

2013/2014 ANNUAL REVIEW

THE SANDFORD FLEMING FOUNDATION

AN ORGANIZATION DEVOTED TO THE ADVANCEMENT OF ENGINEERING EDUCATION

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Message from the Chair

I would like to welcome Andrea Hagedorn as our new Executive Secretary and Treasurer. Bill Pudifin has had to step back from this position as he deals with ongoing health issues. We all wish him well. Andrea worked with me previously as a Design Engineer with Waterloo Cases in Design Engineering, and has had experience as a treasurer for a local non-profit. She has done an excellent job getting up to speed and taking care of the financial needs of the Foundation. I would like to thank Donna Armbrorst for her continued efforts supporting the Board and our students as office manager.

I am very pleased to announce that we have successfully renewed our student contributions, at the current rate of \$6 per academic term, for a further 5 years, effective September 2014. The renewal of the student contribution was unanimously supported by the SFF board, including the two Engineering Society Presidents on behalf of all students, and was approved by the Board of Governors of the University at their meeting in June.

I would like to sincerely thank all of the members of the board for their efforts in the past year on behalf of our students. The Board has remained unchanged as listed on the last page of this review, but we will undergo some changes in the next year. Laurie Peloquin has completed her 6th year. I would like to sincerely thank Laurie for her thoughtful contributions during her tenure. Three of the remaining Board members are entering their 6th year: Bill Bishop, Marc Aucoin, and myself. In order to avoid an abrupt loss of experience at the end of next year, we have implemented a strategy whereby I will step down from the board this year, and return to help out immediately following. Steve Waslander is currently working to identify new members.

The Sandford Fleming Foundation continues to strongly support and promote a wide range of engineering educational activities that go beyond the classroom: oral and written communication, co-op work term performance, academic excellence, outstanding leadership, and participation in community and professional activities both inside and outside the university. The details of these activities are included throughout this Annual Review.

The Waterloo Engineering Competition (WEC) continues to be a great success, and SFF is proud to support this student-run competition. SFF also runs the Technical Speaker Competition and the Sandford Fleming Debates. I would like to especially thank Bill Bishop for the excellent work he has done coordinating both of these competitions in the last year.

The quality of our engineering education depends on excellence in teaching. SFF is pleased to partner with the Dean of Engineering in the support of the Engineering Teaching Excellence awards. The winners of this year's awards are Kyle Daun of Mechanical and Mechatronics Engineering, David Nairn of Electrical and Computer Engineering, and Luis Ricardez-Sandoval of Chemical Engineering. Congratulations to these exceptional teachers and leaders.

SFF recognizes the importance of student leadership; we typically support 3 leadership awards each year. Alexander (AJ) Rosewarne of Electrical Engineering is the recipient of the Roy Duxbury Leadership Award, and Lisa Belbeck of Nanotechnology Engineering is the recipient of the John Fisher Leadership award. This year, we decided to give out Memorial Leadership Awards to 2 outstanding candidates: David Birnbaum of Civil Engineering and Nicole Jiang of Computer Engineering. Thank you and congratulations to these outstanding students.

Congratulations to the many winners of the Work Term Report awards, the Academic Excellence and Cooperative Proficiency awards, the SFF-WCDE award for the best case study, the Sandford Fleming Debates, the Technical Speaker Competitions, and the Teaching Assistant Excellence awards. These awards recognize the excellence of our students in a broad range of activities associated with engineering education and represent the essential core of the Foundation's activities. All of these students will receive recognition at the annual Faculty of Engineering Awards Dinner.

Finally, I would like to thank Dean Pearl Sullivan for her continued support of our activities. The Foundation would not exist but for the support of the Dean's office.

Steve Lambert, Chair

Waterloo Campus Activities

The Waterloo Campus Committee of the Sandford Fleming Foundation, chaired by Bill Bishop, maintains an active awards program at the University of Waterloo. Funds for the program come from student donations, faculty donations, and endowment earnings. The cost of awards and other programs of direct benefit to students during the past academic year was approximately \$52,000. Expenditures were budgeted to exceed \$65,000. Certain awards and programs were not fully utilized by students causing our overall expenditures to be significantly less than budgeted. Over the next year, we will be working to ensure that all awards, grants, and other activities are fully utilized.

Teaching Excellence Award

The Teaching Excellence Award is presented annually to three professors who have shown an exemplary record of outstanding teaching, concern for students, and commitment to the development and enrichment of engineering education at Waterloo. Recipients are publicly recognized and funds are provided to enable each professor to appoint two Undergraduate Research Assistantships. One of these is funded by the Foundation, the other by the Faculty of Engineering. The 2014 winners are the following:

- Dr. Luis Ricardez Sandoval, Chemical Engineering
- Dr. David Nairn, Electrical & Computer Engineering
- Dr. Kyle Daun, Mechanical & Mechatronics Engineering

Awards for Academic Excellence

The Sandford Fleming Foundation provides awards for Academic Excellence to students who display outstanding performance in the Engineering Undergraduate Program. Fifteen awards were given to students at the June 2014 Convocation.

Awards for Cooperative Proficiency

The Sandford Fleming Foundation provides awards for Cooperative Proficiency to students who display outstanding performance in satisfying both the academic and work term requirement of the Engineering Undergraduate Program. Fifteen awards were given to students from across engineering at the June 2014 Convocation.

Work Term Report Awards

The Sandford Fleming Foundation funded 41 of the work term report awards made by all Engineering Departments during the past year. These awards, granted for excellence in work term report writing, are made in all undergraduate departments in the Faculty of Engineering at Waterloo.

TA Excellence Awards

Each term, undergraduate students are invited to nominate TAs for a Sandford Fleming Teaching

Assistantship Award. This annual award consists of a certificate and \$500 and recognizes excellence in a most important aspect of teaching at Waterloo. The 2014 recipients were as follows:

- Adelle Vickery, Chemical Engineering
- Georgios Balemenos, Civil Engineering
- Laura Bossers, Civil Engineering
- Danyka Byrnes, Environmental Engineering
- Scott (Wei-Ting) Chen, Electrical and Computer Engineering
- Ali Hooshyar, Electrical & Computer Engineering
- Reid Miller, Electrical & Computer Engineering
- Kieran Stobel, Mechanical & Mechatronics Engineering
- Kevin Ling, Mechanical & Mechatronics Engineering
- Rupan Dandiwal, Management Sciences
- Debbie (Xinyun) Wu, Nanotechnology Engineering
- Shahid Haider, Systems Design Engineering
- Saad Ilyas, Year 1 Engineering
- Linda Li, Year 1 Engineering
- Cameron Williams, Year 1 Engineering

The SFF-WCDE Award for Best Case Study based on Work Term Experience

The Sandford Fleming Foundation is pleased to collaborate with Waterloo Cases in Design Engineering (WCDE) for this annual award. This is awarded to the student author of the best case study released in the previous year. The award includes a certificate and a \$500 honorarium and is presented at the Dean's Engineering Awards Dinner.

For this year, all case studies released in 2013 were considered and the selected recipient is Andrew Bogdanis of Mechanical and Mechatronics Engineering, for the case study "Dalsa Harmony Camera Design", co-written by David Effa of WCDE.

Memorial Leadership Award

The Memorial Leadership Award was established in 2010 in recognition of the late Professors Saip Alpay and Wm. C. Nichol, and Sam Ceccerallo, Robert Elligsen, late former students of the Faculty of Engineering. This award is granted to an intermediate-level undergraduate student in the Faculty of Engineering who has demonstrated outstanding contributions to the Faculty in extra-curricular activities. The award includes a certificate and a \$1,000 honorarium.

This year, we had two outstanding candidates and therefore chose to make two awards. The 2014 winners are Nicole Jiang of Electrical and Computer Engineering and David Birnbaum of Civil & Environmental Engineering.

Undergraduate Travel Grants

Often there is little or no financial support for undergraduates to attend scholarly or professional conferences or to participate in competitive team projects.

SFF recognizes four eligible categories for funding. First and foremost is the desire to assist in the presentation of students' work at technical conferences. Second, smaller awards may assist with conference fees for students, who are attending a conference but not presenting. Third, if there are team projects in which a Waterloo team competes with student teams from other engineering schools, SFF may assist in team travel to the place of the competition. Finally, there is some support for attendance at conferences that emphasize the engineering profession (rather than technical projects). The Sandford Fleming Foundation's annual budget for this activity was \$7,500 this past year. Travel grants given in the past year included the Year included the SAE Baja Competition in El Paso, TX, USA the ICRA Nano-Robotics Challenge in Hong Kong, China, the National Business Technology Conference in Toronto, ON, Canada and the NASA Sample Return Robot Challenge in Worcester, MA, USA.

Exchange Program Awards

Dr. F. Hecker Exchange Scholarship

This scholarship is given annually to an outstanding undergraduate Engineering student at the University of Waterloo who is participating in one of the Faculty's student exchange programs. It honours the contribution of Dr. Hecker, Technische Universität Braunschweig, who was co-ordinator for two decades of exchanges with his university and who was noted for his dedication to those programs and the particular care he took of the Waterloo participants.

The recipient of this scholarship is Xiaoyu (Sunny) Guo, Management Sciences.

SFF Exchange Scholarships

The Foundation has established up to eight other exchange scholarships that are given annually. The winners for 2014 are the following:

- Yulei Huang, Civil Engineering
- Yuchen Wu, Mechatronics Engineering
- Ali Shah Sharif, Computer Engineering
- Nathan Yim, Systems Design
- Christian Lee, Mechanical Engineering
- Nikhil Joy Thomas, Electrical Engineering
- Nicholas Choo, Electrical Engineering
- Jade Jie Deng, Electrical Engineering

Other Activities Supported

Iron Warrior

The Waterloo Campus Committee of the Foundation supports the Engineering Society through the purchase of advertising space in the Iron Warrior. The advertisements describe the Foundation's programs and give the names of award winners. This is the Foundation's chief publicity outlet on campus.

The Engineering Awards Dinner

This event features a noteworthy speaker and provides recognition for the large number of engineering students who have won awards and scholarships over the past year.

Co-operation with the Engineering Society

Two or more Engineering Society directors sit on the SFF Board of Directors. The SFF Board considers the student director's contributions to be vital in determining the needs of the undergraduate students and highly values their assistance.

John Fisher Leadership Award

The John Fisher Leadership Award was established by the Sandford Fleming Foundation in recognition of the outstanding contributions made towards the work of the Foundation by a former Chair, Dr. John Fisher. This prestigious award is made to a graduating student who has shown outstanding leadership throughout his/her academic career in activities that relate to engineering education. Since its establishment in 1981 the award has been given 28 times.

Lisa Belbeck (Nanotechnology Engineering) was chosen to receive this year's Fisher Leadership Award in recognition of the exemplary leadership, commitment and enthusiasm he displayed in a wide range of activities. These included:

- Student (CFES), she represented the 60,000 undergraduate engineering students to the Canadian professional engineering as President of the Canadian Federation of Engineering organizations.
- Her leadership in the Engineering Society, especially as Vice-President External, representing Waterloo students to the broader community and promoting engineering in general.
- Leadership, as part of a four-member team of the Engineering Federation Orientation Committee, to organize the week-long orientation activities for 1600 engineering first year students.
- The creation of a new event, Department Hangout, to provide a better connection between first year students and their departments.
- Her pivotal role in the establishment of the Waterloo Engineering Ambassador program, which was created to allow existing students to serve the needs of future students.

During her time at Waterloo, Lisa has continually been active in leadership roles and is extremely worthy of receiving the John Fisher Leadership Award.

The Roy Duxbury Leadership Award

The Roy Duxbury Leadership Award was established in 2011 to recognize the valuable contributions of Dr. Roy Duxbury, a former Chair of the Foundation. Like the John Fisher Leadership Award, this award is granted to a graduating student who has shown outstanding leadership throughout his/her academic career in activities that relate to engineering education.

Alexander (AJ) Rosewarne (Electrical Engineering) was chosen to receive the Duxbury Leadership Award in recognition of the exemplary leadership, commitment, and enthusiasm he displayed in a wide range of activities. These included:

- Outstanding leadership in several roles for the University of Waterloo Robotics Team, including president of the team, organizer for the 2014 International Autonomous Robot Racing Competition and lead for the NASA Sample Return Robot Challenge.
- Extensive leadership through Engineering Society activities, including his many roles in the Engineering Jazz Band (With Respect to Time), his many directorships (semi-formal, Santa Claus Parade, Eng Play, etc.), and long-standing leadership in orientation week.
- Making graduating year a more positive experience through his role as Graduation Committee Chair.
- Fostering a collaborative spirit through his role as Student Life Commissioner.

AJ Rosewarne is an extremely worthy winner of the Roy Duxbury Leadership Award.



Figure 1: 2014 Roy Duxbury Leadership Award Winner Alexander (AJ) Rosewarne and the 2014 John Fisher Leadership Award Winner Lisa Belbeck with Dr. Bill Bishop, SFF Waterloo Campus Chair, and Professor Steve Lambert, SFF Chair (photo credit – Jamie Rosewarne)

Qualifying Competitions for the Ontario Engineering Competition

These awards were developed to support the Waterloo Engineering Competition (WEC), used to help select the two teams that will represent University of Waterloo at the annual Ontario Engineering Competition (OEC). The University of Waterloo sends two teams to represent both streams of our engineering programs.

Design

There are three competitions: the Junior Design Competition, the Senior Design Competition and the Consulting Engineering Competition. The winning teams for each of these competitions share a \$500 award, with \$250 going to the second place teams. The Sandford Fleming Foundation provides the awards for these three design competitions.

Programming

For the first time, WEC has introduced a new Programming Competition to help select student teams to represent Waterloo at the new Programming Competition at OEC. SFF is very pleased to support this new event in the same manner as the existing design competitions.

Debates

The Sandford Fleming Foundation has established these awards to encourage the art of debate among engineering undergraduates. The debates are normally held each term and the winners of this competition represent University of Waterloo at the OEC. The Foundation would like to thank Professor Bill Bishop of Electrical and Computer Engineering for acting as the debate coordinator, along with the many faculty members who volunteer their time to make the debates a success.

Note: There was no competition held in Winter 2014.

The Spring 2014 winners were as follows:

1st Place

- Dinah Shi, Software Engineering
- Thomas Donnelly, Chemical Engineering

2nd Place

- Varun Jacob-John, Mechatronics Engineering
- Jakub Dworakowski, Mechatronics Engineering

Rookie Team

- Ashwin Ramesh, Chemical Engineering
- Christian D'Cruz, Chemical Engineering

Technical Speaking

The Technical Speaker Competition was established to encourage public speaking skills within the student body. The presentation is to be based on a work term experience and the winners of this competition represent University of Waterloo at the OEC. The Foundation would like to thank Professor Jason Grove of Chemical Engineering for acting as faculty coordinator, along with many other faculty members and graduates who have served as judges.

Note: There were no competitions held in Winter or Spring 2014.

Endowment Fund Awards

The foundation acts as Trustee for three funds which provide awards for our students.

Karen Mark Scholarship

This award was established in 1989 by family and friends of Dr. and Mrs. J.W. Mark, in memory of Karen Mark. Karen Mark was a third-year student in Chemical Engineering at the time of her death. This scholarship of \$1000 is awarded to a woman studying in the third year of an undergraduate engineering program at the University of Waterloo who has demonstrated outstanding academic achievement and involvement in student life. The 2014 winner was Shivani Tyagi of Mechatronics Engineering.

George J. Dufault Memorial Fund

The George Dufault Awards arise from a fund established by the Sandford Fleming Foundation from contributions made by faculty, staff, students, and friends in memory of the late Professor George Dufault of the Department of Electrical and Computer Engineering. Awards of \$300 each are given to undergraduate students in Electrical and Computer Engineering for the best work-term reports in their class. Up to four awards are given each calendar year.

Donald J. Clough Memorial Fund

The fund was established in memory of Professor Donald Clough, the founding Chair of the Department of Management Sciences at University of Waterloo. Recipients of the Award are required to display superior scholarship during their first year of graduate studies in Management Sciences at the University of Waterloo. The award is valued at \$300 and this year the winner was Yan Wang.

National Activities

Ontario and Canadian Engineering Competitions

The Sandford Fleming Foundation will be a Special Awards Sponsor starting in 2015 for the Ontario Engineering Competition and is a bronze sponsor of the Canadian Engineering Competition.

W.R. Petri Engineering Design Award

W. R. (Peter) Petri served as an Adjunct Professor in Civil Engineering at the University of Waterloo from 1977 to 1994. He owned his own structural consulting practice and was responsible for many outstanding and innovative designs especially in the area of lightweight structures and the use of aluminum.

In his will, Dr. Petri left funds for the establishment of an engineering design competition to encourage and reward young engineering designers and to draw the attention of industry to the engineering design talent in Canadian universities. SFF administers the award and has arranged for the Canadian Engineering Competition (CEC) to include the Petri Award as part of its annual competition.

The 2014 W.R. Petri Engineering Design Award was given to Yahya El Iraki from Ecole Polytechnique de Montreal, for MySeat, an automatic seating monitoring solution for large buildings. By affixing MEMS accelerometer sensors with Zigbee communication devices, each chair can be remotely monitored for occupancy and data can be aggregated in a convenient user interface for utilization monitoring, or just finding an empty seat. The system had already been deployed at two locations, including the library at the Ecole Polytechnique, and both live data and historical trends were available at the competition. The MySeat system provides detailed data for space planning which can be extremely valuable for corporate offices, school and public institutions, and also for the individual user looking for a desk or a place to sit. Such creative problem solving carried through to large scale deployment exemplifies the best of the Canadian Engineering Competition Innovative Design category, and Yahya El Iraki is our much deserved 2014 W.R. Petri Award Winner.



Figure 2: 2013 Petri Award winner Yahya El Iraki with Professor Steve Waslander (Sandford Fleming Foundation)

Wighton Fellowship

The Wighton Fellowship is a national award to recognize excellence in the development and teaching of laboratory courses in Canadian undergraduate engineering programs. The award is funded by a generous endowment from Dr. J. L. Wighton, former Professor of Engineering, University of Regina, whose commitment to the laboratory component of engineering curricula led to the establishment of the Fellowship in 1986 in cooperation with the National Council of Deans of Engineering and Applied Science (NCDEAS) and the Sandford Fleming Foundation. The Fellowship is administered by the Foundation.

The Fellowship consists of a \$3,000 stipend and a certificate. The Wighton Fellowship Selection Committee consists of the Chair, Vice-Chair and Secretary of the National Council of Deans of Engineering and Applied Science (NCDEAS) and Bill Wilson, the Secretary of the Wighton Fellowship. Their efforts on behalf of this important award are much appreciated.

The Sandford Fleming Foundation is pleased to announce that Dr. Riadh W.Y. Habash of the University of Ottawa was awarded the 2014 Wighton Fellowship. The Fellowship is awarded annually to recognize innovative and exceptional instruction in engineering undergraduate laboratory based courses. Instructors in Faculties and Schools of Engineering at Canadian Universities are eligible for nomination. Since its inception, twenty-ninth Wighton Fellows have been named.



Figure 3: 2013 Wighton Fellow Dr. Riadh W.Y Habash with Dr. William Wilson (Sandford Fleming Foundation)

The Foundation

Treasurer's Report

The Foundation's income is derived from donations by students and faculty and income from investments held in our Endowment funds. All funds raised at Waterloo and so designated must be used for Waterloo Campus Activities.

Endowment fund investments are managed by TD Waterhouse Canada, a well-known firm of investment managers. The market value of our investments at June 30th, 2014 was \$1,634,069. Investment income for the twelve months ended June 30th, 2014 was estimated at \$48,712 or 2.98 %. Our investments continue to hold their value as well as providing sufficient income to cover operating costs.

Andrea Hagedorn

Life Members

The Sandford Fleming Foundation recognizes those who have supported its activities and objectives by their participation and interest through their designation as Life Members:

R. Brooks, C.M. Burns, P. Calamai, D.H. Copp, V.R. Duxbury, G. Farquhar, P. Fieguth, A.J. Fisher, R.A. Fraser, R. Gorbet, J. Hanson, J. Hooper-Yan, S. Jones, S.N. Kalra, J. Keeler, S. Lambert, W.C. Lennox, J. Metz, V. Ojala, H.C. Ratz, P.H. Roe, P. Rossignoli, R. Sadler, D.S. Scott, J.H. Shortreed, K.D. Srivastava, H. Sullivan, W. Weinstein, J. D. Weller, J. Westlake, J.D. Wheeldon, J.L. Wright

Board of Directors 2013/14

Student Directors

- Leila Meema-Coleman
- Allyson Francis

Faculty Members

- Marc Aucoin, Chemical Engineering
- Bill Bishop, Electrical and Computer Engineering
- Steve Lambert, Mechanical and Mechatronics Engineering
- Steve Waslander, Mechanical and Mechatronics Engineering

Community at Large

- Laurie Peloquin, Co-operative Education and Career Action
- Robin Jardin, Student Relations, Dean of Engineering Office

Co-op Student Employer

- Chris Metaxas, EBS Geosteuctural

Executive Secretary and Treasurer

- Andrea Hagedorn

Office Manager

- Donna Armbrorst
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