedings of the 16th International Conference on Deontic Logic and Normative Systems (DEON)*, 2023.

Adam Roberts, Hyung Won Chung, Anselm Levskaya, Gaurav Mishra, James Bradbury, Daniel Andor, Sharan Narang, Brian Lester, Colin Gaffney, Afroz Mohiuddin, Curtis Hawthorne, Aitor Lewkowycz, Alex Salcianu, and **Marc van Zee** et al. Scaling up models and data with `t5x` and `seqio`. *Journal of Machine Learning Research*, 24(377):1–8, 2023.

Marc van Zee, Floris Bex, and Sepideh Ghanavati. Rationalgrl: A framework for argumentation and goal modeling. *Argument & Computation*, 12(2):191–245, 2021.

Marc van Zee, Daniel Furrer, Nathan Scales, and Nathanael Schärli. Compositional generalization in semantic parsing: Pre-training vs. specialized architectures. *arXiv 2007.08970*, 2021.

Marc van Zee, Dragan Doder, Leendert van der Torre, Mehdi Dastani, Thomas Icard, and Eric Pacuit. Intention as commitment toward time. *Artificial Intelligence*, 283:103270, 2020.

Daniel Keysers, Nathanael Schärli, Nathan Scales, Hylke Buisman, Daniel Furrer, Sergii Kashubin, Nikola Momchev, Danila Sinopalnikov, Lukasz Stafiniak, Tibor Tihon, Dmitry Tsarkov, Xiao Wang, **Marc van Zee**, and Olivier Bousquet. Measuring compositional generalization: A comprehensive method on realistic data. In *International Conference on Learning Representations*, 2019.

Leendert van der Torre and **Marc van Zee**. Rational enterprise architecture. In Salem Benferhat, Karim Tabia, and Moonis Ali, editors, *Advances in Artificial Intelligence: From Theory to Practice*, pages 9–18, Cham, 2017. Springer International Publishing.

Sepideh Ghanavati, **Marc van Zee**, and Floris Bex. Argumentation-based methodology for goal-oriented requirements language (GRL). In *Proceedings of the 10th International i* Workshop*, 2017.

Marc van Zee. *Formalising Enterprise Architecture Decision Models*, pages 257–275. Springer International Publishing, Cham, 2017.

Diana Marosin, **Marc van Zee**, and Sepideh Ghanavati. Formalizing and modeling enterprise architecture (EA) principles with goal-oriented requirements language (GRL). In *Proceedings of the CAiSE conference*. Springer, 2016.

Marc van Zee, Diana Marosin, Floris Bex, and Sepideh Ghanavati. The RationalGRL Toolset for Goal Models and Argument Diagrams. In *Computational Models of Argument - Proceedings of COMMA*. IOS Press, 2016.

Marc van Zee and Dragan Doder. AGM-Style Revision of Beliefs and Intentions. In *ECAI 2016 - 22nd European Conference on Artificial Intelligence*. IOS Press, 2016.

Marc van Zee, Diana Marosin, Floris Bex, and Sepideh Ghanavati. Rationalgrl: A framework for rationalizing goal models using argument diagrams. In *Conceptual Modeling - 35th International Conference, ER 2016,*

Gifu, Japan, November 14-17, 2016, Proceedings, volume 9974 of *Lecture Notes in Computer Science*, pages 553–560, 2016.

Marc van Zee, Mehdi Dastani, Dragan Doder, and Leendert W. N. van der Torre. Consistency conditions for beliefs and intentions. In *2015 AAAI Spring Symposia*. AAAI Press, 2015.

Marc van Zee and Thomas Icard III. Intention reconsideration as metareasoning. *Workshop on Bounded Optimality and Rational Metareasoning*, 2015.

Dirk van der Linden and **Marc van Zee**. Insights from a study on decision making in enterprise architecture. In *Working Conference on the Practice of Enterprise Modelling (PoEM 2015)*. CEUR-WS.org, 2015.

Marc van Zee, Dragan Doder, Mehdi Dastani, and Leendert W. N. van der Torre. AGM revision of beliefs about action and time. In *Proceedings of the Twenty-Fourth International Joint Conference on Artificial Intelligence, IJCAI 2015*, pages 3250–3256. AAAI Press, 2015.

Marc van Zee. Rational architecture = architecture from a recommender perspective. In *Proceedings of the Twenty-Fourth International Joint Conference on Artificial Intelligence, IJCAI 2015*. AAAI Press, 2015.

Marc van Zee, Floris Bex, and Sepideh Ghanavati. Rationalization of goal models in GRL using formal argumentation. In *23rd IEEE International Requirements Engineering Conference, RE 2015*. IEEE Computer Society, 2015.

Marc van Zee, Mehdi Dastani, Yoav Shoham, and Leendert van der Torre. Collective intention revision from a database perspective. In *Collective Intentionality Conference*, 2014.

Pouyan Ziafati, Yehia Elrakaiby, **Marc van Zee**, Mehdi Dastani, John-Jules Ch. Meyer, Leendert W. N. van der Torre, and Holger Voos. Reasoning on robot knowledge from discrete and asynchronous observations. In *2014 AAAI Spring Symposia*. AAAI Press, 2014.

Silvano Colombo Tosatto and **Marc van Zee**. Social network analysis for judgment aggregation. In *International conference on Autonomous Agents and Multi-Agent Systems, AAMAS*, 2014.

Marc van Zee, Patrick Doherty, and John-Jules Ch. Meyer. Encoding definitional fragments of temporal action logic into logic programming. In *Proceedings of the International Workshop on Defeasible and Ampliative Reasoning, DARe@ECAI*. CEUR-WS.org, 2014.

Silvano Colombo Tosatto and **Marc van Zee**. Bridging social network analysis and judgment aggregation. In *Social Informatics - 6th International Conference*. Springer, 2014.

Marc van Zee, Georgios Plataniotis, Dirk van der Linden, and Diana Marosin. Formalizing enterprise architecture decision models using integrity constraints. In *IEEE 16th Conference on Business Informatics, CBI 2014*. IEEE Computer Society, 2014.

Dirk van der Linden and **Marc van Zee**. On the semantic feature structure of modeling concepts: An empirical study. In *IEEE 16th Conference on Business Informatics, CBI 2014*. IEEE Computer Society, 2014.

Natasha Alechina, Tristan M. Behrens, Mehdi Dastani, Koen V. Hindriks, Jomi Fred Hübner, Brian Logan, Hai H. Nguyen, and **Marc van Zee**. Multi-cycle query caching in agent programming. In *Proceedings of the Twenty-Seventh AAAI Conference on Artificial Intelligence*. AAAI Press, 2013.

Mehdi Dastani and **Marc van Zee**. Belief caching in 2apl. In *Engineering Multi-Agent Systems - First International Workshop, EMAS*. Springer, 2013.

Diego Agustin Ambrossio, Alessio Antonini, Yehia Elrakaiby, Dov Gabbay, and **Marc van Zee**. Argument revival in annotated argumentation networks. *Second workshop on Argumentation in Artificial Intelligence and Philosophy*, 2013.