

# Berk Cetinsaya

## Software Engineer

berkcetinsaya@gmail.com berkcetinsaya.com Lake Mary, FL

Highly motivated 3D/VR/AR Software Engineer with expertise in interactive virtual simulations. Proven ability to leverage computer graphics, optimization techniques, and knowledge of autonomous systems to deliver innovative solutions. Skilled in digital twins, data visualization, and immersive technologies such as CAVE and stereoscopic displays. Eager to contribute to the development of cutting-edge software that pushes the boundaries of the field.

## EDUCATION

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- University of Central Florida (UCF)** Jan. 2020 - Dec. 2024
- Have a Doctor of Philosophy (PhD) in Computer Science.
- University of Arkansas at Little Rock (UALR)** Aug. 2016 - Dec. 2019
- Have a Master of Science in Computer Science.
  - Started as a PhD student in Computer Science; then transferred to the UCF.
- Bahcesehir University, Turkey (BAU)** Sept. 2012 - June 2016
- Earned a Computer Engineering Bachelor's Degree with a 50% merit scholarship.
  - Ranked 3<sup>rd</sup> highest in the Department of Computer Engineering, Class of 2016.

## PROFESSIONAL EXPERIENCE

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- Examroom.AI** Dec. 2024 - Present  
*Unity Developer*
- Developing advanced medical solutions using AR/VR technologies.
- UCF Department of Computer Science** Jan. 2020 - Dec. 2024  
*Graduate Research Assistant*
- Worked as a Graduate Research Assistant at the Virtual and Augmented Reality Lab (VARLab) at UCF.
  - Designed and implemented a drone control system that autonomously updates a digital twin environment in Unity.
  - Implemented the DBSCAN algorithm in C# to cluster potential outdated areas for further optimization.
  - Designed and developed the Empty Space Skipping (ESS) optimization to visualize large volumetric medical image data for augmented reality on resource-constrained platforms such as Microsoft HoloLens 2.
  - Developed and maintained various projects for CAVE (Cave automatic virtual environment) and stereoscopic displays.
- UALR Department of Computer Science** Aug. 2016 - Dec. 2019  
*Lecturer & Graduate Teaching/Research Assistant*
- Worked as a Graduate Assistant at the Emerging Analytics Center (EAC) at UALR.
  - Taught the Computer Systems and Assembly Language course for two semesters.
  - Worked as a Graduate Research Assistant at the Virtual Reality, Simulation, Imaging, and Modeling (ViRaSIM) Lab.
  - Led the initial design and implementation of an Endoscopic Submucosal Dissection (ESD) surgery simulation in Unity.
  - Created an interface in C to access the Phantom haptic device for real-time haptic feedback in Unity.
  - Built various embedded system projects, such as an Object Detection and Obstacle Avoidance RC Car using Python, Flask, TensorFlow, and a remote-controlling system for an Arduino over the cloud.
- BAU Department of Computer Engineering** Sept. 2015 - June 2016  
*Undergraduate Teaching Assistant*
- Assisted the instructor in lab sessions for various courses and helped students with lab exercises and assignments, including Introduction to C Programming, Introduction to C++ Programming, Object-Oriented C++ Programming, Data Structures and Algorithms in C++, Advanced Programming (Java), Digital System Design, Embedded Systems Programming, and Introduction to Computer Networks.
- Intel Future Labs at BAU** Feb. 2015 - June 2016  
*Lead Lab Member*
- Worked on IoT and wearable technologies using Intel development boards, including Environmental Monitoring and Cloud Analytics, IoT Door and Light Control System using WebIOPi, and Gyronome, a motion-based controller using C++.
- Sparkgo** Sept. 2014 - Sept. 2015  
*Embedded Systems Developer*
- Was responsible for embedded systems at Sparkgo, a technology startup, utilizing Arduino, Raspberry Pi, Python, and C++.

## SKILLS

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**Languages:** C, C++, C#, Python, Java, SQL, JavaScript, HTML, CSS, PHP, MIPS, Bash.

**Game Engines & Graphics:** Unity, Godot, OpenVR, OpenXR, WebGL, OpenGL, GLSL, HLSL, Compute Shaders, Raylib, RenderDoc.

**Tools & Technologies:** MATLAB, 3DS MAX, Blender, ZBrush, Tensorflow, Arduino, Raspberry Pi.

**Knowledge:** Computer Graphics, Optimization, Autonomous Control, Virtual and Augmented Reality, CAVE, Digital Twins, Data Visualization.

## SELECTED PUBLICATIONS & PRESENTATIONS

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- **B. Cetinsaya**, C. Neumann, G. Bruder, D. Reiners and C. Cruz-Neira, “Assessing the Effects of Drone Control Interfaces on Situational Awareness and Digital Twin Environment Updates,” 2025 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW), Saint Malo, France, 2025, pp. 405-413, doi: 10.1109/VRW66409.2025.00093.
- **B. Cetinsaya**, C. Neumann, G. Bruder, D. Reiners and C. Cruz-Neira, “Camera-based Adaptive Line Formation and Dynamic Leader-Following Optimization (CALF-DLFO) for Drone Swarms in Real-time Updated Digital Twins,” 2024 10th International Conference on Control, Decision and Information Technologies (CoDIT), Vallette, Malta, 2024, pp. 2769-2774, doi: 10.1109/CoDIT62066.2024.10708152.
- **B. Cetinsaya**, D. Reiners, and C. Cruz-Neira, “From PID to swarms: A decade of advancements in drone control and path planning - A systematic review (2013-2023),” Swarm and Evolutionary Computation, vol. 89, p. 101626, Aug. 2024, doi: 10.1016/j.swevo.2024.101626.
- **B. Cetinsaya**, C. Neumann, D. Reiners, and C. Cruz-Neira, “Real-time Updated Digital Twins for Drone Swarm Command and Control”, Interservice/Industry Training, Simulation, and Education Conference (I/ITSEC) 2023, Orlando, Florida, 2023.
- **B. Cetinsaya**, C. Neumann and D. Reiners, “Using Direct Volume Rendering for Augmented Reality in Resource-constrained Platforms,” 2022 IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW), Christchurch, New Zealand, 2022, pp. 768-769, doi: 10.1109/VRW55335.2022.00235.
- **B. Cetinsaya**, J. Dials, D. Demirel, T. Halic, S. De, M. Gromski, and D. Rex. 2020. “Comparison Study of Deep Learning Models for Colorectal Lesions Classification”, Proceedings of the 2020 the 4th International Conference on Information System and Data Mining (ICISDM 2020). Association for Computing Machinery, New York, NY, USA, 84-88.
- D. Demirel, **B. Cetinsaya**, T. Halic, S. Kockara, D. Reiners, S. Ahmadi, S. Arikatla, 2020, “A partition-based optimization model and its performance benchmark for Generative Anatomy Modeling Language”, Computers in Biology and Medicine.
- **B. Cetinsaya**, M. A. Gromski, S. Lee, Z. Xia, D. Demirel, T. Halic, C. Bayrak, C. Jackson, S. De, S. Hegde, J. Cohen, M. Sawhney, S. N. Stavropoulos, D. Jones, “A Task and Performance Analysis of Endoscopic Submucosal Dissection (ESD) Surgery,”. Surg Endosc (2019) 33: 592.

## PROFESSIONAL DEVELOPMENT ACTIVITIES

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- **Development and Validation of a Virtual Endoluminal Surgical Simulator (VESS) for Treatment of Colorectal Cancer**, National Institutes of Health (NIH) / National Cancer Institute (NCI), 1R01CA197491, \$1,361,583 until Fiscal Year 2018, 25/08/2016 - 31/08/2020, Collaborators: Rensselaer Polytechnic Institute, Harvard School of Medicine (Beth Israel Deaconess Medical Center (BIDMC) and Massachusetts General Hospital (MGH))  
*My role:*
  - Design and development of endoscopic submucosal dissection surgery simulator,
  - Implementation of realistic force feedback using haptics,
  - Development of various simulation scenarios,
  - Initial validation of the simulator through data collection from surgeons.
- **Development and Validation of a Virtual Colorectal Surgical Trainer (VCOST)**, National Institutes of Health (NIH) / National Institute of Biomedical Imaging and Bioengineering (NIBIB), 1R01EB025241-01, \$693,484 for Fiscal Year 2018, Collaborators: Rensselaer Polytechnic Institute, Harvard School of Medicine (Beth Israel Deaconess Medical Center (BIDMC) and Massachusetts General Hospital (MGH))  
*My role:*
  - Designing and creating grading metrics,
  - Editing 3D models for the simulator.

## REFERENCES

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Available Upon Request