# Stephen Melnick

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GitHub: Redesigner

## Skills

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- **Engine Programming:** 3D Mathematics (Vector, Matrices, Quaternions), 3D Rendering and Animation, Input Systems, Entity-Component Systems, Advanced Spatial Algorithms, Physics Simulations and CCD, Data Serialization, Type Reflection, Thread Management, Memory Management, Engine Debugging
- **Unreal Engine :** Gameplay Ability System, Network Prediction, AI Behavior/State Trees, CommonUI, Enhanced Input System, Unreal Insights, Visual Logger, Custom Engine Modifications
- **Game Programming:** Custom Camera Systems, Advanced Character Platformer Physics, Controller Input Systems, Combat Systems, Crafting Systems
- **Programming Language Experience:**
    - **Advanced:** C/C++, Unreal Blueprint
    - **Proficient:** C#, GLSL, JavaScript, Python
    - **Intermediate:** SystemVerilog, GDScript, GML
- **Development Tools:** Visual Studio, Git, CMake, RenderDoc, Blender
- **Game Engines and Frameworks:** Unreal Engine 4/5, Unity, Godot, XNA/MonoGame, SDL2/3, OpenGL 4.0+

## Personal Projects

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**Vox Engine | Solo Developer** **January 2025**

- Programmed complete high-performance actor and component system with type reflection in C++
- Implemented sparse voxel octree world saving and loading, with parallelized GPU mesh generation algorithms
- Created glTF model, material, and animation importer
- Engineered deferred OpenGL 3D renderer with PBR shading, skeletal mesh deformations, and post-process effects
- Developed editor tools including transformation gizmos, component hierarchy trees, realtime data reflection, and prefab creation

**Jelly Ship | Lead Programmer** **September 2024**

- Implemented custom movement physics with buoyancy simulation
- Developed flexible ability system
- Collaborated with designers and artists and delivered a complete project in under one week

**Witch Forest | Solo Developer** **February 2024**

- Programmed Gameplay Ability System
- Implemented custom content creation tools for recipes and items
- Created custom network prediction system to integrate with Unreal GAS
- Integrated custom AI logic with existing Behavior Trees to create advanced creature behavior

**Rea Engine | Solo Developer** **March 2022**

- Designed easy-to-use entity-component system with messaging
- Implemented continuous collision detection for convex polygons based on Gilbert-Johnson-Keerthi model

- Developed font loading and atlas texture generation using FreeType

**Tether | Lead Developer** **December 2021**

- Programmed custom platforming physics with advancement movement systems for climbing, sidling, and wall jumping, supporting moving and rotating platforms
- Modeled and rigged character with expressive animations to complement custom physics

**GJK Solver | Solo Developer/Designer** **March 2021**

- Wrote and designed presentation for explaining methodology and foundational concepts
- Programmed in both C# and C++
- Implemented simple gift-wrapping algorithm for use with complex polygons
- Developed visualization/interactivity with Microsoft XNA

**Additional Projects**

## Professional Experience

**Lab Research Assistant |** Temple University Computer Science Dept., Philadelphia, PA **August 2019 – January 2021**

Doctoral Program Research Assistant, responsible for data research, computer programming, and hardware/circuit design

**Installer |** Pierson Computing Connection, Mechanicsburg, PA **April 2018 – August 2018**

**Help Desk Associate |** Temple University IT, Philadelphia, PA **August 2015 – April 2018**

## Education

**Temple University, Philadelphia, PA**
Coursework towards B.S., Computer Science (Data Structures and Algorithms, Low-Level Programming, Physics, Computational Probability and Statistics, Mathematical Concepts in Computing)