Lewis Martin Spencer, M.Eng

⚲ Bristol   ✉ lewismspencer@gmail.com   📞 07858 010792   **in** lewismspencer

A versatile and results-driven senior engineer with a proven track record of delivering high-impact solutions across a wide range of industries, from broadcast AR/VR graphics to digital twins and robotic simulations. I thrive in small, fast-paced teams, combing technical depth with creative problem-solving to bring complex ideas to life. .

Technical Skills

Programming Languages: C++ 20, C, Python, HLSL, C#, JavaScript, Lua, VB, MATLAB, Shell, Batch, and Assembly.

APIs and Frameworks: Unreal Engine, Blueprints, DirectX, ROS, CMAKE, CUDA, Electron, NodeJS, OpenGL, OpenCV, OpenCL, WebGL, .Net, SQL, Postgres, REST, NSIS, ATL, and SDL.

UI/UX: Qt, Slate, UMG, HTML, CSS, VC++, MFC, and Figma.

Continuous Integration: Docker, GTest, Unreal Automation System, GitHub Actions, and Team City.

System Knowledge: AR, VR, GIS, Digital Twins, Broadcast Graphics, Virtual Production, AWS, 3D Tiles, Point Clouds, Video/Mesh Streaming, Robotics, Simulation, Linux, and Windows.

Education

University of Reading, Masters of Engineering in Robotics, **1st Class**   *Oct 2006 - Jun 2010*

Project Higlights

Semi-Automatic Offside and Virtual Production   *Hawk-Eye Innovations*

- Full limb tracking data driving a rigged skeleton mesh representation of all 22 players & referees on the pitch.
- Seamless blending between AR graphics over video and VR representation of an semi-automatic offside decision.
- AV and VR telestrations graphics (Unreal) for broadcast enchantment and virtual production representations of on pitch incidents.

Underwater Robotic Simulator   *Beam*

- Containerised (Docker) underwater robotic simulator (Unreal) with web based frontend (TypeScript/React) for system configuration and monitoring.
- Support for simulated sensors and effectors with ROS2 messaging and GStreamer for virtual cameras.

Cricket/Tennis Unreal Broadcast Graphics   *Hawk-Eye Innovations*

- Unreal Engine powered system to display statistic based graphics for television (Ashes 2019/ATP Finals 2019), powered by a back-end node based editor (Qt) with user extended Lua scripting support.
- LBW officiating system, combining a mix of VR and AR graphics over video.
- Limb/player tracking data powered stat graphics for cricket, driven by a suite of Unreal plugins.

Wheelbarrow Mk9   *Northrop Grumman: Remotec*

- Explosive ordnance disposal remote operated vehicle for the 2012 London Olympics.
- Command & control software (C++/MFC) for the operator console involving video streaming and recording from COFDM radios and a real-time kinematic model of the ROV's position.
- Harness and mechanical design, with software and electronic debugging.

Offshore Windfarm Digital Twin   *Beam*

- Fully georeferenced (3D tiles) digital representation of client offshore wind farms, able to process numerous data sources at runtime to produce a unified representation of the data.
- Support for CAD, photogrammetry and point cloud models to be streamed in alongside inspection events and video.

Real Time Electronic Line Calling   *Hawk-Eye Innovations*

- Live line calling system for tennis used to replace the need for court side line judges.
- Built the core decision-making logic, PA integration and an automatic VR representation of each decision.

Golf AR Broadcast Graphics   *Hawk-Eye Innovations*

- Custom DirectX/C++ powered engine to display AR putting predictions over television broadcasts.
- Projected calibrated image based VR for showing graphics when broadcast view was obscured.

Real-time Image Segmentation using GPGPU   *University of Birmingham*

- C++/OpenCL implementation of image segmentation algorithm on modern GPU hardware.
- MATLAB modelling of algorithm's performance and accuracy.

Autonomous Airborne Sensor Platform   *Year 4 Individual Project: A Grade - 77%*

- An autonomous blimp designed to navigate unmapped environments within a digital boundary for the purposes of sensor recording for a range of applications e.g. archaeology, mine detection.
- Data-fusion (GPS, digital compass, ultrasound) used by the PID/FSM/sub-goal control system (Embedded C).

Automatic Calibration System for Underwater Transducers & Hydrophones   *Chelsea Technologies*

- System (VC++) for calibrating underwater transducers and hydrophones and generating a calibration report.
- Controlled impedance analysis, signal generation and processing.

Experience

Beam, Senior Unreal Engineer   *Sep 2022 - May 2025*

- Created digital twin solution targeting offshore wind farm operations and maintenance.
- Integrated bespoke synthetic rendering system into AI/ML training pipeline.
- Produced custom robotic simulator to meet internal developer requirements.

Hawk-Eye Innovations, Graphics Team Lead   *Mar 2016 - Sep 2022*

- Leading a small team of developers using Aglie/Scrum building VR/AR broadcast graphics for a range of sports in Unreal and DirectX.
- Developed officiating technologies for use in a wide range of sports.
- Delivered multiple time critical projects for a range of international high profile customers.

University of Birmingham, Postgraduate Researcher   *Jan 2012 - Dec 2015*

- Worked on real-time image processing systems for image segmentation and stereo matching.
- Created robotic research platforms for off-board image processing with Wi-Fi MPEG4 camera streaming, powered by an OpenGL engine.

Northrop Grumman: Remotec, Development Engineer   *Oct 2010 - Dec 2011*

- Worked as part of a small team developing the next generation of large sized EOD RCVs for use in particular at the 2012 London Olympics.
- Provided Software, Electronic, Mechanical and Harness design and troubleshooting.

Intelligent Media Systems and Services, EPSRC Internship   *Jul 2008 - Sept 2008*

- Worked on a web crawling project as part of a 10-week internship.

Chelsea Technologies, Technician/Programmer   *Jul 2005 - Jan 2006, Mar 2007 - Sep 2007*

- Responsible for the design and implementation of an automatic calibration system for underwater transducers and hydrophones.
- Contributed to an EU Report on BRIMON (techniques to remove bio-mass on optical windows).