***Letter of Transmittal***

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Dear Sir:

Attached please find a copy of my work-term report entitled "Measurement of Ejection Fraction & Wall Thickening in Myocardial Perfusion Positron Emission Tomography” which I am submitting in partial fulfillment of the requirements for SEG 2901.

This report was prepared by me at the request of my employer and summarizes the work performed on my two major projects. It therefore falls into the Type I class of reports. It is the first work-term report that I have submitted.

During the work term, I was employed in the University of Ottawa Heart Institute (UOHI) as a software engineer in the PET research and imaging department. Throughout the entire work term, Dr. Robert deKemp, in collaboration with Mr. Ran Klein, supervised the entire work put into the development of the FlowQuant software program which studies the heart’s functionality.

I was particularly assisted by Mr. Ran Klein in developing the algorithms and implementing them into Matlab code, whereas Mr. Robert had more of an overview position as well as a physician’s point of view when in need of a more experienced eye. Both supervisions where essential since sometimes the program would work just fine, yet some physicians require some particular aspect or functionality and can’t express their needs clearly, which affects greatly the client-worker communication. However, Mr. Ran as well as Dr. Robert provided sufficient collaboration and assistance to overcome all obstacles such as me being new in the medical field, low prior knowledge of the Matlab language and what it has to offer.

I worked on developing various methods and visualization tools for FlowQuant such as an Ejection Fraction Calculating algorithm as well as a Wall Thickening Calculating method and create a final report page entitled “Gated Report” that studies handles gated images and show the results from both previous algorithms. The FlowQuant program is then tested and compared to 4DM, which is the current program of choice for handling PET perfusion scans.

The major problem encountered in this project was the need of the most accurate results obtainable from low resolution and noisy PET images, sometimes encountering partial volume loss. Also, there was some difficulty behind the calculations themselves, since the object studied (the left ventricle) is of an irregular shape, size and thickness and varies irregularly throughout the cardiac cycle and among species or individual from the same species, therefore determining its volume or wall thickness wasn’t as easy at thought.

Adding UNIX support to the program in order to acquire the ability to use it on UNIX platforms was another project I had for the summer and was fairly easier than the precedent one. Nevertheless, we encountered a few setbacks, mostly working in the UNIX environment itself. Not many colleagues have any expertise in this field, most of them being physicists or in medical training. Having no UNIX background myself, I had to do my own research and learn the essentials and understand the different characteristics of each platform in order to adapt FlowQuant to UNIX platforms.

Typically, every first of the week, the supervisor sends me an email with a list of tasks to do, insuring me that I can contact him with any request of assistance or any question I might have encountered. However, mostly the work would be done independently and prior to the end of the week where I would send out a request of additional chores to work on to ensure no waste of time is ever detected. Then later on in the work term, I started to understand how the supervisors divide their tasks and what their expectations are, thus ended up working overtime, as a hobby in my own personal free time, to ensure the maximum beneficiary of my time to improve the program before the term was over.

Other than implementing the program code, I was involved in the medical aspect of the program. Knowledge of animal anatomy, specially the heart’s characteristics was an essential factor in determining possible methods to study the LV features and analyze its functionality.

During the work term, I had to learn to work alone independently, to be creative and use the little resources available on hand to achieve the most, but most importantly, to research whatever unknown concept or difficulty that would appear, with the least dependence on the supervisors’ interventions.

My problem solving skills have improved greatly, as well as my self confidence and my trust in my abilities. I had some lack of communication flow with my supervisors at first, mostly explaining too fast and skipping details, or focusing on non essential ones, and that because of the focus I put in the brain storming step of the implementation: I would assume that if they have more experience in the field, they would know more than I do regarding the program’s functionality, and that wasn’t usually case. However, my communication skills are improving in time.

Among the computer-related benefits I gained during the work term were learning a new programming language (Matlab), and a more advanced working experience in the UNIX environment.

As for the interpersonal achievements I acquired, I must mention that I had the opportunity to meet with some great physicians, discuss my work with some great minds and some potential contacts for further future employment or references.

At the end of the coop term, I was offered both a returning opportunity to the UOHI in the next coop placement, as well as a part-time job in fall, where my research can potentially be written into a journal article. I had to decline the last offer unfortunately due to lack of free time in my fall session to work on a professional medical article. As for the next Coop placement, I offered to stay in contact to insure I get the best Coop placement opportunity, and the supervisor seemed pleased.

As a side note, when the supervisor was interviewed by the Coop office, I had a good review by Mr. Robert, which led me to a conversation with Miss Daniella, the interviewer, where I had a chance to discuss my wishes of a gaming stream work experience, such as EA Games or Ubisoft Games in Montreal. At the end of the conversation, I was advised to contact the office at the beginning of the winter term to inquire more information about any available job posting in this field, or discuss retuning back to the hospital for another, maybe better placement.

I was very pleased with the working experience, specially the work hour’s flexibility. I also admired my supervisors’ constant wish for me to learn the most of the work term, and achieve more than I myself might have imagined. They offered me an amazing and friendly working environment at the office where my colleagues and I are free to discuss freely and learn from each other’s expertise. Overall, I would recommend the position I held to other students if given the chance, anything we wish for at work is available for a great working experience, except proper parking at the hospital, but still I would be honoured to come back the next year if I don’t get an job opportunity in my own field: I have learned a lot.

Yours truly,

Charles Malo

Second Year Software Engineer Student

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**Remark and Disclaimer:**

**This letter of transmittal borrows from the sample/template letter of transmittal available online from the Coop office, due to lack of time. Thus by having similarities with the sample letter of transmittal, I do not intend to take credit for the common aspects between both letters, but simply provide an easy layout for my own letter to finish in time.**