

Federico Berto

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[in federicoberto](#) | [G fedebotu](#) | [T fedebotu](#) | [G fedebotu.github.io](#)

Tokyo, Japan

RESEARCH INTERESTS

- Efficient alternative architectures beyond autoregressive transformers
- AI for Science & AI for Combinatorial Optimization
- Multi-agent systems, including agentic AI

EXPERIENCE

Radical Numerics

Founding AI Scientist

07/2025 - present

Tokyo, Japan

- Research on next-generation AI scientific world models
- Large-scale ML training and inference infrastructure
- R&D on efficient models, including diffusion and hybrid architectures

Omelet AI

AI Scientist (Part-time)

07/2024 - 06/2025

Daejeon, South Korea

- R&D on foundation models for optimization
- Development of optimization AI Agent platform
- Research in neural combinatorial optimization for real-world applications

Daewoong Pharmaceuticals

Internship & Scholarship Recipient

07/2021 - 06/2024

Seoul, South Korea

- Optimization of pharmaceutical production processes with machine learning
- Automatic document translation optimization via LLMs
- Medical news crawler and notification service

Comau Robotics

Internship

10/2019 - 01/2020

Shanghai, China

- Design of automated engine assembly lines from the FCA group
- PLC Software Design
- International Team Cooperation

EDUCATION

Doctor of Philosophy (Ph.D.)

Korea Advanced Institute of Science and Technology (KAIST)

2022 - 2025

Daejeon, South Korea

- Major: Industrial and Systems Engineering
- Advisor: Prof. Jinkyoo Park
- Thesis: "Learning Foundation Models for Efficient Neural Combinatorial Optimization"

Master of Science (M.S.)

Korea Advanced Institute of Science and Technology (KAIST)

2020 - 2022

Daejeon, South Korea

- Major: Industrial and Systems Engineering
- Advisor: Prof. Jinkyoo Park
- Thesis: "Neural Solvers for Fast and Accurate Numerical Optimal Control"

Bachelor of Science (B.S.)

University of Bologna & Tongji University (double degree)

2016 - 2020

Bologna, Italy & Shanghai, China

- Major: Automation Engineering
- Advisor: Prof. Claudio Melchiorri
- Thesis: "Design Strategy for Controlling Computer Games Based on Machine Learning Algorithms"

- [1] Federico Berto*, Chuanbo Hua*, Nayeli Gast Zepeda*, André Hottung, Niels Wouda, Leon Lan, Junyoung Park, Kevin Tierney, Jinkyoo Park. "RouteFinder: Towards Foundation Models for Vehicle Routing Problems" In: *Transactions on Machine Learning Research (TMLR) & International Conference on Machine Learning (ICML)*, 2026.
- [2] Jiwoo Son*, Zhikai Zhao*, Federico Berto*, Chuanbo Hua, Changhyun Kwon, Jinkyoo Park. "RRNCO: Towards Real-World Routing with Neural Combinatorial Optimization" In: *International Conference on Learning Representations (ICLR)*, 2026.
- [3] Chuanbo Hua*, Federico Berto*, Zhikai Zhao, and Jiwoo Son, Changhyun Kwon, Jinkyoo Park. "USPR: Learning a Unified Solver for Profiled Routing". In: *In Proceedings of the AAAI Conference on Artificial Intelligence*, 2026
- [4] Zhikai Zhao*, Chuanbo Hua*, Federico Berto*, and Kanghoon Lee, Zihan Ma, Jiachen Li, Jinkyoo Park. "TrajEvo: Designing Trajectory Prediction Heuristics via LLM-driven Evolution". In: *In Proceedings of the AAAI Conference on Artificial Intelligence*, 2026
- [5] Federico Berto*, Chuanbo Hua*, Laurin Luttman*, Jiwoo Son, Junyoung Park, Kyuree Ahn, Changhyun Kwon, Lin Xie, Jinkyoo Park. "PARCO: Parallel AutoRegressive Models for Multi-Agent Combinatorial Optimization" In: *Advances in Neural Information Processing Systems (NeurIPS)*, 2025.
- [6] Keshigeyan Chandrasegaran, Armin W. Thomas, Jerome Ku, Federico Berto, Jae Myung Kim, Garyk Brix, Eric Nguyen, Stefano Massaroli, Michael Poli. "RND1: Simple, Scalable AR-to-Diffusion Conversion". Radical Numerics Technical Report, 2025.
- [7] Federico Berto*, Chuanbo Hua*, Junyoung Park*, Laurin Luttman*, Yining Ma, Fanchen Bu, Jiarui Wang, Haoran Ye, Minsu Kim, Sanghyeok Choi, Nayeli Gast Zepeda, André Hottung, Jianan Zhou, Jieyi Bi, Yu Hu, Fei Liu, Hyeonah Kim, Jiwoo Son, Haeyeon Kim, Davide Angioni, Wouter Kool, Zhiguang Cao, Jie Zhang, Kijung Shin, Cathy Wu, Sungsoo Ahn, Guojie Song, Changhyun Kwon, Lin Xie, Jinkyoo Park. "RL4CO: an Extensive Reinforcement Learning for Combinatorial Optimization Benchmark" In: *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD)*, 2025.
- [8] Haeyeon Kim, Junghyun Lee, Seonguk Choi, Federico Berto, Taein Shin, Joonsang Park, Jihun Kim, Jiwon Yoon, Byeongmok Kim, Youngwoo Kim, Joungho Kim. "Advanced Chiplet Placement and Routing Optimization considering Signal Integrity". In: *IEEE Transactions on Components, Packaging and Manufacturing Technology*, 2025.
- [9] Haeyeon Kim*, Federico Berto*, Junghyun Lee, Hyunjun An, Taein Shin, Chuanbo Hua, Jinkyoo Park, Youngwoo Kim, Joungho Kim. "Accelerating Chiplet Placement & Routing Optimization with Machine Learning" In: *DesignCon (Best Paper Award Finalist)*, 2025.
- [10] Chuanbo Hua*, Federico Berto*, Jiwoo Son*, Seunghyun Kang, Changhyun Kwon, Jinkyoo Park. "CAMP: Collaborative Attention Model with Profiles for Vehicle Routing Problems" In: *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2025.
- [11] Haoran Ye, Jiarui Wang, Zhiguang Cao, Federico Berto, Chuanbo Hua, Haeyeon Kim, Jinkyoo Park, Guojie Song. "ReEvo: Large Language Models as Hyper-Heuristics with Reflective Evolution" In: *Advances in Neural Information Processing Systems (NeurIPS)*, 2024.
- [12] Huijie Tang*, Federico Berto*, Jinkyoo Park. "Ensembling Prioritized Hybrid Policies for Multi-agent Pathfinding" In: *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024.
- [13] Huijie Tang*, Federico Berto*, Zihan Ma, Chuanbo Hua, Kyuree Ahn, Jinkyoo Park. "HiMAP: Learning Heuristics-Informed Policies for Large-Scale Multi-Agent Pathfinding" In: *AAMAS*, 2024.

- [14] Chuanbo Hua*, Federico Berto*, Michael Poli, Stefano Massaroli, Jinkyoo Park. "Learning Efficient Surrogate Dynamic Models with Graph Spline Networks" In: *Advances in Neural Information Processing Systems (NeurIPS)*, 2023.
- [15] Minsu Kim, Federico Berto, Sungsoo Ahn, Jinkyoo Park. "Bootstrapped Training of Score-Conditioned Generator for Offline Design of Biological Sequences" In: *Advances in Neural Information Processing Systems (NeurIPS)*, 2023.
- [16] Haeyeon Kim*, Minsu Kim*, Federico Berto, Joungho Kim, Jinkyoo Park. "DevFormer: a symmetric transformer for context-aware device placement" In: *International Conference on Machine Learning (ICML)*, 2023.
- [17] Michael Poli*, Stefano Massaroli*, Federico Berto*, Jinkyoo Park, Tri Dao, Christopher Re, Stefano Ermon. "Transform Once: Efficient Operator Learning in Frequency Domain" In: *Advances in Neural Information Processing Systems (NeurIPS)*, 2022.
- [18] Federico Berto, Stefano Massaroli, Michael Poli, Jinkyoo Park. "Neural Solvers for Fast and Accurate Numerical Optimal Control" In: *International Conference on Learning Representations (ICLR)*, 2022.

AWARDS AND SCHOLARSHIPS

Best Paper Award Finalist

2025

DesignCon

Santa Clara, CA, USA

Paper: "Accelerating Chiplet Placement & Routing Optimization with Machine Learning"

Top Reviewer (x2)

2023 - 2024

NeurIPS

New Orleans, USA; Vancouver, Canada

Received complimentary NeurIPS pass each time

International Scholarship

2020 - 2025

KAIST

Daejeon, South Korea

Full-tuition scholarship and monthly stipend for top applicants

Venture Research Program for Graduate Students

2024

KAIST

Daejeon, South Korea

Scholarship for cross-department project collaborations with the Electrical Engineering Department

Song Hyun-sang Award

2023

KAIST

Daejeon, South Korea

Based on academic excellence and contribution to the development of the Department through leadership, service, and creativity

Korean Speech Contest

2023

KAIST International House

Daejeon, South Korea

Third place winner

Outstanding Reviewer

2022

International Conference of Machine Learning (ICML)

Remote

Top 10% of reviewers

AI and Big Data Scholarship

2021 - 2024

Daewoong Foundation

Remote

Monthly scholarship for talented applicants in AI & Big Data

AI Hackaton Award

2021

Daewoong Foundation

Gangwon-do, South Korea

Third place winner for developing "Olppaemi: an AI assessment and monitoring tool for skin analysis"

Almatong Program Scholarship

2017 - 2020

University of Bologna and Tongji University

Shanghai, China

Full scholarship for double degree abroad

ACADEMIC REVIEWER

International Conference on Machine Learning (ICML)	2022 - 2026
Conference on Neural Information Processing System (NeurIPS)	2022 - 2026
International Conference on Learning Representation (ICLR)	2024 - 2026
AAAI Conference on AI (AAAI)	2025 - 2026
Knowledge Discovery and Data Mining (KDD)	2024 - 2026
International Joint Conference on Artificial Intelligence (IJCAI)	2024 - 2025
International Conference on Artificial Intelligence and Statistics (AISTATS)	2025 - 2026
Transactions on Machine Learning Research (TMLR)	2025 - 2026
Reinforcement Learning Conference (RLC)	2025
Learning and Intelligent Optimization (LION)	2025

SKILLS

- **Research Community Engagement:** Founder of the [AI4CO](#) community (400+ members)
- **Programming Languages:** Python, C++, Cuda
- **Deep Learning Frameworks:** PyTorch, TensorFlow, Jax, TorchRL, Transformers
- **General Software Frameworks:** NumPy, Streamlit, Langchain/Langgraph, FastAPI, MkDocs
- **Software Tools:** Linux, Git, Docker, Slurm, Agentic Coding (e.g. Claude Code), $\LaTeX$

CERTIFICATIONS

English Language Certification (IELTS)	Level 8.0
Chinese Language Certification (HSK)	Level 3
Driving Licenses	Italy, China, South Korea, International

ADDITIONAL INFORMATION

Languages: Italian (Native), English (Proficient), Chinese (Lower Intermediate), Spanish (Intermediate), Korean (Basic)

Extracurricular Activities: Traveling, Cultural exchanges, Tech trends, Hiking and multi-day trekking, Board games, Developing for fun

Open-Source Contributions: Active contributor to various projects from research libraries to practical applications such as [these examples](#)