

***Curriculum Vitae***  
**Seth Dworkin, Ph.D., P.Eng., FCSME**  
**Canada Research Chair (Tier II)**  
**in High Performance Computing for Sustainable Energy**

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Mechanical and Industrial Engineering  
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## EDUCATION

### **Yale University – New Haven, Connecticut, USA**

2009 – Ph.D., Mechanical Engineering  
2005 – M.Phil., Mechanical Engineering  
2004 – M.Sc., Mechanical Engineering

### **McMaster University – Hamilton, Ontario, Canada**

2003 – B.Eng., Mechanical Engineering, *Summa Cum Laude*

## CURRENT POSITIONS HELD

### **August 2020 – present:**

Faculty of Engineering and Architectural Science, Dimensions Faculty Chair – Ryerson University

### **April 2020 – present:**

Professor, Mechanical and Industrial Engineering – Ryerson University

### **April 2017 – present:**

Canada Research Chair (Tier II) in High Performance Computing for Sustainable Energy

## PREVIOUS POSITIONS

### **January 2015 – April, 2020:**

Associate Professor, Mechanical and Industrial Engineering – Ryerson University

### **June 2011 – December, 2014:**

Assistant Professor, Mechanical and Industrial Engineering – Ryerson University

### **April 2009 – May, 2011:**

Postdoctoral Fellow and Lecturer, Mechanical and Industrial Engineering – University of Toronto

## HONOURS

### **Awards and Accolades**

- 2020 – Research Excellence Award of The Combustion Institute, which “recognizes Combustion Institute members who have made contributions of innovative and prolific research with a significant impact on the field of combustion”
- 2019 – Inducted as a Fellow of the Canadian Society of Mechanical Engineering, for “having attained excellence in mechanical engineering and contributed actively to the progress of the profession and of society”
- 2017 – McMaster University Alumni Association Arch Award, recognizing the achievements of McMaster alumni within fifteen years of graduation

- 2016 – Ontario Ministry of Research and Innovation – Early Researcher Award (details in “Research Support” section)
- 2015 – Professional Engineers of Ontario (PEO), Engineering Medal – Young Engineer, given to one recipient annually in Ontario, for exceptional achievements in career, community and professional participation before the age of 35.
- 2015 – Granted ‘Early Tenure’ and promoted to Associate Professor after three years for “Exemplary Performance” as an Assistant Professor.
- 2014 – Ryerson University Early Research Career Excellence Award, given to one Ryerson faculty annually for research achievements within five years of becoming a faculty member (\$2000 research grant).
- 2013 – Canadian Society for Mechanical Engineering (CSME) “I. W. Smith Award,” given annually to one recipient in Canada, for outstanding achievement in creative mechanical engineering within ten years of undergraduate graduation.
- 2013 – Ryerson Faculty of Engineering and Architectural Science Scholarly Research and Creative Activity (SRC) Award, 2013 (\$2000), given to one recipient annually, at Ryerson.
- 2012 – International Conference on Clean Energy, Quebec City, Quebec, “Best Student Paper Presentation” for my co-supervised students Lele, Ekrami, and Hasib.
- 2011 – Fellow of the Collaborative Research Centre of Deutsche Forschungsgemeinschaft (DFG), German Aerospace Institute (DLR).
- 2008 – Bernard Lewis Fellowship, The International Combustion Institute, Recognizing Research Achievements and Potential.
- 2006 – Prize Teaching Fellowship, Yale University, Recognizing Excellence as a TA (\$2000).
- 2000-2003 – Dean’s Honour list, McMaster University, Recognizing Academic Achievement.
- 2001-2003 – Golden Key Honour Society (National), Recognizing Academic Achievement.

### Scholarships and Fellowships

- NSERC Post-Doctoral Fellowship (PDF), 04/2010 – 05/2011
- Ontario Ministry of Research and Innovation Post-Doctoral Fellowship, 05/2009 – 05/2011
- American Society of Engineering Education NDSEG Research Fellowship, 2005 – 2008
- NSERC PGS-D Doctoral Research Fellowship, 2005 – 2008
- NSERC Undergraduate Summer Research Assistant (USRA), 2001, 2002, 2003
- McMaster University Senate Scholarship, 2002

## PUBLICATIONS AND PRESENTATIONS

### Summary

Peer-reviewed journal publications:	51 published/accepted (+5 under review)
Non-scientific publications:	1
Media features:	15
Keynote Addresses and Invited Seminars:	10
Conference Papers with Oral Presentations:	79 published/accepted (+1 submitted)
Published Abstracts with Oral Presentations:	33 (+0 submitted)
Poster presentations:	23 presented (+0 submitted)
Technical reports:	24
Invention Disclosures	2

### Most Commonly used Journals for Publications

Combustion and Flame (12 publications)
Proceedings of the Combustion Institute (8 publications)

### Impact Factor as of 2020

4.570
5.627

Applied Energy (4 publications)	8.848
Renewable Energy (4 publications)	6.274
Combustion Theory and Modelling (4 publications)	2.076
Combustion Science and Technology (2 publications)	1.730
Energy Conversion and Management (2 publications)	8.208
Engineering Applications of Computational Fluid Mechanics (2 publications)	5.800

**Peer-reviewed Journal Publications;** Trainee's names underlined:

1. M. Jadidi, L. Di Liddo, **S. B. Dworkin**, "A Long Short-term Memory Neural Network for the Low-cost Prediction of Soot Concentration in a Time-dependent Flame," Submitted to *Energies*, *minor revision requested*.
2. R. Daneshazarian, S. Antoun, **S. B. Dworkin**, "Melting of Nano Phase Change Material (Nano-PCM) in a Cylinder Cavity: Numerical Approach," Submitted to *Int. J. Heat Mass Tran.*, *minor revision requested*.
3. S. Shukla, A. M. Bayomy, S. Antoun, A. Mwesigye, W. H. Leong, **S. B. Dworkin**, "Performance Characterization of Novel Caisson-Based Thermal Storage for Ground Source Heat Pumps," Submitted to *Renew. Energ.*, *under review*.
4. S. R. Nicholson, L. Kober, A. Mwesigye, **S. B. Dworkin**, "The Influence of Geometry on the Performance of a Helical Steel Pile as a Geo-Exchange System," Submitted to *Appl. Therm. Eng.*, *undergoing revision*.
5. A. M. Bayomy, J. Wang, **S. B. Dworkin**, "Numerical and Analytical Study of a Geo-exchange Borehole Using Conventional Grout and Bentonite-Based Backfilling Material," Submitted to *Int. J. Energy Res.*, *undergoing revision*.
6. M. Jadidi, S. Kostic, L. Zimmer, **S. B. Dworkin**, "An Artificial Neural Network for the Low-cost Prediction of Soot Emissions," *Energies*, 13 (2020) 1-17 ([Published Open Access Link](#)).
7. M. Mousa, A. M. Bayomy, J. Wang, **S. B. Dworkin**, Z. Saghir, "Underground Energy Storage Utilizing Concrete Building Foundation: Experimental and Numerical Approach," *Int. J. Energy Res.*, 44 (2020) 11643-11657 ([Published Link](#), [Open Access Link](#)).
8. A. Mansouri, L. Zimmer, **S. B. Dworkin**, N. A. Eaves, "Impact of Pressure-based HACA Rates on Soot Formation in Varying-Pressure Coflow Laminar Diffusion Flames," *Combust. Flame*, 218 (2020) 109-120 ([Published Link](#), [Open Access Link Pending](#)).
9. S. Shukla, R. Daneshazarian, A. Mwesigye, W. H. Leong, **S. B. Dworkin**, "A Novel Radiant Floor System: Detailed Characterization and Comparison with Traditional Radiant Systems," *Int. J. Green Energy*, 17 (2020) 137-148 ([Published Link](#), [Open Access Link Pending](#)).
10. A. Mwesigye, A. Kiamari, **S. B. Dworkin**, "Energetic Optimization and Exergetic Performance Investigation of an Ejector System Using HFO-1233zd(E) as a Refrigerant," *Int. J. Refrig.*, 112 (2020) 155-171 ([Published Link](#), [Open Access Link](#)).
11. A. Mansouri, N. A. Eaves, M. J. Thomson, **S. B. Dworkin**, "Influence of Pressure on Near Nozzle Flow Field and Soot Formation in Laminar Co-flow Diffusion Flames," *Combust. Theor. Model.*, 23 (2019) 536-548 ([Published Link](#), [Open Access Link](#)).
12. T. Dembeck-Kerekes, J. P. Fine, J. Friedman, **S. B. Dworkin**, J. J. McArthur, "Performance of Variable Flow Rates for Photovoltaic-Thermal Collectors and the Determination of Optimal Flow Rates," *Sol. Energy*, 182 (2019) 148-160 ([Published Link](#), [Open Access Link](#)).

13. L. Zimmer, S. Kostic, **S. B. Dworkin**, “A Novel Soot Concentration Field Estimator Applied to Sooting Ethylene/air Laminar Flames,” *Eng. Appl. Comp. Fluid.*, 13 (2019) 470-480 ([Open Access Link](#)).
14. J. P. Fine, **S. B. Dworkin**, J. Friedman, “A Methodology for Predicting Hybrid Solar Panel Performance in Different Operating Modes,” *Renew. Energ.*, 130 (2019) 1198-1206 ([Published Link](#), [Open Access Link](#)).
15. A. Mwesigye, **S. B. Dworkin**, “Performance Analysis and Optimization of an Ejector Refrigeration 1 System Using Alternative Working Fluids under Critical and Subcritical Operation Modes,” *Energy Convers. Manag.*, 176 (2018) 209-226 ([Published Link](#), [Open Access Link](#)).
16. M. Sahafzadeh, **S. B. Dworkin**, L. W. Kostiuk, “Predicting the Consumption Speed of a Premixed Flame Subjected to Unsteady Stretch Rates,” *Combust. Flame*, 196 (2018) 237-248 ([Published Link](#), [Open Access Link](#)).
17. J. P. Fine, H. V. Nguyen, J. Friedman, W. H. Leong, **S. B. Dworkin**, “A Simplified Ground Thermal Response Model for Analyzing Solar-Assisted Ground Source Heat Pump Systems,” *Energy Convers. Manag.*, 165 (2018) 276-290 ([Published Link](#), [Open Access Link](#)).
18. R. Alexander, S. Bozorgzadeh, A. Khosousi, **S. B. Dworkin**, “Development and Testing of a Soot Particle Concentration Estimator Using Lagrangian Post-processing,” *Eng. Appl. Comp. Fluid.*, 12 (2018) 236–249 ([Published Open Access Link](#)).
19. A. Veshkini, **S. B. Dworkin**, “A Computational Study of Soot Formation and Flame Structure of Coflow Laminar Methane/air Diffusion Flames Under Microgravity and Normal Gravity,” *Combust. Theor. Model.*, 21 (2017) 864-878 ([Published Link](#), [Open Access Link](#)).
20. M. Sahafzadeh, L. W. Kostiuk, **S. B. Dworkin**, “Transient Response of a Laminar Premixed Flame to a Radially Diverging/Converging Flow,” *Combust. Flame*, 179 (2017) 51-62 ([Published Link](#), [Open Access Link](#)).
21. A. A. Alaica, **S. B. Dworkin**, “Characterizing the Effect of an Off-Peak Ground Pre-Cool Control Strategy on Hybrid Ground Source Heat Pump Systems,” *Energ. Buildings*, 137 (2017) 46-59 ([Published Link](#), [Open Access Link](#)).
22. J. P. Fine, J. Friedman, **S. B. Dworkin**, “Detailed Modeling of a Novel Photovoltaic Thermal Cascade Heat Pump Domestic Water Heating System,” *Renew. Energ.*, 101 (2017) 500-513 ([Published Link](#), [Open Access Link](#)).
23. N. A. Eaves, **S. B. Dworkin**, M. J. Thomson, “Assessing Relative Contributions of PAHs to Soot Mass by Reversible Heterogeneous Nucleation and Condensation,” *P. Combust. Inst.*, 36 (2017) 935-945 ([Published Link](#), [Open Access Link](#)).
24. N. A. Eaves, **S. B. Dworkin**, M. J. Thomson, “CoFlame: A Refined and Validated Numerical Algorithm for Modeling Sooting Laminar Diffusion Flames,” *Comput. Phys. Commun.*, 207 (2016) 464-477 ([Published Link](#), [Open Access Link](#)).
25. Y. L. E. Law, **S. B. Dworkin**, “Characterization of the Effects of Borehole Configuration and Interference with Long Term Ground Temperature Modelling of Ground Source Heat Pumps,” *Appl. Energ.*, 179 (2016) 1032-1047 ([Published Link](#), [Open Access Link](#)).
26. A. Veshkini, **S. B. Dworkin**, M. J. Thomson, “Understanding Soot Particle Size Evolution in Laminar Ethylene/Air Diffusion Flames Using Novel Soot Coalescence Models,” *Combust. Theor. Model.*, 20 (2016) 707-734 (\*\*Cover article\*\*) ([Published Link](#)).

27. A. Veshkini, N. A. Eaves, **S. B. Dworkin**, M. J. Thomson, "Application of PAH-Condensation Reversibility in Modeling Soot Growth in Laminar Premixed and Nonpremixed Flames," *Combust. Flame.*, 167 (2016) 335-352 ([Published Link](#)).
28. H. V. Nguyen, Y. L. E. Law, X. Zhou, P. R. Walsh, W. H. Leong, **S. B. Dworkin**, "A Techno-economic Analysis of Heat-Pump Entering Fluid Temperatures, and CO<sub>2</sub> Emissions for Hybrid Ground-Source Heat Pump Systems," *Geothermics*, 61 (2016) 24-34 ([Published Link](#), [Open Access Link](#)).
29. N. Kuzmic, Y. L. E. Law, **S. B. Dworkin**, "Numerical Heat Transfer Comparison Study of Hybrid and Non-hybrid Ground Source Heat Pump Systems," *Appl. Energ.*, 165 (2016) 919-929 ([Published Link](#), [Open Access Link](#)).
30. N. Ekrami, Z. M. Hasib, **S. B. Dworkin**, A. S. Fung, D. Naylor, "Residential Application of a Natural Gas Based Tri-generation System for Cold Climates," *ASHRAE-Transactions* 121 (2015) 504-510.
31. A. Khosousi, **S. B. Dworkin**, "Soot Surface Reactivity during Surface Growth and Oxidation in Laminar Diffusion Flames," *Combust. Flame*, 162:12 (2015) 4523-4532.
32. J. P. Fine, J. Friedman, **S. B. Dworkin**, "Transient Analysis of a Photovoltaic Thermal Heat Input Process with Thermal Storage," *Appl. Energ.*, 160 (2015) 308-320.
33. A. Khosousi, F. Liu, **S. B. Dworkin**, N. A. Eaves, M. J. Thomson, X. He, Y. Dai, S. Shuai, J. Wang, "Experimental and Numerical Study of Soot Formation in Laminar Coflow Diffusion Flames of Gasoline/Ethanol Blends," *Combust. Flame* 162:10 (2015) 3925-3933.
34. A. Khosousi, **S. B. Dworkin**, "Detailed Modelling of Soot Oxidation by O<sub>2</sub> and OH in Laminar Diffusion Flames," *P. Combust. Inst.* 35 (2015) 1903-1910.
35. N. A. Eaves, **S. B. Dworkin**, M. J. Thomson, "The Importance of Reversibility in Modeling Soot Nucleation and Condensation Processes," *P. Combust. Inst.* 35 (2015) 1787-1794.
36. N. Ekrami, Z. M. Hasib, P. Lele, **S. B. Dworkin**, A. S. Fung, D. Naylor, "Preliminary Test and Analysis of A Stirling Engine Based Residential Tri-generation system at TRCA Archetype Sustainable House," *ASHRAE-Transactions* 120:2 (2014) 273-284.
37. A. Veshkini, **S. B. Dworkin**, M. J. Thomson, "A Soot Particle Surface Reactivity Model Applied to a Wide Range of Laminar Ethylene/Air Flames," *Combust. Flame.* 161:12 (2014) 3191-3200.
38. H. V. Nguyen, Y. L. E. Law, M. Alavy, P. R. Walsh, W. H. Leong, **S. B. Dworkin**, "An Analysis of the Factors affecting Hybrid Ground-Source Heat Pump Installation Potential in North America," *Appl. Energ.* 125 (2014) 28-38.
39. M. Alavy, **S. B. Dworkin**, W. H. Leong, "A Design Methodology and Analysis of Combining Multiple Buildings onto a Single District Hybrid Ground Source Heat Pump System," *Renew. Energ.*, 66 (2014) 515-522.
40. V. Chernov, M. J. Thomson, **S. B. Dworkin**, N. A. Slavinskaya, U. Riedel, "Soot Formation with C<sub>1</sub> and C<sub>2</sub> Fuels using an Improved Chemical Mechanism for PAH Growth," *Combust. Flame*, 161 (2014) 592-601.
41. N. A. Eaves, M. J. Thomson, **S. B. Dworkin**, "The Effect of Conjugate Heat Transfer on Soot Formation Modelling at Elevated Pressures," *Combust. Sci. Technol.*, 85 (2013) 1799-1819.
42. M. Alavy, H. V. Nguyen, W. H. Leong, **S. B. Dworkin**, "A Methodology and Computerized Approach for Optimizing Hybrid Ground Source Heat Pump System Design," *Renew. Energ.*, 57 (2013) 404-412.

43. M. Saffaripour, M. Kholghy, Q. Zhang, **S. B. Dworkin**, M. J. Thomson, "A Numerical and Experimental Study of Soot Formation in a Laminar Coflow Diffusion Flame of a Jet A-1 Surrogate," *P. Combust. Inst.*, 34 (2013) 1057-1065.
44. S. A. Esfarjani, **S. B. Dworkin**, J. Mostaghimi, K. S. Kim, C. T. Kingston, B. Simard, G. Soucy, "Detailed Numerical Simulation of Single-Walled Carbon Nanotube Synthesis in a Radio-Frequency Induction Thermal Plasma System," *J. Phys.: Conf. Ser.*, 406 (2012) 012011.
45. F. Liu, **S. B. Dworkin**, M. J. Thomson, G. J. Smallwood, "Modeling DME Addition Effects to Fuel on PAH and Soot in Laminar Coflow Ethylene/air Diffusion Flames using two PAH Mechanisms," *Combust. Sci. Technol.*, 184 (2012) 966-979.
46. N. A. Eaves, A. Veshkini, C. Riese, Q. Zhang, **S. B. Dworkin**, M. J. Thomson, "A Numerical Study of High Pressure, Laminar, Sooting, Ethane-Air Coflow Diffusion Flames," *Combust. Flame*, 159:10 (2012) 3179-3190.
47. V. Chernov, Q. Zhang, M. J. Thomson, **S. B. Dworkin**, "Numerical Investigation of Soot Formation Mechanisms in Partially-premixed Ethylene-air Co-flow Flames," *Combust. Flame*, 159:9 (2012) 2789-2798.
48. **S. B. Dworkin**, Q. Zhang, M. J. Thomson, N. A. Slavinskaya, U. Riedel, "Application of an Enhanced PAH Growth Model to Soot Formation in a Laminar Coflow Ethylene/Air Diffusion Flame," *Combust. Flame*, 158:9 (2011) 1682-1695.
49. N. A. Slavinskaya, U. Riedel, **S. B. Dworkin**, M. J. Thomson, "Detailed Numerical Modelling of PAH Formation and Growth in Non-Premixed Ethylene and Ethane Flames," *Combust. Flame*, 159:3 (2012) 979-995.
50. M. Saffaripour, P. Zabeti, **S. B. Dworkin**, Q. Zhang, H. Guo, F. Liu, G. J. Smallwood, M. J. Thomson, "A Numerical and Experimental Study of a Laminar Sooting Coflow Jet-A1 Diffusion Flame," *P. Combust. Inst.*, 33 (2011) 601-608.
51. **S. B. Dworkin**, J. A. Cooke, B. A. V. Bennett, M. D. Smooke, R. J. Hall, M. B. Colket, "Distributed-Memory Parallel Computation of a Forced, Time-Dependent, Sooting, Ethylene/Air Coflow Diffusion Flame," *Combust. Theor. Model.*, 13:5 (2009) 795-822. (\*\*Cover article\*\*)
52. **S. B. Dworkin**, M. D. Smooke, V. Giovangigli, "The Impact of Detailed Multicomponent Transport and Thermal Diffusion Effects on Particulate Formation in Ethylene/Air Flames," *P. Combust. Inst.*, 32:1 (2009) 1165-1172.
53. **S. B. Dworkin**, A. M. Schaffer, B. C. Connelly, M. B. Long, M. D. Smooke, M. P. Puccio, B. McAndrews, J. H. Miller, "Measurements and Calculations of Formaldehyde Concentrations in a Methane/N<sub>2</sub>/Air, Non-Premixed Flame: Implications for Heat Release Rate," *P. Combust. Inst.*, 32:1 (2009) 1311-1318.
54. **S. B. Dworkin**, B. C. Connelly, A. M. Schaffer, B. A. V. Bennett, M. B. Long, M. D. Smooke, M. P. Puccio, B. McAndrews, J. H. Miller, "Computational and Experimental Study of a Forced, Time-Dependent, Methane-Air Coflow Diffusion Flame," *P. Combust. Inst.*, 31:1 (2007) 971-978.
55. **S. B. Dworkin**, B. A. V. Bennett, M. D. Smooke, "A Mass-Conserving Vorticity-Velocity Formulation with Application to Nonreacting and Reacting Flows," *J. Comput. Phys.*, 215:2 (2006) 430-447.
56. **S. B. Dworkin**, T. J. Nye, "Image Processing for Machine Vision Measurement of Hot Formed Parts," *J. Mater. Process. Tech.*, 174:1-3 (2006) 1-6.

## Non-scientific Publications

1. “Clearing the Air: How HPC is Helping Improve our Air Quality,” written by **S. B. Dworkin**, *SciNet Portal Quarterly Newsletter* 1 (2010) p.10.

## Media Features

1. Featured in “Investing in the Cities of the Future at Ryerson,” *Innovating Canada*, published in the National Post print edition, December 17, 2020, <https://www.innovatingcanada.ca/environment/investing-in-the-cities-of-the-future-at-ryerson/>
2. Featured in “The green building revolution will start from the ground up,” *Construction Links Network*, November 9, 2020, <https://constructionlinks.ca/news/the-green-building-revolution-will-start-from-the-ground-up/>
3. Interviewed by the Canadian Broadcasting Corporation (CBC) Radio Program “Here and Now” on the City of Toronto’s Plan to Create Renewable Natural Gas from Green Bin Organic Waste. July 20, 2018.
4. Quoted in “Biofuel mixture could cut jet particle emissions by more than half, study suggests,” March 18, 2017 <http://www.cbc.ca/news/technology/biofuels-reduce-effects-climate-change-1.4026752>
5. “Partnering to improve output of geothermal systems,” *Ryerson Innovation Newsletter*, Dec 13, 2016 <http://www.ryerson.ca/research/publications/newsletter/nov-dec-2016/#6>
6. “CTV Toronto: Lights out for Earth Hour,” *CTV Toronto News*,” March 29, 2014, <http://toronto.ctvnews.ca/video?clipId=315890>
7. “Super-Computing to Save the Planet,” *The Eyeopener*, April 3, 2013, <http://theeyeopener.com/2013/04/supercomputing-to-save-the-planet/>
8. “Supercomputing Greener Energy,” *Ryerson Today*, March 22, 2013, [http://www.ryerson.ca/news/news/Research\\_News/20130322\\_dworkin.html](http://www.ryerson.ca/news/news/Research_News/20130322_dworkin.html)
9. “Bellair Ventures Inc. Announces the Collaboration of Clean Energy Developments Corp. and Ryerson University to Develop Cleantech Software,” *MarketWire.com*, August 7, 2012, <http://www.marketwire.com/press-release/bellair-ventures-inc-announces-collaboration-clean-energy-developments-corp-ryerson-tsx-venture-bvi-1687647.htm>
10. “Avoiding the Next Big Blackout,” *Ryerson Today*, May 18, 2012, [http://www.ryerson.ca/ryersontoday/stories/20120518\\_cue.html](http://www.ryerson.ca/ryersontoday/stories/20120518_cue.html)
11. “CUE Showcase: Avoiding the Next Big Blackout,” *Ryerson Centre for Urban Energy, E-Newsletter* May 11, 2012
12. “Micro Tri-Generation of Electricity, Building Heating and Cooling from Natural Gas,” *Ryerson Centre for Urban Energy*, Fall, 2011, [http://www.cue.ryerson.ca/cue/research/efficiency\\_microtrigen.html](http://www.cue.ryerson.ca/cue/research/efficiency_microtrigen.html)
13. “Canadian Supercomputers Assigned Homework”, *SciNet Computing Consortium*, March, 2011, <https://www.scinethpc.ca/canadian-supercomputers-assigned-their-homework-on-global-problems/>
14. “Largest Supercomputer Simulations of Bio-jet-fuel Will Help Make Fuels Clean and Green”, *Newswire*, June, 2010, <http://www.newswire.ca/en/story/583603/largest-supercomputer-simulations-of-bio-jet-fuel-will-help-make-fuels-clean-and-green>
15. “Largest Supercomputer Simulations Yet of Bio-Jetfuel Will Help Identify Optimal Mixtures”, *GreenCarCongress*, June, 2010, <http://www.greencarcongress.com/2010/06/dworkin-20100608.html>

### Keynote Addresses and Invited Seminars

1. “Understanding & Predicting Soot Formation from Combustion” *University of British Columbia*, postponed due to pandemic, originally scheduled for March 24, 2020.
2. “Clearing the Air: High-Performance Computing in Combustion Emissions Research” Keynote Address for the Compute Canada Board of Directors, Compute Canada annual meeting, *Ryerson University*, December 4, 2019.
3. “Hybrid Geothermal Solutions: The Ryerson Method for Analyzing Geothermal Potential” McMaster Innovation Park, *McMaster University*, Hamilton, Canada, April 14, 2016.
4. “HVAC Design using Hybrid Geothermal Systems” MCW Consultants Ltd., Toronto, Canada, March 8, 2015.
5. “Addressing Atmospheric Emissions Through the Development of Novel Numerical Algorithms and High-Performance Computation” Lassonde School of Engineering, *York University*, Toronto, Canada, February 26, 2013.
6. “Development of a Solar and Natural Gas Powered Air Conditioner: a Micro Tri-generation System” Centre for Urban Energy Hosts the Ontario Minister of Energy, *Ryerson University*, Toronto, Canada, March 22, 2012.
7. “Recent Advances in the Modelling and Understanding of Soot Formation in Combustion: An Application of Large-Scale Computation” Mechanical and Mechatronics Engineering, *University of Waterloo*, Waterloo, Canada, August 19, 2011.
8. “Recent Developments in Flame and Soot Modelling: An Application of Large-Scale Computation” The *German Aerospace Center (DLR)*, Stuttgart, Germany, June 27, 2011.
9. “Computational Combustion: Toward the use of Sustainable and Alternative Fuels” SciNet Computing Consortium, *University of Toronto*, Toronto, Canada, February 9, 2011.
10. “Computational and Experimental Study of Sooting and Nonsooting Forced, Time-Dependent, Coflow Diffusion Flames,” Department of Propulsion and Thermofluid-Dynamics, *Universidad Carlos III de Madrid*, Madrid, Spain, September 26, 2008.

### Conference Papers with Oral Presentations

1. “Computational Fluid Dynamics Modelling of Cough Droplet Trajectories and Mask Material Effectiveness,” L. R. Kober, S. Antoun, M. Jadidi, **S. B. Dworkin**, *Canadian Society for Mechanical Engineering International Congress 2021*, Charlottetown, PEI, Canada, June 27 – 30, 2021, *submitted*.
2. “Artificial Neural Network for the Prediction of Penetration Height of Liquid Jets in Gaseous Crossflows: A Case Study of Aerated Elliptical Liquid Jets,” M. Jadidi, S. Shaghaghian, **S. B. Dworkin**, A. Dolatabadi, *ICLASS 2021, 15th Triennial International Conference on Liquid Atomization and Spray Systems*, Edinburgh, UK, August 29 – September 2, 2021, *accepted*.
3. “Multi-Objective Optimization of a NanoPCM Based Thermal Energy Storage System Based on Genetic Algorithm,” R. Daneshazarian, S. Antoun, A. Bayomy, **S. B. Dworkin**, *8th International Building Physics Conference - IBPC2021*, Copenhagen, Denmark, August 25 – August 27, 2021, *accepted*.
4. “Numerical Investigation of the Thermal Performance of a Steel Helical Energy Pile Incorporating Latent Energy Storage,” A. Mwesigye, **S. B. Dworkin**, *The American Society of Mechanical Engineers, POWER2020*, Anaheim, California, USA, August 2-6, 2020, *submitted, postponed due to pandemic*.



5. "Transient Thermal Performance and Ground Temperature Variation for a Heat Pump System Using High Thermal Conductivity Materials and Varying Borehole Sizes," A. Mwesigye, H. V. Nguyen, R. Daneshazarian, **S. B. Dworkin**, *International Mechanical Engineering Congress & Exposition*, Salt Lake City, Utah, USA, November 11-14, 2019.
6. "Thermodynamic Analysis and Performance Comparison of an Ejector Refrigeration System using HFO-1233zd(E) and R245fa," A. Mwesigye, **S. B. Dworkin**, *International Mechanical Engineering Congress & Exposition*, Salt Lake City, Utah, USA, November 11-14, 2019.
7. "Modelling and Optimization of Helical Steel Piles as In-Ground Heat Exchangers for Ground-Source Heat Pumps," S. R. Nicholson, **S. B. Dworkin**, *10<sup>th</sup> International Conference on Indoor Air Quality, Ventilation, and Energy Conservation in Buildings*, Bari, Italy, September 5-7, 2019.
8. "Experimental and Numerical Investigation of a Thermal Storage Medium for Ground Source Heat Pump Applications," A. Mwesigye, H. V. Nguyen, D. Salt, **S. B. Dworkin**, *10<sup>th</sup> International Conference on Indoor Air Quality, Ventilation, and Energy Conservation in Buildings*, Bari, Italy, September 5-7, 2019.
9. "The Thermodynamic Investigation and Optimization of an Ejector Refrigeration System using R1233zd(E) as a Working Fluid," A. Mwesigye, A. Kiamari, **S. B. Dworkin**, *10<sup>th</sup> International Conference on Indoor Air Quality, Ventilation, and Energy Conservation in Buildings*, Bari, Italy, September 5-7, 2019.
10. "Detailed Characterization of Novel Radiant Floor Heating and Cooling Systems," S. Shukla, R. Daneshazarian, A. Mwesigye, **S. B. Dworkin**, J. Swift, *CSME International Congress 2019*, London, Ontario, Canada, June 2-5, 2019.
11. "A Soot Particle Concentration Estimator Applied to a Transient Turbulent Non-premixed Jet Flame," L. Zimmer, **S. B. Dworkin**, A. Attili, H. Pitsch, F. Bisetti, *Combustion Institute Canadian Section Spring Technical Meeting*, Kelowna, British Columbia, Canada, May 13-16, 2019.
12. "Thermal Behaviour of Phase Change Material (PCM) inside a Cavity: Numerical Approach," Md A. A. Shak, A. M. Bayomy, **S. B. Dworkin**, J. Wang, M. Z. Saghir, *International Conference on Computational & Experimental Engineering and Sciences*, Tokyo, Japan, March 25-28, 2019.
13. "Performance Analysis of a Single Underground Thermal Storage Borehole Using Phase Change Material," A. M. Bayomy, H. V. Nguyen, **S. B. Dworkin**, *International Ground Source Heat Pump Association Technical Research Conference*, Stockholm, Sweden, September 18-20, 2018.
14. "Assessment of Aliphatic Based Soot Inception in Laminar Diffusion Flames," N. Ceranic, **S. B. Dworkin**, *Proceedings of The Canadian Society for Mechanical Engineering International Congress 2018*, Toronto, Ontario, Canada, May 27-30, 2018. (**\*\*\*Awarded Second Prize in the Student Paper Competition of the CSME, \$750\*\*\***)
15. "Predicting the Consumption Speed of a Premixed Flame Subjected to an Unsteady Stretch Rate," M. Sahafzadeh, **S. B. Dworkin**, L. W. Kostiuk, *Proceedings of The Canadian Society for Mechanical Engineering International Congress 2018*, Toronto, Ontario, Canada, May 27-30, 2018.
16. "Numerical Study of Soot Concentration in Co-flow Laminar Ethylene-air Diffusion Flames at Varying Pressures," A. Mansouri, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Toronto, Ontario, Canada, May 14-17, 2018.
17. "Parameter Study of a Soot Particle Concentration Estimator Applied to Sooting Ethylene/air Laminar Flames," L. Zimmer, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Toronto, Ontario, Canada, May 14-17, 2018.

18. "Predicting the Consumption Speed of a Premixed Flame Subjected to an Unsteady Stretch Rate," M. Sahafzadeh, **S. B. Dworkin**, L. W. Kostiuk, *Combustion Institute Canadian Section Spring Technical Meeting*, Toronto, Ontario, Canada, May 14-17, 2018.
19. "An Assessment of Aliphatic Based Soot Inception in Laminar Diffusion Flames," N. Ceranic, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Toronto, Ontario, Canada, May 14-17, 2018.
20. "Soot Concentration Estimation Using Lagrangian Post-Processing for Laminar Flames of Varying Dilution and Pressures," R. Alexander, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Montreal, Quebec, Canada, May 15-18, 2017.
21. "Numerical Investigation of Transfer Function Models of a Laminar Premixed Flame Using Frequency Response Analysis," M. Sahafzadeh, **S. B. Dworkin**, L. W. Kostiuk, *Combustion Institute Canadian Section Spring Technical Meeting*, Montreal, Quebec, Canada, May 15-18, 2017.
22. "Soot Particle Concentration Estimator Applied to a Transient Sooting Ethylene/air System," L. Zimmer, R. Alexander, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Montreal, Quebec, Canada, May 15-18, 2017.
23. "Numerical Simulation of Laminar Diffusion Flames with Aliphatic Collision Inception," N. Ceranic, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Montreal, Quebec, Canada, May 15-18, 2017.
24. "Modelling of Alternative Borehole Configurations for Geo-Exchange," Y. L. E. Law, **S. B. Dworkin**, *International Ground Source Heat Pump Association Technical Research Conference and Expo 2017*, Denver, Colorado, USA, March 14-16, 2017 ([Link](#)).
25. "Effect of an Off-peak Ground Pre-cool Control Strategy on Hybrid Ground-source Heat Pump Systems," A. A. Alaica, **S. B. Dworkin**, *International Ground Source Heat Pump Association Technical Research Conference and Expo 2017*, Denver, Colorado, USA, March 14-16, 2017 ([Link](#)).
26. "Analysis of a Photovoltaic Thermal Domestic Water Heating System," J. P. Fine, J. Friedman, **S. B. Dworkin**, *CSME International Congress 2016*, Kelowna, British Columbia, Canada, June 26-29, 2016.
27. "The Effect of an Off-Peak Ground Pre-Cool Control Strategy on a Hybrid Ground Source Heat Pump System," A. A. Alaica, **S. B. Dworkin**, *CSME International Congress 2016*, Kelowna, British Columbia, Canada, June 26-29, 2016.
28. "A Study of the Effect of Borehole Configurations on Ground Temperature in Ground Source Heat Pumps," Y. L. E. Law, **S. B. Dworkin**, *CSME International Congress 2016*, Kelowna, British Columbia, Canada, June 26-29, 2016.
29. "Analysis and Comparison of a Photovoltaic Thermal Domestic Water Heating System with an Evacuated Tube System," J. P. Fine, J. Friedman, **S. B. Dworkin**, *Energy and Water Symposium and Industry Summit*, Windsor, Ontario, Canada, June 22-23, 2016.
30. "Assessing Relative Contributions of PAHs to Soot Mass by Reversible Heterogeneous Nucleation and Condensation," N. A. Eaves, **S. B. Dworkin**, M. J. Thomson, *Combustion Institute Canadian Section Spring Technical Meeting*, Waterloo, Ontario, Canada, May 10-12, 2016.
31. "An Investigation on the Effect of Positive and Negative Stretch on the Structure of Laminar Premixed Flame," M. Sahafzadeh, L. W. Kostiuk, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Waterloo, Ontario, Canada, May 10-12, 2016.

32. "Development of a Soot Particle Concentration Estimator Using Lagrangian Post-processing for Industrial Combustion Applications," R. Alexander, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Waterloo, Ontario, Canada, May 10-12, 2016.
33. "Development and Validation of a Partially Coupled Soot Model for Turbulent Kerosene Combustion in view of Application to Gas Turbines," B. Shahriari, **S. B. Dworkin**, M. J. Thomson, *ASME Turbo Expo 2015*, Montreal, Quebec, Canada, June 15-19, 2015.
34. "Role of PAH-Soot Equilibrium on Predicting Soot Particle Size Distributions in Laminar Premixed Flames," A. Veshkini, N. A. Eaves, **S. B. Dworkin**, M. J. Thomson, *9th U.S. National Combustion Meeting*, Cincinnati, Ohio, May 17-20, 2015.
35. "Transient Response of a Laminar Premixed Flame to a Radially Diverging/converging Flow," M. Sahafzadeh, L. W. Kostiuik, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Saskatoon, Saskatchewan, Canada, May 11-14, 2015.
36. "Refinement and Analysis of a Soot Particle Concentration Estimator," R. Alexander, S. Bozorgzadeh, A. Khosousi, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Saskatoon, Saskatchewan, Canada, May 11-14, 2015.
37. "Development of a Unique Function for Soot Surface Reactivity during Oxidation and Surface Growth in Laminar Diffusion Flames," A. Khosousi, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Saskatoon, Saskatchewan, Canada, May 11-14, 2015.
38. "Numerical Simulation of Ground Temperature from Long Term Operation of Ground Source Heat Pumps," Y. L. E. Law, N. Kuzmic, **S. B. Dworkin**, *International Conference & Exhibition on Clean Energy*, Quebec City, Quebec, Canada, October 20-22, 2014.
39. "Preliminary Analysis of a Hybrid Solar Desalination System," J. P. Fine, J. Friedman, **S. B. Dworkin**, *International Conference & Exhibition on Clean Energy*, Quebec City, Quebec, Canada, October 20-22, 2014.
40. "Feasibility Analysis of a Natural Gas Based Tri-generation system In Cold Climate" N. Ekrami, Z. M. Hasib, **S. B. Dworkin**, A. S. Fung, D. Naylor, *ASHRAE annual Conference*, Seattle, USA, June 28-July 2, 2014.
41. "A Techno-economic Analysis of CO<sub>2</sub> Emissions for Hybrid Ground-Source Heat Pumps," H. V. Nguyen, Y. L. E. Law, X. Zhou, W. H. Leong, **S. B. Dworkin**, *CSME International Congress*, Toronto, Ontario, June 1-4, 2014.
42. "Experimental and Numerical Study of Soot Formation in Laminar Coflow Gasoline/Ethanol Diffusion Flames," A. Khosousi, **S. B. Dworkin**, F. Liu, N. A. Eaves, M. J. Thomson, X. He, Y. Dai, S. Shuai, J. Wang, *Combustion Institute Canadian Section Spring Technical Meeting*, Windsor, Ontario, May 12-15, 2014.
43. "Effect of Nucleation Reversibility on Predicting Soot Particle Size Distributions in Premixed Flames," A. Veshkini, N. A. Eaves, **S. B. Dworkin**, M. J. Thomson, *Combustion Institute Canadian Section Spring Technical Meeting*, Windsor, Ontario, May 12-15, 2014.
44. "Development of a Soot Model for Gas Turbine Applications," B. Shahriari, M. J. Thomson, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Windsor, Ontario, May 12-15, 2014.
45. "The Importance of Reversibility in Modeling Soot Nucleation and Condensation Processes," N. A. Eaves, **S. B. Dworkin**, M. J. Thomson, *Combustion Institute Canadian Section Spring Technical Meeting*, Windsor, Ontario, May 12-15, 2014.

46. "A Soot Particle Concentration Estimator for Industrial Combustion Applications," S. Bozorgzadeh, A. Khosousi, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Windsor, Ontario, May 12-15, 2014.
47. "Detailed Modelling of Soot Oxidation by O<sub>2</sub> and OH in Laminar Diffusion Flames," A. Khosousi, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Windsor, Ontario, May 12-15, 2014.
48. "An Experimental and Modeling Study of Soot Formation in Laminar Coflow Diffusion Flames of Conventional and Alternative Jet Fuel," M. Saffaripour, A. Veshkini, M. Kholghy, **S. B. Dworkin**, M. J. Thomson, *European Combustion Meeting Flames Workshop*, Lund, Sweden, June 25-28, 2013.
49. "Modeling Soot Formation in Coflow Flames at Elevated Pressures," N. A. Eaves, **S. B. Dworkin**, M. J. Thomson, *European Combustion Meeting*, Lund, Sweden, June 25-28, 2013.
50. "Conversion of a Residential Cogeneration System to Micro Tri-generation," P. Lele, N. Ekrami, Z. M. Hasib, **S. B. Dworkin**, A. S. Fung, D. Naylor, *3<sup>rd</sup> Climate Change Technology Conference*, Montreal, Quebec, May 27-29, 2013.
51. "Understanding Optimization Factors in Sizing Ground-Source Heat Pumps in Hybrid Systems," H. V. Nguyen, M. A. Ghahfarokhy, W. H. Leong, **S. B. Dworkin**, *3<sup>rd</sup> Climate Change Technology Conference*, Montreal, Quebec, May 27-29, 2013.
52. "Modeling Soot Particle Nucleation as a Rare Event," N. A. Eaves, M. J. Thomson, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Quebec City, Quebec, May 13-16, 2013.
53. "Detailed Study of Soot Oxidation in Laminar Diffusion Flames by O<sub>2</sub> and OH," A. Khosousi, M. J. Thomson, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Quebec City, Quebec, May 13-16, 2013.
54. "Conversion of a Residential Cogeneration System to Micro Tri-generation," P. Lele, N. Ekrami, Z. M. Hasib, **S. B. Dworkin**, A. S. Fung, D. Naylor, *ICCE 2012: International Conference on Clean Energy*, Quebec City, Quebec, September 10-11, 2012. (\*\*\*)Students Lele, Ekrami and Hasib were awarded "Best Student Paper Presentation" for this contribution(\*\*\*)
55. "Numerical Methodology for Optimum Ground Source Heat Pump Systems Design," M. A. Ghahfarokhy, H. V. Nguyen, **S. B. Dworkin**, W. H. Leong, *11th International Conference on Sustainable Energy technologies (SET-2012)*, Vancouver, British Columbia, September 2-5, 2012.
56. "Feasibility Study of Residential Tri-generation System based on LiCl-H<sub>2</sub>O Adsorption Chiller," N. Ekrami, Z. M. Hasib, **S. B. Dworkin**, A. S. Fung, D. Naylor, *11th International Conference on Sustainable Energy technologies (SET-2012)*, Vancouver, British Columbia, September 2-5, 2012.
57. "Feasibility Study of Residential Tri-generation System based on LiCl-H<sub>2</sub>O Adsorption Chiller," N. Ekrami, Z. M. Hasib, **S. B. Dworkin**, A. S. Fung, D. Naylor, *CSME International Congress*, Winnipeg, Manitoba, June 4-6, 2012.
58. "Developing of a Numerical Model to Predict Smoking and Non-Smoking Behaviour in Laminar Diffusion Flames," A. Khosousi, M. J. Thomson, **S. B. Dworkin**, *Combustion Institute Canadian Section Spring Technical Meeting*, Toronto, Ontario, May 13-16, 2012.
59. "A Numerical and Experimental Study of Soot Formation in a Laminar Coflow Diffusion Flame of a Jet A-1 Surrogate," M. Saffaripour, M. Kholghy, Q. Zhang, **S. B. Dworkin**, M. J. Thomson, *Combustion Institute Canadian Section Spring Technical Meeting*, Toronto, Ontario, May 13-16, 2012.

60. "Numerical Predictions of Soot Volume Fractions in Partially-premixed Ethylene-air Coflow Flames," V. Chernov, Q. Zhang, **S. B. Dworkin**, M. J. Thomson, *Combustion Institute Canadian Section Spring Technical Meeting*, Toronto, Ontario, May 13-16, 2012.
61. "The Effect of Pressure and Conjugate Heat Transfer on Soot Formation Modelling," N. A. Eaves, **S. B. Dworkin**, M. J. Thomson, *Combustion Institute Canadian Section Spring Technical Meeting*, Toronto, Ontario, May 13-16, 2012.
62. "A Numerical Investigation on of a Simplified Two-Equation Soot Model in Methane/Air Co-flow Laminar Diffusion Flames at 1 to 40 atmospheres for use in Natural Gas Engine Simulations," J. J. Shum, M. J. Thomson, Q. Zhang, **S. B. Dworkin**, J. Huang, *Combustion Institute Canadian Section Spring Technical Meeting*, Toronto, Ontario, May 13-16, 2012.
63. "A Soot Particle Surface Ageing Model Applied to Laminar Ethylene/Air Diffusion Flames," A. Veshkini, **S. B. Dworkin**, M. J. Thomson, *Combustion Institute Canadian Section Spring Technical Meeting*, Toronto, Ontario, May 13-16, 2012.
64. "CFD Simulation of Single-walled Carbon Nanotube Growth in an RF Induction Thermal Plasma Process with a Chemistry Model," S. A. Esfarjani, **S. B. Dworkin**, J. Mostaghimi, K. S. Kim, B. Simard, *42<sup>nd</sup> AIAA Thermophysics Conference*, Honolulu, Hawaii, June 27-30, 2011.
65. "Application of a PAH Growth Mechanism to Soot Formation in Laminar Diffusion Flames," **S. B. Dworkin**, Q. Zhang, M. J. Thomson, N. A. Slavinskaya, U. Riedel, *Combustion Institute Canadian Section Spring Technical Meeting*, Winnipeg, Manitoba, May 8-11, 2011.
66. "Modelling Soot Particle Surface Oxidation in Laminar Flames," **S. B. Dworkin**, Q. Zhang, M. J. Thomson, *Combustion Institute Canadian Section Spring Technical Meeting*, Winnipeg, Manitoba, May 8-11, 2011.
67. "Numerical Analysis of PAH Growth Mechanisms in a Sooting Laminar Methane-air Diffusion Flame," V. Chernov, **S. B. Dworkin**, Q. Zhang, M. J. Thomson, *Combustion Institute Canadian Section Spring Technical Meeting*, Winnipeg, Manitoba, May 8-11, 2011.
68. "Numerical Study of DME Addition to Fuel on PAHs and Soot Formation in a Laminar Coflow Ethylene/Air Diffusion Flame," F. Liu, **S. B. Dworkin**, M. J. Thomson, G. J. Smallwood, *Combustion Institute Canadian Section Spring Technical Meeting*, Winnipeg, Manitoba, May 8-11, 2011.
69. "Development of a Numerical Model for Soot Particle Ageing in Laminar Flames," A. Veshkini, **S. B. Dworkin**, M. J. Thomson, *Combustion Institute Canadian Section Spring Technical Meeting*, Winnipeg, Manitoba, May 8-11, 2011.
70. "Application of a Semi-Detailed PAH Growth Mechanism to Soot Formation in Laminar Diffusion Flames," **S. B. Dworkin**, Q. Zhang, M. J. Thomson, N. A. Slavinskaya, U. Riedel, *7<sup>th</sup> U.S. National Combustion Meeting*, Atlanta, Georgia, March 20-23, 2011.
71. "Distributed-Memory Parallel Computation of a Laminar Sooting Coflow Jet-A1 Diffusion Flame," M. Saffaripour, P. Zabeti, **S. B. Dworkin**, Q. Zhang, H. Guo, F. Liu, G. J. Smallwood, M. J. Thomson, *High Performance Computing Symposium HPCS2010*, Toronto, Ontario, June 6-9, 2010.
72. "A Numerical and Experimental Study of a Laminar Sooting Coflow Jet-A1 Diffusion Flame," M. Saffaripour, P. Zabeti, **S. B. Dworkin**, Q. Zhang, M. J. Thomson, H. Guo, F. Liu, G. J. Smallwood, *Combustion Institute Canadian Section Spring Technical Meeting*, Ottawa, Ontario, May 9-12, 2010.
73. "Numerical Modelling of PAH Formation and Soot Inception in the Central/Pyrolysis Region of a Laminar Ethylene/Air Diffusion Flame," **S. B. Dworkin**, Q. Zhang, H. Guo, F. Liu, G. J. Smallwood,

M. J. Thomson, *Combustion Institute Canadian Section Spring Technical Meeting*, Ottawa, Ontario, May 9-12, 2010.

74. "Parallel Computation of a Forced, Time-Dependent, Sooting, Ethylene/Air Coflow Diffusion Flame," **S. B. Dworkin**, J. A. Cooke, B. A. V. Bennett, M. D. Smooke, R. J. Hall, M. B. Colket, *6<sup>th</sup> US National Combustion Meeting*, Ann Arbor, Michigan, May 17-20, 2009.
75. "The Impact of Detailed Multicomponent Transport and Thermal Diffusion Effects on Soot Formation in Ethylene/Air Flames," **S. B. Dworkin**, B. A. V. Bennett, V. Giovangigli, M. D. Smooke, *Eastern States Section, Combustion Institute, Technical Meeting*, Charlottesville, Virginia, October 21-24, 2007.
76. "A Mass-Conserving Vorticity-Velocity Formulation with Application to Axisymmetric Laminar Methane Flames," **S. B. Dworkin**, B. A. V. Bennett, M. D. Smooke, *Eastern States Section, Combustion Institute, Technical Meeting*, Orlando, Florida, November, 13-15, 2005, pp. 239-242.
77. "Computational and Experimental Study of Molecular Growth in Forced, Time-Varying Flames," B. C. Connelly, B. A. V. Bennett, **S. B. Dworkin**, M. D. Smooke, M. B. Long, J. H. Miller, M. A. Puccio, J. D. Herdman, *Eastern States Section, Combustion Institute, Technical Meeting*, Orlando, Florida, November 13-15, 2005, pp. 259-262.
78. "Comparison of Rotational and Translational Diffusion in Supercooled Liquids of Rigid Dimers," **S. B. Dworkin**, N. Xu, C. O'Hern, *American Physical Society, March Meeting*, Montreal, Quebec, March 22-26, 2004.
79. "Analysis of Insulating Panels for Hot Water Radiator Heating Systems," J. Woods, K. Celeste, **S. B. Dworkin**, M. F. Lightstone, *SESCI 2004 Conference* University of Waterloo, Waterloo, Ontario, August 21-25, 2004.
80. "Image Processing for Machine Vision Measurement of Hot Formed Parts," **S. B. Dworkin**, T. J. Nye, *CSME International Congress*, Kingston, Ontario, May 16-18, 2002. (**\*\*\*Awarded Best Student Paper Presentation of the CSME, \$400\*\*\***)

#### **Published Abstracts with Oral Presentations**

1. "Experimental Investigation of Phase Change Material in Concrete and Bentonite-Based Thermal Energy Storage Media," P. Atefrad, H. V. Nguyen, R. Daneshazarian, A. Mwesigye, **S. B. Dworkin**, D. Salt, *CSME International Congress 2019*, London, Ontario, Canada, June 2-5, 2019.
2. "Numerical Modeling of a Thermal Energy Storage System for Ground Source Heat Pump Applications," H. V. Nguyen, A. Mwesigye, P. Atefrad, R. Daneshazarian, **S. B. Dworkin**, D. Salt, *CSME International Congress 2019*, London, Ontario, Canada, June 2-5, 2019.
3. "Thermodynamic Modeling and Optimization of Ejector Refrigeration Systems Using Alternative Working Fluids," A. Mwesigye, A. Kiamari, **S. B. Dworkin**, *CSME International Congress 2019*, London, Ontario, Canada, June 2-5, 2019.
4. "Experimental Investigation of a Paraffin-based Concrete Caisson Thermal Storage System," H. V. Nguyen, P. Atefrad, R. Daneshazarian, A. Mwesigye, D. Salt, **S. B. Dworkin**, *CSME International Congress 2019*, London, Ontario, Canada, June 2-5, 2019.
5. "Numerical Modelling of Helical Steel Piles as In-Ground Heat Exchangers for Ground-Source Heat Pumps," S. R. Nicholson, **S. B. Dworkin**, *CSME International Congress 2019*, London, Ontario, Canada, June 2-5, 2019.

6. "Soot Particle Concentration Estimator Applied to a Transient Turbulent Non-premixed Jet Flame," L. Zimmer, A. Attili, H. Pitsch, F. Bisetti, **S. B. Dworkin**, *17th International Conference on Numerical Combustion*, Aachen, Germany, May 6-9, 2019.
7. "Numerical Study of Soot Formation in Coflow Laminar Diffusion Flames at Varying Pressures," A. Mansouri, **S. B. Dworkin**, *17th International Conference on Numerical Combustion*, Aachen, Germany, May 6-9, 2019.
8. "Numerical Simulation of Soot Formation in Diffusion Flames," N. Ceranic, **S. B. Dworkin**, *16th International Conference on Numerical Combustion*, Orlando, Florida, USA, April 2-5, 2017.
9. "Nonlinear Frequency Response Analysis of Laminar Premixed Flames," M. Sahafzadeh, L. W. Kostiuk, **S. B. Dworkin**, *16th International Conference on Numerical Combustion*, Orlando, Florida, USA, April 2-5, 2017.
10. "Development of a Soot Particle Concentration Estimation Library for Industrial Combustion Applications," R. Alexander, **S. B. Dworkin**, *16th International Conference on Numerical Combustion*, Orlando, Florida, USA, April 2-5, 2017.
11. "Development of a Unique Function for Soot Surface Reactivity for Oxidation and Surface Growth in Laminar Diffusion Flames," A. Khosousi, **S. B. Dworkin**, *15th International Conference on Numerical Combustion*, Avignon, France, April 19-22, 2015.
12. "Heterogeneous PAH dimerization as an Important contributor to soot nucleation," N. A. Eaves, M. J. Thomson, **S. B. Dworkin**, *15th International Conference on Numerical Combustion*, Avignon, France, April 19-22, 2015.
13. "Transient Response of a Laminar Premixed Flame to a Radially Diverging/converging Flow," M. Sahafzadeh, L. W. Kostiuk, **S. B. Dworkin**, *15th International Conference on Numerical Combustion*, Avignon, France, April 19-22, 2015.
14. "Residential Application of a Natural Gas Based Tri-generation System for Cold Climates," N. Ekrami, Z. M. Hasib, **S. B. Dworkin**, A. S. Fung, D. Naylor, ASHRAE Winter Conference, Chicago, January 24-28, 2015.
15. "Preliminary Test and Analysis of A Stirling Engine Based Residential Tri-generation system at TRCA Archetype Sustainable House," N. Ekrami, Z. M. Hasib, P. Lele, **S. B. Dworkin**, A. S. Fung, D. Naylor, ASHRAE Annual Conference, Seattle, June 28-July 2, 2014.
16. "The Contribution of Nucleation and Condensation to Soot Morphology," N. A. Eaves, M. J. Thomson, **S. B. Dworkin**, *14th International Conference on Numerical Combustion*, San Antonio, Texas, April 8-10, 2013.
17. "Detailed Numerical Study of the Effects of OH and O<sub>2</sub> Oxidation Rates on Soot Formation in Flames," A. Khosousi, M. J. Thomson, **S. B. Dworkin**, *14th International Conference on Numerical Combustion*, San Antonio, Texas, April 8-10, 2013.
18. "A Numerical and Experimental Study of Soot Formation in a Laminar Coflow Diffusion Flame of a Jet A-1 Surrogate," M. Saffaripour, M. Kholghy, Q. Zhang, **S. B. Dworkin**, M. J. Thomson, *34th International Symposium on Combustion*, Warsaw, Poland, July 29-August 3, 2012.
19. "Detailed Numerical Simulation of Single-Walled Carbon Nanotube Synthesis in a Radio-Frequency Induction Thermal Plasma System," S. A Esfarjani, **S. B. Dworkin**, J. Mostaghimi, K. Kim, B. Simard, *12<sup>th</sup> European Plasma Conference*, Bologna, Italy, June 24-29, 2012.

20. "Progress in Understanding Combustion Generated Emissions using High Performance Computing," **S. B. Dworkin**, V. Chernov, M. J. Thomson, *The 18th Annual Meeting of ScicomP, the IBM HPC Systems Scientific Computing User Group*, Toronto, Ontario, May 14-18, 2012.
21. "Feasibility of Residential Micro Tri-generation System by Ryerson University," N. Ekrami, Z. M. Hasib, **S. B. Dworkin**, A. S. Fung, D. Naylor, *Das Haus 2012*, Toronto, Ontario, April 20, 2012.
22. "Modelling DME Addition Effects on PAHs and Soot in Laminar Coflow ethylene/Air Diffusion Flames using two PAH Mechanisms," F. Liu, **S. B. Dworkin**, M. J. Thomson, G. J. Smallwood, *Seventh Mediterranean Combustion Symposium*, Chia Laguna, Cagliari, Sardinia, Italy, September 11-15, 2011.
23. "Modelling of Soot Formation in Co-flow Laminar Diffusion Flames," N. A. Eaves, C. Riese, Q. Zhang, **S. B. Dworkin**, M. J. Thomson, *2011 UofT Mechanical & Industrial Engineering Research Symposium*, Toronto, Ontario, May 13, 2011.
24. "Application of an Enhanced PAH Growth Model to Soot Formation in Laminar Ethylene Diffusion Flames," **S. B. Dworkin**, Q. Zhang, M. J. Thomson, N. A. Slavinskaya, U. Riedel, *13th International Conference on Numerical Combustion*, Corfu, Greece, April 27-29, 2011.
25. "A Numerical and Experimental Study of a Laminar Sooting Coflow Jet-A1 Diffusion Flame," M. Saffaripour, P. Zabeti, **S. B. Dworkin**, Q. Zhang, H. Guo, F. Liu, G. J. Smallwood, M. J. Thomson, *33rd International Symposium on Combustion*, Beijing, China, August 1-6, 2010.
26. "The Impact of Detailed Multicomponent Transport and Thermal Diffusion Effects on Soot Formation in Ethylene/Air Flames," **S. B. Dworkin**, M. D. Smooke, V. Giovangigli, *32nd International Symposium on Combustion*, Montreal, Quebec, August 3-8, 2008.
27. "Measurements and Calculations of Formaldehyde Concentrations in a Methane/N<sub>2</sub>/Air, Non-Premixed Flame: Implications for Heat Release Rate," **S. B. Dworkin**, A. M. Schaffer, B. C. Connelly, M. B. Long, M. D. Smooke, M. P. Puccio, B. McAndrews, J. H. Miller, *32nd International Symposium on Combustion*, Montreal, Quebec, August 3-8, 2008.
28. "The Impact of Multicomponent Transport and Thermal Diffusion Effects on Soot Formation in Coflow Ethylene/Air Diffusion Flames," **S. B. Dworkin**, M. D. Smooke, V. Giovangigli, *12th International Conference on Numerical Combustion*, Monterey, California, March 31-April 2, 2008.
29. "The Impact of Detailed Multicomponent Transport and Thermal Diffusion Effects on Particulate Formation in Ethylene/Air Flames," **S. B. Dworkin**, V. Giovangigli, M. D. Smooke, *Mini-Symposium on Transport Phenomena and Nonequilibrium Thermodynamics*, Yale University, New Haven, Connecticut, July 30, 2007.
30. "Application of a Modified Vorticity-Velocity Formulation to Steady and Unsteady Laminar Diffusion Flames," **S. B. Dworkin**, B. C. Connelly, B. A. V. Bennett, A. M. Schaffer, M. B. Long, M. D. Smooke, M. P. Puccio, B. McAndrews, J. H. Miller, *Journée des Doctorants du CMAP*, Palaiseau, France, March 7, 2007.
31. "Computational and Experimental Study of a Forced, Time-Dependent, Methane-Air Coflow Diffusion Flame," **S. B. Dworkin**, B. C. Connelly, B. A. V. Bennett, A. M. Schaffer, M. B. Long, M. D. Smooke, M. P. Puccio, B. McAndrews, J. H. Miller, *31st International Symposium on Combustion*, Heidelberg, Germany, August 6-11, 2006.
32. "Computational and Experimental Investigation of Soot and NO<sub>x</sub> Formation in Coflow Diffusion Flames," M. D. Smooke, M. B. Long, B. C. Connelly, **S. B. Dworkin**, R. J. Hall, M. B. Colket, *11th International Conference on Numerical Combustion*, Granada, Spain, April 23-26, 2006.



33. "Application of a Modified Vorticity-Velocity Formulation to Steady and Unsteady Laminar Diffusion Flames," S. B. Dworkin, B. C. Connelly, B. A. V. Bennett, A. M. Schaffer, M. B. Long, M. D. Smooke, M. P. Puccio, B. McAndrews, J. H. Miller, *11th International Conference on Numerical Combustion*, Granada, Spain, April 23-26, 2006.

### Theses

1. S. B. Dworkin (2009), "Serial and Distributed-Memory Parallel Computation of Sooting, Steady and Time-Dependent, Laminar Flames using a Modified Vorticity-Velocity Formulation," Ph.D. Thesis, Yale University, New Haven, Connecticut, USA.

### Poster Presentations

1. "New Technology in Geo-Exchange," S. R. Nicholson, P. Hatefraad, H. V. Nguyen, S. B. Dworkin, *GRADShowcase, The Ryerson Graduate Student Conference*, Toronto, Canada, August 27, 2019.
2. "Thermal Energy Storage (TES) Using Novel Technologies Including Nano-particles and Encapsulated Phase Change Material (PCM)," R. Daneshazarian, H. V. Nguyen, A. Bayomy, S. B. Dworkin, *GRADShowcase, The Ryerson Graduate Student Conference*, Toronto, Canada, August 26, 2018. **\*\*\* Won First Prize in the Ryerson Graduate Poster Competition - \$500 \*\*\***
3. "Predicting the Consumption Speed of a Premixed Laminar Flame Subjected to Unsteady Stretch Rates," M. Sahafzadeh, L. W. Kostiuk, S. B. Dworkin, *37<sup>th</sup> International Symposium on Combustion*, Dublin, Ireland, July 29-August 3, 2018.
4. "Numerical Study of Soot Concentration in Co-flow Laminar Ethylene-Air Diffusion Flames at Varying Pressures," A. Mansouri, S. B. Dworkin, *37<sup>th</sup> International Symposium on Combustion*, Dublin, Ireland, July 29-August 3, 2018.
5. "Numerical Study of Soot Concentration in Co-flow Laminar Ethylene-Air Diffusion Flames at Elevated Pressures," A. Mansouri, S. B. Dworkin, *10<sup>th</sup> Mediterranean Combustion Symposium*, Naples, Italy, September 18-21, 2017.
6. "Numerical Investigation of Transfer Function Models of a Laminar Premixed Flame Using Frequency Response Analysis," M. Sahafzadeh, S. B. Dworkin, L. W. Kostiuk, *10<sup>th</sup> Mediterranean Combustion Symposium*, Naples, Italy, September 18-21, 2017.
7. "Soot Modelling Research in the Dworkin Group," N. Ceranic, A. Mansouri, S. B. Dworkin, *NSERC CREATE Summer School on Clean Combustion Engines*, Toronto, Canada, May 23-May 26, 2017.
8. "Development of Soot Concentration Estimator for Industrial Combustion Applications," R. Alexander, L. Zimmer, S. B. Dworkin, *NSERC CREATE Summer School on Clean Combustion Engines*, Toronto, Canada, May 23-May 26, 2017.
9. "Numerical Investigation of Transfer Function Models of Laminar Premixed Flames Using Frequency Response Analysis," M. Sahafzadeh, L. W. Kostiuk, S. B. Dworkin, *NSERC CREATE Summer School on Clean Combustion Engines*, Toronto, Canada, May 23-May 26, 2017.
10. "Transient Response of a Laminar Premixed Flame to a Radially Diverging/Converging Flow," M. Sahafzadeh, L. W. Kostiuk, S. B. Dworkin, *International Summer School on Clean Combustion Engines*, Toronto, Canada, May 30-June 3, 2016. **(\*\*\*Awarded 3<sup>rd</sup> Place for Best Student Poster at the Workshop, \$100\*\*\*)**
11. "Development of Soot Concentration Estimator for Industrial Combustion Applications," R. Alexander, S. B. Dworkin, *International Summer School on Clean Combustion Engines*, Toronto, Canada, May 30-June 3, 2016.

12. "On the Importance of Conjugate Heat Transfer on Soot Formation Modelling in High Pressure Flames," N. A. Eaves, **S. B. Dworkin**, M. J. Thomson, *34<sup>th</sup> International Symposium on Combustion*, Warsaw, Poland, July 29-August 3, 2012.
13. "Predicting Soot Particle Size Distributions in Flames Considering Sectional Particle Tracking and Liquid-Like Coalescence," A. Veshkini, M. J. Thomson, **S. B. Dworkin**, *34<sup>th</sup> International Symposium on Combustion*, Warsaw, Poland, July 29-August 3, 2012.
14. "Detailed Numerical Modelling of Soot Oxidation in Flames," A. Khosousi, M. J. Thomson, **S. B. Dworkin**, *International Sooting Flame Workshop*, Warsaw, Poland, July 29, 2012.
15. "Investigation of Soot Reduction Tendency in Oxygenated Premixed and Non-premixed Ethylene Flames," N. A. Slavinskaya, U. Riedel, D. A. Knyazkov, S. A. Yakimov, A. G. Shmakov, O. P. Korobeinichev, V. Chernov, M. J. Thomson, **S. B. Dworkin**, J. Yang, F. Qi, *34<sup>th</sup> International Symposium on Combustion*, Warsaw, Poland, July 29-August 3, 2012.
16. "A Numerical Methodology for Optimum Hybrid Ground Source Heat Pump System Design," H. V. Nguyen, M. Alavy, W. H. Leong, **S. B. Dworkin**, *The Centre for Urban Energy at Ryerson hosts the Deputy Minister of Energy*, Toronto, Ontario, July 5, 2012.
17. "Residential Micro Tri-Generation Study," Z. M. Hasib, N. Ekrami, A. Fung, **S. B. Dworkin**, D. Naylor, *The Centre for Urban Energy at Ryerson hosts the Deputy Minister of Energy*, Toronto, Ontario, July 5, 2012.
18. "Residential Micro Tri-Generation Study," Z. M. Hasib, N. Ekrami, A. Fung, **S. B. Dworkin**, D. Naylor, *Ontario Centres of Excellence; OCE Discovery*, Toronto, Ontario, May 14-15, 2012.
19. "Application of a PAH Growth Mechanism to Soot Formation in Laminar Diffusion Flames," **S. B. Dworkin**, Q. Zhang, M. J. Thomson, N. A. Slavinskaya, U. Riedel, *German Aerospace Centre (DLR) Industrial Research Symposium*, Stuttgart, Germany, July 22, 2011.
20. "Radio Frequency Thermal Plasma Technology in Production of Single-Walled Carbon Nanotubes," S. A. Esfrajani, **S. B. Dworkin**, J. Mostaghimi, A. Shahverdi, G. Soucy, K. S. Kim, B. Simard, *2011 UoT Mechanical & Industrial Engineering Research Symposium*, Toronto, Ontario, May 13, 2011.
21. "Experimental and Numerical Studies of a Laminar Sooting Coflow Bio & Synthetic Jet Fuel Diffusion Flames: A Preliminary Study of Jet-A1," P. Zabeti, M. Saffaripour, **S. B. Dworkin**, M. J. Thomson, *Conference of the Agricultural Biorefinery Innovation Network for Green Energy, Fuels and Chemicals (ABIN)*, London, Ontario, March 14 – 16, 2010.
22. "Computational and Experimental Study of Sooting Time-Varying Flames," B. C. Connelly, **S. B. Dworkin**, M. D. Smooke, and M. B. Long, *International Discussion Meeting and Workshop 2008: Laser-Induced Incandescence, Quantitative Interpretation, Modelling, Application*, Ottawa, Canada, July 31 – August 1, 2008.
23. "Measurements and Calculations of Formaldehyde Concentrations in a Methane/N<sub>2</sub>/Air, Non-Premixed Flame: Implications for Heat Release Rate," J. H. Miller, B. McAndrews, M. P. Puccio, **S. B. Dworkin**, A. M. Schaffer, B. C. Connelly, M. B. Long, and M. D. Smooke, *31st International Symposium on Combustion*, Heidelberg, Germany, August 6-11, 2006.

### Technical Reports

1. Consulting Report for BentallGreenOak, "Analysis of a Potential Hybrid Geo-Exchange System for 490 St. Clair Avenue East," **S. B. Dworkin**, J. P. Fine (2020).
2. Consulting Report for the York Catholic District School Board, "HGS Report for the YCDSB Head Office HVAC System Phase 1 Analysis," **S. B. Dworkin**, J. P. Fine (2020).

3. Sub-consulting Report for Quasar Consulting, “Analysis of a Geo-exchange System for the Planet Traveler Building at 357 College St, Toronto, ON, and the Potential for Use with an Adjacent Expansion,” **S. B. Dworkin**, S. R. Nicholson, H. V. Nguyen (2020)
4. Technical Report for Nucap Industries Inc., “Numerical Study of a Novel Radiant Panel for In-floor Heating and Cooling,” S. Shukla, R. Daneshazarian, A. Mwesigye, W. H. Leong, **S. B. Dworkin** (2019).
5. Consulting Report for the York Catholic District School Board, “HGS Phase 1 Report for the Geothermal System in the Prince of Peace School in Keswick; Assessment of Functionality and Technical Issues,” **S. B. Dworkin**, J. P. Fine, H. V. Nguyen (2019).
6. Technical Report Outlining Commercialization and Partnership Potential for Keller Foundations Ltd. and McClymont and Rak Engineers Inc., “Combining a Caisson with Thermal Energy Storage,” A. Mwesigye, A. M. Bayomy, M. A. Ghahfarrokhy, H. V. Nguyen, **S. B. Dworkin** (2019).
7. Project Progress Report for McClymont and Rak Engineers Inc., “Economic Feasibility Estimations for Underground Thermal Storage Technologies using Nanoparticles and Phase Change Material,” A. M. Bayomy, H. V. Nguyen, **S. B. Dworkin** (2018).
8. Consulting Report for **Redacted** assessing the potential for a hybrid geo-exchange system, “Analysis of a Potential Hybrid Geo-exchange System for a Mixed-Use Commercial/Residential Building in **Redacted**, Ontario,” S. B. Dworkin, J. P. Fine (2018).
9. Consulting Report for Brookfield Global Integrated Solutions assessing the potential for a hybrid geo-exchange system, “Analysis of a Potential Hybrid Geo-exchange System for a Laboratory and Office Building at 1800 Walkley Road, Ottawa, Ontario,” **S. B. Dworkin** (2018).
10. Consulting Report for Capture Technologies Inc., “Analysis of a Potential Geo-exchange System for a Multi-purpose Space “the Barn” at 5335 17th Sideroad, King City, Ontario,” **S. B. Dworkin**, M. Alavy (2017).
11. Consulting Report for Capture Technologies Inc., “Analysis of a Potential Geo-exchange System for a Single Detached House at 758281 2<sup>nd</sup> Line East, Mulmur, Ontario,” **S. B. Dworkin**, M. Alavy (2017).
12. Consulting Report for Gardens Retirement Developments Inc. assessing the potential for a hybrid geo-exchange system, “Analysis of a Potential Geo-exchange System for a 70-unit Retirement Home at 396 Cedar Street, in Simcoe, Ontario,” **S. B. Dworkin**, M. Alavy (2017).
13. Consulting Report for Brookfield Global Integrated Solutions assessing the potential for a solar-assisted geo-exchange system and determining required solar system capacity, “Analysis of a Solar Assisted Geo-exchange System for the Kilns Building, Evergreen Brick Works,” **S. B. Dworkin**, H. V. Nguyen, J. P. Fine (2017).
14. Consulting Report for Ontario 2059710 Inc. assessing the potential for a hybrid geo-exchange system, “Analysis of a Potential Geo-exchange System for Private Residence, 3372 Mamquam Road, Squamish, BC,” **S. B. Dworkin**, M. Alavy, H. V. Nguyen (2016).
15. Technology Development Report for McClymont and Rak Engineers Inc., “A Study of Alternative Borehole Configurations and Thermal Storage Medium (TSM) in Geo-Exchange,” Y. L. E. Law, **S. B. Dworkin** (2016).
16. Consulting Report for the York Catholic District School Board, assessing the potential for geo-exchange system, “Analysis of a Potential Geo-exchange System for Our Lady of Good Council Catholic School,” **S. B. Dworkin**, H. V. Nguyen (2016).

17. Consulting Report for the York Catholic District School Board, assessing the potential for geo-exchange technology in their schools, “HGS Exploratory Assessment for the YCDSB,” **S. B. Dworkin**, H. V. Nguyen (2015).
18. Consulting Report for Stantec Architecture Ltd., “Analysis of a Potential Geo-exchange System for the Etobicoke General Hospital and Associated West Expansion,” **S. B. Dworkin**, W. H. Leong, M. Alavy, H. V. Nguyen (2015).
19. Consulting Report for Groundheat Systems Inc., “Analysis of a Potential Geo-exchange System for a 75-unit Residential Building (Dupont and Landsdowne),” **S. B. Dworkin**, M. Alavy, H. V. Nguyen (2014).
20. Technology Development Report for Groundheat Solar Wind Inc., “Design of a ‘Smart Manifold’ for Geothermal HVAC Installations,” by M. Di Paolo, **S. B. Dworkin**, (2014).
21. Toronto Atmospheric Fund Interim Report, “Geo-Cities Initiative: Supporting the Development of Earth Energy Systems in Urban Applications,” by **S. B. Dworkin**, W. H. Leong, P. R. Walsh, H. V. Nguyen, M. Ayala, R. Hossain, M. Schlitt, A. Alaica, Y. L. E. Law, M. Alavy, X. Zhou (2013).
22. Time of Use Customer Analysis, prepared for Hydro One Networks Ontario, by H. V. Nguyen, A. Fung, and **S. B. Dworkin** (2013).
23. Analysis of Insulating Panels for Hot Water Radiator Heating Systems, prepared for Natural Resources Canada, by **S. B. Dworkin**, J. Woods, M. F. Lightstone (2003).
24. Validation of Conjugate Heat Transfer Modeling in CFX-TASCflow, prepared for Pratt and Whitney Canada, by **S. B. Dworkin**, M. F. Lightstone (2002).

### **Invention Disclosure**

1. Ryerson University Invention Disclosure “Thermal Caisson,” **S. B. Dworkin**, A. Bayomy, H. V. Nguyen, A. Mwesigye, L. Rak, J. Wang, D. Salt, M. Alavy, November 4, 2019.
2. Ryerson University Invention Disclosure “A Mathematical Framework for Optimizing the Design Geothermal System Ground Loops Considering Engineering and Economic Analysis, which can be Implemented into a Software Format,” **S. B. Dworkin**, W. Leong, M. A. Ghahfarrokhy, March 1, 2012.

## **RESEARCH GRANTS AND AWARDS**

**Summary** (note that values in the summary consider only my appropriated portions of shared grants)

Externally funded projects: **\$2,992,688** and 9420.5 CPU-years<sup>1</sup> (total value: \$5,372,928)

Internal awards held/secured: \$168,998 total

### **Research Support – Major Projects/Grants**

#	Agency, Program, Sources	Project Title (PI or CoPI)	Value (%)	Award Dates
1	NSERC Discovery	Understanding Soot Formation from Combustion with Numerical Modelling (PI)	\$230,000 (5×\$46,000), 2020 COVID-19 Supplement \$7360 (100%)	Apr 1, 2019 - Mar 31, 2024

<sup>1</sup> Compute Canada is a CFI funded computational infrastructure granting organization that grants CPU-years based on a competitive peer-reviewed application process.

2	NSERC Discovery Accelerator Supplement	Understanding Soot Formation from Combustion with Numerical Modelling (PI)	\$120,000 (3×\$40,000) (100%)	Apr 1, 2019 - Mar 31, 2022
3	Canada Research Chair (Tier II)	Canada Research Chair in High-Performance Computing for Sustainable Energy (PI)	\$500,000 (100%)	Apr 1, 2017 - Mar 31, 2022
4	NSERC CRD, OCE Voucher for Innovation and Productivity II, Ryerson University, McClymont and Rak Engineers Inc.	NSERC: Development of a Thermally Enhanced Nanomaterial for Ground Energy Storage (PI)  OCE: McClymont & Rak: Nano-engineered Underground Thermal Storage for Ground Source Heat Pumps and Solar Thermal Heating (PI)	Total: \$750,000 NSERC: \$320,000 OCE: \$150,000 Rye: \$120,000 MCR: \$160,000 (64%)	Sept 1, 2017 - Mar 31, 2021
5	Ontario Ministry of Research and Innovation – Early Researcher Award, Ryerson University	Understanding and Mitigating Engine Emissions (PI)	Total: \$150,000 ERA: \$100,000 Rye: \$50,000 (100%)	Apr 1, 2016 - Mar 31, 2021
6	Compute Canada Resource Allocations (RAC)	Parallel Simulation and Model Development of Pollutant Formation in Combustion Processes (PI)	2018-2019: 1925 CPU-yrs Value: \$301,776 (50%)  2019-2020: Renewed at 1663 CPU-yrs Value: \$260,703 (50%)  2020-2021: Renewed at 1610 CPU-yrs Value: \$195,302 (50%)	Apr 1, 2018 - Mar 31, 2021
7	NSERC CREATE, Ryerson University	NSERC CREATE Program in Clean Combustion Engines (CoPI, PI is M. Thomson at U. Toronto)	\$1.65M (12.3%) Rye: \$60,000 (100%)	Mar 4, 2013 - Mar 31, 2019
8	NSERC Discovery	Developing Numerical Models for the Combustion and Soot Formation of Alternative Fuels (PI)	\$217,000 (7×\$31,000) (100%)	Apr 1, 2012 - Mar 31, 2019

9	Compute Canada Resource Allocations (RAC)	Parallel Simulation and Model Development of Pollutant Formation in Biofuel Combustion (PI)	2162 CPU-yrs Value: \$407,975 (50%)	Apr 1, 2017 - Mar 31, 2018
10	Compute Canada Resource Allocations (RAC)	Parallel Simulation and Model Development of Pollutant Formation in Biofuel Combustion (PI)	2800 CPU-yrs Value: \$781,373 (50%)	Jan 1, 2016 - Dec 31, 2016
11	Compute Canada Resource Allocations (RAC)	Parallel Simulation and Model Development for Combustion Generated Soot Particle Emissions (PI)	3000 CPU-yrs Value: \$825,000 (50%)	Jan 1, 2015 - Dec 31, 2015
12	Compute Canada Resource Allocations (RAC)	Parallel Simulation and Model Development of Pollutant Formation in Biofuel Combustion (PI)	2183 CPU-yrs Value: \$764,050 (50%)	Jan 1, 2014 - Dec 31, 2014
13	Toronto Atmospheric Fund	Evaluating and Advancing Earth Energy Systems in the Urban Context (PI)	\$75,000 (33%)	Apr 9, 2012 - Aug 31, 2014
14	Compute Canada Resource Allocations (RAC)	Parallel Solution and Model Development of Pollutant Formation in Biofuel Combustion (PI)	2152 CPU-yrs Value: \$753,200 (50%)	Jan 1, 2013 - Dec 31, 2013
15	NSERC RTI	Characterization of Combustion Generated Nano-particles, held at U. Toronto (CoPI, PI is M. Thomson at U. Toronto)	\$97,034 (25%)	Awarded Mar 28, 2013
16	Compute Canada Resource Allocations (RAC)	Parallel Solution of Particle Formation in Chemically Reacting Flow Problems (CoPI, PI is M. Thomson at U. Toronto)	1346 CPU-yrs Value: \$471,100 (50%)	Jan 1, 2012 - Dec 31, 2012
17	Canadian Foundation for Innovation (CFI) – LOF, Ontario Research Fund – RI, Ryerson University	Application of High Performance Parallel Computing to the Numerical Simulation of Biofuel Combustion and Combustion-Generated Emissions (PI)	Total: \$248,184 CFI: \$119,092 ORF: \$119,092 Rye: \$10,000 (100%)	Awarded Aug 9, 2012

#### Research Support – Other Projects/Grants

#	Agency, Program, Sources	Project Title (PI or CoPI)	Value (%)	Award Dates
1	NSERC Alliance COVID-19 grants	Engineering COVID-19 Fashion - Designing the Most Effective Face Masks for the Canadian Fashion Industry (CoPI, PI is E Karatas, Ryerson)	\$50,000 (15%)	June 29 2020 - June 28 2021

2	NSERC USRA for student Leya Kober	Experimental Investigation of a Laboratory Scale Helical Steel Pile Geothermal Heat Exchanger	\$4500 (100%)	May, 2020 - Aug, 2020
3	MITACS Accelerate with Innovia Geo Corp.	Development and Optimization of a Pile Integrated Geo-Exchange System	Total: \$66,800 MITACS \$15,000 (100%) Innovia: \$51,800 (100%)	March 1, 2020 - Oct 31, 2020
4	Canada Research Chair's grant	Research in High-Performance Computing for Sustainable Energy (PI)	\$80,000 (100%)	Apr 1, 2018 - Mar 31, 2022
5	OCE Voucher for Innovation and Productivity, Innovia Corporation	Pile Integrated Geo-Exchange System	Total: \$33,150 OCE: \$20,000 Innovia: \$13,150 (100%)	Dec 4, 2018 - Dec 3, 2019
6	NSERC Engage with Nucap Energy	Development of a Model for an Enhanced Heat Transfer Surface for Heat Exchangers (PI)	\$25,000 (100%)	July, 2018 - Dec, 2018
7	NSERC USRA for student Pedram Hatefraad	Modelling Enhanced Heat Transfer Surfaces for Solar Assisted Ground Source Heat Pumps	\$4500 (100%)	May, 2018 - Aug, 2018
8	NSERC USRA for student Bobby Anand	Development of a Numerical Model for Solar Assisted Ground Source Heat Pumps (PI)	\$4500 (100%)	May, 2017 - Aug, 2017
9	NSERC Engage with Ecologix Inc.	Development of a Hybrid Solar Cascade Heat Pump Heating System (PI)	\$25,000 (100%)	Jan, 2017 - July, 2017
10	NSERC Collaborative Research and Development (CRD)	Performance Characterization and Feasibility Analysis of Natural Gas Heat Pumps for Canadian Weather Conditions: Experimental and Numerical Investigations (CoPI, PI is A. Fung, Ryerson)	\$300,000 (33.3%)	July, 2016 - June, 2019
11	NSERC USRA for student Bobby Anand	Development of a Numerical Model to Predict Particulate Emissions from Engines (PI)	\$4500 (100%)	May, 2016 - Aug, 2016
12	MITACS Cluster with Siemens Canada	Next Generation Engines (CoPI, PI is G. Bourque at Siemens Canada)	\$60,000 (25%)	Apr 1, 2016 - Aug 31, 2016
13	OCE TalentEdge with McClymont and Rak Engineers	An Assessment of the use of an Inexpensive Thermal Storage Medium to Improve Geo-exchange Technology (PI)	\$15,000 (100%)	Jan 4, 2016 - May 5, 2016

14	NSERC USRA for student Nikola Kuzmic	Development of a Numerical Model for Ground Thermal Response in Geo-exchange Systems (PI)	\$4500 (100%)	May, 2015 - Aug, 2015
15	NSERC USRA for student Raymond Alexander	Development of a Numerical Model to Predict Particulate Emissions from Engines (PI)	\$4500 (100%)	May, 2015 - Aug, 2015
16	NSERC Engage with McClymont and Rak Engineers	A Model for Long-term Ground Temperature Response to Geo-exchange (PI)	\$25,000 (100%)	Mar 31, 2015 - Sept 30, 2015
17	NSERC Engage with GeoSource Energy Inc.	Developing an Intelligent Control System for Hybrid Ground Source Heat Pumps (PI)	\$25,000 (100%)	Oct 1, 2014 - Mar 31, 2015
18	OCE – Voucher for Innovation and Productivity	Developing a Smart Manifold system with Groundheat Solar Wind Corp. (PI)	\$20,000 (100%)	Feb 15, 2014 - July 15, 2014
19	Connect Canada Internship for student Michael Di Paolo	Internship for Developing a Smart Manifold system with Groundheat Solar Wind Corp. (PI)	\$5000 (100%)	Feb 15, 2014 - July 15, 2014
20	NSERC Engage with Groundheat Systems Inc.	A Smart Manifold Design for Ground Source Heat Pump Applications (PI)	\$25,000 (100%)	Sept 16, 2013 - Mar 16, 2014
21	Contract with Groundheat Solar Wind Corp.	A Smart Manifold for Ground Source Heat Pump Applications (PI)	\$5000 (100%)	Sept 1, 2013 - Apr 30, 2014
22	OCE – Market Readiness Phase 1	Hybrid Geothermal Software Systems (PI)	\$50,000 (50%)	July 1, 2013 - Feb 28, 2014
23	NSERC Engage with Westport Innovations Inc.	A Soot Particle Concentration Calculator for Industrial Combustion Applications (PI)	\$25,000 (100%)	Mar 31, 2013 - Sept 30, 2013
24	NSERC Interaction	Visit to give a technical presentation and discuss an NSERC Engage proposal by Seth Dworkin, Ryerson University at Westport Innovations Inc. (PI)	\$1800 (100%)	Awarded Nov 20, 2012
25	Contract with Hydro One	Time of Use Customer Analysis Phase I (PI)	\$3750 (50%)	Oct 1, 2012 - Jan 31, 2013
26	MITACS Cluster with Renteknik Inc.	Comprehensive Study of Tri-generation System based on ClimateWell Technology for Canadian Residential Homes (CoPI, PI is A. Fung at Ryerson)	\$44,000 (33%)	July 4, 2012 - Apr 30, 2014



27	FedDev Applied Research and Commercialization Program	Development of an Automated Software Package for the Optimization of Hybrid Ground Source Heat Pump System Design (PI)	\$71,750 (50%)	July 1, 2012 - Mar 31, 2013
28	MITACS Accelerate with Pratt and Whitney Inc.	CFD Simulation of a Gas Turbine Combustor (PI)	\$15,000 (50%)	June 1, 2012 - Aug 31, 2013
29	Union Gas Energy Research	Comprehensive Study of Residential Scale Tri-generation System based on ClimateWell Technology (CoPI, PI is A. Fung at Ryerson)	\$94,875 (33%)	Dec 1, 2011 - Apr 30, 2013
30	Contract with Pratt and Whitney Inc.	Numerical Modeling of Unsteady Combustion Processes (PI)	\$67,934 (50%)	Dec 1, 2011 - Aug 31, 2013
31	Contract with Pratt and Whitney Inc.	Altitude Emissions Control for Aviation - Contributions in Numerical Modelling (CoPI, PI is M. Thomson at U. Toronto)	\$84,000 (50%)	Sept 1, 2011 - Aug 31, 2013

#### Internal Grants/Awards Held

#	Program	Project Title (PI or CoPI)	Value (%)	Dates
1	Dean's Research Fund – Undergraduate Research Experience	Modelling and Experimentation on Ground Thermal Storage using Phase Change Material (PI)	\$6700 (100%)	Awarded Apr 10, 2019
2	Dean's Travel Fund	For travel to the Combustion Institute Canadian Section meeting, Kelowna, BC (PI)	\$750 (100%)	Awarded Mar 15, 2019
3	Dean's Travel Fund	For travel to the 17th International Conference on Numerical Combustion in Aachen, Germany (PI)	\$1000 (100%)	Awarded Feb 15, 2019
4	Dean's Travel Fund	For travel to the International Combustion Symposium in Dublin Ireland (PI)	\$1000 (100%)	Awarded Mar 16, 2018
5	Dean's Research Fund – Undergraduate Research Experience	Development and Validation of a Numerical Model for Enhanced Heat Transfer Surfaces for Solar Assisted Ground Source Heat Pumps (PI)	\$6700 (100%)	Awarded Mar 7, 2018
6	Dean's Travel Fund	For travel to the Mediterranean Combustion Symposium and International Sooting Flame Workshop Meeting, Naples, Italy (PI)	\$1000 (100%)	Awarded Oct 13, 2017
7	Dean's Travel Fund	For travel to the Combustion Institute Canadian Section meeting, Montreal, Quebec (PI)	\$750 (100%)	Awarded June 5, 2017

8	Dean's Research Fund – Booster	Building a Foundation for an NSERC CREATE Program in Geo-Exchange Design, Technology and Entrepreneurship (PI)	\$10,000 (100%)	Awarded May 10, 2017
9	Dean's Research Fund – Undergraduate Research Experience	Development of a Numerical Model for Solar Assisted Ground Source Heat Pumps (PI)	\$6700 (100%)	Awarded Mar 28, 2017
10	Dean's Travel Fund	For travel to the 2017 International Ground Source Heat Pump Association Conference in Denver, Colorado, USA (PI)	\$1000 (100%)	Awarded Feb 26, 2017
11	Ryerson University Fall/Winter RA Program	Detailed Numerical Modelling of a Novel Underground Slurry-based Thermal Storage System (PI)	\$4000 (100%)	Sept 6, 2016 - Apr 7, 2017
12	Dean's Research Fund – Undergraduate Research Experience	Predicting Particulate Emissions in CFD Simulations of Engine Conditions (PI)	\$6700 (100%)	Awarded Apr 6, 2016
13	Dean's Research Fund – Postdoctoral Fellow Support	Topics in Combustion/Soot Formation Modelling (PI)	\$10,000 (100%)	Awarded Sept 7, 2015
14	Dean's Research Fund – Tools	A Thermally-driven Stand-alone Desalination Testing Rig (PI)	\$18,000 (50%)	Awarded June 1, 2015
15	Dean's Research Fund – Undergraduate Research Experience	Numerical Analysis and Experimentation of Solar Powered Desalination Process (PI)	\$6700 (100%)	Awarded Apr 30, 2015
16	Dean's Research Fund – Connector	Development and Testing of a Solar Powered Compressor System for a Photo-Voltaic/Thermal Solar powered Desalination Unit (PI)	\$10,000 (50%)	Awarded Apr 30, 2015
17	Dean's Travel Fund	For travel to the Combustion Institute Canadian Section meeting, Saskatoon, Saskatchewan (PI)	\$750 (100%)	Awarded Feb 13, 2015
18	Dean's Travel Fund	For travel to the Fifteenth International Conference on Numerical Combustion, Avignon, France (PI)	\$1000 (100%)	Awarded Oct 20, 2014
19	Ryerson University Fall/Winter RA Program	Developing an Engine Emissions Calculator for the Canadian Transportation Industry (PI)	\$4000 (100%)	Sept 2, 2014 - Apr 9 2015
20	Dean's Research Fund – Booster	The Development and Application of Computer Models of Particulate Emissions (PI)	\$10,000 (100%)	Awarded May 22, 2014
21	Dean's Travel Fund	For travel to the Combustion Institute Canadian Section meeting, Windsor, Ontario (PI)	\$750 (100%)	Awarded Feb 27, 2014
22	Dean's Travel Fund	For travel to the International Combustion Symposium, San Francisco, USA (PI)	\$1000 (100%)	Awarded Nov 6, 2013
23	Ryerson University Fall/Winter RA Program	Multidimensional Optimization of Hybrid Ground Source Heat Pump Design (PI)	\$4000 (100%)	Sept 16, 2013 - Apr 30, 2014

24	Ryerson Summer Research Opportunities Program	A Model and Assessment of the CO <sub>2</sub> Emission Reduction Potential Associated with Geothermal Heating and Cooling in Ontario (PI)	\$8800 (100%)	Awarded May 22, 2013
25	Dean's Travel Fund	For travel to the Combustion Institute – Canadian Section Meeting, Quebec City, Canada (PI)	\$750 (100%)	Awarded Feb 11, 2013
26	Dean's Travel Fund	For travel to the International Meeting on Numerical Combustion, San Antonio, USA (PI)	\$1000 (100%)	Awarded Oct 9, 2012
27	Dean's Travel Fund	For travel to the International Combustion Symposium, Warsaw, Poland (PI)	\$1000 (100%)	Awarded Oct 9, 2011
28	Faculty of Engineering and Applied Science	Start-Up Grant (PI)	\$58,948 (100%)	Awarded June 1, 2011

**External Applications Pending:**

None

**Internal Applications Pending:**

None

**STUDENT SUPERVISION:**

**Summary**

Postdoctoral fellows supervised: 6 completed, 2 in progress  
 Ph.D. students supervised: 7 completed, 3 in progress  
 M.ASc. students supervised: 17 completed, 2 in progress  
 M.Eng. students supervised: 2 completed, 0 in progress  
 Undergraduate students supervised: 18 completed, 1 in progress  
 Research assistants supervised: 2 completed, 0 in progress  
 Capstone projects supervised: 11 groups, 43 students  
 Directed studies courses given: 1 MEng., 15 M.ASc., 5 Ph.D.  
 Graduate examinations: 13 M.ASc., 5 Ph.D.

**Current Post-Doctoral Fellows**

#	Name	Research Project	Start Date
1	Dr. Mehdi Jadidi	Combustion Studies, Sole Supervision	Jan 6, 2020
2	Dr. Sylvie Antoun	Thermal Storage Caissons with Phase Change Material and Nanofluids, Sole Supervision	June 20, 2019

**Current Graduate Students**

#	Name	Program Information	Start Date
1	Andisheh Khanehzar	Ph.D., Sole Supervision	Sept 8, 2020
2	Francisco Cepeda	Ph.D., Sole Supervision <i>Awarded Ryerson Graduate Scholarship for International Students (\$15,000)</i>	Sept 3, 2019

3	Reza Daneshazarian	Ph.D., Sole Supervision <i>Awarded Ontario Graduate Scholarship for International Students (\$15,000 x 2)</i> <i>Awarded Ryerson Graduate Scholarship (\$15,000)</i> <i>MIE Graduate Excellence award (\$2000)</i> <i>Awarded the Centre for Urban Energy-Toronto Hydro Student Award - 2019 (\$2500)</i> <i>Awarded the Centre for Urban Energy-Toronto Hydro Student Award - 2020 (\$1250)</i> <i>Awarded MITACS Research Training Award (\$3000)</i>	Sept 5, 2017
4	Luke Di Liddo	MASc., Sole Supervision <i>Awarded NSERC Canada Graduate Scholarship (\$17,500)</i> <i>Awarded MITACS Research Training Award (\$3000)</i>	May 4, 2020
5	Pedram Hatefraad	MASc., Sole Supervision <i>Awarded the Stalin Boctor Graduate Award (\$4484)</i>	Apr 29, 2019

#### Current Undergraduate Research Students

#	Name	Project Title and Information	Start Date
1	Leya Kober	Helical Steel Piles for Geo-exchange Applications <i>Awarded NSERC USRA (\$4500)</i>	April 29, 2019

#### Former Post-Doctoral Fellows

#	Name	Project Title and Information	Dates	Initial Position
1	Dr. Aggrey Mwesigye	Development and Optimization of a Novel Hybrid GSHP-Solar Ejector Refrigeration System, Sole Supervision	Jan 2, 2018 - Dec 31, 2019	Assistant Professor, University of Minnesota – Duluth
2	Dr. Leonardo Zimmer	Combustion Studies, Sole Supervision	Jan 9, 2017 - June 14, 2019	Data Scientist/AI Developer at energyX Solutions Inc.
3	Dr. Ayman Bayomy	Ground Source Heat Pumps and Thermal Storage, Sole Supervision	Sept 6, 2017 - Aug 31, 2018	Thermalhydraulics Analyst, Canadian Nuclear Laboratories
4	Dr. Meysam Sahafzadeh	Understanding Premixed Oscillating Curved Flames (Ryerson), Co-supervised with L. Kostiuk	Feb 1, 2018 - July 6, 2018	Data Scientist/AI Developer at energyX Solutions Inc.
5	Dr. Ali Khosousi	Topics in Flame Simulation and Soot Modelling, Sole Supervision	Nov 7, 2015 - Nov 30 2016	Analyst, Analytics4Life
6	Dr. Armin Veshkini	Modelling Micro-gravity Soot Formation in Coflow Diffusion Methane/Air Flames, Sole Supervision	July 20, 2015 - Dec 31, 2015	Software Developer, MAYA Heat Transfer Technologies

### Former Graduate Students

#	Name	Program	Thesis	Dates	Initial Position
1	Hiep Nguyen	Ph.D., Sole Supervision <i>Awarded NSERC Canada Graduate Scholarship (\$35,000 x 2)</i> <i>Awarded Ontario Graduate Scholarship (\$15,000)</i> <i>CUE-Enwave Energy Corporation Award (\$5000)</i> <i>MIE Graduate Excellence award (\$2000)</i>	Experimental and Numerical Investigation of Thermal Storage Medium for Ground Source Heat Pump Applications	May 4, 2015 - Aug 3, 2020	Seeking Employment
2	Saunak Shukla	MASc. (Ryerson), Co-supervised with W. Leong <i>Awarded Ryerson (Ontario) Graduate Scholarship (\$15,000)</i>	Characterization of a Novel Radiant Floor Panel and a Caisson-Based Geothermal System	Sept 4, 2018 - Aug 13, 2020	Mechanical Engineer in Training at Bruce Power
3	Sarah Nicholson	MASc., Sole Supervision <i>Awarded NSERC Canada Graduate Scholarship (\$17,500)</i> <i>Awarded the CUE-Toronto Hydro Student Award (\$2500)</i>	Characterization of a Novel In-Ground Heat Exchanger for Applications in Sustainable Building Energy and Maintaining Permafrost	Sept 4, 2018 - May 19, 2020	Chief Technical Officer, Innovia Corp.
4	Amin Mansouri	M.Eng (Ryerson), Co-supervised with N. Eaves	Modelling the Effect of Pressure on Soot Formation in Varying-Pressure Coflow Laminar Diffusion Flames	Sept 6, 2016 - Jan 15, 2020	Seeking Employment
5	Daniel Gemara	M.Eng (Toronto), Co-supervised with T. Chan	Curling Analytics	Sept 5, 2017 - Dec 22, 2018	Data Analytics Associate, Toronto Blue Jays
6	Nemanja Ceranic	MASc., Sole Supervision <i>Awarded Ontario Graduate Scholarship (\$15,000), QEII Graduate Scholarship in Science and Technology (\$15,000)</i>	The Influence of Aliphatics on Soot Inception Modelling	Sept 6, 2016 - Sept 11, 2018	External, Controls, Nacelle Engineer in Training, Aviya Aerospace Systems

7	Jamie Fine	Ph.D. (Ryerson), Co-supervised by J. Friedman <i>Awarded Ontario Graduate Scholarship (\$15,000 x 2)</i> <i>CUE-Enwave Energy Corporation Award (\$5000)</i> <i>MIE Graduate Excellence award (\$2000)</i>  <b>***Winner of the 2018 C. Ravi Ravindran Outstanding Doctoral Thesis Award (\$1000), given for the top thesis at the university***</b>	Development of a Hybrid Solar Cascade Heat Pump Heating System	May 4, 2014 - July 16, 2018	Postdoctoral Fellow, U. Toronto
8	Meysam Sahafzadeh	Ph.D. (Ryerson), Co-supervised by L. Kostiuk	The Effect of Unsteady Stretch on Laminar Premixed Curved Flames	Jan 1, 2014 - Jan 26, 2018	Postdoctoral Fellow, Ryerson
9	Alisha Hunter	MASc., Sole Supervision	Comparative Life Cycle Assessment: Ground Source Heat Pump System Versus Gas Furnace and Air Conditioner System	Sept 8, 2015 - Sept 6, 2017	The City of North Bay Environmental Waste Management
10	Raymond Alexander	MASc., Sole Supervision <i>Awarded Ontario Graduate Scholarship (\$15,000)</i>	Development of a Soot Concentration Estimation Library for Industrial Combustion Applications Using Lagrangian Parcel Tracking	Sept 8, 2015 - Sept 5, 2017	Controls Engineer, Aviya Aerospace Systems
11	Adam Alaica	MASc., Sole Supervision <i>Awarded Ontario Graduate Scholarship (\$15,000)</i>	The Development of an Off-peak Ground Pre-cool Control Strategy for Hybrid Ground Source Heat Pump Systems	May 16, 2014 - Sept 8, 2016	Enwave Corp.

12	Ying Lam Law	MASc., Sole Supervision <i>Awarded Ontario Graduate Scholarship (\$15,000), QEII Graduate Scholarship in Science and Technology (\$15,000), CUE-Enwave Energy Corporation Award (\$5000)</i>	Characterization of the Effects of Borehole Layouts in Geo-exchange	May 16, 2014 - Sept 8, 2016	Provident Energy Management Inc.
13	Nick Eaves	Ph.D. (Toronto), Co-supervised by M. Thomson <i>Awarded NSERC Canada Graduate Scholarship (\$35,000 x 3)</i>	The Effect of Reversibility and High Pressure on Soot Formation	Sept 1, 2012 - June 27, 2016	Postdoctoral Fellow, University of Cambridge
14	Ali Khosousi	Ph.D., Sole Supervision	Detailed Numerical Study of Soot Surface Growth and Oxidation in Laminar Diffusion Flames	Sept 1, 2011 - Nov 6, 2015	Postdoctoral Fellow, Ryerson
15	Armin Veshkini	Ph.D. (Toronto), Co-supervised by M. Thomson	Understanding Soot Particle Growth Chemistry and Particle Sizing Using a Novel Soot Growth and Formation Model	July 1, 2011 - June 22, 2015	Postdoctoral Fellow, Ryerson
16	Bijan Shahriari	M.Sc. (Toronto), Co-supervised by M. Thomson <i>Awarded NSERC Post Graduate Scholarship (\$17,500)</i>	Development and Validation of a Partially Coupled Soot Model for Turbulent Kerosene Combustion in Industrial Applications	July 16, 2012 - Sept 5, 2014	Hatch Ltd.
17	Michael Di Paolo	MASc., Sole Supervision	Design of a Smart Manifold for Geothermal HVAC Installations	Sept 1, 2012 - May 5, 2014	Groundheat Systems Inc.
18	Hiep Nguyen	MASc. (Ryerson) Co-supervised by W. Leong	Analyses of the Factors Affecting Hybrid Ground Source Heat Pump Installation Potential	Sept 1, 2012 - May 2, 2014	PhD student, Ryerson

19	Sepehr Bozorgzadeh	MASc., Sole Supervision	Development of a Soot Concentration Estimator for Industrial Combustion Applications	Sept 1, 2012 - Apr 29, 2014	Kepstrum Inc.
20	Levon Larson	MASc. (Ryerson) Co-Supervised by P. Walsh	Numerical Simulation of Liquid Prechamber Fuel Ignition	Sept 1, 2011 - Sept 30, 2013	Ford Motor Co.
21	Kaveh Khalilian	M.Sc. (Toronto) Co-supervised by M. Thomson	Development and Validation of a Partially Coupled, Two-Equation Soot Model for Industrial Applications	July 1, 2011 - Sept 18, 2013	FEA Training Consultants Inc.
22	Navid Ekrami	MASc. (Ryerson) Co-supervised by A. Fung and D. Naylor	Feasibility of Residential Combined Cooling, Heating, and Power Generation System in Canadian Cities	Sept 1, 2011 - Apr 30, 2013	PhD student, Ryerson
23	Zannatul Moiet Hasib	MASc. (Ryerson) Co-supervised by A. Fung and D. Naylor	Residential Micro Tri-Generation System Based on a Gas Fired Stirling Engine CHP and Thermo Chemical Accumulator (TCA)	Sept 1, 2011 - Apr 24, 2013	Virtual Engineers Inc.
24	Sanaz Arabzadeh Esfarjani	Ph.D. (Toronto) Co-supervised by J. Mostaghimi <i>Awarded Ontario Graduate Scholarship (\$15,000 x 2)</i>	A Modeling Framework for the Synthesis of Carbon Nanotubes by RF Plasma Technology	July 1, 2011 - Apr 16, 2013	Mathworks Inc.
25	Masih Alavy Ghahfarrokhy	MASc. (Ryerson) Co-supervised by W. Leong	Optimization of Hybrid Ground Source Heat Pump Systems Design	Sept 1, 2011 - Apr 1, 2013	PhD student, U. Toronto
26	Nick Eaves	M.Sc. (Toronto) Co-supervised by M. Thomson	The Effect of Pressure and Conjugate Heat Transfer on Soot Formation Modelling	July 1, 2011 - Aug 29, 2012	PhD student, U. Toronto



### Former Undergraduate Research Students

#	Name	Project Title and Information	Dates
1	Alejandro Gonzalez-Ferras	Design and Implementation of ‘Thermal Caisson’ – an In-ground Heat Exchanger with Phase Change Material, Sole Supervision	Apr 29, 2019 – Apr 30, 2020
2	Amir Kiamari	Detailed Numerical Modelling of Refrigerant Performance in Ejector Refrigeration Systems, Sole Supervision	May 22, 2018 – Aug 30, 2019
3	Pedram Hatefraad	Development of a Numerical Model for Solar Assisted Ground Source Heat Pumps, Sole Supervision <i>Awarded NSERC USRA (\$4500), Canadian Congress of Applied Mechanics Award – Solid Mechanics (\$1000)</i>	Sept 6, 2017 – Apr 26, 2019
4	Stevan Kostic	Development and Testing of a Soot Concentration Post-processing Analysis Tool, Sole Supervision	June 4, 2018 - Aug 27, 2019
5	Bobby Anand	Numerical Study of Horizontal Directional Drilling and Coaxial Ground Heat Exchangers, Sole Supervision, <i>Awarded NSERC USRA (\$4500 x 2) Awarded CUE Toronto Hydro Corporation Student Assistantship Award (\$2500)</i>	May 16, 2016 – Sept 1, 2017
6	Seyedeh Rozhan Ghoreishi	Development of a Numerical Model for Solar Assisted Ground Source Heat Pumps, Sole Supervision, <i>Awarded the Canadian Congress of Applied Mechanics Award – Thermofluids (\$1000)</i>	May 8, 2017 – Aug 11, 2017 Sept 4, 2018 – April 26, 2019
7	Talha Ansari	Predicting Particulate Emissions in CFD Simulations of Engine Conditions, Sole Supervision	May 16, 2016 - Apr 30, 2018
8	Akshay Chaudhari	Understanding Coflow Diffusion Flame Centerline Soot Formation, Sole Supervision <i>Awarded MITACS Globalink Scholarship</i>	May 5, 2015 - July 24, 2015
9	Mihai Duica	Numerical Analysis and Experimentation of Solar Powered Desalination Process, Sole Supervision	May 5, 2015 - Aug 28, 2015
10	Sana Askari	Computer Simulation of Microgravity Combustion and Soot Formation, Sole Supervision	May 5, 2015 - Aug 28, 2015
11	Nikola Kuzmic	Development of a Numerical Model for Ground Thermal Response in Geo-exchange Systems, Sole Supervision, <i>Awarded NSERC USRA (\$4500)</i>	May 5, 2014 - Aug 28, 2015
12	Raymond Alexander	Development of a Numerical Model to Predict Particulate Emissions from Engines, Sole Supervision, <i>Awarded NSERC USRA (\$4500)</i>	May 5, 2014 - Aug 28, 2015
13	Vivian Truong	A Study on Addressing Ground-fouling by Integration of Geo-exchange with Water Desalination, Sole Supervision	June 1, 2014 - Aug 29, 2014
14	Xiaoyan Chloe Zhou	Optimization of Ground Loop Entering and Exiting Temperature Pairs in Ground Source Heat Pumps, Sole Supervision, <i>Awarded MITACS Globalink Scholarship</i>	July 1, 2013 - Sept 16, 2013
15	Ying Lam Law	A Finite Element Model for Ground Temperature Response to a Geo-exchange System, Sole Supervision, <i>Awarded Ryerson URA (\$6700)</i>	Apr 28, 2013 - Apr 26, 2014

16	Adam Alaica	A Computational Model for Sizing Horizontal Ground Loops in Geo-exchange Systems, Co-supervised by W. Leong, <i>Awarded NSERC USRA (\$4500)</i>	Apr 28, 2013 - Aug 16, 2013
17	Brian Reghelini	Testing and Validation of an Engine Emissions Model using Computational Fluid Dynamics, Sole Supervision	Apr 28, 2013 - Aug 23, 2013
18	Pushan Lele	Conversion of a Residential Cogeneration System to Micro Tri-generation, Co-supervised by A. Fung and D. Naylor, <i>Awarded NSERC USRA (\$4500)</i>	May 7, 2012 - Aug 24, 2012

#### Former Research Assistants

#	Name	Project Title and Information	Dates
1	Hiep Nguyen	Studying the Impact of Varying Geographic Location on the Economic Viability of Ground Source Heat Pumps, Sole Supervision	May 2, 2014 - May 1, 2015
2	Masih Alavy Ghahfarrokhy	Predicting Particulate Emissions in CFD Simulations of Engine Conditions, Co-supervised by W. Leong	Apr 2, 2013 - Aug 29, 2014

#### Capstone Design Projects Supervised

#	Names	Project Title	Year
1	Zaid Al-Hashemi Awais Lakhani Muhammad Manzoor Talha Bukhtiar	Residential Renewable Energy System	2018
2	Mike Truong Farzan Zamiri Adrian Yong Marcin Ciuraj	Hybrid Geothermal Design	2018
3	Bobby Anand Shiva Motamidi Geoffrey Lambe Gayan Ferdinands	Automatic Sensor-controlled Residential Geothermal Heating and Cooling System	2017
4	Dao Tran Tanmay Parikh Anirban Mandal	Residential Flood Prevention System	2017
5	Rajh Balasundaram Nijanthan Thevarajah Sajjad Nasimi Shurraj Rao	Design of an Arctic Greenhouse Heating System	2016
6	Lorenzo Cortese Michael Duquette Dana Dhailieh Nathan Burrows	Design of an Automatic Sensor-Controlled Geothermal Heating and Cooling System	2016
7	Raymond Alexander Regis Joseph Juan Osorio James Dolan	Design of a Smart Vent Register for Active Control of Residential Climate Zones	2015

8	Ryan Derry Ryan Fung Alexander Jagdat Marko Stakic	Design of an Automatic Sensor-controlled Residential geothermal heating and cooling system	2015
9	Nemanja Zivkovic Dan Desroches Hari Gupta Mike Halberstadt	Design of an Automatic Sensor-Controlled Residential Geothermal Heating and Cooling System	2013
10	Piyush Sharma Maryam Urooj Pinkal Suthar Nilan Rveendran	Green Fitness Facility Package	2013
11	Wissam Kariakos Kika Ozah Ravinder Matharu Hesame Hoshmand	Automated Residential Geothermal HVAC System	2012

### Directed Studies Courses Given

#	Student and Program	Course Title	Semester
1	Pedram Hatefraad MAsc. student	Load Shifting Strategies in Ground Source Heat Pump (GSHP) Applications	Fall 2020
2	Francisco Cepeda Ph.D. student	Implementation of a Numerical Model for Transient Laminar Combustion	Winter 2020
3	Sarah Nicholson MAsc. student	Potential Impacts of Helical Steel Piles as In-Ground Heat Exchangers for Ground Source Heat Pumps in Small and Remote Communities in Canada	Fall 2019
4	Saunak Shukla MAsc. student	Review of the State-of-the-art Radiant Heating and Cooling Systems	Summer 2019
5	Reza Daneshazarian Ph.D. student	Thermal Energy Storage (TES) Using Novel Technologies Including Nano-particles and Encapsulated Phase Change Material (PCM)	Summer 2018
6	Nemanja Ceranic MAsc. student	Influence of Kinetic Mechanism and Surface Reactivity on Soot Inception and Growth Modelling	Summer 2017
7	Amin Mansouri MAsc. student	Effect of Pressure and Dilution Ratio on Soot Formation in a Laminar Ethylene/air Coflow Diffusion Flame	Winter 2017
8	Raymond Alexander MAsc. student	A Detailed Review of Soot Formation Modeling Techniques	Summer 2016
9	Alisha Hunter MAsc. student	Comparative Life Cycle Assessment of Ground Source Heat Pump Systems versus Conventional HVAC Systems with Applications in Ontario	Summer 2016
10	Hiep Nguyen Ph.D. student	Current State of Computational Simulation Techniques for Ground-Source Heat Pumps	Fall 2015
11	Adam Alaica MAsc. student	Intelligent Control Methodologies for Hybrid Ground Source Heat Pump Systems	Summer 2015
12	Ying Lam Law MAsc. student	A Model for Long-Term Ground Temperature Response to Geo-Exchange	Summer 2015

13	Meysam Sahafzadeh Ph.D. student	Numerical Investigation of Time-Dependent Laminar Premixed Flame,	Summer 2014
14	Hiep Nguyen MAsc. student	Understanding the Interaction between a Thermal Chemical Accumulator (TCA) and a Ground Loop	Summer 2013
15	Michael Di Paolo MEng. student	New Technologies in Ground Source Heat Pump Design	Summer 2013
16	Sepehr Bozorgzadeh MAsc. student	Predicting Soot Formation in Industrial Combustion Systems	Summer 2013
17	Nick Eaves M.Sc. student (Toronto)	Optimizing a Parallelized Numerical Model for Combustion and Soot Formation	Fall 2012
18	Ali Khosousi Ph.D. student	Modelling Combustion Emissions	Winter 2012
19	Zannatul Moiet Hasib MAsc. student	Review on Absorption, Adsorption and ClimateWell® Technology and their Application in Tri-generation Systems	Winter 2012
20	Masih Alavy Ghahfarrokhy MAsc. student	A Review of Ground Source Heat Pump Systems	Winter 2012
21	Levon Larson MAsc. student	Turbulent Combustion Simulation	Summer 2012

### Graduate Examinations

#	Student, Degree, and Institution	Thesis Title	Date
1	Poorya Karvan, Ph.D. Preliminary Exam*	Visco-Plastic Ratcheting Evaluation of Steel Alloys Undergoing Various Step-Loading Conditions by Means of Isotropic –Kinematic Hardening Rules	Feb 26, 2020
2	Erica Barnes, MAsc., Ryerson	Building Energy Surrogate Modelling – A Feature Selection Methodology	Aug 20, 2019
3	Nan Ge, Ph.D., U. Toronto	Tailoring the Species Transport in Polymer Electrolyte Membrane Fuel Cells for Improved Performance	July 31, 2019
4	Fadi Mishriky, Ph.D., Ryerson	Aerodynamic Analyses of Skins for Morphing Wings	Sept 7, 2018
5	Cherilyn Dignan, MAsc., Ryerson	An Assessment of Microalgal Biodiesel with Acetone, Butanol and Ethanol using Life Cycle Assessment Methodology	Apr 16, 2018
6	Mashal Farid, MAsc., Ryerson*	Modelling Workload to Quality Using System Dynamics in Manufacturing and Healthcare	Jan 19, 2017
7	Monu Malik, Ph.D., UOIT	Investigation of New Phase Change Materials Based Thermal Management Systems for Li-ion Batteries	Dec 12, 2016
8	Afarin Amirirad, MAsc., Ryerson	A Heat Pump Water Heater for Cold Climate – Canada	Sept 13, 2016
9	Brian Battaglia, MAsc., Ryerson	Refining Field Portable Technology: Quantification of Arsenic Field Test Kits	Aug 26, 2015
10	Mayy Habayeb, MAsc., Ryerson	On the Use of Hidden Markov Model to Predict the Time to Fix Bugs	July 9, 2015
11	Alireza Sayyidmousavi, Ph.D., Ryerson	Investigation of Creep and Fatigue in High Temperature Polymer Matrix Composites Using a Micromechanical Approach	Aug 21, 2014

12	Waleed Alzahrani, M.A.Sc., Ryerson	Experimental Study of a Vertically and Horizontally Coupled Ground Source Heat Pump System	Dec 19, 2013
13	Lam Dang, M.A.Sc., Ryerson	Theoretical and Experimental Study of Single-Needle Thermal Conductivity Probe	Aug 23, 2013
14	Seyed Sepehr Mohaddes Foroushani, M.A.Sc., Ryerson	A Numerical Study of the Effects of Overhangs on the Wind-Driven Rain Wetting of Building Facades	Apr 23, 2013
15	Justin Jeekee Shum, M.Sc., U. Toronto	The Development and Validation of a Simplified Soot Model for use in Soot Emissions Prediction in Natural Gas Fuelled Engine Simulations	Sept 20, 2012
16	Mohammad Reza Kholghy, M.Sc., U. Toronto	The Evolution of Soot Morphology in Laminar Co-Flow Diffusion Flames of the Surrogates for Jet A-1 and a Synthetic Kerosene	Sept 14, 2012
17	Ahmad Khoshnevis, M.A.Sc., Ryerson	Numerical Simulation of Thermodiffusion Subjected to Different Gravity Fields	Aug 9, 2012
18	Kamyar Tanha, M.A.Sc., Ryerson	Evaluating the performance of two solar domestic hot water systems of the archetype sustainable houses	Jan 12, 2012

\*Served as committee chair

## SERVICE ACTIVITIES

### Service Activities at Ryerson (Internal)

#### *Hiring, Appointments and Evaluation Committees*

- Vice-Provost and Dean, Yeates School of Graduate Studies Search Committee, 2018/2019
- Mechanical & Industrial Engineering, Departmental Hiring Committee (DHC), 2018/2019
  - Human Resources training for the DHC completed September 19, 2018
- Mechanical & Industrial Engineering Chair Search/Reappointment Committee, 2018
- Associate Vice-President Research and Innovation Search Committee, 2017/2018
- Chair, Mechanical & Industrial Engineering Department Evaluations Committee (DEC), 2015/2016
- Faculty of Engineering and Architectural Science, Associate Dean of Graduate Studies Search Committee, 2016
- Mechanical & Industrial Engineering Chair Search/Reappointment Committee, 2015
- Mechanical & Industrial Engineering, Departmental Hiring Committee (DHC), 2014/2015
- Mechanical & Industrial Engineering, Departmental Hiring Committee (DHC), 2013/2014
- Mechanical & Industrial Engineering, Departmental Hiring Committee (DHC), 2012/2013
  - Human Resources training for the DHC (on line and in class) completed October 11, 2012

#### *Proposal Review Committees*

- Ryerson Innovation Circle Application Reviewer, Spring 2019 competition
- Internal RTI Equipment Fund Committee, 2012, 2013, and 2014 competitions
- Mechanical & Industrial Engineering Ontario Graduate Scholarship (OGS) Committee, 2013
- RA/URO Application Review Committee, Summer, 2013
- RA Application Review Committee, Fall, 2012
- Centre for Urban Energy (CUE) Scholarship Application Review Committee, 2012

#### *Departmental Positions and Representation*

- Mechanical & Industrial Engineering Department Council Speaker, 2020/2021 and 2021/2022 academic years

- Mechanical & Industrial Engineering Awards Night Master of Ceremonies, 2018
- Mechanical & Industrial Engineering Awards Night Presenter, 2011 - 2018
- Mechanical & Industrial Engineering Department Council Secretary, 2012/2013 and 2013/2014 academic years
- New Faculty Orientation Representative, August, 2012
- Mechanical & Industrial Engineering, Departmental Seminar Coordinator, 2012/2013
- Ryerson RFA rep's council representative, 2 year term from 2014-2016
- Ryerson RFA rep's council representative, 2 year term from 2011-2013

*Other Internal Service*

- Ontario Early Researcher Award Information Session Presenter, 2016, 2017, and 2018
- Accelerated Masters Development Committee Member, 2017
- New Faculty Orientation – Scholarly Research and Creative Activity Panel Member, 2016
- Ryerson SHAD High School Student Summer Program Organizing Committee, 2015-2019
- Organized an Information Session for Faculty on Compute Canada and SOSCIP resources available for researchers, 2015
- FEAS NSERC Discovery Grant Internal Pre-review, 2013

**External Service and Professional Activities**

*Conference Chairing Activities*

- Combustion Institute Canadian Section Spring Technical Meeting 2018 – Lead Conference Organizer and Chair (141 participants), responsible for organizing registration, abstract submission, paper submission and review, venue, catering, social events, local outing, managing a team of volunteers, and arranging discounts with local hotels and restaurants
- NSERC CREATE Clean Combustion Engines Summer School 2017 – Local Host (43 participants)

*Conference Session Chair*

1. Combustion Institute Canadian Section Spring Technical Meeting, Kelowna, Canada, May, 2019 (Pollutant Formation 2)
2. Combustion Institute Canadian Section Spring Technical Meeting, Montreal, Canada, May, 2017 (Heterogeneous and Spray Combustion)
3. Combustion Institute Canadian Section Spring Technical Meeting, Saskatoon, Canada, May, 2015 (Gas Turbines)
4. 15<sup>th</sup> International Conference on Numerical Combustion, Avignon, France, April, 2015 (Soot)
5. International Symposium on Combustion, San Francisco, USA, August, 2015 (Diffusion/Soot)
6. Combustion Institute Canadian Section Spring Technical Meeting, Windsor, Canada, May, 2014 (Modelling & Chemical Kinetics I)
7. Combustion Institute Canadian Section Spring Technical Meeting, Quebec City, Canada, May, 2013 (Soot and Particulates 1)
8. Combustion Institute Canadian Section Spring Technical Meeting, Toronto, Canada, May, 2012 (Laminar Flames I)
9. 7<sup>th</sup> U.S. National Combustion Meeting, Atlanta, Georgia, March, 2011 (Soot)
10. 32<sup>nd</sup> International Symposium on Combustion, Montreal Canada, August, 2008 (Flame Vortex Interactions)
11. 11<sup>th</sup> International Conference on Numerical Combustion, Granada, Spain, April, 2006 (Laminar Flames II)

*Grant Proposal Reviewer*

- United States Department of Energy, Office of Basic Energy Sciences 2020 competition (1 proposal)
- Partnership for Advanced Computing in Europe (PRACE), 2018 Scientific Review (1 proposal)

- Chilean National Science and Technology Commission, Regular 2016 grant competition (1 proposal)
- NSERC CRD (1 proposal)
- NSERC Large CRD Reviewer and Site Visit Committee member (1 proposal)
- NSERC Discovery Grant (5 proposals)
- NSERC I2I (2 proposals)

*Book Proposal Reviewer*

- Elsevier Global Book Production (1 proposal)

*Manuscript Peer Reviewer*

1. Applied Energy (3 reviews)
2. Applied Mathematical Modelling (2 reviews)
3. Applied Sciences (2 reviews)
4. Canadian Water Resources Journal (1 review)
5. Canadian Young Scientist Journal (1 review)
6. Central European Journal of Engineering (1 review)
7. Chemical Engineering Science (1 review)
8. Combustion and Flame (33 reviews)
9. Combustion Science and Technology (2 reviews)
10. Combustion Theory and Modelling (6 reviews)
11. Energy and Fuels (1 review)
12. Energies (3 reviews)
13. Fuel (3 reviews)
14. Geothermal Energy (1 review)
15. International Journal of Green Energy (3 reviews)
16. Journal of Cleaner Production (1 review)
17. Proceedings of the Combustion Institute (19 reviews)
18. Renewable Energy (4 reviews)
19. Sustainable Cities and Society (2 reviews)
20. Sustainability (2 reviews)

*Review and Organizing Committees*

- Chair, Bernard Lewis Fellowship Selection Committee, The International Combustion Institute – 2020
- International Sooting Flame Workshop, Program Leader for Laminar and Pressurized Flames, 2016 – 2018 (responsible for co-organizing the workshop and determining session topics)
- Bernard Lewis Fellowship Selection Committee, The International Combustion Institute – 2018
- Southern Ontario Smart Computing Innovation Platform (SOSCIP) Scientific Advisory Committee (SAC) member, 2015
- International Sooting Flame Workshop, Program Leader for Laminar Flames, 2012 – 2016 (responsible for co-organizing two workshops and determining session topics)
- Compute Canada Resource Allocation Committee (RAC) member and chair for Engineering, Mathematics and Computer Science, 2014/2015 (performing scientific reviews of computational infrastructure requests from Canadian faculty, and chairing committee meetings that allocate resources)
- Compute Canada Resource Allocation Committee (RAC) member for Engineering, Mathematics and Computer Science, 2013/2014 (performing scientific reviews of computational infrastructure requests from Canadian faculty)

- Compute Canada Resource Allocation Committee (RAC) member for Engineering, Mathematics and Computer Science, 2012/2013 (performing scientific reviews of computational infrastructure requests from Canadian faculty)
- Ontario Resource Allocation Committee member, 2012/2013 (responsible for the allocation of computational resources based on scientific reviews)
- SciNet (Compute Canada) Local Resource Allocation Committee (LRAC) member, 2011/2012

*Memberships in Professional Societies*

- Combustion Institute, 2003 – present
- Professional Engineers of Ontario, 2009 – present
- SciNet Users Group, 2010 – present
- Canadian Society of Mechanical Engineering, 2011 – present

*Other Service to the Profession and Community*

- Panel discussion panelist, for “Every new car sold in 2040 will be zero-emission,” at the Combustion Institute Canadian Section Spring Technical Meeting, Kelowna, Canada, May, 2019
- Yale University Alumni Mentoring Program, mentor to Dhruvajyoti Das, a third-year Chemical Engineering PhD student, 2015
- Toronto Science Fair Judge, March, 2015
- Toronto Science Fair Judge, April, 2014
- SciNet High Performance Computing Symposium – Press Conference Panel Member, June 7, 2010
- University of Toronto MIE Research Symposium - Judging Panel Member, April 30, 2010
- Canada Wide Science Fair Judge, May, 2009

**ACTIVITIES RELATED TO FOSTERING EQUITY, DIVERSITY, AND INCLUSION (EDI)**

**Internal Activities related to EDI at Ryerson University**

1. Dimensions Faculty Chair, Faculty of Engineering and Applied Science – In September, 2020 I was appointed to the role of Dimensions Faculty Chair for a Tri-council pilot program aiming to understand and address EDI barriers in research. In my role as chair, I lead a team of trainees at the undergraduate, graduate, and postdoctoral level (distinct from members of my research group) to study and understand EDI barriers in the Ryerson research ecosystem. As a Dimensions chair, I regularly meet with counterparts in each faculty, led by a Dimensions Faculty Director, do discuss approaches to collect data, understand barriers, and develop new initiatives designed to foster EDI in research, and eradicate barriers.
2. Fostering inclusivity in my research group – I am aware of the historical barriers that have hindered particular groups from advancing in the academy and I strive to maintain an inclusive environment in which all researchers feel welcome, comfortable, and can thrive. I keep an open door policy and encourage dialog with each researcher. I make it clear that I have zero-tolerance for discrimination and bias, and that I engage in life-long learning and self-reflection on my own pre-conceptions, misconceptions, unconscious bias, and privilege. I encourage my trainees to do the same. My trainees are a diverse group who come from all over the globe; North and South America, Europe, Africa, The Middle East, and Asia. They have included HQP who are the first in their family to attend university, and HQP who identify as LGBTQ2S++. At all times, I embrace and encourage diversity.
3. Creation of the “Dworkin Group Philosophy and Code of Conduct” – In 2018, I led the creation of the *Dworkin Group Philosophy and Code of Conduct*, which gets distributed to each new group member. It was created by four group members who represented a cross section of diversity, gender, and seniority,



under my supervision, and in consultation with the rest of the group. The document outlines our commitment to equity and inclusivity, and lists ten points of conduct that each group member agrees to follow. The code of conduct serves as a reminder that our actions effect others, and that we need to be sensitive to the viewpoints and needs of others. It is a living document, in that it is also open to change and evolution as new developments are made.

4. Leading a group of six faculty members in my department, I formulated a request to our Chair to have our department host an annual EDI workshop for faculty and research trainees. The aim of the workshop is to educate and raise awareness of EDI issues, especially as they exist within Mechanical and Industrial Engineering. In response to our request, our chair has begun working with the Ryerson Office of the Vice President Equity and Community Inclusion to offer the first such workshop in our department in the fall of 2019.

#### **External Activities related to EDI**

5. I was selected as one of seven representatives of Ryerson to attend the Athena SWAN Round Table Discussion held at U. Toronto on March 22, 2019. The full-day workshop brought together representatives from the Toronto area universities to discuss equity, diversity, inclusion, institutional change, and the implementation of a Canadian version of the Athena SWAN program. Athena SWAN (Scientific Women’s Academic Network) is a British government organization that celebrates and recognizes institutional achievements towards the advancement of gender equity and representation. The workshop provided new insights on advancing and celebrating inclusivity activities, and how to contribute to an environment in which the greatest portion of participants can thrive.

#### **Research Activities Benefitting Indigenous Peoples and Northern Communities**

1. Geothermal Piles for Northern Communities – One ongoing research project focuses on the development of helical steel piles for building foundations that contain internal heat exchangers which can be used with ground source heat pumps. The specialized drilling equipment required for traditional geothermal installations has been a significant barrier towards adoption the north. By contrast, these new piles significantly reduce the cost of installing geothermal heating and cooling systems as they are portable, modular, and do not require specialized drilling. In addition, as they extract heat from the ground, they can be engineered to remediate the risks that melting permafrost poses to existing building foundations. This means that marginalized groups, such as Indigenous communities, would benefit from access to sustainable heating systems and improved structural stability of older buildings that were constructed on permafrost. Our research is now seeking to understand the installation of these heat exchangers into various types of permafrost conditions, and integration into existing northern Canadian building practices.
2. Collaboration with *Growing North* – I have had significant collaboration with *Growing North*, a Ryerson based not-for-profit that designs and builds greenhouses to address food scarcity in northern communities. I led a project to design sustainable heating alternatives for the *Growing North* greenhouses that could extend their growing season from three months to twelve months per year. The project involved detailed computer simulation of greenhouse heating needs in northern climates, and iterative design of heating options in close collaboration with Growing North staff.

## **TEACHING**

### **Courses Taught at Ryerson University**

#### Undergraduate:

- F2020 – MEC817: Combustion Engineering
- F2019 – MEC817: Combustion Engineering
- F2018 – MEC817: Combustion Engineering

W2018 – MEC810: Thermal Power Generation  
W2017 – MEC810: Thermal Power Generation  
W2016 – MEC810: Thermal Power Generation  
F2015 – MEC514: Applied Thermodynamics  
W2015 – MEC810: Thermal Power Generation  
F2014 – MEC817: Combustion Engineering  
F2013 – MEC817: Combustion Engineering  
W2013 – MEC817: Combustion Engineering  
F2012 – MEC514: Applied Thermodynamics  
W2012 – MEC810: Thermal Power Generation  
F2011 – MEC514: Applied Thermodynamics

Graduate:

F2020 – ME8151: Combustion Engineering  
S2020 – ME/AE8112: Computational Fluid Dynamics and Heat Transfer  
F2019 – ME8151: Combustion Engineering  
S2019 – ME/AE8112: Computational Fluid Dynamics and Heat Transfer  
F2018 – ME8151: Combustion Engineering  
S2018 – ME/AE8112: Computational Fluid Dynamics and Heat Transfer  
F2014 – ME8151: Combustion Engineering  
W2013 – ME8112: Computational Fluid Dynamics and Heat Transfer

**Courses Taught at University of Toronto as a Sessional Instructor**

W2011 – MIE1210: Computational Fluid Mechanics and Heat Transfer  
W2010 – MIE1210: Computational Fluid Mechanics and Heat Transfer  
F2009 – AER334: Numerical Methods, Course Coordinator and Instructor

**Guest Lectures**

1. Combustion, Ryerson University, March, 2012, on the subject of “Computational Combustion”
2. Combustion and Fuels, University of Toronto, March, 2010, on the subject of “Droplet Combustion”
3. Transport Processes, Yale University; May 2007, on the subject of “Computational Combustion”

**LANGUAGES**

- English – Native Speaker
- French – Basic Conversational