REPORT DOCUMENTATION PAGE

Form Approved OMB NO. 0704-0188

1. REPORT DATE (DD-MM-YYYY)	2. REPORT TYPE	3. DATES COVERED (From - To)
06-06-2018	Final Report	1-Jan-2017 - 30-Jun-2017

4. TITLE AND SUBTITLE
Final Report: The 16th Electromagnetic and Light Scattering Conference

5a. CONTRACT NUMBER
W911NF-17-1-0067

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER
611102

6. AUTHORS

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAMES AND ADDRESSES
Kansas State University
2 Fairchild Hall
1601 Vattier Street
Manhattan, KS 66506 -1103

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS (ES)
U.S. Army Research Office
P.O. Box 12211
Research Triangle Park, NC 27709-2211

10. SPONSOR/MONITOR'S ACRONYM(S)
ARO

11. SPONSOR/MONITOR'S REPORT NUMBER(S)
69848-CH-CF.4

12. DISTRIBUTION AVAILIBILITY STATEMENT
Approved for public release; distribution is unlimited.

13. SUPPLEMENTARY NOTES
The views, opinions and/or findings contained in this report are those of the author(s) and should not contrued as an official Department of the Army position, policy or decision, unless so designated by other documentation.

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	15. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Matthew Berg
UU	UU	UU	UU		19b. TELEPHONE NUMBER 785-317-3378

RPPR Final Report
as of 07-Jun-2018

Agency Code:

Proposal Number: 69848CHCF **Agreement Number: W911NF-17-1-0067**
INVESTIGATOR(S):

Name: Matthew Berg
Email: mberg81@gmail.com
Phone Number: 7853173378
Principal: Y

Organization: **Kansas State University**
Address: 2 Fairchild Hall, Manhattan, KS 665061103
Country: USA
DUNS Number: 929773554 EIN: 480771751

Report Date: 30-Sep-2017 Date Received: 06-Jun-2018
Final Report for Period Beginning 01-Jan-2017 and Ending 30-Jun-2017
Title: The 16th Electromagnetic and Light Scattering Conference
Begin Performance Period: 01-Jan-2017 **End Performance Period:** 30-Jun-2017
Report Term: 0-Other

Submitted By: Matthew Berg Email: mberg81@gmail.com
Phone: (785) 317-3378

Distribution Statement: 1-Approved for public release; distribution is unlimited.

STEM Degrees: 0 **STEM Participants:** 7

Major Goals: This award supported a mid-scale scientific conference that brought together experts, graduate students, and early-career scientists working in the field of electromagnetic scattering. Broadly, the purpose of this conference was to provide a forum for participants from a worldwide venue to present cutting-edge advances in theoretical and experimental topics related to sensing and characterization of aerosol chemistry and microphysics. The conference featured reviews from subject-matter experts as invited speakers, contributed oral and poster presentations covering substantial scientific advances, and discussions at-large among the participants that has spurred collaborations.

Accomplishments: The main objective of this conference was to assemble scientists, engineers, and PhD students researching various aspects of electromagnetic scattering by particles and particle groups and to provide a stimulating atmosphere for in-depth discussions of theory, measurements, and applications. The conference featured 143 presentations by 132 registered participants from 18 countries. The program and the abstracts of conference presentations are available at the official conference web site: https://www.giss.nasa.gov/staff/mmishchenko/ELS-XVI .

Following the well-established ELS tradition and with the publisher's (Elsevier) encouragement, we solicited full-size papers for a topical issue of the Journal of Quantitative Spectroscopy and Radiative Transfer (JQSRT). As always, every paper ultimately included in this topical issue has undergone the same rigorous peer review process as any other manuscript published in the JQSRT.

The specific topics covered by ELS-XVI included (but were not limited to) the following:
-new theoretical developments, numerical simulations, and laboratory measurements of light scattering by nonspherical and morphologically complex particles and particle groups
-detection and characterization of atmospheric particulates using laboratory, in situ, and remote sensing techniques
-scattering of light by terrestrial aerosols and clouds
-scattering of light by oceanic particulates
-scattering of light by solar system objects, exoplanets, and exoplanetary environments
-scattering of light by various astrophysical objects
-applications of light scattering methods in biology and biomedicine
-light scattering in densely packed particulate media
-near-field and coherent effects in light scattering, optical trapping, and manipulation
-light scattering methods to control material properties and technological applications

In addition, two special sessions were held:
-Study of aerosol and environmental chemistry through analyses of light scattering
-Tropospheric aerosols: the NASA perspective .

An important part of the ELS-XVI conference was the presentation of several Elsevier awards, including the fourth Hendrik C. Van de Hulst Award. This major professional distinction is granted by Elsevier for landmark original research contributions to the field of Electromagnetic Scattering and is administered by the JQSRT via a Van de Hulst Award Committee appointed by Elsevier. The 2017 Van de Hulst Award Committee was chaired by Professor George W. Kattawar of the Texas A&M University and was composed of 19 distinguished world-renowned experts.

As a result of the vote by the Committee, the 2017 Van de Hulst Award was granted to Dr. Petr Chýlek of the Los Alamos National Laboratory (USA) (Fig. 2). An integral part of the official award ceremony was a highly instructive Van de Hulst Lecture given by Dr. Chýlek on March 23. The prestigious Peter C. Waterman Award is presented annually to exceptional early-career scientists in the category of Electromagnetic Scattering, while the annual Richard M. Goody Award is presented in the category of Atmospheric Radiation & Remote Sensing. Both awards are administered by JQSRT via an expert committee appointed by Elsevier. The 2016 and 2017 Waterman awards were presented, respectively, to Dr. Feng Xu of the NASA's Jet Propulsion Laboratory (USA) and Professor Chao Liu of the Nanjing University of Information Science and Technology (China). The 2016 and 2017 Goody Awards were presented, respectively, to Dr. Sergey Korkin of the NASA's Goddard Space Flight Center (USA) and Professor Rajan Chakrabarty of the Washington University in St. Louis (USA).

Training Opportunities: A total of 7 graduate students, 1 postdoc, and 5 senior scientists were given travel support from this award. We view the support to the students as training in that many of them had not attended a conference at that point.

Results Dissemination: The program and the abstracts of conference presentations are available at the official conference web site https://www.giss.nasa.gov/staff/mmishchenko/ELS-XVI .

In addition, a special issue of the Journal of Quantitative Spectroscopy and Radiative Transfer (JQSRT) was solicited and published including many of the attendee work.

Honors and Awards: Nothing to Report

Protocol Activity Status:

Technology Transfer: Nothing to Report

PARTICIPANTS:

Participant Type: PD/PI
Participant: Matthew Berg
Person Months Worked: 1.00
Project Contribution:
International Collaboration:
International Travel:
National Academy Member: N
Other Collaborators:

Funding Support:

WEBSITES:

RPPR Final Report
as of 07-Jun-2018

URL: https://www.giss.nasa.gov/staff/mmishchenko/ELS-XVI/
Date Received: 06-Jun-2018
Title: The 16th Electromagnetic and Light Scattering Conference ELS-XVI
Description: Conference website

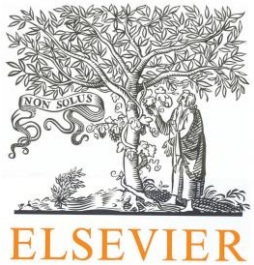
URL: https://www.giss.nasa.gov/staff/mmishchenko/ELS-XVI/
Date Received: 06-Jun-2018
Title: The 16th Electromagnetic and Light Scattering Conference ELS-XVI
Description: Conference website

ELS-XVI

ELS-XVI Sponsors

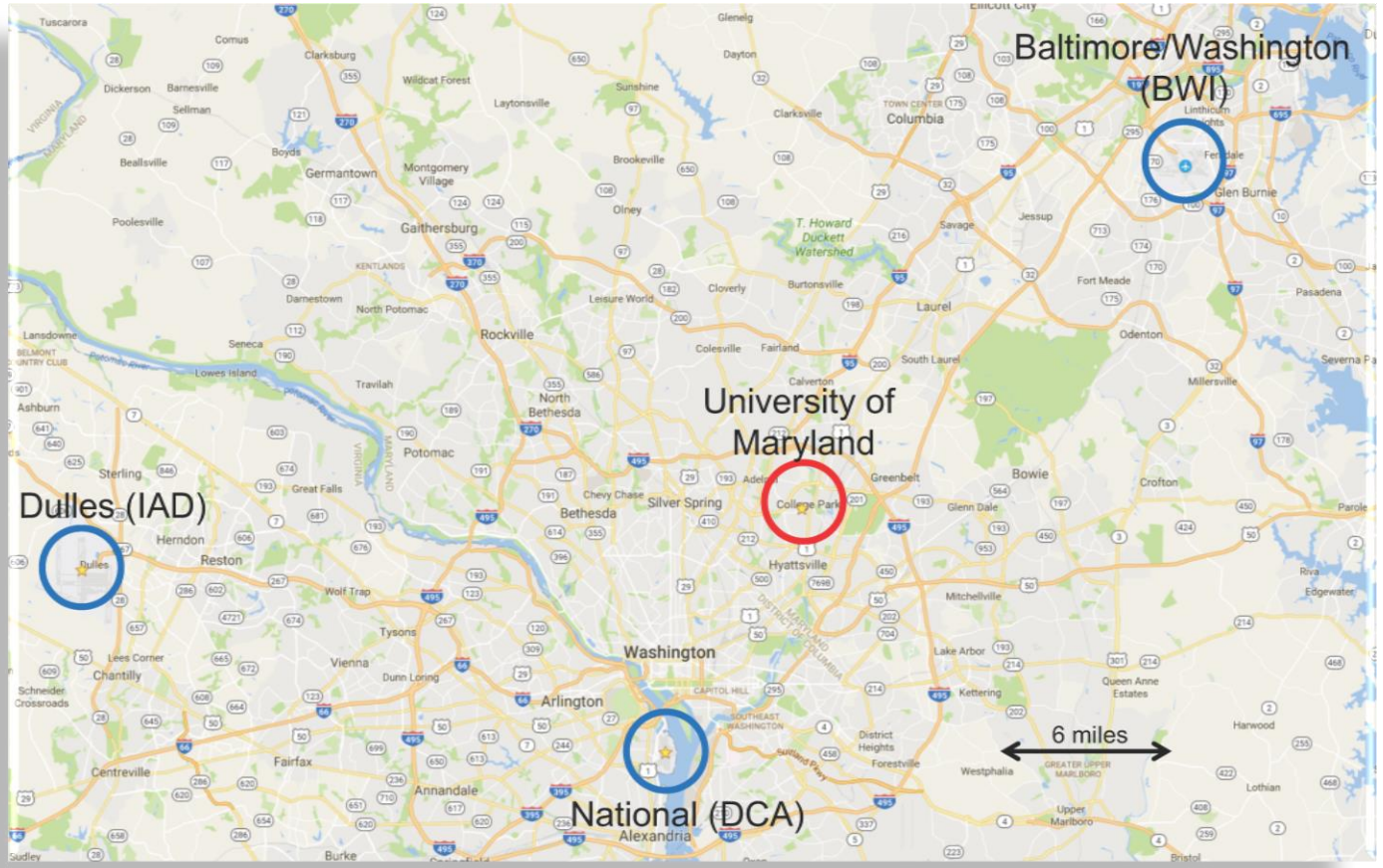
Hal Maring

Laura Krnavek



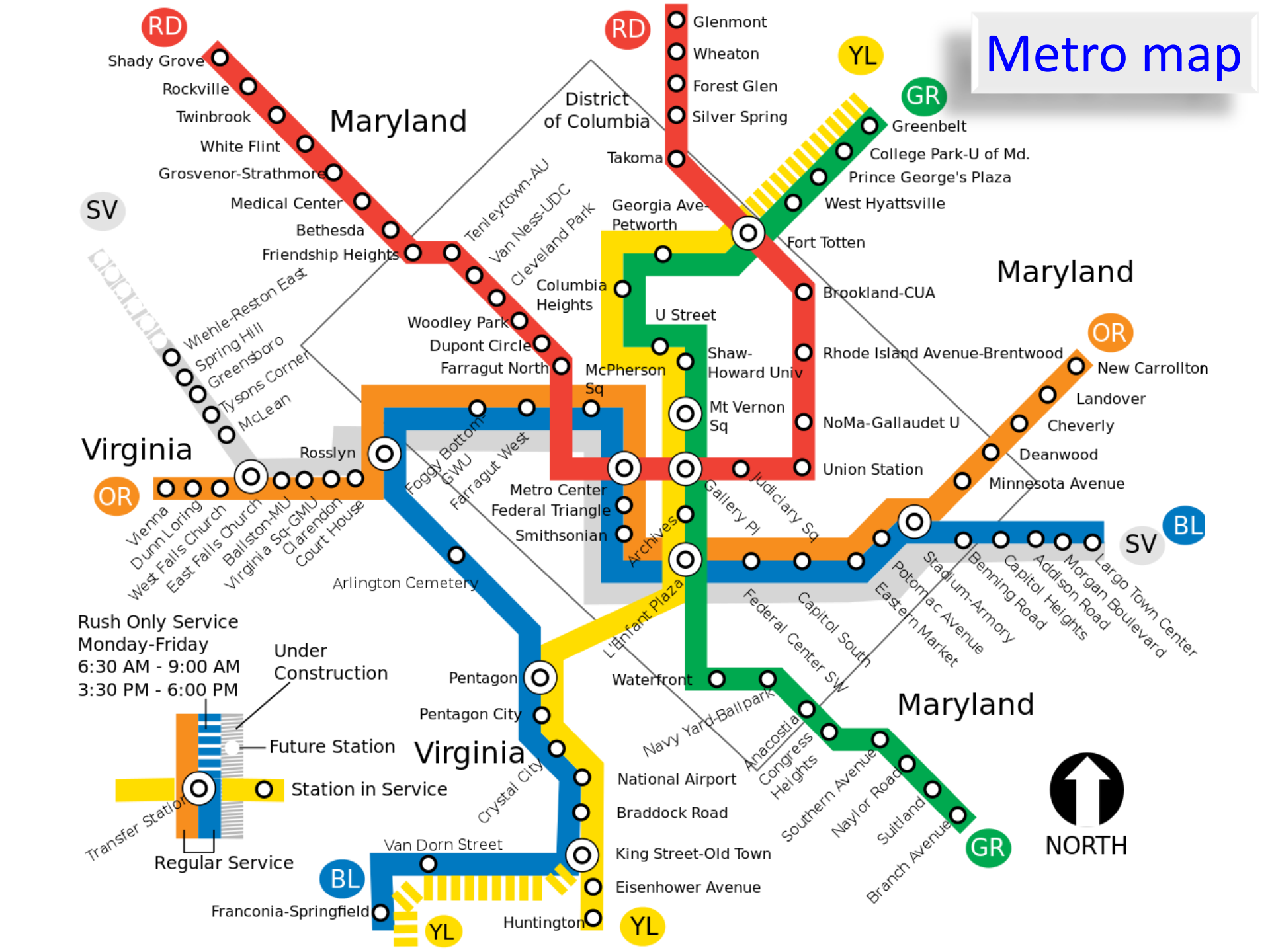
José Stoop

Washington DC area airports



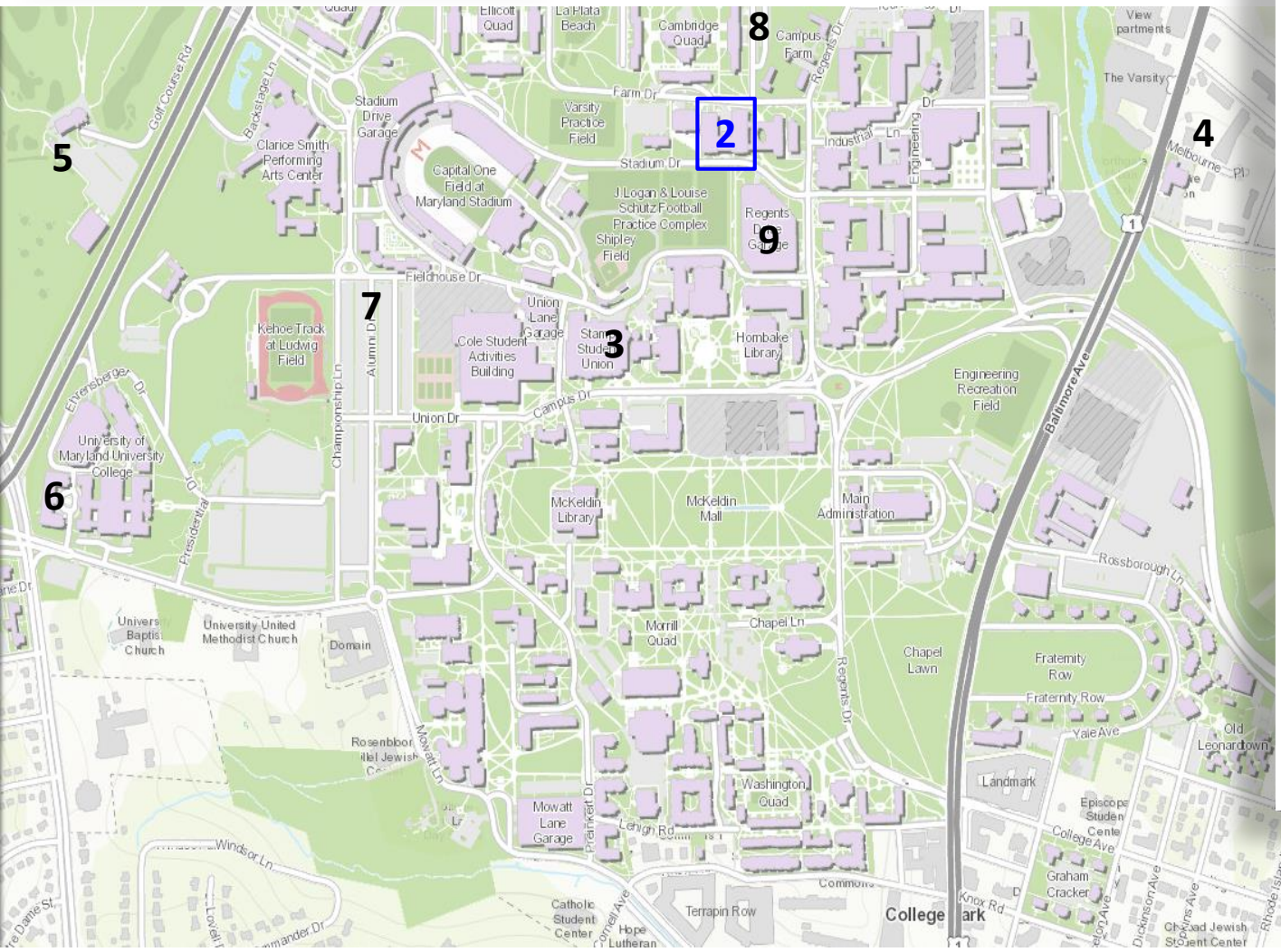
Public transportation from airports:

- **From IAD:** Take Washington Flyer bus to metro Wiehle-Reston station, then continue by metro to College Park. Or use Super Shuttle.
- **From DCA:** Take metro to College Park, walk to College Park Metrorail station, take metro bus C8 to UMD.
- **From BWI:** Take bus B30 to Greenbelt metro station, then continue by metro to College Park. OR, take airport shuttle bus to MARC station, exit train at New Carrolton station, take metro bus F6 to UMD.


Metro map
RD
Shady Grove
Rockville
Twinbrook
White Flint
Grosvenor-Strathmore
Medical Center
Bethesda
Friendship Heights
Maryland
District of Columbia
Glenmont
Wheaton
Forest Glen
Silver Spring
Takoma
YL
GR
Greenbelt
College Park-U of Md.
Prince George's Plaza
West Hyattsville
Fort Totten
Georgia Ave-Petworth
Columbia Heights
U Street
Brookland-CUA
Rhode Island Avenue-Brentwood
Shaw-Howard Univ
McPherson Sq
Mt Vernon Sq
NoMa-Gallaudet U
Union Station
Woodley Park
Dupont Circle
Farragut North
Tenleytown-AU
Van Ness-UDC
Cleveland Park
SV
Wiehle-Reston East
Spring Hill
Greensboro
Tysons Corner
McLean
Virginia
OR
Vienna
Dunn Loring
West Falls Church
East Falls Church
Ballston-MU
Virginia Sq-GMU
Clarendon
Court House
Rosslyn
Foggy Bottom-GWU
Farragut West
Metro Center
Federal Triangle
Smithsonian
Gallery Pl
Judiciary Sq
Archives
Arlington Cemetery
New Carrollton
Landover
Cheverly
Deanwood
Minnesota Avenue
Stadium-Armory
Benning Road
Capitol Heights
Addison Road
Morgan Boulevard
Largo Town Center
BL
Rush Only Service
Monday-Friday
6:30 AM - 9:00 AM
3:30 PM - 6:00 PM
Under Construction
Future Station
Station in Service
Transfer Station
Regular Service
L'Enfant Plaza
Capitol South
Federal Center SW
Eastern Market
Potomac Avenue
Pentagon
Pentagon City
Crystal City
Waterfront
Navy Yard-Ballpark
Anacostia
Congress Heights
Southern Avenue
Naylor Road
Suitland
Branch Avenue
National Airport
Braddock Road
King Street-Old Town
Eisenhower Avenue
Huntington
Van Dorn Street
Franconia-Springfield
NORTH

Key locations

600 ft



1 – College Park Metro Station (approx 2 km from conference site)

2 – Atlantic Building (conference site)

3 – Student Stamp Union (food on March 23–24)

4 – Campus Village Plaza (food all days)

5 – Golf Course Restaurant (food all days)

6 – Marriott Hotel (Restaurant Commons)

7 – Free parking, lot #1

8 – Free parking, lot #2 (small, gets filled up early)

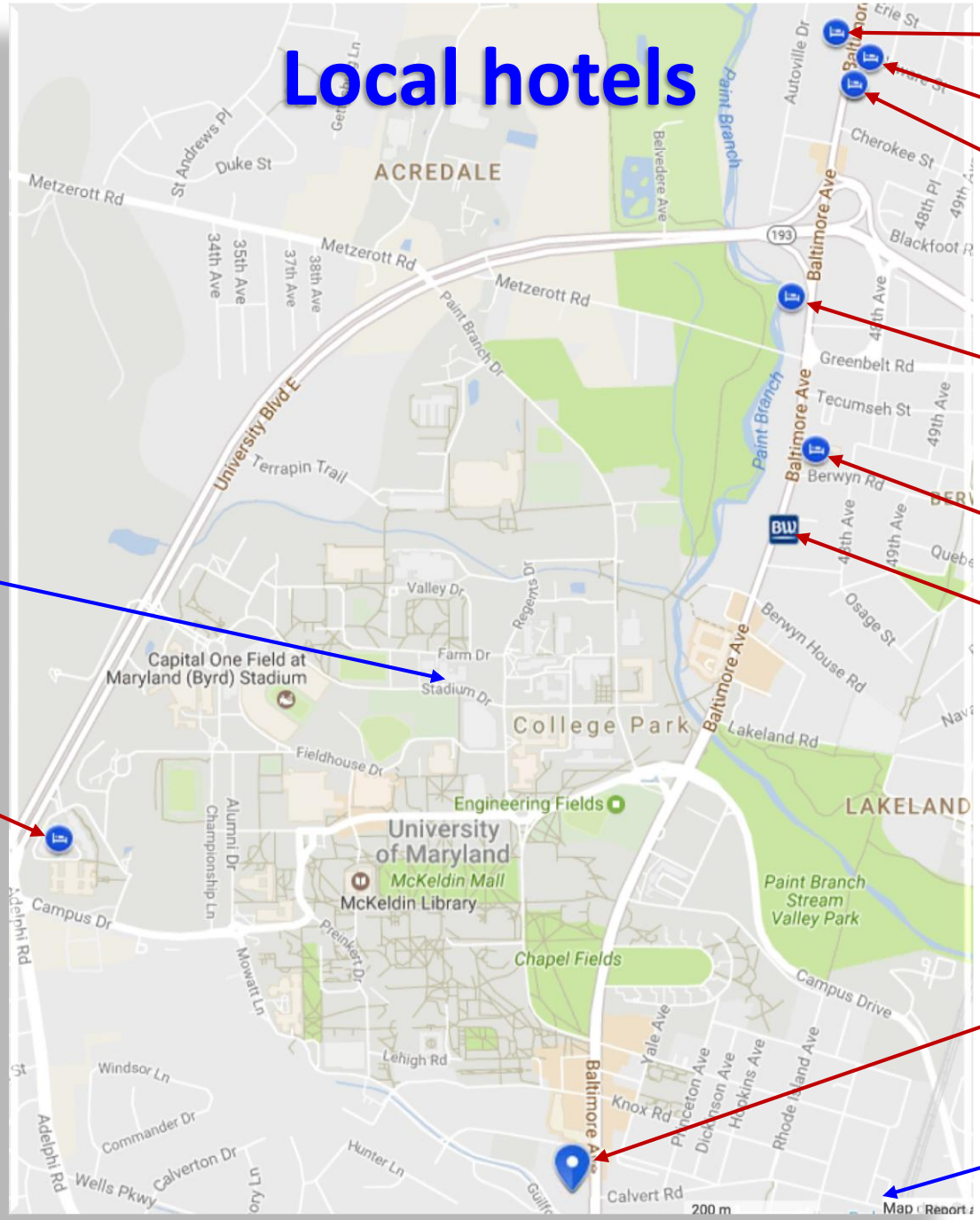
9 – Regents Drive Garage, the closest paid parking (**free Sunday–Wednesday**), city bus stop, tour bus stop

Ride from/to College Park Metro Station

Free shuttle: #104 on March 23–25

City Buses C8 and F6: all days. Exit on campus: “Regent Drive”

Local hotels



Super 8

Red Roof Inn

Days Inn / Howard Johnson Inn

Holiday Inn Express

Clarion Inn

Best Western Plus

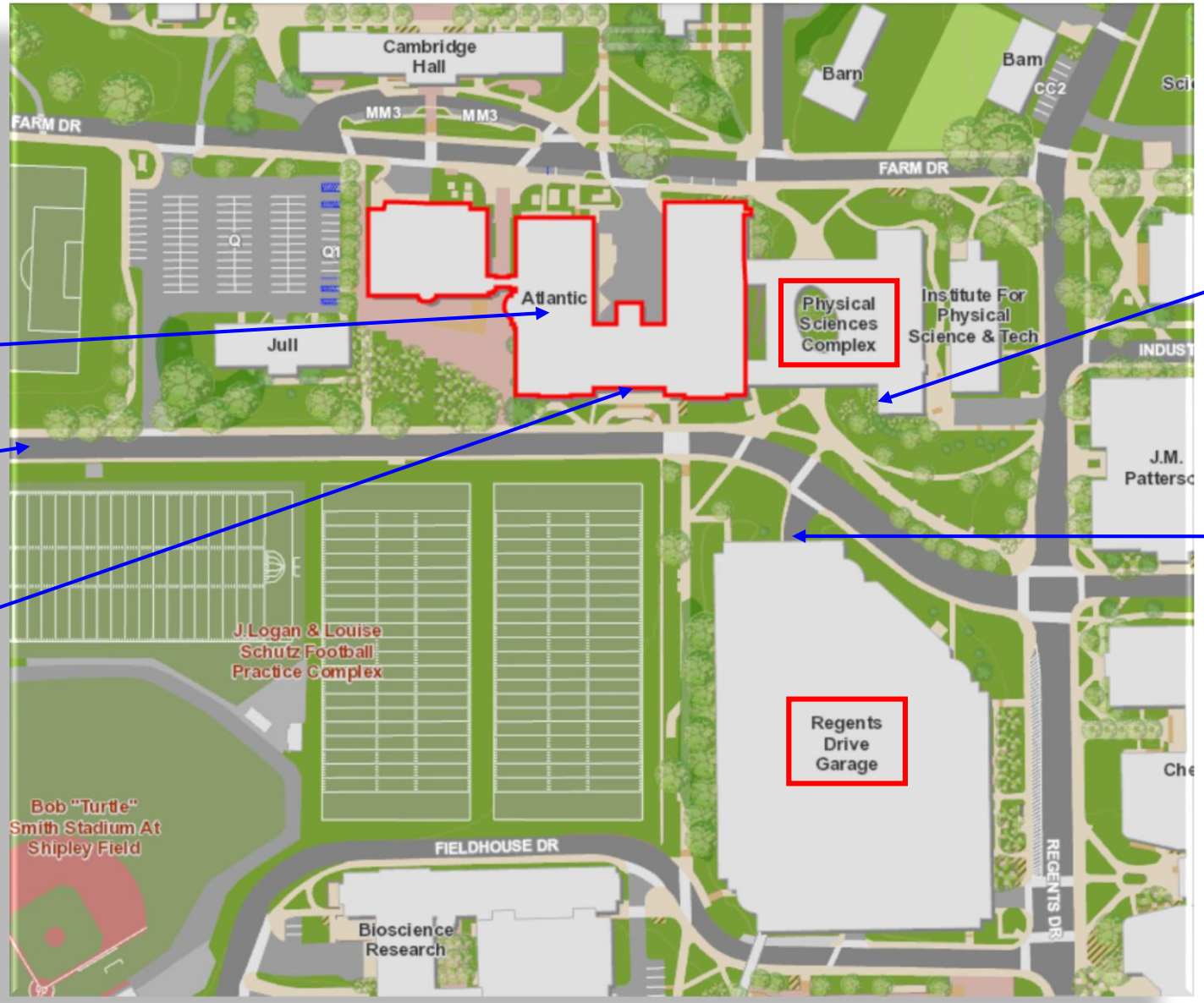
Atlantic Building

College Park Marriott Hotel

Quality Inn & Suites

College Park Metro Station

Conference venue



Conference room

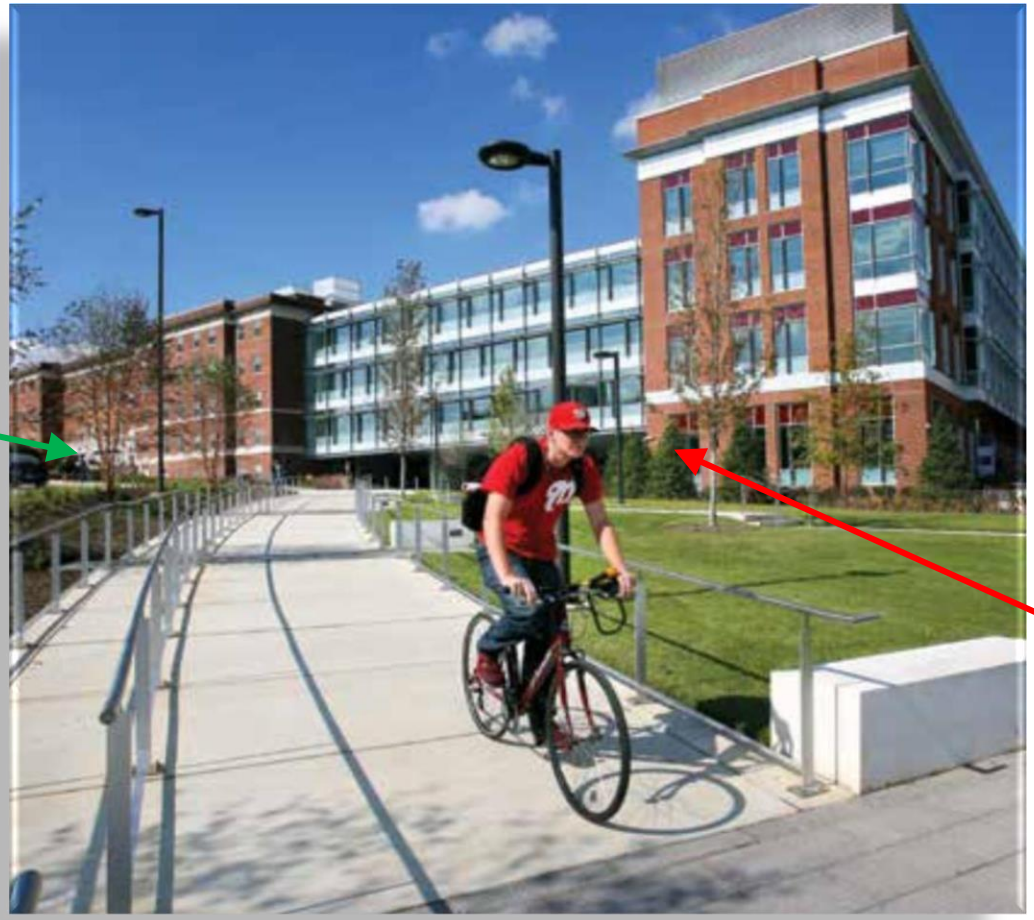
Stadium Drive

Entrance

Opening Reception and Poster Session

Closest paid parking (free Sunday through Wednesday)

On-site registration (starts 5:30 pm)
Opening Reception (starts 6 pm)
Sunday, March 19



Atlantic Building

Quantum Café, Physical Sciences Complex

You can park <u>for free</u> in the Regents Drive Garage

Atlantic Building, second floor

Please upload and test your presentation file(s) before your session starts!

Invited reviews: 30 min

(22 min to present + 3 min to rap up + 5 min for questions)

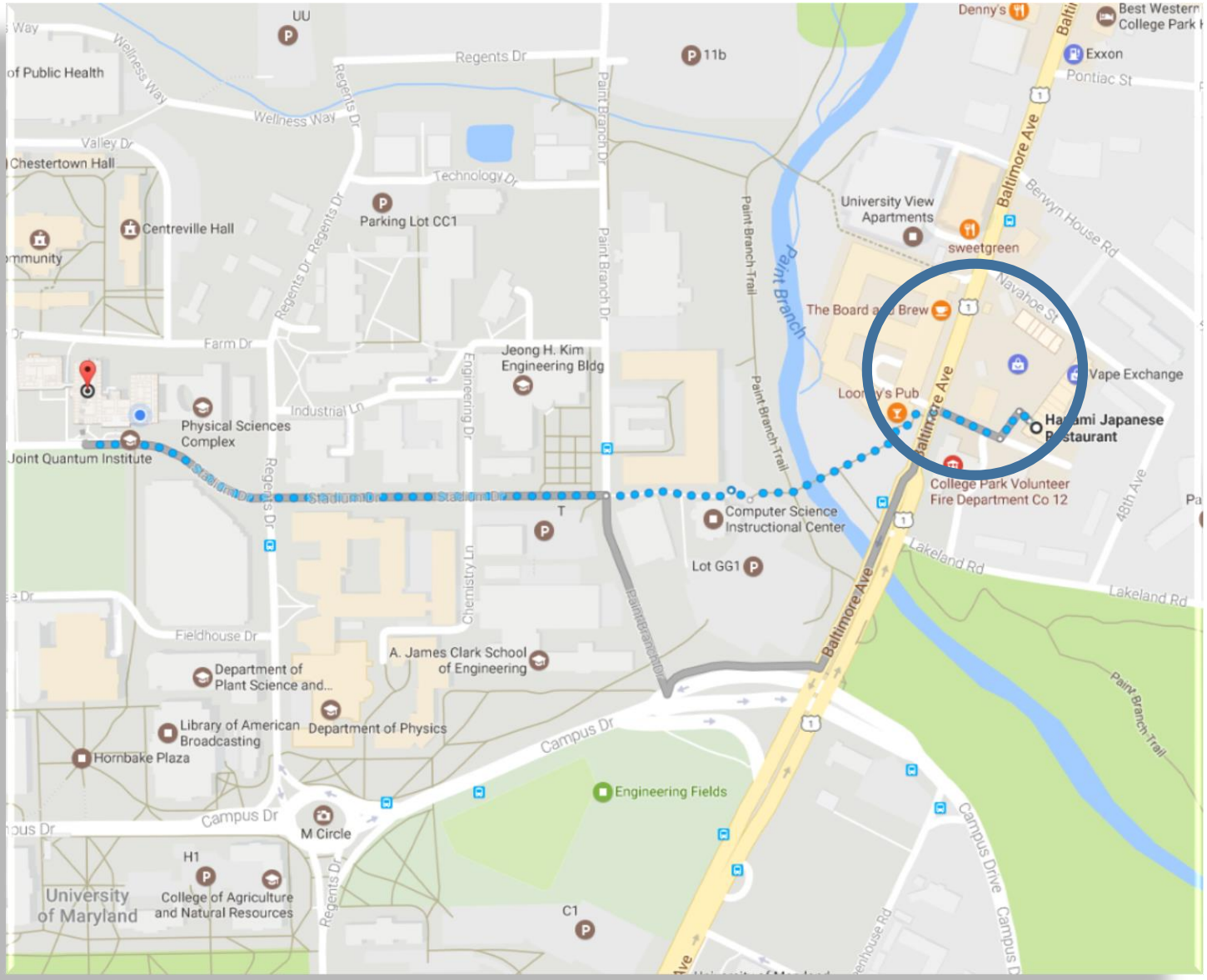
Regular talks: 15 min

(10 + 2 + 3)

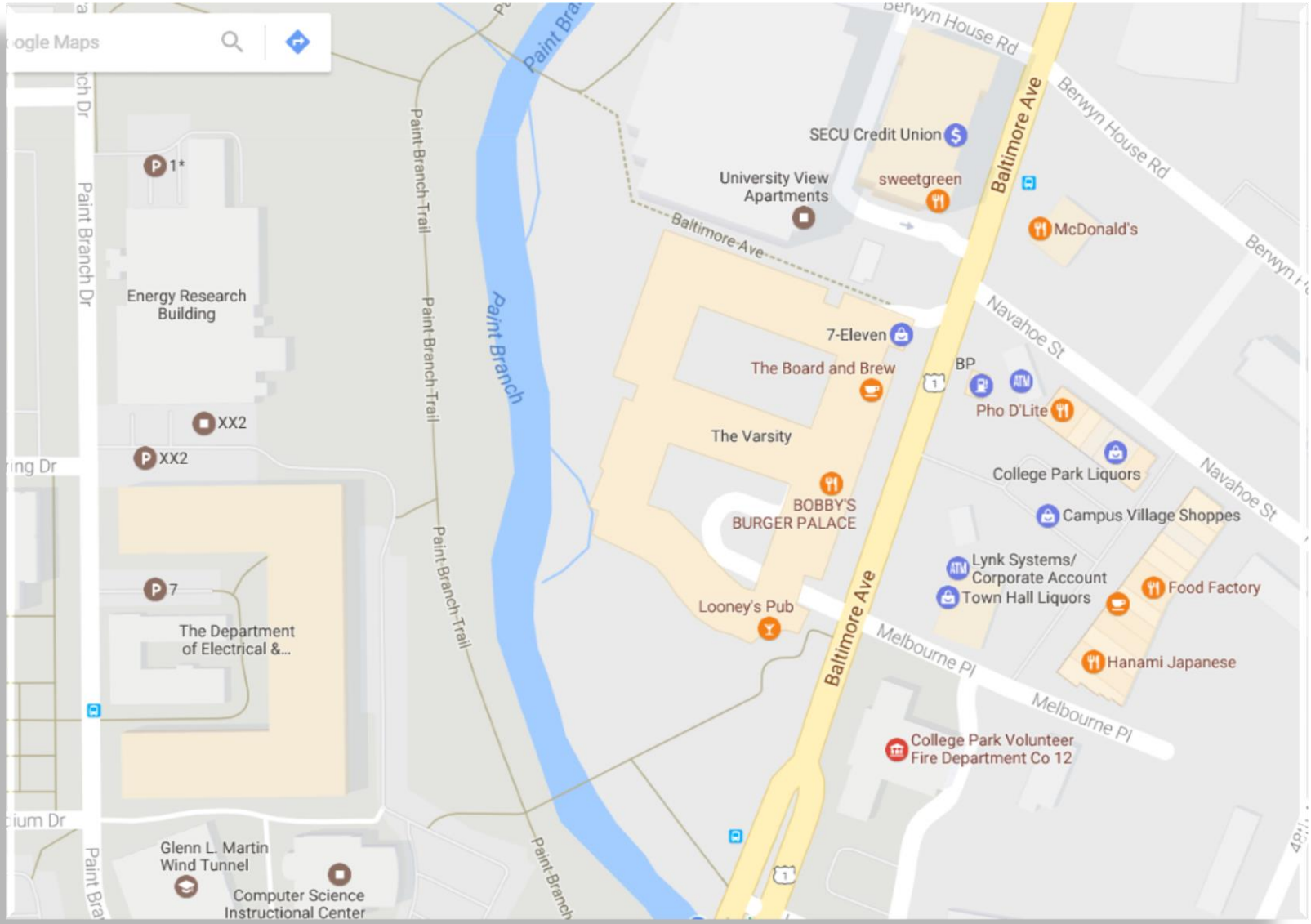
Session chairs: please be strict!

Notify the speakers after 22 (or 10) min
and stand up after 25 (or 12) min

Walking to Campus Village Plaza
(lunch on March 20 and 21)

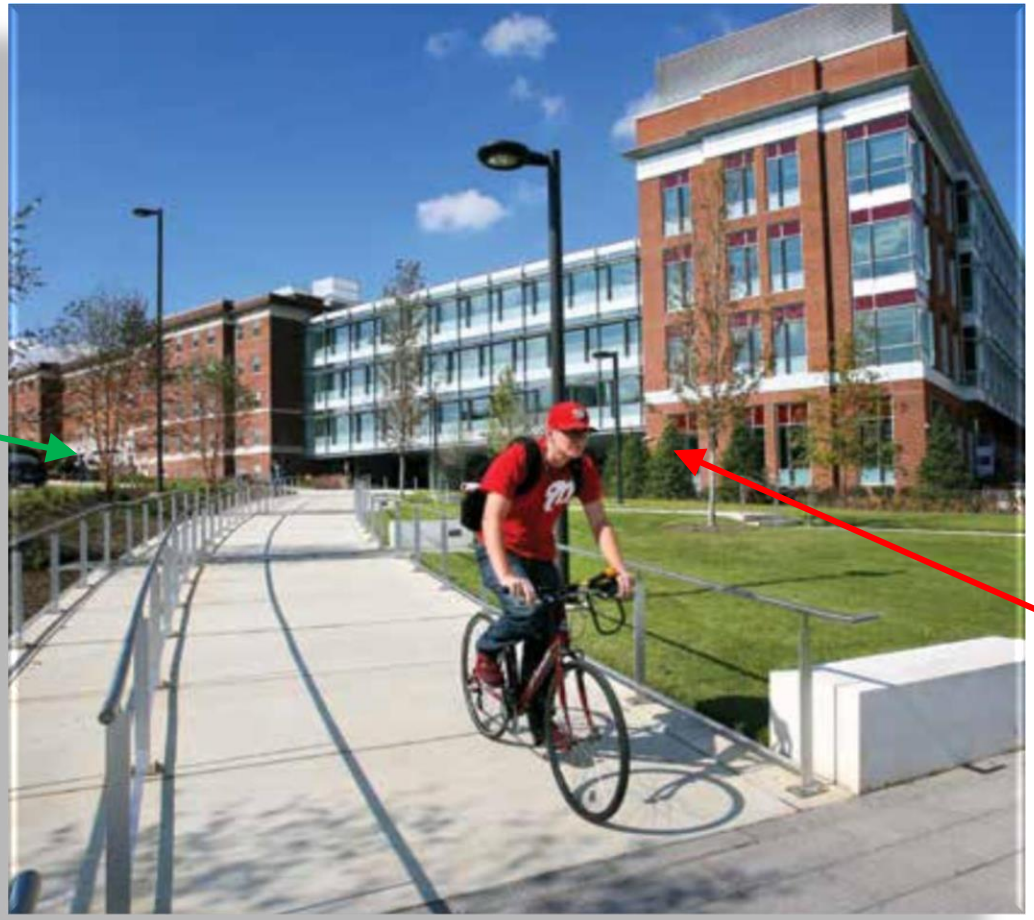


Campus Village Plaza



Poster Session

Wednesday, March 22, 12:00 noon – 3:15 pm

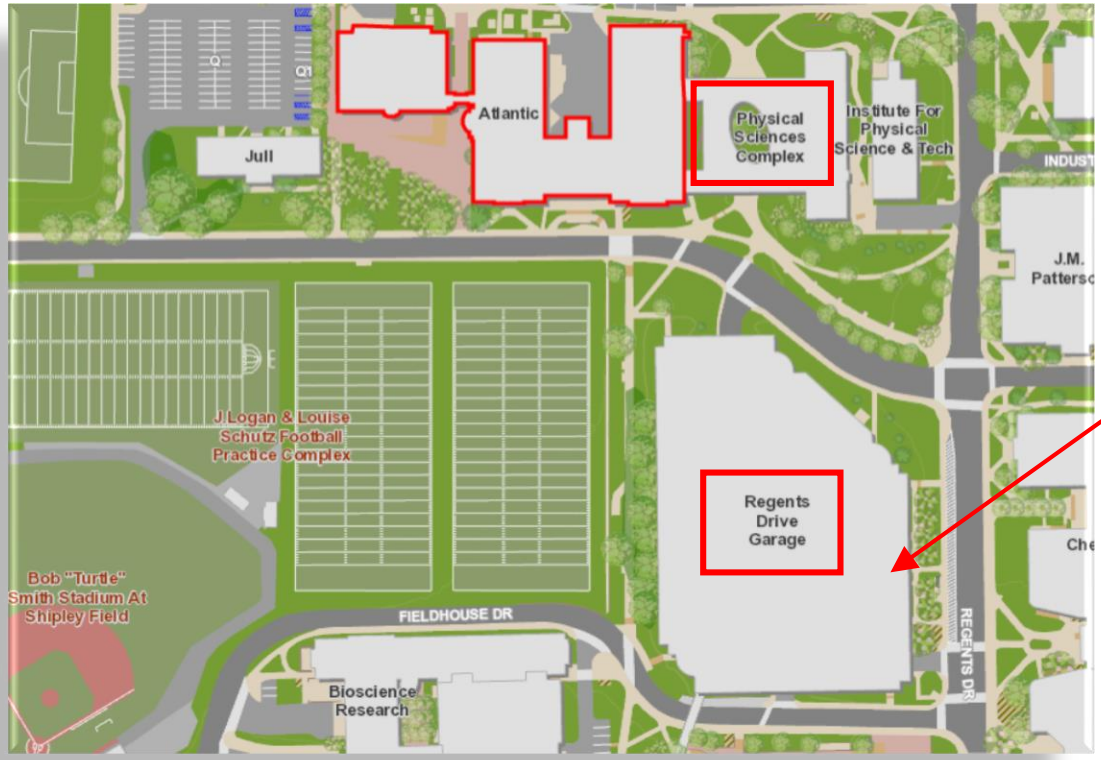


Atlantic Building

Quantum Café, Physical Sciences Complex

The posters can be put on during the morning coffee break and must be taken down at the end of the Poster Session.
Generic lunch will be provided.

Bus tour and Conference Banquet
March 22

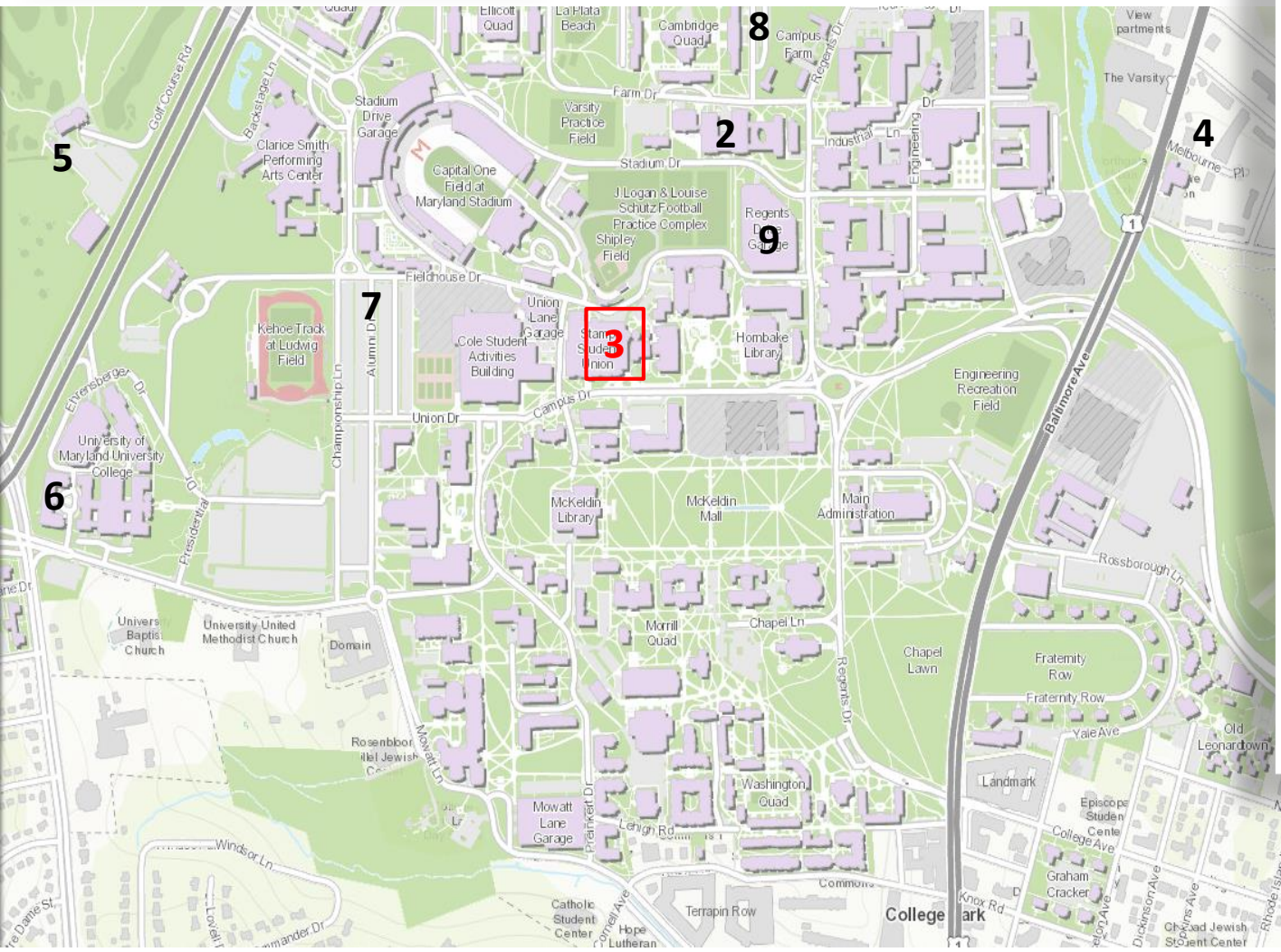


Buses will depart at 3:30 pm sharp from the Regents Drive Garage

Banquet location:
Annapolis Marriott Waterfront Hotel
80 Compromise St., Annapolis, MD 21401
6:30 pm – 10:00 pm

Key locations

600 ft



1 – College Park Metro Station (approx 2 km from conference site)
2 – Atlantic Building (conference site)
3 – Student Stamp Union (food on March 23–24)
4 – Campus Village Plaza (food all days)
5 – Golf Course Restaurant (food all days)
6 – Marriott Hotel (Restaurant Commons)
7 – Free parking, lot #1
8 – Free parking, lot #2 (small, gets filled up early)
9 – Regents Drive Garage, the closest paid parking, city bus stop, tour bus stop

Ride from/to College Park Metro Station

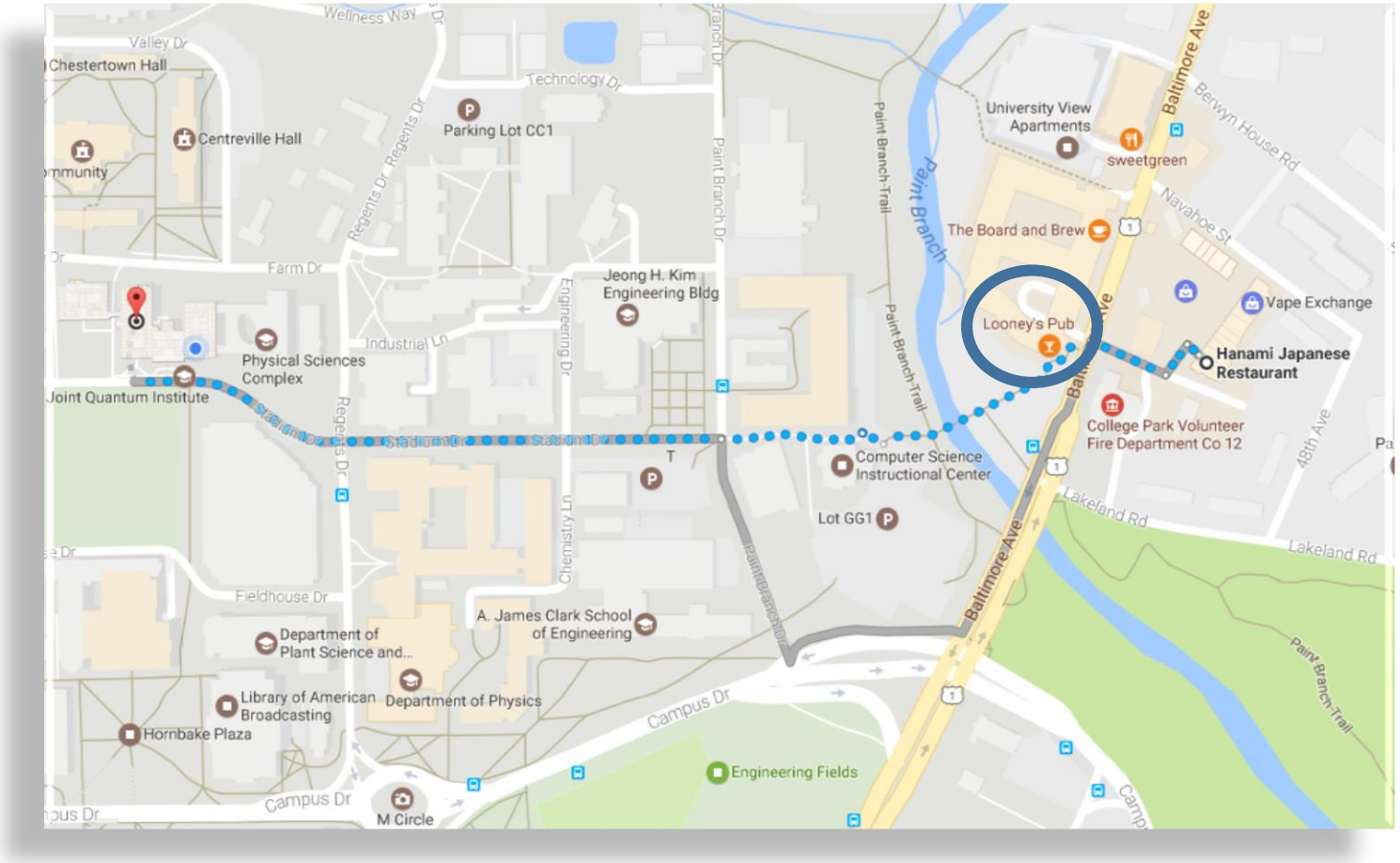
Free shuttle: #104 on March 23–25

City Buses C8 and F6: all days. Exit on campus: "Regent Drive"

Farewell Party

Friday, March 24, 5:45 pm

Looney's Pub @ Campus Village Plaza



Web access

The password will be provided at registration

Topical issue of *JQSRT*

Submission deadline:
15 June 2017

Expedited publication process

ELS Business Meeting

(to discuss our future)

Tuesday, March 21, 5:30 pm

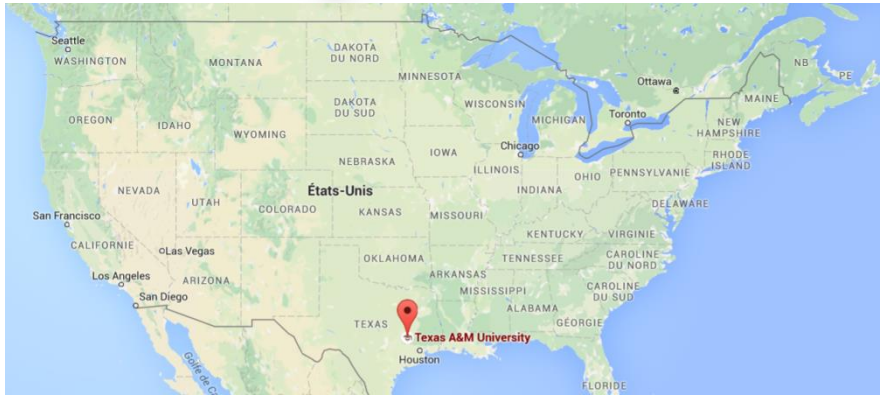
TEXAS A&M UNIVERSITY

Laser-Light and Interactions with Particles, 12–16 March 2018

Edward Fry
Distinguished Professor
Associate Department Head for Development
Applied Physics
Quantum Optics - Experimental

George W. Kattawar
Professor
Applied Physics
Atomic - Theoretical

Ping Yang
Professor
Department Head
David Bullock Harris Chair in Geosciences



Organization Team: Patrick Stegmann, Guanglin Tang, Irene Martinez, *et al*.

TEXAS A&M UNIVERSITY
College Station, TX 77840, USA

THE CAMPUS

http://atmo.tamu.edu/lip2018