Simon Jones

Rose-Hulman Institute of Technology
5500 Wabash Avenue
Terre Haute, IN 47803

jones5@rose-hulman.edu
812-264-3257

EDUCATION

2007 – 2010 **PhD in Engineering**
University of Cambridge Cambridge, UK
Ground vibration from underground railways: how simplifying assumptions limit prediction accuracy

2003 – 2005 **MSc in Mechanical Engineering**
University of Alberta Edmonton, Alberta, Canada
Simulation of impact testing of implant/abutment system

1998 – 2003 **BSc in Mechanical Engineering (Co-op Program)**
University of Alberta Edmonton, Alberta, Canada

TEACHING EXPERIENCE

2012 – present **Rose-Hulman Institute of Technology,** Terre Haute, IN, USA
Associate Professor (2018 - present)
Assistant Professor (2012 - 2018)

- Instructor for the following courses:
  - EM 103 Introduction to Design
  - EM 104 Graphical Communication
  - ME 123 Computer Applications
  - ES 201 Conservation & Accounting Principles
  - ES 204 Mechanical Systems
  - ME 323 Numerical Methods
  - EM 406 Mechanical Vibrations
  - ME 422 Introduction to Finite Element Fundamentals
  - ME 522 Advanced Finite Element Analysis

- Overall Instructor Rating of 4.8/5.0 – averaged from over 50 classes taught
- Advisor for 2 MSc thesis students and 22 undergraduate research students, resulting in a thesis, two undergraduate posters and a presentation at IMECE conferences, and a technical journal paper.
- Faculty advisor for the Alpha Lambda Delta national honor society, the rock climbing club, the ski team, the robotics team, the rifle team, and the women's lacrosse team, for which I won the Student Government Association - Outstanding Advisor Award in 2016 and 2017

2011 – 2012 **REU Project Supervisor – McGill University**

Co-supervised two summer research students in developing and integrating novel numerical models for geometry smoothing (B-splines and NURBS) and eigenvalue decomposition into turbo-machinery code used by industrial partners

2008 – 2010 **Supervisor – University of Cambridge**

Supervised third-year analytic dynamics and vibration courses; supervisions consisted of eight groups of three students per term meeting bi-weekly for one hour teaching sessions, group discussions, quizzes and reviews

2008 – 2010 **Coach – University of Cambridge Rifle Association**

Trained new team members, organized competitions, acted as club treasurer

2007 – 2009 **Lab Demonstrator – University of Cambridge**

Demonstrated first-year mechanics and third-year dynamics lab exercises; demonstrating consisted of a thirty minute review lecture, assisting students complete the experiments, and group discussion of assigned questions

INDUSTRY EXPERIENCE

2015 **Rose-Hulman Ventures – Consulting Engineer**

Terre Haute, Indiana, USA

- Acted as a Consulting Engineer for Taghleef Industries (project organized and managed via Rose-Hulman Ventures)
- Contracted to investigate heat transfer mechanisms in thermoplastic polymer film manufacturing unit; goal to provide a thorough understanding of the effect of various operating parameters on temperature profile of film
- Developed numerous first-order models using analytic and numerical methods, analyzed results, compiled report, and provided advice to client

2011 – 2012 **McGill University – Postdoctoral Fellow**

Montreal, Quebec, Canada

- Investigated the use of wavelet analysis for reduced order modeling of vibrational mistuning of bladed turbine assemblies, and wavelet-Galerkin methods for solution of nonlinear vibration problems involving contact
- Developed novel approach for simulating wave propagation through thick-layered, heterogeneous materials using wavelet-Galerkin methods
- Have maintained a working collaboration with McGill colleagues while at Rose-Hulman to further research into sparse representations of non-smooth, periodic responses to unilateral contact

2005 – 2007 **C-FER Technologies – Research Engineer**

Edmonton, Alberta, Canada

- Integral member of a small, multidisciplinary team focused on solving nonlinear solid mechanics problems subjected to high temperatures and pressures using analytical and finite element methods
- Responsibilities included developing bids, client interaction, acting as chief technical engineer, technical report writing, and oral presentation of results
- Researched and initiated a new method of finite element model development using Abaqus to streamline analyses requiring geometric dependent meshes

HONORS AND AWARDS

2016 – 2017	Rose-Hulman Institute of Technology Student Government Association Outstanding Organization Advisor – Women's Lacrosse
2015 – 2016	Rose-Hulman Institute of Technology Student Government Association Outstanding Organization Advisor – Women's Lacrosse
2013 & 2018	Delta Delta Delta Professor of the Month

MAJOR SCHOLARSHIPS

2011 – 2013	**Tomlinson Postdoctoral Fellowship:** 1 of 3 postdocs recruited to McGill University for exceptional research and teaching potential (~3% of applicants)
2007 – 2010	**Gates-Cambridge Scholarship:** awarded to 90 international post-graduates for personal and professional promise and leadership (~2% of applicants)
2007 – 2010	**Churchill Scholarship:** sole Albertan recipient for doctoral study in engineering at Churchill College, University of Cambridge
2007 – 2009	**Natural Sciences and Engineering Research Council of Canada PGS-D:** doctoral award to support continued excellence in research and academia

GRANTS ASSOCIATED WITH UNDERGRADUATE RESEARCH

Fall 2017	**Rose-Hulman Student Academic Travel Fund:** co-advisor for student awarded a competitive travel grant covering costs to present student research at IMECE 2017 (~20% of applicants)
Summer 2017	**Rose-Hulman Summer Undergraduate Research Fellowship (R-SURF):** co-advisor for student project "The effect of room temperature creep on the fatigue life of aluminum 7075-T6" (~10% of applicant)
Spring 2017	**Independent Project/Research Opportunities Program (IP/ROP) Best Poster Award:** advisor for top undergraduate research student; award included a travel grant to present research at IMECE 2017 (~5% of applicants)
Summer 2015	**Rose-Hulman Summer Undergraduate Research Fellowship (R-SURF):** advisor for student project "Design, Testing, Analysis, and Material Properties of Carbon Fiber Reinforced Polymers" which currently has approximately 1300 downloads of the final report from our library (~10% of applicant)
2012 - 2018	**Independent Project/Research Opportunities Program (IP/ROP):** advisor for over 20 undergraduate research grants covering independent student project material costs (~90% of applicants)

ACADEMIC COMMITTEES

- Safety, Security & Traffic Committee (Chair in 2016, Secretary in 2015 & 2017)
- Faculty Teller (2013-2015)
- Member of the Commission on the Assessment of Student Outcomes (since 2013)
- RosEvaluation Rating member (since 2013)
- Undergraduate research proposal reviewer (since 2013)
- Mechanical Engineering faculty search committee member (2012, 2013)
- Numerical Methods and Programming subcommittee member (since 2016)
- Solid Mechanics subcommittee member (since 2016)

PROFESSIONAL SERVICE AND ACTIVITIES

- Associate Editor – Transactions of the Canadian Society for Mechanical Engineering
    - responsible for finding reviewers, organizing high-level technical reviews, communication with authors, and final decision on article selection
- Coauthor of ANSYS tutorial website (www.mece.ualberta.ca/tutorials/ansys)
    - used world-wide for introduction to finite-element analysis using ANSYS
    - website is ranked first by Google when searching "ANSYS tutorial"
- Technical consultant for television productions
    - Dambusters – Building the Bouncing Bomb (2011)
    - Engineering Connections (Bullet Train Episode – 2011)
- Journal reviews (selected publications)
    - Journal of Sound and Vibration
    - Soil Dynamics and Earthquake Engineering
    - Journal of Applied Mechanics (ASME)
    - Journal of Rail and Rapid Transport
    - AIAA Journal
    - Intl. Journal for Numerical and Analytical Methods in Geomechanics
    - Computational and Applied Mathematics
    - International Journal of Computer Mathematics

- Book reviews
    - A.H. Choudhury and R.K. Deka, *Wavelet-Galerkin solutions of one dimensional partial differential equations*. Springer (2013)
    - M. Kumar, *Wavelets and Their Applications in Signal and Image Encryption Springer* (2014)
    - S. Kumar, *Finite Element and Wavelets: Mathematics to Divide and Conquer*. CRC Press (2016)
    - H. Murakami and T. Impelluso, *Moving Frames in Dynamics*. Pearson Publishing (2017)

JOURNAL PUBLICATIONS

S. Jones, T. Impelluso, H. Hunt, The curious case of the self-levitating billiard ball, *American Journal of Physics* (in progress)

S. Jones and H. Hunt, Rattlebacks for the rest of us, *American Journal of Physics* (under review - submitted November 2018)

S. Jones, Harmonic response of layered halfspace using reduced finite element model with perfectly-matched layer boundaries, *Soil Dynamics and Earthquake Engineering*, 92 (2016) 1-8

S. Jones, M. Legrand, Forced vibrations of a turbine blade undergoing regularized unilateral contact conditions through the wavelet balance method, *International Journal for Numerical Methods in Engineering*, 101(5) (2015) 351-374

S. Jones, T. Zhang, M. Legrand, The computation of wavelet-Galerkin three-term connection coefficients on a bounded domain, *Progress in Applied Mathematics*, 7(1) (2014) 1-8

S. Jones, M. Legrand, On solving one-dimensional partial differential equations with spatially dependent variables using the wavelet-Galerkin method, *Journal of Applied Mechanics ASME*, 80(6) (2013) 1-7

S. Jones, K. Kuo, M. Hussein and H. Hunt, Prediction uncertainties and inaccuracies resulting from common assumptions in modelling vibration from underground railways, *Journal of Rail and Rapid Transport* (*IMechE*), 226(5) (2012) 501-512

S. Jones and H. Hunt, Predicting surface vibration from underground railways through inhomogeneous soil using the thin-layer method, *Journal of Sound and Vibration*, 331(9) (2012) 2055-2069

S. Jones and H. Hunt, The effect of inclined soil layers on surface vibration from underground railways using the thin-layer method, *Journal of Engineering Mechanic*, 137(12) (2012) 887-900

S. Jones and H. Hunt, Voids at the tunnel-soil interface for calculation of ground vibration from underground railways, *Journal of Sound and Vibration*, 330(2) (2011) 245-270

S. Jones, M. Hussein and H. Hunt, Use of PiP to investigate the effect of a free surface on ground vibration due to underground railways, *Acoustics Australia*, 38(1) (2010) 20-24

J. Xie, S. Jones, *et al.*, Slotted liner design for SAGD wells, *World Oil*, 228(6) (2007) 67-75

S. Jones, G. Faulkner, *et al.*, Simulation of impact test for determining "health" of percutaneous bone anchored implants, *Journal of Biomechanical Engineering*, 128(5) (2006) 647-653

CONFERENCE PROCEEDINGS

S. Jones[†] and K. Kern, Rattlebacks for undergraduate engineers: modelling complex behavior using introductory dynamics and numerical methods, *Proceedings of the ASME 2018 International Mechanical Engineering Congress & Exposition*, Pittsburgh, PA, 2018

K. Kern, S. Jones, T. Impelluso, Rattleback Dynamics Using Moving Frame Method, *Undergraduate Poster at ASME 2017 International Mechanical Engineering Congress & Exposition*, Tampa, Florida, 2017

S. Gandhi, S. Jones, P. Cantwell, The Effect of Room Temperature Creep on Fatigue Life of Notched Aluminum 7075-T6, *Undergraduate Poster at ASME 2017 International Mechanical Engineering Congress & Exposition*, Tampa, Florida, 2017

S. Jones†, Harmonic response of a layered halfspace using reduced finite element model with perfectly-matched layer boundaries, *Proceedings of the ASME 2016 International Mechanical Engineering Congress & Exposition*, Phoenix, Arizona, 2016

S. Jones†, Predicting wave propagation through inhomogeneous soils using a finite element model incorporating perfectly-matched layers, *Proceedings of the ASME 2015 International Mechanical Engineering Congress & Exposition*, Houston, Texas, 2015

S. Jones†, Vibrations of an axial bar experiencing periodic unilateral contact using the wavelet balance method, *26th Conference on Mechanical Vibration and Noise*, Buffalo, New York, 2014

S. Jones†, Computation of the 2D Green's function for thick soil layers with varying stiffness, *12th U.S. National Congress on Computational Mechanics*, Raleigh, North Carolina, 2013

K. Kuo, S. Jones, M. Hussein and H. Hunt, Recent developments in the Pipe-in-Pipe model for underground-railway vibration predictions, *Proceedings of the 11th International Workshop on Railway Noise*, Uddevalla, Sweden, 2013

S. Jones† and M. Legrand, The wavelet-Galerkin method for solving vibratory PDE's with spatially dependent variables, *Proceedings of the 19th International Congress on Sound and Vibration*, Vilnius, Lithuania, 2012

S. Jones, K. Kuo, *et al.*, Prediction inaccuracies and uncertainties associated with common assumptions in modelling vibration from underground railways, *Proceedings of 8th International Conference on Structural Dynamic*s, Leuven, Belgium, 2011

S. Jones† and H. Hunt, Inhomogeneous soils and their effect on ground vibration due to underground railways, *Proceedings of the 17th International Congress on Sound and Vibration*, Cairo, Egypt, 2010

H. Hunt, M. Hussein, S. Jones and K. Kuo, Ground-borne vibration from underground railways: some commonly-made modelling assumption and their associated inaccuracies and uncertainties, *Proceedings of Noise in the Built Environment – The Institute of Acoustics*, Ghent, Belgium, 2010

S. Jones† and H. Hunt, Simulating ground vibration from underground railways through subsiding soil layers, *Proceedings of The International Conference on Computing in Civil and Building Engineering*, Nottingham, UK, 2010

S. Jones† and H. Hunt, Uncertainty in predicting ground vibration from underground railways: the effect of inclined layers and soil voids on response due to a moving load, *Proceedings in EuroNoise*, Edinburgh, UK, 2009

S. Jones† and H. Hunt, The effect of inclined soil layers on surface vibration from underground railways using a semi-analytical approach, *Proceedings of the 7th International Conference on Modern Practice in Stress and Vibration Analysis*, Cambridge, UK, 2009

S. Jones† and H. Hunt, The effect of voids around underground railway tunnels on ground vibration, *Proceedings of the 16th International Congress on Sound and Vibration*, Krakow, Poland, 2009

S. Jones† and H. Hunt, The effect of soil uncertainty on surface vibration due to underground railways: a semi-analytic approach, *Proceedings of Noise and Vibration: Emerging Methods*, Oxford, UK, 2008

S. Jones† and H. Hunt, Effect of inclined soil layers on vibration from underground railways, *Proceedings of The International Conference on Noise and Vibration*, Leuven, Belgium, 2008

K. Kuo, S. Jones† and H. Hunt, Application of PiP: vibration of embedded foundations near a railway tunnel, *Proceedings of the 7th European Conference on Structural Dynamics*, Southampton, UK, 2008

J. Xie, S. Jones, *et al.*, Slotted liner design for SAGD wells, *Proceedings of the 1st World Heavy Oil Conference*, Beijing, China, 2006

† - signifies presentation of the paper at these conferences

GRADUATE AND UNDERGRADUATE RESEARCH PUBLICATIONS

Z. Glick (S. Jones: advisor), Simulating Shaft Whirl in Turbine Engines using Harmonic Axisymmetric Finite Elements, *MSc Thesis – Rose-Hulman Institute of Technology.* (in progress)

S. Ramesh (S. Jones: advisor), Implementation of Space-Time Finite Element Formulation in Elastodynamics, *MSc Thesis – Rose-Hulman Institute of Technology.* 2016 http://scholar.rose-hulman.edu/mechanical_engineering_grad_theses/7

A. Miner and S. Jones, Design, Testing, Analysis, and Material Properties of Carbon Fiber Reinforced Polymers. 2016 *Rose-Hulman Undergraduate Research Publications* http://scholar.rose-hulman.edu/undergrad_research_pubs/9

A. Valdescault, A. Batailly, S. Jones, Interpolation et approximation de données à l'aide de courbes et surfaces paramétriques de type B-splines, *Technical Report – McGill University*, August, 2012 http://hal.archives-ouvertes.fr/hal-00724596

REFERENCES AVAILABLE UPON REQUEST