Christopher Thomas, PhD

Research Scientist

https://christopher-thomas-cv.com

https://www.linkedin.com/in/christopher-thomas-677046328/

Goals:

My passion is designing innovative hardware and software for scientific research.

Credentials:

- PhD, Computer Engineering, York University
- MASc, Computer Engineering, University of Toronto

Signal Processing Accomplishments:

- "NeuroLoop" neural stimulation system   *(Supervisor: Thilo Womelsdorf, Vanderbilt University)*
    - Implemented a real-time signal processing chain for closed-loop neural stimulation.
    - Collected and analyzed in vivo pilot data using this closed-loop system.
- "Neuro2k" neural recording system   *(Supervisor: Thilo Womelsdorf, Vanderbilt University)*
    - Implemented signal processing workflows for offline analysis of high-channel-count neural recording data.
- Custom image sensor deblurring algorithm   *(Supervisor: Richard Hornsey, York University)*
    - Formulated and tested deblurring and colour reconstruction algorithms for use with a custom image sensor chip.

Embedded Systems Accomplishments:

- Wearable inertial measurement unit   *(Supervisor: Dana Kulić, University of Waterloo)*
    - Designed and implemented hardware and firmware for a wearable motion sensing module.
    - Designed and implemented wireless network hardware and firmware to aggregate data from these sensors.
- Neuroscience Experiment Controller   *(Supervisor: Thilo Womelsdorf, Vanderbilt University)*
    - Designed and implemented hardware and firmware for a real-time analog data logger and digital signal generator.

ASIC Accomplishments:

(Supervisor: Richard Hornsey, York University)

- Custom image sensor chip
    - Designed and implemented mixed-signal circuitry and embedded optics for custom image sensor chips.
    - Designed and implemented custom embedded test boards for verification of these sensors.
- Custom analog to digital converter
    - Designed and implemented an ultra-low-power analog to digital converter chip.
    - Designed and implemented custom embedded test boards for verification of this converter.

Strengths:

- Hardware and Embedded System Skills:
    - PCB design and layout (20 years).
    - Design of microcontroller-based embedded systems (20 years).
    - Wireless sensor networks (1.5 years).
    - Integrated circuit schematic capture, layout, and verification (7 years).
    - Mechanical design and CAD (7 years).
- Software and Data Analysis Skills:
    - C++ programmer (26 years).
    - Matlab programmer (18 years).
    - Image processing (7 years).
    - Signal processing of neural data (6 years).
- Additional strengths:
    - Excellent written communication and technical writing skills.
    - Easily adaptable to new environments and tools.

(**Project keywords:** ADC design, analog circuit design, ASIC design, ASIC layout, Atmel, AVR, board layout, C, C++, CAD, Cadence, CMOS APS, debugging, design documentation, design for manufacturability, DSP, electronics design, embedded firmware, embedded hardware, embedded systems, frequency domain, makefiles, Matlab, microcontrollers, mixed-signal electronics, multithreaded programming, object oriented design, parallel computing, pcb design, prototyping, real-time systems, schematic capture, signal processing, software development, time domain, time frequency analysis, version control, wavelets)