

# Tiernan McCarthy

## Games Programmer

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## Summary

Games Programmer with over **3 years** of experience developing **VR** and Simulation Experiences for PC, Android and Quest Platforms in **Unity 3D with C#**. Focused on delivering optimised products and innovative Gameplay/Simulation experiences for Quest Standalone and on PC, collaborating with a multi-disciplinary team to supply fluid experiences for clients in a timely manner. Focused on creating high quality applications on single user and multiplayer environments (Photon Fusion for Unity). Consistently authoring entire scenes, implementing 3D assets as bespoke interactive vehicles or machinery and implementing their tasks for digital rehearsal purposes. Experienced in vehicle simulations and large Baggage Flow Simulation with thousands of Rigidbodies on a procedurally generated baggage route based from CAD Designs.

An avid learner and a team player, keen on furthering my skillset and learning with others to create interactive and interesting solutions. Experienced with C++ and currently learning Unreal Engine in my spare time.

Currently based in the south of England (Portsmouth Area).

## Experience

### XR Developer

1/03/2022-Present

Costain

- Optimised performance on multiple platforms, simplifying CAD designs, applying techniques to reduce CPU and GPU load for use in Unity for viewing and interacting with CAD on low spec platforms such as Quest 2 or standard Android Phones to high detail baggage flow simulations on PC.
- Took control of the code base, providing all major features and implementations in projects. Responsible for testing and maintaining systems for adaptability and expansion between projects.
- Collaborated with Artists to bring visions of Construction plans, simulations and rehearsal programs for clients to promote safety and create value for the business.
- Created a proprietary driving simulation system for vehicles around Heathrow Airport to accommodate functionality of a wide range of unique vehicles. This allowed us to tailor the simulation to the needs of the client.
- Experience creating large open world environments such as the entirety of Heathrow Airport, with the ability to drive around the whole site, populating it with aircraft with real time aircraft data and pedestrians to create a lived in simulation.
- Created bespoke editor tools to ease development for the art focused team. Specifically of note, a tool that could take an outline of a CAD Baggage path and simplify and split the path into conveyor game objects and barriers that simulated an abstraction of the baggage flow with thousands of bags on several kilometres around Terminal 2 at Heathrow.

## Education

Computer Games Technology MSc– Merit 2020-2021 (Dissertation on Procedurally Generating Planets)

University of Portsmouth

Computer Games Technology BSc Hons – First Class 2017-2020 (Dissertation on Ragdolls in games and implementing large scale Verlet Integration Ragdolls)

University of Portsmouth

Computer Games Technology Graduate from Portsmouth University, experienced in game development using various industry tools and practices (**C++**, **C#**, **Unity Engine**, **OpenGL**, **DirectX11**, **Networking**). Experience developing for PS4 Devkits and Homebrew Console Development.

Experienced in team-based video game production, notably acting as **Project Manager** and **lead programmer** in a VR project commissioned by BAE Systems.

## Skills

### **Professional Experience**

C#

Unity Engine

VR Development (Quest Mobile and Desktop VR)

Optimisation for mobile and desktop platforms

Physics Programming (Vehicles, conveyors and other systems)

Gameplay driven by Rigidbodies

Collaborative Skills

Source Control (Git, Github, Azure Dev Ops)

AI in Games (Behaviour Trees, Finite State Machines, Desirability brains e.t.c)

Networking (Specifically Photon Fusion and Bolt in Unity)

### **Other Skills**

C++ & Unreal Engine (Fluent and happy to build Windows Applications, currently teaching myself Unreal Engine to broaden my skillset)

Python (Scripts written to export flight data to Unity for real time airport simulation)

3D Modelling Blender (I've an appreciation for modelling and regularly created assets to assist myself as a programmer + I am more than capable of adjusting pivots and models to help complete a task) ( e.g. Road Navmeshes at Heathrow)

## Projects (Links to Portfolio in Project Title & More on [TiernanMcCarthy.dev](https://tiernanmccarthy.dev))

### **Heathrow Driving Simulator (Unity 3D C#) (Lead Programmer & Designer)**

Created as an initiative to simulate and assist driver training at Heathrow. Drive several vehicles around Heathrow, completing several tasks to familiarise with the airport. This project makes use of a custom Rigidbody Driving Rig that I wrote in Unity in order to support a wide range of unique Airport Vehicles and Functions. This project supports VR interactions with vehicles and the world, whilst allowing the user to drive at Heathrow in multiple times of day, weather conditions and scenarios, avoiding traffic and pedestrians on the way.

This project was designed with multi monitor support and an emphasis on a Logitech Driving Rig which I implemented with several other controls schemes with Mouse & Keyboard + full controller Support.

### **Heathrow Baggage Flow Simulation (Unity 3D C#) (Lead Programmer)**

Created as an investigation into the creation of a new Baggage System in Terminal 2, testing the flow of a CAD design and the expected environment for workers prior to Construction through a VR Interface. This project simulated several kilometres of conveyors around Terminal 2 at Heathrow, looking at a proposed new design. I created a tool in Unity that would abstract and generate a mesh and therefore colliders that approximated the extremely heavy CAD routes into simplified conveyors and barrier objects. Bags were simulated as Rigidbodies, with conveyors also simulating movement with a kinematic rigidbody exploit which would impart its momentum onto bags. Combining this with Unity's ECS system allowed us to simulate a huge CAD scene at a stable and acceptable frame rate.

### **Pogo Me Home (Unity, 3D Platformer) Developed entirely by me**

Pogo Me Home is a Rigidbody based platformer made around manipulating a Pogo Stick around a facility to escape.

The player can rotate, jump and grab physics objects. Portal as a physically based Rigidbody essentially. The Pogo stick controller is something I'm really proud of as it exists and moves entirely through forces, making its movements predictable, but also complex. I really enjoyed developing the breakable objects, obstacles and designing the levels, and I am incredibly keen and excited to apply my programming and game development skills in more creative ventures like this,

### **Crane & Construction Timeline Simulation Systems (Unity 3D, Lead Programmer)**

Created as a collaboration between Costain and Heathrow and later Transport For London as a visual aid to sell and demonstrate construction plans over a time period to business and public stakeholders. The user can manipulate and use multiple cranes and other pieces of plant equipment in VR or on PC. Most importantly, the entire construction plan was made in Unity, with a link made between scheduling and CAD Assets, as a result I was able to create a timeline system that allows the user to inspect the construction at any stage. This therefore exists as a complex 4D Inspection tool for our clients which we're looking to roll out on future projects.