Max Nicosia, PhD

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DOB: 30 May 1986 British (with 5-year Eng. JP Visa)

SUMMARY

I am a PhD graduate who ran his own company providing commercial research services (prototypes/simulations) to the UK MoD. I have over **10 years** of hands-on experience in high-performance safety-critical software and hardware integration, system design, and evaluation across a variety of technologies and programming languages.

Education: PhD (Engineering, U. of Cambridge), MPhil (Comp. Sci, U. of Cambridge), BSc (Comp. Sci, U. of St Andrews).
Languages: English (native), German and Spanish (conversational).

TECHNICAL SKILLS

Languages / Libraries / Paradigms / Software

• C/C++ • C# • Python • Java • Android / Gradle • iOS XCode • R • TypeScript • JavaScript • Ruby • React • CSS • MySQL/SQL • AR/VR • TCP/UDP/IP • WebSockets • AWS • Bash • PowerShell • Linux • OpenMP • MPI • pthreads • GitHub • Boost • psutil • scikit-learn • PyTorch • scipy • numpy • d3.js • LaTeX

Development and Programming Skills

• Agile development • Scrum Development • Test-driven development • Designing and building custom APIs to expose functionality for information feeds and/or hardware control • Development of custom 2D/3D adaptive interfaces • Custom 2D/3D interactive visualisations development for real-time live object tracking and/or data stream monitoring of stats to display visualisations using d3.js in TypeScript with React • Rapid prototyping and integration of proprietary interfaces / systems for demos • Middleware design and implementation for multi-platform integration • Multithreading / lockless coding / synchronisation / memory barriers • Memory management for restrictive hardware and/or operations • Interfacing with hardware drivers, e.g. sensors • Sensor fusion and machine learning model building • MapReduce implementation and integration (Hadoop) • Design and implementation of custom network protocols at kernel level • TCP / UPD / WebSockets • Custom network paradigms, e.g. data-centric, publish-subscribe and distributed networks

Unity / Unreal

• Use of assets such as Mixamo characters • Importing/modifying and blending character animations • Textures • Lighting effects / filters • Some shader experience • LOD use and configuration • Dynamic asset loading • Spline implementation and collision avoidance for custom pathfinding, e.g. vehicles and pedestrians • Behaviour trees and blackboards for characters • Custom object serialisation for loading and saving, e.g. data-structure marshalling • Blueprint design

Analytical / Research

• Statistical testing • Statistical model fitting • Machine learning models • Participant and participant-free design and execution • Big data management and analysis • Scientific data visualisation / presentation

Project Management

• Stakeholder meetings • Requirement elicitation • Milestone allocation and prioritisation • Live demos and presentations

WORK EXPERIENCE / DEVELOPMENT

Jun 24 – Present | **Woven by Toyota** – Tokyo, Japan

Tech Lead in Driver Sync Assist Division

- **Technologies:** C#, C/C++, Unity, Python, CAN interfaces, Bash.
- **Development** of safety simulations in Unity to match researched hazard use-cases and **verification** cases.
- **Designed** Software Architecture for the simulation system that could replay real-world collected data.
- **Integrated** Vehicle Physic Pro library for realistic physics simulation.
- **Developed** C/C++ wrappers for CAN data integration with various controllers and system/sensor interfaces.
- **Development and execution** of validation and verification experiments of safety logic with human participants.
- **Validated** simulation accuracy through use-case testing.
- **Reviewed** Pull Request to ensure quality assurance, style, etc.
- **Structured / refactored** existing code base to integrate into our product.
- **Assetasation** of simulation logic for team collaboration.
- **Participated** in strategy meetings for long-term division growth and OKR planning.
- **Presented and demoed** state of system at quarterly VIP events.
- **Development** of future technologies and patents (see section below).

Apr 24 – May 24 | **FinStadiumX** – Tokyo, Japan

Strategic Software Development Team Lead

• **Technologies:** C++, pthreads, OpenMP, MPI, Boost, Docker, Podman, AWS, CMake, Git, Linux and Bash.
• **Responsible** for overseeing maintenance of legacy C++ software components for financial transaction services capable of servicing **2000-5000 transactions per second** and managing daily revenues of **7–10 Billion Yen** per product (Equities, Futures, Dark Pools).
• **Designed** and **developed** new in-house C++ low-latency, lockless software components for High-Frequency Trading services for Linux (Equities, Futures, Dark Pools).
• **Used** advanced C++ low-latency paradigms/features such as memory barriers, ring buffers, lockless coding, memory pools, cache alignment strategies and CPU compiler optimisations.
• **Profiled** legacy components to identify candidates for optimisation and/or for redesign and reimplementation.
• **Developed** build procedures for components and libraries in Linux/Windows (VS Studio, CMake and Make).
• **Carried out** code reviews and team meetings to manage component/feature development.
• **Maintained** development, test and production environment in Docker/Podman images in various platforms, including AWS-hosted servers.
• **Ensured** compliance with FIX Protocols across components.
• **Built** documentation of legacy and new components and features.

Nov 22 – Mar 24

Tokyo Academics – Tokyo, Japan

Head of Research

• **Technologies:** Python, numpy, scikit-learn, PyTorch, Kaggle, etc.
• **Supervised** CS projects, for prototyping and/or in machine learning in various languages.
• **Managed** a team of ≈20 part-time researchers who supervise young students' research projects.
• **Managed** division, including sales and marketing strategy.
• **Exceeded** YTD sales performance by **125%**, above the 50% target.

Mar 23 - present

Learning Optimiser Mobile Application – Passion Project (Part-time)

Main Developer - (Cambridge Intelligent Systems UK Ltd)

• **Technologies:** Unreal, C++, XCode and Apple App Store for test deployments/publishing.
• **Developing** a prototype of an iOS mobile app in Unreal that uses machine learning to optimise learning outcomes based on the user's learning performance in a given problem space.

Mar 20 – Feb 21

Attention-Aware System for Mixed and Augmented Reality Controls in Armoured Vehicles – Proj. Ref: ACC2006330 – Cambridge, UK

Technical Lead / Main Developer / Project Coordinator

• **Technologies**: Unity, C#, .Net 4.x, Mixamo, Visual Studio and Git.
• **Objective**: Distil requirements and deliver a simulation VR environment to test/train operator threat detection capabilities under various attention-aware visualisations.
• **Developed** a simulation environment with following features: multiple stages and NPCs with animations, spline and navigation paths for NPC vehicles, NATO-compliant threat visualisations in 3D/Minimap, 360-world view, threat tagging UI, operator performance logging, and three dynamic attention-aware visualisations: 1) Tracking of attended and non-attended areas in 360-world map and minimap, 2) Animated pointers to areas not attended during specified intervals. 3) Out-of-view pointers to threats with extra moving animations if not attended to, and 4) Animated motions to NATO symbols.
• **Held** meetings with DSTL/UK MoD for requirements and specifications elicitation, and milestone management.
• **Developed** software was used for training exercises with all land platform teams.

Oct 19 – Jul 20

University of Cambridge – Department of Engineering – Cambridge, UK

Research Associate

• **Developed** support software for the research groups in C++/TypeScript and ran research experiments.

Dec 18 – Oct 19

Mixed Reality Controls for Armoured Vehicles – Proj. Ref: ACC2000981 – Cambs, UK

Technical Lead / Main Developer / Project Coordinator

• **Technologies**: Unity, C#, .Net 4.x, Mixamo and Visual Studio.
• **Objective**: Develop a Virtual Reality UI for the Oculus Rift that emulates an AR deployment inside a tank which is compliant with the Generic Vehicle Architecture (GVA) and uses the UltraLeap sensor for input.
• **Developed** a simulation environment with the following features: Multi-GVA UIs simulating mixed-reality with pass-through for arms and hands, in- and out-of-vehicle spherical 360 simulated cameras that could be rotated/directly manipulated through touching gestures (scrolling) and NATO-compliant threat symbology.
• **Held** regular meetings and attended briefings with DSTL/UK MoD members to gather requirements, develop software specifications and manage project milestones.
• **Developed** software was used for demoing potential future capabilities to the highest-ranking army officers to set long-term future capability design plans.

May 17 – Dec 17

Distributed multi-display system and middleware for close proximity operator gaze and attention tracking – Proj. Ref: ACC101965 – Cambridge, UK

Technical Lead / Main Developer / Project Coordinator

- **Developed** a middleware in C++ that demoed capabilities of eye-tracking and showing attentional states in multi-display Web Applications interacting with the middleware's API.
- **Developed** a TypeScript React application in d3.js to visualise live operator attentional states.
- **Developed** application visualisations to show the history of point movements and their attentional state.
- **Developed** an API for Typescript applications to subscribe to attentional events through callbacks and hooks.
- **Demo application** was used to encourage new capabilities in the RAF's air-traffic control systems.

Nov 17 – Jun 25

Cambridge Intelligent Systems UK Ltd – Cambridge, UK

(Exec. Director & Co-founder) Technical Lead / Main Developer / Project Coordinator

- **Technical and lead developer** for all projects (see all projects with references) and all director duties.

Aug 10 – Sep 10

OpenMath Binary Encoding Package – GAP Software – St Andrews, UK

Open Source Developer Intern

- **Developed** functionality for the OpenMath binary encoding package for the GAP mathematical software (https://www.gap-system.org/Packages/openmath.html) in the GAP programming language.

EDUCATION

Subt. Aug 22, Grad. Oct 23

PhD Thesis Title: Design, Implementation and Evaluation of an Attention Management System – University of Cambridge, UK

Main Research: PhD Research

- **Technologies:** C/C++, C#, Python, Java, TypeScript, pthreads, OpenMP, MPI, Boost, Docker, AWS, CMake, Git, Linux Bash, React and d3.js.
- **Designed** and **evaluated** a multi-component middleware system architecture that interoperated with various sensors across networked computers to detect operator's attentional states within applications, match it to application's data changes and deliver instructions to optimise live operator task performance.
- **Used** a completely **agile development philosophy** as requirements were discovered through direct experimentation and iteration. All component and test development was Git source controlled.
- **Implemented** a sensor networking component built in C++ directly interacting with both structured lighting sensors and eye-tracker drivers in C/C++.
- **Implemented** a live monitoring component developed in Python with TCP and WebSockets to directly interact with sensor information and Web applications built in TypeScript.
- **Implemented** a live performance visualiser tool in TypeScript/React with d3.js to showcase live and retrospective operator performance.
- **Implemented** a simulator in Python that could re-run captured operator actions to model alternative operational outcomes under different visualisation policies. This could plug into the performance visualiser.
- **Evaluated** system through experiments involving live testing with whole system integration and simulation using collected participant task performance data. Results published in peer-reviewed papers.

Additional Research / Software Development / Maintenance Tasks

- **Participated** in the research group's **Scrum** group for developing tools/libraries that were used across the entire research group. This included live graphing data through d3.js, Unity interfaces for prototyping, networking libraries for logging results, sensor polling and ML model building.
- **Maintained** documentation to shared resources and libraries for the research group that I owned.
- **Deployed** and **maintained** the VMs and Docker containers used in the research group's local servers for running experiments and number crunching.
- **Developed** and **maintained** Python scripts using *psutil* to monitor the usage of the research group's local servers to ensure up-time and catch any user misuse/abuse.
- **Used** AWS services to test and build ML models from sensor data collected for various research projects. This allowed maximising resource utilisation so only specific parameters in the search grid would get scheduled for building models based on previous results.
- **Developed** an application that provided an API to get the head pose of an operator in a 5m $\times$ 5m room fitted with 8 Microsoft Kinect 2.0 through a purposely built ML classifier model. Work published in **HCCS 2018**.
- **Developed** Android apps to collect data on various Fittz Law tasks used by the research group in publications.

Jul 13

University of Cambridge – Cambridge, UK

MPhil in Advanced Computer Science

- **Thesis title**: A privacy-preserving advertisement delivery system
- **Developed** a publish-subscribe targeted ad delivery system that prevented user privacy leaking to providers.
- **Courses:** Security, Data-centric Networks, Network Theory, Dist. Networks and Mobile App Development.

Jun 12 | **University of St Andrews** – St Andrews, UK

BSc in Computer Science

•**Thesis title:** A reduced implementation of INLPv4 (Identifier-Locator Network Protocol) for Linux.
• **Implemented** the INLPv4 protocol described in RFC 6740 in C as a kernel-level module.

PUBLICATIONS

• Nicosia, M., & Kristensson, P. O. 2024. Risk management in human-in-the-loop AI-assisted attention aware systems. In Putting AI in the Critical Loop (pp. 81-92). Academic Press.
• Nicosia, M. and Kristensson, P.O. 2021. Design principles for AI-assisted attention aware systems in human-in-the-loop safety critical applications. In Lawless, W.F., Llinas, J., Sofge, D.A. and Mittu, R. (Eds.), Engineering Artificially Intelligent Systems: A Systems Engineering Approach to Realizing Synergistic Capabilities. Cham: Springer Nature
• Nicosia, M. and Kristensson, P.O. 2020. A conceptual design of an inattention management middleware with adaptive target saliency. In Proceedings of the 41st IEEE Aerospace Conference. IEEE Press.
• Nicosia, M. and Kristensson, P.O. 2018. Inattention management middleware for human-in-the-loop multi-display applications. In Proceedings of the IEEE Workshop on Human-Centered Computational Sensing (HCCS 2018). IEEE Press: 71-76
• Nicosia, M., Oulasvirta, A. and Kristensson, P.O. 2014. Modeling the perception of user performance. In Proceedings of the 32nd ACM Conference on Human Factors in Computing Systems (CHI 2014). ACM Press: 1747-1756

PATENTS

• Nicosia, L.M., & Fukui, Y. April 2025. USER STATUS NOTIFICATION METHOD AND USER SUPPORT SYSTEM. Japanese Application no. 2025-063631.
• Nicosia, L.M., & Fukui, Y. Jan 2026. USER STATUS NOTIFICATION METHOD AND USER SUPPORT SYSTEM. US Application filed.