Omar Hesham, PhD candidate
Computer Simulation & Visualization

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Profile Summary

Throughout my PhD studies in discrete-event simulation and model development at Carleton University, I was presented with multiple opportunities to explore and advance my teaching experience. From being a Contract Instructor for undergraduate studies, to designing and delivering an Enrichment Mini-Course Program (EMCP) that gave grade-schoolers a chance to experience the art and science behind animation production, through Carleton's state-of-the-art motion capture and game development facilities.

My adaptive approach to teaching assistance, which caters to learners from various departmental backgrounds and skills, has been appreciated by both students and course instructors alike, resulting in multiple EDC Outstanding TA Award nominations. Off-campus, my educational channel, Koldora, continues to deliver copyright-free content to scholars around the world, with over 2400 hours of viewership and growing.

My recent publications on interactive crowd simulation and visualization have been generally well-received by the simulation community, and have won multiple best paper awards. Lately, I've also enjoyed being consulted for grant writing and funding procurement activities.

Education Overview

Ph.D. Electrical and Computer Engineering, Carleton University. Supervisor: Dr. Gabriel Wainer (2013-2018)
M.Sc. Information and Systems Science, Carleton University. Supervisor: Dr. Chris Joslin (2009-2011)
B.I.T. Interactive Multimedia and Design, Carleton University & Algonquin College, with Distinction (2005-2009)
IGCSE Cambridge International AS & A Levels (2002-2005)

Honours and Awards

- Bernard Pagurek and Murray Woodside award (2017).
- Carleton EDC Outstanding TA Award nominee (2016-2017).
- Ontario Graduate Scholarship (OGS) for (2016-2017).
- Dr. Roger Kaye Memorial Scholarship for Ontario Students (2015-2016).
- Queen Elizabeth II Graduate Scholarship in Science & Technology (QEII-GSST) (2015-2016).
- Carleton EDC Outstanding TA Award nominee (2015-2016).
- Carleton Graduate Scholarship (2013-2016).
- Ontario Graduate Scholarship (OGS) (2010-2011).
- Deans' Honour List (2005-2009).
- Carleton Entrance Scholarship (2005-2009).
- Cambridge ICE Award (2005).

Research

Ph.D. Electrical and Computer Engineering (2013-present)
Advanced Real-time Simulation Lab, Carleton University
- Modeling crowd and pedestrian dynamics using the Discrete Event System Specification (DEVS).
- UI and toolset overhaul of several in-lab devkits and simulation engines. Emphasis on portability, usability, rapid iteration, and developer-friendly pipelines.
- Refereed publications:
    - **Omar Hesham** and Gabriel Wainer. 2017. *Context-sensitive Personal Space for Dense Crowd Simulation*. In Proceedings of the Symposium on Simulation for Architecture & Urban Design (SimAUD '17).
        - Awarded: Best Student Paper.
    - **Omar Hesham** and Gabriel Wainer. 2016. *Centroidal particles for interactive crowd simulation*. In Proceedings of the Summer Computer Simulation Conference (SCSC '16). Society for Computer Simulation International, San Diego, CA, USA, Article 7, 8 pages.
        - Awarded: SummerSim 2016 Best Paper SCSC.
        - Awarded: SummerSim 2016 Overall Best Paper.
    - Michael Van Schyndel, **Omar Hesham**, Gabriel Wainer, and Brandon Malleck. 2016. *Crowd Modeling in the Sun Life Building*. In Proc. of the Symposium on Simulation for Architecture & Urban Design (SimAUD '16).

M.Sc. Information and Systems Science (2009-2011)
School of Information Technology, Carleton University
- Interdisciplinary studies combining Systems Engineering and Computer Science.
- GPA: 11.0/12.0; RA funded by Ontario Research Fund - Research Excellence Grant (2009-2011).
- Thesis on real-time tearing of soft-body objects, with anisotropic fibre influence. Supervised by Dr. Chris Joslin.
- VoroDyn: a novel Voronoi-based implicit collision detection simulation of thick fluids and granular materials on limited mobile devices, written in Java and OpenGL.
- Supervised several experiment runs for fellow Cognitive Science PhD students (2010-2011).
- Refereed publications**:**
    - Meagan Leflar, **Omar Hesham**, Chris Joslin. *Use of High Dynamic Range Images for Improved Medical Simulations*. In Proceedings of 3DPH. 2009, 199-208.

Reviews

Primary Reviewer
Served as a reviewer for the following journals/conferences:
- Simulation Modelling Practice and Theory (SIMPAT), Elsevier. June 2017.
- Winter Simulation Conference (WSC 2017).

Secondary Reviewer
Assisted various committee members as a secondary reviewer for the following journals/conferences:
- ACM SIGSIM Conference on Principles of Advanced Discrete Simulation (SIGSIM PADS 2017).
- IEEE Conference on Enabling Technologies: Infrastructure for Collaborative Enterprises (WETICE 2016).
- ACM SIGSIM Conference on Principles of Advanced Discrete Simulation (SIGSIM PADS 2016).
- International Conference on Cellular Automata for Research and Industry (ACRI 2016).
- Winter Simulation Conference (WSC 2016).
- ASIM Dedicated Conference on Simulation in Production and Logistics (ASIM SPL 2016).
- IEEE International Symposium on Network Computing and Applications (NCA 2016).
- Summer Solstice International Conference on Discrete Models of Complex Systems (SSIC 2015).
- Computer Graphics International (CGI 2012).

Teaching

Teaching Assistant – (2013 – 2017)
Department of Systems and Computer Engineering, Carleton University.

Course	Title	Semester	Course Instructor
SYSC 3601	Microprocessor Systems: Intel x86	2017 Winter	Dr. Ramy Gohary
SYSC 3006	Computer Organization: ARM Microarchitecture	2016 Fall	Dr. Ramy Gohary
SYSC 3303	Real-time Concurrent Systems	2016 Winter	Dr. Lynn Marshall
SYSC 3006	Computer Organization: ARM Microarchitecture	2015 Fall	Dr. Trevor Pearce
SYSC 3303	Real-time Concurrent Systems	2015 Winter	Dr. Mohamed Ibrahim
IMD 4003	3D Computer Animation	2014 Fall	Dr. Chris Joslin
IMD 3002	3D Computer Graphics	2014 Winter	Dr. Chris Joslin
SYSC 3006	Computer Organization: x86 Assembly	2013 Summer	Mr. Graham Eatherley

Contract Instructor – IMD4005 (Winter 2013)
School of Information Technology, Carleton University.
- Designed and taught a new course on procedural computer graphics at the senior undergraduate level. Topics included generative design and behavioural swarm animation.

EMCP Course Instructor – (2010)
Carleton University.
- Designed and taught a week-long 25 hours course on Computer Graphics to forty grade 8-11 students as part of the Enrichment Mini-Course Program (2010). Introduced them to specialised art equipment, including a live Mo-Cap session. Received positive response from parents.

Completed TA Training Workshops
- Supporting and Accommodating Students with Disabilities
- Managing Challenging Teaching Situations

Miscellaneous
- Guest lecturer on Parallel DEVS for SYSC5104 Methodologies for Discrete-Event M&S (Fall 2016).
- Guest lecturer on Match-moving Techniques for IMD3002 Computer Graphics (Winter 2015).
- Online Guest Lecturer on Game Engines for graduate students from IŞIK University, Turkey (May 2010).
- Undergraduate Tutor for Carleton University Learning Support Services in Math and CG courses (2006-2008).
- Created educational particle and grid-based fluid animation demos using Maya and RealFlow, accompanied by original tutorials to be taught in senior year IMD classes (2008).

Skills and Languages

- Programming: JavaScript, C++, and Java.
- Autodesk Maya: as a user, developer and a tutor.
- Brief experience with Assembly (ARM, Intel 16-bit), networking protocols (UDP, TCP) and concurrency (Java).
- Familiar with low-level 3D APIs (OpenGL); and high-level game dev frameworks (XNA, Unity, UDK).
- Comfortable with Git, CMake, and Visual Studio.
- Freelance web development: front-end (HTML, CSS, JavaScript) and back-end (PHP, MySQL).
- Neat, readable and well-documented code. Particular about structure and modularity.
- Excellent communicator and confident presenter.
- Fluent in English and Arabic; basic French.

Professional Experience

Koldora.ca (July 2015 – July 2016)
Self-employed/Freelance
- Web design, development, and hosting for small and medium-sized businesses and research labs
- Design and development of educational videos and illustrative guides for training applications.

3D Technical Director – Part Time (April 2009 – January 2010)
Interactive Media Group (iMG) / Algonquin College Applied Research & Innovations.
- Content dev for Tipontia, an online UnrealEngine2.5 environment for the CHEO Ronald McDonald House.
- Working with Tegan Laing, Nuket Nowlan and Dr. Ali Arya, and coordinating with bitHeads and Nortel, I supervised the modeling of new kid characters, and lead the creation of a Maya rigging pipeline to accommodate additional apparel and accessories; which were finally exported to the Unreal web platform.
- Created documentation and video tutorials for colleagues and future employees.
- Our successful Tipontia launch event was featured on CTV News (July 16, 2009)

Webmaster – Part Time (September 2006 – August 2008)
Rideau River Residence Association, Carleton University.
- Designed and maintained a more user-friendly UI and several ActionScript 2.0 components.
- CU Students' Charity Ball web coordinator (2007-2009).