Carmine Elvezio

carmine@cs.columbia.edu
www.carmineelvezio.com
https://www.linkedin.com/in/carmine-elvezio

I'm a recent PhD graduate from the *Computer Graphics and User Interfaces Lab* at Columbia University, studying **AR/VR/MR/3D graphics, interactions and visualization techniques**, under Prof. Steven Feiner. I've worked on many projects with academic and industry partners, contributed to open-source frameworks, advised multiple research projects and internships, and have published in *ACM UIST, CHI,* and *SUI,* and *IEEE ISMAR, VR,* and *IROS*. Looking for research and engineering roles with high impact in the fields of spatial computing, XR, graphics, and HCI.

EDUCATION

Columbia University, New York, NY
PhD, Computer Science, June 2021; MPhil, Computer Science, 2021; MS, Computer Science, 2012
Advisor: *Prof. Steven Feiner*, Thesis: *XR Development with the Relay & Responder Pattern*

Polytechnic Institute of New York University, Brooklyn, NY
BS, Computer Science, Summa Cum Laude, Graduated June 2010
NYU-Polytechnic Institute Presidential Scholarship, Lamelson Scholarship.

SELECTED EXPERIENCE (Additional experience listed on my website)

Columbia University, New York, NY September 2019– June 2021
PhD Student—Computer Graphics and User Interfaces Lab (Prof. Steven Feiner)

- Studied and developed **XR (AR/VR/MR) and haptic interaction and visualization** techniques, associated applications, and supporting frameworks across several domains including medicine, maintenance, aerospace, music, and rehabilitation, working with technologies including HoloLens 1/2, Oculus, SteamVR, and Unity
- Completed **dissertation** on a new software pattern for XR development, released as an open-source project
- Published in *ACM UIST, CHI,* and *SUI,* and *IEEE ISMAR, VR,* and *IROS*
- Managed and advised internships and student research in the CGUI lab
- Assisted teaching *3D User Interfaces and Augmented Reality* and *Topics in AR/VR*

Columbia University, New York, NY September 2010–August 2019
Research Staff—Computer Graphics and User Interfaces Lab

- Studied and developed XR interaction techniques, associated applications, and supporting frameworks
- Created numerous task guidance systems for XR devices, including Microsoft HoloLens, Oculus, and Vive, using Unity, Unreal, MRTK, Vuforia, ARKit, and ARCore
- Developed **hybrid XR systems** for 3D content exploration (including for urban data visualization) using motion tracked head-worn displays, haptic devices, hand-held mobile devices, and multi-touch displays
- Developed and studied XR medical visualization systems aiding doctors in **complex surgical tasks** and for representing symptoms of different **ophthalmological** and neurological conditions
- Created XR calibration tools, video streaming protocols, and XR headset/controller device drivers for Unity
- Created and delivered many XR prototypes for industry and academic partners

SELECTED PROJECTS (Additional projects listed on my website)

HoloFight: An Augmented Reality Fighting Game
A multiplayer AR fighting game combining hand and eye tracking with controller input

Remote Collaboration in AR and VR using Virtual Replicas
A remote expert in *VR* guides a local tech in *AR* performing equipment maintenance in real-time

SELECTED PUBLICATIONS (Additional publications listed on my website)

Liu, J.-S., Elvezio, C., Tversky, B., & Feiner, S. (2021). Using Multi-Level Precueing to Improve Performance in Path-Following Tasks in Virtual Reality. *2021 IEEE ISMAR 2021*. https://doi.org/10.1109/TVCG.2021.3106476

Elvezio, C., Sukan, M., & Feiner, S. (2018). Mercury: A messaging framework for modular UI components. *2018 ACM CHI*. https://doi.org/10.1145/3173574.3174162. (**MercuryMessaging framework available on GitHub**.)

PATENT APPLICATIONS

Feiner, S., Loeb, G., Grinshpoon, A., Sadri, S. and Elvezio, C., 2020. Systems and methods for augmented reality guidance. US. Patent Application 16/796,645.

Elvezio, C., Sukan, M., Oda, O., Feiner, S. and Tversky, B., 2016. Systems and methods for providing assistance for manipulating objects using virtual proxies and virtual replicas. US. Patent Application 15/146,764.

SKILLS

Graphics Platforms: Unity, Unreal, OpenGL, Vulkan, Direct3D
XR Platforms/APIs: Oculus, Vive, SteamVR, MRTK, HoloLens, Vuforia, ARCore, ARToolkit
Languages: C, C++, C#, GLSL, HLSL, Java, Python, PHP, CUDA
OSs: Windows (.NET/COM), macOS, Linux, iOS, Android
Graphics: Multi-core rendering, simulation, GPU, engine development, 3D math (linear algebra, quaternions)
UX and UI design: JavaScript, XAML, HTML, Figma, CSS, Bootstrap
Data Analysis: Python, R