Institute of Biomaterials
& Biomedical Engineering
UNIVERSITY OF TORONTO

LOO GEOK ENG FOUNDATION GRADUATE SCHOLARSHIP

Application Instructions: Please complete this form and submit along with:

1. curriculum vitae
2. a copy of your transcripts (ROSI transcripts are acceptable)
3. letter of recommendation from student supervisor plus 2 additional letters of support

Please print:

LAST NAME: Swarup GIVEN NAMES: Arushri

STUDENT NUMBER: 998866071

COUNTRY OF CITIZENSHIP: Canada

EMAIL ADDRESS: arushri.swarup@mail.utoronto.ca

PROGRAM START DATE: 06-Sep-2016

SUPERVISOR: Dr. Jan Andrysek and Dr. Adrian James

Please provide information on any funding received to date and/or future possible funding for which you have applied: The student's stipend will be funded by the Department of ORL-HNS at the Hospital for Sick Children, will be applying for a POS Innovation Grant from the Hospital for Sick Children, IBBME Director's Innovation Award, the Wallberg Research Fellowship and the Frank Howard Guest Bursary.

Please list the persons who are providing letters of recommendation in support of this application:

A) **THESIS SUPERVISOR:**

Name: Dr. Adrian James Department: ORL-HNS at the Hospital for Sick Children

B) **ADDITIONAL LETTER SUBMITTED BY:**

Name: Dr. Jan Andrysek Department: IBBME

Is referee a member of student's supervisor committee: X Yes ☐ No

C) ADDITIONAL LETTER SUBMITTED BY:

Name: Dr. Dawn Kilkenny Department: IBBME

Is referee a member of student's supervisor committee: ☐ Yes X No

ARUSHRI SWARUP
58 Northforest Trail,
Kitchener, Ontario, Canada N2N 2Z1
519-575-5468 | arushriswarup@gmail.com

PERSONAL STATEMENT

A driven, hard-working and optimistic biomedical engineer starting an MASc. at IBBME. Has developed prototyping, engineering design, teamwork and project management skills through her undergraduate degree of Engineering Science, Biomedical Systems Option at U of T and her internships. Eager to apply and enhance her skills in an exciting Master's project, developing new instruments to facilitate endoscopic ear surgery, through IBBME and the Hospital for Sick Children.

WORK EXPERIENCE

Research Student – Centre for Image Guided Innovation and Therapeutic Intervention at the Hospital for Sick Children May, 2016 - Present

- Used Solidworks, 3D printing and CNC Mill Machining to fabricate components for experiments
- Conducted experiments to characterize force vs. deformation trends nitinol tubes using a motor, force sensor, Arduino board and laser apparatus
- Analyzed data using Matlab and statistical analysis
- Trained students to use CNC Mill Machine and to generate G-Code

Engineering Associate – Baylis Medical Company May, 2014 – August, 2015

- Designed, tested, documented and implemented device verification and validation testing
- Managed projects involving communication with company departments and suppliers
- Prototyped and tested production jigs, using Solidworks and 3D printing, while incorporating feedback from senior engineers and production operators
- Addressed non-conformances in production by performing technical investigations, developing and implementing a solution in production with a product engineer
- Developed a Laser Welding Training Document and Manufacturing Protocols

EDUCATION

University of Toronto September, 2011 – April, 2016

- **Bachelor of Applied Science and Engineering, Biomedical Systems Option, Graduated with Honours**
- Relevant Courses: Biomedical Engineering Design, Undergraduate Thesis, Biomaterial and Medical Device Development, Human Physiology, Cells and Tissue Engineering

ENGINEERING PROJECTS

Design and Fabrication of an Endoscopic Ear Surgery Tool September – December, 2015

- Collaboratively designed a modified surgical tool for Endoscopic Ear Surgery with four team members and an ENT Surgeon at SickKids Hospital
- Used Solidworks, 3D printing and Mill machining to design a functional prototype and tested inside a 3D printed ear canal model and a cadaver ear canal
- Delivered a final presentation and report
- Will continue this project, as an MASc. project at IBBME, where the ENT Surgeon will be the Primary Investigator

Undergraduate Thesis: Computer Simulation of Nerve Stimulation September, 2015 – April, 2016

- Developed a model of enhanced transcutaneous electrical nerve stimulation on a

simplified human leg using COMSOL Multiphysics
- Analyzed nerve excitability using Matlab and optimized model parameters
- Delivered thesis presentation to peers and supervisor and submitted Thesis report

Fabrication of Pneumatic Engine - Basic Machining Course at George Brown College February, 2015
- Used Lathe, Mill machine and Drill press to machine a pneumatic engine

Design and Experimental Verification of a Damped Crutch January – April, 2014
- Collaboratively designed and prototyped a dampened crutch with a team and measured force imparted by the crutch using a force plate and Matlab
- Submitted a proposal and delivered an oral presentation

Development of an Antimicrobial Resistant Microorganism Monitoring System May – August, 2013
- Conducted diffraction-based immunoassays and tested them on a system of optical instruments along with a fellow student
- Utilized Matlab to analyze data collected, wrote an SOP for diffraction patterning

Engineering Design Proof of Concept Dowel-Packing Machine
University of Toronto Division of Engineering Science January – April, 2012
- Designed and prototyped a robot in a machine shop with two team-members

Aeroponic Proof of Concept Project May 2012 – November, 2014
- Collaboratively built an Aeroponic Garden System consisting of individual garden units with a central nutrient-spraying and drainage system, with a team and U of T professor

SKILLS
- Matlab, Solidworks SolidCAM, Microsoft Office, COMSOL Multiphysics, ImageJ
- CNC Mill Machining, Laser Welder, Force Gauge, Pull Test Stand, 3D Printing, Wet Lab experience
- Certified in Laser Safety Training by U of T, May, 2013

AWARDS
- NSERC IUSRA Award May-August, 2014 and 2015 during PEY at Baylis Medical
- Recipient of 2011 University of Toronto President's Scholarship

CLINICAL VOLUNTEER EXPERIENCE
Baylis Medical Company May, 2014 – August, 2015
- Volunteered at company Christmas party and Annual General Meeting

Grand River Hospital/Regional Cancer Centre Volunteer: Summer Student Program July – August, 2011
- Interacted with patients undergoing chemotherapy

LEADERSHIP/VOLUNTEER EXPERIENCE
Engineering Science Ambassador September – December, 2013
- Conversed with prospective Engineering Science students at University Fairs

HOBBIES
Bollywood Dance Instructor at Hart House, U of T February – June, 2016

REFERENCES: Available on Request

UNIVERSITY OF TORONTO

Complete Academic History

Arushri Swarup **Accurate as of:** July 07 2016

Registration History

2011 Fall-2016 Winter: Faculty of Applied Science & Engineering

Bachelor of Applied Science in Engineering Science Conferred - June 2016
with Honours

Faculty of Applied Science & Engineering

2011 Fall - BASc in Engineering Science - Division of Engineering Science

Sessional GPA 2.38 Cumulative GPA 2.38
Sessional % Average 68.2
Status: Pass

Crs Code	Title	Wgt	Mrk	Grd	CrsAvg
CIV102H1	STRUCT. & MATERIALS	0.50	62	C-	B-
CSC180H1	INT.TO COMP.PROGRAM.	0.50	68	C+	B
ESC101H1	PRAXIS I	0.50	70	B-	B
ESC103H1	ENG. MATHEMATICS & COMPUTATION	0.50	57	D+	B
MAT194H1	CALCULUS 1	0.50	85	A	B-
PHY180H1	CLASSICAL MECHANICS	0.50	67	C+	B

May proceed

2012 Winter - BASc in Engineering Science - Division of Engineering Science

Sessional GPA 2.72 Annual GPA 2.55 Cumulative GPA 2.55
Sessional % Average 72.0
Status: Pass

Crs Code	Title	Wgt	Mrk	Grd	CrsAvg
CSC190H1	COMP. ALGOR. & DATA STRUCTURES	0.50	68	C+	B
ECE159H1	FUNDAMENTALS OF ELEC. CIRCUITS	0.50	63	C	C+

ESC102H1	PRAXIS II	0.50	83	A-	B
MAT185H1	LINEAR ALGEBRA	0.50	75	B	B-
MAT195H1	CALCULUS II	0.50	75	B	B
MSE160H1	MOLECULES AND MATERIALS	0.50	68	C+	B

May proceed

2012 Fall - BASc in Engineering Science - Division of Engineering Science

Sessional GPA 2.90 Cumulative GPA 2.67
Sessional % Average 73.5
Status: Pass

Crs Code	Title	Wgt	Mrk	Grd	CrsAvg
AER210H1	VECTOR CALC. & FLUID MECHANICS	0.50	80	A-	B
CHE260H1	THERMODYNAMICS	0.50	76	B	B
ECE253H1	DIGITAL & COMPUT.SYS	0.50	64	C	B-
ESC203H1	ENG. SOCIETY&CRITICAL THINKING	0.50	75	B	B
MAT292H1	Calculus III	0.50	76	B	B-
PHY293H1	WAVES AND MODERN PHYSICS	0.50	70	B-	B

May proceed

2013 Winter - BASc in Engineering Science - Division of Engineering Science

Sessional GPA 3.17 Annual GPA 3.03 Cumulative GPA 2.79
Sessional % Average 76.2
Status: Pass

Crs Code	Title	Wgt	Mrk	Grd	CrsAvg
AER201H1	ENGINEERING DESIGN	0.50	73	B	B
BME205H1	BIOMOLECULES AND CELLS	0.50	78	B+	B-
ECE259H1	ELECTRICITY AND MAGNETISM	0.50	76	B	B-
NMC344H1	Ancient Egypt II	0.50	76	B	B-
PHY294H1	QUANTUM AND THERMAL PHYSICS	0.50	80	A-	B-
STA286H1	PROBABILITY & STATISTICS	0.50	74	B	B-

May proceed

2013 Fall - BASc in Engineering Science (Major in Biomedical Systems Engineering) - Division of Engineering Science

Sessional GPA 3.48 Cumulative GPA 2.91
Sessional % Average 80.8
Status: Pass with Honours

Crs Code	Title	Wgt	Mrk	Grd	CrsAvg
APM384H1	PARTIAL DIFFERENTIAL EQUATIONS	0.50	81	A-	B
BME344H1	MODEL.,DYN., & CONTROL BIO SYS	0.50	76	B	B
BME350H1	BIO SYS ENG I: ORGAN SYSTEMS	0.50	83	A-	B+
BME395H1	BIO SYS ENG II: CELLS & TISSUE	0.50	88	A	B+

CHE391H1	ORGANIC CHEM.&BIOCHE	0.50	76	B	B-
ESC301Y1	ENG. SCI:OPTION SEMINAR	0.10		IPR	

May proceed

2014 Winter - BASc in Engineering Science (Major in Biomedical Systems Engineering) - Division of Engineering Science

Sessional GPA 3.74 Annual GPA 3.61 Cumulative GPA 3.03

Sessional % Average 82.2

Status: Pass with Honours

Crs Code	Title	Wgt	Mrk	Grd	CrsAvg
BME346H1	BIOMED ENG & OMICS TECHNOLOGY	0.50	85	A	B+
BME358H1	MOLECULAR BIOPHYSICS	0.50	77	B+	B
BME396H1	BIO SYS ENG III: MOLE. & CELLS	0.50	80	A-	B+
ESC301Y1	ENG. SCI:OPTION SEMINAR	0.10		CR	*
MIE439H1	BIOMECHANICS	0.50	87	A	B+
MSE352H1	BIOMAT.& BIOCOMPAT.	0.50	82	A-	B

May proceed

2014 Fall - BASc in Engineering Science (Major in Biomedical Systems Engineering) - Division of Engineering Science

Crs Code	Title	Wgt	Mrk	Grd	CrsAvg
PEY500Y1	PROFESSIONAL EXP.YR.	0.00		IPR	

In March 2015, the University of Toronto was affected by a labour disruption. As a result, some students were graded on the University's approved Credit/No Credit scale (see transcript key), rather than receiving a letter or numeric grade, for courses completed in Winter 2015.
For more information, see:
http://www.transcripts.utoronto.ca/guide

2015 Winter - BASc in Engineering Science (Major in Biomedical Systems Engineering) - Division of Engineering Science

Crs Code	Title	Wgt	Mrk	Grd	CrsAvg
PEY500Y1	PROFESSIONAL EXP.YR.	0.00		CR	

2015 Fall - BASc in Engineering Science (Major in Biomedical Systems Engineering) - Division of Engineering Science

Sessional GPA 3.75 Cumulative GPA 3.11

Sessional % Average 84.0

Status: Pass with Honours

Crs Code	Title	Wgt	Mrk	Grd	CrsAvg
BME428H1	BIO SYS ENG IV: COMP. SYS. BIO	0.50	80	A-	A-
BME460H1	BIOMAT & MED DEVICE PROD DEV.	0.50	88	A	*
BME489H1	BIOMEDICAL SYSTEMS ENG. DESIGN	0.50	89	A	A-

CHE374H1	ECO.ANA.& DEC.MAKING	0.50	79	B+	B+
ESC499Y1	THESIS	1.00		IPR	

May proceed

2016 Winter - BASc in Engineering Science (Major in Biomedical Systems Engineering) - Division of Engineering Science

Sessional GPA 3.83 Annual GPA 3.80 Cumulative GPA 3.21

Sessional % Average 83.5

Status: Pass with Honours

Crs Code	Title	Wgt	Mrk	Grd	CrsAvg
BME510H1	REGENERATIVE MEDICINE	0.50	85	A	A-
ESC499Y1	THESIS	1.00	85	A	A-
HMB200H1	Neuroscience	0.50	83	A-	B
HPS303H1	Top: History of Medicine	0.50	85	A	B+
NMC102H1	Ancient Empires	0.50	78	B+	B-
PER001H1	PRACTICAL EXPER. REQUIREMENT	0.00		CR	

May proceed