

Dr.-Ing. Mateusz Malinowski

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Objective

Building responsive machines that understand the surrounding environment, natural language, human intentions, and can act accordingly; all at scale.

Positions

2017–now



Research Scientist, *Google DeepMind*, London, U.K.

Description: Visual Question Answering,
Neural Reasoning,
Grounded Agents,
Video Understanding,
Scalable Training and Inference.

Webpages: mateuszmalinowski.com  (Personal)
[linkedin.com/in/mateuszmalinowski](https://www.linkedin.com/in/mateuszmalinowski)  (LinkedIn)

2011–2016



PhD Student, *Max Planck Institute for Informatics*, Saarbrücken, Germany.

Group: Scalable Learning and Perception
Advisor: Dr. Mario Fritz

Description: Awarded Dr.-Eduard-Martin-Preis for the best doctoral candidate at Saarland University, and DAGM-MVTec 2018 Dissertation Award in German speaking countries.
Built first deep learning architectures that answer questions about images.
Created foundations of Visual Question Answering.
Conducted research on deep learning, spatial reasoning, and retrieval.

2010



Research Engineer, *Cluster of Excellence on Multimodal Computing and Interaction*, Saarbrücken, Germany.

Group: Probabilistic Machine Learning and Medical Image Processing
Advisor: Prof. Matthias Seeger

Description: Developed methods that reconstruct MR images from incomplete measurements.

2009–2010



Research Engineer, *Max Planck Institute for Informatics*, Saarbrücken, Germany.

Group: High Dynamic Range Imaging and Perception Issues in Graphics
Advisor: Prof. Karol Myszkowski

Description: Implemented methods that take advantage of human perceptual system.

Education

2011–2017



Doctor of Engineering, *Saarland University and Max Planck Institute for Informatics*, Saarbrücken, Germany.

Department of Computer Science

Grade: Summa cum laude (with highest honor)

Thesis: Towards Holistic Machines:
From Visual Recognition To Question Answering About Real-World Images

Advisor: Dr. Mario Fritz

Reviewers: Prof. Trevor Darrell, Prof. Manfred Pinkal, Dr. Mario Fritz

2009–2011



Master of Science, Honor's degree, Saarland University, Saarbrücken, Germany.

Department of Computer Science

Grade: Excellent, 1.3 in German Scale (1.0-5.0), 128 ECTS

Thesis: Optimization Algorithms in the Reconstruction of MR Images: A Comparative Study

Advisor: Prof. Matthias Seeger

Reviewer: Prof. Matthias Hein, Prof. Matthias Seeger

2008–2009



Erasmus Student, Saarland University, Saarbrücken, Germany.

Department of Computer Science

2004–2008



Undergraduate Studies, University of Wrocław, Wrocław, Poland.

Department of Computer Science

Awards and Scholarships

2021 **Outstanding Reviewer Award, CVPR, Virtual.**

2020 **Outstanding Reviewer Award, CVPR, Virtual.**

2019 **Outstanding Reviewer Award, CVPR, Long Beach, USA.**

2018 **DAGM-MVTec 2018 Dissertation Award in Machine Learning, Computer Vision and Pattern Recognition, German Association for Pattern Recognition, Stuttgart, Germany.**

2018 **Dr.-Eduard-Martin-Preis for the Best Doctoral Candidate at Saarland University, Saarland University, Saarbrücken, Germany.**

2017 **Outstanding Reviewer Award, CVPR, Honolulu, Hawaii.**

2017 **Summa cum laude, Saarland University, Saarbrücken, Germany.**

2011 **Honor's degree in Computer Science, Saarland University, Saarbrücken, Germany.**

2010–2011 **International Max Planck Research School Scholarship, Saarbrücken, Germany.**

Invited Talks

2021 **Language in Vision: Visual Reasoning, Visual Navigation, Grounded Translation, and Bias, Polish Academy of Sciences (PAN), Warsaw, Poland.**

2021 **Language in Vision: Visual Reasoning, Visual Navigation, Grounded Translation, and Bias, Cambridge University AI Talks, Cambridge, U.K.**

2020 **Towards Scalable Reasoning, Scientific Symposium; MPI for Intelligent Systems, Tübingen, Germany.**

- 2020 **Visual Question Answering and Related Topics**, *CVPR'20 Workshop: VQA and Dialog*, Seattle, U.S.A.
- 2020 **Sideways: Depth-Parallel Training of Video Models via Backprop with Arrow-of-Time**, *CILVR; New York University*, New York, U.S.A.
- 2020 **Vision + Language + Actions: Visual Question Answering and StreetNav**, *CILVR; New York University*, New York, U.S.A.
- 2019 **Sideways: Depth-Parallel Training of Video Models**, *Warsaw AI*, Warsaw, Poland.
- 2019 **From Static to Dynamic Scenes: Visual Question Answering and Situated Agents**, *Korea University*, Seoul, South Korea.
- 2019 **Grounded Language: Answering Questions about Images and Navigation with Instructions**, *Re-Work Deep Learning Summit*, London, U.K.
- 2019 **Intuitive Mathematics: Building a Proof System with Deep Reinforcement Learning**, *Logic and Learning*, Schloss Dagstuhl, Germany.
- 2019 **Grounded Language: Answering Questions about Images and Navigation with Instructions**, *Recent Advances in Artificial Intelligence*, Bucharest, Romania.
- 2019 **Towards Learnable Proof Systems: Learning Dynamic Semi-algebraic Proofs**, *University of Oxford*, Oxford, U.K.
- 2019 **From Images to Graphs: Modeling topological structures with Deep Learning**, *InfoShare*, Gdansk, Poland.
- 2018 **From Recognition, to Visual Question Answering, to Holistic Reasoning**, *Talk is recorded: <https://www.youtube.com/watch?v=cgOmpgcELPQ>*
PLINML; University of Warsaw, Warsaw, Poland.
- 2018 **Visual Question Answering on CLEVR**, *Facebook AI*, Montreal, Canada.
- 2018 **CLEVR and Grounded Navigation**, *Google Brain*, Montreal, Canada.
- 2018 **Visual Question Answering: Past, Present, and Future**, *University of Oxford*, Oxford, U.K.
- 2018 **From Recognition to Visual Question Answering, to Agents that Act**, *Technical University of Poznań*, Poznań, Poland.
- 2018 **Scene Understanding via Visual Question Answering**, *CIS; Ludwig-Maximilians-Universität München*, München, Germany.
- 2018 **Scene Understanding via Visual Question Answering**, *CAMP; Technical University of Munich*, München, Germany.
- 2018 **Towards Complex Reasoning: From Image Classification To Visual Question Answering**, *AI Congress*, O2 London, U.K.
- 2018 **Towards Holistic Machines: From Visual Recognition To Question Answering About Real-World Images**, *University of Cambridge*, Cambridge, U.K.
- 2017 **Relation Networks on CLEVR**, *Max Planck Institute for Informatics*, Saarbücken, Germany.
- 2016 **Towards a Visual Turing Challenge**, *Microsoft Research*, Cambridge, U.K.
- 2016 **Towards a Visual Turing Challenge**, *DeepMind*, London, U.K.

2015 **Ask Your Neurons: A Neural-based Approach to Answering Questions about Images**, ICCV, Santiago, Chile.

Academic and Industrial Services

Advisor I supervise the following PhD students

- Spyros Mouselinos. Warsaw University (2021-)
With: Prof. Henryk Michalewski
Title: Towards Visual Reasoning

I supervised the following students (Warsaw University)

- Piotr Piękos. Master's Thesis (2020-21)
Title: Measuring and Improving BERT's Mathematical Abilities by Predicting the Order of Reasoning

Co-Advisor I co-advised the following students (ETH Zurich)

- Franzmeyer Tim. Master's Thesis (2020-21)
With: Dr. João Henriques
Title: Learning Altruistic Behaviours in Reinforcement Learning without External Rewards
Now: PhD student at University of Oxford

I co-advised the following interns (DeepMind)

- Gunnar Atli Sigurdsson (2019)
With: Prof. Andrew Zisserman
Now: Research Scientist at Amazon
- Aishwarya Agrawal (2018)
With: Dr. Tejas Kulkarni
Now: Assistant Professor at MILA

I co-advised the following students (Max Planck Institute for Informatics)

- Ashkan Mokarian. Master's Thesis (2016)
With: Dr. Mario Fritz
Title: Deep Learning for Filling Blanks in Image Captions
Now: PhD student at Max Delbrück Center for Molecular Medicine
- Sreyasi Nag Chowdhury. Master's Thesis (2015)
With: Dr. Andreas Bulling, and Dr. Mario Fritz.
Title: Contextual Media Retrieval Using Natural Language Queries
Now: PhD student at MPI for Informatics

Mentor

- Mentor of Zuzanna Kwiatkowska, a DeepMind Scholar for underrepresented students at Warsaw University (2021)
- Mentor of Diptarko Roy, a DeepMind Scholar at University of Oxford (2019-20)
- EEML Mentor (2020-21)
- Google mentor of Wadhvani (2021)
- Google mentor of Social Wolves Foundation (2021)
- Google mentor for the Google AI Impact Challenge Accelerator (2019)

- Teaching
- Guest Lecture at the NLP class: Vision+Language, UCL, London, U.K., 2020
 - Deep Learning Course, Leibniz University, Hannover, Germany, 2019
 - Deep Learning Seminar, Max Planck Institute for Informatics, Saarbrücken, Germany, 2016
 - 2nd Summer School on Integrating Vision and Language: Deep Learning, Valletta, Malta, 2016
 - Probabilistic Graphical Models and their Applications, Max Planck Institute for Informatics, Saarbrücken, Germany, 2013
- Co-organizer of
- Beyond BackPropagation: Novel Ideas for Training Neural Architectures, USA, 2020
 - NeurIPS Visually Grounded Interaction and Language (ViGiL) (committee), Mexico, 2021
 - Workshops Visually Grounded Interaction and Language (ViGiL), Canada, 2019
 - Visually Grounded Interaction and Language (ViGiL), Canada, 2018
 - Visually Grounded Interaction and Language (ViGiL), USA, 2017
- Reviewer (Journals)
- Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2016, 18, 21
 - International Journal of Computer Vision (IJCV), 2016-19
 - Journal of Machine Learning Research (JMLR), 2020
 - Transactions on Image Processing (TIP), 2018-19
 - Journal of Mathematical Imaging and Vision (JMIV), 2013
 - Information Processing and Management (IPM), 2016
 - Transactions on Computational Intelligence and AI in Games, 2015
 - Language and Linguistics Compass, 2015
- Reviewer (Conferences)
- International Conference on Computer Vision (ICCV), 2017, 19, 21
 - Conference on Computer Vision and Pattern Recognition (CVPR), 2017-21
 - Neural Information Processing Systems (NIPS), 2016, 2019
 - European Conference on Computer Vision (ECCV), 2016, 2018, 2020
 - International Conference on Machine Learning (ICML), 2019
 - Asian Conference on Computer Vision (ACCV), 2016
 - ACM Computer Science in Cars Symposium (CSCS), 2020
 - The European Chapter of the ACL (EACL), 2016
 - International Conference on Pattern Recognition (ICPR), 2016
 - NeurIPS Workshop: Visually Grounded Interaction and Language (ViGiL), 2017-19, 21
 - ICML Workshop on Learning in Artificial Open Worlds, 2020
 - NeurIPS Workshop: Beyond BackPropagation: Novel Ideas for Training Neural Architectures, 2020
- Reviewer (Grants)
- AI4D-IndabaX Innovation, 2020
 - Google AI Impact Challenge, 2019-20
 - The National Science Center (Poland), 2019-20
- Reviewer (Theses)
- Bachelor Theses, Warsaw University, 2020
- Grants Committee
- External Member in the Expert Panel in National Science Centre, Poland, 2019.

Other Member of DeepMind University Outreach, 2020.
IEEE Computer Society membership, 2020.
IEEE member, 2016-present.
BMVA member, 2014, 2017.
GCPR R3 Session. Saarbrücken, Germany, 2013.
Graduate Summer School: Deep Learning, Feature Learning. IPAM, UCLA, USA, 2012.
Microsoft PhD Summer School. MSR, Cambridge, UK, 2012.
Organizer of the Computer Vision Reading Group, DeepMind, London, U.K. 2017-present
Organizer of the Deep Learning Reading Group, MPI, Saarbrücken, Germany, 2015-16

Additional

Media Coverage “Sideways takes a pages from computer architecture”. ZDNet
“What is in this picture? AI becomes as smart as a toddler”. Bloomberg Business
“Forget AlphaGo—DeepMind Has a More Interesting Step ...”. MIT Technology Review
“Computers are starting to reason like humans”. Science News
“Visual Turing Test”. Wikipedia
“Relation Networks”. Wikipedia
“DeepMind’s AI Learns Superhuman Relational Reasoning”. Two Minute Papers
“Visual Turing Test and AI”. Biznes Myśli. Interview in Polish
“Google Is Teaching A.I. How to Travel Through Cities Like a Human”. Inverse
“From Recognition, to Visual Question Answering”. PLINML

Investor Neptune.AI

Publications (conference, journal) ([🔗 Google Scholar profile](#))

2021.

- Mateusz Malinowski, Dimitrios Vytiniotis, Grzegorz Świrszcz, Viorica Pătrăucean, João Carreira
“*Gradient Forward-Propagation for Large-Scale Temporal Video Modelling*”
CVPR: Conference on Computer Vision and Pattern Recognition
- Piotr Piękos, Henryk Michalewski, Mateusz Malinowski
“*Measuring and Improving BERT’s Mathematical Abilities by Predicting the Order of Reasoning*”
ACL, Oral: Association for Computational Linguistics
- Adrià Recasens et al.
“*Broaden Your Views for Self-Supervised Video Learning*”
ICCV: International Conference on Computer Vision

2020.

- Mateusz Malinowski, Grzegorz Świrszcz, João Carreira, Viorica Pătrăucean
"Sideways: Depth-Parallel Training of Video Models"
CVPR: Conference on Computer Vision and Pattern Recognition
- Gunnar A. Sigurdsson, Jean-Baptiste Alayrac, Aida Nematzadeh, Lucas Smaira, Mateusz Malinowski, João Carreira, Phil Blunsom, Andrew Zisserman
"Visual Grounding in Video for Unsupervised Word Translation"
CVPR: Conference on Computer Vision and Pattern Recognition
- Mateusz Malinowski*, Karl Moritz Hermann*, Piotr Mirowski*, Andras Banki-Horvath, Keith Anderson, Raia Handzel (* denotes equal contributions)
"Learning To Follow Directions in Street View"
AAAI: Association for the Advancement of Artificial Intelligence

2019.

- Alhussein Fawzi, Mateusz Malinowski, Hamza Fawzi, Omar Fawzi
"Learning Dynamic Polynomial Proofs"
NeurIPS*, **Spotlight**: Neural Information Processing Systems
(* before it was known as **NIPS**)
- Caglar Gulcehre, Misha Denil, Mateusz Malinowski, Ali Razavi, Razvan Pascanu, Karl Moritz Hermann, Peter Battaglia, Victor Bapst, David Raposo, Adam Santoro, Nando de Freitas
"Hyperbolic Attention Networks"
ICLR: International Conference on Learning Representations

2018.

- Mateusz Malinowski, Carl Doersch, Adam Santoro, Peter Battaglia
"Learning Visual Question Answering by Bootstrapping Hard Attention"
ECCV: European Conference on Computer Vision
- Piotr Mirowski, Matthew Koichi Grimes, Mateusz Malinowski, Karl Moritz Hermann, Keith Anderson, Denis Teplyashin, Karen Simonyan, Koray Kavukcuoglu, Andrew Zisserman, Raia Hadsell
"Learning to Navigate in Cities Without a Map"
NIPS: Neural Information Processing Systems
- Apratim Bhattacharyya, Mateusz Malinowski, Bernt Schiele, and Mario Fritz
"Long-Term Image Boundary Prediction"
AAAI: Association for the Advancement of Artificial Intelligence

2017.

- Mateusz Malinowski, Marcus Rohrbach, and Mario Fritz
"Ask Your Neurons: A Deep Learning Approach to Visual Question Answering"
IJCV: International Journal of Computer Vision: Best papers from ICCV'15
- Adam Santoro, David Raposo, David G.T. Barrett, Mateusz Malinowski, Razvan Pascanu, Peter Battaglia, Timothy Lillicrap
"A Simple Neural Network Module for Relational Reasoning"
NIPS, Spotlight: Neural Information Processing Systems

2016.

- Ashkan Mokarian, Mateusz Malinowski, and Mario Fritz
"Mean Box Pooling: A Rich Image Representation and Output Embedding for the Visual Madlibs Task"
BMVC: British Machine Vision Conference
- Zeynep Akata, Mateusz Malinowski, Mario Fritz, and Bernt Schiele
"Multi-Cue Zero-Shot Learning with Strong Supervision"
CVPR, Spotlight: IEEE Computer Vision and Pattern Recognition
- Sreyasi Nag Chowdhury, Mateusz Malinowski, Andreas Bulling, and Mario Fritz
"Contextual Media Retrieval Using Natural Language Queries"
ICMR: ACM International Conference in Multimedia Retrieval

2015.

- Mateusz Malinowski, Marcus Rohrbach, and Mario Fritz
"Ask Your Neurons: A Neural-based Approach to Answering Questions about Images"
ICCV, Oral: IEEE International Conference on Computer Vision

2014.

- Mateusz Malinowski, and Mario Fritz
"A Multi-World Approach to Question Answering about Real-World Scenes based on Uncertain Input"
NIPS: Neural Information Processing Systems

2013.

- Mateusz Malinowski and Mario Fritz
"Learning Smooth Pooling Regions for Visual Recognition"
BMVC: British Machine Vision Conference

Publications (workshop, report) ([🔗 Google Scholar profile](#))

2021.

- Tim Franzmeyer, Mateusz Malinowski, João F. Henriques
"Learning Altruistic Behaviours in Reinforcement Learning without External Rewards"
Technical Report
- Piotr Piękos, Henryk Michalewski, Mateusz Malinowski
"Measuring and Improving BERT's Mathematical Abilities by Predicting the Order of Reasoning"
ICLR Workshop: The Role of Mathematical Reasoning in General Artificial Intelligence

2020.

- Piotr Piękos, Henryk Michalewski, Mateusz Malinowski
"Learning to Reason by Learning on Rationales"
BayLearn: Bay Area Machine Learning Symposium
- Hossein Hajipour, Mateusz Malinowski, Mario Fritz
"IReEn: Iterative Reverse-Engineering of Black-Box Functions via Neural Program Synthesis"
NeurIPS'20 Workshop on Computer-Assisted Programming

2019.

- Karl Moritz Hermann, Mateusz Malinowski, Piotr Mirowski, Andras Banki-Horvath, Keith Anderson, Raia Handsell
"Learning To Follow Directions in Street View"
CVPR'19 Workshop on Deep Learning for Visual Navigation
- Piotr Mirowski, Andras Banki-Horvath, Keith Anderson, Denis Teplyashin, Karl Moritz Hermann, Mateusz Malinowski, Matthew Koichi Grimes, Karen Simonyan, Koray Kavukcuoglu, Andrew Zisserman, Raia Handsell
"The StreetLearn Environment and Dataset"
Technical Report

2018.

- Mateusz Malinowski, Carl Doersch
"The Visual QA Devil in the Details: The Impact of Early Fusion and Batch Norm on CLEVR"
ECCV Workshop on Shortcomings in Vision and Language (**SiVL**)
- Misha Wagner, Hector Basevi, Rakshith Shetty, Wenbin Li, Mateusz Malinowski, Mario Fritz, Ales Leonardis
"Answering Visual What-If Questions: From Actions to Predicted Scene Descriptions"
ECCV Workshop on Visual Learning and Embodied Agents in Simulation Environments (**VLEASE, Oral**)
- Aishwarya Agrawal, Mateusz Malinowski, Felix Hill, Ali Eslami, Oriol Vinyals, Tejas Kulkarni
"Generating Diverse Programs with Instruction Conditioned Reinforced Adversarial Learning"
NIPS Workshop: Visually Grounded Interaction and Language (ViGIL, Oral)
- Peter Battaglia et al.
"Relational inductive biases, deep learning, and graph networks"
Technical Report
- Julien Pérolat, Mateusz Malinowski, Bilal Piot, Olivier Pietquin
"Playing the Game of Universal Perturbations"
Technical Report

2016.

- Mateusz Malinowski, and Mario Fritz
"Tutorial on Answering Questions about Images with Deep Learning"
2nd Summer School on Integrating Vision and Language: Deep Learning
- Apratim Bhattacharyya, Mateusz Malinowski, and Mario Fritz
"Long Term Boundary Extrapolation for Deterministic Motion"
NIPS Workshop on Intuitive Physics

2015.

- Mateusz Malinowski and Mario Fritz
"Hard to Cheat: A Turing Test based on Answering Questions about Images"
AAAI Workshop: Beyond the Turing Test

2014.

- Mateusz Malinowski, and Mario Fritz
"Towards a Visual Turing Challenge"
NIPS Workshop: Learning Semantics
- Mateusz Malinowski and Mario Fritz
"A Pooling Approach to Modelling Spatial Relations for Image Retrieval and Annotation"
Technical Report

2013.

- Mateusz Malinowski and Mario Fritz
"Learnable Pooling Regions for Image Classification"
ICLR Workshop: International Conference on Learning Representations: Workshop Track

Thesis

2017.

- Mateusz Malinowski

"Towards Holistic Machines: From Visual Recognition To Question Answering About Real-world Image"

PhD Thesis

2011.

- Mateusz Malinowski

"Optimization Algorithms in the Reconstruction of MR Images: A Comparative Study"

Master's Thesis