

# Nels Numan (he/him)

PhD Candidate at UCL

As a PhD candidate in the [VECG Group](#) at [University College London](#), I conduct research on asymmetric collaborative mixed reality in both indoor and outdoor environments. In parallel, I am a part-time research intern at [Niantic Labs](#). I have a BSc and MSc in Computer Science and previously worked at [Microsoft Research](#) and [TNO Research](#) as a research intern and at [IBM](#) as a data scientist.

My work has spanned various topics within the field of computer science, including human-computer interaction, computer-supported cooperative work, computer vision, and generative artificial intelligence. However, a common thread throughout my work has been a focus on building human-centered systems that are both effective and enjoyable to use.



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## Education

Jul. 2021 — Nov. 2025

### Ph.D. Computer Science

University College London, *Virtual Environments and Computer Graphics (VECG) Group* ↗

Topic: *Asymmetric (Outdoor) Collaborative Mixed Reality*. Supervisors: [Prof. Anthony Steed](#) and [Prof. Simon Julier](#).

Feb. 2018 — Oct. 2020

### M.Sc. Computer Science

Delft University of Technology ↗

Track: Data Science & Technology. Graduated with the thesis titled “Generative RGB-D Face Completion for Head-Mounted Display Removal”, supervised by [Prof. Pablo Cesar](#) (TU Delft, CWI) and [Dr. Frank ter Haar](#) (TNO). A paper based on this thesis was published to the Virtual Humans and Crowds for Immersive Environments (VHCIE) workshop at IEEE VR 2021.

Sep. 2013 — Feb. 2018

### B.Sc. Computer Science

Leiden University ↗

Graduated with the thesis titled “A Comparative Performance Analysis of Feature Description Algorithms”, supervised by [Prof. Michael Lew](#).

## Working Experience

Oct. 2023 — Jun. 2024

### Research Intern

Niantic Labs ↗

Conducting research on the future of collaborative outdoor mixed reality under the mentorship of [Jessica van Brummelen](#) and [Gabriel Brostow](#) as a part-time internship during my Ph.D. studies.

May 2023 — Sept. 2023

### Research Intern

Microsoft Research ↗

- Conducted research within the EPIC group (Extended Perception, Interaction & Cognition) and HCAIX group (Human-Computer & Artificial Intelligence Experiences) under the mentorship of [Bala Kumaravel](#), [Nicolai Marquardt](#), and [Andy Wilson](#).
- Contributed to two co-first author papers at the intersection of CSCW and generative AI; one exploring 2D content generation (with a pending patent), and the other, in preparation, focusing on 3D content generation.

Oct. 2020 — Jul. 2021

Data Scientist

IBM ↗

- Worked on advanced systems driven by custom machine learning models, delivering direct business impact for enterprise clients.
- Communicated analytical findings to diverse audiences, steering strategic decision-making for internal and external stakeholders.

Feb. 2020 — Oct. 2020

Cloud Solution Architect Intern (Data & AI)

Microsoft ↗

- Designed and engineered advanced data models and analytics solutions for global clients and internal Microsoft teams.
- Proposed and designed a data-centric methodology to enhance efficiency in data center construction process management.

Jul. 2019 — Aug. 2020

Research Intern

Netherlands Organisation for Applied Scientific Research (TNO) ↗

- Conducted research towards a novel approach to head-mounted display (HMD) removal within RGB-D images at the Intelligent Imaging group under the mentorship of [Frank ter Haar](#).
- Designed and evaluated a generative adversarial network (GAN) for the joint inpainting of RGB-D images.
- Described the results in my master’s thesis as well as a paper presented during the VHCIE workshop at IEEE VR 2021.

Publications

Mar. 2024

BlendScape: Enabling Unified and Personalized Video-Conferencing Environments through Generative AI ↗

Shwetha Rajaram\*, **Nels Numan**\*, Balasaravanan Thoravi Kumaravel, Nicolai Marquardt, Andrew D. Wilson

[arXiv](#)

UNDER REVIEW

Mar. 2024

DreamCodeVR: Towards Democratizing Behavior Design in Virtual Reality with Speech-Driven Programming ↗

Daniele Giunchi, **Nels Numan**, Elia Gatti, Anthony Steed

31st IEEE Conference on Virtual Reality and 3D User Interfaces (IEEE VR 2024)

CONFERENCE

Mar. 2024

StreamSpace: A Framework for Window Streaming in Collaborative Mixed Reality Environments ↗

Daniele Giunchi, Riccardo Bovo, **Nels Numan**, Anthony Steed

31st IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (IEEE VR 2024)

CONFERENCE POSTER

Oct. 2023

Extending the Open-Source Social Virtual Reality Ecosystem to the Browser in Ubiq ↗

Sebastian Friston, Ben Congdon, **Nels Numan**, Klara Brandstätter, Lisa Izzouzi, Felix Thiel, Jingyi Zhang, Daniele Giunchi, David Swapp, Anthony Steed

28th International ACM Conference on 3D Web Technology (Web3D 2023)

CONFERENCE

Mar. 2023

Ubiq-Genie: Leveraging External Frameworks for Enhanced Social VR Experiences ↗

**Nels Numan**, Daniele Giunchi, Benjamin Congdon, Anthony Steed

OAT: 2nd Workshop on Open Access Tools and Libraries for Virtual Reality (IEEE VR 2023)

CONFERENCE WORKSHOP

Mar. 2023

Towards Outdoor Collaborative Mixed Reality: Lessons Learnt from a Prototype System ↗

**Nels Numan**, Ziwen Lu, Benjamin Congdon, Daniele Giunchi, Alexandros Rotsidis, Andreas Lernis, Kyriakos Larmos, Tereza Kourra, Panayiotis Charalambous, Yiorgos Chrysanthou, Simon Julier, Anthony Steed

ReDigiTS: 2nd Workshop on 3D Reconstruction, Digital Twinning, and Simulation for Virtual Experiences (IEEE VR 2023)

CONFERENCE WORKSHOP

Mar. 2023

**Towards Understanding, Alleviating, and Exploiting the Effects of Asymmetry in Collaborative Mixed Reality ↗**  
**Nels Numan**

IEEE VR 2023 Doctoral Consortium

DOCTORAL CONSORTIUM

Mar. 2023

**Immersive Competence and Immersive Literacy: Exploring How Users Learn about Immersive Experiences ↗**

Anthony Steed, Daniel Archer, Lisa Izzouzi, **Nels Numan**, Kalila Shapiro, David Swapp, Dinah Lammiman, Rob Lindeman

Frontiers in Virtual Reality

JOURNAL

Nov. 2022

**Exploring User Behaviour in Asymmetric Collaborative Mixed Reality ↗**

**Nels Numan**, Anthony Steed

28th ACM Symposium on Virtual Reality Software and Technology (VRST 2022)

CONFERENCE

Oct. 2022

**Ubiqu-Exp: a Toolkit to Build and Run Remote and Distributed Mixed Reality Experiments ↗**

Anthony Steed, Lisa Izzouzi, Klara Brandstätter, Sebastian Friston, Benjamin Congdon, Otto Olkkonen, Daniele Giunchi, **Nels Numan**, David Swapp

Frontiers in Virtual Reality

JOURNAL

Mar. 2021

**Generative RGB-D Face Completion for Head-Mounted Display Removal ↗**

**Nels Numan**, Frank ter Haar, Pablo Cesar

VHCIE: 6th Workshop on Virtual Humans and Crowds for Immersive Environments (IEEE VR 2021)

CONFERENCE WORKSHOP

Mar. 2019

**Star Tag: a Superhuman Sport to Promote Physical Activity ↗**

**Nels Numan**, Ayla Kolster, Niels Hoogerwerf, Bernd Kreyen, Jeanique Romeijnnders, Tomas Heinsohn Huala, Nestor Z. Salamon, J. Timothy Balint, Stephan Lukosch, Rafael Bidarra

SHS: 1st Workshop on Superhuman Sports (IEEE VR 2019)

CONFERENCE WORKSHOP

## Teaching and Mentorship

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2021 — 2023

**Postgraduate Teaching Assistant at UCL**

- Virtual Environments (COMP0113) with Prof. Anthony Steed
- Systems Engineering (COMP0016) with Prof. Dean Mohamedally

2022 — 2024

**Thesis Project Supervisor**

- Angela Yu (MEng Computer Science): *Interactive Avatar Appearance Modelling with Generative AI*
- Praveen Selvaraj (MSc Computer Science): *Escape Room in Asymmetric Collaborative Mixed Reality*

## Reviewing

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2024

**ACM Conference on Human Factors in Computing Systems (ACM CHI)**

★ SPECIAL RECOGNITION FOR OUTSTANDING REVIEW

2024

**IEEE Conference on Virtual Reality and 3D User Interfaces (IEEE VR)**

# Grants and Awards

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Jul. 2021 — Jul. 2024

## Ph.D. Studentship

European Union’s Horizon 2020 Research and Innovation Program (Project RISE), grant no. 739578.

Oct. 2023

## Honorable Mention for Best Design Award at ISMAR 2023 Student Competition ↗

Reviving the Euston Arch: A Mixed Reality Approach to Cultural Heritage Tours

Mar. 2019

## Conference Travel Grant

Delft Sports Engineering Institute

# Interests and Skills

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## Current Fields of Interest

Mixed Reality

Human-Computer Interaction

Computer Vision

Generative Artificial Intelligence

Computer-Supported Collaborative Work

Interaction Design

User Experience

Visualization

## Programming Languages and Frameworks

Python

C++

C#

Java

JavaScript

PHP

R

SQL

Apache Spark

TensorFlow

PyTorch

MRTK

## Software and Services

Unity

AWS

Azure

GCP

Adobe Illustrator

Adobe Photoshop

Adobe InDesign

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## Current Work Eligibility

European Union

United Kingdom (*part-time*)

United States