

# Martin DE LASA

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## EDUCATION

- OCT 2010 PHD, COMPUTER SCIENCE, **University of Toronto**, Toronto, ON, CANADA, CGPA: 3.88  
SEPT 2005 Thesis: *Feature-Based Control of Physics-Based Character Animation* | Advisor: Dr. Aaron HERTZMANN  
\* 2011 Canadian Artificial Intelligence Association (CAIAC) Doctoral Dissertation Award
- SEPT 2000 MESC, ELECTRICAL AND COMPUTER ENGINEERING, **McGill University**, Montreal, QC, CANADA, CGPA: 3.60  
SEPT 1998 Thesis: *Dynamic Compliant Walking of the Scout II Quadruped* | Advisor: Dr. Martin BUEHLER
- APRIL 1998 BSC, COMPUTER SCIENCE, **University of Western Ontario**, London, ON, CANADA, CGPA: 3.88  
SEPT 1995 Honors with Distinction
- APRIL 1998 BENG, MECHANICAL ENGINEERING, **University of Western Ontario**, London, ON, CANADA, CGPA: 3.87  
SEPT 1993 Honors with Distinction

## WORK EXPERIENCE

- Current* **Senior Software Engineer, Autodesk Canada**, Toronto, ON, CANADA  
JULY 2010 As part of the Animation Solutions team, my role is to bridge the gap between research and advanced development with the mandate of improving Autodesk's animation tools.
- OCT 2010 **Research Assistant, University of Toronto**, Toronto, ON, CANADA  
SEPT 2005 Proposed and demonstrated new control approach for simulated physics-based characters. This involved developing a novel optimization algorithm and low-dimensional planner for rough-terrain locomotion. Results of this kind had not been previously demonstrated. To enable this work, I implemented a generalized-coordinate articulated rigid-body dynamics simulator with support for: constraint-based contact, inverse dynamics, automatic differentiation and Jacobian computation. This simulator is currently being used across several research projects.
- JULY 2010 **Principal, MDL Consulting**, Toronto, ON, CANADA  
SEPT 2005 Provided engineering consulting services in the areas of real-time software systems, articulated rigid-body dynamic simulation, and software design, implementation, and performance optimization.
- SEPT 2005 **Technical Lead and Architect, Boston Dynamics**, Cambridge, MA, USA  
SEPT 2003 Led company wide real-time software development activities in support of numerous DARPA robotics projects (approx. \$20M USD funding). Resulting low-level hardware drivers, logging, communications, and controls infrastructure software are currently used across all company robots. Highlights include:
- Led team of 4 while maintaining active technical role. Managed team remotely for 1 year
  - Designed & implemented end-user API for closed-loop control of robots over WiFi
  - Refactored inherited codebase while ensuring in-house projects proceeded without interruption
  - Played key role in timely delivery of *LittleDog* to DARPA Learning Locomotion program teams
- Led development of Digital Biomechanics, BD's physics-based simulation tool. Digital Biomechanics is used to simulate robots and virtually prototype new human borne equipment (e.g., helmets and backpacks). Digital Biomechanics customers include SONY, the US Army, and US Marines. Highlights include:
- Led refactoring and performance optimization efforts; achieved speedup of over 400 %
  - Worked with VP Engineering to coordinate development with in-house simulation activities
  - Provided feasibility assessments for numerous project proposals
  - Provided ongoing feedback to technical staff and conducted annual performance reviews

- SEPT 2003 **Simulation Engineer, Boston Dynamics, Cambridge, MA, USA**  
 NOV 2000 Played a key role developing Digital Biomechanics (see above), helping to secure funding for ongoing product development (approx. \$2M USD). Highlights include:
- Key contributor to product design and architecture, including core product libraries
  - Coordinated software releases, wrote documentation, and delivered training seminars
  - Supported peers formally and informally (brainstorming, clarifying requirements, etc.)
  - Extended product architecture to concurrently simulate virtual characters and equipment
  - Developed novel contact model from experimental material property measurements
  - Implemented virtual-human control algorithms (walking, running, crawling, squatting, balancing)
  - Validated walking simulations against US Army load carriage studies

## COMPUTER SKILLS

Many years of hands-on experience **writing, debugging, profiling, and optimizing cross-platform** software with strict **real-time/performance** requirements. Highlights of skills include:

LANGUAGES	C, C++, Java, Python, Mel, Lua, shell scripting	TOOLCHAINS	Visual Studio, GNU
PLATFORMS	Windows, OS X, Unix, Linux, QNX (v4.2.x, RTP)	BUILD TOOLS	Scons, Cmake, Jam, Make
APIS	Qt, OpenGL, boost, Sockets, Pthreads	SOURCE CONTROL	SVN, Git, Perforce, CVS
	Blas/Lapack, OpenMaya (C++/Python), Win32	PERFORMANCE	VTune, BoundsChecker, Gprof, Shark
WEB	HTML, XML, CSS, CGI, Javascript	ENG. APPS	Matlab, Mathematica, Maple

## PUBLICATIONS

- **M. de Lasa**, I. Mordatch, and A. Hertzmann, *Feature-Based Locomotion Controllers*, ACM Trans on Graphics, July 2010
- I. Mordatch, **M. de Lasa**, and A. Hertzmann, *Robust Physics-Based Locomotion Using Low-Dimensional Planning*, ACM Trans on Graphics, July 2010
- **M. de Lasa** and A. Hertzmann, *Prioritized Optimization for Task-Space Control*, IROS 2009
- A. Layon, **M. de Lasa**, R. Playter, S. Talebi, M. LaFiandra, *Validation of a Load Carriage Simulation*, SAE Digital Human Modeling for Design and Engineering Symposium, 2004
- T. Yamamoto, M. Fujita, **M. de Lasa**, S. Talebi, D. Jewell, R. Playter, M. Raibert, *Development of Dynamic Gaits for the AIBO Entertainment Robot: Teaching a New Dog Old Tricks*, CLAWAR 2001
- **M. de Lasa** and M. Buehler, *Dynamic Compliant Quadruped Walking*, ICRA 2001
- **M. de Lasa** and M. Buehler, *Dynamic Compliant Walking of a Quadruped Robot: Preliminary Experiments*, CLAWAR 2000

## PATENTS

- T. Yamamoto, **M. de Lasa**, S. Talebinejad, D. Jewell, R. Playter, M. Raibert, *Robot apparatus and method for controlling jumping of robot device*, US patent 6,484,068, SONY Corp and Boston Dynamics Inc, 2001

## LANGUAGES

ENGLISH	} Native fluency (spoken and written)	POLISH	Beginner
FRENCH			
SPANISH			

## PROFESSIONAL ACTIVITIES

- ACM SIGGRAPH (2011, 2010, 2009, 2007) Technical Papers Reviewer
- ACM SIGGRAPH ASIA (2011, 2010, 2008) Technical Papers Reviewer
- International Conference on Robotics and Automation (ICRA 2001) Technical Papers Reviewer
- IEEE Computer Graphics & Applications (2010) Technical Papers Reviewer
- ACM/Eurographics Symposium on Computer Animation (SCA 2011) Program Committee