

May 26th, 2023

Dr. Michael Hegedus  
School of Engineering Science  
Simon Fraser University  
Burnaby, BC, V5A 1S6

Subject: ENSC 405W/440 Letter of Transmittal for short project proposal/selection

Dear Dr. Hegedus,

The enclosed document outlines a short project proposal/selection for ENSC 405W/440 by Company 13. Our aim is to create a modular product that acts as an attachment to convert a generic office chair into a motorized one. This would make workplaces more accessible for individuals with impaired mobility. Additionally, it would allow those with mobility issues to be completely independent and therefore increase productivity.

This document describes the problems faced by individuals with limited walking ability at workplaces. Furthermore, it proposes a cost effective solution aimed at low income individuals and compares it to the current possible solutions in the market.

Our team comprises five highly skilled and dedicated senior engineering students: Kaj Grant-Mathiasen (CEO), Kate Wang (CFO), Amrit Mangat (COO), Colin Buchko (CTO), Divyam Sharma (CCO). Each member brings a unique engineering background, and together, we possess extensive expertise in both hardware and software.

Should you have any questions or require additional information please do not hesitate to contact our Chief Communication Officer, Divyam Sharma, via email ([divyams@sfu.ca](mailto:divyams@sfu.ca)) or via phone (+1 236-512 4989). We will be more than happy to address any concerns or provide any clarification you may require.

Sincerely,

A handwritten signature in black ink, appearing to read 'Kaj', with a horizontal line extending to the right.

Kaj Grant-Mathiasen  
Chief Executive Officer  
Company 13

ENCLOSED: Short Project Proposal/Selection for Company 13

# Short Project Proposal

Company #13

Kaj Grant-Mathiasen - CEO

Kate Wang - CFO

Amrit Mangat - COO

Colin Buchko - CTO

Divyam Sharma - CCO

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## Problem Statement

Office environments typically require individuals to move between workstations, collaborate with colleagues, attend meetings, and access shared resources. However, individuals with limited mobility face significant challenges in navigating these spaces, leading to reduced productivity, decreased independence, and potential social isolation [1]. While mobility aids such as power chairs exist, they can be expensive and may not be suitable for all office environments. The aim of this project is to address the problem of limited mobility and accessibility in office environments by developing a cost-effective and versatile motor attachment for office chairs.

## Statement of Need

Addressing limited mobility and accessibility in office environments for low-income individuals is crucial for inclusivity and equal opportunities as an estimated 288,800 Canadians aged 15 or older use some form of wheeled mobility devices [2]. Additionally, stigmatization with current mobility scooter solutions discourage a significant portion of potential users from fully utilizing them [3]. Our proposed solution would address this issue by providing an alternative that can be subtly integrated into an existing office chair. This solution enables people with mobility impairments to participate fully and independently in the workplace, enhancing their productivity and well-being. This project is unique in its ability to be retrofitted to various chair models while simultaneously remaining affordable compared to other options.

## Current Solutions

There are several competitors and solutions/products that target limited mobility and accessibility in the office environment, but they often fail to address the combination of compatibility, versatility, and affordability. Common solutions are office chairs designed for individuals with mobility impairments that include features such as powered wheels, adjustable height and tilting mechanisms. However, these can be quite expensive. Certain wheelchair attachments are also available to enable movement for hand powered wheelchairs, however these are not designed for office chairs and are mainly created for outdoor use. Low-cost office chair mobility aids have been designed in previous studies, but have failed to create a solution that can be easily transferred across multiple office chairs [4].

## Proposed Solution

This project introduces an innovative attachment for office chairs, incorporating a battery-powered wheel system that can be easily attached to different office chair models. It aims to enhance mobility and accessibility in office environments by enabling individuals with limited mobility to move independently and efficiently. Our product would involve a rechargeable battery, a motor powered wheel system, a footstand, and a user control system. The project emphasizes cost-effectiveness, with the estimated materials cost totalling around \$450. By addressing these aspects, this solution empowers low-income individuals by providing an affordable and versatile mobility-enhancing option for office chairs.

Item	Estimated Cost
Battery	\$100
Motor	\$250
Controller	\$50
Structural Materials (3D Printer Filament)	\$50

*Table 1: Estimated cost of key parts*

## References

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- [2] Giesbrecht, Edward M.; Miller, William C.; Mortenson, W. Ben; Smith, Emma M. "Needs for mobility devices, home modifications and personal assistance among Canadians with disabilities", Statistics Canada, Catalogue no. 82-003-X, Health Reports, Vol. 28, no. 8, pp. 9-15, August 2017. [Online]. Available:  
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- [3] R. Thoreau, "Perception of needing and using a mobility scooter: A preclinically disabled non-scooter User Perspective," *Disability and Rehabilitation: Assistive Technology*, vol. 14, no. 7, pp. 732–736, 2018. doi:10.1080/17483107.2018.1499136
- [4] G. H. d. O. Moura, R. C. de Oliveira, T. Magno Dutra Castilho, J. M. Soares Leal, J. E. dos Santos Padilha and T. V. Rodrigues, "Adapting a regular office chair for people with limited mobility," 2015 IEEE Canada International Humanitarian Technology Conference (IHTC2015), Ottawa, ON, Canada, 2015, pp. 1-4, doi: 10.1109/IHTC.2015.7238053.