

First Name: Ali

Family Name: Atwi

Program: Eng. Phys.

Degree: MSc

Supervisor: Chang-qing Xu

Defence date: Dec.14, 2022

In the interests of facilitating research by others at this institution and elsewhere, and in consideration of my being accepted for enrolment as a graduate student at this institution, I hereby grant a license to:

McMaster University

to make copies of my graduate thesis/dissertation (for substantial parts thereof) and to reproduce it on the web (or any future method of dissemination), the copyright of which is vested in me, provided that this licence is subject to the following conditions:

1. Only single copies shall be made or authorized to be made at any one time, and only in response to a request from the library or any university or similar institution on its own behalf or on behalf of one of its users.
2. This licence shall continue for the full term of the copyright, or for as long as may be legally permitted.
3. The Universal Copyright Notice shall appear on all copies made under the authority of this licence.
4. This licence does not permit the sale of authorized copies at a profit, but does permit the collection by the institution or institutions concerned of charges covering actual cost.
5. All copies made under the authority of the licence bear a statement to the effect that the copy in question "is being made available in this form by authority of the copyright owner solely for the purposes of private study and research and may not be copied or reproduced except as permitted by the copyright laws without written authority from the copyright owner".
6. The foregoing shall in no way preclude the granting by the author of a licence to the National Library of Canada to reproduce the thesis or dissertation and to lend or to sell copies of the same. For this purpose it shall also be permissible for McMaster University to submit the above mentioned thesis or dissertation to the National Library of Canada.



Signature of Witness

Date Dec. 14, 2022



Signature of Student

Date Dec 14th, 2022