Navdeep K. Dhaliwal

@ navdeep.dhaliwal@mail.mcgill.ca
40 Viewmount Crescent
Brampton, Canada L6Z 4R5
+1 514 516 4682
Nationality Canadian

Education

2014 – 2020 **McGill University - Montreal, Canada**
Ph.D. Electrical Engineering
Advisor: Prof. Francois Bouffard
PhD Thesis: Generation Expansion Planning with Renewables

2010 – 2012 **I.I.T Delhi - New Delhi, India**
M.Tech Power Electronics, Electrical Machines and Drives
Advisor: Prof. G. Bhuvaneshwari
M.Tech Thesis: Analysis and Implementation of Solar PV Generating System

2003 – 2007 **Thapar University - Punjab, India**
B.Eng. Electrical Engineering

Awards

2019, 2018, 2017 Nominated for McGill Faculty of Engineering Outstanding Teaching Assistant Award.

2018 Selected as the McGill University Representative to 2018 Seminar for the Next Generation of Researchers in Power Systems

2014-2016 Graduate Excellence Fellowship - McGill Engineering

2014 Dr. Y Lin-Alexander Fellowship in Engineering

2010-2012 MHRD Master's Fellowship, India

Teaching Experience

2014 - 2019 **Teaching Assistant: ECSE 361, Power Engineering**
- *Undergraduate course at McGill University*

2018 **Teaching Assistant: ECSE 461, Electric Machinery**
- *Undergraduate course at McGill University*

2018 **Laboratory Assistant: IGEE 418, Electrical Power Generation**
- *Institute for Electrical Engineering (IGEE) at Polytechnique Montreal*

2015 **Laboratory Assistant: ECSE 486, Power Laboratory**
- *Undergraduate laboratory at McGill University*

2012-2013 **Lecturer in Dept. of Electrical Engineering at The NorthCap University,India**
- *Undergraduate School of Electrical Engineering*

- ***EEL340*** *Basic Electrical Drives.*
- ***ECL 102*** *Circuit Theory.*
- ***ECL 101*** *Basics of Electrical and Electronics Engineering.*

2012 **Teaching Assistant: EEL 209 Power Electronics Devices and Circuits**
- *Undergraduate course at IIT Delhi.*

2011 **Laboratory Assistant: EEP 209 Power Electronics Lab**
- *Undergraduate laboratory at IIT Delhi.*

Experience

2014-2020 **Research Assistant in Electric Energy Systems Laboratory at McGill University**

Fast Flexibility-Driven Generation Expansion Planning with Renewables

- *Developed a novel generation expansion planning approach in GAMS and MATLAB using CPLEX that incorporates intra-hour operational details with high solution quality and rapid runtimes.*
- *Extended to include renewable investment as a decision variable and incorporated demand response for net load shifting.*
- *Extended to multi-year planning with decommissioning of coal generators.*
- *Analyzed the impact of carbon pricing policies and future renewable energy pricing on the capacity expansion.*
- *I am proficient in GAMS, CPLEX, DER-CAM, MATLAB, Simulink.*

Study on Decarbonization of the Northeast North American Electricity Sector

- *Implemented investment planning in generation capacity and transmission for hydro, wind, solar, energy storage, nuclear, thermal technologies and demand response in GAMS and MATLAB using CPLEX..*
- *Estimated the value of inter-regional interconnections for future low carbon power systems for the Northeast Power Coordinating Council (NPCC) regions of Quebec, Ontario, the Maritimes, New York and New England.*

Sigma Energy Storage Inc. CAES solution

- *Performed sensitivity analysis to determine optimal sizing of energy storage for various wind penetrations.*
- *Estimated the net benefit of deploying compressed air energy storage in remote communities.*

2012-2013 **Lecturer in Dept. of Electrical Engineering at The NorthCap University, India**

Teaching

- ***EEL340** Basic Electrical Drives.*
- ***ECL 102** Circuit Theory.*
- ***ECL 101** Basics of Electrical and Electronics Engineering.*

Curriculum Design:

- *I designed the course outline for EEL340 basic electrical drives. The course outline consisted of course description, course content, recommended course material and learning outcome. I taught this course to the undergraduate students via weekly lectures and problem solving in the lecture and tutorial class.*

Other Responsibilities

- *Project coordinator of undergraduate projects in EECE Department.*
- *Organized MATLAB workshops for undergraduate students.*
- *Member of “Modular program for working professional from industry".*
- *Other University services including encouraging women in engineering.*

2010-2012 **Research Assistant in Power Electronics and Machines Laboratory at IIT Delhi**

Solar PV Generation System with MPPT

- *Built a MATLAB Simulink model for PV and battery charge controller with MPPT.*
- *Developed a novel MPPT control algorithm which combines constant voltage and variable step P & O methods.*
- *Compared the novel method to existing MPPT techniques and demonstrated a favourable combination of high energy generated and fast response time.*

50 Wp solar Panel used for LED lighting by flyback converter and MPPT

- *Designed and built hardware of flyback transformer rated at 50kHz, and output voltage of 24 V.*
- *Built and assembled the hardware setup for 50 Wp PV panel connected to LED lights through the flyback transformer.*

2007-2009 **Software Engineer, Accenture Services Private ltd., Bangalore, India**

Java Developer and Tester at United Health Care Group in United States

- *Coding, designing and implementing application codes in JAVA.*
- *Developing test cases, test plan, test scenarios using SQL.*

Research Advising and Mentoring

Undergraduate student advisor

- *Titouan Delorme (co-advised with Francois Bouffard)*
  Project: Sizing of energy storage.

Undergraduate student advisor

- *Antonia Butler (co-advised with Francois Bouffard)*
  Project: Inter-regional transmission expansion planning for NPCC.

Journal Publications

2020 N. K. Dhaliwal, F. Bouffard and M. O'Malley, A Fast Flexibility-Driven Generation Portfolio Planning Method for Sustainable Power Systems, in *IEEE Transactions on Sustainable Energy*, To Appear.

2014 Mohanty, P., Bhuvaneswari, G., Balasubramanian, R. and Dhaliwal, N. K., MATLAB based modeling to study the performance of different MPPT techniques used for solar PV system under various operating conditions, *Renewable and Sustainable Energy Reviews, 38*, 581-593.

Working Journal Paper

2021 N. K. Dhaliwal and F. Bouffard, A Fast Flexibility-Driven Generation Expansion Planning with Investment in Renewables. **Available upon request**

2021 N. K. Dhaliwal and F. Bouffard, A Long Term Multi-Year Generation Expansion Planning with Intra-Hour Operational Details. **Available upon request**

Technical Report

2018 Francois Bouffard, Sebastian Debia, Navdeep Dhaliwal and Pierre-Olivier Pineau (2018). A Decarbonized Northeast Electricity Sector: The Value of Regional Integration. Available at https://iet.polymtl.ca/en/publications/decarbonized-northeast-electricity-sector/

Book Chapter

2015 Amir Abiri-Jahromi, Navdeep Dhaliwal, and François Bouffard. Demand response in smart grids. In Mancarella, A. Vicino, A. Losi, editors, *Integration of Demand Response into the Electricity Chain- Challenges, Opportunities, and Smart Grid Solutions.*, Wiley-ISTE, New York.

Volunteering

Community Outreach

- *Homework Zone mentor to K-12 children to help them with their homework and engage them in team building exercises and give them a tour of laboratories at McGill University.*

Vice Chair of IEEE Women in Engineering McGill

- *I was responsible for organizing industrial visits (e.g. Beauharnois Hydroelectric station), IEEE Day and IEEE Montreal Section general meetings etc.*

VP-internal McGill Electrical Engineering Graduate Student Society

- *I was responsible for organizing industrial visits (e.g. Hydro-Québec Research Institute) and other activities to engage students outside of academics like movie nights, game nights etc.*