

Mark Strachan

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PROFESSIONAL SUMMARY

Systems engineer and technical leader with 25+ years building sophisticated, high-reliability software across XR, robotics, simulation, enterprise systems, and regulated medical platforms. Former Founder, NSF Principal Investigator, and Staff Engineer with deep experience in real-time engines, perception pipelines, distributed systems, and hardware/software integrations. I specialize in design and architecture for intelligent decision-making systems and simulations infrastructure that supports robotics, teleoperation, and AI-driven applications.

TECHNICAL SKILLS

Real-Time Engines & XR Systems

Unity (10+ years), Unreal, C#, C++, Python, OOA/D, design patterns, real-time systems, XR simulation, ECS, CPU/GPU memory layout, job scheduling, physics/collision systems, procedural mesh generation, compute shaders, ShaderGraph, SRP/URP, fast math libraries and burst compilation, native Jobs, spatial-computing interface design.

Perception, Interaction & Intelligent Systems

Signal processing, on-device neural networks, segmentation pipelines, SLAM-adjacent systems, Kalman filtering, geometric modelling, color science, interaction modelling, multimodal input design, digital twins.

Systems Architecture & Cloud Infrastructure

Distributed systems, Kubernetes, MagicOnion gRPC, protobuf/MessagePack, NoSQL, Redis session management, JSON, Azure/AWS cloud architecture, ETL/data pipelines, performance optimization, constraint systems.

Multi-User & Networked XR

Avatar systems, synchronized state management, gesture recognition, hand tracking, multi-node cloud orchestration, secure real-time communication, scalable XR session architecture.

Leadership, Technical Strategy & Cross-Domain Integration

Architecture ownership, cross-team integration, mentoring, code reviews, standards development, operational readiness, globally distributed team leadership, AI-assisted development, configuration management.

WORK EXPERIENCE

create.media – Founder / Principal Architect

2015 – Present

- Designed and built *musicshaper*, a collaborative XR environment grounded in geometric music theory, enabling visual composition through spatial interfaces; resulting in multiple granted patents.
- Developed 85k+ lines of Unity/C# across XR client, UI framework, and multi-node cloud system; with a decade of deep Unity/XR experience and additional Unreal explorations.
- Architected cloud infrastructure: multi-VM C# NoSQL nodes, Kubernetes-orchestrated MagicOnion gRPC services, protobuf/MessagePack networking, Redis session management, and a scriptable JSON-driven admin console.
- Implemented advanced XR client systems: Normcore multi-user avatars, hand tracking and gesture recognition, custom spatial-computing UI framework, CIECAM2-based color modelling, and fully procedural UI generation with Unity Jobs, native memory, and mathematics libraries.
- Built high-performance rendering and interaction pipelines: compute shaders, ShaderGraph GPU workloads, ECS-based collider generation, procedural mesh instancing, and burst-optimized deformation systems.
- Created automated UI testing system using event-driven architecture for deterministic interaction validation.
- Integrated LLM-based spec driven code generation into daily development (Claude Code, Opus), applying AI to API simplification, log analysis, Kalman-filter smoothing, and vector-embedding based detection of code duplication.

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Intuitive Surgical – Staff Software Engineer – Surgical Telepresence, Industrial Digital Twins **2022 – 2024**

- Built VR based telepresence system enabling real-time, remote expert surgical instruction, for the DaVinci surgical robot; deployed in cadaver and live porcine surgeries and demonstrated to C-Level Execs.
- Implemented training system in multi-user Unity/C# VR based surgical theatre simulation, with Digital Twin for the DaVinci Surgical Robot. System included CAD model import, mesh optimization, and real time interaction.

Facebook Reality Labs – Human Understanding Team – W-2 Contract – XR engineer **2020 – 2021**

- Coinventor of patent for dynamic object/human body detection in streaming video, using on device (HMD) neural networks (LSTM/Predictive Networks) and reconstructing 3D form from SLAM data.
- Implemented Unity/C# body detection system, with C++ plugin integration, forming a perception pipeline with range finding, segmentation, smoothing, edge detection, and passthrough compositing.
- Implemented C++ instance of fast ellipse detection algorithm, based on research whitepaper/MATLAB code.

Intel Sports – W-2 Contract AR/VR Engineer – 2020 Tokyo Olympics **2019**

- Delivered features and QA support for Unity/C# VR content delivery application, using Intel TrueVR framework and including 3D video, 360 video, and volumetric video generated by stadium mounted multi-view camera system.

CodeSource Software - enterprise consulting & software development outsourcing **1999 – 2019**

Founder-CEO, Manager, Architect, Forward Deployed Engineer, with Clients:

Amgen Corporation, Biostatistics Group – IC+Team/Outsourced Development Team Manager

- Led sole offshore team for Fortune 500 biostatistics group, with 7 CodeSource engineers, delivering 10 enterprise Java applications, supporting 250 analysts, and reporting to director level.
- Selected and coached staff, providing code reviews and guidance regarding architecture, standards compliance, release management, testing, test automation, and configuration management.
- Owned Regulated Information Systems delivery under HIPAA/CDISC compliance, for applications used in drug delivery pipeline, producing Amgen biological products like Repatha.
- Team built privacy preserving data pipelines & secure computation access layers (ETL) for double-blinded clinical datasets, integrating SAS modules for statistical modelling & machine learning, with data submission to the FDA.

Serena Software – IC/Forward Deployed Engineer - SDLC Automation, Enterprise Workflow

- Implemented SDLC and configuration management for energy, healthcare and enterprise clients, and consulted with Serena Architecture Group regarding Frameworks for Enterprise Application Lifecycle Management (ALM.)
- Advised client-side Directors/VPs re: software development procedures and operational readiness.
- Implemented “Human as Agent” workflows for nuclear power corrective actions process.

Marshall/Avnet – IC/Lead Architect - Java for Enterprise

- Designed mid-tier domain model for global electronic parts supply chain management system, with JIT robotic warehouse delivery; Company ranked #1 IT Innovator out of the yearly InformationWeek IT500.
- Integrated NOSQL data storage with Symbolic AI/Constraint Solver solutions for supply chain optimization.

CodeSource Internal Projects—IC+Team/Software Development and Architecture:

- **National Science Foundation - Principal Investigator** -- Awarded 2 SBIR grants for immersive edtech product, utilizing differential geometry to design 2D/3D domain specific UI; Project spun off into company--create.media.
- **Thinktank/Objective/Aurora**—an end-to-end ALM system, with requirements, design, defects, components, configuration, releases, etc. Built on **Objective** app framework and **Aurora** object-based persistence engine.
- **Pivotal SQLFire**—Initial specification for SQL interface over high-speed distributed caching system GemFire.

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Rockwell International – Software Engineer

Foundational Work

- Implemented thin film deposition chamber control system for custom optics in C++, deployed to Hellfire Missile.
- Explored feature enhancement with edge detection and image convolution, and early VR systems with OpenGL.
- Created proprietary C++ image processing technique using boundary conditions to stabilize sub-pixel resolution enhancement with respect to noise, via linear programming.

EDUCATION

Harvey Mudd College

B.S. Mathematics & Computer Science (Dual Major), Minor in Music.

Coursework: computational math, quantum mechanics, linear & abstract algebra, differential geometry & topology.

PATENTS AND PUBLICATIONS

[Grant #11335077](#) – May 17, 2022 – Assignee: Facebook Technologies, LLC.

Generating and modifying representations of dynamic objects in an artificial reality environment

Augmented Reality System and Method -- Assignee--Mark Strachan

[Grant #11798236](#) – Oct 24, 2023, [Grant #12592045](#) – Mar 31, 2026

Music Shaper -- Assignee--Mark Strachan

[Grant #9530391](#) – Dec 27, 2016, [Grant #9754570](#) – Sep 5, 2017, [Grant #10235983](#) – Mar 19, 2019, [Grant #10468000](#) – Nov 5, 2019, [Grant # 10957292](#) – Mar 23, 2021, [Grant #11790874](#) – Oct 17, 2023, [Grant #12217729](#) – Feb 4, 2025

Patent Pending -- Assignee--Mark Strachan

Application Pending [#19/011077](#) – Jan 6, 2025 – Music Shaper

Publication Only:

Publication [#20070299864](#) – Dec 27, 2007 – Inventor: Mark Strachan
Object Storage Subsystem Computer Program

CURRENT AREAS OF STUDY

Galileo, Codex, OpenUSD, Unity Robotics, Unreal Robotics, Isaac Sim