

Gwynn J. Elfring

CONTACT INFORMATION

University of California, San Diego
Department of Mechanical & Aerospace Engineering
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EDUCATION

University of California, San Diego, La Jolla, CA

Ph.D., Engineering Sciences, Sept 2008 - present (*C.Phil.*, Nov 2010)

- Research Areas: Biomechanics, Fluid Mechanics, Applied Mathematics
- Advisor: Eric Lauga
- GPA: 4.0/4.0

University of Victoria, Victoria, BC

M.A.Sc., Mechanical Engineering, October 2007

- Thesis: Thermodynamics of Sorption and Distribution of Water in Nafion
- Advisor: Henning Struchtrup
- GPA: 4.0/4.0

B.Eng., Co-op Mechanical Engineering *with distinction*, May 2005

- Minor in Mathematics

RESEARCH EXPERIENCE

University of California, San Diego, La Jolla, CA

Graduate Research Assistant

Sept 2008 - Present

- Research in biological fluid mechanics using applied mathematics.

University of Victoria, Victoria, BC

Graduate Research Assistant

Sept 2005 - Aug 2007

- Researched the thermodynamic properties of water in Nafion fuel cells.
- Investigated the exergetic efficiency of high-bypass turbo fan air engines.

Undergraduate Research Assistant

Jan 2005 - Apr 2005

- Researched fuel cell design using constructal theory.

TEACHING EXPERIENCE

University of California, San Diego, La Jolla, CA

Teaching Assistant, Dept. of Mechanical & Aerospace Eng.

Sept 2009 - Present

- Fluid Mechanics I (Graduate): Graded homework problems and exams.
- Probability and Statistical Methods for Engineers: Conducted weekly tutorial sessions.

University of Victoria, Victoria, BC

Teaching Assistant, Department of Mechanical Engineering

Sept 2005 - May 2007

- Thermodynamics I: Graded Homework Problems.
- Thermodynamics II: Prepared and conducted weekly tutorial sessions.
- Mechanics of Fluids I: Conducted tutorial and laboratory sessions.
- Heat Transfer and Mass Transfer: Supervised and graded heat exchanger laboratory.

INDUSTRY
EXPERIENCE

Enbridge Pipelines Inc., Edmonton, AB

Project Engineer, Major Projects

Nov 2007 - Aug 2008

- Project management and technical analysis of pipeline design for Southern Lights pipeline project.

University of Victoria, Co-op Program, Various Locations

Intern Engineer

June 2000 - Apr 2004

- Four different four month long internships: Wireline Engineer with Schlumberger Canada, Project Engineer with Abitibi Consolidated and Maintenance and Systems Engineer with Pacifica Papers.

VOLUNTEER
EXPERIENCE

University of Victoria, Victoria, BC

Engineering Open House

Sept 2006

- Thermodynamics Lab Demonstrations.

Go West/Science Venture Youth Camps

July 2006 - July 2007

- Lab Tours and Equipment Demonstrations for kids.

AWARDS AND
DISTINCTIONS

- University of California San Diego, Summer Graduate Teaching Fellowship (2012).
- University of California San Diego, Kaplan Dissertation Year Fellowship (2011).
- Natural Sciences and Engineering Research Council Postgraduate Scholarship D-3 (2009).
- WAGS/UMI Distinguished Master's Thesis Award Nominee (2008).
- Lt. Governor's Silver Medal Nominee: University of Victoria's top master's student (2008).
- Institute for Integrated Energy Systems Graduate Scholarship (2006).
- Smith Graduate Scholarship (2006).
- University of Victoria M.A.Sc. Fellowship (2005).

PEER REVIEW

Journals

Canadian Journal of Chemical Engineering, International Journal of Heat and Mass Transfer

PUBLICATIONS

Journal Publications

9. G.J. Elfring, E. Lauga, *Buckling instability of squeezed droplets*, Submitted (2012).
8. M. Sauzade*, G.J. Elfring, E. Lauga, *Taylor's swimming sheet: Analysis and improvement of the perturbation series*, *Physica D* **240** (2011) 1567-1573.
7. G.J. Elfring, E. Lauga, *Synchronization of flexible sheets*, *Journal of Fluid Mechanics* **674** (2011) 163-173.
6. G.J. Elfring, E. Lauga, *Passive hydrodynamic synchronization of two-dimensional swimming cells*, *Physics of Fluids* **23** (2011) 011902
5. G.J. Elfring, O.S. Pak, E. Lauga, *Two-dimensional flagellar synchronization in viscoelastic fluids*, *Journal of Fluid Mechanics*, **646** (2010) 505-515.
4. G.J. Elfring, E. Lauga, *Hydrodynamic phase locking of swimming microorganisms*, *Physical Review Letters*, **103** (2009) 088101. (Editors' Suggestion)
-also selected for Virtual Journal of Biological Physics Research (August 15 2009).
3. G.J. Elfring, H. Struchtrup, *Thermodynamics of pore wetting and swelling in Nafion*, *Journal of Membrane Science*, **315** (2008) 125-132.
2. H. Struchtrup, G.J. Elfring, *External losses in high-bypass turbo fan air engines*, *Int. Journal of Exergy*, **5** (2008) 400-412.
1. G.J. Elfring, H. Struchtrup, *Thermodynamic considerations on the stability of water in Nafion*, *Journal of Membrane Science*, **297** (2007) 190-198.

PRESENTATIONS

Conference Presentations

- G.J. Elfring, E. Lauga, *Buckling instability of a pinned droplet*, 64th Meeting of the APS Division of Fluid Dynamics, Baltimore, MD, November 2011.
- G.J. Elfring, E. Lauga, *Synchronization of swimming microorganisms*, Boulder School for Condensed Matter Physics, University of Colorado, Boulder, CO, July 2011.
- G.J. Elfring, E. Lauga, *Buckling instability of a droplet*, Fifth Southern California Symposium on Flow Physics, University of Southern California, Los Angeles, CA, April 2011.
- G.J. Elfring, E. Lauga, *Elastic symmetry-breaking in synchronizing cells*, 63rd Meeting of the APS Division of Fluid Dynamics, Long Beach, CA, November 2010.
- G.J. Elfring, E. Lauga, *Flow due to the movement and remodeling of tubule networks*, Fourth Southern California Symposium on Flow Physics, University of California Irvine, Irvine, CA, April 2010.
- G.J. Elfring, E. Lauga *Synchronization of swimming microorganisms*, 62nd Meeting of the APS Division of Fluid Dynamics, Minneapolis, MN, November 2009.
- G.J. Elfring, E. Lauga, *On the phase locking of swimming microorganisms*, Softflow 2009: Complex and bio fluids, Institut d'Etudes Scientifique de Cargese, Cargese, France, June 2009.
- G.J. Elfring, E. Lauga, *Geometric conditions for the apparent phase locking of swimming microorganisms*, Third Southern California Symposium on Flow Physics, University of California San Diego, La Jolla, CA, April 2009.
- G.J. Elfring, H. Struchtrup, *On the thermodynamics of sorption and distribution of water in Nafion*, Graduate Innovation Forum, University of Victoria, Victoria, Canada June 2007.

PROFESSIONAL
DEVELOPMENT

Summer Schools

- Boulder School for Condensed Matter Physics, University of Colorado Boulder, Boulder, CO, July, 2011.
- Soft Solids and Complex Fluids, University of Massachusetts Amherst, Amherst, MA, June, 2010.
- Softflow 2009: Complex and bio fluids, Institut d'Etudes Scientifique de Cargese, Cargese, France, June 2009.

*STUDENTS
SUPERVISED

Graduate Students

Martin Sauzade, Visiting Masters Student [from *ENSTA*, France] ('09-'10)

MEMBERSHIP

American Physical Society, Association of Professional Engineers Geologists and Geophysicists of Alberta, Society of Industrial and Applied Mathematics, Society of Mexican American Engineers and Scientists.