Philip Zwanenburg

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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

LINKS

Github:// **PhilipZwanenburg**
LinkedIn:// **Philip Zwanenburg**
Google Scholar:// **Philip Zwanenburg**

COURSEWORK

GRADUATE
MATH   Numerical Differential Equations
        Numerical Analysis 1
COMP   Matrix Computations
MECH   Computational Gasdynamics

UNDERGRADUATE
MATH   Linear Algebra and PDE's
MECH   Numerical Methods in Mech Eng
        Thermodynamics 1 & 2
        Fluid Mechanics 1 & 2

TEACHING ASSISTANTSHIP

Linear Algebra and PDE's (2x)
Intermediate Calculus
Applied Electronics and Instrumentation

SKILLS

PROGRAMMING LANGUAGES
C • C++ • Python3 • MATLAB • Fortran • LaTeX • Markdown

SOFTWARE
Vim • Git • Doxygen • CMake • Paraview • Gmsh • Intel MKL • PETSc

LANGUAGES
English • French

EXPERIENCE/RESEARCH

MCGILL UNIVERSITY | Graduate Student - PhD Fast-Track
Sept. 2014 - Present | Montreal, QC
Goal: Investigation of modern numerical methods for computational fluid dynamics:
- 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).
- Wrote an open-source high-order unstructured compressible Navier-Stokes Discontinuous Galerkin solver (available on github).
- Currently investigating the discontinuous Petrov-Galerkin method.
- Additional competencies/interests: multiresolution, sum factorization, isogeometric analysis, entropy stability.

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.
- Led to an accepted AIAA Aviation 2015 conference paper (unpublished).

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.
  - Magnetic Timing Valves for Fluid Control in Paper-Based Microfluidics (Lab on a Chip 2013).

UNIVERSITÉ DE MONTRÉAL | Chemistry Research Assistant
May 2011 - August 2011 | Montreal, QC
- Investigated nanodot morphology in ultrathin block copolymer monolayer films.
- Atomic-force microscopy images generated were used in a presentation:
  - Ultrathin Block Copolymer Films: Reinterpretation of Pressure-Induced Transition and Gold Patterning of Nanostrand Templates (95th Canadian Chemistry Conference and Exhibition 2012).

AWARDS

Year	Level	Award
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.