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**Personal Details**

Name: Philip Gregory Hall.  
Age: 40  
Date of Birth: 25th August 1978  
Nationality: British  
Driving License: Yes (clean)

**Education**

*1990 - 1996* Loughborough Grammar School, Loughborough, Leicestershire

*1996 - 1999* Reading University (*C.S. & Cybernetics),* Reading, Berkshire

**Qualifications**

*GCSEs (9) -* 1A\*, 6A, 2B

*A-Levels (5) -* Computer Science (A), Mathematics (A), Physics (B), Further Mathematics (C), General Studies (C)

*Degree Course*

Graduated in June 1999 with a 2-1, BSc qualification in “Computer Science and Cybernetics” at Reading University. Course comprised modules in Mathematics, Electronic Engineering, Artificial Intelligence, Neural Networks, Graphics, 3D Rendering, Operating System Design and Philosophy. Second and third year final projects were “Neural network recognition of silhouette images” and “Simulation of cybernetic systems” respectively.**Employment**

***April 2013 – now***

***ARM Holdings****, Cambridge*

*Role:* ***Staff Engineer***

Employed as a Staff Engineer as part of ARM’s Mali Video Team performing research and development of video codecs. During this time I designed and implemented Video Decoder and Encoder pipelines at the firmware level to support the multi-core ARM MALI Video hardware products. Development was performed in a Linux environment using a combination of C-simulations, RTL simulations and FPGA boards.

Responsibilities included:

* Architecture and maintenance of the common codec framework which included: custom internal memory allocators, DMA scheduling, and on-board inter-core synchronisation.
* Maintenance of bare-metal drivers and communications API.
* Firmware loading, boot scripts and multisession scheduling.
* Creation and maintenance of validation frameworks for both system testing and hardware functional development.
* Assisting with the iteration of hardware designs from a Firmware usage viewpoint.
* Writing specifications for implementation of new features and documenting changes in existing features.

Released Products:

* Mali V500, Mali V550, Mali V61, Mali V52/76

Projects Included:

* Design and implementation of full VP8 Encode firmware (V500)
* Full HEVC Decode firmware (V550)
* VP9 Decode bitstream and MC firmware (V61)
* HEVC 8k - double-speed hardware re-architecture (V76)
* Common framework block colocation engine.
* Maintenance of ‘legacy’ codecs including MPEG2/4, VC1, H264, Real.
* AV1 Decode bitstream and MC firmware (unreleased product)

Additionally, recent research work includes some knowledge of Machine Learning and Deep Convolution Networks.

***January 2013 – April 2013***

***Intel****, Egham*

*Role:* ***Graphics Software Engineer***

Intel acquired the 3dLabs/ZiiLabs staff and premises in January 2013 and was converted to a team developing PC graphics drivers.

***June 2008 – January 2013***

***3DLabs/ZiiLabs****, Egham*

*Role:* ***Principle Architect*** *for Codecs*

As a Principle Architect at ZiiLabs I designed and developed Codecs, Media pipelines and test software targeting ZiiLabs’ series of in-house designed ARM A8/A9 based SoCs (ZMS-05 to ZMS-40). Primarily focusing on high performance with low power consumption; achieved by careful balancing of the use of ARM assembly, ZiiLabs Array microcode and cache and memory controller access patterns. Other responsibilities included specifying new instructions and behaviour for the ZiiLabs Array processor and auxiliary devices to improve video decode and processing performance while meeting power consumption targets.

Projects Included:

* Maintenance and improvements and supervising changes for existing codecs: MP3, VC1, JPEG. This often required porting CPU-implemented functionality to use the ZiiLabs Array hardware.
* A from-specification CPU-only implementation of AAC decoder (LC, LTP, SBR & SBR+PS) for the ARM926 based ZMS-05 using fixed-point arithmetic.
* Implementation of MP3 and Flac decoders.
* A from-specification implementation of H264. Including optimised High profile and Picture Adaptive/Macroblock Adaptive interlacing (PicAFF/MbAFF). This took advantage of both custom ZiiLabs hardware, optimised Array microcode and ARM Neon assembly to provide 40Mbit/s decode performance on an 800Mhz Cortex-A8 coupled with the 200Mhz ZiiLabs Array core.
* Design and Architecture for a VP8 decode implementation. Supervised junior employee’s implementation of this codec using our framework and tools.
* Performance Analysis of Codecs using Realview Trace and the ARM Coresight facilities in the SoC. The resulting information was used to modify structure sizes and layouts for better cache usage and memory access patterns.
* Development of performance and conformance testing tools to ensure all Codecs meet their specified conformance requirements and our performance targets for marketing purposes.
* Pre-silicon development and debugging of Codecs using the 3dLabs/ZiiLabs C-Simulator. With the resulting software used on the RTL simulation and for validation.
* Initial C-model implementation of the new High Efficiency Video Coding specification (HEVC) leading to development of Array Microcode on the ZiiLabs C-Simulator. Project cut-short due to acquisition by Intel.

***September 2007 – 31st December 2007***

***Rebellion Studios****, Brewer Street, Oxford*

*Role:* ***Software Engineer***

As a software engineer I developed and improved the audio and video playback code in Rebellion’s proprietary game engine, targeting the PlayStation 3 and Xbox 360 platforms. Development included the use of the PS3 Cell’s SPU cores for audio processing. Target development required the use of the GNU tool chain with custom compiler for cross-platform development, along with remote debugging and profiling tools to examine program execution on the console itself.

***June 1999 – September 2007***

***Aitken Scientific Ltd****, Oxford House, Thame, OX9 2AH*

*Role:* ***Senior Software Engineer***

While employed as Senior Software Developer at Aitken Scientific Ltd I designed and developed automation and control software for robotic systems and any kind of robotic or manual process control. This entailed the use of C, C++ and C# mainly targeting the Windows platform (NT4/2000/XP). Most projects required a low-level communication implementation (RS232, RS485, TCP/IP, CAN, MODBUS and OEM Digital IO boards), a mid-level control system (using timed state machines with threading and extensive error handling), and a high-level user interface (usually a C++ or C# based windowing application using a suitable framework).

I have designed, costed and implemented several projects, usually as lead programmer in a small development team. Emphasis during development was on flexibility, reusability and reliability, making full use of modular concepts like; object oriented programming, shared libraries and COM & distributed COM whenever required. I have worked in environments requiring adherence to GMP (Good Manufacturing Practice) and conformance with 21 CFR Part 11. Project development often required travelling to the client site to assess available resources and limitations, then returning after the development cycle for software installation and system testing.

**General Systems Knowledge**

Throughout university and previous employment I have received training on, or have a good working knowledge of, the following computer systems and languages:

Systems - Windows, Linux & X11, Android/Linux. Reference development boards with embedded Linux and ICE debugging devices and associated tools.

C/C++ - I have over 20 years of experience developing in C and C++ for industry using a number of frameworks (STL, ATL, MFC, COM) and a range of compilers including Microsoft Visual Studio, ARM RVDS, CLANG and the GNU compiler tool-chain on Unix/Linux-like platforms.

C# - I have used C# and the .NET framework extensively and have gained a good knowledge of the C# language structure and its supporting libraries including .NET core.

Assembler - Good knowledge of Intel x86/x64 assembly language, working knowledge of ARM and Thumb, and Neon assembly language. Also well versed in a number of proprietary VLIW assembly variants associated with internal projects.

Graphics - Good knowledge of the OpenGL and Direct3D 10/11 APIs. Including GLSL and HLSL programming.

Console - Some experience in developing for Xbox (classic & 360) and Playstation 3; including Sony’s RSX and the Cell processor (used for software audio processing).

**Interests & Hobbies**

Computer programming - Personal projects include 3D rendering, physics simulations, custom development tools, small games. I enjoy learning new techniques, languages and technologies whenever the need arises.

Leisure activities include long distance running and playing guitar. I also enjoy digital & film SLR photography in a studio environment.

**References**

References are available on request.