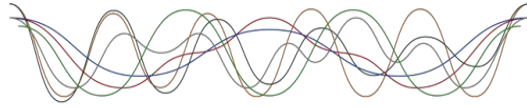




**CUBE**  
CLUB FOR UNDERGRADUATE  
BIOMEDICAL ENGINEERING

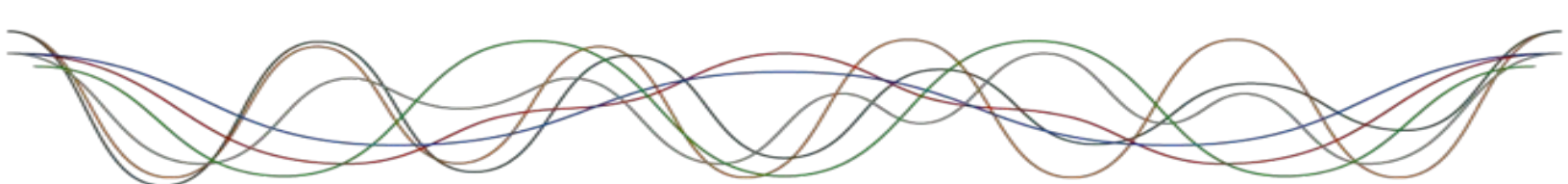
**Annual Report & Prospectus**

**2013-2014**



## BIOMEDICAL ENGINEERING

“The application of engineering principles and techniques to  
the medical field”



CUBE would like to thank the Institute of Biomaterials and Biomedical Engineering (IBBME), Skule Alumni and Friends, Engineering Society (EngSoc), Department of Engineering Science, Department of Electrical and Computer Engineering, Department of Mechanical & Industrial Engineering, Department of Chemical Engineering & Applied Chemistry, Department of Materials Science & Engineering, and the U of T Student's Union (UTSU) for continuing to allow CUBE to be successful in carrying out its mission during the 2013-2014 year.

Thank you for making this possible!

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## **Club for Undergraduate Biomedical Engineering**

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# About CUBE and Our Mission

CUBE is a student-run club whose mandate is to promote biomedical engineering at the undergraduate level. The oldest and largest chapter was founded in 1997 at the University of Toronto. Currently, the Toronto chapter has over 200 active members from assorted programs and faculties and more than 500 students on our mailing list.

Our purpose is to disseminate knowledge pertaining to the biomedical field as well as to serve as a point of contact between students, researchers, and industry. This is accomplished by hosting events such as information sessions on the latest cutting-edge research in the fields of biomedical engineering, medicine, and biotechnology; attending international conferences in related areas; networking with industry leaders during held speaker seminars; and touring various industrial plants, hospitals, and laboratories.

The club is run entirely by a student executive committee following the dictates of our constitution, and is recognized as an official campus group. Anyone within the University of Toronto community is invited to join the Toronto chapter at no cost.



## Executive Committee of 2014-2015

VP Academic: Matthew Langley  
VP BMEC: Mark Aquilino  
VP BMEC Assistant: Fan Guo  
VP External: Masha Itkina



VP Finance: Sharon Ravindran  
VP Logistics: Rami Abu-Shammeh  
VP Promotions: Anna Kotlov  
VP Tech: Arel Roche

Co-Presidents: Martin Par & Cynthia Eunyong Shin

## Faculty Advisors



### Christopher Yip

- ◆ Director, Institute of Biomaterials and Biomedical Engineering
- ◆ Department of Chemical Engineering & Applied Chemistry
- ◆ Department of Biochemistry
- ◆ Donnelly Centre for Cellular and Biomolecular Research

Tel: (416) 978-7853  
Email: christopher.yip@utoronto.ca

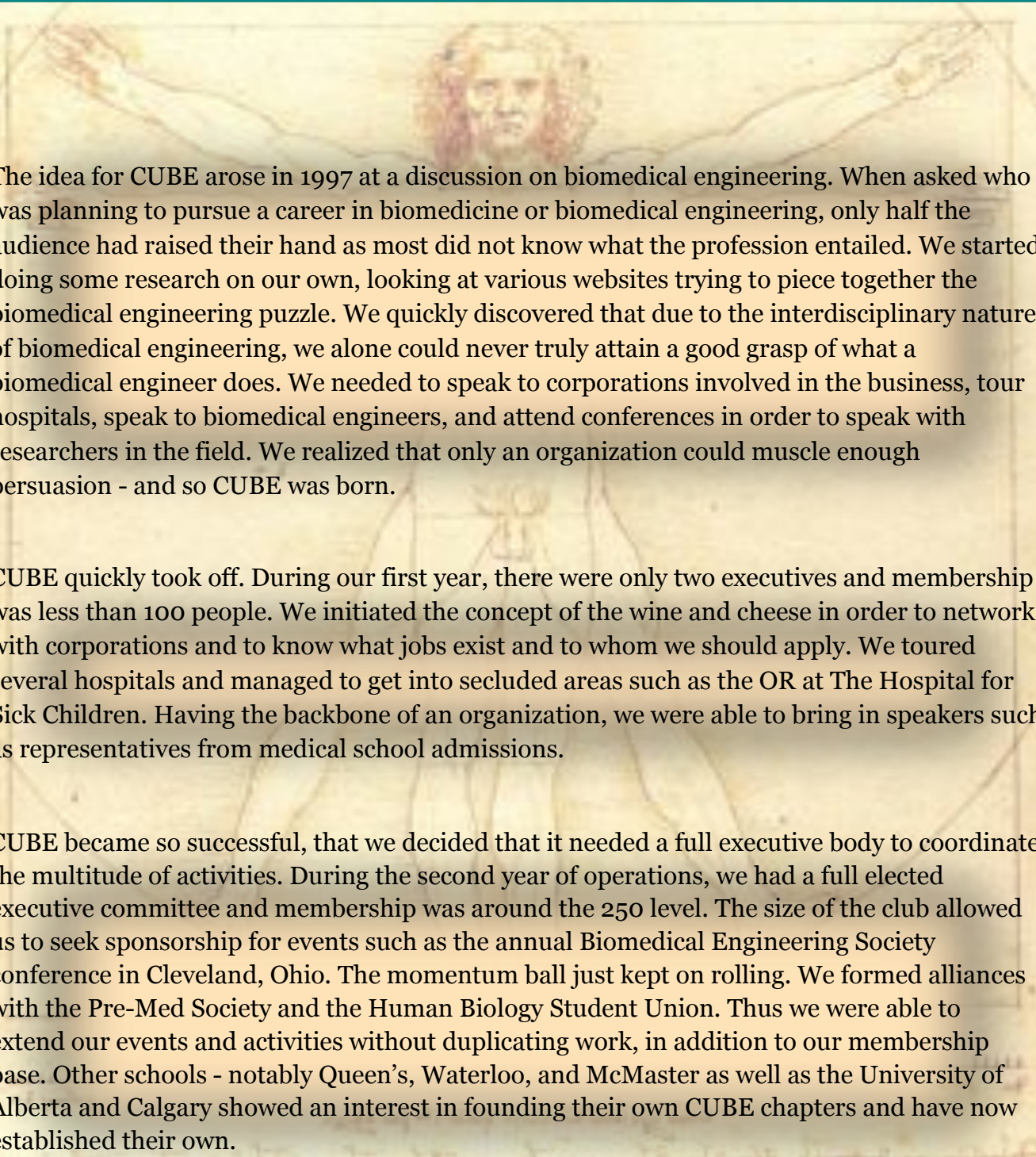


### Eli Sone

- ◆ Institute of Biomaterials and Biomedical Engineering
- ◆ Department of Materials Science & Engineering
- ◆ Faculty of Dentistry

Tel: (416) 978-7422  
Email: eli.sone@utoronto.ca

# History Behind the Motivation and Vision



The idea for CUBE arose in 1997 at a discussion on biomedical engineering. When asked who was planning to pursue a career in biomedicine or biomedical engineering, only half the audience had raised their hand as most did not know what the profession entailed. We started doing some research on our own, looking at various websites trying to piece together the biomedical engineering puzzle. We quickly discovered that due to the interdisciplinary nature of biomedical engineering, we alone could never truly attain a good grasp of what a biomedical engineer does. We needed to speak to corporations involved in the business, tour hospitals, speak to biomedical engineers, and attend conferences in order to speak with researchers in the field. We realized that only an organization could muscle enough persuasion - and so CUBE was born.

CUBE quickly took off. During our first year, there were only two executives and membership was less than 100 people. We initiated the concept of the wine and cheese in order to network with corporations and to know what jobs exist and to whom we should apply. We toured several hospitals and managed to get into secluded areas such as the OR at The Hospital for Sick Children. Having the backbone of an organization, we were able to bring in speakers such as representatives from medical school admissions.

CUBE became so successful, that we decided that it needed a full executive body to coordinate the multitude of activities. During the second year of operations, we had a full elected executive committee and membership was around the 250 level. The size of the club allowed us to seek sponsorship for events such as the annual Biomedical Engineering Society conference in Cleveland, Ohio. The momentum ball just kept on rolling. We formed alliances with the Pre-Med Society and the Human Biology Student Union. Thus we were able to extend our events and activities without duplicating work, in addition to our membership base. Other schools - notably Queen's, Waterloo, and McMaster as well as the University of Alberta and Calgary showed an interest in founding their own CUBE chapters and have now established their own.

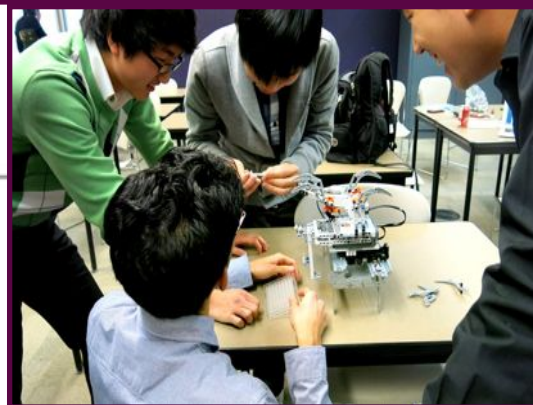
# How to Join

Becoming a member is easy and free! Simply sign up at any CUBE event or visit us at <http://cube.skule.ca>. However, events are open to all students regardless of whether or not they have signed up. But, by signing up, participants will be regularly informed of bio-related events happening across campus held by organizations other than CUBE as well as be informed about upcoming conferences and related activities.



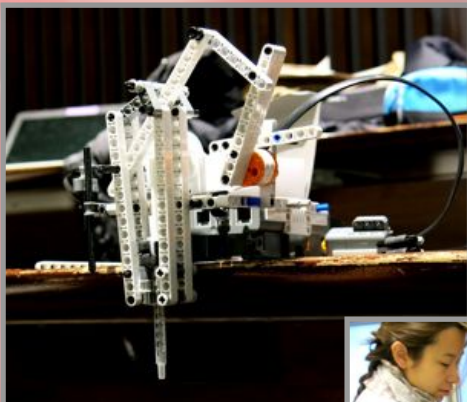
## Quick Facts

- ◆ Established in 1997
- ◆ Over 200 active members and 500 members on the mailing list
- ◆ Over 100 speaker seminars and workshops held
  - ◆ 10 conferences attended



# Biomedical Engineering Competition (BMEC) 2014

The 4<sup>th</sup> annual Biomedical Engineering Competition (BMEC) held this year was once again a great success! BMEC is a competition where undergraduate students are tasked with solving an industrially relevant biomedical engineering problem. Each team is equally given supplies and support to assist them in developing a practical and unique prototype solution.

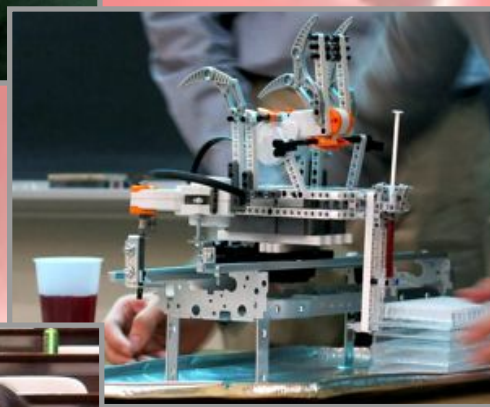


The problem statement this past year was to design and prototype automatic workstations capable of performing a simplified ELISA for laboratories in resource-poor countries. 21 teams with the use of Lego Mindstorms developed solutions that were creative and practical, and most important of all, the participants all walked away with a more in-depth knowledge of challenges that arise in the field of bioengineering.



- ◆ More than **60** Participants
- ◆ 21 teams with **more waitlisted**
- ◆ Signups exceeded available space by **50%**
  - ◆ **Demonstration style** application of the prototype to test the design

- ◆ **1st–4th year students** across all disciplines: Mech, Chem, MSE, ECE, Indy, EngSci



## Judges:

**Mary Nagai** (IBBME),  
**Nika Shikiba** (PhD candidate in IBBME),  
**David Hoggarth** (PhD candidate in IBBME)

# Student Professor Mixer

This event was an excellent opportunity to explore the research being done at U of T while giving students the opportunity to interact with professors at a personal level. The event started off with professors giving brief talks about their research. Students from CIV, MIE, ECE, MSE, EngSci, CHEM, and Life Sciences then had the opportunity to talk with the speakers face-to-face and learn more about biomedical engineering in the academic field. It was insightful for many of our attendees!

5 guests coming in to share their experience with approx. 50 students:

- ◆ Professor Yip, Director of IBBME, Molecular Imaging
- ◆ Professor Simmons, Mechanobiology
- ◆ Professor Sefton, vascularized tissue engineering and regenerative biomaterials
- ◆ Professor Jaffray, Radiation Physics
- ◆ Professor Carter, Healthcare Engineering

# Undergraduate Summer Student Research Seminar

This seminar was to provide students with the inside scoop of how to land a summer research position in line with their future aspirations. We discussed the application process for health and bioengineering related research programs, and application procedures for grants such as NSERC. Further, we provided tips on how to approach a prospective professor to discuss research positions and how to have a successful interview.



# PEY/Industrial Mixer

More than 100 students came to hear leading industry professionals discussing their companies, their own journeys in the biomedical field, and tips and tricks on how to land a job in the biomed industry. The event started off with industry professionals giving a brief talk about their company and background. Students from disciplines ranging from CIV, CHEM, ECE, EngSci, MIE, MSE, and Life Sciences, had a chance to talk with them face-to-face and learn more about biomedical engineering in industry. Eleven distinguished guests from a diverse selection of companies (from start-ups to well-established biomedical companies) and specialties (ranging from app development, to medical devices, and to tissue regenerative medicine). The speakers ranged from entrepreneurs, such as Karl Martin (EngSci oT1), the CEO of Bionym, to researchers at renowned hospitals, such as Tilak Dutta (ECE oT3) from the Toronto Rehabilitation Institute. In addition, a great number of representatives present were looking to hire PEY and summer positions easing the job search and creating a network environment for the students.

Special thanks to Professor Truong and Levi for combining this event with the 3<sup>rd</sup> year Engineering Science: Biomedical Systems Engineering option seminar!



100+ student turnout  
11 speakers/guests

## ◆ **Interface Biologics**

Develops biomedical polymers to improve safety and effectiveness of medical devices

## ◆ **Kangaroo Group**

Contract manufacturing of medical devices

## ◆ **Baylis Medical**

Developer and distributor of high-tech cardiology, radiology, and pain management products

## ◆ **Bionym**

Develops biometric recognition technologies

- ◆ Toronto's leading hospitals such as **Toronto Rehab** and **Princess Margaret Cancer Centre**

## ◆ **Spinesonics Medical Inc.**

Designing a process to insert screw implants during spinal surgeries

## ◆ **Tissue Regeneration Therapeutics Inc.**

Tissue regeneration studies involving Human Umbilical Cord PeriVascular Cells and biodegradable scaffolding



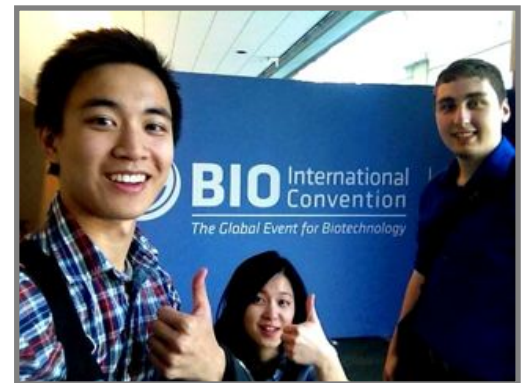
# Grad School Night



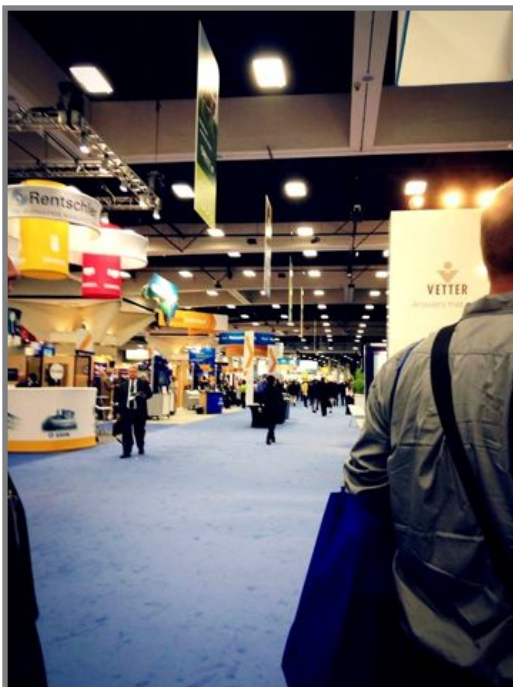
The seminar was attended by Professor Yip and Audet, the chair and graduate coordinator of IBBME respectively. Furthermore, the seminar was also attended by graduate students in programs such as U of T's MD/PhD, medical school, and MIT- Harvard PhD program. Both the professors and students gave their advice and insights regarding the biomedical graduate studies.

## BIO International 2014 Conference, San Diego, California

Members of CUBE volunteered and attended the 2014 BIO International Convention in San Diego. This is the largest Biotech conference in the world hosting over 20,000 industry leaders and more than 1,800 exhibitors from more than 65 countries across the world. BIO covers the wide spectrum of life science innovations and application areas, such as Drug discovery, biomanufacturing, genomics, biofuels, nanotechnology, and cell therapy. As a volunteer, members had a chance to attend talks from distinguished



keynote speakers, network with leaders in the field, and learn about future trends and career options. Topics covered bioengineering, medical devices, pharmaceuticals, research and development, graduate studies, finances, and law.





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## Tour

MaRS Discovery District is where science, technology and social entrepreneurs get the help they need. A limited number of students had a chance to join our tour of MaRS, where the students first visited Scar X Therapeutics, a pre-clinical stage biotechnology company focused on the development of a novel therapeutic to reduce dermal scars, followed by STARR Innovation Centre, the only imaging center in the world providing state-of-the-art imaging technology for cellular studies such as MRI, PET, and CT scanners. The tour ended with exploring a Human Factors Lab, Healthcare Human Factors.

# Past Notable Events

- ◆ Inviting biotech/pharma leaders from the GTA and California to speak to students and provide career advice
- ◆ Sending a delegation to the International Society of Pharmaceutical Engineering
- ◆ Annual General Meeting in Montreal to learn more about the pharmaceutical industry as well as to network with industry executives
- ◆ Sending a delegation to represent the University of Toronto at the Biomedical Engineering Society conference in Philadelphia
- ◆ Promoting CUBE to parents and high school students at Discovery Day
- ◆ Plant tour of Sanofi Pasteur
- ◆ A tour of the MaRS Discovery District followed by laboratory tours and information sessions hosted by Ambit Biosciences, Claron Technology, Kanata Chemical Technologies, Biosign Technologies, Interface Biologics, and Larial Proteomics.

# Outlook for 2014-2015

The main objectives of cube for the coming year:

- ◆ Continue to promote the field of Biomedical Engineering, as well as to produce and expand on existing workshops and informational sessions.
- ◆ To establish networks between students and biomedical engineers
- ◆ Create more opportunities to allow students to practice within the biomedical field and learn skills that will be relevant in their future summer/PEY experience.

Furthermore, we plan to implement two Biomedical Engineering Competitions (BMEC) this year. One designated as a junior students (years 1-2), where the problem statement will be more of a resource driven problem. The second competition will be geared for senior students (years 3-4) with the problem statement highlighting more of a design- intensive problem.

# Closing Remarks

Are we achieving what we've set out to do? We believe so. To the active member, CUBE can provide information on all aspects of Biomedical Engineering—whether it be in industry or academia. It is important for the undergraduate student to have a good feel for what the field he or she is interested in entails, and to this end, CUBE is doing everything it can to provide the exposure that the students want.

# Contact Us

Feel free to email your questions and comments to:

***[cube@skule.ca](mailto:cube@skule.ca)***

or visit us on the web at:

***<http://cube.skule.ca>***



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