# Christopher **Marsh**

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## Interests

Cryosphere-hydrology, numerical modelling, field work, programming, high-performance computing, the outdoors

## Education

2012–present **Ph.D.** candidate in Physical Geography
University of Saskatchewan, Saskatoon, SK
Supervisors: Dr. John Pomeroy, Dr. Howard Wheater
Emergent Phenomena And Model Complexity In Simulating Cold Regions Hydrology

2009–2012 **M.Sc.** Physical Geography
University of Saskatchewan, Saskatoon, SK
Supervisors: Dr. John Pomeroy, Dr. Raymond Spiteri
Implication Of Mountain Shading And Topographic Scaling On Energy For Snowmelt

2005–2009 **B.Sc. Honours** Physical Geography, Minors: Math and Comp. Sci.
University of Saskatchewan, Saskatoon, SK
High Resolution Radiation Modelling In Complex Terrain

## Awards & Grants

2016 **AGU Flash Freeze competition**
American Geophysical Union

2016 **AGU Outstanding Student Paper Award in Cryosphere**
American Geophysical Union, student presentation

2014–2016 **NSERC Alexander Graham Bell**
Natural Sciences and Engineering Research Council of Canada (NSERC)

2014 **CGU Stan Patterson award in Glaciology**
Canadian Geophysical Union

2014 **Saskatchewan Innovation and Opportunity**
University of Saskatchewan and Gov. Saskatchewan research in a signature area

2013 **J.H. Richards Graduate Award**
University of Saskatchewan, highest average

2012 **AGU Outstanding Student Paper Award in Cryosphere**
American Geophysical Union, student presentation

2011 **D.M. Gray Hydrology Award**
CGU-HS, top student paper and presentation

2009–2012 **Graduate Student Scholarship**
University of Saskatchewan, academic performance

2009 **Canadian Association of Geographers**
Most distinguished geography undergraduate

2008 **Honours scholarship**
University of Saskatchewan, academic performance

## Research Experience

2012–present **Research assistant**
Coordinated purchases, configuration, and on-going support of the shared workstations used for numerical simulations
Center for Hydrology, University of Saskatchewan

2012–present **Field work for PhD.**
Canmore, AB; Whitehorse, YK
Snow surveys, meteorological site maintenance, ground control of historical sites

2012 **CRHM Tools developer**
Supervisor: John Pomeroy
Lead developer on the Cold Regions Hydrological Model (CRHM) Tools project at the University of Saskatchewan

2009–2012 **Field work for M.Sc.**
Canmore, AB
Installing radiometers and time lapse cameras, snow surveys, and meteorological site maintenance

2009 **MITACS summer employment with Environment Canada**
Supervisor: Bruce Davison and Raymond Spiteri
Improved MESH efficiency via parallelization and code optimization

2008 **Modelling with the Cold Regions Hydrological Model (CRHM) for work in ungauged basins**
Supervisor: John Pomeroy

Spring 2008 **International Polar Year**
Inuvik, NWT
Field assistant for instrument installation (water level recorders, snow surveys, vegetation surveys, and surveying (Total Station)

Spring 2006 **NHRC, Environment Canada**
Inuvik, NWT
Field assistant for instrument installation of water level recorders and surveying

## Teaching experience

2017 **Lecturer**
Geography 290, University of Saskatchewan
Delivered lectures for two weeks on remote sensing and GIS. Prepared material and taught the associated labs, as well as providing 1-on-1 teaching

2016 **Lecturer**
Geography 290, University of Saskatchewan
Delivered lectures for two weeks on remote sensing and GIS. Prepared material and taught the associated labs, as well as providing 1-on-1 teaching

2016 **Teaching assistant**
Geography 225, University of Saskatchewan
2nd year general hydrological course. Lead labs and provided 1-on-1 teaching

2016 **Teaching assistant**
Geography 290, University of Saskatchewan
2nd year introduction to field methods. Assisted in the field with students

2014 **Teaching assistant**
Geography 225, University of Saskatchewan
2nd year general hydrological course. Lead labs and provided 1-on-1 teaching

## Other Experience

2006–2009 **Salesperson and customer service**
Saskatoon, SK
Boomtown Outfitters

## Scientific service

2016–2017 **Young Hydrologic Society (YHS) Canada branch**
Chair and founding member

2010–present **CRYOLIST.org**
Co-manager of the listserv

2012–present **Global Institute for Water Security (GIWS) student group**
Founding member and committee member
University of Saskatchewan

2012 **Canadian Geophysical Union Hydrology Section (CGU-HS) student conference**
Principal organizer
Saskatoon, SK

### Peer review

- The Cryosphere
- Computers and Geoscience
- Water Resources Research
- Atmosphere-Ocean

## Skills

### Languages

- Native English
- French immersion (Grade 12)

### Technical skills

- Programming: C, C++11, R, Matlab, Python, OpenMP, some MPI, git
- GIS: ArcGIS, SAGA GIS, QGIS, GDAL
- Office: MS Office, Photopshop, LaTeX
- OS: Linux (Fedora, Ubuntu), Windows, MacOS

### Field work

- Dataloggers
- Site maintenance
- Meteorological site installation
- Snow surveys

### Instruction

- CRCA Canoe Moving Water Level 1 and 2
- CRCA Canoe Moving Water 1 Instructors
- CSIA Downhill Skiing Level 1 Instructors

### Safety

- Rescue 3 International SwiftWater Rescue Technician Unit 1
- OHS Standard Level First Aid and CPR Level C
- Over 15 years of extensive remote outdoor experience such as wilderness camping and canoeing

# Publications

## Peer-reviewed journal

Marsh, C.B., J.W. Pomeroy, and R.J. Spiteri (June 2012b), Implications of mountain shading on calculating energy for snowmelt using unstructured triangular meshes, Hydrological Processes **26**(12), pp. 1767–1778, DOI: 10.1002/hyp.9329, URL: http://doi.wiley.com/10.1002/hyp.9329.

## Thesis

Marsh, C.B. (2012), Implications of mountain shading on calculating energy for snowmelt using unstructured triangular meshes, M.Sc. University of Saskatchewan.

## Technical report

Marsh, C.B., R.J. Spiteri, and B. Davison (2009b), Improved MESH efficiency via parallelization and code optimization, tech. rep., Department of Computer Science, The University of Saskatchewan, URL: http://www.cs.usask.ca/content/researchinfo/techreports/2009/TR-2009-02.pdf.

## Posters

Headstrom, N., R. Granger, S. Miller, M. Marsh, and C.B. Marsh (2013), Effect of Buoy Motion on Eddy Flux Measurements over Lakes, CGU-HS May 27-30; Saskatoon, SK, Canada.

Marsh, C.B. and J.W. Pomeroy (2013), Automated Hydrological Response Unit create for use with CRHM, CGU-HS May 27-30; Saskatoon, SK, Canada.

Marsh, C.B., J.W. Pomeroy, and R.J. Spiteri (2011c), Implication of mountain shading and topographic scaling on energy for snowmelt, CGU-HS Student conference, Jan 29; Calgary, Alberta, Canada.

Marsh, P., S. Endrizzi, C. Derksen, M. Russell, C. Onclin, H. Wilson, J. Pomeroy, and C.B. Marsh (2010), Factors controlling the spatial variability in end of winter snowcover and spring melt at an arctic tundra site, AGU Dec 13-17; San Francisco, California, USA.

Marsh, C.B., R.J. Spiteri, and B. Davison (2009a), Improved MESH efficiency via parallelization and code optimization, P3/WC2N Annual conference, Oct 14-17; Lake Louise, Alberta, Canada.

Marsh, C.B., S. Pohl, and G.E. Liston (2007), Impact of increased shrub density on snow accumulation and melt in the Arctic tundra, IUGG; Perugia, Italy.

## Conferences (Oral presentation)

Marsh, C.B. (2017), Simulating Complex, Cold-region Process Interactions Using a Multi-scale, Variable-complexity Hydrological Model (OSPA Invited), AGU; Dec 11-15; New Orleans, LA, USA.

Marsh, C.B., J.W. Pomeroy, H. Wheater, N. Wayand, and R. Spiteri (2017a), Simulating blowing snow with the Canadian Hydrological Model, AGU; Dec 11-15; New Orleans, LA, USA.

– (2017b), Simulating steady-state blowing snow with the Canadian Hydrological Model, CGU-HS; May 29-31; Vancover, BC, Canada.

Marsh, C.B., J.W. Pomeroy, and H. Wheater (2016), Testing warranted model complexity using a multi-scale, variable-complexity hydrological model, CGU-HS; May 29-June 2; Fredericton, NB, Canada.

Marsh, C.B., N. Wayand, J.W. Pomeroy, and H. Wheater (2016), The Canadian Hydrological Model: a Multiscale, Multiphysics, Variable Resolution Mesh Simulation System for Cold Regions, AGU; Dec 12-16; San Francisco, CA, USA.

Marsh, C.B., J.W. Pomeroy, and H. Wheater (2015), Robustness in the spring surface energy balance in a mountain basin, CGU-HS; May 3-7; Montreal, QC, Canada.

– (2014), Impacts of spatial scaling of unstructured meshes on calculating surface irradiance, CGU-HS; May 4-8; Banf, AB, Canada.

Marsh, C.B., J.W. Pomeroy, R.J. Spiteri, D. Marks, M. Hayashi, S. Munro, M. Demuth, and H. Wheater (2013), Impacts of spatial scaling of unstructured meshes on calculating surface irradiance, CGU-HS; May 27-30; Saskatoon, SK, Canada.

Marsh, C.B., J.W. Pomeroy, and R.J. Spiteri (2012a), Implication of mountain shading and topographic scaling on energy for snowmelt, AGU Dec 3-7; San. Francisco, Calif. , USA.

– (2011a), Implication of mountain shading and topographic scaling on energy for snowmelt, CGU-HS student conference Jan 29; Calgary, Alberta, Canada.

– (2011b), Implication of mountain shading and topographic scaling on energy for snowmelt, CGU-HS May 15-18; Banff, Alberta, Canada.