



**University  
of Victoria**

Graduate Studies

Notice of the Final Oral Examination  
for the Degree of Master of Applied Science

of

**EBAD SALEHI**

BSc (Sharif University of Technology, 2012)

**“Employing Compression Solutions under OpenACC”**

Department of Electrical and Computer Engineering

Friday, January 29, 2016

10:00 A.M.

Engineering Office Wing

Room 430

Supervisory Committee:

Dr. Amirali Baniasadi, Department of Electrical and Computer Engineering, University of Victoria  
(Supervisor)

Dr. Kin Li, Department of Electrical and Computer Engineering, UVic (Member)

External Examiner:

Dr. Sudhakar Ganti, Department of Computer Science, UVic

Chair of Oral Examination:

Dr. Don Vandenberg, Department of Physics and Astronomy, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

## **Abstract**

For GPUs to achieve their peak performance, effective and efficient usage of memory bandwidth is necessary. To this end, programmers invest extensive development effort to optimize a GPU program, specially its memory bandwidth usage. The OpenACC programming model has been introduced to tackle the accelerators programming complexity. However, this model's coarse-grained control on a program can make the memory bandwidth utilization even worse than CUDA. We propose an extension to OpenACC in order to reduce the traffic on the memory interconnection network, using a compression method on floating point numbers. We examine our method on three case studies and achieve up to 1.36X speedup.