



# The NSF GENI Research and Educational Experiment Winter Camp (GREE-WC 2014)

Raytheon BBN Technologies  
1/8-1/11, 2014

## The Organizing Committee

Kaiqi Xiong and Yin Pan, RIT  
Yong Guan, Iowa State University  
Bing Wang, UConn  
Mark Berman, Niky Riga and Vicraj Thomas, BBN/GPO

## ACKNOWLEDGEMENT

We would like to acknowledge the assistance and support from National Science Foundation (NSF)/BBN, GENI Program Office (GPO), and B. Thomas Golisano College of Computing and Information Sciences (GCCIS) at Rochester Institute of Technology (RIT).

We are grateful to many people of GPO, in particular, Mark Berman, Sarah Edwards, Chip Elliott, Niky Riga, Vicraj Thomas, and Henry Yeh, who have offered tremendous amount of helps in planning and running the winter camp. Chip and Mark have provided their constant support and advice. Henry has helped on the camp hospitality, logistics, and budget planning. Niky, Vic, and Sarah have spent a great deal of time helping with recruiting and selecting camp participants, arranging the camp curriculum, reserving GENI resources, providing tutorials, and coaching the labs and projects during the camp. Without their support, this winter camp would not have been possible. We also thank Bryan Lyles from NSF for his warm support to the winter camp.

We would like to thank Azer Bestavros (Boston University) for his insightful keynote speech, and thank all instructors and teaching assistants from various GENI development teams, Niky Riga and Sarah (BBN/GPO), Michael Zink and Divya Bhat (University of Massachusetts Amherst), and Paul Ruth and Anirban Mandal (RENCI) for teaching GENI tutorials, labs and projects.

We are in debt to Brian Duddy and Tracy Miller (RIT), and Julie McColgan, Peter Stickney, and Sandra Zucco (BBN) for their help in the camp. Finally, I am very thankful to the other members of the organizing committee, consisting of Mark Berman, Yong Guan, Yin Pan, Niky Riga, Vicraj Thomas, and Bing Wang, for their help with organizing the winter camp.

Sincerely,

Kaiqi Xiong

On behalf of the Winter Camp Organizing Committee



## Sponsors of the Winter Camp

This project is funded by BBN/NSF.

It is a collaborative project between RIT (Kaiqi Xiong and Yin Pan), Iowa State University (Yong Guan), and University of Connecticut (Bing Wang).



## Welcome Message

We sincerely welcome you to participate in the 2014 NSF GENI Research and Educational Experiment Winter Camp (GREE-WC2014) at the Raytheon BBN Technologies on January 8 – 11, 2014.

The Global Environment for Network Innovation (GENI) infrastructure is becoming a mature virtual laboratory for exploring future Internet at-scale. It supports at-scale experimentation on shared and heterogeneous GENI resources among multiple users, permits users deep programmability throughout the network, and offers collaborative and exploratory environments for innovative research and education. More and more researchers, educators, and students have started or are starting to conduct research and educational experiments on the GENI infrastructure. National Science Foundation (NSF) has sponsored a variety of GENI experiment projects since September 2010. Please refer to [www.geni.net](http://www.geni.net) for more information.

This winter camp will provide you the opportunity to learn and experiment various tools available in the GENI environment through well-structured tutorials, labs and projects including:

- Introduction to GENI resources.
- OS installation and configuration for GENI experiments.
- GENI Portal and Omni.
- LabWiki and GIMI.
- Omni and OpenFlow.
- Cloud-based GENI.
- Gaining hands-on lab experience with multiple GENI resources and using them to develop a team-based project.
- Lab sessions with GENI experts who will help you design and begin your experiment.

We truly hope that all of you will find this winter camp to be an interesting, enriching, and informative experience, and you will continue to use GENI in your research and educational projects. You are **strongly encouraged** to submit papers to the 2014 GENI Research and Educational Experiment Workshop (GREE2014) and other GENI workshops. We look forward to seeing you in GREE2014.

Sincerely,

The NSF GENI Winter Camp Committee:

Kaiqi Xiong and Yin Pan, RIT

Yong Guan, Iowa State University

Bing Wang, UConn

Mark Berman, Niky Riga and Vicraj Thomas, BBN

## **GENI Winter Camp Details:**

**Dates and Times of Camp:** The winter camp will be held at the Raytheon BBN Technologies. It will be in the BBN conference room Wednesday-Saturday (1/8-1/11).

The camp will run every day from 9AM-5PM, with an hour-lunch break from 12-1pm. Please notice that we will end at 3pm on the last day.

**Pre-work and Agenda:** If you plan to participate in the hands-on tutorials, please finish the pre-work beforehand. Information of pre-work and the agenda can be found at GREE-WC2014 website <http://groups.geni.net/geni/wiki/UGREE-GENI/GREE-WC2014>

**Lodging:** Information of Best Western Plus Hotel Tria (<http://www.roomstays.com/hotel/806201>). Please extend or cancel your hotel reservation immediately if your plan is changed. The hotel can be reached at 617-491-8000 for any inquiry.

**Directions to the hotel:** You can get to the hotel by subway or taxi. If you take subway, the hotel can provide a free shuttle to pick you up at the train station. The direct phone for the hotel is 617-491-8000. (It was told that the hotel is about 7 minutes walking distance from the train station. Please call the hotel to verify it if you plan to walk from the train station to the hotel.) Four maps are provided for your information at the end of the handout.

**Meals:** Complimentary breakfast is offered to those who stay in the at Best Western Plus Hotel Tria (<http://www.roomstays.com/hotel/806201>.) Lunch will be delivered outside the conference room every day. Local campers can buy breakfast at the BBN cafeteria on your owns if needed.

**Location of Camp:** BBN Technologies 10 Moulton Street Cambridge, MA 02138. Directions to BBN can be found at the link: <http://www.bbn.com/utility/contact/massachusetts>.

**Driving directions to BBN:** It can be found at the link: <http://www.bbn.com/utility/contact/massachusetts>.

**Parking and entrance at BBN:** Please see the map at the end of the handout and contact the camp staff to register your vehicle for parking when you arrive.

**Pre- and Post-evaluation Surveys:** Camp participants please fill in pre- and post-evaluation surveys on the first and last day of the camp, respectively.

Pre-evaluation survey is at: <http://www.sogosurvey.com/k/RQsXPQRsSsPsPsP>

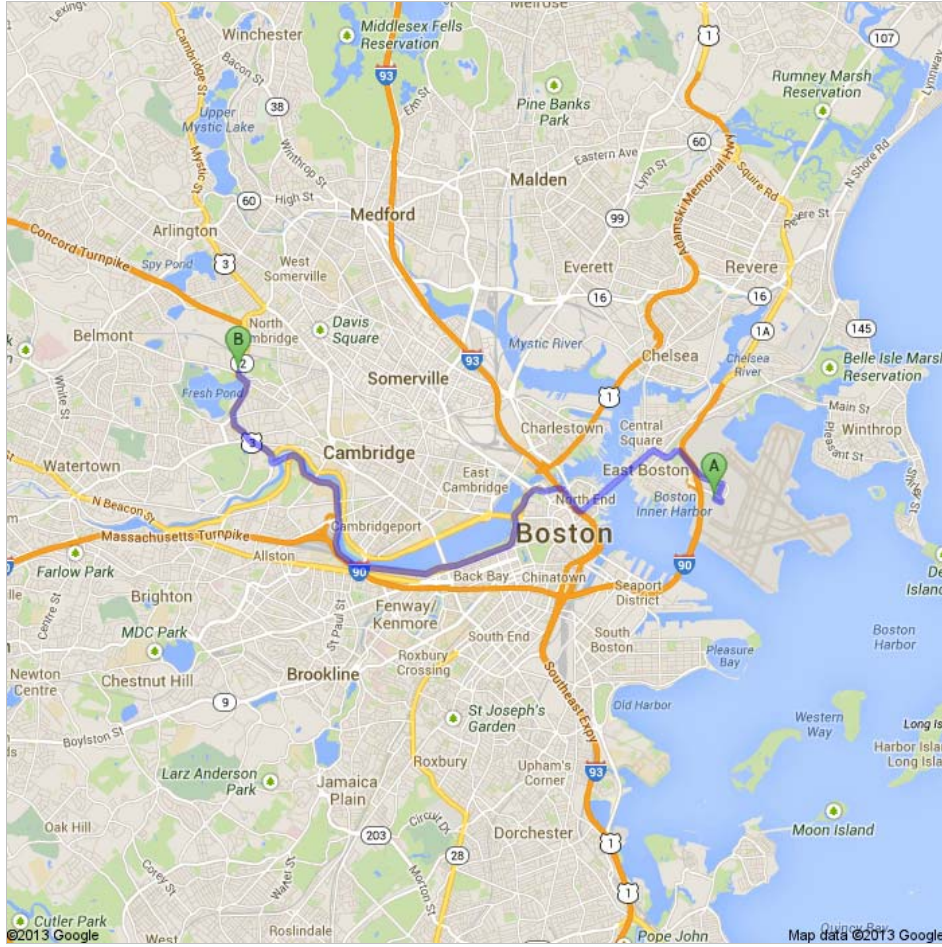
Post-evaluation survey is at: <http://www.sogosurvey.com/k/RQsXPQRsVsPsPsP>

## A List of Speakers and Participants














<b>Name:</b>	<b>University/Company</b>	<b>Status</b>
Ravi Shankar Akella	University of Missouri, Columbia	Graduate Student
Nabeel Akhtar	Boston University	Ph D Student
Mark Berman	BBN	Project Director & VP/Speaker
Azer Bestavros	Boston University	Faculty/Speaker
Divya Bhat	University of Massachusetts Amherst	PhD Student/Tutorial Assistant
Peter Blum	University of Massachusetts Amherst	Undergraduate
Alison Chan	Kettering University	Undergrad
Veeresh Dandur	Southern Illinois University	Ph D Student
Sarah Edwards	BBN/GPO	Network Scientist/Speaker
Chip Elliot	BBN/GPO	Futures Director/Speaker
Eswer Kishore Kumar	University of Massachusetts Amherst	Graduate Student
Bryan Lyles	NSF	Program Director/Speaker
Anirban Mandal	RENCI	Research Scientist/Speaker
Guevara Noubir	Northeastern University	Faculty
Tigran Novosartov	Temple University	Undergrad
Yin Pan	RIT	Faculty
Niky Riga	BBN/GPO	Network Scientist/Speaker
Paul Ruth	RENCI	Research Scientist/Speaker
Amirali Sanatinia	Northeastern University	Ph D Student
Guobao Sun	University of Minnesota	Ph D Student
Vicraj Thomas	BBN/GPO	System Engineer/Speaker
Venupraveen Veluman	RIT	Graduate Student
Jane Wang	University of Massachusetts Boston	Ph D Student
Qing Wang	Clemson University	Ph D Student
Kaiqi Xiong	RIT	Faculty
Henry Yeh	BBN/GPO	Project Manager
Yang, Zengxu	Tufts University	Ph D Student
Hongxu Zhang	Temple University	Ph D Student
Michael Zink	University of Massachusetts Amherst	Faculty/Speaker



**Directions to Best Western Plus Hotel Tria**  
220 Alewife Brook Pkwy, Cambridge, MA 02138  
10.3 mi – about 19 mins



**A** Logan International Airport  
1 Harborside Dr, Boston, MA 02128

1. Head **southeast** go 423 ft  
total 423 ft
-  2. Slight left  
About 1 min go 0.4 mi  
total 0.5 mi
-  3. Slight right go 0.2 mi  
total 0.7 mi
-  4. Keep right at the fork to continue toward **MA-1A S** go 0.2 mi  
total 0.9 mi
-  5. Keep right at the fork, follow signs for **Massachusetts 1A S/Interstate 93 N/Sumner Tunnel** and merge onto **MA-1A S**  
About 1 min go 0.6 mi  
total 1.5 mi
-  6. Turn left to stay on **MA-1A S**  
**Toll road**  
About 2 mins go 1.2 mi  
total 2.7 mi
-  7. Keep right at the fork, follow signs for **Massachusetts 3 N/Storrow Drive** go 495 ft  
total 2.8 mi
-  8. Keep right at the fork to continue toward **MA-3 N/MA-3A N**  
About 1 min go 0.6 mi  
total 3.4 mi
-  9. Keep right at the fork, follow signs for **MA-28 S/MA-3 N/Storrow Dr** and merge onto **MA-3 N/MA-3A N**  
About 54 secs go 0.4 mi  
total 3.8 mi
-  10. Continue onto **MA-28 S** (signs for **Storrow Drive W**)  
About 59 secs go 0.6 mi  
total 4.4 mi
11. Continue onto **Storrow Dr** (signs for **Storrow Drive West**)  
About 3 mins go 2.0 mi  
total 6.4 mi
12. Continue onto **Soldiers Field Rd**  
About 3 mins go 2.0 mi  
total 8.4 mi
-  13. Slight right onto **Eliot Bridge** (signs for **MA-2/US-3/Arlington/Fresh Pond Pkwy**) go 0.3 mi  
total 8.7 mi
-  14. Slight right toward **Gerrys Landing Rd** go 0.2 mi  
total 8.9 mi
15. Continue straight onto **Gerrys Landing Rd** go 0.2 mi  
total 9.1 mi
16. Continue onto **Fresh Pond Pkwy**  
About 3 mins go 1.0 mi  
total 10.1 mi
-  17. At the traffic circle, take the **3rd** exit onto **Concord Ave** go 0.2 mi  
total 10.3 mi
-  18. At the traffic circle, take the **2nd** exit onto **Alewife Brook Pkwy**  
Destination will be on the right go 121 ft  
total 10.3 mi

**B** Best Western Plus Hotel Tria  
220 Alewife Brook Pkwy, Cambridge, MA 02138

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

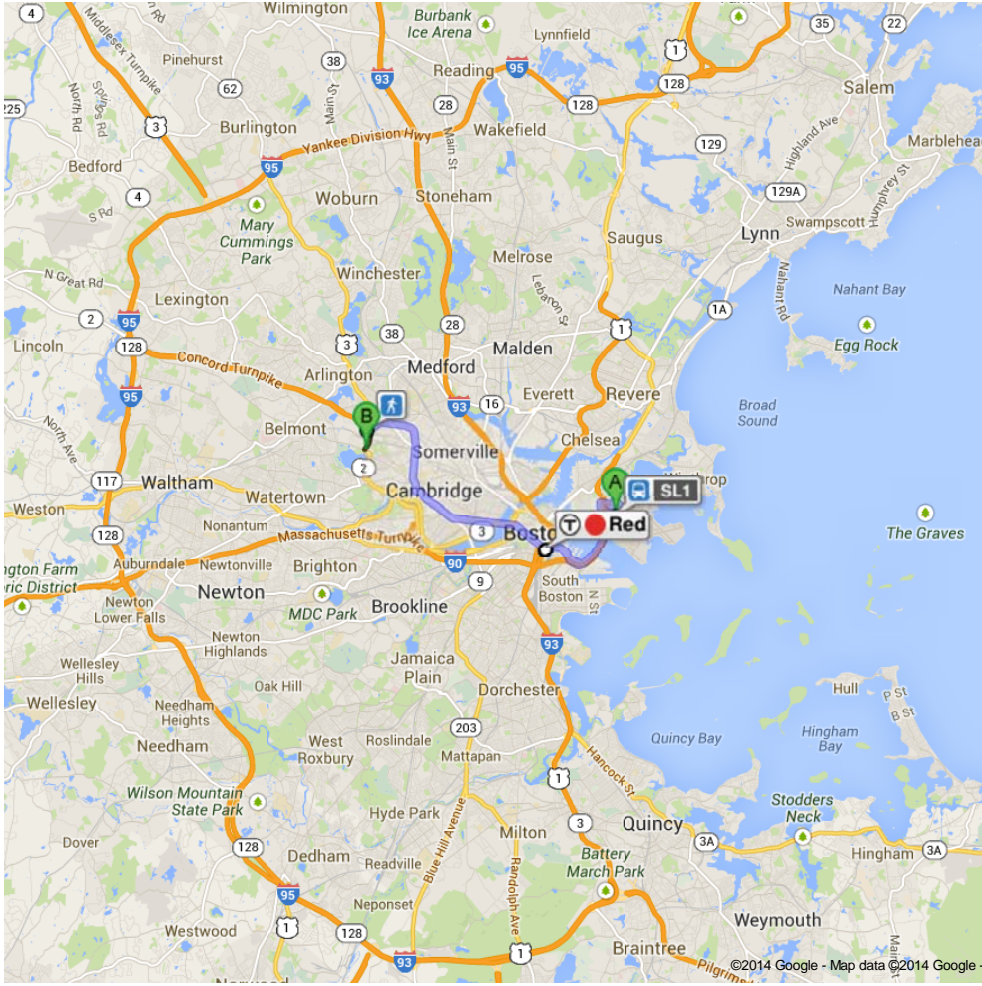
Map data ©2013 Google

Directions weren't right? Please find your route on [maps.google.com](https://maps.google.com) and click "Report a problem" at the bottom left.





Start Logan International Airport  
1 Harborside Dr, Boston, MA 02128  
End Best Western Plus Hotel Tria  
220 Alewife Brook Pkwy, Cambridge, MA 02138  
When 12/21/13 after 9:14pm  
Duration 1 hour 2 mins total



**A** Logan International Airport  
1 Harborside Dr, Boston, MA 02128

Walk to Terminal A About 1 min

Terminal A (Stop ID: 17091) 9:15pm - 9:37pm  
Bus - SL1 - Silver Line SL1 towards South Station (22 mins, 9 stops)

**South Station** (Stop ID: 70080) 9:44pm - 10:05pm  
**Incident or service disruption at this station.**  
**Escalator and stairs: SOUTH STATION - Red Line to Food Court out of service from 9 pm to end of service on Dec 19-23, Dec 26-30, and Jan 2-5.**  
Subway - Red Line towards Alewife (21 mins, 9 stops)

Alewife Station (Stop ID: 70061) About 11 mins  
Walk to Best Western Plus Hotel Tria

**B** Best Western Plus Hotel Tria  
220 Alewife Brook Pkwy, Cambridge, MA 02138

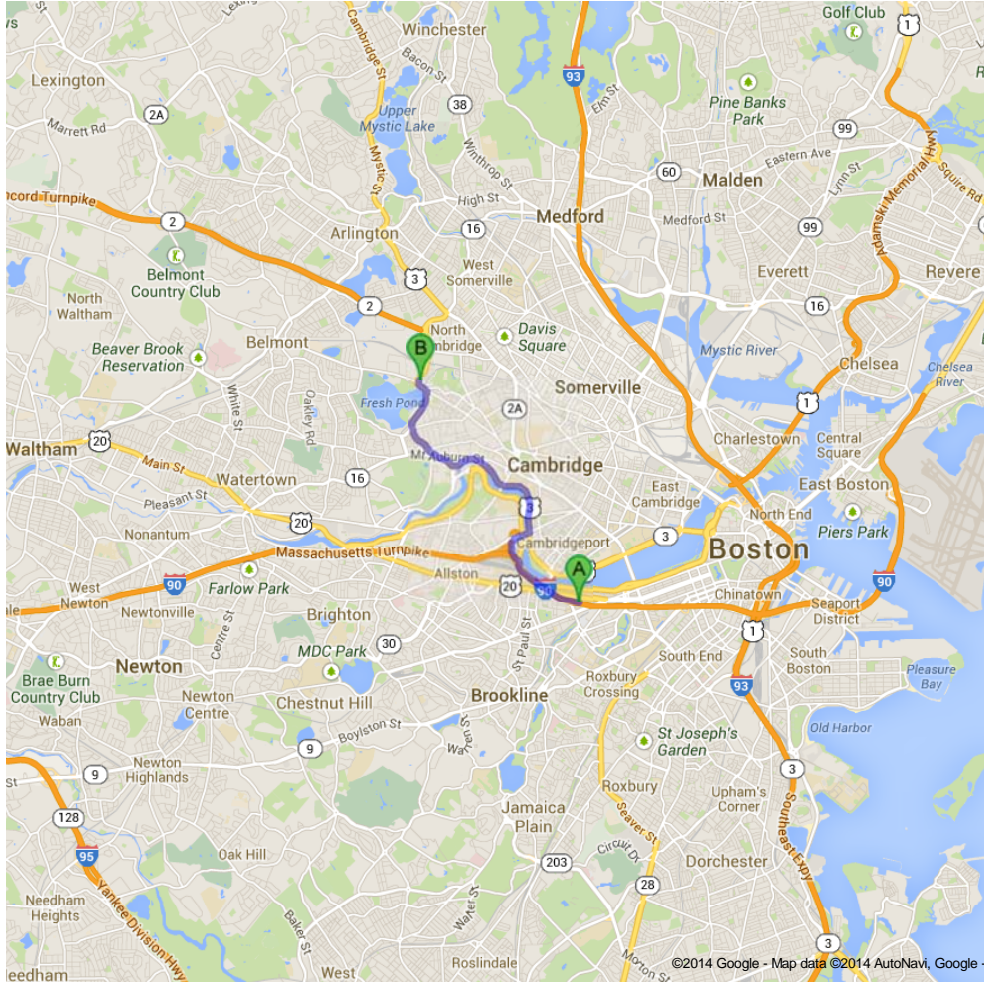
**Local agency information:** MBTA

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Map data ©2013 Google



**Directions to Best Western Plus Hotel Tria**  
220 Alewife Brook Pkwy, Cambridge, MA 02138  
4.5 mi – about 11 mins



**A** Massachusetts Turnpike, Boston, MA

- 
 1. Head **west** on **I-90 W** toward **Exit 20**  
 Partial toll road  
 About 1 min
 go 0.9 mi  
total 0.9 mi
- 
 2. Take exit **20** toward **Brighton/Cambridge**  
 Toll road
 go 0.2 mi  
total 1.0 mi
- 
 3. Keep right at the fork  
 Toll road
 go 226 ft  
total 1.1 mi
- 
 4. Keep right at the fork, follow signs for **Cambridge/Somerville**  
 Toll road
 go 0.2 mi  
total 1.3 mi
- 5. Continue straight
 go 469 ft  
total 1.4 mi
- 
 6. Turn right onto **Cambridge St**  
 About 46 secs
 go 0.1 mi  
total 1.5 mi
- 
 7. Turn left onto **Memorial Dr**  
 About 4 mins
 go 1.6 mi  
total 3.1 mi
- 8. Continue onto **Gerrys Landing Rd**
go 0.2 mi  
total 3.3 mi
- 9. Continue onto **Fresh Pond Pkwy**  
 About 3 mins
 go 1.0 mi  
total 4.3 mi
- 
 10. At the traffic circle, take the **3rd** exit onto **Concord Ave**
go 0.2 mi  
total 4.5 mi
- 
 11. At the traffic circle, take the **2nd** exit onto **Alewife Brook Pkwy**  
 Destination will be on the right
 go 121 ft  
total 4.5 mi

**B** **Best Western Plus Hotel Tria**  
220 Alewife Brook Pkwy, Cambridge, MA 02138

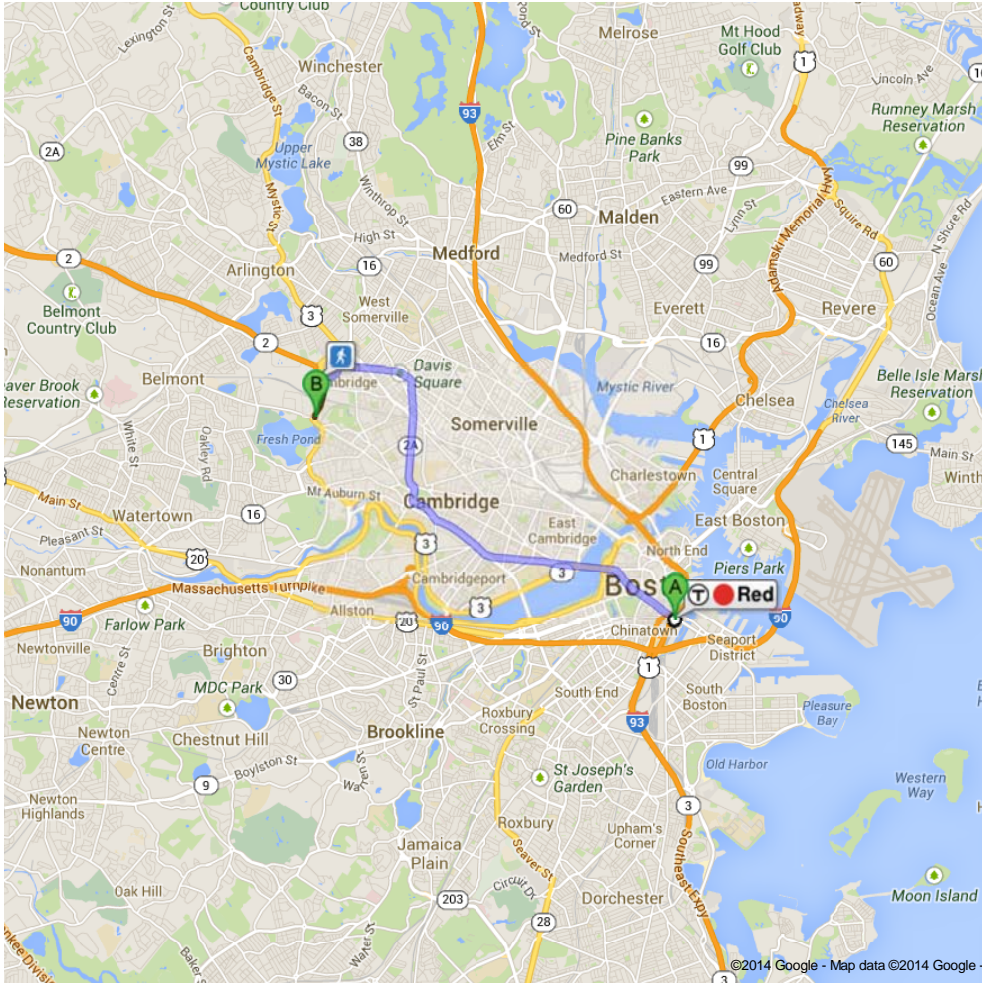
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Map data ©2013 Google

Directions weren't right? Please find your route on [maps.google.com](https://maps.google.com) and click "Report a problem" at the bottom left.



Start South Station Transit Center  
**700 Atlantic Ave, Boston, MA 02111**  
End Best Western Plus Hotel Tria  
**220 Alewife Brook Pkwy, Cambridge, MA 02138**  
When 12/21/13 after 9:11pm  
Duration 33 mins total



**A** **South Station Transit Center**  
700 Atlantic Ave, Boston, MA 02111

Walk to South Station About 1 min

**South Station** (Stop ID: 70080) 9:16pm - 9:37pm  
(21 mins, 9 stops)

**Incident or service disruption at this station.**  
**Escalator and stairs: SOUTH STATION - Red Line to Food Court out of service from 9 pm to end of service on Dec 19-23, Dec 26-30, and Jan 2-5.**

Subway - Red Line towards Alewife

**Alewife Station** (Stop ID: 70061) About 11 mins

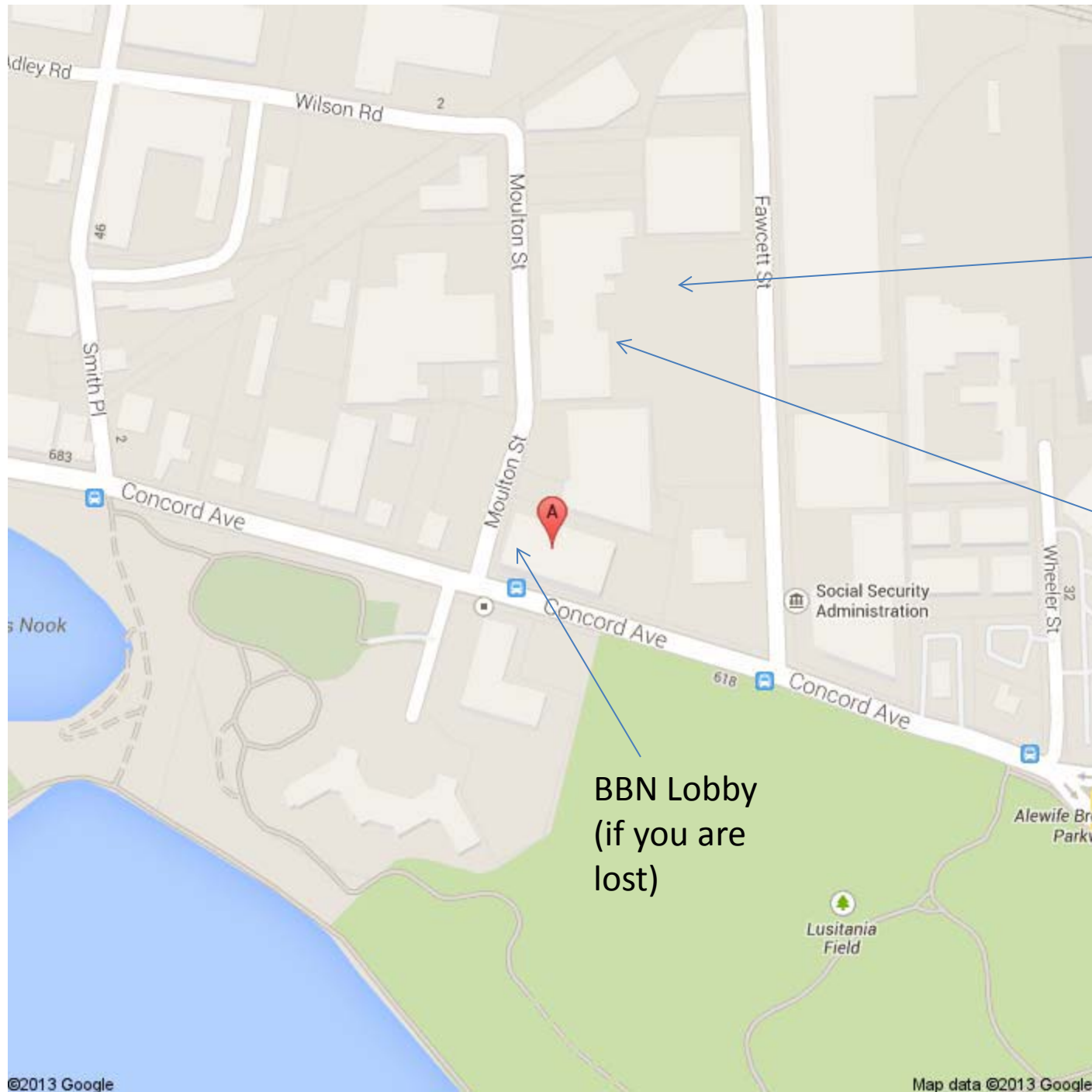
Walk to Best Western Plus Hotel Tria

**B** **Best Western Plus Hotel Tria**  
220 Alewife Brook Pkwy, Cambridge, MA 02138

**Local agency information:** MBTA

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Map data ©2013 Google



Parking lots  
GREE parking,  
too

GREE attendee  
entrance. Sign  
on the window

BBN Lobby  
(if you are  
lost)

Larger map

