Shakith Fernando

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PROFESSIONAL SNAPSHOT

Passionate and experienced embedded systems engineer looking for a challenging role, where my technical background can be applied to solve practical problems. A Professional Doctorate in Engineering (PDEng) and 7+ years of expertise in developing embedded systems. Proven ability to multi-task under pressure and effectively manage multiple projects simultaneously, while delivering engineering designs under tight deadlines. Highly proficient in:

- **Software Languages:** Verilog, VHDL, C, C++, JAVA, Assembly, SystemC, BASH scripting
- **Software Modelling Tools:** UML, SYSML
- **Development Tools**: Matlab, OpenCV, Xilinx ISE EDK Vivado HLS, Modelsim, Makefile, Meld, GIT
- **Platforms & Architectures:** Xilinx Zynq, Google Glass, Nexus 9, FPGA, ARM, SIMD, VLIW
- **Operating Systems:** Linux, uclinux on Microblaze, uC-OS/II (real-time), Android

- Embedded Systems
- Rapid Prototyping
- Problem Solving
- Technical Communication
- FPGA/ARM/DSP
- HW/SW Co-design
- Multi-tasking
- Documentation
- Signal Processing
- Research & Development
- Project Management
- Training & Mentoring

EDUCATION & TRAINING

- **Professional Doctorate in Engineering** (Sep 2013 - Sep 2015)
  - Major: Healthcare System Design
  - Eindhoven University of Technology (TU/e), Netherlands
- **Bachelor of Engineering** (July 2001 - April 2006)
  - Major: Computer Engineering
  - National University of Singapore (NUS), Singapore

Academic Achievements:

- Awarded the bronze prize at the Intel International Undergraduate Embedded Contest, China (2006)
- Awarded the "Design Automation Summer School Scholarship" (ACM), California, USA (2005)

Patents: Akash Kumar, Shakith Fernando, Yajun Ha, "Multi-Processor Multiple Application Synthesis"

- US Provisional Patent for a year

PROFESSIONAL EXPERIENCE

Eindhoven University of Technology, Netherlands — **September 2013 - Present**
Máxima Medisch Centrum (MMC), Veldhoven
Philips Research, Eindhoven
PDEng Trainee

Multiple Projects:

Improving the Programmability of FPGA Accelerators

- Designed and implemented "*(AS)^2*"; a design flow that automatically generates an efficient FPGA hardware accelerator from high-level languages like C/C++

Vital Sign Medical App on Google Glass

- Designed and implemented the medical image processing app on the Android-based Google Glass platform
- Exploited SIMD parallelism in the image processing algorithm to obtain real-time performance
- Gained insight into and applied the Agile & Scrum practises to the software development cycle of this app
- Collaborated with algorithm specialists, camera engineers and business managers to develop this app

Contactless Vital Sign Monitoring

- Designed and implemented medical demonstrators to extract heart-rate and respiration from a camera
- Designed and conducted a clinical study at MMC to validate the accuracy of the above demonstrators
- Collaborated with a multidisciplinary design team from three organizations to successfully complete the project

Teaching Assistant / Student Supervisor

- Facilitated and taught the following:
  - **Computer Architecture (Intel/Silicon Hive VLIW)** to 60 first-year master students (2011 - 2014)
    - Developed hands-on labs for the implementation and optimization of various image and signal processing algorithms on the Silicon Hive VLIW architecture: AES encryption (2011), AES decryption (2012), face detection (2013), and ECG application (2014).
  - **C Programming** to 30 first-year undergraduate students (2012 - 2014)

Key Achievements:

- One of the first standalone medical applications on Google Glass
- Successfully created proof of concept products for camera based heart-rate and respiration-rate monitoring
- Successful completion of a project led to government subsidies to all partners and will lead to a promotion bonus (80000 euros) to the university

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Eindhoven University of Technology, Netherlands **September 2011 – September 2013**

R&D Engineer

- Designed and implemented "MAMPSx"; a design flow that automatically generates a complete FPGA-based SoC (including the C code) from a high-level specification, to reduce design time and design costs.

Key Achievements:

- A successful engineering design on the Xilinx Zynq platform that is now being used by Xilinx itself
- Published author (Work has been recognised at international conferences)
- Initiated an FPGA student interest group to discuss and collaborate ideas

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A*STAR Data Storage Institute, Singapore **October 2010 - September 2011**

FPGA Engineer

- Designed and implemented an FPGA based control system for a 3D Holographic Display
- Explored the efficient 3D hologram computation on GPU and FPGA architectures

Key Achievements:

- Successfully created a proof of concept product for a 3D Holographic Display using my hardware designs
- Invited to be a part of an expert panel to streamline, consolidate and expand embedded engineering resources and expertise for the entire company

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National University of Singapore (NUS), Singapore **May 2010 - November 2010**

Teaching Assistant / Mentor

- Facilitated and taught the following:
  - **EE4214 Real Time Software Design** to 80 final year undergraduate students

Key Achievements:

- Co-mentored the 3rd place winning team of undergraduates who participated in an "International Embedded Systems" competition (Intel Cup 2010 NUS Team)
- Developed a student project for a real time football player and display system on FPGA
- Established a student competition with the support of Xilinx

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National University of Singapore, Singapore **September 2006 - October 2008**

Research Engineer (Division of Bioengineering)

Multiple Projects:

Bio-Imaging

- Designed and implemented a high-speed(3GHz) medical application on an FPGA-based embedded system
    - Collaborated with a multidisciplinary design team to integrate the FPGA design with a cancer detection unit based on optical imaging

Multi-Application Multi-Processor Synthesis (MAMPS)

- Co-developed a multi-processor emulation tool that can automatically generate a multi-processor system-on-chip running on FPGA for a given multimedia application.
    - Provisional patent obtained for the design flow

Scalable FPGA

- Designed a novel reconfigurable computing architecture, which is scalable for larger logic capacities

Key Achievements:

- Patented a design technology
- Successfully created proof of concept product for cancer detection using my engineering designs
- Published several papers in several international conferences and journals

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RECENT PUBLICATIONS (Click here for the full list)

1) **Shakith Fernando**, Mark Wijtvliet, Cedric Nugteren, Akash Kumar and Henk Corporaal*,"(AS)^2: Accelerator Synthesis using Algorithmic Skeletons for Rapid Design Space Exploration"*, Design, Automation & Test in Europe Conference, March 2015.
2) **Shakith Fernando**, Adrienne Heinrich, Sidarto Bambang Oetomo, Gerard De Haan, Henk Corporaal, *"Clinical Video Recording Methodology for Contactless Vital Sign Monitoring of Neonates"*, In Proceedings of the IEEE SBE Advancing Healthcare Symposium. 18 Feb 2014, Eindhoven, Netherlands.
3) **Shakith Fernando**, Firew Siyoum, Yifan He, Akash Kumar, Henk Corporaal*, "MAMPSx: A Design Framework for Rapid Synthesis of Predictable Heterogeneous MPSoCs"*, IEEE International Symposium on Rapid System Prototyping, Oct 2013.

HOBBIES

- Swimming
- Reading fictional novels
- Tech blogger

REFERENCES AVAILABLE UPON REQUEST