SEBASTIAN STARKE

AI/Animation Researcher

London, UK
+44 7858617389
Sebastian.Starke@mail.de
Portfolio
GitHub
@blacksquirrel__

ABOUT

Sebastian Starke is a Research Scientist at Meta Reality Labs, working on AI-driven motion synthesis and character control for embodied virtual avatars. His research focuses on applying deep learning for generating lifelike motions by leveraging generative models for problems related to time-series regression, probabilistic sampling or vector quantization. Before that, he worked as Sr. AI Scientist at Electronic Arts and interned twice at Adobe Research. Sebastian received a Ph.D. in Artificial Intelligence / Animation from the University of Edinburgh and a Dr. rer. nat. in Robotics from the University of Hamburg, where he also completed his M.Sc. and B.Sc. in Informatics.

EXPERTISE

- Animation, Robotics, VR
- Deep Learning / GenAI
- Time-Series Modeling
- Numerical Optimization
- Python / C# / C++
- AI4Anim 8.3k★ on GitHub

REFERENCES

Taku Komura, Professor, HKU
Jensen Huang, CEO, NVIDIA
Danny Lange, VP, Google
Jovan Popovic, Scientist, Meta
Claire Delaunay, VP, NVIDIA
Mohsen Sardari, VP, BILL
Kazi Zaman, CDO, Shoreline

EXPERIENCE

2022/6 – now **Research Scientist** — **Meta, London, UK**
Research on embodied avatar movements in virtual reality (see SIGGRAPH 2024 papers).

2021/11 – 2022/6 **Senior AI Scientist** — **Electronic Arts, Redwood City, USA**
Research on data-driven character control and motion matching (see SIGGRAPH 2022 paper). Integration contributions for EA Hypermotion Technology for FIFA.

2020/2 – 2021/11 **AI Scientist** — **Electronic Arts, Redwood City, USA**
Research on neural animation layering (see SIGGRAPH 2021 paper), enhancement of motion matching systems and motion style transfer.

2019/8 – 2020/2 **AI Scientist Intern** — **Electronic Arts, Redwood City, USA**
Research on local motion phases for basketball plays (see SIGGRAPH 2020 paper).

2019/2 – 2019/6 **Creative Intelligence Intern** — **Adobe Research, Edinburgh, UK**
Research on character-scene interactions and quadrupedal motion control in VR applications.

2018/10 – 2019/2 **Lecturer** — **University of Edinburgh, UK**
Teaching the Computer Graphics and Visualization course.

2018/6 – 2018/9 **Creative Intelligence Intern** — **Adobe Research, Seattle, USA**
Research on data-driven character-scene interactions (see SIGGRAPH Asia 2019 paper).

2017/10 – 2018/1 **Tutor** — **University of Edinburgh, UK**
Tutoring the Computer Graphics and Visualization assignments.

2016/6 – 2017/8 **Research Associate** — **University of Hamburg, GER**
Research on dexterous manipulation and full-body inverse kinematics (see IROS/ICRA papers).

2014/9 – 2016/6 **Student Associate** — **University of Hamburg, GER**
Research on person detection and tracking with RGB-D cameras.

EDUCATION

2017 – 2022 **Ph.D. in Artificial Intelligence** — **University of Edinburgh, UK**
Deep Learning for Character Animation and Control

2016 – 2020 **Dr. rer. nat. in Robotics** — **University of Hamburg, GER**
BioIK: A Memetic Evolutionary Algorithm for Multi-Objective Inverse Kinematics

2014 – 2016 **M.Sc. in Informatics** **University of Hamburg, GER**
Specialization in Robotics, Computer Vision and Bio-Inspired AI

2009 – 2014 **B.Sc. in Informatics** **University of Hamburg, GER**
Specialization in 3D Graphics/Geometry and Game Programming

PUBLICATIONS

2025 **FORCE: Physics-aware Human-object Interaction** **Arxiv**
Xiaohan Zhang, Bharat Lal Bhatnagar, **Sebastian Starke**, Ilya Petrov, Vladimir Guzov, Helisa Dhamo, Eduardo Pérez-Pellitero, Gerard Pons-Moll

2024 **SCENIC: Scene-aware Semantic Navigation with Instruction-Guided Control** **Arxiv**
Xiaohan Zhang, **Sebastian Starke**, Vladimir Guzov, Zhensong Zhang, Eduardo Pérez Pellitero, Gerard Pons-Moll

2024 **CHOICE: Coordinated Human-Object Interaction in Cluttered Environments for Pick-and-Place Actions** **ACM SIGGRAPH / TOG**
Jintao Lu, He Zhang, Yuting Ye, Takaaki Shiratori, **Sebastian Starke**, Taku Komura

2024 **Categorical Codebook Matching for Embodied Character Controllers** **ACM SIGGRAPH / TOG**
Sebastian Starke, Paul Starke, Nicky He, Taku Komura, Yuting Ye

2024 **WalkTheDog: Cross-Morphology Motion Alignment via Phase Manifold** **ACM SIGGRAPH**
Peizhuo Li, **Sebastian Starke**, Yuting Ye, Olga Sorkine-Hornung

2023 **Avatars Grow Legs: Generating Smooth Human Motion from Sparse Tracking Inputs with Diffusion Model** **IEEE CVPR**
Paul Starke, **Sebastian Starke**, Taku Komura, Frank Steinicke

2023 **Motion In-Betweening with Phase Manifolds** **ACM SCA**
Yuming Du, Robin Kips, Albert Pumarola, **Sebastian Starke**, Ali Thabet, Artsiom Sanakoyeu

2022 **DeepPhase: Periodic Autoencoders for Learning Motion Phase Manifolds** **ACM SIGGRAPH / TOG**
Sebastian Starke, Ian Mason, Taku Komura

2022 **Learning Soccer Juggling Skills with Layer-wise Mixture-of-Experts** **ACM SIGGRAPH**
Zhaoming Xie, **Sebastian Starke**, Hung Yu Ling, Michiel van de Panne

2022 **COUCH: Towards Controllable Human-Chair Interactions** **ECCV**
Xiaohan Zhang, Bharat Lal Bhatnagar, Vladimir Guzov, **Sebastian Starke**, Gerard Pons-Moll

2021 **Real-Time Style Modelling of Human Locomotion via Feature-Wise Transformations and Local Motion Phases** **ACM SIGGRAPH / I3D**
Ian Mason, **Sebastian Starke**, Taku Komura

2021 **Neural Animation Layering for Synthesizing Martial Arts Movements** **ACM SIGGRAPH / TOG**
Sebastian Starke, Yiwei Zhao, Fabio Zinno, Taku Komura

2020 **Local Motion Phases for Learning Multi-Contact Character Movements** **ACM SIGGRAPH / TOG**
Sebastian Starke, Yiwei Zhao, Taku Komura, Kazi Zaman

2019 **Neural State Machine for Character-Scene Interactions** **ACM SIGGRAPH Asia / TOG**
Sebastian Starke*, He Zhang*, Taku Komura, Jun Saito, *Joint First Authors

2018 **Few-Shot Learning of Homogeneous Human Locomotion Styles** **Pacific Graphics**
Ian Mason, **Sebastian Starke**, He Zhang, Taku Komura, Jun Saito

2018 **Memetic Evolution for Generic Full-Body Inverse Kinematics** **IEEE TEVC**
Sebastian Starke, Norman Hendrich, Jianwei Zhang

2018 **Mode-Adaptive Neural Networks for Quadruped Motion Control** **ACM SIGGRAPH / TOG**
He Zhang*, **Sebastian Starke***, Taku Komura, Jun Saito, *Joint First Authors

2018 **Cost Functions to Specify Full-Body Motion and Mutli-Goal Manipulation Tasks** **IEEE ICRA**
Philipp Ruppel, Norman Hendrich, **Sebastian Starke**, Jianwei Zhang

2017 **Evolutionary Multi-Objective Inverse Kinematics on Highly Articulated and Humanoid Robots** **IEEE IROS**
Sebastian Starke, Norman Hendrich, Dennis Krupke, Jianwei Zhang

2017 **A Memetic Evolutionary Algorithm for Real-Time Articulated Kinematic Motion** **IEEE CEC**
Sebastian Starke, Norman Hendrich, Jianwei Zhang

2017 **Prototyping of Immersive HRI Scenarios** **CLAWAR**
Dennis Krupke, **Sebastian Starke**, Lasse Einig, Frank Steinicke, Jianwei Zhang

2017 **A Forward Kinematics Data Structure for Efficient Evolutionary Inverse Kinematics** **Springer**
Sebastian Starke, Norman Hendrich, Jianwei Zhang

2016 **An Efficient Hybridization of Genetic Algorithms and Particle Swarm Optimization for Inverse Kinematics** **IEEE ROBIO**
Sebastian Starke, Norman Hendrich, Sven Magg, Jianwei Zhang

2016 **Fast and Robust Detection and Tracking of Multiple Persons on RGB-D Data fusing Spatio-Temporal Information** **IEEE MFI**
Sebastian Starke, Norman Hendrich, Hannes Bistry, Jianwei Zhang

AWARDS

2025 **Young Researcher Award at EG 2025**

2023 **Doctoral Dissertation Award at ACM SCA 2023**

2023 **O-1 USA Visa (Sponsored by Meta)**

2022 **Best Technical Paper Award at ACM SIGGRAPH 2022**

2020 **Thesis Fast Forward Winner at ACM SIGGRAPH 2020**

2020 **MACHINA Best Presentation Award at Electronic Arts**

2020 **O-1 USA Visa (Sponsored by Electronic Arts)**

2018 **Best Student Paper Award at Pacific Graphics**

2017 **Highly Commended Paper Award of the Industrial Robot Innovation Award at CLAWAR 2017**

2017 **Principal's Career Development Ph.D. Scholarship from the University of Edinburgh**

2017 **Distinction in M.Sc. Informatics from the University of Hamburg**

2017 **Best EXPO Student Project at the University of Hamburg**

PATENTS

20240312102 **Learning Character Model Animations With A Layer-Wise Mixture-Of-Experts Network**

20240257429 **Neural Animation Layering for Synthesizing Movement**

20240241573 **Full Body Motion Tracking For Use In Virtual Environment**

11995754 **Enhanced Animation Generation Based On Motion Matching Using Local Bone Phases**

20240161371 **A System For Customizing In-Game Character Animations By Players**

20230310998	**Learning Character Motion Alignment With Periodic Autoencoders**
20230267668	**Joint Twist Generation For Animation**
20230186543	**Dynamic Locomotion Adaptation In Runtime Generated Environments**
20230177755	**Predicting Facial Expressions Using Character Motion States**
11670030	**Enhanced Animation Generation Based On Video With Local Phase**
P9351-US	**Neural State Machine Digital Character Animation**

SELECTED MEDIA & PRESS RELEASES

Unity 6 Release Trailer featuring Categorical Codebook Matching
https://www.youtube.com/watch?v=1SyqN3D6khI

Two Minute Papers (Categorical Codebook Matching)
https://www.youtube.com/watch?v=2zGhxnoKBWc

Two Minute Papers (Football Juggling)
https://www.youtube.com/watch?v=L5KOQkZOusE

Two Minute Papers (Deep Phase)
https://www.youtube.com/watch?v=wAbLsRymXe4

Two Minute Papers (Neural Animation Layering)
https://www.youtube.com/watch?v=t33jvL7ftd4

Two Minute Papers (Local Motion Phase)
https://www.youtube.com/watch?v=pBkFAIUmWu0

Two Minute Papers (Neural State Machine)
https://www.youtube.com/watch?v=cTqVhcrilrE

Two Minute Papers (Quadruped Motion Control)
https://www.youtube.com/watch?v=Mnu1DzFzRWs

AAAS ACM
https://www.eurekalert.org/pub_releases/2019-10/afcm-dnn102919.php

Adobe MAX Keynote
https://max.adobe.com/sessions/max-online/#29631

NVIDIA GTC Keynote
https://www.youtube.com/watch?v=Z2XlNfCtxwI

NVIDIA Developer
https://news.developer.nvidia.com/virtual-character-animation-system-uses-ai-to-generate-more-human-like-movements

Inverse
https://www.inverse.com/innovation/ea-games-motion-capture

CNET
https://www.cnet.com/news/electronic-arts-says-artificial-intelligence-will-make-game-characters-much-more-lifelike

GE Reports
https://www.ge.com/reports/the-5-coolest-things-on-earth-this-week-27

80.lv Articles
https://80.lv/articles/mode-adaptive-neural-networks-for-quadruped-motion-control

Cartoon Brew
https://www.cartoonbrew.com/tools/could-these-be-the-next-high-tech-tools-that-animators-use-daily-158630.html

CONFERENCE/JOURNAL COMMITTEE MEMBER

SIGGRAPH Asia 2023, 2025, SCA 2025

CONFERENCE/JOURNAL REVIEWER

SIGGRAPH, SIGGRAPH Asia, Eurographics, Pacific Graphics, Computer Graphics Forum

GAME CREDITS

FIFA 2023, FIFA 23: Legacy Edition, Madden NFL 23, FIFA 22, Madden NFL 21

INVITED TALKS

SIGGRAPH 2025	**Seven Years of Bringing Characters To Life with Computer Brains**
CVPR 2025	**How To Break Your Neural Animation Controller**
FMX 2023	**DeepPhase: Periodic Autoencoders for Learning Motion Phase Manifolds**
GDC 2022	**Four Years of Bringing Characters to Life with Computer Brains**
NVIDIA GTC 2019	**Learning Quadruped Motion Controllers with Neural Networks**