Notice of the Final Oral Examination
for the Degree of Master of Applied Science

of

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BEng (University of Victoria, 2017)

“pH Sensitive Thread-Based Wound Dressing with Integrated Drug Delivery and Wireless Bluetooth Interface”

Department of Mechanical Engineering

Thursday October 10, 2019
10:00 A.M.
Engineering Office Wing
Room 430

Supervisory Committee:
Dr. Mohsen Akbari, Department of Mechanical Engineering, University of Victoria (Supervisor)
Dr. Caterina Valeo, Department of Mechanical Engineering, UVic (Member)

External Examiner:
Dr. Amirali Baniasadi, Department of Electrical and Computer Engineering, UVic

Chair of Oral Examination:
Dr. Xiaodai Dong, Department of Electrical and Computer Engineering, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies
Abstract

Wound treatment is a significant field in healthcare, but one with huge potential and need for advancement. Infection monitoring, in its current state, is a largely primitive affair, relying on visual and olfactory inspection to detect bacteria. As a result, early detection is impossible, and doctors and patients are forced to remove dressings to investigate the wound in a laborious, painful, and unsanitary process. When an infection is detected, the treatment is typically systemic administration of antibiotics. Systemic administration reduces the concentration of antibiotics that can be brought to bear on the infection because it interacts with the entire body and is dissipated by the time it reaches the wound and increases the risk of side effects or antibiotic resistance. Within this thesis, a smart, thread based wound dressing is presented that addresses these issues by providing a pH-based early detection system accompanied by a topical, on-demand drug delivery system. The device has been tested in vitro and in vivo, on bacterial culture and on an animal model, and demonstrated effectiveness at detecting and eliminating bacteria, and at promoting wound healing. This smart wound dressing has the potential to improve treatment and outcomes for a wide variety of injuries, varying from burns to chronic wounds.