# PAUL STARKE

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## ABOUT

Paul Starke is working on AI-driven character animation and control for digital humans. He worked as a Research Engineer at Meta Reality Labs and as a Machine Learning Engineer at Electronic Arts. Paul completed a M.Sc. and B.Sc. in Informatics and has a strong passion about state-of-the-art technology in game animation and seeks to expand his comprehension in the areas of computer graphics and artificial intelligence.

## TECHNICAL SKILLS

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| **Animation:** | Neural Motion Generation, Inverse Kinematics, Character Controllers, Motion Matching, Motion Phase Alignment, Motion Captured Data Visualization, (Hand) Object-Interaction |
| **Programming:** | C#, Python, Java, (No)SQL, HTML/CSS/JS |
| **Technology/Tools:** | Unity3D, LightWorks, Unreal Engine, LaTeX, Blender |
| **Artificial Intelligence:** | Mixture-of-Expert Models, Supervised Learning, Deep Learning |

## EXPERIENCE

### META REALITY LABS — 05/2023 – 11/2024

*Research Engineer, Consultant* — *Zurich, Switzerland*

- Development of an **AI-driven augmentation tool** to generate novel character movements from mocap data. Enabled data augmentation inside Digital Human datasets by increasing their motion diversity by $O(N^9)$.
- Developed a **framework to learn motion evaluation** from user feedback. Model detects motion artifacts such as foot sliding and stiff- or unnatural movements. Integrated in animation creation processes to speed up QA.
- **Learning collision avoidance** from random noise without the need of real-geometry data during training. Method can generate full-body, hand-to-hand and hand-to-object collision avoidance behaviors in real-time.
- Development of a contact aware-IK based hand motion variation pipeline to generate **hand-object interactions**.
- Working on **VR body tracking** for a "generative legs" solution (see SIGGRAPH 2024 paper) as well as integrate and adapt this research in context of the company needs (e.g. **ML-based NPC animations**).

### ELECTRONIC ARTS — 10/2021 – 04/2023

*Machine Learning Engineer* — *Cologne, Germany*

- Build and design of an **AI-driven animation authoring framework** for cinematic sequence authoring. This tool was found to enable faster prototyping workflows for animators by saving 90% of work time versus traditional key-framing techniques and 99% versus motion capturing sessions.
- Research on state-of-the-art **motion in-betweening** for arbitrary skeletal characters (see SCA 2023 paper).
- Assisted integration process of phase-based motion generators with mocap data of AAA-titles (e.g. FIFA23).

### UNIVERSITY OF HAMBURG — 01/2021 – 06/2021

*Student Research Associate* — *Hamburg, Germany*

- Research on neural question answering and question generations.

### DEPARTMENT OF APPLIED COMPUTER SCIENCE LEIPZIG — 09/2019 – 10/2020

*Student Associate* — *Leipzig, Germany*

- Development of front- and backend for the university social network.

## EDUCATION

UNIVERSITY OF HAMBURG 10/2020 – 02/2023

*Master of Science in Informatics* *Hamburg, Germany*

- Specialization in Computer Vision, Machine Learning, Robotics, Game Programming, and NoSQL systems.
- *Master thesis* in developing a state-of-the-art AI-driven motion in-betweening system (see Projects)
- GPA: 1.6 (Germany)

UNIVERSITY OF LEIPZIG 10/2017 – 10/2020

*Bachelor of Science in Informatics* *Leipzig, Germany*

- Specialization in 3D Graphics/Geometry and Database Management.
- Bachelor thesis in developing an Authoring tool for AI-driven quadruped animations (see Projects).
- GPA: 2.5 (Germany)

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## PUBLICATIONS

CATEGORICAL CODEBOOK MATCHING FOR EMBODIED CHARACTER CONTROLLERS 2024

*Sebastian Starke, **Paul Starke**, Nicky He, Taku Komura, Yuting Ye* *ACM SIGGRAPH / TOG*

MOTION IN-BETWEENING WITH PHASE MANIFOLDS 2023

***Paul Starke**, Sebastian Stake, Taku Komura, Frank Steinicke* *ACM SCA / TOG*

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## PROJECTS

AI4ANIMATION: DEEP LEARNING FOR CHARACTER CONTROL [GITHUB *7800] 2020 - ONGOING

*Unity3D, C#, PyTorch*

- Collaborator of the AI4Animation framework, supporting development, asset processing, and data visualization.

MOTION IN-BETWEENING FOR SKELETAL CHARACTERS [**GITHUB** ***180**] 2022 - 2023

*Unity3D, C#, Frostbite, C++*

ANIMATION AUTHORING FOR NEURAL QUADRUPED CONTROLLERS [GITHUB *80] 2020 - 2021

*Unity3D, C#*

- System development to enable offlice character control for data-driven motion generators.

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## SELECTED MEDIA

Two Minute Papers (Codebook Matching)

*https://youtu.be/2zGhxnoKBWc?si=lnZnpRGK2L0OAiVk*

Unite 2024 – Runtime AI with Unity Sentis (AI4Animation)

*https://youtu.be/T-sbHvDF6Bw?si=r4i6SniR_JWnj_c-&t=1467*

Unity 6 (VR Motion Tracking)

*https://unity.com/releases/unity-6 ; https://youtu.be/1SyqN3D6khI?si=qinSEEvJrZDI34br&t=60*

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## REFERENCES


Sebastian Starke, Sr. Research Scientist, Meta Reality Labs, sebastian.starke@mail.de

Aayush Prakash, Head of Machine Learning for Synthetic Data, Meta Reality Labs, aayushp@meta.com

Yuting Ye, Research Scientist, Meta Reality Labs, yutingye.public@gmail.com

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