

# Philip Zwanenburg

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## SKILLS

### PROGRAMMING LANGUAGES

C • C++ • Python3 • MATLAB •  $\LaTeX$  •  
Markdown • Fortran

### ENVIRONMENTS

Linux • macOS

### SOFTWARE

CMake • Doxygen • Git • Vim • Gmsh  
• Paraview • Intel MKL • PETSc • Solid-  
Works

### LANGUAGES

English • French

## EDUCATION

### MCGILL UNIVERSITY

PHD IN MECHANICAL ENGINEERING

Sept. 2014 - Present | Montreal, QC

GPA: 4.00 / 4.00

### MCGILL UNIVERSITY

BS IN MECHANICAL ENGINEERING

Sept. 2010 - May 2014 | Montreal, QC

GPA: 3.99 / 4.00

### DAWSON COLLEGE

DEC IN HEALTH SCIENCE (FIRST  
CHOICE)

Sept. 2008 - May 2010 | Montreal, QC

## COURSEWORK

### GRADUATE

MATH Numerical Differential Equations  
Numerical Analysis 1

COMP Matrix Computations

MECH Computational Gasdynamics

## TEACHING

### ASSISTANTSHIP

Linear Algebra and PDE's (2x)

Intermediate Calculus

Applied Electronics and Instrumentation

## LINKS

Github:// [PhilipZwanenburg](#)

LinkedIn:// [Philip Zwanenburg](#)

Google Scholar:// [Philip Zwanenburg](#)

## VALUES

- **Sustainability:** test-driven development, usage of external tools/libraries, documentation.
- **Excellence:** usage of modern algorithms and programming features.
- **Collaboration:** synthesis of varying expertise of team members.
- **Practicality:** motivation before implementation.

## EXPERIENCE/RESEARCH

### MCGILL UNIVERSITY | GRADUATE STUDENT - PHD FAST-TRACK

Sept. 2014 - Present | Montreal, QC

Goal: Investigation of modern numerical methods for computational fluid dynamics.

- Wrote an open-source hp-adaptive high-order unstructured compressible Navier-Stokes Discontinuous Galerkin solver (available on [github](#)).
  - Managed undergraduate student contributors to the project.
- Presented at several conferences: [AIAA 2015](#), [SIAM 2015](#), [AIAA 2016](#), [AIAA 2017](#), [USNCCM 2017](#).
- Proved the general equivalence of the Energy Stable Flux Reconstruction and filtered Discontinuous Galerkin methods (see significant publications).
- Investigated several aspects relating to curved high-order geometry treatment (see significant publications).

### MCGILL UNIVERSITY | STUDENT UNDERGRADUATE RESEARCHER

May 2013/2014 - August 2013/2014 | Montreal, QC

- Explored multiresolution in the context of the Flux Reconstruction scheme for finite element analysis.

### MCGILL UNIVERSITY | STUDENT UNDERGRADUATE RESEARCHER

May 2012 - August 2012 | Montreal, QC

- Contributed to the development of novel magnetic timing valve functionality for paper-based diagnostics platforms allowing them to be more user-friendly and opening up the possibility of performing multi-step immunoassays.

### UNIVERSITÉ DE MONTRÉAL | CHEMISTRY RESEARCH ASSISTANT

May 2011 - August 2011 | Montreal, QC

## AWARDS

2017	National	Alexander Graham Bell Canada Graduate Scholarship
2015	University	McGill Engineering Doctoral Award
2015	National	NSERC Postgraduate Scholarship
2015	University	Vadasz Doctoral Fellowship in Engineering
2014	National	Canada Graduate Scholarship - Master's Program
2014	Provincial	FQRNT Bourses de maîtrise en recherche
2014	University	Charles Michael Morssen Gold Medal
2014-2012	University	NSERC Undergraduate Student Research Award (3x)

## SIGNIFICANT PUBLICATIONS

- [1] Philip Zwanenburg and Siva Nadarajah. Equivalence between the Energy Stable Flux Reconstruction and Filtered Discontinuous Galerkin Schemes. *Journal of Computational Physics*, 306:343 – 369, 2016.
- [2] Philip Zwanenburg and Siva Nadarajah. On the Necessity of Superparametric Geometry Representation for Discontinuous Galerkin Methods on Domains with Curved Boundaries. May 2017.