

Filip Marić

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Generative models, robotic manipulation, embodied and multimodal AI

WORK EXPERIENCE

Meta

San Francisco Bay Area, USA

AI Research scientist

06/2024 | Present

- Designed novel body tracking architecture, replacing current production baseline
- Prototyping novel generative, diffusion-based architectures for human motion synthesis

Samsung Research America

Montreal, Canada

AI research scientist

02/2023 | 02/2024

- Conceptualized and led development of on-device VLM-based visual-language search prototype

Meta

San Francisco Bay Area, USA

Research scientist, intern

04/2022 | 09/2022

- Developed and trained deep learning architecture for inside-out body tracking

Coursera

Toronto, Canada

Subject matter expert

2019 | 2020

- Designed assignments for the [state estimation specialization](#)
- Created materials for batch trajectory optimization and Kalman filter sections

SELECTED PUBLICATIONS

- Z. Li, S. K. Dwivedi, F. Marić, C. Chacón, N. Bertsch, F. Arcadu, T. Hodan, M. Ramamonjisoa, P. Wonka, A. Zhao, R. Kips, C. Keskin, A. Tkach, and C. Yang, “XR-Poser: Accurate Egocentric Human Motion Estimation for AR/VR”, *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2026., [preprint](#)
- O. Limoyo, F. Marić, M. Giamou, P. Alexson, I. Petrović, and J. Kelly, “Generative Graphical Inverse Kinematics,” *IEEE Transactions on Robotics*, 2025. [preprint](#)
- M. Giamou, F. Marić, D. M. Rosen, V. Petroukhin, N. Roy, I. Petrović, and J. Kelly, “Convex iteration for distance-geometric inverse kinematics”, *IEEE Robotics and Automation Letters*, vol. 7, no. 2, pp. 1952–1959, 2022, [preprint](#)
- F. Marić, M. Giamou, A. W. Hall, S. Khoubyarian, I. Petrović, and J. Kelly, “Riemannian optimization for distance-geometric inverse kinematics”, *IEEE Transactions on Robotics*, vol. 38, no. 3, pp. 1703–1722, 2021, [preprint](#)
- F. Marić, L. Petrović, M. Guberina, J. Kelly, and I. Petrović, “A Riemannian metric for geometry-aware singularity avoidance by articulated robots”, *Robotics and Autonomous Systems*, vol. 145, pp. 103865, 2021, [preprint](#)
- O. Limoyo, B. Chan, F. Marić, B. Wagstaff, A. R. Mahmood, and J. Kelly, “Heteroscedastic uncertainty for robust generative latent dynamics”, *IEEE Robotics and Automation Letters*, vol. 5, no. 4, pp. 6654–6661, 2020, [preprint](#)
- F. Marić, M. Giamou, S. Khoubyarian, I. Petrović, and J. Kelly, “Inverse kinematics for serial kinematic chains via sum of squares optimization”, in *Proc. of the 2020 IEEE International Conference on Robotics and Automation (ICRA)*, 2020, pp. 7101–7107, [video](#), [paper](#)

EDUCATION

PhD, University of Toronto

Advisors: prof. Jonathan Kelly, prof. Ivan Petrović

Thesis: *A Geometric Approach for Generating Feasible Configurations of Robotic Manipulators*

Toronto, Canada

01/2018 | 01/2023

- Finding approaches based on computational geometry for configuration and trajectory optimization in robotic manipulation
- Researching inductive geometric biases for deep learning architectures in robotic manipulation

MASc, University of Zagreb

Control and Automation

Zagreb, Croatia

10/2015 | 09/2017

BASc, University of Zagreb

Electrical Engineering and IT

Zagreb, Croatia

10/2012 | 06/2015

AWARDS AND ACHIEVEMENTS

UofT Grads to Watch

List of the most promising engineering graduates of the year.

University of Toronto, Canada, 2023

Invited speaker, RSS

Presented my work on using Riemannian geometry for kinematics at the Robotics: Science and Systems conference [workshop](#): “Geometry and Topology in Robotics: Learning, Optimization, Planning, and Control”.

Virtual, 2021

Best workshop contribution, IROS

Awarded by Bosch Centre for AI at the International Conference on Intelligent Robots and Systems [workshop](#) “Bringing geometric methods to robot learning, optimization and control”.

Las Vegas, USA, 2020

Rector’s award

Awarded for best student scientific [thesis](#).

University of Zagreb, Croatia, 2016

PROJECTS AND OTHER EXPERIENCE

hn-summaries — [Summarizes](#) the comments of hackernews posts using GPT-3.5 OpenAI API.

graphIK — [Generates](#) distance-graph representations of robots for IK problems and learning using GNNs.

kinematics-rs — [Computes](#) forward kinematics of arbitrary robots, written as an exercise in Rust.

thing-ros — Motion planning and control for the [Thing](#) mobile manipulator at STARS Laboratory.

Kinematic Educational Robot (KER) — [Open source](#), low-cost quadruped platform with ROS and simulation capabilities. Developed by three person team from scratch.

SKILLS AND INTERESTS

Programming: Python, MATLAB, C++, Rust

Software: ROS, Gazebo, Docker, Git, Linux, Blender, Emacs, ONNX

Libraries: Numpy, PyTorch, Pandas, PyG, Eigen, Ceres, CVX, PCL, LaTeX

Mathematics: Computational geometry, Local optimization, Probability theory, Control theory

Deep Learning: VLM, LLM, graph neural networks, diffusion models, VAE, equivariant architectures

Languages: English (C2), French (A2), Croatian (native)

Soft Skills: supporting and working in international teams, presenting research projects

OTHER PUBLICATIONS

- H. J. Zhang, M. Giamou, F. Marić, J. Kelly, and J. Burgner-Kahrs, “CIDGIK: Distance-Geometric Inverse Kinematics for Continuum Robots,” *IEEE Robotics and Automation Letters*, 2023. [preprint](#)
- I. Bilić, F. Marić, I. Marković, and I. Petrović, “A Distance-Geometric Method for Recovering Robot Joint Angles From an RGB Image,” arXiv preprint arXiv:2301.02051, 2023.
- O. Limoyo, B. Chan, F. Marić, B. Wagstaff, A. R. Mahmood, and J. Kelly, “Heteroscedastic uncertainty for robust generative latent dynamics,” *IEEE Robotics and Automation Letters*, vol. 5, no. 4, pp. 6654–6661, 2020. [preprint](#)
- O. Lamarre, O. Limoyo, F. Marić, and J. Kelly, “The Canadian planetary emulation terrain energy-aware rover navigation dataset,” *The International Journal of Robotics Research*, vol. 39, no. 6, pp. 641–650, 2020.
- L. Petrović, F. Marić, I. Marković, and I. Petrović, “Gaussian Processes Incremental Inference for Mobile Robots Dynamic Planning,” *IFAC World Congress*, vol. 53, no. 2, pp. 9584–9589, 2020.
- F. Marić, O. Limoyo, L. Petrović, T. Ablett, I. Petrović, and J. Kelly, “Fast manipulability maximization using continuous-time trajectory optimization,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2019, pp. 8258–8264.