SickKids research training centre

Peter Gilgan Centre for Research and Learning
Research Institute, Hospital for Sick Children
rtc.restracomp@sickkids.ca

686 Bay Street, Fl. 3
Toronto, ON M5G 0A4
416-813-7781

Research Training Competition (Restracomp) Application

Applicant Information

Name Arushri Swarup

SickKids ID

Position Current graduate student

RI Program Physiology & Experimental Medicine

University program Biomedical Systems Engineering

Student number 998866071

Citizenship Canadian citizen

Email address arushri.swarup@mail.utoronto.ca

Supervisor Dr. Adrian James

Supervisor's position Associate Scientist

Restracomp category A

Proposed award start date September 1

Required Documents – please see the Restracomp application instructions for descriptions of all documents	Application Category A	B	C	D	F	G	H	I
Complete in this form								
Application Checklist								
Research Proposal								
Supervisor's Evaluation of Applicant								
Supplementary statement (if required)								
a) Justification for extension to eligibility timeline								
a) Statement of hours worked and letter of intent	–	–	–		–	–	–	–
b) Statement of research goals	–	–	–	–	–		–	–
Append to completed form as additional PDF pages								
OSOTF Financial Needs Assessment					–	–	–	–
Research Training Centre Registry Form								
Curriculum Vitae								
Proof of Enrollment (students) or Employment (fellows)								
Proof of Licensure (all health professionals)	–	–			–	–		
Visa or work permit (international applicants)								
Reference letter – 1								
Reference letter – 2								
Transcripts								

Research Keywords – please check any that apply

Cancer	Pain	Brain and mental health
Genetic medicine	Exercise physiology	Global child health
Cystic fibrosis	Heart function and disease	

Signatures – my signature below confirms that the information provided in this application is correct, and that I have reviewed and will abide by all Restracomp rules and policies

Applicant Arushri Swarup Date 13-Apr-2016.

Supervisor Date

Restracomp – Research Proposal

Please complete these sections using language that would be understandable to a reader with doctoral-level scientific training but no specialist expertise in your field. References may be included on a second page.

Subject of proposed research – provide a brief overview of your proposed research project

The aim of this project is to develop and evaluate innovative surgical instruments for the new and growing field of endoscopic ear surgery. Minimally invasive surgery is beneficial to the patient and the hospital as it reduces trauma to the body, scarring, recovery time and length of hospital stay [1]. By employing an endoscope during middle ear surgery, the middle ear can be accessed through the ear canal without an external incision [2, 3]. As with open microscope-guided surgery, this transcanal endoscopic ear surgery (TEES) technique, allows the surgeon to perform procedures such as ear drum reconstruction, skin growth removal and hearing bone repair [2]. The principle challenge with TEES is that a one-handed surgical technique is required while the endoscope is held in the other hand. Otologic instruments were developed for two-handed microscope-guided surgery so they are not all well suited to TEES conditions [3]. These shortcomings have hindered the use of TEES and will be addressed by this project which will utilize mechanical engineering principles to develop specialized instruments for TEES [3, 4]. While previous instruments were developed by surgeons over decades through trial and error, modern engineering techniques provide the opportunity to rapidly design and produce ergonomic functional instruments optimised to facilitate this new branch of surgery.

Lab choice – explain why your (proposed) lab is the best place to pursue this research

The following labs will provide equipment and expertise to support successful completion of the proposed project: Centre for Image Guided Innovation and Therapeutic Intervention (CIGITI) at SickKids, the Surgical Skills Centre (SSC) at Mount Sinai Hospital and the Institute of Biomaterial and Biomedical Engineering (IBBME). The labs have been successfully used by the investigators to develop a functional initial prototype. CIGITI will provide bench space, technical support and machines to manufacture medical device prototypes. The IBBME will provide office space and computer software to design instruments. The SSC will facilitate prototype testing using cadaveric temporal bone models by trained personnel. The SickKids operating room will be used for needs assessment and evaluation of instruments during surgery. The primary investigator is recognized internationally for his experience in endoscopic ear surgery. He will provide guidance on surgical ergonomics, functional requirements of instruments and feasibility of design proposals. He has previously developed instrumentation for minimally invasive cochlear implant surgery. Co-supervisor Dr. Andrysek has supervised multiple graduate students through MASc programs at IBBME and his experience with medical device design will provide technical engineering support for the project. We believe that the combination of surgical and engineering experience with state of the art facilities for design, manufacturing and testing of novel instruments within a single institution is unparalleled globally.

Outcomes and impacts – describe the expected outcomes and goals of your research, and what impacts might it have on your field/clinical practice/patients or other populations

The objective of the project is to develop and evaluate surgical instruments that facilitate one-handed surgery for TEES. First, a survey will be conducted to compile the needs of endoscopic ear surgery of various ENT surgeons. Tools will be designed to improve grip and manoeuvrability of synthetic grafts and enable accessibility in hard to reach places within the middle ear. Increasing functionality of surgical instruments using engineering design principles and input from endoscopic ear surgeons will increase control during TEES, replicating two-handed manoeuvres. This project will demonstrate the feasibility of using CAD, modelling and printing technologies to expedite design of novel surgical instruments for new procedures. It is anticipated that new TEES instruments will increase the range of ear procedures that can be completed minimally invasively and increase the speed and effectiveness of surgery. This will be validated by having various ENT surgeons test the tool in cadaveric ear canal models. The design techniques and instruments created will also be applicable to other minimally invasive surgery in bony cavities such as sinus, nasal, spinal and arthroscopic surgery [5-7]. It could be envisaged that ultimately, virtual patient models could be used with rapid prototyping and fabrication methods developed by this project to create patient specific specialist instruments to extend minimally invasive surgery.

Career aspirations – describe how Restracomp funding will help you achieve your research/career goals

As a biomedical engineer, I am very interested in developing surgical tools that are targeted to benefit the patient and satisfy the needs of the surgeons and nurses who handle the tools. Through this project, my goal is to refine my engineering design skills and follow through on the product life cycle, of the surgical tool by taking a prototype and developing it into a fully functional, sterilizable and manufacturable product. Upon completing this Master's Degree, I aspire to work at a start-up company that develops medical and surgical devices by collaborating with the end-users. Taking the lead on this project will have enabled me to enhance my leadership, communication and technical skills to enable me to take on the many different roles required at a start-up to successfully deliver functional products and exceed the expectations of the stakeholders.

Restracomp – Supervisor's Evaluation of Applicant

Use this space to speak to the applicant's potential for research performance under your supervision and the applicant's academic performance, publication activity, research/academic leadership, and personal characteristics/abilities.

Signature	Date

Supplementary Statement

Please use this space to complete the Letter of Intent and Statement of Hours (Category D), Statement of Research Goals (Category G), or description of special circumstances that qualify you for an extension to the eligibility timeline. Please see the Restracomp application instructions for descriptions of each document.

References for Restracomp Research Proposal

[1] “Benefits of Minimally Invasive Surgery | AIMIS.” [Online]. Available: http://www.aimis.org/benefits-of-minimally-invasive-surgery/. [Accessed: 14-Nov-2015].

[2] A. James, "Endoscopic Middle Ear Surgery in Children", *Otolaryngologic Clinics of North America*, vol. 46, no. 2, pp. 233-244, 2013.

[3] C. Carlos, W. Parkes and A. James, "Application of 3-dimensional Modeling to Plan Totally Endoscopic Per-Meatal Drainage of Petrous Apex Cholesterol Granuloma", *Otolaryngology -- Head and Neck Surgery*, vol. 153, no. 6, pp. 1074-1075, 2015.

[4] M. Tarabichi, “Endoscopic Middle Ear Surgery,” Ann. Otol. Rhinol. Laryngol., vol. 108, no. 1, pp. 39–46, 1999.

[5] “Benefits of Minimally Invasive Surgery | AIMIS.” [Online]. Available: http://www.aimis.org/benefits-of-minimally-invasive-surgery/. [Accessed: 14-Nov-2015].

[6] “AANS - Minimally Invasive Spine Surgery MIS.” [Online]. Available: http://www.aans.org/patient information/conditions and treatments/minimally invasive spine surgery mis.aspx. [Accessed: 17-Nov-2015].

[7] “Endoscopic Nasal & Sinus Surgery.” [Online]. Available: http://care.american-rhinologic.org/ess. [Accessed: 17-Nov-2015].

Ontario Student Opportunity Trust Funds (OSOTF) Financial Assessment Form

Introduction
The "OSOTF awards" refer to a class of awards that have resulted from Ontario government's matching program. Under the program every dollar of donation received for student assistance has been matched by the government, as well as the university, on a dollar-for-dollar basis. There are two major conditions for all OSOTF awards. Recipients must be Ontario residents and demonstrate financial need.

Restracomp funding for University of Toronto graduate students pursuing their research training at the Hospital for Sick Children is provided through the OSOTF program. The information provided in this form is collected by the Research Training Centre at the Hospital for Sick Children on behalf of the University of Toronto.

Eligibility
OSOTF awards are restricted to the residents of Ontario who demonstrate financial need, according to the provincial government's guidelines for the OSOTF program.

For the purpose of OSOTF awards, an Ontario resident is either a Canadian citizen or a permanent resident of Canada who has an Ontario mailing address at the time the award is made.

Financial need can be demonstrated by past OSAP history or by completing the attached financial needs assessment form.

If you have already been assessed for the Ontario Student Assistance Program (OSAP) or the University of Toronto Advance Planning for Students (UTAPS), complete sections 1, 2 and 3 only. If you have applied for OSAP, but did not receive the result of assessment, complete all sections of this form. If you have not applied for OSAP, complete all sections of this form.

Protection of Information
The University of Toronto respects your privacy. Personal information that you provide to the University is collected pursuant to section 2(14) of the University of Toronto Act, 1971. It is collected for the purpose of administering admissions, registration, academic programs, university-related student activities, activities of student societies, financial assistance and awards, graduation and university advancement, and for the purpose of statistical reporting to government agencies. At all times it will be protected in accordance with the Freedom of Information and Protection of Privacy Act. If you have questions, please refer to www.utoronto.ca/privacy or contact the University Freedom of Information and Protection of Privacy Coordinator at 416-946-7303, McMurrich Building, room 201, 12 Queen's Park Crescent West, Toronto, ON, M5S 1A8.

Section 1	
Name: Arushri Swarup	Student number: 998866071
Home address: 58 Northforest Trail Kitchener, ON, N2N 2Z1	University of Toronto department: Institute for Biomaterials and Biomedical Engineering
	Email address: arushri.swarup@mail.utoronto.ca
	Telephone number: 5195755468

Section 2
Have you applied for OSAP/UTAPS? **Yes** ◯ **No** ◉
Have you received the OSAP/UTAPS assessment? – if yes, complete Sections 3 and 6 only **Yes** ◯ **No** ◉

Section 3
If you know the names of the OSOTF awards you are applying or being considered for, list them below.
1) The Hospital for Sick Children Foundation Student Scholarships at the University of Toronto (Restracomp)
2)
3)

Section 4
Marital status Single
Number of dependent children – do not include children who have been out of high school for five years or longer 0
Number of other dependents 0
Relationship to other dependents 0

Section 5: Budget Outline – Please provide a summary of your financial resources and expenses for the next twelve months.

Resource	Amount	Expenses and Student Debt (including self and spouse)	Amount
Scholarships and awards (include name and amount of each on a separate line)	0	Fees (tuition & student fees)	8498.08
		Books & academic supplies	500
		Rent/mortgage & utilities	12000
		Food & household supplies	2400
		Transportation	1800
		Child care	0
Research Assistantship*	5000	Medical/Dental	
Teaching Assistantship*		Clothing	
Additional Income		Outstanding student loans	0
Income of Spouse/Partner	N/A	Other expenses (detail in lines below)	
Less Tax	-		
Total Net Income			
OSAP/UTAPS			
Savings (include source and amount for each type on a separate line)			
Total	5000	**Total**	25198.08

*If your graduate department provides a guaranteed stipend, you should include that amount as a resource in your budget. Please note that the needs assessment we perform may be used either to locate particular sources of funding for that stipend, and/or to augment the total amount of funding you will receive.

Additional details – please include if necessary, or if more space is needed than provided above
N/A

Section 6	
I hereby certify that I am a permanent resident of Ontario and the information provided on this application is, to the best of my knowledge, true and complete. I understand I may be required to supply documentation, specifically my tax return (or spouse's, if applicable), for the previous year if this application is successful and if I am requested to do so.	
Signature: Urushi Swarup	Date: 13-Apr-2016.

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 in her final year at the University of Toronto. Has developed prototyping, engineering design, teamwork and project management skills through her internship and engineering course work. Eager to apply and develop her skills in exciting, new biomedical engineering challenges.

WORK EXPERIENCE

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

- Designed, tested, documented and implemented verification and validation testing of medical devices
- Managed RoHS compliance project – communicated with suppliers and quality department, took meeting minutes, managed documentation and project plan on MS Project
- Used Solidworks to update device drawings, assemblies, and prototype designs
- Prototyped and tested production jigs using feedback from senior engineers and production operators
- Addressed non-conformances in production by performing technical investigations, developing and implementing a solution in production
- Developed a Laser Welding Training Document, Manufacturing Protocols, Component Descriptions, Test Protocols, Engineering Change Orders

EDUCATION

University of Toronto September, 2011 – April, 2016

Bachelor of Applied Science and Engineering, **Biomedical Systems Engineering**
3rd and 4th Year GPA 3.7
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 and a cadaver ear canal
- Delivered a final presentation and report

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
- Thesis report submitted to the Division of Engineering Science in April, 2016

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 from engineering drawings

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 slides

Engineering Design Proof of Concept Dowel-Packing Machine
University of Toronto Division of Engineering Science January – April, 2012

- Designed and prototyped a robotic dowel-packing machine 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 spraying system and drainage system, with a team

SKILLS

- Matlab, Solidworks, Microsoft Office, COMSOL Multiphysics, ImageJ
- Laser Welder, Force Gauge, Pull Test Stand, 3D Printer and Basic Machining Skills
- Molecular biology wet lab training and experience through coursework
- Certified in Laser Safety Training by U of T, May, 2013

AWARDS

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

CLINICAL VOLUNTEER EXPERIENCE
Grand River Hospital/Regional Cancer Centre Volunteer: Summer Student Program July – August, 2011

- Interacted with patients undergoing chemotherapy

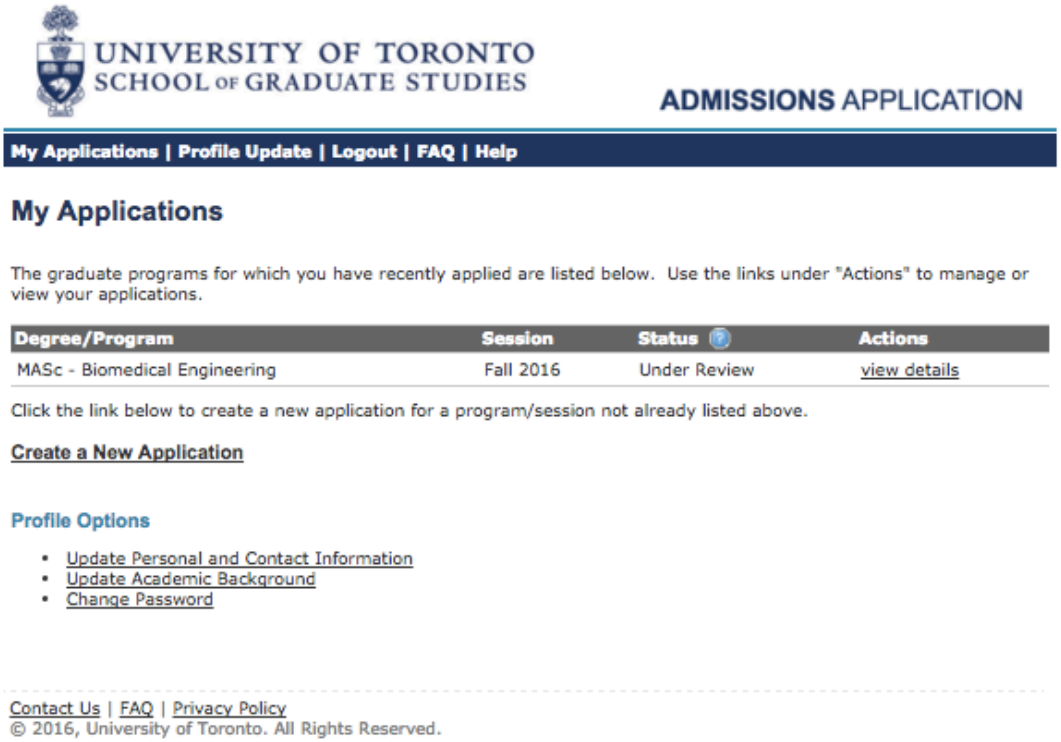
LEADERSHIP/VOLUNTEER EXPERIENCE
Engineering Science Ambassador September – December, 2013

- Conversed with prospective engineering students at the Ontario University Fair and Fall Campus Day, representing Engineering Science at the University of Toronto

HOBBIES
Bollywood Dance Instructor at Hart House, U of T February, 2016 - Present

REFERENCES: Available on Request

Proof of Application to Graduate Program Master's of Applied Science at Institute of Biomaterials and Biomedical Engineering



UNIVERSITY OF TORONTO
SCHOOL OF GRADUATE STUDIES

ADMISSIONS APPLICATION

My Applications | Profile Update | Logout | FAQ | Help

My Applications

The graduate programs for which you have recently applied are listed below. Use the links under "Actions" to manage or view your applications.

Degree/Program	Session	Status	Actions
MASc - Biomedical Engineering	Fall 2016	Under Review	view details

Click the link below to create a new application for a program/session not already listed above.

Create a New Application

Profile Options

- Update Personal and Contact Information
- Update Academic Background
- Change Password

Contact Us | FAQ | Privacy Policy

UNIVERSITY OF TORONTO
SCHOOL OF GRADUATE STUDIES

ADMISSIONS APPLICATION

Application Summary

Printer-friendly Version

The following are the details of your application.

Name, Contact and Personal Information	
Your Applicant Number:	201601309097
Reported Student Number:	998866071
Name:	Miss Arushri Swarup
Previous Surname:	Swarup
Gender:	Female
Birth Date:	August 20, 1993
Present Mailing Address: (expires August 20, 2066)	C/O Arushri Swarup 58 Northforest Trail Kitchener, ON, Canada, Ontario Canada N2N 2Z1
Permanent Address:	C/O Arushri Swarup 58 Northforest Trail Kitchener, ON, Canada, Ontario Canada N2N 2Z1
Phone Number:	519-575-5468
Work Number:	
Fax Number:	
Date of Arrival in Canada:	n/a
Legal Status:	Canadian Citizen
Country of Citizenship:	Canada
First Language:	English
Email:	arushri.swarup@mail.utoronto.ca

UNIVERSITY OF TORONTO
SCHOOL OF GRADUATE STUDIES

ADMISSIONS APPLICATION

Supporting Documents

The documents required to complete your application are listed in the table below. All documents must be received by the graduate unit **February 23, 2016** for your application to be considered complete. Refer to the graduate unit's website for detailed information.

When a document is uploaded to the system by you or one of your referees, the status of that document will automatically change from Pending to Received. However, even after all of your documents are Received, the overall status of your application will remain Documents Pending until the graduate unit manually verifies that the file is complete.

Any hard-copy documents that must be sent to the graduate unit (by mail or courier service, or hand-delivered) should be accompanied by this mailing sheet. If you are required to submit any hard-copy documents, please be aware that the volume of documents received by the graduate unit is greatest just before and after the application deadline. This means that after your document arrives at the graduate unit, there may be a delay in updating the document Status in the table below to "Received". We encourage you to check this page periodically for updates to your file.

Documents	Status	
Transcripts		
UNIV OF TORONTO		
Electronic Transcript	Received	None required
Official Transcript	Received	None required
References		
Prof. Dawn Kilkenny , University of Toronto dawn.kilkenny@utoronto.ca	Received	None required
Dr. Paul Yoo , University of Toronto paul.yoo@utoronto.ca	Received	None required
Mr. Robert Harrison , Baylis Medical Company rharrison@baylismedical.com	Received	None required
Additional Supporting Documents		
Curriculum Vitae	Received	None required
Statement of Intent	Received	None required

[Back]

UNIVERSITY OF TORONTO

TRANSCRIPT OF CONSOLIDATED ACADEMIC RECORD

TORONTO, ONTARIO, CANADA

NAME: **Swarup, Arushri**

ISSUED TO: Arushri Swarup
151 Dan Leckie Way, Suite 1609
Toronto ON M5V 4B2

RECORD AS OF: 2016-01-15
STUDENT NUMBER: 998866071
OEN: 344034004
BIRTH DAY/MONTH: 20/08

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

Faculty of Applied Science & Engineering

2011 FALL - BASC IN ENGINEERING SCIENCE - DIVISION OF ENGINEERING SCIENCE
SESSIONAL GPA: **2.38** CUMULATIVE GPA: **2.38**
SESSIONAL PERS: **68.2**
STATUS: **PASS**

CRS CODE	TITLE	WGT	MRK	GRD	CRS AVG
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 I	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 PERS: **72.0**
STATUS: **PASS**

CRS CODE	TITLE	WGT	MRK	GRD	CRS AVG
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 PERS: **73.5**
STATUS: **PASS**

CRS CODE	TITLE	WGT	MRK	GRD	CRS AVG
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 PERS: **76.2**
STATUS: **PASS**

CRS CODE	TITLE	WGT	MRK	GRD	CRS AVG
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 PERS: **80.8**
STATUS: **PASS WITH HONOURS**

CRS CODE	TITLE	WGT	MRK	GRD	CRS AVG
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 PERS: **82.2**
STATUS: **PASS WITH HONOURS**

CRS CODE	TITLE	WGT	MRK	GRD	CRS AVG
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	CRS AVG
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	CRS AVG
PEY500Y1	PROFESSIONAL EXP.YR.	0.00		CR	

UNIVERSITY OF TORONTO

TRANSCRIPT OF CONSOLIDATED ACADEMIC RECORD

TORONTO, ONTARIO, CANADA

NAME: **Swarup, Arushri**

ISSUED TO: Arushri Swarup

RECORD AS OF: 2016-01-15
STUDENT NUMBER: 998866071
OEN: 344034004
BIRTH DAY/MONTH: 20/08

2015 FALL - BASC IN ENGINEERING SCIENCE (MAJOR IN BIOMEDICAL SYSTEMS ENGINEERING) - DIVISION OF ENGINEERING SCIENCE
SESSIONAL GPA: **3.75** CUMULATIVE GPA: **3.11**
SESSIONAL PERS: **84.0**
STATUS: **PASS WITH HONOURS**

CRS CODE	TITLE	WGT	MRK	GRD	CRS AVG
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

CRS CODE	TITLE	WGT	MRK	GRD	CRS AVG
BME510H1	REGENERATIVE MEDICINE	0.50		IPR	
ESC499Y1	THESIS	1.00		IPR	
HMB200H1	Neuroscience	0.50		IPR	
HPS303H1	Top: History of Medicine	0.50		IPR	
NMC102H1	Ancient Empires	0.50		IPR	

Richard Levin
University Registrar

End of Transcript

University of Toronto
Guide to Transcript

Effective September 1998

	Undergraduate Grade Scale			Graduate Grade Scale	
Grade Meanings	Refined Letter Grade Scale	Numerical Scale of Marks	Grade Point Value	Truncated Letter Grade Scale	Numerical Scale of Marks
Excellent	A+	90 - 100%	4.0	A+	90 - 100%
	A	85 - 89%	4.0	A	85 - 89%
	A-	80 - 84%	3.7	A-	80 - 84%
Good	B+	77 - 79%	3.3	B+	77 - 79%
	B	73 - 76%	3.0	B	73 - 76%
	B-	70 - 72%	2.7	B-	70 - 72%
Adequate	C+	67 - 69%	2.3		
	C	63 - 66%	2.0		
	C-	60 - 62%	1.7		
Marginal	D+	57 - 59%	1.3		
	D	53 - 56%	1.0		
	D-	50 - 52%	0.7		
Inadequate	F	0 - 49%	0.0	FZ	0 - 69%

Approved grade scales that are outside the standard system:
H (Honours), **P** (Pass), **FL** (Failure).
In cases where the FL grade is used in calculating grade point averages, the symbol FL% is used and a grade point value of 0.0 is assigned.
CR (Credit), **NCR** (No Credit).
In cases where the NCR grade is used in calculating grade point averages, the symbol NC% is used and a grade point value of 0.0 is assigned.

Other Symbols and Notations:

ADD Additional course, taken for credit. Included in grade point averages.
(note: the following symbols are not used in calculating grade point averages.)
AEG Aegrotat standing granted on the basis of term work and medical or similar evidence. Course credit granted.
DNW Did not write/did not attend/did little work.
EXT Extra course, not for credit.
GWR Grade withheld pending review.
INC Incomplete.
IPR In progress.
(IPR will also appear if the course has not yet started or the course has finished but an approved grade is not yet available.)
LWD Late withdrawal without academic penalty.
NGA No grade available.
SDF Standing deferred on the basis of incomplete course work because of medical or similar reasons.
WDR Withdrawn without academic penalty.
XMP Exemption granted on the basis of credit for work done elsewhere. Course credit granted.
Candidacy Achieved
A student who has completed all program requirements for the PhD degree exclusive of thesis research will be considered a candidate in the School of Graduate Studies.

NAME: **Swarup, Arushri**

ISSUED TO: Arushri Swarup

RECORD AS OF: 2016-01-15
STUDENT NUMBER: 998866071
OEN: 344034004
BIRTH DAY/MONTH: 20/08

Averages Information:

The following types of averages may appear:

GPA Grade Point Average*
(*for CTEP programs, the GPA does not include performance in B.Ed. courses)
ACCA GPA on the Academic Activity Component of the Bachelor of Physical Health and Education
CICA GPA on the Curriculum and Instruction Component of the Bachelor of Education and Diploma in Technical Education
CTPA GPA on the Bachelor of Education Activity Component of the Concurrent Teacher Education Program
FNCA GPA on Foundations Component of the Bachelor of Education and Diploma in Technical Education
PACA GPA on the Physical Activity Component of the Bachelor of Physical and Health Education
PERS Percentage Average
ACCUM. AVG
Accumulated Average

Awards Information:
Academic awards information is not listed on University of Toronto transcripts.

Academic Sessions:
Fall Session (September - December)
Winter Session (January - April)
Summer Session (May - August)

Course Credits:
A course with a weight of 1.00 equals 6 semester hours.

Course Average:
Course average is shown for undergraduate courses with a size of 12 or more and is expressed as a letter grade corresponding to the refined letter grade scale. The symbol "*" is used to indicate an undergraduate course with fewer than 12 students. A "blank" is used to indicate that a course average has not been calculated.

End of Guide