André Biedenkapp

biedenka@cs.uni-freiburg.de • andrebiedenkapp.github.io

Personal Information

Date of birth: 13.07.1992

Nationality: German

Research Interests

- Dynamic Algorithm Configuration [see, e.g., 1, 6, 12, 15, 16, 19, 20]
- Automated Machine Learning and Reinforcement Learning [see, e.g., 7, 11, 17, 18, 23]
- Deep Reinforcement Learning [see, e.g., 5, 9, 17, 27]
- Learning to Learn [see, e.g., 13, 14, 36]

Work experience

Position held

Postdoctoral Researcher **Albert-Ludwigs-University Freiburg**
Machine Learning Lab *Since 10.2022*
Topic: Automated Reinforcement Learning

Parental Leave
06.05.2024 – 05.07.2024

Past positions

Doctoral Researcher **Albert-Ludwigs-University Freiburg**
Machine Learning Lab *02.2018 - 10.2022*
Topic: Dynamic Algorithm Configuration

Student Assistant **Albert-Ludwigs-University Freiburg**
Machine Learning Lab *10.2015 – 09.2017*
Assisting in the implementation of research projects

Student Assistant **Albert-Ludwigs-University Freiburg**
Chair of Computer Architecture *04.2014 – 09.2014*
Maintenance of the mobile robots for the Hardware-Labcourse

Education

PhD (Dr. rer. nat.) **Albert-Ludwigs-University Freiburg**
Supervised by Prof. Frank Hutter and Prof. Marius Lindauer *02.2018 - 10.2022*
Thesis: Dynamic Algorithm Configuration by Reinforcement Learning (Grade: **Summa Cum Laude**)

Summer School ***Reinforcement Learning Summer SCOOL* (RLSS'19)**
In: Lille, France *July 2019*
Topics: *Reinforcement Learning and Bandits*

Computer Science **Albert-Ludwigs-University Freiburg**
Master of Science (M.Sc.) *04.2015 – 10.2017*
Thesis: Per Instance Algorithm Configuration (Grade: 1.0)
Supervisor: Prof. Dr. Frank Hutter

Computer Science **Albert-Ludwigs-University Freiburg**
Bachelor of Science (B.Sc.) *10.2011 – 03.2015*
Thesis: Data Analysis for the Selection of Recording Channels on Multielectrode-Arrays (Grade: 1.7)
Supervisor: Prof. Dr. Wolfram Burgard

Collaboration

International

- Prof. Carola Doerr since 2020
  (Sorbonne Université Paris, France)
  1 competition win, 1 best paper award, 1 grant
- Asst. Prof. Jendrik Seipp 2021 – 2022
  (Linköping University, Sweden)
  1 workshop paper
- Dr. Aleksandra Faust since 2021
  (Deepmind, United States of America)
  1 journal paper, 1 ICML'2024 workshop
- Dr. Yingjie Miao 2021 – 2022
  (Deepmind, United States of America)
  1 journal paper
- Dr. Jack Parker-Holder 2021 – 2022
  (Deepmind, United Kingdom)
  1 journal paper
- Dr. Silvan Sievers 2021 – 2022
  (University of Basel, Switzerland)
  1 workshop paper
- Dr. Hao Wang 2019 – 2020
  (Leiden University, Netherlands)
  1 competition win
- Asst. Prof. Martin S. Krejca since 2021
  (Institut Polytechnique de Paris, France)
  1 best paper award
- Dr. Nguyen Dang since 2021
  (St. Andrews University, Scotland)
  1 best paper award
- Dr. Nathan Lambert 2020 – 2021
  (HuggingFace, United States of America)
  1 paper
- Dr. Vu Nguyen since 2021
  (Amazon Research, Australia)
  1 journal paper, 1 ICML'2024 workshop
- Dr. Luis Pineda 2020 – 2021
  (Meta AI Research, Canada)
  1 paper
- Dr. David Speck since 2019
  (Linköping University, Sweden)
  1 paper, 1 workshop paper

National

- Prof. Frank Hutter since 2016
  (University of Freiburg, Germany)
  PhD Advisor 02.2018 – 10.2022
  5 journal papers, 13 papers, 12 workshop papers
- Prof. Roberto Calandra 2020 – 2022
  (TU Dresden, Germany)
  1 journal paper, 1 paper
- Prof. Josif Grabocka since 2022
  (University of Technology Nuremberg, Germany)
  2 conference papers, 2 workshop papers
- Dr. Steven Adriaensen since 2019
  (University of Freiburg, Germany)
  1 journal paper, 2 conference papers
- Dr. Noor Awad since 2019
  (University of Freiburg, Germany)
  1 journal paper, 1 paper, 1 competition win,
  collaborated on 2 grant proposals
- Dr. Robert Mattmüller 2020 – 2021
  (University of Freiburg, Germany)
  1 paper, 1 workshop paper
- Prof. Marius Lindauer since 2016
  (Leibniz University Hanover, Germany)
  PhD Advisor 02.2018 – 10.2022
  4 journal papers, 8 papers, 9 workshop papers
- Prof. Matthias Feurer 2019 – 2022
  (LMU Munich, Germany)
  1 journal, 1 competition win, 1 workshop paper
- Prof. Bodo Rosenhan
  (Leibniz University Hanover, Germany)
  1 journal paper, 1 workshop paper
- Dr. Thomas Elsken 2020 – 2021
  (Bosch Center of Artificial Intelligence, Germany)
  1 workshop paper
- Dr. Katharina Eggensperger
  (University of Tübingen, Germany)
  1 journal paper, 1 paper, 1 competition win,
  1 workshop paper

Publications

Google Scholar | DBLP | 0000-0002-8703-8559

Journal and conference rankings are according to CORE'20 (https://www.core.edu.au/conference-portal)

Thesis

[1] **A. Biedenkapp**. "Dynamic Algorithm Configuration by Reinforcement Learning". *Grade: Summa Cum Laude (best possible grade)*. PhD thesis. Freiburg, Germany: University of Freiburg, Department of Computer Science, Machine Learning Chair, Oct. 2022.

[2] **A. Biedenkapp**. "Per Instance Algorithm Configuration". *Grade: 1.0 (best possible grade)*. Master's Thesis. Freiburg, Germany: University of Freiburg, Department of Computer Science, Machine Learning Chair, 2017.

[3] **A. Biedenkapp**. "Data Analysis for the Selection of Recording Channels on Multielectrode-Arrays". Bachelor's Thesis. Freiburg, Germany: University of Freiburg, Department of Computer Science, Autonomous Intelligent Systems, Mar. 2014.

Journal Publications

[4] R. Rajan, J. L. B. Diaz, S. Guttikonda, F. Ferreira, **A. Biedenkapp**, J. O. von Hartz, and F. Hutter. "MDP Playground: An Analysis and Debug Testbed for Reinforcement Learning". In: *Journal of Artificial Intelligence Research (JAIR)* 77 (2023). *Journal Rating: A*, pp. 821–890.

[5] C. Benjamins, T. Eimer, F. Schubert, A. Mohan, S. Döhler, **A. Biedenkapp**, B. Rosenhan, F. Hutter, and M. Lindauer. "Contextualize Me – The Case for Context in Reinforcement Learning". In: *Transactions on Machine Learning Research (TMLR)* (2023). ISSN: 2835-8856. URL: https://openreview.net/forum?id=Y42xVBQusn.

[6] S. Adriaensen, **A. Biedenkapp**, G. Shala, N. Awad, T. Eimer, M. Lindauer, and F. Hutter. "Automated Dynamic Algorithm Configuration". In: *Journal of Artificial Intelligence Research (JAIR)* 75 (2022). *Journal Rating: A*, pp. 1633–1699. DOI: https://doi.org/10.1613/jair.1.13922.

[7] J. Parker-Holder, R. Rajan, X. Song, **A. Biedenkapp**, Y. Miao, T. Eimer, B. Zhang, V. Nguyen, R. Calandra, A. Faust, F. Hutter, and M. Lindauer. "Automated Reinforcement Learning (AutoRL): A Survey and Open Problems". In: *Journal of Artificial Intelligence Research (JAIR)* 74 (2022). *Journal Rating: A*, pp. 517–568. DOI: https://doi.org/10.1613/jair.1.13596.

[8] M. Lindauer, K. Eggensperger, M. Feurer, **A. Biedenkapp**, D. Deng, C. Benjamins, R. Sass, and F. Hutter. "SMAC3: A Versatile Bayesian Optimization Package for Hyperparameter Optimization". In: *Journal of Machine Learning Research (JMLR) – MLOSS* 23.54 (2022). *Journal Rating: A**, pp. 1–9. URL: http://jmlr.org/papers/v23/21-0888.html.

Conference Publications

[9] S. Prasanna, K. Farid, R. Rajan, and **A. Biedenkapp**. "Dreaming of Many Worlds: Learning Contextual World Models Aids Zero-Shot Generalization". In: *Proceedings of the First Reinforcement Learning Conference (RLC'24)*. 2024.

[10] G. Shala, S. P. Arango, **A. Biedenkapp**, F. Hutter, and J. Grabocka. "HPO-RL-Bench: A Zero-Cost Benchmark for HPO in Reinforcement Learning". In: *Proceedings of the Third International Conference on Automated Machine Learning (AutoML'24)*. 2024.

[11] G. Shala, **A. Biedenkapp**, F. Hutter, and J. Grabocka. "Gray-Box Gaussian Processes for Automated Reinforcement Learning". In: *Proceedings of the International Conference on Learning Representations (ICLR'23)*. Published online: iclr.cc, *Acceptance rate: 31.8%, Conference Rating: A**. 2023.

[12] **A. Biedenkapp***, N. Dang*, M. S. Krejca*, F. Hutter, and C. Doerr. "Theory-inspired Parameter Control Benchmarks for Dynamic Algorithm Configuration". In: *Proceedings of the Genetic and Evolutionary Computation Conference (GECCO'22)*. **Joint first authorship**, *Conference Rating: A*, *Won the Best Paper Award (GECH track)*. ACM, July 2022.

[13] **A. Biedenkapp**, R. Rajan, F. Hutter, and M. Lindauer. "TempoRL: Learning When to Act". In: *Proceedings of the Thirty-eighth International Conference on Machine Learning. Acceptance rate: 21.5%, Conference Rating: A**. July 2021, pp. 914–924.

[14] T. Eimer, **A. Biedenkapp**, F. Hutter, and M. Lindauer. "Self-Paced Context Evaluation for Contextual Reinforcement Learning". In: *Proceedings of the Thirty-eighth International Conference on Machine Learning. Acceptance rate: 21.5%, Conference Rating: A**. July 2021, pp. 2948–2958.

[15] T. Eimer, **A. Biedenkapp**, M. Reimer, S. Adriaensen, F. Hutter, and M. Lindauer. "DACBench: A Benchmark Library for Dynamic Algorithm Configuration". In: *Proceedings of the Thirtieth International Joint Conference on Artificial Intelligence (IJCAI'21). Acceptance rate: 19.3%, Conference Rating: A**. ijcai.org, Aug. 2021, pp. 1668–1674.

[16] D. Speck*, A. **Biedenkapp***, F. Hutter, R. Mattmüller, and M. Lindauer. "Learning Heuristic Selection with Dynamic Algorithm Configuration". In: *Proceedings of the Thirty-First International Conference on Automated Planning and Scheduling (ICAPS'21)*. **Joint first authorship**, *Acceptance rate: ~30%, Conference Rating: A**. Aug. 2021, pp. 597–605.

[17] B. Zhang, R. Rajan, L. Pineda, N. Lambert, **A. Biedenkapp**, K. Chua, F. Hutter, and R. Calandra. "On the Importance of Hyperparameter Optimization for Model-based Reinforcement Learning". In: *Proceedings of the International Conference on Artificial Intelligence and Statistics (AISTATS'21). Acceptance rate: 29.8%, Conference Rating: A*. Apr. 2021.

[18] J. KH Franke, G. Köhler, **A. Biedenkapp**, and F. Hutter. "Sample-Efficient Automated Deep Reinforcement Learning". In: *Proceedings of the International Conference on Learning Representations (ICLR'21)*. Published online: `iclr.cc`, *Acceptance rate: 28.7%, Conference Rating: A**. May 2021.

[19] G. Shala*, **A. Biedenkapp***, N. Awad, S. Adriaensen, F. Hutter, and M. Lindauer. "Learning Step-Size Adaptation in CMA-ES". In: *Proceedings of the Sixteenth International Conference on Parallel Problem Solving from Nature (PPSN'20)*. **Joint first authorship**, *Conference Rating: A*. Sept. 2020, pp. 691–706.

[20] **A. Biedenkapp**, H. F. Bozkurt, T. Eimer, F. Hutter, and M. Lindauer. "Dynamic Algorithm Configuration: Foundation of a New Meta-Algorithmic Framework". In: *Proceedings of the European Conference on Artificial Intelligence (ECAI). Acceptance rate: 26.8%, Conference Rating: A*. June 2020, pp. 427–434.

[21] **A. Biedenkapp**, J. Marben, M. Lindauer, and F. Hutter. "CAVE: Configuration Assessment, Visualization and Evaluation". In: *Proceedings of the International Conference on Learning and Intelligent Optimization (LION'18)*. June 2018.

[22] **A. Biedenkapp**, M. Lindauer, K. Eggensperger, C. Fawcett, H. Hoos, and F. Hutter. "Efficient Parameter Importance Analysis via Ablation with Surrogates". In: *Proceedings of the AAAI conference. Acceptance rate: 24.6%, Conference Rating: A**. Feb. 2017, pp. 773–779.

Workshop Contributions

[23] G. Shala, **A. Biedenkapp**, F. Hutter, and J. Grabocka. "Gray-Box Gaussian Processes for Automated Reinforcement Learning". In: *Workshop on Meta-Learning (MetaLearn@NeurIPS'22)*. 2022.

[24] G. Shala, S. Pineda Arango, **A. Biedenkapp**, F. Hutter, and J. Grabocka. "AutoRL-Bench 1.0". In: *Workshop on Meta-Learning (MetaLearn@NeurIPS'22)*. 2022.

[25] R. Sass, E: Bergman, **A. Biedenkapp**, F. Hutter, and M. Lindauer. "DeepCAVE: An Interactive Analysis Tool for Automated Machine Learning". In: *Workshop on Adaptive Experimental Design and Active Learning in the Real World (ReALML@ICML'22)*. 2022.

[26] **A. Biedenkapp**, D. Speck, S. Sievers, F. Hutter, M. Lindauer, and J. Seipp. "Learning Domain-Independent Policies for Open List Selection". In: *Workshop on Bridging the Gap Between AI Planning and Reinforcement Learning (PRL@ICAPS'22)*. 2022.

[27] C. Benjamins, T. Eimer, F. Schubert, **A. Biedenkapp**, B. Rosenhan, F. Hutter, and M. Lindauer. "CARL: A Benchmark for Contextual and Adaptive Reinforcement Learning". In: *Workshop on Ecological Theory of Reinforcement Learning (EcoRL@NeurIPS'21)*. Sept. 2021.

[28] S. Izquierdo, J. Guerrero-Viu, S. Hauns, G. Miotto, S. Schrodi, **A. Biedenkapp**, T. Elsken, D. Deng, M. Lindauer, and F. Hutter. "Bag of Baselines for Multi-objective Joint Neural Architecture Search and Hyperparameter Optimization". In: *Workshop on Automated Machine Learning (AutoML@ICML'21)*. May 2021.

[29] S. Müller, **A. Biedenkapp**, and F. Hutter. "In-Loop Meta-Learning with Gradient-Alignment Reward". In: *AAAI workshop on Meta-Learning Challenges (MetaLearning@AAAI'21)*. Feb. 2021.

[30] N. Awad, G. Shala, D. Deng, N. Mallik, M. Feurer, K. Eggensperger, **A. Biedenkapp**, D. Vermetten, H. Wang, C. Doerr, M. Lindauer, and F. Hutter. "Squirrel: A Switching Hyperparameter Optimizer Description of the entry by AutoML.org & IOHprofiler to the NeurIPS 2020 BBO challenge". In: ***arXiv***:*2012.08180* (Dec. 2020). **Winning entry of the BBO Competition@NeurIPS'20 on a meta-learnable search space**.

[31] **A. Biedenkapp**, R. Rajan, F. Hutter, and M. Lindauer. "Towards TempoRL: Learning When to Act". In: *Workshop on Inductive Biases, Invariances and Generalization in RL (BIG@ICML'20)*. July 2020.

[32] T. Eimer, **A. Biedenkapp**, F. Hutter, and M. Lindauer. "Towards Self-Paced Context Evaluation for Contextual Reinforcement Learning". In: *Workshop on Inductive Biases, Invariances and Generalization in RL (BIG@ICML'20)*. July 2020.

[33] **A. Biedenkapp**, H. F. Bozkurt, F. Hutter, and M. Lindauer. "Towards White-Box Benchmarks for Algorithm Control". In: *IJCAI 2019 DSO Workshop*. Aug. 2019.

[34] M. Lindauer, M. Feurer, K. Eggensperger, **A. Biedenkapp**, and F. Hutter. "Towards Assessing the Impact of Bayesian Optimization's Own Hyperparameters". In: *IJCAI 2019 DSO Workshop*. Aug. 2019.

Preprints

[35] T. Camaret Ndir, **A. Biedenkapp**, and N. Awad. "Inferring Behavior-Specific Context Improves Zero-Shot Generalization in Reinforcement Learning". In: ***arXiv***:*2404.09521* (2024).

[36] G. Shala, **A. Biedenkapp**, and J. Grabocka. "Hierarchical Transformers are Efficient Meta-Reinforcement Learners". In: ***arXiv***:*2402.06402* (2024).

[37] M. Lindauer, K. Eggensperger, M. Feurer, **A. Biedenkapp**, J. Marben, P. Müller, and F. Hutter. "BOAH: A Tool Suite for Multi-Fidelity Bayesian Optimization & Analysis of Hyperparameters". In: ***arXiv***:*1908.06756* (Aug. 2019).

Blog Posts

[38] T. Eimer, R. Rajan, A. Mohan, and **A. Biedenkapp**. "2023 in AutoRL". In: *autorl.org* (Jan. 2024). URL: `http://autorl.org/blog/retrospective/#2023-in-autorl`.

[39] **A. Biedenkapp**, R. Rajan, F. Hutter, and M. Lindauer. "TempoRL - Learning When to Act". In: *Personal Blog* (May 2022). URL: `https://andrebiedenkapp.github.io/blog/2022/temporl/`.

[40] **A. Biedenkapp**, N. Dang, M. S. Krejca, F. Hutter, and C. Doerr. "Theory-Inspired Parameter Control Benchmarks for DAC". In: *Personal Blog* (May 2022). URL: `https://andrebiedenkapp.github.io/blog/2022/gecco/`.

[41] N. Lambert, B. Zhang, R. Rajan, and **A. Biedenkapp**. "The Importance of Hyperparameter Optimization for Model-based Reinforcement Learning". In: *https://bair.berkeley.edu/blog* (Apr. 2021). URL: `https://bair.berkeley.edu/blog/2021/04/19/mbrl/`.

[42] R. Rajan, **A. Biedenkapp**, T. F. Runge, and J. Franke. "AutoRL: AutoML in the Realm of Deep Reinforcement Learning". In: *https://www.automl.org/automl-blog* (Apr. 2021). URL: `https://www.automl.org/blog-autorl`.

[43] **A. Biedenkapp**. "Learning Step-Size Adaptation in CMA-ES". In: *https://www.automl.org/automl-blog* (Aug. 2020). URL: https://www.automl.org/learning-step-size-adaptation-in-cma-es.

[44] **A. Biedenkapp**. "Dynamic Algorithm Configuration". In: *https://www.automl.org/automl-blog* (Feb. 2020). URL: https://www.automl.org/dynamic-algorithm-configuration.

[45] **A. Biedenkapp** and F. Hutter. "BOHB". In: *https://www.automl.org/automl-blog* (Aug. 2018). URL: https://www.automl.org/blog_bohb.

[46] **A. Biedenkapp**, K. Eggensperger, M. Feurer, and F. Hutter. "2nd AutoML Challenge". In: *https://www.automl.org/automl-blog* (Aug. 2018). URL: https://www.automl.org/blog-2nd-automl-challenge.

Patents

Google Patents

[47] **A. Biedenkapp**, G. Shala, S. Adriaensen, N. Awad, M. Lindauer, and F. Hutter. "Verfahren und Vorrichtung zum Lernen einer Strategie und Betreiben der Strategie". German pat. DE102020209281A1. Robert Bosch GmbH. Jan. 27, 2022. URL: https://depatisnet.dpma.de/DepatisNet/depatisnet?action=bibdat&docid=DE102020209281A1. *Further pat. req. filed in Japan (JP2022022177), USA (US20220027743) & China (CN113971460).*

[48] S. Müller, **A. Biedenkapp**, and F. Hutter. "Verbesserte Vorrichtung zum Anlernen von maschinellen Lernsysteme für Bildverarbeitung". German pat. DE202021100225. Robert Bosch GmbH. Mar. 25, 2021. URL: https://depatisnet.dpma.de/DepatisNet/depatisnet?action=bibdat&docid=DE202021100225U1. *Further pat. req. filed in the USA (US20220230416) & China (CN114861929).*

[49] D. Speck, **A. Biedenkapp**, R. Matmüller, J. Spitz, F. Hutter, and M. Lindauer. "Device and Method for Planning and Operation of a Technical System". European pat. EP3920103. Robert Bosch GmbH. Dec. 8, 2021. URL: https://register.epo.org/application?number=EP20178576. *Further pat. req. filed in the USA (US2021383245) & China (CN113759710).* Forthcoming.

[50] D. Speck, **A. Biedenkapp**, R. Matmüller, J. Spitz, F. Hutter, and M. Lindauer. "Vorrichtung und Verfahren zur Planung eines Betriebs eines technischen Systems". German pat. DE102020207114. Robert Bosch GmbH, Albert-Ludwigs-Universität Freiburg, and Gottfried Wilhelm Leibniz Universität Hannover. Dec. 9, 2021. URL: https://depatisnet.dpma.de/DepatisNet/depatisnet?action=bibdat&docid=DE102020207114A1.

[51] **A. Biedenkapp**, F. Hutter, and M. Lindauer. "Verfahren zum Trainieren eines Algorithmus des maschinellen Lernens durch ein bestärkendes Lernverfahren". German pat. DE102022210480A1. Robert Bosch GmbH. Apr. 4, 2024. URL: https://depatisnet.dpma.de/DepatisNet/depatisnet?action=bibdat&docid=DE102022210480A1.

Teaching Experience

Meta-Algorithmics & AutoML
Undergraduate lecture *04.2023*
Guest Lecture as part of the "Artificial Intelligence Practice" course at the St. Andrews University

Dynamic Algorithm Configuration and Optimization
Seminar, Achieved the top grade (1.0) in the student teaching evaluation *10.2022 – 02.2023*
Responsible for setting up the seminar. Jointly held with Prof. Frank Hutter and Dr. Noor Awad

Automated Machine Learning
Lab course *10.2022 – 02.2023*
Responsible for setting up the lab course. Jointly held with Prof. Frank Hutter and Rhea Sukthanker

Teaching Assistant

Foundations of Deep Learning **(Flipped Classroom)**
Graduate course *10.2023 – 03.2024*

Grading of exercises & creating the exam. Preparation to release course as MOOC.

Automated Machine Learning **(Flipped Classroom)**
Graduate course, Ranked first place in the student teaching evaluation *04.2023 – 09.2023*
Creation and grading of exercises & final project.

Automated Machine Learning **(Flipped Classroom)**
Graduate course *04.2022 – 09.2022*
Creation and grading of exercises & final project.

Automated Machine Learning **Massive Open Online Course (MOOC)**
Graduate course *Published 04.2021*
Creation of coding exercises. Involved in setting up the MOOC

Automated Machine Learning **(Flipped Classroom)**
Graduate course, Virtual, Ranked first place in the student teaching evaluation *04.2021 – 09.2021*
Creation and grading of exercises & final project. Setting up online teaching through Zoom and GitHub classroom.

Automated Machine Learning **(Flipped Classroom)**
Graduate course, Virtual *04.2020 – 09.2020*
Creation and grading of exercises & final project. Setting up online teaching through Zoom and GitHub classroom.

Automated Machine Learning
Graduate course *04.2019 – 09.2019*
Creation and grading of exercises & final project

Machine Learning for Automated Algorithm Design
Graduate course *10.2018 – 03.2019*
Creation and grading of exercises & final project

Machine Learning for Automated Algorithm Design
Graduate course *10.2017 – 03.2018*
Creation and grading of exercises & final project

Hardware-Labcourse
Undergraduate course *04.2014 – 09.2014*
Assisting students with practical exercises

Student Project and Thesis Supervision

MSc Thesis
L. Gieringer *started 01.2024*
Working Title: Towards General Offline RL-Based Dynamic Algorithm Configuration

MSc Thesis
J. Fix *started 01.2024*
Working Title: Towards Dynamical Learning Rate Adaptation in Neural Network Optimization Using Multi-Teacher Offline RL

MSc Project
P. Bordne *06.2023 – 04.2024*
Working Title: Multi-Timescale Multi-Agent RL for Dynamic Algorithm Configuration

MSc Thesis
J. Hog, Joint supervision with R. Rajan and V. Nguyen *05.2023 – 12.2023*
Meta Learning Through Time With Population-Based Bandits

MSc Project
J. Fix & L. Gieringer, Joint supervision with N. Awad *05.2023 – 10.2023*
Crowd Control: A case study in scaling individual DE population members using Offline RL for DAC

MSc Thesis at the University of St. Andrews
M. Hossain, Joint supervision with N. Dang *04.2023 – 08.2023*
Dynamic Algorithm Configuration with Proximal Policy Optimisation

MSc Thesis
F. Diederichs, Joint supervision with N. Awad *09.2022 – 02.2023*

On the Applicability of Offline Reinforcement Learning for Dynamic Algorithm Configuration of Differential Evolution

MSc Thesis
B. Zhang, Joint supervision with R. Rajan, Published at AISTATS'21 *04.2020 – 10.2020*
On the Importance of Hyperparameter Optimization in Model-based Reinforcement Learning

MSc Project & Thesis
G. Shala, Published at PPSN'20 *04.2019 – 05.2020*
Learning to Optimize CMA-ES

MSc Thesis
H. F. Bozkurt *03.2019 – 11.2019*
RL-DCBO: Reinforcement Learning Guided Dynamic Control for Bayesian Optimization

MSc Thesis
T. Eimer, Follow up work published at ICML'21 *12.2018 – 09.2019*
Improved Meta-Learning for Algorithm Control through Self-Paced Learning

MSc Thesis
K. Hättig *12.2018 – 09.2019*
Model-Based Population Based Training

MSc Thesis
O. Brunner, Joint supervision with D. Speck at GKI-Freiburg *11.2018 – 04.2019*
Learning Domain-Independent Heuristics with Deep Neural Networks

MSc Project
T. Eimer & K. Hättig *04.2018 – 12.2018*
Algorithm State Description for Algorithm Control

Student Mentorship

Student Research Assistants:

- S. Prasanna (11.2023 – 06.2024)
- T. C. Ndir (10.2022 – 09.2024)
- F. Diederichs (11.2021 – 02.2023)
- L. Goldbach (04.2021 – 10.2021)
- S. Ohnemus (07.2020 – 10.2020)
- G. Shala (07.2020 – 10.2020)
- J. Marben (01.2020 – 06.2020)
- H. F. Bozkurt (03.2019 – 11.2019)

Student Teaching Assistants:

- T. Athanasiadis (10.2023 – 09.2024)
- A. Garg (10.2023 – 09.2024)
- G. Mouratidis (10.2023 – 04.2024)
- L. Zhang (10.2023 – 09.2024)
- R. C. Fernandez (10.2023 – 09.2024)
- L. Strack (10.2023 – 03.2024)
- I. Das (08.2023 – 09.2024)

Presentations

Invited Talks & Competitively-Selected Tutorials

Beyond Trial & Error: A Tutorial on Automated Reinforcement Learning
ECAI 2024 Tutorial, Santiago de Compostela, Spain *10.2024*
Jointly with Theresa Eimer

Beyond Trial & Error: A Tutorial on Automated Reinforcement Learning
AutoML 2024 Tutorial, Paris, France *09.2024*
Jointly with Theresa Eimer

AutoRL with Applications to Sustainability
Invited AutoML School 2024 Tutorial, Hannover, Germany *09.2024*
Jointly with Theresa Eimer

Meta-Algorithmics & AutoML
Invited Lecture (part of CS5011), University of St. Andrews, Scotland (online) *04.2023*

Learning to Dynamically Optimise Algorithms
Seminar on Advances in Probabilistic Machine Learning, Aalto University Helsinki, Finland (online) *11.2022*

Dynamic Algorithm Configuration
ELLIS Meetup Freiburg, Freiburg, Germany *03.2022*

Advances of Dynamic Algorithm Configuration
Bosch Center for Artificial Intelligence, Renningen, Germany *06.2021*

Algorithm Configuration: Challenges, Methods and Perspectives
IJCAI 2020 Tutorial, Online *01.2021*
Jointly with Prof. Marius Lindauer

Algorithm Configuration: Challenges, Methods and Perspectives
PPSN 2020 Tutorial, Online *09.2020*
Jointly with Prof. Marius Lindauer

Challenges of Dynamic Algorithm Configuration
Bosch Center for Artificial Intelligence, Renningen, Germany *03.2020*

Dynamic Algorithm Configuration
Institut für Informationsverarbeitung (TNT), University of Hannover, Germany *01.2020*

Conference Presentations

The Genetic and Evolutionary Computation Conference **Online**
GECCO (Oral, Joint video presentation with all authors) *07.2022*
Theory-inspired Parameter Control Benchmarks for Dynamic Algorithm Configuration

International Conference on Machine Learning **Online**
ICML (Poster) *07.2021*
TempoRL: Learning When to Act

International Conference on Parallel Problem Solving from Nature **Leiden**
PPSN (Poster), Netherlands *08.2020*
Learning Step-SizeAdaptation in CMA-ES

European Conference on Artificial Intelligence **Santiago de Compostela**
ECAI (Oral), Spain *08.2020*
Dynamic Algorithm Configuration: Foundation of a New Meta-Algorithmic Framework

Learning and Intelligent OptimizatioN Conference **Kalamata**
LION (Oral), Greece *06.2018*
CAVE: Configuration Assessment, Visualization and Evaluation

AAAI Conference on Artificial Intelligence **San Francisco**
AAAI (Poster), California, USA *02.2017*
Efficient Parameter Importance Analysis via Ablation with Surrogates

Workshop Presentations

Bridging the Gap Between AI Planning and Reinforcement Learning **Online**
PRL@ICAPS'22 *06.2022*
Learning Domain-Independent Policies for Open List Selection

Inductive Biases, Invariances and Generalization in Reinforcement Learning **Online**
BIG@ICML'20 *07.2020*
Towards TempoRL: Learning When to Act

Data Science Meets Optimisation **Macau**
DSO@IJCAI'19, Macau (SAR), China *08.2019*
Towards White-box Benchmarks for Algorithm Control

Funding Acquisition

Research grants, as proposal contributor

Alliance Sorbonne Université project under the Emergence 2023/24 funding call **€ 60 000**
Team member & involved in drafting the proposal, PI: Carola Doerr *09.2023 - 08.2025*

DFG[1] Collaborative Research Center "Small Data"
Involved in drafting project C04, WP PI: Noor Awad, WP co-PI: Joschka Bödecker *10.2023 - 09.2027*

CZS[2] Breakthroughs project "ReScaLe"
Contributed to the draft of WP5, WP PI: Noor Awad, WP co-PI: Joschka Bödecker *06.2021 - 05.2028*

Scholarships, Honors and Awards

Best Paper Award
GECCO'22, Theory-inspired Parameter Control Benchmarks for Dynamic Algorithm Configuration *2022*
GECH Track – `https://gecco-2022.sigevo.org/Best-Paper-Awards#GECH_Track`

Best Reviewers (Top 10%)
ICML'21 *2021*

Black-Box Optimization Competiton@NeurIPS'20 **1st place**
Part of the AutoML & IOHprofiler Team, 1st place on a meta-learning friendly search space *2020*
Leaderboard: `https://bbochallenge.com/altleaderboard`

Black-Box Optimization Competiton@NeurIPS'20 **3rd place***
Part of the AutoML & IOHprofiler Team, Leaderboard: `https://bbochallenge.com/leaderboard` *2020*
*Due to a bug the initial evaluation failed. After re-evaluation our team would have gotten the third place.

Professional Service

Academic Self-Administration

Thesis Advisory Committee Membership
since June 2024, A. Hasan
University of Freiburg – CRC 1597 Small Data research project: C04

Thesis Advisory Committee Membership
since February 2024, B. Zhang
University of Freiburg – CRC 1597 Small Data research project: C04

Thesis Advisory Committee Membership
since January 2024, J. Hog
University of Freiburg – CRC 1597 Small Data research project: B01

Member in appointment committee
since June 2023

Membership

AutoRL.org **Co-Founder**
since January 2024

AutoML.org Supergroup **Member**
since October 2017

COSEAL.net **Chair**
since August 2022
Jointly with Alexander Tornede (until 2024), Theresa Eimer (since 2024) and Lennart Schäpermeier

AutoML.org Supergroup **Member**
since October 2017

Organizer

AutoRL Workshop@ICML'24
2024, Co-Organiser
Jointly with Theresa Eimer, Raghu Rajan, Julian Dierkes, Vu Nguyen and Aleksandra Faust

AutoML Conference - Online Experience Chair
2023 & 2024
Joinlty with Gabi Kadlecová in 2024 and 2023 jointly with Hayeon Lee, Mohammed Abdelfattah & Richard Song

[1] Deutsche Forschungsgemeinschaft – German Research Council
[2] Carl Zeiss Stiftung

2nd AutoML Fall School
2022, Local Organiser

ELLIS Unit Meetups Freiburg
07.2022-12.2022, Co-Organiser with Simon Ging
Involved in setting up the first "ELLIS Social" followup event in 2023

Journal Reviewing

Autonomous Agents and Multi-Agent Systems **JAAMAS**
2023

Journal of Artificial Intelligence Research **JAIR**
2024, 2023, 2022

IEEE Transactions on Evolutionary Computation **TEVC**
2022

Computational Intelligence **CI**
2022

Journal of the Association for Computing Machinery **Journal of the ACM**
2022, 2021

Program Committee Membership at Conferences

AAAI Conference on Artificial Intelligence **AAAI**
2018

AutoML Conference **AutoML**
2024, 2023, 2022

European Conference on Artificial Intelligence **ECAI**
2024, 2020

International Conference on Machine Learning **ICML**
2024, 2023, 2021, 2019

International Conference on Learning Representations **ICLR**
2024

Neural Information Processing Systems **NeurIPS**
2023, 2022, 2021

NeurIPS Datasets and Benchmarks **NeurIPS DBT**
2021 (Track 1 & Track 2)

Program Committee Membership at Workshops

ICLR Workshop on Agent Learning in Open-Endedness **ALOE**
2022

ICML Workshop on Automated Machine Learning **AutoML@ICML**
2021, 2020, 2019, 2018

European Workshop on Reinforcement Learning **EWRL**
2023, 2022

NeurIPS Workshop on Meta-Learning **MetaLearn@NeurIPS**
2019

Programming Skills

Excellent: Python, Bash, LaTeX **Good**: C, C#, C++, Julia **Basic**: Matlab, Java

Selected Open-Source Projects

GitHub Page: `https://github.com/AndreBiedenkapp`

https://github.com/automl/DAC *DAC*
Role: Developer
DAC is the first dynamic algorithm configurator which enables configuration not only to specific problem instances but also at each time-step. To gain insights into the strengths and weaknesses of this reinforcement learning based configurator DAC comes with example white-box benchmarks.

https://github.com/automl/DACBench *DACBench*
Role: Contributor
DACBench is a benchmark library for Dynamic Algorithm Configuration. Its focus is on reproducibility and comparability of different DAC methods as well as easy analysis of the optimization process.

https://github.com/automl/ParameterImportance *PyImp*
Role: Developer
PyImp is an easy to use tool that helps developers to identify the most important parameters of their algorithms. Given the data of a configuration run with SMAC3, PyImp allows for usage of various parameter importance methods to determine which parameters have the most influence on the algorithms behaviour.

https://github.com/automl/SMAC3 *SMAC3*
Former Role: Contributor
Python implementation of SMAC (sequential model-based algorithm configuration). SMAC is a tool for automated algorithm configuration.

Languages

Native: German **Fluent**: English **Basic**: French