Reggie Segovia
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Portfolio: https://rs-dkd.github.io/my-portfolio/

Research Interests

- **Human-Computer Interaction:** Projected Reality, Tangible Interfaces, Natural User Interfaces, Graphics
- **AI-Augmented Systems:** LLMs in Creative Contexts, Conversational AI, Intelligent Interfaces
- **Immersive Technologies:** VR/AR for Scientific Visualization, Spatial Computing, Mixed Reality
- **High-Performance Computing:** GPU Optimization, Parallel Algorithms, Computational Efficiency

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Education

Bachelor of Science in Computer Science | University of Florida, Gainesville, FL
January 2024 – December 2025 (Expected)

- **GPA:** 3.81/4.0
- **Research Focus:** Human-Computer Interaction, Computer Graphics, High-Performance Computing
- **Honors:** Bright Futures Florida Academic Scholars Award, Dean's List Spring 2025

Relevant Coursework
Core Computer Science: Data Structures & Algorithms, Algorithm Abstraction and Design, Operating Systems, Programming Language Concepts, Computer Organization, Software Engineering, Database Systems, Senior Design

Mathematics & Analytics: Computational Linear Algebra, Statistics for Engineers, Calculus I-III, Discrete Structures

Specialized Topics: Artificial Intelligence, Virtual Reality, Computational Media, Data Science, Cryptology, Security in Computing, Penetration Testing

Research & Physics: Engineering Research, Physics I & II + Laboratory

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Research Experience

Research Assistant | University of Florida - HCI Lab
April 2025 – Present | Advisor: Dr. Alexandre Gomes de Siqueira

- **Graspable Memories Project:** Leading development of an AI-powered projected reality system enabling seamless on-hand interaction with images using natural occlusion as a core interaction mechanism
- **Publication:** Submitted paper to TEI 2026 on "Graspable Memories: AI-Powered Projected Reality"
- **Technical Implementation:** Developed AI hand tracking algorithms for real-time gesture recognition and spatial interaction
- **VR Conversational AI:** Built a VR system integrating Whisper (speech-to-text), Gemini LLM, ElevenLabs TTS, and NeuroSync lip-sync technology in Unreal Engine
- **Collaboration:** Working with Dr. de Siqueira on tangible interface research exploring physical traces as computational interfaces

Research Assistant | University of Florida - AI-Share Lab
June 2025 – Present | Advisor: Dr. Karla Saldaña Ochoa

- **Digital Twin Development:** Developing digital twin simulations in VR/AR for flood risk analysis and climate resilience planning.
- **3D Modeling Workflows:** Evaluating 3D modeling workflows (ArcGIS Pro, BlenderGIS) to generate realistic building models from geospatial data.
- **Automation Scripts:** Authoring Blender scripts to automate data filtering and mesh optimization for large-scale urban environments.
- **AI Integration:** Integrating AI models for flood pattern prediction using the HiperGator high-performance computing cluster.

Research Assistant | University of Florida - SurfLab
May 2025 – Present | Advisor: Dr. Jorg Peters

- **BlendReality Project:** Developing a VR version of Blender using optimized polyhedral-net splines (PNS) for

real-time mesh smoothing and intuitive 3D modeling.
- **AR-Guided Therapy Project:** Collaborating on an augmented reality application with Shands Hospital to guide parents through neonatal physical therapy exercises, creating interactive visualizations with real-time feedback.
- **Algorithm Optimization:** Optimizing geometric algorithms (PNS) and computer vision models for real-time performance in immersive VR/AR environments.

Research Assistant | University of Florida - EASAL Lab
March 2025 – Aug 2025 | Computational Geometry & Molecular Assembly
- **Performance Optimization:** Identified computational bottlenecks in EASAL software for analyzing molecular assembly landscapes
- **CUDA Implementation:** Developed CUDA and OpenCL parallelization strategies, achieving 4x+ speedups in vertex localizations and matrix transformations for larger molecular assemblies
- **Algorithm Development:** Extended algorithms to multi-body systems while maintaining mathematical consistency with active constraint graphs and Cayley parametrization
- **Interdisciplinary Collaboration:** Worked with the computational biology team to ensure robust and accurate molecular computation solutions

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Current Research Projects

BlendReality: VR Blender with Polyhedral-net Splines Optimization
In Progress | Collaboration with Dr. Jorg Peters
- Developing a VR recreation of Blender utilizing optimized polyhedral-net splines (PNS) algorithm for quad-dominant mesh smoothing
- Implementing intuitive spatial interaction paradigms for 3D modeling workflows, replacing traditional mouse-keyboard interfaces with natural hand gestures
- Optimizing PNS computational performance for real-time VR rendering while maintaining mathematical precision in mesh refinement operations
- **Technologies:** VR, Computer Graphics, Spatial Computing, PNS Algorithm, 3D Modeling, Unity

Flood Risk Digital Twins in VR/AR
In Progress | Research Assistant for Dr. Karla Saldaña Ochoa
- Evaluating and implementing 3D modeling workflows (ArcGIS Pro, BlenderGIS) to generate realistic building models from geospatial data for simulation.
- Developing Blender scripts to automate data filtering and mesh optimization for large-scale urban environments.
- Assisting with the integration of AI models for flood pattern prediction using the HiperGator high-performance computing cluster.
- Creating AI-powered flood risk simulations using digital twins in virtual/augmented reality environments for climate resilience planning.
- **Technologies**: AI, Digital Twins, VR/AR, Climate Modeling, Photogrammetry, ArcGIS Pro, Blender, Unity

Embodied Inscriptions
In Progress | Collaboration with Dr. Alexandre Gomes de Siqueira
- Investigating how physical traces can become computational interfaces, exploring tangible interaction design for memory and authorship
- Developing fingerprint tracking systems on moldable 3D printed material that transform biometric patterns into interactive digital experiences and personalized interface elements
- Creating novel HCI paradigms where personal physical artifacts serve as input modalities for computational systems and memory preservation
- **Technologies:** Tangible Interfaces, HCI, Physical Computing, Interface Design, Unity, C++, Fingerprint Library Tracking

AR-Guided Neonatal Physical Therapy
In Progress | Collaboration with Dr. Jorg Peters & Dr. Weiss, Shands Hospital
- Developing an augmented reality application to guide parents of infants with brain injuries through prescribed physical therapy exercises at home
- Creating an interactive AR visualization of therapeutic movements with real-time feedback and progress

tracking for exercise accuracy
- Integrating professional video guides and interactive Q&A functionality to support parent confidence and therapeutic compliance
- **Technologies:** AR, Computer Vision, Medical Visualization, Unity, Interactive Guidance Systems

VirtualHuman 2.0: Conversational AI in VR
In Progress | Collaboration with Dr. Alexandre Gomes de Siqueira
- Architecting an immersive VR conversational agent system within Unreal Engine for naturalistic human-AI interaction.
- Integrating a full-stack speech pipeline: Whisper for real-time speech-to-text, Gemini LLM for dynamic response generation, and ElevenLabs for text-to-speech synthesis.
- Implementing NeuroSync technology for realistic, real-time lip-sync animation to enhance social presence and believability.
- **Technologies**: Unreal Engine, VR, Conversational AI, LLMs (Gemini), Whisper, ElevenLabs, NeuroSync

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Publications

Under Review
Segovia, Reggie D. & de Siqueira, Alexandre G., "Graspable Memories: Holding Personal Memories Through Occlusion-Aware Projected Interaction." *Submitted to ACM TEI 2026*.

Professional Experience

Teaching Assistant - Introduction to Virtual Reality | University of Florida
August 2025 – Present
- Supporting instruction for an undergraduate VR course with hands-on Unity XR development
- Facilitating lab sessions covering VR hardware setup, tracking systems, and spatial interaction design
- Providing detailed feedback on 3D programming concepts and debugging VR applications
- **Technologies:** Unity XR, C#, VR Development, Spatial Computing

Real Estate Web Development Intern | Aquarelle Realty, Orlando, FL
February 2023 – January 2025
- Developed full-stack web functionalities using CSS, JavaScript, PHP, and MySQL
- Integrated API features including self-updating property listings, mortgage calculators, and geolocation services
- Optimized website visibility and search rankings through SEO implementation techniques

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Technical Projects

Stock Price Prediction with Twitter Sentiment Analysis
- **Machine Learning Pipeline:** Built a comprehensive system combining Twitter sentiment analysis with historical stock data for the top 25 most-watched stocks
- **NLP Implementation:** Implemented advanced techniques including VADER sentiment analysis, custom Naive Bayes classifiers, and TF-IDF vectorization for sentiment-driven investment insights
- **Interactive Application:** Created a Streamlit web application featuring real-time data visualizations, confusion matrices, and ROC-AUC performance metrics for investor decision support
- **Technologies:** Python, NLP, Machine Learning, Streamlit, Twitter API, Yahoo Finance API, VADER, Scikit-learn

Echo Journal: AI-Powered Journaling App
- **AI-Powered Analysis:** Developed an iOS journaling application using CoreML and a custom-trained "toneDetectorAI" model for real-time emotion analysis and personalized recommendations
- **Interactive Visualization:** Implemented Mood Board system with calendar-based emotional trend tracking, photo integration capabilities, and comprehensive entry management
- **SwiftUI Architecture:** Architected modular interface with custom components, featuring night mode support, accessibility-focused design, and privacy-first on-device data storage
- **Technologies:** Swift, SwiftUI, CoreML, Natural Language Framework, iOS Development, Custom ML

Models, Photo Integration, Core Data

Everglades VR: Interactive Environmental Experience

- **Immersive Environment:** Created a VR adventure featuring realistic canoe navigation through the Everglades ecosystem with dynamic day/night cycles and weather systems
- **Educational Interaction:** Developed an interactive experience with animated flora and fauna using custom SpeedTree assets and pop-up information systems for conservation awareness
- **Environmental Storytelling:** Implemented advanced features through 3D spatial audio, realistic water physics, procedural weather effects, and comprehensive UX optimization
- **Technologies:** Unity, C#, VR Development, 3D Modeling, Environmental Design, SpeedTree, 3D Audio, Procedural Generation

Intelligent Code Quality Analysis System

- **AI-Powered Analysis:** Developed a TensorFlow-based system for automated code quality assessment and error detection across multiple programming metrics
- **Machine Learning Architecture:** Built neural network models trained on diverse codebases to recognize patterns in code structure, style violations, and logical errors
- **Pattern Recognition:** Created algorithms to identify recurring programming antipatterns and suggest refactoring strategies with automated insights for improvement
- **Technologies:** TensorFlow, Python, Natural Language Processing, Static Code Analysis, Machine Learning

College Football Statistics Analysis System

- **Database Architecture:** Designed a comprehensive trend analysis system for college football data spanning 2004-2024 with 500,000+ tuples from the College Football Data API
- **Complex Query Implementation:** Structured data into a normalized Oracle database schema with sophisticated analytical queries examining player performance and recruiting impact
- **Full-Stack Development:** Built React frontend with C#/.NET backend, featuring dynamic data visualizations and interactive filtering by players/teams/conferences
- **Technologies:** C#/.NET, React, JavaScript, Oracle Database, D3.js, Chart.js, College Football Data API

Programming Language Interpreter & Compiler System

- **Core Components:** Architected a complete language processing pipeline, including Lexer, Parser, Analyzer, Environment, Generator, and Interpreter components
- **Language Design:** Implemented a custom programming language with support for variables, control structures, functions, type checking, and recursive descent parsing
- **Runtime System:** Developed environment management for variable scoping, memory allocation, execution control, and comprehensive error reporting
- **Technologies:** Java, Compiler Design Principles, Abstract Syntax Trees, Symbol Table Management

Route Optimization Visualization System

- **Algorithm Implementation:** Developed and compared A* and Dijkstra's pathfinding algorithms for real-world city navigation with comprehensive performance analysis
- **Interactive Visualization:** Integrated Bridges API to create dynamic, playable visualizations showing algorithm execution step-by-step with complexity analysis
- **Cross-Platform Development:** Built a command-line interface accepting city names and coordinates with real-time algorithm comparison for Windows and macOS
- **Technologies:** C++, Bridges API, Pathfinding Algorithms, Data Structures, Performance Analysis

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Technical Skills

Programming Languages
Python, C++, C#, Swift, JavaScript, Java, PHP, C

High-Performance Computing
CUDA, OpenCL, Parallel Computing, GPU Optimization, Mathematical Computing

AI & Machine Learning
Computer Vision, Natural Language Processing, Deep Learning, TensorFlow, PyTorch, Neural Networks, MediaPipe

Immersive Technologies
Unity XR, Unreal Engine, Projected Reality, Spatial Computing, Hand Tracking, LiveLink

Development Tools & Frameworks
MySQL, CSS, React, Oracle Database, Three.js, Git, Linux, iOS Development, Web Development, API Integration

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Leadership & Service

Executive Board - Webmaster | Tau Sigma National Honor Society
Current
- Leading digital presence and web development initiatives for a national honor society chapter

Active Memberships
- Hispanic-Latino Cultural Club
- FinTech Club
- Computer Science Club
- UF Society of Information Technology (UFSIT)
- UF Association for Computing Machinery (ACM)

Certifications

Microsoft Certifications:
- Microsoft Office Specialist (Excel, Word, PowerPoint)
- Microsoft Technology Associate (Programming using JavaScript)

Adobe Certification:
- Adobe Certified Professional (Photoshop CC)

Awards & Honors

- **Bright Futures Florida Academic Scholars Award**
- **Dean's List:** Spring 2025
- **Overall GPA:** 3.81/4.0

Research Statement Summary

My research focuses on creating intuitive and efficient interfaces that bridge human creativity and computational power. I am particularly interested in projected reality systems that leverage natural human behaviors, such as occlusion for interaction, AI-augmented creative tools, and high-performance computing optimization for real-time interactive systems. My current work on "Graspable Memories" demonstrates my commitment to developing novel HCI paradigms that feel natural while pushing technological boundaries.

I am seeking PhD opportunities to further explore how emerging technologies can enhance human capabilities while remaining accessible and intuitive, with specific interests in programs that support interdisciplinary collaboration between HCI, computer graphics, and AI research.

References available upon request