

FRIEDMAN FAMILY VISITING PROFESIONALS PROGRAM

Visit to University of Toronto: March 9, 2020



This report summarizes the visit of **Mr. David A. Friedman** from Forell/Elseesser Engineers that took place at the University of Toronto on March 9, 2020.

ITINERARY OR AGENDA

March 8 th	
TIME:	ACTIVITY:
7:45 PM – 8:15 PM	Student Chapter President, Myron Zhong, and Chapter members, Jeffrey Salmon and Pedram Mortazavi, meet Mr. David Friedman at the Toronto Pearson International Airport and welcome him to Canada, and the City of Toronto
8:30 PM – 10:30 PM	After arrival, Mr. Friedman has dinner with the Chapter members at a local restaurant.
March 9 th	
TIME:	ACTIVITY:
9:30 AM – 9:45 AM	Student Chapter President and one Chapter member, meet Mr. Friedman at his hotel and accompanies him to the University of Toronto Campus
9:50 AM – 10:50 AM	Tour of the University of Toronto campus by the Chapter members
11:00 AM – 12:00 PM	Graduate students' presentations to Mr. Friedman on their research projects
12:15 PM – 1:15 PM	Lunch / Networking with graduate students, faculty members, and alumni working in engineering firms in Toronto
1:30 PM – 2:45 PM	Guest lecture by Mr. Friedman – The lecture was well attended by graduate students, faculty members, and alumni working in engineering firms in Toronto
3:00 PM – 3:45 PM	Faculty and Associate Chair, Professor Evan Bentz, Chapter President and Members, give Mr. Friedman a tour of the University of Toronto Structural Testing Facilities
3:45 PM – 4:00 PM	Graduate student and industry partner, give Mr. Friedman a live demo of current experimental testing programs in the Structural Testing Facilities
4:00 PM – 4:30 PM	Undergraduate student presentation to Mr. Friedman on their Seismic Design Competition
4:45 PM – 6:00 PM	Mr. Friedman has dinner with the Chapter members at a local restaurant before heading to the airport.
6:30 PM	Farewell

STUDENT CHAPTER VISIT PLANNING COMMITTEE

LEAD ORGANIZER(S): Myron Chiyun Zhong, President, myron.zhong@mail.utoronto.ca

- Mohamed Sayed, Vice-President, sayed.mohamed@mail.utoronto.ca
- Patrick Clarke, Director-Finance, pm.clarke@mail.utoronto.ca
- Allan Kuan, Director-Undergraduate Relations, allan.kuan@mail.utoronto.ca
- Nicole Piperis, Director-Events, nicole.piperis@mail.utoronto.ca
- Jeffrey Salmon, Chapter Member, jeff.salmon@utoronto.ca
- Luis Ardila Bothia, Chapter Member, l.ardila@mail.utoronto.ca
- Pedram Mortazavi, Chapter Member, pedram.mortazavi@mail.utoronto.ca
- Dr. Michael Montgomery, Kinetica Dynamics
- Professor Evan Bentz
- Professor Constantin Christopoulos

VISITING PROFESSIONAL LECTURE OVERVIEW

The title of the lecture was "The Practice of Structural & Earthquake Engineering Today & 3 Unique Structural Engineering Projects". The presentation started with an introduction of the EERI and its mission to reduce world-wide seismic risks, Mr. Friedman then gave the audience an overview of the current practice as a structural and earthquake engineer, and addressed the design and construction of three unique projects that featured unique architecture, presenting challenge to their structural design and retrofit using advanced structural systems including base isolation and rocking systems.

The lecture was well attended by graduate and undergraduate students, faculty members and industry professionals. Professors Evan Bentz and R. Douglas Hooton attended the lecture. Industry professionals from Cast Connex, Kinetica Dynamics, RJC, Dialogue, Arup, and the City of Toronto Engineering and Construction Services joined the talk. The pictures below were taken during the lecture.



Figure 1: A picture of the Lecture by Mr. David Friedman at the University of Toronto



Figure 2: A picture of the Lecture by Mr. David Friedman at the University of Toronto

Lecture Abstract

The practicing structural engineer today must not only have a broad understanding of not just structural engineering, but must be knowledgeable about architecture, M/E/P systems, construction delivery methodologies, and the construction process. All projects come with their own litany of challenges and constraints, and the structural engineer is one of the key players in achieving the optimal solution. The project's budget, the selected performance and design criteria, the architectural form, and the operating systems all affect the selection of the appropriate structural materials and lateral force resisting system. Then the analysis must get translated into a design, and the design must clearly and carefully be delineated into construction documents including plans, details, sections and technical specifications, with appropriate attention to sequencing, phasing and constructability. This all gives rise to the notion of today's structural engineer as a "Master Builder," one who can articulate their way through a complex labyrinth of form finding, criteria setting, risk evaluation, design and documentation, and construction (and hopefully not litigation). Some current projects that highlight these issues include:

- San Francisco City Hall
- UCSF Parnassus Ray & Dagmar Dolby Regeneration Medicine Building
- UC Berkeley California Memorial Stadium

Professional Bio

David A. Friedman, S.E., is a Senior Principal at Forell/Elsesser, and is licensed in California. He has been with the firm since 1980, has over 43 years of structural engineering experience, and has served as Project Principal on a variety of new design and retrofit projects including community and civic facilities, university complexes, research laboratories and transportation facilities. David served as the firm's President and CEO from 1995 to 2007 and chaired the Board of Directors from 2000 to 2017. With a specialty in seismic engineering and retrofitting of existing structures, particularly those with historic designation, David has solved numerous structural and earthquake engineering challenges during his career with Forell/Elsesser Engineers. His experience includes many of the firm's signature projects including the base isolation retrofits of San Francisco City Hall and the Asian Art Museum, the adaptive reuse and retrofit for the San Francisco Conservatory of Music, and the seismic safety corrections and remodeling of UC Berkeley's California Memorial Stadium. David is devoted to world-wide seismic risk reduction and is the current President of the Earthquake Engineering Research Institute, dedicated to learning and disseminating the lessons learned from earthquakes around the world. He is also deeply involved in many civic, philanthropic and not for-profit Boards including The San Francisco Foundation, SPUR, UC Berkeley Foundation and the Jewish Home of San Francisco.

SUPPLEMENTAL ACTIVITIES

Dinner on March 8th

After picking up Mr. David Friedman from the airport, the Chapter members met Mr. Friedman and the Chapter President at a local restaurant for dinner.

University of Toronto Campus Tour

The first activity on the agenda for the day of March 9th was a tour of the University of Toronto campus. Hart House, the Robarts Library, the Thomas Fisher Rare Books Library, Myhal Centre for Engineering Innovation and Entrepreneurship, the Convocation Hall, the King's College circle, The Knox College, the Soldiers' Tower were among the places that were visited during the tour. Chapter President, Myron Zhong led the tour. The pictures below were taken during the tour.

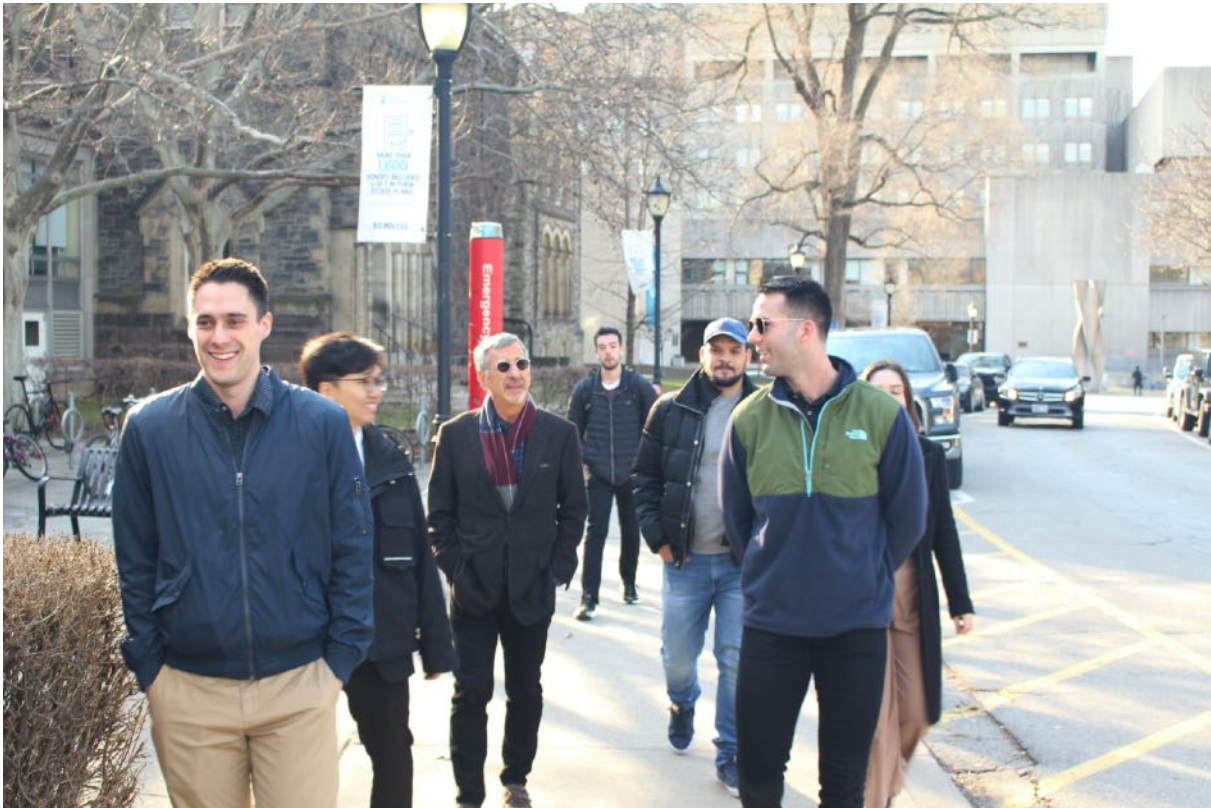


Figure 2: Chapter members with Mr. Friedman at the University of Toronto's King's College Circle

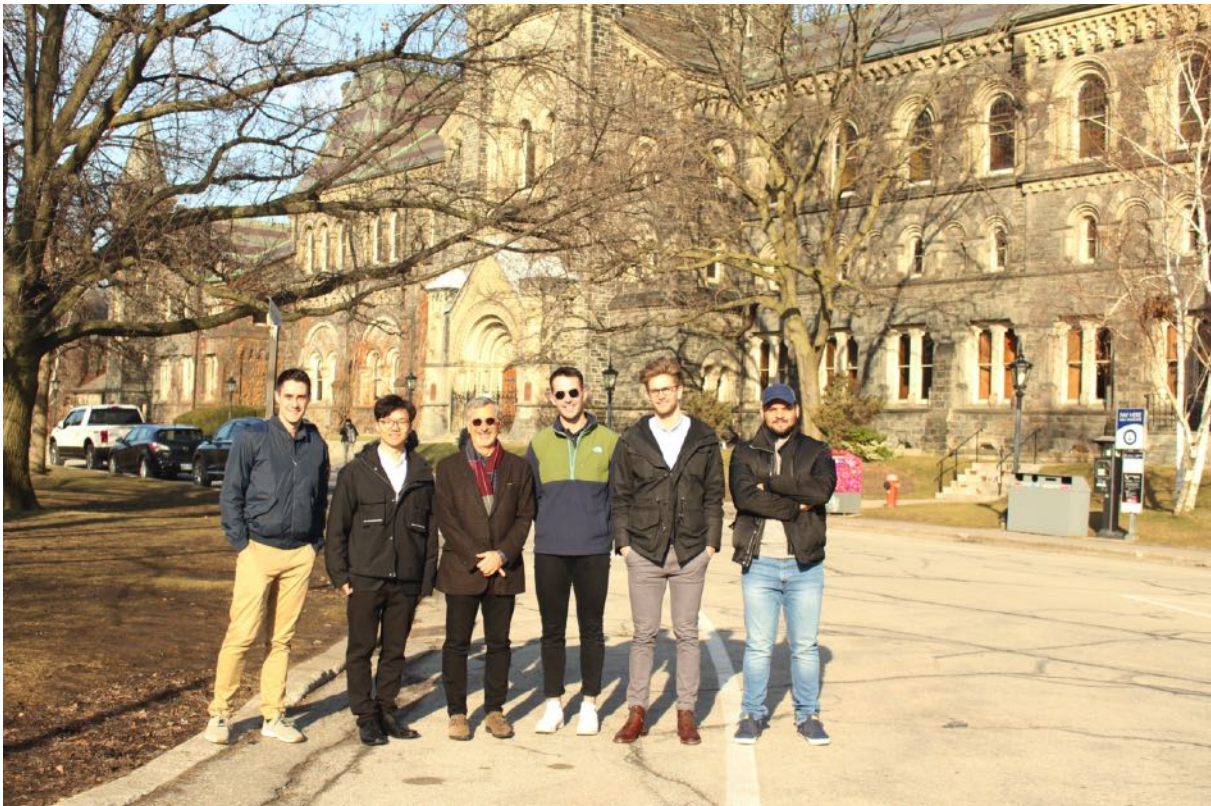


Figure 4: Chapter members with Mr. Friedman at the University College
Christopher Weckesser, Myron Zhong (President), Mr. David Friedman, Patrick Clarke (Director Finance), Jeffrey Salmon, and Mohamed Sayed (VP)

Graduate Student presentations

The campus tour was followed by graduate research presentations. Several graduate students presented their research projects to Mr. David Friedman and got valuable feedback on their research.

Graduate Students Presentations:

- **Mohamed Sayed:** A framework for multi-scale seismic simulation of a city block with site-city interaction
- **Jeffrey Salmon:** Gapped-Inclined Bracing System: a Seismic Retrofit for Soft-Storey Buildings
- **Luis Ardila:** Viscoelastic coupling damper tests for outrigger systems in supertall buildings

Lunch/Networking Session

After the Graduate Student Presentations, Mr. David Friedman and the Chapter members were joined by industry professionals, alumni, and faculty members for lunch. Mr. David Friedman interacted with professionals from the leading engineering offices in Toronto. Graduate students were provided with an opportunity to interact with industry professionals as well.



Figure 5: Picture taken during the networking lunch

Several professionals from Toronto Dialog office, RJC Engineers, Arup, CastConnex, and Kinetica Dynamics attended the lunch. Professors Evan Bentz attended the lunch as well.

Tour of the Structural Testing Facilities at the University of Toronto

Mr. David Friedman's lecture was followed by a tour of the Structural Testing Facilities of the Department of Civil Engineering at the University of Toronto. The tour was led by Professor Evan Bentz and the Chapter's President, Myron Zhong. Testing devices and some of the most recent developments at the University of Toronto were presented to Mr. David Friedman. The following Pictures were taken during the lab tour.



Figure 6: Professor Evan Bentz discussing recent research developments at the University of Toronto



Figure 7: Professor Evan Bentz, and Dr. Michael Montgomery from Kinetica Dynamics, discussing recent research developments at the University of Toronto

Undergraduate Student Presentations

Towards the end of the day, several undergraduate students in the seismic design team of the EERI student chapter at the University of Toronto presented their work to Mr. David Friedman about their progress during past academic year, and some ongoing projects the undergraduate seismic design team is working on, and got valuable feedback.

Dinner and Farewell

Mr. Friedman and Chapter members had dinner together at a local restaurant before heading to the airport. Mr. Friedman shared advice with Chapter members on career development and extra-curriculum activities

RESULTS, FEEDBACK AND LESSONS LEARNED

Overall, EERI UofT was extremely pleased with the event and has received positive feedback from attendants. Mr. Friedman's lecture provided a great opportunity for the University of Toronto structural engineering community to learn more about the current earthquake engineering practices in the west coast. Interest in the EERI chapter and earthquake engineering has noticeable increased.

The lecture by Mr. David Friedman attracted a large audience from graduate students, U of T alumni, Industry professionals, and faculty members. Unfortunately, the date of the event was close to the mid-term period for undergraduate students, which led to under-representative of undergraduate students to the event attendants. Future improvements are needed to increase the attendance of undergraduate students.

The graduate students found the unique opportunity to present their research projects to Mr. Friedman and receive valuable feedback from him. Further, Mr. Friedman provided the Chapter members with valuable career advice. The networking session allowed the graduate students to interact with industry professionals.

EERI U of T intends to host at least three guest lectures per year and to continue to apply for the Friedman Family Visiting Professional Program annually. For future visits and guest lectures, EERI U of T is interested in topics on:

- Advanced structural systems such as controlled rocking systems and base isolation
- Performance based design
- Performance of nonstructural components and systems

ACKNOWLEDGEMENTS

The University of Toronto EERI Student Chapter gratefully acknowledges the support of the Friedman Family for sponsoring the travel of Mr. David A. Friedman through their Friedman Family Visiting Professional Program endowment.

The Chapter is also grateful to the Department of Civil and Mineral Engineering, You're Next Career Network at U of T, Engineering Society at U of T, and the Engineering Alumni Association at the University of Toronto, for their financial support.

LIST OF ATTACHMENTS

Included at the end of this report are various attachments to supplement the information included above. A list of the attachments is included below:

- Item 1, flier for event
- Item 2, other items

The Practice of Structural Engineering Today & 3 Unique Structural Engineering Projects

Info and RSVP:
civmin.utoronto.ca



**FRIEDMAN FAMILY
VISITING
PROFESSIONALS
PROGRAM**

Presented
with **Civil +
Mineral
Engineering**

David A. Friedman, SE
*Senior Principal, & Chairman of the Board
Forell/Elsesser Engineers, Inc., California*

**Monday
March 9 @ 1:30 p.m.**



**Galbraith Building
Room GB202
University of Toronto**

The Practice of Structural Engineering Today & 3 Unique Structural Engineering Projects

Presented By

David A. Friedman, SE

Senior Principal & Chairman of the Board

Forell/Elsesser Engineers, Inc., California

Monday, March 9, 2020

1:30PM – 2:30PM / GB 202

Abstract The practicing structural engineer today must not only have a broad understanding of not just structural engineering, but must be knowledgeable about architecture, M/E/P systems, construction delivery methodologies, and the construction process. The project's budget, the selected performance and design criteria, the architectural form, and the operating systems all affect the selection of the appropriate structural materials and lateral force resisting system. Then the analysis must get translated into a design, and the design must clearly and carefully be delineated into construction documents including plans, details, sections and technical specifications, with appropriate attention to sequencing, phasing and constructability. This all gives rise to the notion of today's structural engineer as a "Master Builder," one who can articulate their way through a complex labyrinth of form finding, criteria setting, risk evaluation, design and documentation, and construction (and hopefully not litigation). Some current projects that highlight these issues include:



San Francisco City Hall Forell/Elsesser served as Prime Engineer for the complete repair and base isolation seismic upgrade of the 550,000 sq.ft., 4-story City Hall which contains both Superior and Municipal Courts for the City and County of San Francisco. This "essential facility" is a classic steel framed structure with a 310-foot high dome clad with perimeter granite walls and with hollow clay tile interior walls. Base isolation was selected because it is cost-effective, allowed for minimum disruption to the ornate historic building, and provided maximum protection. The structural solution consisted of 530 isolators, concrete shear walls, steel collectors, reinforcement of rotunda tower walls and installation of steel braces and shotcrete walls were used at various levels of the dome.



UCSF Parnassus Ray & Dagmar Dolby Regeneration Medicine Building The construction of this 80,000 SF stem cell research building utilized the design/build delivery system. The program included wet laboratories, laboratory support, offices, an auditorium, and "green roofs." This unique building, designed by the renowned and international architect, Rafael Viñoly, is situated on a steeply sloped site and terraces vertically through a series of steps along the building length. The structure is steel framed with special friction pendulum isolators that protect the structure and the sensitive equipment and research it houses from the effects of a major seismic event.



UC Berkeley California Memorial Stadium This historic concrete football stadium was originally built in 1923 and was designed by John Galen Howard. The project included seismic strengthening and modernization of this non-ductile concrete frame structure with a seating capacity of 72,000-seats. The west bowl retrofit saved the perimeter historic wall of the stadium; provided a new seating bowl, press box, and 200,000 SF of game-day and programmatic improvements. The unusual aspect of the project was created by the challenged posed by the Stadium sitting atop the northern segment of the Hayward Fault, which runs approximately from end zone to end zone. The retrofit of the fault rupture segments includes "blocks," separated from the adjacent building portions, and free to move independently when the fault ruptures and displaces. The West Bowl was an interesting challenge as well, and utilized vertically-post-tensioned rocking concrete walls and passive viscous dampers.



The Practice of Structural Engineering Today & 3 Unique Structural Engineering Projects

Presented By

David A. Friedman, SE

Senior Principal & Chairman of the Board

Forell/Elsesser Engineers, Inc., California

Monday, March 9, 2020

1:30PM – 2:30PM / GB 202



DAVID A. FRIEDMAN, SE

Senior Principal & Chairman of the Board

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Project List:

- UCB's California Memorial Stadium
- UCB's Student Athlete High Performance Center
- Taube-Koret Campus for Jewish Life
- San Francisco Jewish Community Center
- San Francisco Conservatory of Music
- Asian Art Museum of San Francisco
- San Francisco City Hall
- Jewish Home of San Francisco, Renovation & Expansion
- Congregation Emanu-El Renovation

Total Years Experience

43 years

Education

UC Berkeley, M.S., Civil Engineering

Registration

California, Civil Engineer
California, Structural Engineer

Professional Affiliations

EERI Member of the Board of Directors & President

Jewish Home of San Francisco,
Board of Directors, Former Chair
of Board of Trustees, JSLG Chair

SPUR Emeritus, Board of
Directors, & Chair

Awards

SEAONC's 2012 H.J. Brunnier
Lifetime Achievement Award

UC Berkeley CEE Academy of
Distinguished Alumni

Department of Civil & Mineral Engineering

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Posted February 7th, 2020 by Phill Snel

Talk by David Friedman

WHEN: March 9, 2020 @ 1:30 pm – 2:30 pm
WHERE: Room GB202, Galbraith Building
35 St. George Street
Toronto
Ontario
COST: Free

 Calendar

 Add to Calendar ▼

 [EVENT](#) [EVENTS](#) [FEATURED](#)

Presented by U of T Earthquake Engineering Research Institute (UT-EERI) Student Chapter

[RSVP REQUIRED](#)

Talk by David Friedman

The Practice of Structural Engineering Today & 3 Unique Structural Engineering Projects

Monday, March 9, 2020
1:30 p.m. – 2:30 p.m.

Room GB202
Galbraith Building
35 St. George Street
University of Toronto

[RSVP REQUIRED](#)

Abstract

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U of T Proposed Itinerary for Mr. David Friedman's Visit

Travel Dates: Sunday, 03/08/20 – Monday, 03/09/20

Day 1 – Sunday, 03/08

Transportation

Arriving: 19:43

Flight #: AC 756

Arriving to: Toronto Pearson International Airport – **Meet at the airport**

Accommodation

InterContinental, Yorkville

Address: 220 Bloor Street West, Toronto

Day 2 – Monday, 03/09

University of Toronto

9:30 – 10:30: Meet and greet at the **hotel** + **U of T campus tour** – Arrive at GB at **10:30**

- Campus Tour: **Pedram, Myron, Jeff, Patrick, Mohamed**

10:45 – 11:45: Presentations of Current Research at U of T (10 min each) – **SF1009**

- **Jeffrey Salmon**: Full-Scale Testing of the Gapped-Inclined Bracing System: a Seismic Retrofit for Soft-Storey Buildings
- **Pedram Mortazavi**: Four-Element Hybrid Simulation of a Steel Frame with Cast Steel Yielding Connectors
- **Mohamed Sayed**: A framework for multi-scale seismic simulation of a city block considering site-city interaction
- **Luis Ardila**: Viscoelastic coupling damper tests for outrigger systems in supertall buildings

12:00 – 13:10: Informal Lunch with Faculty, Students, and Alumni – **SF1009**

13:30 – 14:45: **Guest Lecture/Talk – GB202**

15:00 – 15:45: Structures Lab Tour – **Professor Evan Bentz** – **Structures Lab**

15:45 – 16:00: Full-Scale Test Demonstration of Viscoelastic Coupling Dampers – **Structures Lab**

16:10 – 16:30: Presentation by EERI Undergraduate Seismic Design Team

- **Eliza/Alex/Maher (3rd year undergrads)**: Present the team's progress and results this year, including some current study on implementing advanced systems to the competition design.

17:00 – 18:00: Light Dinner and Farewell with EERI Chapter Members (time permitted)

18:15 – 18:45: Leave to the Toronto City Airport

Transportation

Leaving: 20:15

Flight #: AC 7978

Leaving from: Billy Bishop Toronto City Airport