Curriculum Vitae for Faculty Members

Date: August 2, 2015   **Initials**:

1.   **SURNAME**: MacLean   **FIRST NAME**: Karon
                                                       MIDDLE NAME: E.
2.   **DEPARTMENT/SCHOOL:** Computer Science
3.   **FACULTY:** Science
4.   **PRESENT RANK:** Professor   **SINCE**: July 1, 2010
5.   **POST-SECONDARY EDUCATION**

  (a)   Degrees

University or Institution	*Degre*	Subject Area	Dates
Stanford University	B.S.	Biological Sciences & Mechanical Engineering	1986
Massachusetts Institute of Technology	M.S.	Mechanical Engineering	1988
Massachusetts Institute of Technology	Ph.D.	Mechanical Engineering	1996

*(b)   **Title of Dissertation and Name of Supervisor***

Title: Emulation of Haptic Feedback for Manual Interfaces, Ph.D. Thesis, MIT, February 1996.
Supervisor: William K. Durfee

*(c)   **Special Professional Qualifications***

6.   **EMPLOYMENT RECORD**

(a)   Prior to coming to UBC

University, Company or Organization	Rank or Title	Dates
User Interface Consulting	Consultant	2000
Interval Research Corporation	Member, Research Staff; Project Lead	1997-1999
Interval Research Corporation	Postdoctoral Fellow	1996-1997
Center for Engineering Design, University of Utah	Project Engineer	1989-1991
Veteran's Administration Medical Center, Palo Alto	Engineering Research Assistant	1984-1986

(b)   At UBC

Rank or Title	Dates
Professor	July 1, 2010
Associate Professor	July 1, 2005
Associate Faculty Member, Mechanical Engineering	October 1, 2004
Assistant Professor	July 15, 2000

(c)   Date of granting of tenure at U.B.C.: July 1, 2005

7.   LEAVES OF ABSENCE

University, Company or Organization at which Leave was taken	Type of Leave	Dates
UBC	Sabbatical	Jul 1, 2014 – Jun 31, 2015
UBC	Sabbatical	Jul 1, 2007 – Jun 31, 2008
UBC	Maternity/Parental	Oct 26, 2003 – May 2, 2004
UBC	Maternity/Parental	Jan 13, 2002 – Jul 21, 2002

8.   TEACHING

(a)   Areas of Special Interest and Accomplishments

I have taught courses or modules in human-computer interaction (HCI), empirical experimental methods, mechanical design, robot control, dynamic systems, mechatronics, and computer programming. In addition to formal courses, I am generally supervising 1-4 undergraduates in research projects at any given time (see 8(g)).

I prefer to teach through projects. In HCI and haptics, these often involve a physical artifact as well as the software. A large part of my course development effort at UBC has been in creating studio and prototyping resources at the undergraduate and graduate level.

UBC Infrastructure Development

- (2011/12) Developed an Arduino mechatronics / interface prototyping lab in conjunction with a redesign of CPSC 543. First 'draft' is a fully equipped work area including toolbench, tools and materials in the HCI Teaching Studio (ICICS x360). Budget of $1000 provided by UBC CS. Offered 2nd time in 2013/14.
- (2003, 2010-2012) Designed and built a set of **low-cost haptic teaching displays,** initially using a 2003 UBC FOS Skylight Development Grant ($2000), for use in my graduate haptics course (CPSC 543). Developed a new I/O technique for portability and cost savings. In 2009, updated to USB communication, with major iteration initiated in 2010 (difficulties encountered). Earlier designs were shared online and used by other instructors internationally.

- (2003-2012) Created (with G. Sawatsky; 2005 opening) and currently co-direct the **ICICS/AMPEL Graduate Student Prototyping Workshop** where graduate students can learn implementation skills and access fabrication resources. Startup costs ($100K) were funded 50% by my CFI New Opportunities grant; I help coordinate user-shared maintenance funding ($50-75K annually). In 2012, I began a renewal effort which brought in the Mech Design Chair as well.

- (2004-07) With J. McGrenere, created the department's **HCI Teaching Studio** (ICICS x360) **i**n the new Computer Science building with a UBC TLEF grant ($41,217), now used by CPSC 344, 444, 543 and 544. Unique among CS undergraduate labs, it supports team-based learning, creation of physical and electronic design artifacts and both computer- and non-computer based design techniques.

UBC Curriculum Development and Revision

- (2013-15) CPSC **344^{new}: underway.** In 2013/14, completely rebuilt our introductory undergrad/grad course with focus on pedagogical improvement, accessibility (prerequisites, and non-CS entry at request of department), content updating, sustainability of staff resources for delivery, and reducing course workload generally. Finally, it needed to scale up to handle 2x the students (~90 to 150-180) and continue to work for grad students (544). This ambitious agenda was piloted in 2013/14 T2, with CSWEI fellow support (Jessica Dawson).
  During 2014/15-W1, I substantively mentored Dawson as she did 2nd offering, continuing to be course keeper for this complex course, and also assisted in updating TA practices, course documentation and compliance with UBC Ethics requirements for instruction in human experimentation.

- (2010-13) **CPSC 544^{new}:** In 2010, re-formulated our introductory graduate HCI course (544) to better meet department / university needs and resources. In Fall 2010, first offered the new 344/544 cross-listed course where 544 is augmented with a team-taught seminar and an extended project; thus freeing McGrenere to add a new HCI course (554) at cost of making 344/544 more complex to offer. In subsequent offerings (2011, 2012, 2013W1) this arrangement has been fairly efficient and very beneficial to the group, albeit adding to effort and complexity of teaching 344.

- (2000-2014) **CPSC 543: Physical Interface Design and Evaluation**: In 2000, developed one of the first haptics courses internationally, addressing topics critical to design of tactile and force feedback applications including human perception, interaction and haptic device design, robot control, and HCI experimentation. Attracts students from CS, Mech, EECE. In 2011/12 W2, piloted a major adaptation to an iterative haptic sketching / Arduino-based prototyping format with a new lab setup (this version is less likely to produce publishable results).

- (2004-present) **HCI Curriculum Coordination:** Led the CS HCI faculty (myself, J. McGrenere, K. Booth) in overhauling our courses around the new HCI Learning Studio. 2004: proposed the 344/444 sequence. 2005: piloted 344. 2006: revised 344 while designing the Learning Studio; McGrenere used its structure for 1st 444. 2007: 344 designated as satisfying the Graduate HCI Breadth Requirement. 2007-09: led planning of 544^{new}.

- 2012-2014: major redesign of 344/544 to double its size and accessibility without increasing cost of delivery, eventually encompassing 444 (with McGrenere), inclusion in Arts major stream, CPSC mini specialization and other outreach implications.
2015: Consulted on Dawson's upcoming revision of CPSC 444, for which 344 is the primary prerequisite and serves as example for its new design.

- (2005-13) **CPSC 344 "old": Introduction to Human Computer Interaction**: Developed for 2005, using an enhanced subset of "old" 444 materials with an innovative, more hands-on teaching methodology targeted at broader audience. Revised significantly for 2006. In *2008*, improvements in scheduling resulted in increased enrolment, requiring further re-jigging in 2008, 2009. For Fall 2010, noted by Dean for high teaching evaluations. *Replaced in 2013/14 T2 with redesigned version.*

- (2001-04) **CPSC 444: Human Computer Interaction ("old" version)**: In 2001, substantially revised format and content of a twice-offered pilot. Modified and emphasized the course project structure.
This course was replaced in 2006-07 by the new 344/444 combination.

  Projects have routinely been accepted as peer-reviewed conference publications (*2000 [C10]; 2002 [OS1,OS2]; 2004: 3/3 teams, including Best Paper at ACM ICMI [C22-24]; 2006 [C32]; 2008 [C38]); 2009 [C43, C45]; 2010 [C46, C47]; 2011 [C57]*. Course undergoes modification for most offerings.

- (2006) **CPSC 211: Introduction to Software Development**: Taught in Spring 2006. Intent was to teach this or related courses regularly, but to date the department's need for HCI instructors has prevented this

(b)   Courses Taught at UBC

Session	Course Number	Scheduled Hours	Class Size	Hours Taught		
				Lectures	Labs	Tutorials
2014 -15						
S	NSERC USRA	By arrangement	1			
2013 -14						
T2	CPSC 543	3/week	4	3	0	0
T2	CPSC 344^{new} (pilot)	5/week	26	3	0	2
T1	CPSC 344/544	7/week	68+18	3	2	2
S	CPSC 448	By arrangement	1			
2012 -13						

T1-T2	448, cogs402	By arrangement	4			
T1	CPSC 344/544	6.5/week	45+13	2.5	2	2
S	NSERC USRA	By arrangement	1			
2011-12						
S	UGrad RA	By arrangement	1			
S	NSERC USRA	By arrangement	2			
T1-T2	Grad Dir Study	By arrangement	1			
T1	CPSC 344/544	6.5/week	51+18	2.5	2	2
T2	CPSC 543	3/week	15	3		
T1-T2	ugrad volunteer	By arrangement	1			
2010-11						
S	NSERC USRA	By arrangement	1			
T1	CPSC 344/544	6.5/week	44+17	2.5	2	2
T2	CPSC 543 (as dir stud)	3/week	4	3		
T1-T2	CS Honors	By arrangement	1			
S, T1-T2	UGrad RA	By arrangement	1			
T1-T2	Mech 54x Proj	By arrangement	4			
2009-10						
S	NSERC USRA	By arrangement	1			
S	COGS DirStu	By arrangement	1			
T1	CPSC 344	6.5/week	47	2.5	2	2
T2	CPSC 543	3/week	20	3		
2008-09						
T1	CPSC 344	6/week	61	2	2	2
T1	CPSC 543[4]	3/week	12	3		
T1	EngPhys Proj	By arrangement	4			

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