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Prof. Heather MacLean
Department of Civil & Mineral Engineering
University of Toronto
35 St. George St.
Toronto, Ontario, Canada, M5S 1A4

Dear Prof. MacLean,

I am very excited to learn of the opportunity to work on life cycle assessment of low carbon light-duty vehicle (LDV) technologies. I have perused your recent work and have always shared your views surrounding the rapid electrification of modern light vehicle fleets. Most countries are introducing bans within the next 30 years on internal combustion engines when in reality, they should be focusing on reducing the need to drive longer distances using heavier vehicles (such as SUVs) which has been steadily climbing in the past few years.

Detailed life-cycle analysis of alternative technological pathways (electric vehicles, fuel cell vehicles, and powertrain technologies) are the key to formulating a policy that comprises several measures for meeting the greenhouse gas (GHG) emission targets for the next few decades. I believe that my research experience in the field of remanufacturing of aeroengine components can help enrich existing LCA models of LDV fleets. I have developed models for estimating the impact of remanufacturing on the overall performance of aeroengine components as well as algorithms and design metrics for deciding on how and when to remanufacture an existing product.

Although my research was more oriented towards life extension of individual products and components rather than entire fleets, I feel there are some similarities involved when it comes to circular economy aspects of design. In other words, adopting a circular economy paradigm in design and policy-making by considering remanufacturing (e.g., vehicle lightweighting) alongside new technologies (such as electric vehicles) can help extract the most value from product fleets (in the form of lower lifecycle costs and GHGs).

I realize that being a researcher entails three things: 1) Mentorship and supervision acumen 2) Strong research skills 3) Good communication skills to present key takeaways from cutting-edge research.

I have ample experience with all three fields and thrive on mentoring and teaching my students. Nothing gives me a greater sense of joy than hearing about the accomplishments of my students. As you can tell from my career profile, I made it a habit to always engage in research and mentorship simultaneously and never turned away anyone that asks for my opinion or guidance.

I have a strong mathematical background in research related to numerical optimization, simulation and data-driven models. I combined these three aspects to automate time-consuming simulation-based design problems in the aerospace industry and was able to transform my ideas into industrial practice through the training programs and workshops that I conducted for our industrial partners (GKN Aerospace).

Yours sincerely,

Khalil Al Handawi