BENJAMIN KAHL

Curriculum Vitae

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Summary

I am an experienced game programmer with a strong background in C++, C#, and computer graphics. My passion for visual storytelling and video games has driven me to develop games both as a hobby and as a profession.
With valuable experience gathered from the development of cognitive studies in academia, I am excited to take this passion further and enter the games industry.

Nationality: Germany, Finland

Skills

Over 10 years of programming experience with C++ and C#.

5+ years of hands-on development with Unity, Unreal Engine, OpenGL, and DirectX.

Adept in image editing, UX design, texturing, and 3D modelling using Photoshop and Blender.

Complementary knowledge with Python, Java, Git, LaTeX and web-development frameworks.

Work Experience

12/2022–present

VR Developer
Max-Planck Institute for Human Development · Full-Time

- Developed and co-designed VR-based cognitive studies from inception to completion using Unity and C#
- Integrated cutting-edge technologies such as Wavefield-Synthesis, full-body 3D scanners, and hand/eye tracking into studies
- Created frameworks and libraries for multiplayer networking, runtime-scripting languages and data collection

11/2021–12/2022

Research Assistant
Science of Intelligence Cluster / TU Berlin · Part-Time

- Delivered technical solutions to several different projects at the SCIoI Cluster of Excellence
- Specialized in multiplayer games focusing on collective intelligence and modeling foraging behavior in realistic environments

10/2019–11/2021

Game Developer
Max-Planck Institute for Human Development (ARC) · Part-Time

- Developed and implemented gamified cognitive studies using Unity, Unreal Engine, Python (OpenSesame) and Java
- Developed and used rendering software for recording, analyzing and evaluating scientific data
- Co-authored research papers and assisted in data analysis with Python scripts and GPU-based visibility simulations
- Built software frameworks and modules to facilitate VR game development

3/2017–6/2017

Full-Stack Developer
Futurice · Internship

- Developed internal web tools using Django and Python
- Designed front-end interfaces with HTML, CSS, and JavaScript
- Integrated back-end systems with PostgreSQL databases
- Participated in projects involving microcontrollers

Languages

German
Native Tongue

English
Fluent (C2 / IELTS 8.5)

Spanish
Fluent

Finnish
Fluent

Education

9/2018—11/2022 **Computer Science**
Freie Universität Berlin · Master of Science

- **Relevant courses:** Computer Graphics, Algorithmic Geometry, Machine Learning, Software Project: Computational Geometry, Software Project: Unity Simulator
- **Thesis title:** *Hardware Acceleration of Progressive Refinement Radiosity using Nvidia RTX*
  Thesis mark: 1.0 (very good)
- **Overall mark:** 1.3 (very good)

9/2014—3/2019 **Computer Science**
Freie Universität Berlin · Bachelor of Science

- **Relevant courses:** Compiler Development, Non-sequential Programming, Object-oriented Programming
- **Thesis Title:** *Real-Time Global Illumination Using OpenGL and Voxel Cone Tracing*
  Thesis mark: 1.0 (very good)
- **Overall mark:** 2.3 (good)

9/2013—9/2014 **Chemistry**
Freie Universität Berlin · Bachelor Studies

- Lab traineeship and courses on mathematics, physical chemistry and scientific presentations
- **Average mark:** 3.0 (satisfactory)

2001–2013 **High School Graduation**
Deutsche Schule Madrid · Abitur / Gymnasium

- **Language classes:** German, Spanish (native speaker level), English, French
- **Abitur examination:** German, Spanish, Mathematics and Chemistry
- **Overall mark:** 1.9 (very good)

1999–2007 **Weekend Schooling**
Finnish School of Madrid ·

- Classes on Finnish language, culutre and history

Publications

2023 **Collective incentives reduce over-exploitation of social information in unconstrained human groups**
Nature Communications · Deffner, D., Mezey, D., Kahl, B., Schakowski, A., Romanczuk, P., Wu, C. M., et al.
DOI: 10.1038/s41467-024-47010-3

2023 **Visual-spatial dynamics drive adaptive social learning in immersive environments**
Preprint · Wu, C. M., Deffner, D., Kahl, B., Meder, B., Ho, M. H., & Kurvers, R. H. J. M.
DOI: 10.1101/2023.06.28.546887

2022 **Hardware Acceleration of Progressive Refinement Radiosity using Nvidia RTX**
Master's Thesis · Kahl, B
DOI: 2303.14831

2021 **Specialization and selective social attention establishes the balance between individual and social learning**
Preprint · Wu, C. M., Ho, M. K., Kahl, B., Leuker, C., Meder, B., & Kurvers, R. H. J. M.
DOI: 10.1101/2021.02.03.429553

2019 **Real-Time Global Illumination Using OpenGL And Voxel Cone Tracing**
Bachelor's Thesis · Kahl, B
DOI: 2104.00618

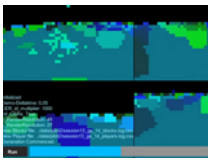
Projects

ARC-VR
`vr-toolbox.org`
A Unity framework for the development of VR-based cognitive and/or behavioral studies. Built from the ground up, using only OpenXR as a dependency, including many fundamental VR features such as movement, physics, avatars, UI-interactions etc. in an extremely modular manner.
I held a much-praised talk showcasing it at the MPIB.

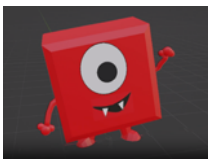
CoinScrounge
`github.com/DominikDeffner/VirtualCollectiveForaging`
Unity-based multiplayer study modelling dynamically-interacting individuals in human collectives in realistic environments.
The final manuscript of our findings was accepted for publication in nature communications.

RTRad
`github.com/Helliaca/RTRad`
A C++ implementation of progressive refinement radiosity uniquely leveraging Nvidia's RTX technology to GPU-accelerate visibility calculations.
Built on Falcor 4.4, using a highly configureable DirectX 12 render-pipeline, the development took place as part of a Masters's thesis at the Freie Universität Berlin.

VXCT
`github.com/Helliaca/VXCT`
An OpenGL-based C++ implementation of the Voxel Cone Tracing lighting algorithm as part of a Bachelor's Thesis. Highly customizable and educational on the inner workings of the algorithm.
The underlying thesis has been cited several times, and the open-source codebase used for several derivative projects.



ProducerScroungers
`github.com/charleywu/minecraftforaging`
A behavioral study modelling collective intelligence in foraging tasks using Minecraft for the underlying environment. Using Unity-based simulations we were able to recreate each participants visual fields to combine analysis of spatial trajectories and visual field data.

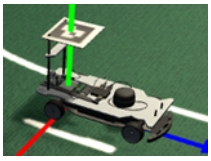


Runner's Study

VR study to investigate whether embedding the learning process in performing instrumental actions can help with the learning of cue-outcome relationships in young children.
Custom-built levels and self-animated characters to ensure a child-friendly environments, and utilization of eye-tracking data to interact with the experiment.

RCAS

A Unity framework enabling remote control of mobile VR applications from a smartphone or computer, in addition to streaming a live-view of the headset's FOV and allowing recorded data to be retrieved from the headset. Developed as a freelance project for the Max Planck Institute for Human Cognitive and Brain Sciences.



AutoModelCar Simulator
`github.com/Helliaca/AutoModelCar_Simulator`
Unity3D simulator of the AutoNOMOS robot-cars that are used at the Freie Universität Berlin. Allows a user to seamlessly connect a ROS environment and control virtual robots that behave much like the real ones, but also include insightful debugging-data.

Hearts of Iron IV - Lord of the Rings Mod
`steamcommunity.com/sharedfiles/filedetails/?id=1314446921`
A full-conversion mod bringing the world of Lord of the Rings into the game of Hearts of Iron 4. Currently has over 100.000 active subscribers, over 8000 favourites as well as an active and thriving online community.
I have served as it's lead developer since its inception, having developed the majority of content myself.