

Jem Berkes

Toronto, Canada • (416) 477-1527 • www.berkes.ca • jem.berkes@berkes.ca

WORK EXPERIENCE:

Design Engineer, Advanced

Altera Corporation Toronto, ON January 2010 – *present*
Developed device models for next-generation FPGAs. Measured and analysed power consumption of circuits. Worked with low-power devices and created measurement systems. Designed/debugged customer solutions: high-speed memory interfaces and transceivers for communications protocols, including Gigabit Ethernet. Designed digital logic prototypes (HDL) targeting 28-nm FPGA.

Digital Systems Designer

Arctic Renewables Corporation Winnipeg, MB June – November 2009
Performed product research & development for cost-effective electrical engineering solutions in: digital electronics, power management, computer hardware, communications, microprocessors.

NSERC Researcher (Masters student and Research Assistant)

University of Waterloo Waterloo, ON Sept 2005 – Feb 2008
Conducted experiments on computer hardware and low-power microprocessors. Practical lab work involved measuring electrical signals and RF from wireless commercial devices using oscilloscopes and other tools. Designed real-time control systems with automated scripting and computer control.

Entrepreneur / small business owner

SysDesign (sole proprietorship) Canada / Australia 1997 – 2010
Designed solutions, mostly in security & communications, for industry and government customers world-wide. Consulting work involved market research, team coordination, technical writing, sales.

2008	Licensed assembler-based design to the Canadian Space Agency (Government of Canada). The Intel x86 code has a small memory footprint and drives a standard VGA video interface.
2006 - 2007	An ongoing project required a notification system for monitoring physical sensors. I built custom hardware to interface sensors to a Linux PC, which then signals mobile phones. The design used a finite state machine and required integration of peripherals, hardware, software, and networks.
2003 - 2004	Haansoft (Korea), a major software company, requested code suitable for integration into an existing product. The work was coordinated with the remote team and written in C language.
2000 - 2001	The Florida State Government, Division of Emergency Management requested a control solution that could send emergency signals through a satellite communication network.
1999	Designed stereo audio amplifier and constructed working prototype. Integrated the prototype into commercial A/V system by wiring electrical connectors to mix multiple inputs, speakers.
1997	Designed a real-time video camera controller for FOX 7, KTBC-TV (Texas). Controlling the equipment required a solution based on serial I/O over RS-232 using the 16550 UART IC.
1997	Produced assembly language to control printer systems for Albert Smith Signs Group, Australia. Required a new design that interfaced with proprietary DOS-based hardware.
1999 - 2009	My business uses PCs running Windows, Linux and FreeBSD which I build and maintain. The hardware I install, troubleshoot, and use in experimental setups includes: <ul style="list-style-type: none">• Data storage systems and interfaces: IDE, SATA, RAID, removable storage• Console video, graphics adapters (VGA, DVI, composite, S-video, component video)• High speed network equipment, switches, routers (Ethernet and IP) for network servers

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EDUCATION:

Master of Applied Science in Electrical Engineering University of Waterloo, ON 2005 – 2008

Cumulative average: 89.2%

NSERC Julie Payette Scholarship winner, offered to 24 top ranked Masters candidates (6 in Engineering)

NSERC André Hamer Prize winner, offered to the most outstanding Masters candidate in Canada

Research area: computer hardware, security, RF communications, embedded systems

Relevant courses: Advanced Digital Communications, Parallel Programming

Bachelor of Science in Computer Engineering University of Manitoba, MB 2000 – 2005

Cumulative average: 97.3%

Awarded University Gold Medal (highest standing in Engineering) and Medal in Computer Engineering

NSERC-funded laboratory researcher; Undergraduate minors in Management and Arts (Psychology)

GENERAL SKILLS:

- Strong communication and team skills; enjoy interdisciplinary environments; experienced world traveller
- Very strong technical writing skills; experience developing documentation, manuals, technical reports
- Some experience in sales, marketing, accounting and financial management
- Expertise in security: computer hardware, networks, telecommunications and internet systems

ELECTRICAL & HARDWARE SKILLS:

- Experience with: electronics circuits, PCB design, reading/creating schematics, digital control circuits, filtering, optical isolation, sensors, analogue/digital conversion, CMOS/TTL-LS, computer interfacing
- Experience reviewing electronics parts specifications and selecting components for designs
- Experience debugging communications signals including wireless: radio frequency modulation, packets
- 3 years experience in hardware design for security, including crypto implementation, side-channel attacks
- 9 years experience with electronics lab equipment (oscilloscopes, interfacing/data acquisition, RF antennas)
- 10+ years experience programming microprocessors, 2 years with low-power embedded systems (smart cards)
- 3 years experience Verilog/VHDL design, Xilinx and Altera FPGA, other microcontrollers (eg. PIC)
- Experience designing logic, test boards and peripheral electronics for Altera Cyclone IV, Stratix IV, Stratix V
- Knowledge of signal integrity (eye diagrams, jitter, skew) and lab experience debugging DDR memory
- Hardware design experience on FPGA, including high-speed memory interfaces and transceiver I/O's
- Programmable logic design for Altera CPLD (MAX 7000 family) using Altera MAX+PLUS II
- FPGA development using Xilinx ISE environment and Coregen IP; prototyping with Xilinx Spartan-II FPGA
- Experience using Mentor Graphics ModelSim for FPGA simulation and verification, timing analysis
- Experience using Cadence Allegro to review and debug PCB designs, for high-speed applications
- Experience using engineering software: MATLAB, Maple, AutoCAD, Cadence OrCAD (Pspice)
- Experience in control systems theory and design; have implemented finite state machines and feedback

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SOFTWARE SKILLS:

- 10+ years experience with Intel x86 assembly language, IA-32. Expertise designing and writing asm code.
- Extensive knowledge of computer architecture: power supplies, BIOS, memory, IDE and SATA, USB
- Expertise in network communication hardware and security, including TCP, IP, Ethernet, wireless, routers
- Expertise in many platforms and programming language, especially Linux, DOS, C and Intel x86 assembler
- Experience in Motorola 6800/68000 assembly, C++, Java, Unix shell script, BASIC, and embedded coding
- Expertise with scripting and automation tools: batch files, shell script, Perl
- Experience with parallel programming algorithms and implementation, Open MPI
- Advanced knowledge of software and network tools: SSH, VMWare, Wireshark (Ethereal), other Unix tools
- Knowledge of computer video hardware, frame buffers, graphics technologies and display standards
- Knowledge of audio systems: power amplifiers, channel mixing, filtering, digitization (sound cards)
- Knowledge of audio and video compression (e.g. MPEG) and digital formats, storage and playback

RESEARCH / DESIGN PROJECTS:

Masters Project, Electrical and Computer Engineering, University of Waterloo (2005 – 2008)

The research and practical experiments were carried out in an RF electronics laboratory. Power and electromagnetic signals from security hardware (smart cards, RFID, wireless embedded systems) were captured and analysed. I automated testing procedures using PC-controlled signal acquisition and custom firmware code. After investigating design issues for low-power hardware, I designed a novel practical signal analysis technique that can be used for low-power microprocessors communicating by radio.

Bachelors Design Project, Electrical and Computer Engineering, University of Manitoba (2003 – 2004)

Our team of students designed and built a fully functioning Voice over IP (VoIP telephone) system, consisting of independently designed components. I designed and built the hardware component, which used analog audio circuits and digital controls interfaced to POTS (telephone system) through optical isolation, for lightning protection. I also designed a custom PCB and built a properly functioning final prototype.

AWARDS AND RESEARCH GRANTS:

- NSERC Julie Payette scholarship winner, one of 6 “best PGS M candidates” in Engineering, all of Canada
- NSERC André Hamer prize winner, awarded to “most outstanding students” in NSERC graduate competition
- University Gold Medal in Engineering and Medal in Computer Engineering, University of Manitoba (2005)
- Canada Millennium Scholarship, Provincial Excellence Award (2000 through 2004)
- NSERC University Undergraduate Research Award (2003)
- Finalist in 2001, 2002 UM/Management’s Student Entrepreneur of the Year Competition

PROFESSIONAL ACTIVITIES, VOLUNTEER WORK:

- Member of IEEE professional association for 8 years
- Volunteer at Canada Millennium Scholarship Foundation, reviewing scholarship applications, 2006-2007
- Volunteer at Manitoba Cycling Association and civic Recreation & Transport committee, 2003-2005
- Member of University of Manitoba Engineering Society (student council) and IEEE representative, 2001-2004
- Volunteer at Winnipeg Fringe Theatre Festival, 2003-2004