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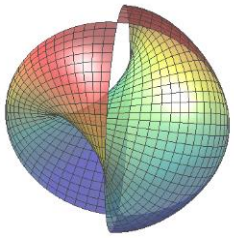

Profile

An innovative engineer with background in mathematics, computing, simulation, robotics & finance.
A software developer with C++ expertise, ranging from low-level up to architecture and API design.
Experienced in high performance software and algorithm design for parallel architectures.
Project instigator & lead, going from client requirements through delivery to support.
A well-received presenter and trainer.

Skills

Mathematical and analytical abilities – very strong:

- Computational geometry, matrix maths, numerical & stability analysis, approximation, optimization.
- Design of algorithms & restructuring of data for efficient parallel processing, performance analysis.
- Modelling, simulation and control of physical systems, expertise in multi-body dynamics.

Technical, computing, programming, dev skills – broad ranging:

- ASM since 1980, C since 1984, C++ since 1988, up on latest C++ standards; language & library.
- Embedded real-time systems, high performance computing, CUDA, OpenMP, vector intrinsics.
- Low-latency, transaction processing, database, load / traffic modelling and simulation.
- Python/MATLAB for algorithm prototyping, V&V, integration, test, analysis of trial & simulation data.
- Jupyter notebooks for investigations, reproducible data analysis and presentation of case studies.

Project planning and execution, communications – good experience:

- Identify opportunities, capture requirements, bid, negotiate, team-build and project manage.
- Clear communicator. Work well with client contacts. Contribute to company training sessions & wiki

Recent Experience

C++ Developer, **Ripple**, working on rippled server, a decentralized payment system. **2016**
Contract Software Development, **CM-Labs**, **Motorleaf**.

C++ Developer, **Morgan Stanley**, Montreal. FID FX Ecom & Options departments. **2013–2015**

- Low latency FX pricing software; my combined contributions lowered latency by 50% in one year.
- Member of 25-strong dev team pioneering modern C++ within MS, using Git/Stash/continuous dev.
- Modernisation of legacy codebase, database, internal libraries, Boost. Latency and perf analysis.
- Performance analysis and tuning. Latency data capture, filtering and correlation.

Dynamicist, **Team Lead** (V&V)**,** Vortex core dev team, mechanical simulation specialist. **2011–2013**
CM-Labs Simulations Inc., Vortex, Montreal.

- Lead on the Vortex constraint library; new joints, improvements, generic design proposal.
- Verification team lead, established V&V framework, directed and mentored verification engineer.
- Research and implement new ways to model and simulate cables and pulley systems of cables.
- Performance analysis and optimization; e.g. position-based algorithm giving 4x scale-up.
- Principal contact with McGill Centre for Intelligent Machines on solver algorithm research.
- Algorithm and math library improvements e.g. matrix factorization, quaternion, interpolation.

Senior Scientist, Mathematical Modelling Deptartment, Technical & Engineering Services **2007–2011**
BAE Systems, Advanced Technology Centre, Filton, Bristol, UK.

- Evaluated accelerator hardware, identified & implemented algorithms with speed-up potential.

NVidia GPU, IBM Cell, Clearspeed accelerator cards as well as custom FPGA.
Computational engineering, geometry processing, linear algebra, stereo disparity, search.

- First in ATC to negotiate and win contracts from Detica, worth £100K, following acquisition.
  Project managed the 3-person team resulting in IP, a secondment and follow-on work.
- Successfully bid for project assisting business unit to design a holographic head-up display.
- Investigated auto-generation of maps with low error from multiple GPS traces and GIS data.
- General mathematical modelling. Integration of modelling, simulation and visualization tools.
- Grew BAES-wide 'enterprise Wiki' to 2000 users; install, set up, upgrades, extensions.

Earlier Experience

Consultant & Technical Trainer, self-employed, 3D geometry and mathematics **2007**

- Delivered training courses and consulting to animators & developers: NaturalMotion, TSP.

Software Engineer, Maths Programming Specialist, **Clearspeed Technology plc**, Bristol, UK. **2006**

- Implemented matrix maths functions (BLAS) optimized for their proprietary parallel chips.

Software Architect, contract, Ageia PhysX **Ageia inc.**, St Louis, USA (now **Nvidia** Corp). **2003–2005**

- Specified D6Joint for PhysX, basis for the rigid_constraint schema in COLLADA 3D XML format.

Software Engineer, **Mathengine plc**, Oxford, UK. Game physics, dynamics R&D **1999–2003**

- Research and development for Mathengine's Karma physics engine and Renderware Physics.
- Developed single-body vehicle dynamics models and specialized joints for character modelling.
- Pioneered configurable constraints to simplify libraries of joint types for simulating human characters, vehicles and other articulated systems. Implemented in Mathengine's Karma MdtSkeletal joint and then as sole joint in Criterion's Renderware Physics, RwpJoint (led to Ageia's PhysX D6Joint, see above, ideas loosely copied in Bullet Physics and others).
- Advocated the use of 'swing and twist' rotational coordinates for many applications.

Research Associate, UWE Intelligent Autonomous Systems engineering Lab, Bristol, UK. **1993–1996**

- Designed and built a novel, omnidirectional, wheeled mobile robot including all mechanics, electronics, microcontroller, firmware and software. Developed a simulation suite for analyzing mobile robot dynamics. Used this to design adaptive control algorithms based on neural networks.
- Set up Lab network of linux PCs. Taught embedded computing, including C, RTOS & OCCAM.

Member of Technical Staff, **Hewlett-Packard Labs**, High Speed Networks, Bristol, UK. **1988–1992**

- Software guy on project team designing and building the world's first fibre-optic gigabit network.
- Contributed the protocol stack implementation plus system software, drivers and firmware.
- Early adopter of C++ for embedded systems, layered on top of real time operating system.
- Performed network traffic capture, analysis, and simulation testing of network architectures.

Sponsored Student, Central Electricity Generating Board, 8-week summer placements. **1986, 1987**

- Worked with team designing 'snake' robot manipulators for nuclear reactor repair.

Software Engineer, **Psion plc**, London – 'gap year' job before university **1984–1985**

- First task was to port and optimise dynamic equations for their flight simulator.

Video Game Author, Sinclair ZX80, ZX81 & ZX Spectrum **1980–1982**

- Successful early career writing games during the home computer boom.

Other

French Language: upper intermediate (TEFAQ B2). Also have some Spanish and Japanese.

Education

1994-2000: PhD study; UWE Intelligent Autonomous Systems engineering Lab (now Bristol Robotics Lab) "Dynamics and Neural Network Control of Mobile Robots". Did not submit.

1985-1988: Degree course; Churchill College, Cambridge, prize scholarship to read Engineering, EIST: Electronics & Information Systems Tripos. Awarded 2-1 BA Hons.