

# Robert John Holash PhD

## Muscle Physiology, Computational Biology

### Address

KNB 103c Faculty of Kinesiology, University of Calgary,  
2500 University Dr. N.W., Calgary, AB. Canada T2N 1N4

### Education

- 2009-2017 **Doctorate in Muscle Physiology** University of Calgary, Canada  
Discipline: Skeletal Muscle Physiology.  
Main subjects: Muscle Physiology, Computational Biology, Data Analysis, Structural Modeling, Stochastic Agent based Modelling.  
*Thesis: "Three dimensional stochastic computer model of the skeletal muscle half sarcomere: changes in calcium diffusion caused by the myofilament lattice."*  
*Committee:* Prof. Brian MacIntosh, Prof. Henk ter Keurs, Prof. Christian Jacob, Prof. Chris Barclay.
- 1997 - 2000 **Master of Science** University of Calgary, Canada  
Discipline: Exercise Physiology.  
Main subjects: Cycling Power, Muscle Power.  
*Thesis: "Validation of single maximal effort tests for power measurement."*  
*Committee:* Prof. Brian MacIntosh, Dr. Stephen Norris, Dr. Douglas Syme.
- 1990 - 1993 **Bachelor's Degree in Physical Education** University of Calgary, Canada  
Main subjects: Outdoor Pursuits, Leadership in Extreme Environments.  
*Senior Project: "Calgary river cleanup, management and conservation of Calgary rivers and pathways".*

### Publications

#### Published Journal Articles

- An innovative ergometer to measure neuromuscular fatigue immediately after cycling.  
Douglas Doyle-Baker, John Temesi, Mary E Medysky, Robert J Holash, and Guillaume Y Millet  
*Medicine and Science in Sports and Exercise* 50 (2 Feb. 2018) pp. 375–387
- A stochastic simulation of skeletal muscle calcium transients in a structurally realistic sarcomere model using MCell.  
Robert J Holash and Brian R MacIntosh  
*PLoS Computational Biology* \* (accepted with revisions Oct. 2018) \*
- Skeletal muscle fatigue—regulation of excitation—contraction coupling to avoid metabolic catastrophe.  
Brian R MacIntosh, Robert J Holash, and Jean-Marc Renaud  
*Journal of Cell Science* 125.9 (2012) pp. 2105–2114. *The Company of Biologists Ltd*
- A comparison of exer-gaming interfaces for use in rehabilitation programs and research.  
Kazumoto Tanaka, Jim Parker, Graham Baradoy, Dwayne Sheehan, John R Holash, and Larry Katz  
*Loading* 6.9 (2012) pp. 69–81
- Feasibility of the two-hour marathon is a burning issue.  
Jared F Fletcher, Shane P Esau, R John Holash, and Brian R MacIntosh  
*Journal of Applied Physiology* (Bethesda, Md.: 1985) 110.1 (2011) 282–discussion

Procedures for rat in situ skeletal muscle contractile properties.

Brian R MacIntosh, Shane P Esau, R John Holash, and Jared R Fletcher  
*Journal of Visual Experimentation* 56 (2011)

## Submitted Journal Articles in Review

A new test for assessing neuromuscular fatigue during and immediately after cycling exercise in cancer populations: feasibility, reliability and implications.

Douglas Doyle-Baker, John Temesi, Mary E Medysky, Rosie Twomey, Robert J Holash, Nicole Culos-Reed, and Guillaume Y Millet  
*Medicine and Science in Sports and Exercise* (\* Sept. 2018) \*

## Books / Book Chapters

Power output and force-velocity properties of muscle.

B R MacIntosh and R J Holash  
*Biomechanics and Biology of Movement. 2000 pp. 193–210. Human Kinetics*

## Conference Presentations / Published Abstracts

Increased occupation of sarcomeric calcium buffers reduces required calcium release for similar troponin-c binding of subsequent activation.

Robert John Holash, Ian Smith, Walter Herzog, and Brian R MacIntosh  
*Journal of Muscle Research and Cell Motility* vol. 37 (2017). *European Muscle Conference. Montpellier, France*

Effect of sarcomere length on calcium diffusion in a 3-D sarcomere model.

Robert John Holash and Brian R MacIntosh  
*Journal of Muscle Research and Cell Motility* vol. 36 (2015). *European Muscle Conference. Strasbourg, Austria*

The importance of structure on: calcium release, diffusion, and binding in a spatially realistic 3-D sarcomere model.

Robert John Holash and Brian R MacIntosh  
(2013). *Biomedical Basis for Human Performance Across the Lifespan*

3-Dimensional calcium kinetics; release, diffusion, binding, and uptake in a multicompartamental, skeletal muscle 1/2 sarcomere.

Robert John Holash and Brian R MacIntosh  
*Applied Physiology, Nutrition, and Metabolism* vol. 37 (2012). *Canadian Society of Exercise Physiology Conference, CSEP*

Modelling calcium diffusion, binding, and uptake in a spatially realistic 3-dimensional sarcomere model.

Robert John Holash and Brian R MacIntosh  
*Journal of Muscle Research and Cell Motility* vol. 33 (2012). *European Muscle Conference. Rhodes, Greece*

A comparison of exer-gaming interfaces for use in rehabilitation programs and research.

Kazumoto Tanaka, Jim Parker, Graham Baradoy, Dwayne Sheehan, John R Holash, and Larry Katz  
*Loading* vol. 6.9 (2012). *Interactive Media Conference. Calgary, Alberta*

Micro-physiological simulation of calcium diffusion in a 3-dimensional sarcomere model.

Robert John Holash and Brian R MacIntosh  
*Applied Physiology, Nutrition, and Metabolism* vol. 36 (2011). *Canadian Society of Exercise Physiology Conference, CSEP*

Can the second head of myosin bind to the adjacent thin filament?

Robert John Holash and Brian R MacIntosh  
(2009). *Multi-scale Muscle Mechanics Conference. Woods Hole, Massachusetts*

Skeletal muscle filament spacing changes with contraction.

Robert John Holash and Brian R MacIntosh  
*Applied Physiology, Nutrition, and Metabolism* (2009). *Canadian Society of Exercise Physiology Conference, CSEP*

Modelling calcium release in a simplified two dimensional skeletal muscle model using the agent-based system Netlogo.

Robert John Holash and Brian R MacIntosh

*Applied Physiology, Nutrition, and Metabolism* vol. 33 (2008). *Canadian Society of Exercise Physiology Conference, CSEP*

Validation of single maximal effort tests for peak power output.

Robert John Holash, Igor Kopecky, Krista Sevdhal, and Brian R MacIntosh

*Canadian Journal of Applied Physiology* vol. 25 (2000). *Canadian Society of Exercise Physiology Conference, CSEP*

## Theses

Three dimensional stochastic computer model of the skeletal muscle half sarcomere: changes in calcium diffusion caused by the myofilament lattice.

Robert John Holash

*PhD thesis, University of Calgary.*

<https://dx.doi.org/10.5072/PRISM/28434>

Validation of single maximal effort tests for power measurement.

Robert John Holash

*Masters of Science Thesis, University of Calgary.*

<https://dx.doi.org/10.5072/PRISM/11695>

## Experience

- 2013 - \* **Data Science/Systems Analyst** HPL, Kinesiology, UofC  
Design, develop and maintain expert computational solutions for research problems within the Human Performance Lab (HPL). Maintain computers, and research equipment used within the HPL. Design and development of custom software, algorithms, and for research equipment and special projects. Guest Lecturer for KNES: 201, 203, 615, 381, 485/685 courses
- 2000 - 2013 **Senior Systems Analyst** Kinesiology, UofC  
Technical lead, software designer, and analyst for Kinesiology IT. Led the development and implementation of numerous software projects, network designs, and multi-factor computer projects within Kinesiology co-supervising up-to 5 employees. Led the development of 3 versions of the Kinesiology websites. Led the development and roll out of the first interactive websites for the Olympic Oval, and Active Living (formerly Campus Recreation).
- 1984 - 2010 **IT Security and Networking Consultant** RJHolash Consulting  
Operated a private consulting firm which provided: computer technical support, security development, security testing, software development, application development, and general trouble/problem solving related to hardware, software, and operating systems. Clients included: Calgary Separate School Board, Calgary Regional Health Authority, Canadian National Institute for the Blind, and several private companies in Research Park. Employed up to 3 additional staff for various projects.
- 1997 - 2000 **Systems Analyst** Kinesiology, UofC  
Created the first Active Directory on the University of Calgary campus to solve ongoing computer issues within the Faculty of Kinesiology. Worked to merge Faculty of Kinesiology IT, Campus Recreation IT groups and developed a process to provide IT services to Canadian Sport Centre, Olympic Oval, and Athletic department, in order to provide unified and consistent IT services. Directly managed 2 employees.

- 1996 - 1997 **Instructor / Research Assistant GAT** Kinesiology, UofC  
 Lab supervisor & learning tutorials: Human Growth and Development: labs & occasional lectures. Tests and Measures & Exercise Physiology: labs and lectures for Environmental Physiology, and Adapted Physical Education; Developed/taught biomechanics modules for the Outdoor Pursuits rock-climbing course.
- 1996 **Mini University Course Instructor** Campus Recreation, UofC, Calgary  
 Mini PhD program in Medicine, Camps for Kids. Developed course program and led activities.
- 1991 - 1994 **Teaching & Lab Assistant / Instructors Assistant** Kinesiology, UofC  
 Lab supervisor / Tutorials led for: Human Anatomy, Human Growth and Development, Statistics, Test and Measures, Computer Usages in Sport, and numerous activities and outdoor pursuit courses. Coordinated research studies and programs in biomechanics for Dr. Jack Engsburg. Testing and coordinating subjects and performing initial analysis and statistical analysis of data.
- 1994 - 1996 **Civilian Instructor Department of National Defence** DND CFB Medley, AB  
 Developed & Taught Survival Instructors, and Air Crew Survival courses and curriculum for the Department of National Defence. Programs included: orienteering, back country survival, camp skills, water craft safety, canoe tripping, leadership.
- 1993 - 1996 **Ski Instructor/Coach/Guide** Canada Olympic Park, Calgary  
 Ski Instructor for children's day camps, school programs and private lessons. Taught Alpine, Nordic, and Telemark skiing techniques. Coached junior development programs for Alpine skiing.
- 1992 - 1994 **Canoe Instructor/Coach/Guide** Calgary Canoe Club, Calgary  
 Instructed Canoe and kayaking skills and techniques for all manner of groups and school programs, day camps. Organized and led river, backcountry, and white water trips. Coached novice canoe and kayak programs.

## Awards and Grants:

**2013 Young Investigator Award:** *Best Presentation for: The importance of structure on: calcium release, diffusion, and binding in a spatially realistic 3-D Sarcomere Model.*

Bio-medical Basis for Human Performance Across the Lifespan.

University of Calgary, Calgary AB.

**2013 Outstanding Leadership (Staff) Award** *Roger Jackson Centre for Health and Wellness.*

University of Calgary, Calgary AB.

**2012 Research Travel Grant** *Faculty of Graduate Studies.*

University of Calgary, Calgary AB.

**2011 Excellence in Research Grant** *Faculty of Graduate Studies.*

University of Calgary, Calgary AB.

**1998 Alberta Sports Research Grant** *Development of electronic bike ergometer.*

Government of Alberta.

**1996 Alberta Parks and Recreation Grant** *Measuring muscle tone in children with Downs Syndrome.*

University of Calgary, Calgary AB.

**1996 Canadian National Institute for the Blind You make a difference Award** *Blind bowling program.*  
University of Calgary, Calgary AB.

**1994- Clean World Award**, *International Association for Environmental Urban Living (GBH): for accomplishments running the Calgary River Clean-up 1994.*  
University of Calgary, Calgary AB.

**1993- Mayors Environmental Stewardship Award**, *Presented by Mayor Al Duer, for organizing and running the Calgary River Clean-up 1993.*  
University of Calgary, Calgary AB.

## Certifications

2013	<b>ADI Instruments System Management and Teaching basics</b> <i>ADI System Management and Physiology Instruction modules</i>	University of Saskatoon
2008	<b>ITIL Intermediate Level V3 certification</b> <i>Standards for Computer Support</i>	University of Calgary
2005	<b>Management Training</b> <i>Franklin Covey Leadership</i>	Franklin Covey Leadership
2004	<b>Microsoft Certified System Architect</b> <i>MCSA</i>	Continuing Education, UofC
2001	<b>Microsoft Certified Database Professional</b> <i>MCDP</i>	Continuing Education, UofC
1998	<b>Microsoft Certified Professional</b> <i>MCP</i>	Continuing Education, UofC
1994	<b>Canadian Association of Alpine Ski Instructors</b> <i>CSIA Level I</i>	Canada Olympic Park, WinSport
1994	<b>Canadian Association of Nordic Ski Instructors</b> <i>CASI Level I</i>	Canada Olympic Park, WinSport
1992	<b>Canadian Recreational Canoe Association</b> <i>CRCA Level V</i>	Calgary Canoe Club

## Training & Learning

2018	<b>Spill Response Training</b>	Online, UofC
2018	<b>Bio-Safety Training</b>	Online, UofC
2017	<b>Chematrix / Lab Manager</b>	Chematrix, UofC
2007	<b>Animal Care and Handling</b>	Online, UofC
2018	<b>Occupational Health and Safety Orientation</b>	Online, UofC
2018	<b>Workplace Inspections Training</b>	Online, UofC

2016	<b>WHMIS 2015</b>	Online, UofC
2016	<b>Bio-Safety Program Training</b>	Online, UofC
2016	<b>Hazard Assessment Training</b>	Online, UofC

## Conference Organization

2018-2019	<b>Invited Reviewer - International Society of Biomechanics</b> ISB	Calgary, Alberta
2006-2007	<b>Technology Coordinator, CSEP Conference Banff</b> CSEP	Banff, AB
1999-2000	<b>Technology Coordinator, CSEP Conference Canmore</b> CSEP	Canmore, AB
2002	<b>Presentation Assistant - World Congress of Biomechanics</b> WCB	Calgary, Alberta
1999	<b>Presentation Assistant - International Society of Biomechanics</b> ISB	Calgary, Alberta
1995-1996	<b>Technology Director Special Olympics Canada Winter Games Conference</b> Special Olympics Calgary	Calgary, AB

## Governing Boards-Volunteer

2003-2016	<b>Board Member, Canadian Internet Registration Authority</b> CIRA	Calgary, AB
1995-1996	<b>Technology Director Special Olympics Canada Winter Games</b> Special Olympics Calgary	Calgary, AB
1996	<b>Program Coordinator, Special Olympics swimming</b> Special Olympics	Calgary, AB
1995-1996	<b>Program Facilitator, PREP program</b> Preparation for Re-entry into Education Program, Grace Hospital	Calgary, AB
1993-1996	<b>Environmental Director</b> Calgary Canoe Club	Calgary, AB
1994-1996	<b>Environmental Director</b> Calgary Area Outdoor Council	Calgary, AB
1993-1996	<b>Mayor's Environmental Committee</b> City of Calgary	Calgary, AB
1992-1995	<b>Volunteer Emergency Room Support</b> CRHA	Calgary, AB

October 23, 2018

*John Holash*