

# Carmin Elvezio

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## EDUCATION

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### 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, June 2010 (Summa Cum Laude) NYU-Poly Presidential and Lamelson Scholarships

## SELECTED EXPERIENCE (Additional experience listed on my website)

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### Apple Inc. (Sunnyvale, CA)

November 2021– Present

#### AR Prototyping Engineer

- Developed AR prototypes and tools to support the release of Apple Vision Pro
- Created systems facilitating the preparation and execution of user studies
- Presented studies, tools, and prototypes to executives, designers, and engineers across the company

### Columbia University (New York, NY)

September 2019– November 2021

#### PhD Student (Advisor: Prof. Steven Feiner), Postdoctoral Researcher

- Created and studied *XR (AR/VR/MR) and haptic interaction and visualization techniques*
- Conducted experiments across domains including medicine, maintenance, aerospace, and music
- Completed *dissertation* on a new software pattern for XR development, released as open-source project
- Published in *ACM UIST*, *CHI*, and *SUI*, and *IEEE ISMAR*, *VR*, and *IROS*
- Assisted teaching *3D User Interfaces and Augmented Reality* and *Topics in AR/VR*

### Computer Graphics & User Interfaces Lab, Columbia University (New York, NY)

September 2010–August 2019

#### XR Research Scientist

- Developed XR systems, calibration tools, and libraries supporting voice/touch input, and hand/eye tracking
- Created numerous *task guidance systems* for XR devices for local and remote collaboration
- Developed *hybrid XR systems* for 3D content exploration and urban data visualization
- Developed XR systems aiding in *complex surgical tasks* and visualizing *ophthalmological* conditions
- Filed patents for *virtual replicas in XR collaboration* and *AR guidance in performing medical procedures*

### ARchemist (New York, NY)

November 2011–July 2012

#### Software Engineer—Server Development

- Created 3D model database, server and web UI, with support for streaming content to mobile devices
- Developed streaming system for compact 3D model transmission over network

## SELECTED INDUSTRY RESEARCH PROJECTS (Additional industry projects listed on my website)

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### DARPA & Columbia - Cone of Silence

June 2021–September 2021

- Managed team of researchers on XR privacy system facilitating communication in sensitive environments

### Verizon & Columbia - Remote Rehabilitation

September 2017–January 2019

- Created VR system enabling remote physical rehabilitation over 5G networks
- Worked onsite with Verizon engineers to create system with feedback and guidance from Verizon management

### Naval Sea Systems Command & Columbia - AR Task Guidance

May 2015–December 2015

- Created automated AR guidance system, and associated calibration tools, for complex assembly tasks
- Managed team to integrate system and calibration suite into proprietary NAVSEA tool chain

## SELECTED PUBLICATIONS (Additional publications listed on my website)

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Samuel, S., Elvezio, C., Khan, S., Bitzer, L.Z., Moss-Salentijn, L. and Feiner, S., 2024. Visuo-Haptic VR and AR Guidance for Dental Nerve Block Education. *IEEE Transactions on Visualization & Computer Graphics*, (01), pp.1-10. <https://doi.org/10.1109/TVCG.2024.3372125>

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>. ([GitHub](#))

## SKILLS

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**Engines/Graphics Platforms:** Unity, Unreal, OpenGL, Vulkan, Direct3D, RealityKit, ARKit

**XR Platforms/APIs:** Oculus, Vive, SteamVR, MRTK, HoloLens, Vuforia, ARCore, ARToolkit, SwiftUI,

**Languages:** C++, C#, C, GLSL, HLSL, Java, Python, PHP, CUDA, R, Swift

**OSs:** Windows (.NET/COM), macOS, Linux, iOS, Android

**Graphics:** Multi-core rendering, simulation, GPU, engine development, 3D math

**Data Analysis:** Python, R, Prism, Tableau, Splunk, proficient with various statistical methods

**UX and UI design:** JavaScript, XAML, HTML, Figma, CSS, Bootstrap