May 3, 2021

National Research Council of Canada (NRC)
Ottawa, Ontario, Canada
Re: Research associate application

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Dear comittee member,

I would like to express my enthusiasm and excitement for the opportunity to be a part of Canada's largest research organization, The National Research Council of Canada (NRC). I am a strong believer in Canada's commitment to diversity and inclusiveness in the workforce which made me look towards Canada for my STEM education ever since I was a child back in Syria. I have recently completed my doctoral studies at McGill University and I feel that it is time to use my years of training and experience as a researcher to support Canada's vision in shaping this world into a better place for all people. The research associate position at NRC is perfect place for me to project and share my ideas with Canada and the world.

I believe that my experience during my doctoral studies would be valuable to supporting Canada's manufacturing and production sectors. My PhD dissertation focused on surrogate modeling of complex aeroengine systems and the use of surrogate-based optimization to explore lots of different designs with relatively low computational effort. This work resulted in a set-based design toolbox for my industrial collaborators at GKN Aerospace, Sweden. The design tools I developed emphasized flexibility and scalability of products for ease of remanufacturing in the future. This helps keep aircraft parts in service for longer periods of time without becoming obsolete. This can drastically reduce the lifecycle cost of such products and environmental impact by proxy.

I also worked on public health projects during my doctoral studies and developed an epidemiological simulation application for predicting the trajectory of pandemics. I managed to model a complex phenomena such as a human social network using 2D particle dynamics with collision, attraction, and repulsion behavior to simulate social distancing and large gatherings. I wrote a program to implement this model and made predictions about the course of the pandemic in Québec to provide informed public health policies about the best measures to control the spread of the COVID-19 pandemic.

Although I am happy with my current job working as a researcher at McGill and coming up with my own research ideas and supervising students to make their ideas a reality, I wanted to explore something different that I could only find at NRC. That is the opportunity to work with a multidisciplinary team, bring people's ideas together, and translate research into practice by working with small and medium-sized enterprises (SMEs) and industry partners. My lab, where I did my doctoral studies specializes in multidisciplinary design optimization for coordinating the engineering activities of multidisciplinary teams and organizations.

I believe that my strong mathematical and simulation skills, experience in software development, and understanding of the industry's simulation needs will add a lot of value to the research being done at NRC and help us both realize our vision of a better tomorrow for everyone around the world. I hope you enjoy going through my profile and my projects on my website (https://khbalhandawi.github.io/projects/) and I hope we can discuss all of this.

Yours sincerely,

Khalil Al Handawi