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Schulich School of Engineering

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Department of Mechanical and Manufacturing Engineering

University of Calgary

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1. EDUCATION

05/2011 – 02/2015	Ph.D. (Mechanical Engineering), University of Pretoria, Pretoria, South Africa.
08/2006 – 12/2008	Master of Science in Mechanical Engineering (Sustainable Energy Engineering Specialization), Royal Institute of Technology, Stockholm, Sweden.
09/2001 – 07/2005	Bachelor of Science (Mechanical Engineering), summa cum laude, Makerere University, Kampala, Uganda.

2. ACADEMIC POSITIONS

2021 – Present	Assistant Professor, Department of Mechanical and Manufacturing Engineering, University of Calgary, Calgary, Alberta, Canada.
2022 – 2025	Adjunct Professor, Department of Mechanical and Industrial Engineering, Toronto Metropolitan University, Toronto, Canada.
2020 – 2021	Assistant Professor, Department of Mechanical and Industrial Engineering, University of Minnesota Duluth, USA.
2018 – 2019:	Postdoctoral Research Fellow in Sustainable Energy Systems, Mechanical and Industrial Engineering, Ryerson University, Canada.
2015 – 2017:	Senior Lecturer, School of Mechanical, Industrial, and Aeronautical Engineering, University of the Witwatersrand, Johannesburg, South Africa.
2014 – 2015:	Lecturer, Department of Mechanical Engineering, Mechatronics and Industrial Design, Tshwane University of Technology, Pretoria, South Africa.
2011 – 2015:	Research Assistant and Ph.D. Student, Department of Mechanical and Aeronautical Engineering, University of Pretoria, Pretoria, South Africa.
2009 – 2011:	Assistant Lecturer, Department of Mechanical Engineering, Makerere University, Kampala, Uganda.
2005 – 2009:	Teaching Assistant, Department of Mechanical Engineering, Makerere University, Kampala, Uganda.

3. HONORS AND AWARDS**3.1 Honors and Awards**

- i. Best Research Paper Award – 2024, presented to the authors of the best papers among 300 papers presented at the 9th Thermal and Fluids Engineering Conference (TFEC-2024) of the American Society of Thermal and Fluids Engineers, University of Oregon, Oregon, April 21-24, 2024
- ii. Excellence Awards - 2023, [Graduate Supervision Excellence Award](#), Schulich School of Engineering, University of Calgary.

- iii. 3rd Best Paper Award, awarded by the Advanced Energy Systems Division (AESD) for papers presented in the Energy Track at the ASME International Mechanical Engineering Congress and Exposition (IMECE2022), Columbus, Ohio, Oct 31st - Nov 3rd, 2022.
- iv. Excellence Awards - 2023, [Award for Blended and Online Learning](#) (Team), Schulich School of Engineering, University of Calgary.
- v. Excellence Awards - 2023, [Award for Experiential and Active Learning Initiatives](#) (Team), Schulich School of Engineering, University of Calgary.
- vi. Fall 2020 Award for Dedication to Student Learning - Thank a Teacher Program, Center for Educational Innovation, University of Minnesota.
- vii. 2018 Highly Cited Review Paper in Applied Energy, Awarded by Applied Energy, Elsevier (Measured on 20th August 2020), [Applied Energy Highly Cited Paper Awards 2020](#).
- viii. Most Highly Cited Researcher in the Faculty of Engineering and the Built Environment at the University of the Witwatersrand (2017-2018). See [Wits Celebrates its Rated Researchers](#)
- ix. Most Valued Reviewer Award for 2016, Renewable Energy - An International Journal.
- x. Outstanding Contribution in Reviewing, Energy Conversion and Management - An International Journal, August 2016.
- xi. Institutional Researcher in Training of the Year, Tshwane University of Technology, Senate Committee for Research and Innovation (2015-2016).
- xii. Outstanding Contribution in Reviewing, Renewable Energy - An International Journal, November 2015.
- xiii. Best Paper Award, Applied Energy ICAE2013, 5th International Conference on Applied Energy, July 1-4, 2013, Pretoria, South Africa ([Awarded by Applied Energy, Elsevier](#)).
- xiv. Best Graduating Student Award in Mechanical Engineering at Makerere University by the Uganda Institute of Professional Engineers (UIPE), highest ever GPA (4.86/5.0), 2004/2005.
- xv. Best Student Awards in BSc. Mechanical Engineering for all semesters in academic years, 2001/2002, 2002/2003, 2003/2004, 2004/2005, Makerere University, Kampala, Uganda.

3.2 Fellowships/Scholarships

- i. Postdoctoral Research Fellowship, Dworkin research group, Ryerson University, Jan – June 2018.
- ii. Nominated by Ryerson University for the Banting Postdoctoral Fellowships program, 2017-2018 (Not Awarded: Overall score 6.47/10).
- iii. University of Pretoria, Postgraduate Research Support Bursary (2011- 2013).
- iv. University of Pretoria, Department of Mechanical and Aeronautical Engineering Research Bursary (2011 – 2013).
- v. Government of Uganda Merit Scholarship for BSc. Mechanical Engineering at Makerere University (2001-2005).

3.3 Research Funding Awarded

3.3.1 Research Grants

- i. NSERC Alliance Grant with Innovia GEO Corp. Enhancement of energy pile coupled ground source heat pump systems in cold climates, July 2024 – June 2027:
CAD 257,000 (Cash), CAD 60,000 (Company in-kind) (PI)
- ii. NSERC Discovery Grants Program. Development, characterization, and optimization of novel linear concentrating beam-down systems integrating high-temperature photovoltaic/thermal receivers or thermochemical reactors, April 2024 – March 2029:
CAD 152,500 (PI)
- iii. Modeling and Assessment of an ECO Positive Home: ETA Energy Inc: Natural Resources Canada: January 2024 – November 2024:
CAD 22,000 (PI)
- iv. National Research Capacity Building - Thermal management of electric vehicles: Concordia's Volt-Age seed call initiative supported by Canada First Research Excellence Fund (CFREF): PI: Prof. Dominic Groulx (Dalhousie University), Co-PI's: Dr. Aggrey Mwesigye (University of Calgary), Prof. Ofelia Jianu (University of Windsor). Collaborator: Prof. Chunyan Lai (Concordia University): March 2024 – February 2026:
CAD 200,000 (CO-PI)
- v. Integrated concentrating solar photovoltaic/thermal (CPV/T) and pumped thermal energy storage (PTES) systems in Canada's cold climate - Concordia's Volt-Age Seed call initiative supported by Canada First Research Excellence Fund (CFREF): Co-PI's Dr. Abdulmajeed Mohamad (University of Calgary), Dr. Fuzhan Nasiri (Concordia University), Prof. Dominic Groulx (Dalhousie University), Wahiba Yaici (CanmetENERGY): March 2024 – February 2026:
CAD 200,000 (PI)
- vi. A coupled solar photovoltaic/thermal (PVT) - ground source heat pump system for space heating and cooling in a multi-family complex (125 units) - Funding provided by Emissions Reductions Alberta to Telsec Properties Corp with the University of Calgary as the research lead: UofC PI, with UofC Co-Applicants: Dr. Aleksandra Govedarica, Dr. Roman Shor, Dr. Apostolos Kantzas - June 2024 - December 2026:
CAD 2,125,000 (UofC PI)
- vii. Vice President Research Catalyst Grant (University of Calgary), Numerical characterization of foundation heat exchangers and energy piles coupled with ground source heat pumps for cold climate space heating and cooling - January 2024 – June 2024: **CAD 13,500 (PI)**
- viii. NSERC Alliance International with Prof. Carsten Wemhöner at the Institute for Energy Technology Eastern Switzerland University of Applied Sciences. Development and Optimization of Solar-Assisted Heat Pump Systems for Space Heating and Domestic Hot Water in Cold Climates - July 2023 - June 2023: **CAD 25,000 (PI)**
- ix. NSERC-SSHRC Preparatory Funds for Sustainable Agriculture. On-farm sustainable energy generation and use - enhanced anaerobic digestion for cold climate + electrification of heating - June 2023 - December 2023: **CAD 35,000 (PI)**
- x. Mitacs Business Strategy Internship with the Biosphere Institute of the Bow Valley: Feasibility of shallow geothermal systems for the Bow Valley municipalities - June 2023 - August 2023: **CAD 10,000 (PI)**
- xi. NSERC Alliance Grant with ENMAX and ETA Energy Solutions: Coupled solar thermal-air source heat pump (ASHP) system integrating thermal energy storage for electrification of space heating in cold climates - March 31, 2023 - March 30, 2025:
CAD 152,880 (Cash) and CAD 82,000 (Company In-kind) (PI)

- xii. Mitacs Business Strategy Internship with ENMAX: Techno-economic evaluation of the potential for seasonal thermal energy storage for the District Heating - September 2022 - December 2022: **CAD 15,000 (PI)**
- xii. Vice President Research Catalyst Grant (University of Calgary), Experimental characterization and optimization of a solar-assisted direct expansion heat pump system for space and water heating in cold climates - September 2023 – March 2024
CAD 11,704.50 (PI)
- xiii. Emerson Commercial and Residential Solutions, support towards components of a direct expansion solar-assisted heat pump capstone project, 2021 - 2022: **CAD 4,000 (PI)**
- xiv. Schulich School of Engineering, University of Calgary, Start-up grant, 2021:
CAD 100,000 (PI)
- xv. Schulich School of Engineering Catalyst for 1 Doctoral student 2021: CAD 15,000 the first year, CAD 10,000 the second year, and CAD 5,000 the third year **CAD 30,000 (PI)**
- xvi. Fall 2020 Swenson College of Science and Engineering Chancellor's Faculty Small Grant, University of Minnesota Duluth. **USD4,000 (PI)**
- xvii. Legislative-Citizen Commission on Minnesota Resources (LCCMR), "Enhanced Thermo-Active Foundations for Space Heating in Minnesota." June 2021 – May 2024
USD312,000 (PI)
- xviii. Thuthuka research funding, 2017 (Renewal), "Design, Optimization and Performance Analysis of Solar Cooling and Heating Systems in South Africa," National Research Foundation (NRF): **ZAR 416,000 (PI)**
- xix. MerSETA and University of the Witwatersrand funding for student bursaries in solar-assisted heating and cooling – 4 Masters bursaries worth R440,000 and one Ph.D. bursary worth R140,000 (2016 - 2017): **ZAR 580,000 (PI)**
- xx. Knowledge Interchange and Collaboration (KIC) grant, October 2016, National Research Foundation (NRF): **ZAR 35,000 (PI)**
- xxi. Thuthuka research funding, 2016, "Design, Optimization and Performance Analysis of Solar Cooling and Heating Systems in South Africa," National Research Foundation (NRF):
ZAR 288,000 (PI)
- xxii. Knowledge Interchange and Collaboration (KIC) grant, October 2015, National Research Foundation (NRF): **ZAR 25,000 (PI)**
- xxiii. Tshwane University of Technology, Faculty of Engineering and Built Environment Research Start-up funding, June 2015: **ZAR 100,000 (PI)**
- xxiv. Knowledge Interchange and Collaboration (KIC) grant, November 2014, National Research Foundation (NRF): **ZAR 30,000 (PI)**

3.3.2 Teaching Improvement

- i. Steam Power Plant with Steam Engine for ENME 485 Laboratories, Funding from the University of Calgary Engineering Endowment (UCEE) Board, 2024: **CAD 41,403.35, Faculty Sponsor**

3.3.3 Supervised Student Awards

- i. Philip Adebayo, Ph.D. student - Best Presentation Award, Department of Mechanical and Manufacturing Engineering Annual Graduate Conference, April 18, 2024

- ii. Philip Adebayo, Ph.D. student - Vanier Canada Graduate Award, CAD 50,000 for three years (2024-2027)
- iii. Nima Mazaheri, Ph.D. student - Schulich School of Engineering Graduate Student Research Impact Excellence Award, University of Calgary, 2024
- iv. Philip Adebayo, Ph.D. student - Schulich School of Engineering Graduate Student Research Impact Excellence Award, 2024
- v. Charaka Jathunge, M.Sc. student - Schulich School of Engineering Graduate Student Research Impact Excellence Award, 2024
- vi. Temitayo Oketola, M.Sc. student - SSE Graduate Student Research Impact Excellence Award, 2024
- vii. Philip Adebayo, Ph.D. student - IBET Momentum Fellowship, CAD 25,000 for 4 years (2023 - 2027)
- viii. Temitayo Oketola, M.Sc. student - Alberta Graduate Excellence Scholarship, CAD 11,000 for 1 year (2023 - 2024), Alberta Innovates Award, CAD 15,000 (2023 - 2024)
- ix. Bardia Abbasi, MSc. student - Alberta Graduate Excellence Scholarship, CAD 11,000 for 1 year (2023 – 2024)
- x. Bowen Tian, NSERC Undergraduate Summer Research Award, University of Calgary, Summer 2023. CAD 7,500 + CAD 1,500
- xi. Nima Mazaheri, Ph.D student - Best Presentation Award, Department of Mechanical and Manufacturing Engineering Annual Graduate Conference, April 18, 2024
- xii. Md Arshad Hossain, Program for Undergraduate Research Experience (PURE), University of Calgary, Summer 2023, CAD 7,500
- xiii. Sushant Shah, Program for Undergraduate Research Experience (PURE), University of Calgary, Summer 2023, CAD 7,500
- xiv. Nima Mazaheri, Ph.D. student - Provost's Doctoral Scholarship worth CAD 15,000 for 4 years (2022 - 2026)
- xv. Charaka Jayathunga, M.Sc. student - Alberta Graduate Excellence Scholarship, CAD 11,000 for 2 years (2022 - 2024)
- xvi. Gloria Wamuo Tom, B.Sc. student - University of Minnesota Duluth, Undergraduate Research Opportunity (Summer 2021) US\$1,750.
- xvii. Andrew Walz – B.Sc. student - University of Minnesota Duluth, Undergraduate Research Opportunity (Fall 2021) US\$1,750.
- xviii. Cadin Wendland – B.Sc. student University of Minnesota Duluth, Undergraduate Research Opportunity (Fall 2021) US\$1,750.

4. STUDENT SUPERVISION AND MENTORING

4.1 Postdoctoral

- 2022 - 2024 Shayan Davani: *Modeling and optimization of enhanced thermo-active foundations with phase change material for energy storage for space heating and cooling in cold climates* - Supervisor/Co-supervision with Dr. Alison Hoxie at the University of Minnesota Duluth

4.2 Postgraduate

Ph.D. Students

- 2024 - Present Nicholas Fry: *Geothermal district heating and cooling system dynamics – modeling and simulation of coupled surface and subsurface facilities for building stock decarbonization*. Sustainable Systems Engineering, University of Calgary - **Main supervisor**, (Co-supervisor – Dr. Roman Shor)
- 2024 - Present Charaka Beragama Jathunge: *Advanced modeling and optimization of helical pile ground heat exchangers incorporating thermal energy storage* - Department of Mechanical and Manufacturing Engineering, University of Calgary - **Main supervisor**
- 2022 - Present Nima Mazaheri: *Experimental study and multi-objective decision-making optimization of novel heat sinks operating with nanofluids for cooling of inverters in electric vehicles* - Department of Mechanical and Manufacturing Engineering, University of Calgary - **Main Supervisor**
- 2022 - Present Philip Adebayo: *Development and optimization of novel solar-assisted ground-source heat pump systems for space heating in cold climates*. Department of Mechanical and Manufacturing Engineering, University of Calgary - **Main Supervisor** (Co-supervisor: Dr. Abdulmajeed Muhamad)
- 2022 - Present Ibrahim Ghalayini: *Modeling and optimization of heat pump systems coupled with vertical and horizontal helical steel piles*. Department of Mechanical and Industrial Engineering, Toronto Metropolitan University, Toronto, Canada, (2022 - 2026) - **Co-supervisor** (Main supervisor: Prof. Seth Dworkin)

Masters Thesis-Based (M.Sc.)

- 2024 - Present Eric Riep: Title: CO₂ conversion for seasonal energy storage. – **Co-supervisor** – (Main Supervisor – Dr. Joule Bergerson)
- 2024 - Present Timothy Otukoya: Title: Energy, exergy and economic analysis of Integrated concentrating solar photovoltaic/thermal (CPV/T) systems - **Main supervisor** (Co-supervisor: Dr. Abdulmajeed Muhamad)
- 2023 - Present Bhadra Sheel: Title: *Thermodynamic modeling and optimization of solar-assisted heat pump system: Comparison of air heaters and solar collectors*. M.Sc., Department of Mechanical and Manufacturing Engineering, University of Calgary - **Main Supervisor**
- 2022 - 2024 Jordan Gruenes: Title: *Long-term performance modelling of solar-enhanced thermo-active foundations in cold climates* (Co-supervision with Dr. Hoxie). M.S.M.E. Program, Department of Mechanical and Industrial Engineering, University of Minnesota Duluth (Advisor/Co-Advisor) - **Co-supervisor** – (Main Supervisor – Dr. A. Hoxie)
- 2022 - 2024 Temitayo Oketola: Title: *A novel approach for enhancing the overall thermal and thermodynamic performance of a parabolic trough solar collector using a combined rotating absorber tube and hybrid nanofluids*. M.Sc., Department of Mechanical and Manufacturing Engineering, University of Calgary - **Main supervisor**
- 2022 - 2024 Charaka Beragama Jathunge: Title: *Numerical Investigation of the Long-Term Performance of Solar-Enhanced Novel Energy Pile-Based Ground Source Heat Pump Systems for Space Conditioning Applications in Cold Climates*. M.Sc., Department of Mechanical and Manufacturing Engineering, University of Calgary –

Main supervisor

- 2022 - 2023 Amirhossein Darbandi: Title: *Numerical analysis of the long-term thermal performance of a solar-assisted foundation heat exchanger - ground source heat pump system for space heating and cooling in extremely cold climates*. M.Sc., Department of Mechanical and Manufacturing Engineering, University of Calgary - **Main supervisor**
- 2022 - 2023 Bardia Abbasi: Title: *Thermodynamic Investigation of solar-assisted heat pumps for water heating applications in cold climatic conditions*. M.Sc. Department of Mechanical and Manufacturing Engineering, University of Calgary - **Main supervisor** (Co-supervisor: Dr. Simon Li)
- 2021 - 2023 Prem Agarwala: Title: *Enhanced thermo-active foundations for space heating and cooling in cold climates*, M.S.M.E. Program, Department of Mechanical and Industrial Engineering, University of Minnesota Duluth - **Main supervisor** (Co-supervisor: Dr. Alison Hoxie)
- 2018 - 2019 Sarah Nicholson: Title: *Modeling of sustainable building energy systems incorporating energy piles*, M.Sc. Mech, Department of Mechanical and Industrial Engineering, Ryerson University - **Co-supervisor** (Supervisor: Prof. Seth Dworkin)
- 2017 - 2020 Nkosinathi Shongwe: Title: *Energy optimization of a solar-thermal driven ejector refrigeration system under South African conditions*, M.Sc. Mech, School of Mechanical, Industrial and Aeronautical Engineering, University of the Witwatersrand - **Main supervisor** - (with Dr. Hamed Roohani)
- 2014 - 2016 Rigardt Coetzee: Title: *The design and optimization of a multi-purpose solar thermal system for residential use*, M.Tech., Tshwane University of Technology - **Co - supervisor** - (Main supervisor: Prof. Zhongjie Huan)
- 2014 - 2015 Lazarus Ramathe: Title: *Experimental study on the thermal performance of R600a, R290, and R600a/R290 mixtures in a retrofit R134a refrigeration system*, M.Tech., Tshwane University of Technology - **Co-supervisor** - (Supervisor: Prof. Zhonjie Huan)

Masters M.Eng/M.Sc. SEDV at the University of Calgary

- 2024 Stuart Mills, M.Sc. SEDV. Title: *Integrated energy system for remote northern communities* - **Main Supervisor**
- 2023 Dishank Bhavsar, M.Eng.: Title: *Sand-based thermal energy storage for district heating - A feasibility study*. Mitacs Business Strategy Internship with ENMAX - **Main supervisor**
- 2022 Harshang Shah, M.Eng.: Title: MEng Program, Department of Mechanical and Manufacturing Engineering, University of Calgary - in fulfillment of course requirements for ENEN 681 - Project in Environmental Engineering - **Main Supervisor**

4.3 Undergraduate

4.3.1 University of Calgary

Research Assistants

- Summer 2024 Maryem Sahbani, Mitacs Global Research Intern, Modeling of concentrating photovoltaic thermal systems
- Summer 2024 Rohan Kurien Thomas, Mitacs Global Research Intern, Modeling Solar driven

	ORC and absorption chiller systems with data center preheating
Summer 2024	Adam Anastas, NSERC Undergraduate Research Assistant, Modeling direct-expansion solar-assisted heat pump systems with photovoltaic-thermal evaporators
Feb – May 2024	Mahmoud Ramzy, Research Assistant, Economic and environmental analysis of heat pump systems coupled with foundation heat exchangers
Summer 2023	Bowen Tian, NSERC Undergraduate Research Assistant, Sustainable Thermal Energy Systems Research Lab and GeoS, Geo-exchange systems
Summer 2023	Md Arshad Hossain, Summer Undergraduate Research Assistant, Sustainable Thermal Energy Systems Research Lab, Parabolic trough systems with supercritical CO ₂
Summer 2023	Sushant Shah, Summer Undergraduate Research Assistant, Sustainable Thermal Energy Systems Research Lab and GeoS, Development of a data acquisition and monitoring system for a field scale geo-exchange system
Oct 2022 – April 2023	Devon Dickinson, Undergraduate Research Assistant, Sustainable Thermal Energy Systems Research Lab and GeoS, Modeling of a campus district heating system

Capstone Projects

2023 - 2024	Bahar Mohagheghfard, Joel Aaron Marquez, James Williams, Moiz Malik, Maynard Maglalang, Terence Ly, <u>ENME 501</u> : Upgrade of the YYC International Airport Geo-Exchange System
2022 - 2023	Tasnim Mustafa, Trinity Kramer, Denise Ante, Charlie Laycock, Long Tran, Aishwarya Llangovan, (<u>ENME 501/502</u>): Design and construction of a low energy greenhouse for Southern Alberta
2021 - 2022	Cody Lassiter, Kyle li, Matthew Henderson, Meghdad Ghias: Structural Review and Design of a Solar Thermal Outdoor Furniture
2021 - 2022	Charuka Marasinghe, Dhruvi Patel, Jessica Sambhi, Nadia Elgamal, Edwin Pulikkottil, Kerwin Virtusio, (<u>ENME 501/502</u>): Design and construction of a novel solar-assisted direct-expansion heat pump (DX-SAHP) for cold climates

4.3.2 University of Minnesota Duluth

2020 - 2021	Ethan Shingledecker - Undergraduate Research Assistant, Department of Mechanical and Industrial Engineering
2020 - 2021	Cadin Wendland - Undergraduate Research Assistant, Department of Mechanical and Industrial Engineering
2020 - 2021	Andrew Walz - Undergraduate Research Assistant, Department of Mechanical and Industrial Engineering
Summer 2021	Gloria Wamuo Tom - Undergraduate Research Assistant, Department of Mechanical and Industrial Engineering
Fall 2022	Ethan Kopiecki - Undergraduate Research Assistant, Department of Mechanical and Industrial Engineering

4.3.3 Ryerson University

Summer 2018	Amir Kiamari - Summer student. Optimization of the performance of ejector refrigeration systems working with alternative working fluids
Summer 2019	Leya R. Kober - Undergraduate Research Assistant. Performance of helical steel piles for space heating and cooling

4.3.4 University of the Witwatersrand – Final Year Projects

2017	Makuru Tshepiso - Numerical simulation of the performance of an underground
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	heat exchanger for a geothermal heat pump system
2017	Sibisi Themba - A compact solar-powered heating and cooling system.
2017	Shabalala Siyabonga - Energy and exergy analysis of a 100 kW solar-powered organic Rankine cycle
2017	Joubert Margaretha - Solar-powered organic Rankine cycle for a rural home.
2017	Shabalala Siyabonga - Energy and exergy analysis of a 100 kW solar-powered organic Rankine cycle.
2017	Mlotya Thabile - Thermodynamic performance of a commercial cascade refrigeration system using R744a with either R1234yf, R1234Ze, R152a or R600a.
2017	Ramulongo Livhuwani - Performance analysis of a low-temperature Organic Rankine cycle using R1234yf and R1234ze isomers as alternative working fluids.
2017	Mbau Lufuno - Solar-powered organic Rankine cycle trigeneration system
2017	Bhaiyat Taahir -Solar pumped hydro energy storage system.
2017	Ndlovu Michael - Performance of a solar-assisted direct expansion heat pump system using hydrocarbon refrigerant mixtures.
2016	Mlilo Mduduzi - Performance and operational strategies of a solar thermal-biogas hybrid energy system.
2016	Lebea Thabang - Energy recovery potential from supermarket refrigeration systems.
2016	Tsheng Tshepo - Performance evaluation of a solar chimney at different orientation angles.
2016	Moyo Jabulani - Thermodynamic performance of a refrigeration system using R134a, R600a, and R290 mixtures.
2016	Rupere Takudzwanashe - A heat exchanger for a combined waste heat and solar thermally driven organic Rankine cycle.
2016	Chokoe Radiphoko - Design of heat exchanger for a combined waste heat and solar thermally driven organic Rankine cycle.
2016	Qhola Qetelo - Design of a sand by-pass system for the Port of Ngqura.
2016	Mlilo Mduduzi - Design of a solar thermally powered water pump.
2016	Chettiar Seshan - A 500 kW solar thermally powered pumped hydro energy storage system.

5. TEACHING

5.1 University of Calgary - Department of Mechanical and Manufacturing Engineering

Spring 2024, Winter 2022, Winter 2023	ENME341 – Fundamentals of Fluid Mechanics
Winter 2024	SUSE311 – Thermodynamics and Fluid Mechanics
Fall 2022, 2023 and 2024	ENME485 – Mechanical Engineering Thermodynamics

5.2 University of Minnesota Duluth - Department of Mechanical and Industrial Engineering

Spring 2020, Fall 2020, Spring 2020 ME 4122 – Heat Transfer, Thermodynamics and Fluid Mechanics Laboratory

5.3 Ryerson University - Department of Mechanical and Industrial Engineering

March 2018 Solar power guest lecture (Ch 13 – in *Power Plant Technology*; M.M. El-Wakil; McGraw-Hill, 2002) as part of the Thermal Power Generation (MEC810) at Ryerson University.

5.4 University of the Witwatersrand, 2015 - 2017 - School of Mechanical, Industrial, and Aeronautical Engineering

2016 - 2017 MECN2006 – Thermodynamics I
2016 - 2017 MECN3017 – Thermodynamics II
2016 - 2017 MECN4013 – Thermal systems
2016 - 2017 MECN4024 – Propulsion
2016 - 2017 MECN3003 and MECN3007 – Boundary Layer Laboratory
2016 - 2017 MECN3003 and MECN3007 – Gas Turbine Laboratory

5.5 Tshwane University of Technology, 2014-2015

Department of Mechanical Engineering, Industrial Design and Mechatronics

2014 - 2015 TDN201T – Thermodynamics II
2014 - 2015 TDN321T – Thermodynamics III

5.6 Makerere University, 2005-2010

Department of Mechanical Engineering

2008 - 2010 MEC4102 – Applied Thermodynamic
2008 - 2010 MEC4105 – Renewable Energy Technologies
2008 - 2010 MEC4205 – Air Conditioning and Refrigeration
2008 - 2010 MEC1204 – Mechanics of Materials
2005 - 2007 MEC1102 – Engineering Mechanics – Statics and Dynamics
2005 - 2007 MEC2103 – Computer-Aided Design

5. MEMBERSHIP IN PROFESSIONAL BODIES

- i. Canadian Society of Mechanical Engineers, CSME (November 2022 - Present)
- ii. Association of Professional Engineers and Geoscientists Alberta, APEGA (July 2021 - Present)
- iii. American Society of Heating, Refrigerating, and Air Conditioning Engineers (November 2021 - Present)
- iv. Professional Engineers Ontario, P.Eng. member (December 2019 - Present)
- v. Professional Engineers Ontario, EIT member (May 2018 - December 2019)
- vi. American Society of Mechanical Engineers (ASME), Member (2007 - Present)
- vii. South African Institution of Mechanical Engineering (SAIMEchE), Member (2015 - 2017)
- viii. Uganda Institution of Professional Engineers (UIPE), Graduate Member (2007 - 2013)

ix. Institute of Energy Professionals (PEM), Member (2013 - 2016)

7. PUBLICATIONS

7.1 Summary

Google Scholar <i>h-index</i> and <i>i10-index</i>	20 and 25, respectively
Scopus <i>h-index</i>	19
ResearchGate <i>h-index</i>	20
Guest Editorials	4
Peer-reviewed journal articles	34 published/accepted, 11 Under review
Keynote papers/Panel discussions	3
Refereed conference papers with oral presentations	55
Presentations at conferences without full papers	12
Other significant outputs:	5
Technical reports	9

7.2 Refereed Journal Papers (trainees/mentees underlined)

- i. Darbandi A., Davani S., Gruenes J., Hoxie A., and **Mwesigye A.** Numerical investigation of the long-term thermal performance of a solar assisted foundation heat exchanger - ground source heat pump system for cold climates. Under Review in *Energy Build* (*Impact factor: 6.7*)
- ii. Adebayo P., Jathunge C.B., Fry N., Shor R., Mohamad A., and **Mwesigye A.** Long-term performance analysis of foundation pile and vertical borehole heat exchangers of a ground-source heat pump system. Submitted to *Geothermics* (*Impact factor: 3.5*)
- iii. Jathunge C.B., Dworkin S.B., Wemhöner C., and **Mwesigye A.** Long-term performance analysis of an energy pile-based solar assisted ground source heat pump system for a residential application in a cold climate: A numerical investigation Under Review in *Energy Convers Manage* (*Impact factor: 9.9*)
- iv. Oketola T., and **Mwesigye A.** Thermal and thermodynamic performance of a parabolic trough solar collector using supercritical CO₂ and rotating absorber tube at varying concentration ratios and rim angles. Submitted to *Solar Energy* (*Impact factor: 6.0*)
- v. Said Z., **Mwesigye A.**, Syam Sunder L., Tiwari A. K., Ali H.M., Bellos E.A., Gim C., Revolutionizing heat transfer: turbulators as key to energy efficiency and sustainability, Submitted to *Advances in Colloid and Interface Science* (*Impact factor: 15.6*)
- vi. Davani S., Darbandi A., Gruenes J., Hoxie A., and **Mwesigye A.** Long-term thermal performance of a solar-assisted slinky foundation heat exchanger coupled with a heat pump for a cold climate. Under Review in *App Therm Eng* (*Impact factor: 6.465*)
- vii. Adebayo P., Shor R., Mohamad A., Wemhöner, C., and **Mwesigye A.** Thermal analysis of a double u-tube vertical ground heat exchanger with two independent circuits for a solar-assisted ground source heat pump. Revisions requested in *J. Eng. Sustain. Bldgs. Cities* (*Impact factor 3.6*)
- viii. Adebayo P., Jathunge C.B., Fry N., Wemhöner C., Shor R., Mohamad A., and **Mwesigye A.** Development, modeling, and optimization of ground source heat pump systems for cold climates - A comprehensive review. Revisions requested, *Energy Build* (*Impact factor: 6.7*)

- ix. Adebayo P., Shor R., Mohamad A., Wemhöner C., and **Mwesigye A.** Performance analysis of a solar-assisted ground source heat pump with a single vertical u-tube Ground heat exchanger. Revisions requested *App Therm Eng (Impact factor: 6.465)*
- x. Abuheiba A., Abuseada M., Alghamdi A., Boetcher S.K.S., Chen L., Diaz G., Fisher T.S., Jajal N., Lee H., Mazumder S., Melendez I., Morgan K.B., **Mwesigye A.**, Ordonez J., Ozalp N., Samadi F., da Silva R.P.P., Recent developments in heat transfer in energy systems: sustainable fuels, thermal energy storage, heat exchangers, multigeneration systems, and system efficiency optimization. Revisions under review in ASME J. Heat and Mass Transfer (*Impact factor: 2.1*)
- xi. Mazaheri N., and **Mwesigye A.** CFD analysis of a combined supercritical carbon dioxide and microjet impingement technique for advanced thermal management of high-heat flux IGBT modules. Revisions under review in *App Therm Eng (Impact factor: 6.465)*
- xii. Fry N., Adebayo P., Tian R., Shor R. **Mwesigye A.** A review of district energy technology with subsurface thermal storage integration. In Press *Geothermal Energy (Impact factor: 3.876)*
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- xiv. Oketola T., and **Mwesigye A.** Numerical investigation of the overall thermal and thermodynamic performance of a high concentration ratio parabolic trough solar collector with a novel modified twisted tape insert using gaseous and supercritical CO₂ as the working fluid. *Therm. Sci. Eng. Prog* 51(2024), 102592 (*Impact factor: 4.8*)
- xv. Abbasi B., Li S., and **Mwesigye A.** Energy, exergy, environmental, and economic (4E) analysis of SAHP water heaters under very cold climatic conditions. *Renew Energy* 226 (2024), 120391 (*Impact factor: 8.634*)
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- xix. Yilmaz İ.H., **Mwesigye A.**, and Kılıç F. Prioritization of heat transfer fluids in parabolic trough solar systems using CFD-assisted AHP-VIKOR approach, *Renew Energy* 210 (2023), 751-768 (*Impact factor: 8.634*)
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- xxi. **Mwesigye A.**, and Yilmaz İ.H. Thermal and thermodynamic optimization of the performance of a large aperture width parabolic trough solar collector using gaseous and

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- xxii. Bahiraei M., Daneshyar M.R., Mazaheri N., and **Mwesigye A.** Two-phase simulation of irreversibilities for nanofluid flow inside an elliptical pin-fin heat sink: Entropy generation and exergy considerations, *Powder Technol* 409(2022), 117723 (*Impact factor: 5.64*)
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- xxiv. Nicholson S.R., Kober L.R., Pedram Atefrad, **Mwesigye A.**, and Dworkin S.B. The Influence of geometry on the performance of a helical steel pile as a geo-exchange system, *Renew Energ* 172 (2021), 714-727 (*Impact factor: 8.634*)
- xxv. **Mwesigye A.**, and Yilmaz İ.H. Thermal and thermodynamic benchmarking of liquid heat transfer fluids in high concentration ratio parabolic trough solar collector systems, *J. Mol. Liq* 318 (2020),114151 (*Impact factor: 6.633*)
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- xxviii. **Mwesigye A.**, Kiamari A., and Dworkin S.B. Energetic Optimization and exergetic performance investigation of an ejector system using HFO-1233zd(E) as a refrigerant, *Int J Refrig* 112 (2020), 155 – 171 (*Impact factor: 4.14*)
- xxix. **Mwesigye A.**, and Dworkin S.B. Performance analysis and optimization of an ejector refrigeration system using alternative working fluids under critical and subcritical operation modes, *Energy Convers Manage* 176(2018), 209-226 (*Impact factor: 11.533*)
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- xxxvi. **Mwesigye A.**, Huan Z., Bello-Ochende T., and Meyer J. P. Influence of optical errors on the thermal and thermodynamic performance of a solar parabolic trough receiver, *Sol Energy* 135 (2016), 703–718 (*Impact factor: 7.188*)
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- xxxviii. **Mwesigye A.**, Bello-Ochende T., and Meyer J.P. Heat transfer and entropy generation in a parabolic trough receiver with wall-detached twisted tape inserts, *Int J Therm Sci* 99 (2016), 238-257 (*Impact factor: 4.779*)
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- xl. **Mwesigye A.**, Huan Z., and Meyer J. P. Thermodynamic optimisation of the performance of a parabolic trough receiver using synthetic oil-Al₂O₃ nanofluid, *Appl Energy* 156 (2015), 398-412 (*Impact factor: 11.45*)
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- xlii. **Mwesigye A.**, Bello-Ochende T., and Meyer J. P. Multi-objective and thermodynamic optimisation of a parabolic trough receiver with perforated plate inserts, *App Therm Eng* 77 (2015), 42-56 (*Impact factor: 6.465*)
- xliii. **Mwesigye A.**, Bello-Ochende T., and Meyer J. P. Minimum entropy generation due to heat transfer and fluid friction in a parabolic trough receiver with non-uniform heat flux at different rim angles and concentration ratios, *Energy* 73 (2014), 606-617 (*Impact factor: 8.857*)
- xliv. **Mwesigye A.**, Bello-Ochende T., and Meyer J. P. Thermodynamic performance of a parabolic trough receiver with centrally placed perforated plate inserts, *Appl Energy* 136 (2014), 989 – 1003 (*Impact factor: 11.45*)
- xlv. **Mwesigye A.**, Bello-Ochende T., and Meyer J. P. Numerical investigation of entropy generation in a parabolic trough receiver at different concentration ratios, *Energy* 53 (2013), 114-127 (*Impact factor: 8.857*)

7.3 Keynote Papers/Panels/White Papers

- i. **Mwesigye A., Wood S., Ahmed S.** Shad 2024 Panel Discussion on Renewable Energy, July 4th, 2024, University of Calgary
- ii. **Mwesigye A.**, Helfenbaum B., Hastings-Simon S., Engineering energy solutions, [Schulich Connects](#) organized by Schulich School of Engineering and sponsored by TD Insurance, February 29, 2024
- iii. **Mwesigye A.** Panel on low-medium temperature geothermal for campuses. [Geothermica Initiative](#) and CET Partnership TRI4 Workshop in Dublin, Ireland, October 11-11, 2023.

- iv. **Mwesigye A.** Panel on low-medium temperature geothermal for cities. [Geothermica Initiative](#) and CET Partnership TRI4 Workshop in Dublin, Ireland, October 11-11, 2023.
- v. **Mwesigye A.** Low carbon energy systems and thermal energy storage. Panelist presentation at the Emission Reduction Alberta (ERA)/University of Alberta/University of Calgary - Research in Action webinar. 10th May 2022.
- vi. **Bello-Ochende T., Mwesigye A.,** and Meyer J.P. Heat transfer enhancement, thermodynamic and numerical optimisation of complex solar energy systems-parabolic trough collector systems: *In Conference Proceedings of the 16th International Heat Transfer Conference (IHTC16)*, Beijing, China, August 10-15, 2018.

7.4 Full Length Peer Reviewed Conference Papers (trainees/mentees underlined)

- i. Sheel B., and **Mwesigye A.** Thermal performance analysis of solar air collector coupled with an air source heat pump for residential space heating in cold climates. In Conference Proceedings of the ASME2024 International Mechanical Engineering Congress and Exposition (IMECE2024), November 17-21, 2024, Portland, OR (Accepted)
- ii. Jathunge C.B., Dworkin S.B., Wemhöner C., and **Mwesigye A.** Energy, economic and environmental assessment of a novel solar-assisted ground source heat pump for residential space heating in a Canadian cold climate. In Conference Proceedings of the ASME2024 International Mechanical Engineering Congress and Exposition (IMECE2024), November 17-21, 2024, Portland, OR (Accepted).
- iii. Darbandi A., Castaneda A.I., Holm-Radford M., Govedarica A., Shor R., and **Mwesigye A.** Techno-economic and environmental performance comparison of different systems for space heating systems in cold climates – case of the Bow valley municipalities. In the Conference Proceedings of the 18th Energy Sustainability Conference, American Society of Mechanical Engineers (ASME), Hilton Anaheim, CA, USA, July 15-17, 2024.
- iv. Mazaheri N., and **Mwesigye A.** Using a green graphene-based nanofluid inside a varying-pitch pin-fin heat sink for cooling of IGBT modules: irreversibility minimization. In Proceedings of the Canadian Society for Mechanical Engineering International Congress, 31st Annual Conference of the Computational Fluid Dynamics Society of Canada, CSME/CFD2024, May 26–29, 2024, Toronto, Ontario, Canada.
- v. Abbasi B., Li S., and **Mwesigye A.** Experimental investigation of the thermal performance of a prototype direct-expansion solar-assisted heat pump system in a cold climatic condition. In the Conference Proceedings of the 18th Energy Sustainability Conference, American Society of Mechanical Engineers (ASME), Hilton Anaheim, CA, USA, July 15-17, 2024.
- vi. Gruenes J., Darbandi A., Davani S., Hoxie A., and **Mwesigye A.** Thermal performance analysis of a solar assisted double U-loop heat exchanger in a thermo-active foundations in cold climates. In Conference Proceedings of the 9th Thermal and Fluids Engineering Conference, American Society of Thermal and Fluids Engineers (ASTFE) Oregon State University, OR, USA, April 21-24, 2024.
- vii. Ghalayini I., Dworkin S.B., and **Mwesigye A.** Numerical characterization of the thermal performance of horizontal geo-columns for ground source heat pump systems. In Conference Proceedings of the International Ground Source Heat Pump Association Research Conference, Montreal, Canada, May 28-30, 2024
- viii. Jathunge C.B., Adebayo P., Dworkin S.B., and **Mwesigye A.** Numerical investigation of an energy pile based solar assisted ground source heat pump system for space heating

and cooling in cold climates. In Conference Proceedings of the International Ground Source Heat Pump Association Research Conference, Polytechnique Montréal, May 28-30, 2024.

- ix. Adebayo P., Fry N., Shor R., Mohamad A., and **Mwesigye A.** Performance enhancement of a cold climate residential scale ground source heat pump system with solar thermal energy. In Conference Proceedings of the 9th Thermal and Fluids Engineering Conference, American Society of Thermal and Fluids Engineers (ASTFE) Oregon State University, OR, USA, April 21-24, 2024.
- x. Mazaheri N., and **Mwesigye A.** Computational analysis of combined novel pin-fin heat sink and a green nanofluid containing graphene nanoplatelets for cooling enhancement of IGBT modules in electric vehicles. In Conference Proceedings of the 9th Thermal and Fluids Engineering Conference, American Society of Thermal and Fluids Engineers (ASTFE), Oregon State University, OR, USA, April 21-24, 2024..
- xi. Oketola T., and **Mwesigye A.** Performance enhancement of a high-concentration ratio parabolic trough solar collector using supercritical CO₂ with a modified twisted tape insert. In Conference Proceedings of the 9th Thermal and Fluids Engineering Conference, American Society of Thermal and Fluids Engineers (ASTFE) Oregon State University, OR, USA, April 21-24, 2024.
- xii. Abbasi B., Li S., and **Mwesigye A.** Second law analysis of a direct-expansion solar assisted heat pump with a bare flat plate collector as the evaporator. In Conference Proceedings of the 9th Thermal and Fluids Engineering Conference, American Society of Thermal and Fluids Engineers (ASTFE) Oregon State University, OR, USA, April 21-24, 2024.
- xiii. Mai A., **Mwesigye A.**, Dickinson D., Badger E., Kantzas A., Pedersen P., and Shor R.J. Reservoir thermal storage as part of a middle-deep closed-loop geothermal system. In Conference Proceedings of the 2023 Geothermal Rising Conference, Reno, Nevada, USA, October 1-4, 2023.
- xiv. Fry N., Adebayo P., Tian R., Shor R.J., and **Mwesigye A.** Underground thermal energy storage at scale: A review of techniques and a case study for Calgary, Alberta. In Conference Proceedings of the 2023 Geothermal Rising Conference, Reno, Nevada, USA, October 1-4, 2023.
- xv. Jathunge C.B., Darbandi A., Kim N., Taleghani S.R., Dworkin S.B., and **Mwesigye A.** Long-term thermal performance evaluation of a novel energy pile for space heating and cooling in a cold climate. In Conference Proceedings of the ASME2023 International Mechanical Engineering Congress and Exposition (IMECE2023), October 29th - November 2nd, 2023, New Orleans, LA.
- xvi. Adebayo P., Jathunge C.B., Shor R., Mohamad A., and **Mwesigye A.** A comparative study of the long-term performance of vertical u-tube borehole heat exchanger and foundation piles in a cold climate. In Conference Proceedings of the ASME2023 International Mechanical Engineering Congress and Exposition (IMECE2023), October 29th - November 2nd, 2023, New Orleans, LA.
- xvii. Dickinson D., Mai A., Govedarica A., Shor R., and **Mwesigye A.** Thermal performance of a geothermal source high-temperature heat pump for district heating – comparison of single-stage and cascade vapor compression cycles. In Conference Proceedings of the

ASME2023 International Mechanical Engineering Congress and Exposition (IMECE2023), October 29th - November 2nd, 2023, New Orleans, LA.

- xviii. **Mwesigye A.** Thermodynamic performance investigation of environmentally friendly working fluids in a geothermal integrated pumped thermal energy storage system. In Conference Proceedings of the ASME2023, 17th International Conference on Energy Sustainability, July 10-12, 2023, Washington DC.
- xix. Mazaheri N., and **Mwesigye A.** Investigation of the entropy generation and exergy destruction rates for a novel micro-jet heat sink working with a nanofluid for efficient cooling of motor inverters in electric vehicles. In Conference Proceedings of the ASME2023 Summer Heat Transfer Conference, July 10-12, 2023, Washington DC.
- xx. Davani S., Darbandi A., Agarwala P., Gruenes J., Hoxie A., and **Mwesigye A.** Design and performance analysis of SlinkyTM type foundation heat exchangers for space heating and cooling in a cold climate. In Conference Proceedings of the 8th Thermal and Fluids Engineering Conference (Hybrid), American Society of Thermal and Fluids Engineers (ASTFE), March 26-29, 2023, Maryland, College Park, MD, USA.
- xxi. Darbandi A., Davani S., Gruenes J., Agarwala P., Hoxie A., and **Mwesigye A.** Long-term thermal performance investigation of horizontal foundation heat exchangers for space heating and cooling in extremely cold climates. In Conference Proceedings of the 8th Thermal and Fluids Engineering Conference (Hybrid), American Society of Thermal and Fluids Engineers (ASTFE), March 26-29, 2023, Maryland, College Park, MD, USA.
- xxii. Agarwala P., Davani S., Gruenes J., Darbandi A., Hoxie A., and **Mwesigye A.** Numerical analysis of vertical thermo-active foundations for cold climates. In Conference Proceedings of the ASHRAE and SCANVAC HVAC Cold Climates Conference, March 6-8, 2023, Anchorage, Alaska, USA.
- xxiii. Elgamal N., Sambi J., Patel D., Marasinghe C., Pulikkottil E., Virtusio K., Li S., and **Mwesigye A.** Design, construction, and thermodynamic analysis of a direct-expansion solar assisted heat pump for cold climates. In Conference Proceedings of the ASME2022 International Mechanical Engineering Congress and Exposition (IMECE2022), October 30th - November 3rd, 2022, Columbus, OH, USA.
- xxiv. **Mwesigye A.**, Shingledecker E., Walz A., and Dworkin S.B. Thermal performance of a helical steel energy pile incorporating latent thermal energy storage for ground-source heat pump applications. In Conference Proceedings of the ASME2021 International Mechanical Engineering Congress and Exposition (IMECE2021), November 1-5, 2021 (Virtual).
- xxv. Shongwe N., **Mwesigye A.**, and Roohani H. Performance analysis and optimization of a solar-driven R134a Ejector refrigeration system. In Conference Proceedings of the 6th Southern African Solar Energy Conference (SASEC2019), ISBN 978-0-7972-1825-3 November 25-27, 2019, East London, South Africa.
- xxvi. Huan Z., Coetzee R.A.A., and **Mwesigye A.** Dynamic performance of a multi-purpose solar thermal system for residential applications. In Conference Proceedings of the 6th Southern African Solar Energy Conference (SASEC2019), ISBN 978-0-7972-1825-3 November 25-27, 2019, East London, South Africa.
- xxvii. **Mwesigye A.**, Nguyen H.V., Atefrad P., Daneshazarian R., Bayomy A.M., and Dworkin S.B. Transient thermal performance and ground temperature variation for a heat pump system using high thermal conductivity energy piles, ID IMECE2019-12005. In Conference

Proceedings of the ASME 2019 International Mechanical Engineering Congress and Exposition (IMECE2019), November 11-14, 2019, Salt Lake City, UT, USA.

- xxviii. **Mwesigye A.**, and Dworkin S.B. Energetic and exergetic performance comparison of an ejector refrigeration system using modern low GWP refrigerants. In Conference Proceedings the ASME 2019 International Mechanical Engineering Congress and Exposition (IMECE2019), November 11-14, 2019, Salt Lake City, UT, USA.
- xxix. Yılmaz İ.H., **Mwesigye A.**, and Goksu T.T. Thermal performance analysis of a large aperture width parabolic trough solar collector using computational fluid dynamics. In Conference Proceedings of the ULIBTK'19 22nd Congress of Thermal Sciences and Technology, 11-14 September 2019, KOCAELİ, Turkey.
- xxx. Shukla S., Daneshazarian R., **Mwesigye A.**, Dworkin S.B, and Swift J. Detailed characterization of novel Radiant floor heating and cooling systems. In Conference Proceedings of the 2019 CSME International Congress, June 2-5, 2019, Western University, London, Ontario, Canada.
- xxxi. Nicholson S.R., **Mwesigye A.**, and Dworkin S.B. Modelling and optimization of helical steel piles as in-ground heat exchangers for ground-source heat pumps. In Conference Proceedings of the 10th International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings (IAQVEC2019), September 5,7, 2019, Bari, Italy.
- xxxii. **Mwesigye A.**, Nguyen H.V., Salt D., and Dworkin S.B. Experimental and numerical investigation of a thermal storage medium for ground source heat pump applications. In Conference Proceedings of the 10th International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings (IAQVEC2019), September 5,7, 2019, Bari, Italy.
- xxxiii. **Mwesigye A.**, Kiamari A., and Dworkin S.B. A thermodynamic investigation and optimization of an ejector refrigeration system using R1233zd as a working fluid. In Conference Proceedings of the 10th International Conference on Indoor Air Quality, Ventilation and Energy Conservation in Buildings (IAQVEC2019), September 5,7, 2019, Bari, Italy.
- xxxiv. Yılmaz İ.H., **Mwesigye A.**, and Goksu T.T. Enhancement of the thermal performance of a parabolic trough solar collector using wire coil inserts. In Conference Proceedings of the SolarTR2018, Solar Conference and Exhibition, Istanbul, Turkey, November 29-30, 2018, p. 143-154.
- xxxv. **Mwesigye A.**, and Meyer J.P. Heat transfer performance of a parabolic trough receiver using SWCNTs-Therminol@VP-1 nanofluids. In Conference Proceedings ASME 2017 International Mechanical Engineering Congress and Exposition (IMECE2017) Volume 8: Heat Transfer and Thermal Engineering, Tampa, Florida, USA, November 3-9, 2017.
- xxxvi. Coetzee R.A.M., **Mwesigye A.**, and Huan Z. A numerical analysis for the dynamic performance of a multi-purpose solar thermal system for residential applications. In Conference Proceedings of the 13th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, HEFAT2017, 17 – 19 July 2017, Portorož, Slovenia.
- xxxvii. **Mwesigye A.**, Huan Z., and Meyer J.P. Comparative thermal performance of a parabolic trough receiver with Cu-Therminol@VP-1, Ag-Therminol@VP-1, and Al₂O₃ - Therminol@VP-1 nanofluids. In Conference Proceedings of the ASME2016 International Mechanical Engineering Congress and Exposition (IMECE2016), Phoenix, Arizona, November 11-17, 2016.

- xxxviii. **Mwesigye A.**, Huan Z., and Meyer J.P. Improving the thermal and thermodynamic performance of parabolic trough receivers using Cu-Therminol@VP-1 nanofluid – performance at different concentration ratios. In Conference Proceedings of the 4th Southern African Solar Energy Conference (SASEC 2016), 31st October – 2nd November 2016, Stellenbosch, South Africa, Paper ID 41. ISBN: 978-0-7972-1658-7.
- xxxix. **Mwesigye A.**, Huan Z., Bello-Ochende T., and Meyer J.P. Thermal efficiency and entropy generation for a parabolic trough receiver at different concentration ratios. In Conference Proceedings of the 12th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, HEFAT2016, 11 – 13 July 2016, Costa del Sol, Spain.
- xl. **Mwesigye A.**, Huan Z., and Meyer J.P. Thermal performance of a receiver tube for a high concentration ratio parabolic trough system and potential for improved performance with syltherm800-CuO nanofluid. In Conference Proceedings of the ASME2015 International Mechanical Engineering Congress and Exposition (IMECE2015), Houston, Texas, November 13-19, 2015.
- xli. Ramathe T., Huan Z., and **Mwesigye A.** Experimental study on the thermal performance of R600a, R290 and R600a/R290 mixtures in a retrofit R134a refrigeration system. In Conference Proceedings of the Industrial and Commercial Use of Energy conference (ICUE2015), 17-19 August 2015, Cape Town, South Africa.
- xlii. **Mwesigye A.**, Bello-Ochende T., and Meyer J.P. Numerical investigation of the effect of slope errors and specular errors on the thermal performance of a solar parabolic trough collector system. In Conference Proceedings of the 3rd Southern African Solar Energy Conference (SASEC 2015), 11-13 May 2015, Skukuza, Kruger National Park, South Africa, Paper ID 1570019707.
- xliii. **Mwesigye A.**, and Huan Z. Thermal and thermodynamic performance of a parabolic trough receiver with Syltherm800-Al₂O₃ nanofluid as the heat transfer fluid. In Conference Proceedings of the 7th International Conference on Applied Energy, ICAE2015, March 28-31, Abu Dhabi, UAE, Paper ID-ICAE2015-34.
- xliv. **Mwesigye A.**, Bello-Ochende T., and Meyer J.P. Thermal performance of a parabolic trough receiver with perforated conical inserts for heat transfer enhancement. In Conference Proceedings of the ASME 2014 International Mechanical Engineering Congress and Exposition, IMECE2014, Nov 14-20, 2014, Montreal, Quebec, Canada, Paper ID: IMECE2014-39849.
- xlv. **Mwesigye A.**, le Roux W.G., Bello-Ochende T., and Meyer J.P. Thermal and thermodynamic analysis of a parabolic trough receiver at different concentration ratios and rim angles. In Conference Proceedings of the 10th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, HEFAT2014, 14 – 26 July 2014, Orlando, Florida.
- xlvi. **Mwesigye A.**, Bello-Ochende T., and Meyer J.P. Heat transfer enhancement in a parabolic trough receiver using perforated conical inserts. In Conference Proceedings of the 15th International Heat Transfer Conference, IHTC-15, August 10-15, 2014, Kyoto, Japan. Paper I.D. IHTC15-9150.
- xlvii. **Mwesigye A.**, Bello-Ochende T., and Meyer J.P. Determination of heat flux and temperature distribution in a parabolic trough receiver at different rim angles and concentration ratios. In Conference Proceedings of the 2nd Southern African Solar Energy Conference, SASEC 2014, January 27-29, 2014, Pine Lodge Resort, Nelson Mandela Bay, South Africa. Paper ID. 27.

- xlvi. le Roux W.G., **Mwesigye A.**, Bello-Ochende T., and Meyer J.P. Tracker and collector for an experimental setup of a small-scale solar thermal Brayton cycle. In Conference Proceedings of the 2nd Southern African Solar Energy Conference (SASEC 2014), January 27-29, 2014, Pine Lodge Resort, Nelson Mandela Bay, South Africa. Paper ID. 28.
- xliv. **Mwesigye A.**, Bello-Ochende T., and Meyer J.P. Heat transfer enhancement in a parabolic trough receiver using wall detached twisted tape inserts. In Conference Proceedings of ASME 2013 International Mechanical Engineering Congress and Exposition, IMECE2013, Nov 15-21, 2013, San Diego, CA, USA. Paper ID: IMECE2013-62745.
- I. **Mwesigye A.**, Bello-Ochende T., and Meyer J.P. Thermodynamic performance of a parabolic trough receiver with centrally placed perforated plate inserts. In Conference Proceedings of the International Conference on Applied Energy, ICAE2013, July 1-4, 2013, Pretoria, South Africa. Paper ID: ICAE2013-258.
- ii. Mwesigye A., Bello-Ochende T., and Meyer J.P. Numerical analysis of the thermal performance of an externally longitudinally finned receiver for parabolic trough solar collector, In Conference Proceedings of the 9th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, HEFAT 2012, pp. 159 – 168, Malta, July 16-18, 2012.
- iii. Kariko B., Mwesigye A., Arineitwe J., and Colonna P. Challenges to the sustainability of small-scale biogas technologies in Uganda. In Conference Proceedings of the 2nd International Conference on Advances in Engineering and Technology, pp. 499-504, January 2011, Entebbe, Uganda.
- iiii. **Mwesigye A.**, Kucel S.B., and Sebbit A. Opportunities for generating electricity from municipal solid waste: Case of Kampala City Council Landfill. In Conference Proceedings of the 2nd International Conference on Advances in Engineering and Technology, pp. 523-529, January 2011, Entebbe, Uganda.

7.5 Extended Abstracts

- i. Adebayo P., Fry N., Mwesigye A., Mohamad A., and Shor R.J., Building decarbonization applications from the subsurface: Calgary building developers are leaning into geothermal technologies. In Conference Proceedings of the 2023 CECA Geoconvention, May 15 - 17, Calgary, AB, Canada.

7.6 Conference Presentations Without Full Papers

- i. Davani S., Darbandi A., Agarwala P., Gruenes J., Hoxie A., **Mwesigye A.** Design and performance analysis of solar assisted slinky™ type foundation heat exchangers for space heating and cooling in a cold climate. Presented in 1st Northland Complex Fluids Workshop, Oct 27th, Duluth, MN, US.
- ii. Darbandi A., and **Mwesigye A.** Computational analysis of the performance of horizontal foundation heat exchangers in cold climates. 4th Annual Canadian Geothermal Students' Days, August 21-22, 2023, University of Calgary.
- iii. Jathunge C.B., and **Mwesigye A.** Thermal behaviour of a novel geo-energy pile for residential space heating and cooling in Calgary, 4th Annual Canadian Geothermal Students' Days, August 21-22, 2023, University of Calgary.

- iv. Agarwala P., Davani S., Gruenes J., Darbandi A., Hoxie A., and **Mwesigye A.** CFD study of vertical u-loop thermo-active foundations for cold climates, Presented at the 75th APS DFD Annual Meeting, November 20-22, 2022, Indianapolis, ID, US.
- v. **Mwesigye A.** Energetic and exergetic performance of a compressed thermal energy storage system coupled with a deep borehole heat exchanger. Presentation at the ASME2022 International Mechanical Engineering Congress and Exposition (IMECE2022), October 30 - November 3, Columbus, Ohio, United States.
- vi. Wendland C., and **Mwesigye A.** Thermodynamic performance of a compressed heat energy storage (CHEST) system using alternative working fluids. Presentation at the ASME2021 International Mechanical Engineering Congress and Exposition (IMECE2021), November 1-5, 2021 (Virtual).
- vii. Shukla S., Antoun S., **Mwesigye A.**, Alavy M., Leong W.H., and Dworkin S.B., Experimental study of a novel Caisson based thermal energy storage system for ground source heat pumps. *In Conference Proceedings of the 2020 CSME International Congress*, June 21-24, 2020, University of Prince Edward Island, Charlottetown, PEI, Canada.
- viii. Shukla S., **Mwesigye A.**, Leong W.H., and Dworkin S.B., Development of a novel radiant floor system: energy simulation and comparison with traditional radiant systems. *In Conference Proceedings of the 2020 CSME International Congress*, June 21-24, 2020, University of Prince Edward Island, Charlottetown, PEI, Canada.
- ix. Nicholson SR., **Mwesigye A.**, and Dworkin S.B. Numerical modelling of helical steel piles as in-ground heat exchangers for ground source heat pumps. *In Conference Proceedings of the 2019 CSME International Congress*, June 2-5, 2019, Western University, London, Ontario, Canada.
- x. Nguyen H.V., **Mwesigye A.**, Atefrad P., Daneshazarian R., Dworkin S.B., and Salt D. Numerical modelling of a thermal energy storage system for ground-source heat pump applications. *In Conference Proceedings of the 2019 CSME International Congress*, June 2-5, 2019, Western University, London, Ontario, Canada.
- xi. **Mwesigye A.**, Kiamari A., and Dworkin S.B. Thermodynamic modelling and optimization of ejector refrigeration systems using alternative working fluids. Presented at *the 2019 CSME International Congress*, June 2-5, 2019, Western University, London, Ontario, Canada.

7.7 Other Presentations, Papers, and Reports

- i. **Mwesigye A.** A solar-assisted ground source heat pump system for a multi-family residential building in SW Calgary, *Calgary Geothermal Workshop*, University of Calgary, May 14, 2024.
- ii. Jathunge C.B., Darbandi A., **Mwesigye A.**, and Shor R. Solar-assisted thermo-active foundations coupled with heat pumps for space heating and cooling in cold climates, *Calgary Geothermal Workshop*, University of Calgary, May 14, 2024.
- iii. Adebayo P., **Mwesigye A.** Solar-assisted low-temperature underground thermal energy storage systems coupled with a ground source heat pump in a cold climate – effect of soil lithology, *Calgary Geothermal Workshop*, University of Calgary, May 14, 2024.
- iv. Adebayo P., Fry N., **Mwesigye A.**, and Shor R. The potential of ground source heat pump and photovoltaic thermal hybrid solar collectors for building decarbonization in Alberta, *Calgary Geothermal Workshop*, University of Calgary, May 12, 2023.

- v. **Mwesigye A.**, Kiamari A., and Dworkin S.B. Optimization of an ejector Refrigeration system for space heating and cooling, *University Wide Sustainable Building Energy Micro Symposium at Ryerson University*, 18th June 2018.
- vi. **Mwesigye A.**, 2018. Thermal performance of parabolic trough solar collector systems. *Presentation to the Dworkin Research Group, Ryerson University*. February 5th, 2018.
- vii. **Mwesigye A.**, Bubendofer A., and Kucel S.B. Sustainability of Small-Scale Hydropower Plants: A Case study of a 1-MW Maziba gorge hydropower station in Southwestern Uganda. *Conference on Collaborative Research for Technological Development*, Speke Resort and Conference Center, Kampala Uganda, December 17th - 21st, 2007.
- viii. **Mwesigye A.**, and Bubendofer A. Potential bio-energy options in developing countries and their impacts: Case study Uganda. *Report submitted to the Department of Energy Technology*, Royal Institute of Technology, and Stockholm, Sweden, 2007.

7.8 Technical Reports

- i. Davani S., Jathunge C.B., Darbandi A., Gruenes J., Ramzy M., Hoxie A., **Mwesigye A.** Energy, economic and emissions analysis of ground source heat pumps coupled with foundation heat exchangers for Minnesota's cold climate, Prepared for the Legislative-Citizen Commission on Minnesota Resources for LCCMR Project No. 2021-010, May 31, 2024
- ii. King W., and **Mwesigye A.** Using UV-C to improve indoor air quality and save energy, 2024, Prepared for AirSniper.
- iii. Darbandi A., Arias C.I., Holm-Ford M., Shor R., Govedarica A., and **Mwesigye A.** Feasibility of shallow geothermal systems for the Bow Valley municipalities, Prepared for the Biosphere Institute of the Bow Valley with Mitaacs Business Strategy Initiative Funding, **1-45**.
- iv. Oketola T., Garth R., and **Mwesigye A.** SolarSteam's Spreadsheet Thermal Performance Calculator: Modifications and Updates, Prepared for SolarSteam Inc., September 2023, **1-5**
- v. Shor R., Pedersen P., **Mwesigye A.**, and Fry N. YYC Deep Closed Loop Geothermal Planning - A Critical Review of Consultant's Report. Prepared for Calgary International Airport, August 2023, **1-12**
- vi. Dishank B., and **Mwesigye A.** Sand Based Thermal Energy Storage for District Heating - a Feasibility Study. Prepared for ENMAX, March 2023, **1-24**
- vii. Davani S., Gruenes J., Hoxie A., and **Mwesigye A.** Building Energy Modeling for Selected Minnesota Locations, *Progress Report, Prepared for Legislative-Citizen Commission on Minnesota Resources, Environment, and Natural Resources Trust Fund (ENRTF)*, June 2022, **1-9**
- viii. **Mwesigye A.**, Bayomy A.M., Alavy M., Nguyen V.H., Gonzalez-Ferras A., and Dworkin S.B. Development of a Novel Caisson Based Thermal Energy Storage System for Ground Source Heat Pumps – Progress Report, *Prepared for Capture Technologies and McClymont and Rak Engineers, Inc.*, October 2019, **1-9**.
- ix. Daneshazarian R., McMillan R., **Mwesigye A.**, and Dworkin S.B. Phase Change Materials for Energy Storage in Ground Source Heat Pump Systems – Literature Review and Toxicology Tests. *Prepared for Capture Technologies and McClymont and Rak Engineers, Inc.*, October 2019, **1-9**.

- x. **Mwesigye A.**, Bayomy A.M., and Dworkin S.B. Determination of the Mass of the Proposed Caisson Based Thermal Energy Storage Installation Prepared for *Keller Foundations Ltd and McClymont and Rak Engineers, Inc.*, June 2019.
- xi. **Mwesigye A.**, Bayomy A.M., Alavy M., Nguyen H.V. and Dworkin S.B. Combining a Caisson with Thermal Energy Storage - Summary for Internal Use. *Prepared for Keller Foundations Ltd. and McClymont and Rak Engineers, Inc.*, February 2019, **1-9**.

7.9 Invited Presentations/Seminars

- i. **Mwesigye A.** Low-Medium temperature geothermal for campuses - University of Calgary, Canada. Presented at the [Geothermica Initiative](#) and CETPartnership TRI4 Workshop in Dublin, Ireland, October 11-11, 2023
- ii. **Mwesigye A.** Modeling and optimization of alternative energy systems for space heating and cooling – Ground coupled heat pump systems, Graduate seminar, Department of Mechanical Engineering, University of Alabama, March 2021.

7.10 Posters

- i. Adebayo P., Jathunge CB., Fry N., Shor R., Mohamad A, and **Mwesigye A.** Numerical investigation of vertical borehole heat exchangers of a ground source heat pump system for space heating and cooling in a typical residential building in Calgary, AB, Canada. Presented at the Energi Simulation Summit 2023, October 24-25, 2023. The Hague, Netherlands
- ii. Shingledecker E., Walz A., and **Mwesigye A.** Numerical investigation of a helical steel pile ground heat exchanger under different operating conditions for space heating and cooling applications. Presented at the ASME2021 International Mechanical Engineering Congress and Exposition (IMECE2021), November 1-5, 2021 (Virtual).
- iii. Adebayo P., Fry N., **Mwesigye A.**, Mohamad A., and Shor R.J., Building decarbonization applications from the subsurface: Calgary building developers are leaning into geothermal technologies. In Conference Proceedings of the 2023 CEGA Geo-convention, May 15 - 17, Calgary, AB, Canada.

7.11 Patent

- i. Seyed, Masih, Alavy, Ghahfarrokhy; Ladislav, Rak; Jun, Wang; David, Ernest, Salt; Afrozalsadat, Alavi; Jaroslava, Marie-Magdalena, Parslow; Seth, B. Dworkin; Ayman, Mahmoud, Bayomy, Mahmoud; **Aggrey, Mwesigye**, and Hiep, V. Nguyen: Apparatus and method for thermal foundation elements. US20230332804A1.

8. TEACHING PROFESSIONAL DEVELOPMENT

2023	Studio Teaching and Learning Series - Schulich School of Engineering
2022	Project-based Learning Course Development - Department of Mechanical and Manufacturing Engineering: Part of the department's project-based learning initiative.
2022	Quality Graduate Supervision - Werklund School of Education, University of Calgary. This MOOC, offered in collaboration with three other Canadian Universities (University of Lethbridge, University of Athabasca, and Queens University), is designed to support faculty members in enhancing their supervisory skills and practices.
2020	Online Design and Teaching Program - University of Minnesota Duluth
2016	Your Teaching Role - University of the Witwatersrand

- 2014 Licence to Teach - Tshwane University of Technology: This is an introductory course introducing new hires to teaching. This included modules on learning outcomes, assessments, pedagogy, and curriculum development, among others.

9. PROFESSIONAL TRAINING/QUALIFICATIONS

9.1 Webinars/seminars

- i. IEA SHC Solar Academy Webinar Series, Task 66, Solar Energy Buildings, International Solar Energy Society (ISES), September 19, 2023. Speakers: Dr. Harald Drück (IGTE, University of Stuttgart, Germany) & Prof. Frank Späte (OTH Amberg-Weiden, Germany), Elsbet Nielsen (Technical University of Denmark, Denmark) and Michael Gumhalter (AEE Intec, Austria)

9.2 General training

- i. Alberta Health Services Community Helpers Training (Responding to Students in Distress), Presented by Student Wellness Services at the University of Calgary, April 11, 2024
- ii. Preventing Sexual Misconduct, Discrimination and Retaliation for Employees, President's Initiative to Prevent Sexual Misconduct (PIPSM), University of Minnesota.
- iii. Responsible Conduct of Research (RCR) – Basic, OVPR University of Minnesota VIA Collaborative Institutional Training Initiative (CITI Program), Completed 11-May-2020.
- iv. Workplace Violence Prevention and Response, HR Program at Ryerson University, Completed 5th February 2018.
- v. Training on Accessibility for Ontarians with Disabilities Act (AODA), Customer Service Standard – Completed at Ryerson University on 18th January 2018.
- vi. Specialized Course for Professionals on Solar Heat for Industrial Applications, Stellenbosch, 2nd - 4th November 2016. Centre for Renewable Energy Studies at Stellenbosch University and the Austrian Development Agency.
- vii. Energy 101, Energy Technology and Policy, University of Texas at Austin and Edx, completed November 2013.
- viii. 132-Hour Occupational Safety and Health Professional Program completed in 2013. OSHAcademy, USA.
- ix. ANSYS CFD Introductory Course, Qfinsoft, Centurion - South Africa, October 2011.
- x. Certificate in Bioenergy, University of Stellenbosch, South Africa, September 2010.
- xi. International Biogas Training Course, International Biogas and Bioenergy Competence Center (IBBK) and University of Hohenheim, Germany, September – October 2009.
- xii. International Workshop on Total Energy Management, Islamic Development Bank and Ghulam Ishaq Khan (GIK), Pakistan, March 2008.
- xiii. Proposal Development Training Workshop, Uganda National Council of Science and Technology, January 2008.
- xiv. Certificate in Energy Systems for Developing Countries, Norwegian University of Science and Technology and Makerere University, July – August 2006.
- xv. Certificate in Design Modeling with Unigraphics NX and Solid Edge, Boeing and Makerere University, July 2004.

10. COMPUTER SKILLS

- i. General: Windows OS, Microsoft Office packages (Word, Excel, PowerPoint, Outlook and Visio), and XLSTAT.
- xvi. Engineering: Engineering Equation Solver (EES); LabView, REFPROP; ANSYS CFD (Fluent), ANSYS Design Exploration; C++; Python; MATLAB; Homer Computer aided drawing (Solid Edge, SolidWorks, ANSYS design modeller and Unigraphics); LandGEM; TRNSYS; COMSOL Multiphysics®.
- ii. E-Learning: Blackboard, Moodle, Canvas

11. REFEREE DUTIES, EDITORSHIPS AND CONFERENCE PARTICIPATION

11.1 Editorships

- i. **Review Editor:** Frontiers in Energy Research – Solar Energy Section (2024 – Present)
- ii. **Guest Editor:** Special Issue "Development, Analysis and Optimization of Sustainable Thermal Energy Systems and Technologies" *Processes* (ISSN 2227-9717) - MDPI, 2022. This special issue belongs to the section ."
- iii. **Associate Editor:** Special Issue of the 13th International Heat Transfer, Fluid Mechanics and Thermodynamics Conference – HEFAT2017, *Heat Transfer Engineering*, 41(15-16) (2020), 1303-1304 <https://doi.org/10.1080/01457632.2019.1624412>
- iv. **Associate Editor: Mwesigye A.**, and Meyer J.P. Guest Editorial, Special Issue of the 12th International Heat Transfer, Fluid Mechanics and Thermodynamics Conference – HEFAT2016, *Heat Transfer Engineering*, 40(13-14) (2019), 1073-1075 <https://doi.org/10.1080/01457632.2018.1457205>

11.2 Journal Reviewing

Regular reviewer for:

- i. Energy Sources, Part A: Recovery, Utilization, and Environmental Effects
- ii. IEEE Transactions on Transportation Electrification
- iii. Chemical Engineering Communications, Taylor and Francis
- iv. Public Library of Science (PLOS) ONE
- v. Engineering Application of Computational Fluids Mechanic, Taylor and Francis
- vi. Springer Nature - Applied Sciences
- vii. International Journal of Green Energy, Taylor and Francis
- viii. Archives of Thermodynamics, PAS Journals
- ix. ASME Journal of Energy Resources Technology
- x. Energy for Sustainable Development, Elsevier
- xi. Journal of Non-Equilibrium Thermodynamics, De Gruyter
- xii. International Journal of Thermofluids, Elsevier
- xiii. Energy Technology, Wiley
- xiv. Applied Energy, Elsevier
- xv. Applied Sciences, MDPI
- xvi. AIMS Energy, AIMS Press

- xvii. Case Studies in Thermal Engineering, Elsevier
- xviii. Computational Design and Engineering, Elsevier
- xix. Energy, Elsevier
- xx. Energy Conversion and Management, Elsevier
- xxi. Energy Science and Engineering, John Wiley and Sons
- xxii. Energy Reports, Elsevier
- xxiii. Entropy, MDPI
- xxiii. International Journal of Heat and Mass Transfer, Elsevier
- xxiv. International Journal of Mechanical Sciences, Elsevier
- xxv. International Journal of Refrigeration, Elsevier
- xxvi. Journal of Energy Engineering, ASCE
- xxvii. Light: Science & Application, Springer Nature
- xxviii. Renewable Energy, Elsevier
- xxix. Science Progress, Sage Publishers
- xxx. Solar Energy, Elsevier
- xxxi. Sustainable Energy Technologies and Assessments, Elsevier
- xxxii. The Open Fuels and Energy Science, Bentham Open
- xxxiii. Urban Climate, Elsevier
- xxxiv. International Journal of Ambient Energy, Taylor and Francis
- xxxv. Journal of Energy, Hindawi Publishing
- xxxvi. Electronics, MDPI, Assignments

11.3 Conference Reviewing

- i. Geothermal Rising Conference, October 27-30, 2024, Waikoloa, Hawai
- ii. Geothermal Rising Conference, October 1-5, 2023, Reno, Nevada
- iii. ASME2023 Summer Heat Transfer Conference, July 9-12, 2023, Washington DC
- iv. ASME2023 Energy Sustainability Conference, July 9-12, 2023, Washington DC
- v. South African Institute of Physics, SAIP2021, University of North-West
- vi. ASME International Mechanical Engineering Congress & Exposition (IMECE): IMECE2023, IMECE2022, IMECE2021, IMECE 2020, IMECE2019, IMECE2018, IMECE2017, IMECE2016
- vii. International Conferences on Heat Transfer, Fluid Mechanics and Thermodynamics (HEFAT): HEFAT2012, HEFAT2014, HEFAT2015, HEFAT 2016, HEFAT 2017
- viii. The 3rd Southern African Solar Energy Conference (SASEC2015)

11.4 Conference Organization

- i. Technical Program Co-Chair - Topic Organizer and Session Chair, K6 - Heat Transfer in Energy Systems - Alternative Power Generation, ASME Summer Heat Transfer Conference (SHTC2024), Anaheim, California, July 15 - 17, 2024

- ii. Track organizer and Session Chair - Track 10 Alternative Energy Conversion Technology (including Wind, Geothermal, Hydro, and Ocean). ASME Energy Sustainability Conference (ES2024), Anaheim, California, July 15 - 17, 2024
- iii. Track organizer and Chair, K6 - Heat transfer in Energy Systems - Alternative Power Generation, Summer Heat Transfer Conference (SHTC2024), Anaheim, California, July 15 - 17, 2024
- iv. Topic Co-Organizer, Track 08-03 - 4E Analysis and Optimization of Energy Systems, ASME2023 International Mechanical Engineering Congress and Exposition, New Orleans, USA,
- v. Topic Organizer, Track 08-4 - Sustainable Energy Systems for Heating and Cooling, ASME2023 International Mechanical Engineering Congress and Exposition, New Orleans, USA
- vi. Topic Co-Organizer, Track 08-19 - Innovations for Cleaner Energy Conversion Technologies, ASME2023 International Mechanical Engineering Congress and Exposition, New Orleans, USA
- vii. Track Organizer, Track 08 - Alternative Energy Conversion Tech (incl Wind, Geothermal, Hydro, Ocean) ASME2013 Energy Sustainability Conference, Washington DC, USA
- viii. Topic Co-organizer 08-06 - 4E Analysis and Optimization of Energy Systems, ASME 2022 International Mechanical Engineering Congress and Exposition, Columbus, Ohio.
- ix. Track Organizer, Track 12 - Distributed Energy Systems, ASME Energy Sustainability Conference, ES 2022, Philadelphia, Pennsylvania, USA
- x. Member of the Local Organizing Committee of the Spring Technical Meeting of the Combustion Institute, Canadian Section at Ryerson University, May 14 -17, 2018
- xi. Member Technical Program Committee of the 13th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, HEFAT2017, 17 to 19 July 2017, Portorož, Slovenia.
- xii. Session Chair at the 12th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, HEFAT2016, 11-13 July 2016, Costa del Sol, Spain.
- xiii. Member Technical Program Committee of the 12th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, HEFAT2016, 11-13th July 2016, Costa del Sol, Spain.
- xiv. Session Chair at the 3rd Southern African Solar Energy Conference (SASEC 2015), 11-13 May 2015, Skukuza, Kruger National Park, South Africa.
- xv. Session Co-chair at the 9th International Conference on Heat Transfer, Fluid Mechanics and Thermodynamics, HEFAT 2012, 16-18 July 2012, Malta.

12. COMMITTEES/ADMINISTRATION/SERVICE

12.1 Grant Proposal Review Panels

- i. Reviewer of the Sustainable Development Goals (SDGs) Collaborative Funding Call Supported by the Global Research Council (GRC), National Research Foundation, South Africa, **2023**.

- ii. Reviewer/Moderator for the DST-NRF Free Standing Innovations and Scarce Skills (FISS) 2024 Funding Postdoctoral Review Panel, Department of Science and Technology - National Research Foundation, South Africa, **2023**.
- iii. Moderator of the 2023 Black Academics Advancement Programme (BAAP) PhD Track Panel Applications, National Research Foundation, South Africa, July - **August 2023**.
- iv. Reviewer for the University of Calgary Program for Undergraduate Research Experience (PURE), Summer Studentships, **January - February 2023** (4 Applications).
- v. Reviewer France-Canada Research Fund (FCRF), 2023 Competition, **April 2023**
- vi. Reviewer of the 2022 Black Academics Advancement Programme (BAAP) PhD Track Panel Applications, National Research Foundation, South Africa, **August 2022**.
- vii. Reviewer for the DST-NRF Free Standing Innovations and Scarce Skills (FISS) 2022 Funding Postdoctoral Review Panel, Department of Science and Technology - National Research Foundation, South Africa, **2022**.
- viii. National Science Foundation Reviewer, December - January 2021; **December - January 2022**.
- ix. Reviewer of the 2021 Fulbright Visiting Student Researcher (VSR) Programme in Energy Engineering - Fulbright Program and NRF South Africa, **August 2021**.
- x. Moderator of the 2021 Black Academics Advancement Programme (BAAP) PhD Track Panel Applications, National Research Foundation, South Africa, **August 2021**.
- xi. Panel Member of the South Africa/ France Science and Technology Research Collaboration (PROTEA) 2021 Grant Applications, National Research Foundation, South Africa, **July 2021**.
- xii. Moderator of the DST-NRF Conference Fund 2020 Applications, National Research Foundation, South Africa, **June 2020**.
- xiii. Moderator of the 2021 DST-NRF Free Standing Innovations and Scarce Skills Postdoctoral Fellowships, National Research Foundation, South Africa, **June 2020**.
- xiv. Editing of the 2019 DST-NRF Free Standing Innovations and Scarce Skills (FISS) Postdoctoral Feedback Reports, Department of Science and Technology, National Research Foundation, South Africa, **March 2020**.
- xv. Moderator for the DST-NRF Free Standing Innovations and Scarce Skills (FISS) 2020 Funding Postdoctoral Review Panel, Department of Science and Technology - National Research Foundation, South Africa, **2019**.
- xvi. Member of the Joint Institute for Nuclear Research (JINR) Research Grant Panel, National Research Foundation, South Africa, **June 2019**.
- xvii. Moderator for The World Academy of Sciences (TWAS) Doctoral Scholarship Program, National Research Foundation, South Africa, **September 2018**.
- xviii. Reviewer for the National Research Foundation and Japan Society for the Promotion of Science 9th HOPE Meeting with Nobel Laureates Review Committee, **October 2016**.
- xix. Member of the NRF Virtual Review Committee as a moderator for the Free-Standing Innovation and Scarce Skills Doctoral Scholarships 2016 Call, Engineering Physics Maths ICT Stats Panel, **September – October 2016**.
- xx. Member of the NRF Virtual Review Committee for the Extended Support for Completion of Masters and Doctoral Scholarships, **September 2016**.

- xxi. Panel member, FISS & TWAS Postdoctoral Scholarship Advisory Panel Meeting, National Research Foundation (NRF), **September 2016**.
- xxii. Panel member, NRF Freestanding, Innovation and Scarce Skills Masters scholarships 2016 applications for Chem-Phy-Engr, **December 2015**.

12.2 University Service

- i. Sustainable Systems Engineering Curriculum Committee, Schulich School of Engineering, **2023 – 2024**.
- ii. Faculty of Graduate Studies Adjudication for Graduate Awards Competitions, Schulich School of Engineering, University of Calgary, **2022, 2023, and 2024**.
- iii. Member, Search Committee, Tier 2 Canada Research Chair in Renewable and Sustainable Energy Systems for Cold Climates, Department of Mechanical Engineering, Schulich School of Engineering, University of Calgary, **2023 and 2024**.
- iv. Member, Search Committee, Assistant Professor Industrial Ecology for Energy and Resources, Sustainable Systems Engineering, Schulich School of Engineering, University of Calgary, **2024**.
- v. Member, Search Committee, Assistant Professor Industrial Transitions, Sustainable Systems Engineering, Schulich School of Engineering, University of Calgary, **2024**.
- vi. Member, Schulich School of Engineering, Sustainability Council, **2022-2024**.
- vii. Member, Schulich School of Engineering, Faculty Graduate Studies Scholarship Committee - **2021/2022, 2022/2023**.
- viii. Member, Graduate Studies Committee, Department of Mechanical and Manufacturing Engineering, University of Calgary, **2021/2022, 2022/2023**.
- ix. Member, Graduate Admissions Committee, Department of Mechanical and Industrial Engineering, University of Minnesota Duluth, **Spring 2021**.
- x. Member, Curriculum Committee, Department of Mechanical and Industrial Engineering, University of Minnesota Duluth, **Spring 2021**.
- xi. Member, Equipment Committee, Department of Mechanical and Industrial Engineering, University of Minnesota Duluth, **Spring 2021**.
- xii. Advisor, (YOS3, 2016; YOS3 2017), School of Mechanical, Industrial and Aeronautical Engineering, University of the Witwatersrand, Johannesburg.
- xiii. Evacuation coordinator, School of Mechanical, Industrial and Aeronautical Engineering, Southwest Engineering Building, University of the Witwatersrand, Johannesburg, **2016-2017**.
- xiv. Course coordinator 3rd year Mechanical Engineering Laboratories, School of Mechanical, Industrial and Aeronautical Engineering, **2017**.
- xv. Member of the Mechanical Engineering, Mechatronics and Industrial Design committee for research and innovation at Tshwane University of Technology, South Africa, **2015**.
- xvi. Mechanical Engineering, Mechatronics and Industrial Design Departmental representative on the Faculty Research Ethics committee at Tshwane University of Technology, South Africa, **2015**.

12.3 Other External Service

- i. Volunteer Mentor, Academics Without Borders, supporting researchers at Bahir Dar Institute of Technology, Bahir Dar University, in preparing funding proposals, **2022 - 2025**.
- ii. ASME Advanced Energy Systems Division (AESD), Renewable Energy and Energy Conversion (REEC) Technical Committee, **2019 - Present**.
- iii. Judge for the Minnesota State Science & Engineering Fair organized by the Minnesota Academy of Science, seven projects in March 2021 and six Projects in 2022.

13. EXAMINER/COMMITTEE APPOINTMENTS

13.1 Courses

- i. MHM 420/780 - Heat and Mass Transfer, Department of Mechanical and Aeronautical Engineering, University of Pretoria, November 2017, 2018, 2019, 2020, 2021.
- ii. MECN 5013A - Thermal Systems, Postgraduate diploma program, School of Mechanical, Industrial and Aeronautical Engineering, University of the Witwatersrand, Johannesburg, October 2017.
- iii. MECN 2006 PT - Thermodynamics I part-time course, School of Mechanical, Industrial and Aeronautical Engineering, University of the Witwatersrand, Johannesburg, October 2016.
- iv. MHM 301 - Hydraulic Machines III, Department of Mechanical and Industrial Engineering Technology, University of Johannesburg, South Africa, 2014.
- v. MEC 4113F - Heat Transfer and Psychrometry, Department of Mechanical Engineering, University of Cape Town, South Africa, 2017.

13.2 Examination Committees/External Examinations

Exam Committee Chair

- i. Ng, Marlon Anthony Nicolas, M.Sc. Thesis Final Exam, April 25, 2024 (Supervisor: Dr. Ron Hugo)
- ii. Vahid Zare, Ph.D. Oral Field of Studies Exam, June 26, 2024 (Supervisor: Dr. Salvatore Federico)
- iii. Andre Ricardo Popinhak, Ph.D. Thesis Final Exam, March 07, 2024 (Supervisor: Dr. Christopher Morton)
- iv. Farajtabar Mohammad, Ph.D. Oral Field of Studies Exam, December 14, 2023 (Supervisor: Dr. Marie Charbonneau)
- v. Gunness Neysa Meagan, M.Sc. Thesis Final Exam, December 18, 2023 (Supervisor: Dr. Sun Qiao)
- vi. Kenneth Hinh, Ph.D. Oral Field of Studies Exam, April 21, 2023 (Supervisor: Dr. Robert Martinuzzi)
- vii. Muhammad Ziad ud din Urf Umer. M.Sc. Thesis Final Exam, August 28, 2023 (Supervisor: Dr. Ahmed Tihamiyu)
- viii. Chanhong Park, Ph.D. Oral Field of Studies Exam, July 4, 2023 (Supervisor: Dr. Alex Ramirez-Serrano)

- ix. Sujal Dave, Ph.D. Oral Field of Studies Exam, March 31, 2023 (Supervisor: Dr. Artem Korobenko)
- x. Yinghao Sun, Ph.D. Thesis Proposal Exam, October 20, 2022 (Supervisor: Dr. Frank Cheng)
- xi. Deng Ruoqi, Ph.D. Thesis Proposal Exam, February 7, 2022 (Supervisor: Dr. Leping Li)
- xii. Hussam Tawfik, Ph.D. Oral Field of Studies Exam, February 1, 2023 (Supervisor: Dr. Joanna Wong)
- xiii. Yang Jaehyun, MSc. Thesis Final Exam, January 1, 2022 (Supervisor: Dr. Simon Park)

Ph.D. Thesis Examiner.

- i. Sayyedvahid Bamzad: Ph.D. Chemical Engineering, University of Calgary, September 2024. Experimental and modeling studies of vapour-liquid equilibrium of multicomponent systems of live bitumen/solvent. Supervisor: Prof. Hassan Hassanzadeh
- ii. Annapurna Basavaraju: Ph.D. Mechanical Engineering, University of Calgary, October 2023. **Title:** Performance Enhancement and Mechanical Characterization of Lattice Augmented Paraffin Wax for Reducing Fuel Sloughing in Hybrid Rocket Motors. Supervisors: Prof. Craig Johansen and Prof. Joanna Wong
- iii. Adrian Garcia: Ph.D. Mechanical Engineering, University of Calgary, September 2023. **Title:** Modeling of and Optimization of Ramjet Engines. Supervisors: Prof. Craig Johansen and Prof. Artem Korobenko
- iv. Miriam Solis Meza: Ph.D. Mechanical Engineering, University of Calgary, December 2022. **Title:** Experimental study of Drag Reduction of Highly-Viscous Flow in a Vertical Pipe. Supervisor: Prof. Ron Hugo
- v. Rahul Agarwal: Ph.D. Mechanical Engineering, University of Calgary, August 2024. **Title:** Physics of Gallium-Based Liquid Metals: From Droplet Dynamics and Manipulation to Thermal Management. Supervisor: Prof. Abdulmajeed Mohamad
- vi. Ramy Mohamed A. Elawad: Ph.D. Mechanical Engineering, July 2024. **Title:** Modeling and Simulation of Fluid-based Gyroscope (Particle Imaging Velocimetry Gyroscope): Supervisor: Prof. Abdulmajeed Mohamad
- vii. Ahmed Bayram: Ph.D. Mechanical Engineering, University of Calgary, August 2022. **Title:** Numerical Modelling of Complex Marine Flows in the Framework of the Variational Multi-Scale Method. Supervisor: Prof. Artem Korobenko
- viii. Saeid Khasi: Ph.D. Chemical Engineering, University of Calgary, April 2023. **Title:** Acoustically Assisted Displacements in Porous Media. Supervisor: Prof. Apostolos Kantzas
- ix. Sahand Etemad: Ph.D. Chemical Engineering, University of Calgary, March 2022. **Title:** Mobility control using CNC stabilized CO₂ foams. Supervisor: Prof. Apostolos Kantzas.
- x. Samaneh (Sam) Ashoori: PhD Chemical Engineering, University of Calgary, March 2022. **Title:** Routes to Lower Greenhouse Gas Emission SAGD Operations. Supervisor: Prof. Ian Gates.
- xi. Mohan Sivagnanam: Ph.D. Chemical Engineering, University of Calgary, July 2021. **Title:** Steam Flow from Steam Generator to Well. Supervisor: Prof. Ian Gates.

- xii. Rohit Gupta: Ph.D. Mechanical Engineering, McMaster University, Ontario, Canada. July 2021, Thermodynamic and Workload Optimization of Data Center Cooling Infrastructures. Supervisor: Prof. Ishwar K. Puri.

M.Sc. Thesis Examiner

- i. Navroop Singh: M.Sc. Mechanical Engineering, University of Calgary, July 22, 2024
Title: Hydrogen blending mixing and flow behavior of (N₂/He and CH₄/H₂) blends.
Supervisor: Prof. Ron Hugo
- ii. Gordon Meehan: M.Sc. Chemical and Petroleum Engineering, University of Calgary, April 22, 2024
Title: Co-axial, closed loop geothermal systems modeling. Supervisor: Prof. Roman J. Shor
- iii. Andries Hendrik van der Merwe: Master of Engineering, University of Pretoria, July 2023
Title: Small-scale power generation using parallel turbochargers. Supervisor: Prof. W.G. le Roux
- iv. Joel Kramer: M.Sc. Mechanical Engineering, University of Calgary
Title: Interactions of Confined-Jet Flow Structures with Ejector Entrainment and Compression. Supervisor: Craig Johansen
- v. Simelane SM: M.Sc. Master of Science in Physics, North-West University, South Africa.
Title: Performance Evaluation of Three Different Solar Cookers in Mahikeng. Supervisor: Prof. Ashmore Mawire
- vi. Maharaj N: M.Sc. Mechanical Engineering, University of Cape Town.
Title: A Thermodynamic Analysis and Optimisation of a Tubular Cavity Solar Receiver: Heteroconical Tubular Cavity Receiver, 2018. Supervisor: Prof. Tunde Bello-Ochende.

B.Sc Thesis Examiner.

- i. Ngele M: B.Sc. Mechanical Engineering, University of the Witwatersrand
Design Project: An Alternative to the Vapor Compression Refrigeration in Long Distance Transportation Using Vapour Absorption Refrigeration System, 2019.
Supervisor: Michael D Atkins
- ii. Michael C. Vincent: B.Sc. Mechanical Engineering, University of the Witwatersrand
Design Project: Off-Grid Heating System for RDP Housing, 2018.
Supervisor: Michael D Atkins

13.3 Review of External Applications for Promotion/Rating

- i. Dr. Mehdi Mehrabi, Promotion to Associate Professor, Department of Mechanical and Aeronautical Engineering, University of Pretoria, Pretoria, South Africa, 2022
- ii. Dr. Jacob Muthu, Promotion to Associate Professor, Faculty of Engineering and Applied Science, University of Regina, SK, Canada, 2022
- iii. Dr. Willem Le Roux, Promotion to Associate Professor, Department of Mechanical and Aeronautical Engineering, University of Pretoria, Pretoria, South Africa, 2021
- iv. NRF Researcher Rating Applications, National Research Foundation, South Africa (2021 and 2024)