

CONFERENCE BOOKLET

JUNE 13-15, 2012
MASSACHUSETTS INSTITUTE OF TECHNOLOGY
CAMBRIDGE, MASSACHUSETTS, U.S.A.
WWW.WAFR.ORG

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TECHNICAL PROGRAM AT-A-GLANCE

Wednesday, June 13th

- 9:30-10:30 **Invited talk:** Bruce Donald, Duke University
- 11:00-12:30 Oral Session 1
- 2:00-3:00 **Invited talk:** Antonio Torralba, MIT
- 3:00-4:30 Oral Session 2
- 5:00-6:05 Interactive Session Presentations
- 6:15-8:30 Interactive Session

Thursday, June 14th

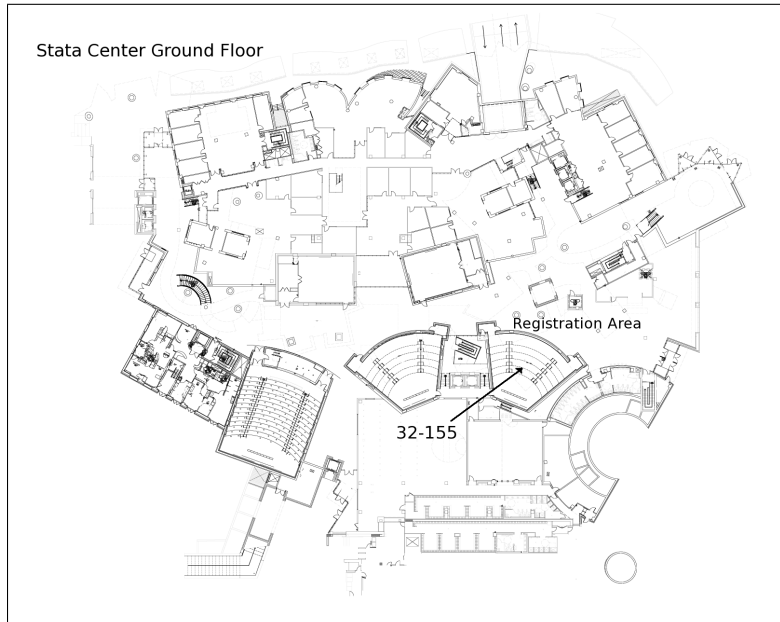
- 9:00-10:00 **Invited talk:** Andreas Krause, ETH Zurich
- 10:30-12:30 Oral Session 3
- 2:00-3:00 **Invited talk:** Geoff Gordon, CMU
- 3:00-4:00 Oral Session 4
- 4:30-6:00 Oral Session 5
- 6:30-10:00 **Conference Banquet**

Friday, June 15th

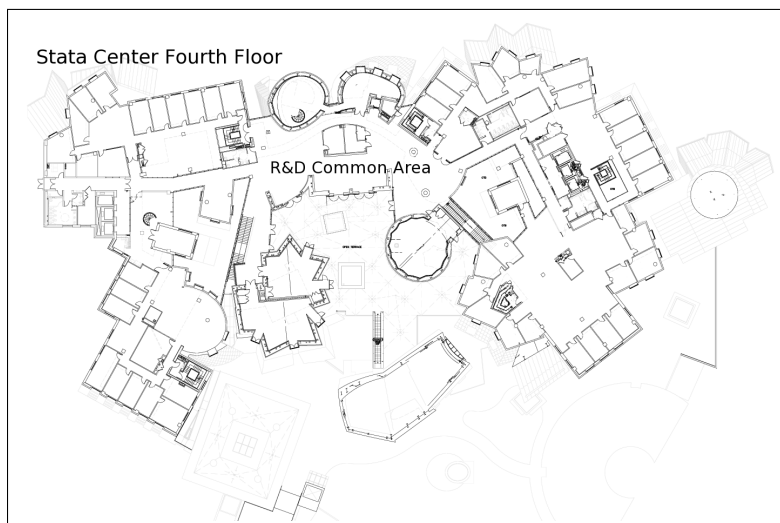
- 9:00-10:00 **Invited talk:** David Hsu, NUS
- 10:30-12:30 Oral Session 6
- 2:00-3:30 Oral Session 7
- 4:00-5:00 Oral Session 8

Conference Information

The technical sessions will occur in the Ray and Maria Stata Center (building 32), Room 32-155.



The interactive session in the evening of Wednesday, June 13th will occur in the R&D Common Area on the fourth floor of the Stata Center.



Registration

The Conference Desk will be staffed for registration and information services outside of 32-155 from 8:30 AM to 5:00 PM each of the three conference days.

Lunch

Lunch has been scheduled daily from 12:30 to 2:00 PM, and lunch will be provided for all registered attendees.

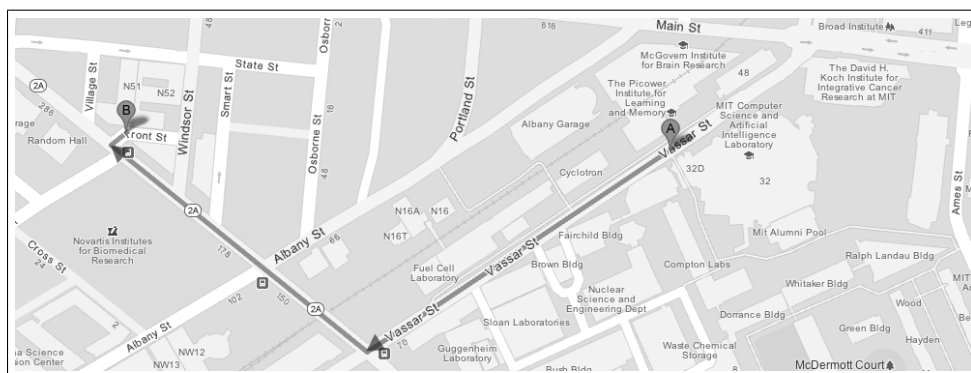
Interactive Session

The interactive session and reception will be held in the fourth floor R&D Common Area on Wednesday from 6:15 PM to 8:30 PM. There will be a reception during the interactive session with drinks and hors d'oeuvres provided.

If you are presenting during the interactive session, please make sure your poster is ready by the time the session starts. The poster boards will be available in the R&D Common Area for mounting posters after 12:30 on Wednesday. We will provide push pins for mounting posters. Please do not use any other material for mounting your poster (e.g., adhesive or tape). Please take down your poster at the end of the evening if you wish to keep it.

Banquet

On Thursday, June 14th, there will be a conference banquet at the MIT Museum at 6:30 PM. The museum is in walking distance of the Stata Center, and can be reached following the route shown in the map below.



The banquet is included in the registration fee: your badge is your banquet ticket, so please ensure that you have your badge when departing for the museum.

Wireless Instructions

There are two wireless networks available in the Stata Center, ESSID StataCenter and MIT GUEST. The MIT network requires guests to register themselves, and may take a few minutes for their registration to become active, but is campus-wide. The StataCenter network provides connectivity more or less instantly, but is localized to the Stata Center building. The kiosks in the lobby of the Stata Center are reserved for MIT student use. Free Internet access is, however, available in the MIT libraries.

Parking

There is no conference parking available on the MIT campus. Arrangements have been made for a special \$12.00 parking rate at the 4 Cambridge Center East Garage. The discounted parking rate is available on a first-come, first-served basis. The rate is not available for overnight or valet parking. Please note that there are other garages in the area and the rate cannot be honored if you do not park in the correct garage.

The 4 Cambridge Center East Garage has two entrances: one on Ames Street, one on Broadway. Use address 90 Broadway, Cambridge, MA 02142 when searching directions online or via GPS. Directions will point to the corner of Ames Street and Broadway.

The 4 Cambridge Center East Garage uses an automated payment system. To park at the reduced rate, please read the following instructions carefully:

1. When entering the garage, take ticket as normally instructed.
2. Show ticket to staff at the on-site registration desk and collect validation coupon.
3. When exiting the garage, insert original ticket. When asked to pay, insert validation coupon and then payment. Note: credit/debit cards and exact change will speed up your transaction.

Public Transportation

There are a number of trains and buses, which provide public transportation to the Cambridge/Boston area. The No. 1 bus stops at MIT's main entrance (77 Massachusetts Avenue) and provides service to Harvard Square and downtown Boston. The CT1 bus departs from Central Square and also stops at MIT's main entrance. The CT2 bus departs from Kendall Square and stops at the corner of Vassar Street and Massachusetts Avenue. One-way bus fare is \$1.25 with a pre-purchased CharlieCard and \$1.50 with a CharlieTicket or cash-on-board.

The MBTA Red Line provides train service to the MIT area via stops at Central Square (on Massachusetts Avenue) and Kendall/MIT (on Main Street). Both stops are approximately a 10-minute walk to the conference site. Subway fare is \$1.70 (pre-purchased CharlieCard); \$2.00 (CharlieTicket/cash-on-board). Most public transportation systems run between the hours of 5:30 AM and 12:30 AM. More information, including how to purchase a Charlie Card, can be found at the MBTA web site: <http://www.mbta.com>.

Taxis

Taxis are available during the day in Kendall Square outside the Marriott Hotel or at 77 Massachusetts Avenue (MIT's main entrance). You may also call Ambassador Cab at 617-429-1100 or Checker Cab at 617-497-9000.

Emergency Services

For emergency services while on campus, dial 617-253-1212 or 100 from any campus phone. MIT Campus Police will answer your call.

WAFR 2012 Program Co-Chairs

Emilio Frazzoli
Tomas Lozano-Perez
Nicholas Roy
Daniela Rus

WAFR 2012 Program Committee

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Devin Balkcom	Kostas Bekris	Antonio Bicchi
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Stephen Smith	Siddhartha Srinivasa	Cyrill Stachniss
Subhash Suri	Jur Vandenberg	

DETAILED TECHNICAL PROGRAM

Technical Sessions: Wednesday, June 13th

Stata Center 32-155

9:30-10:30 **Invited talk:** Bruce Donald, Duke University
Session Chair: Tomas Lozano-Perez

10:30-11:00 **Break**

11:00-12:30 **Oral Session 1**

Session Chair: Dan Halperin

Configurations and Path Planning of Convex Planar Polygonal Loops

Li Han, Lee Rudolph, Michael Chou, Emily Eagle, Dylan Glotzer, Jake Kramer, Jonathan Moran, Christopher Pietras, Ammar Tareen and Matthew Valko

Robust complete path planning in the plane

Victor Milenkovic and Elisha Sacks

Equilibrium Configurations of a Kirchhoff Elastic Rod Under Quasi-Static Manipulation

Timothy Bretl and Zoe McCarthy

12:30-2:00 **Lunch**

2:00-3:00 **Invited talk:** Antonio Torralba, Massachusetts Institute of Technology
Session Chair: Nicholas Roy

3:00-4:30 **Oral Session 2**

Session Chair: Tim Bretl

Trajectory Planning and Assignment in Multirobot Systems

Matthew Turpin, Nathan Michael and Vijay Kumar

Multi-agent Path Planning and Network Flow

Jingjin Yu and Steve Lavalley

Color Multi-Robot Motion Planning

Kiril Solovey and Dan Halperin

4:30-5:00 **Break**

5:00-6:05 **Interactive Session Presentations**

Session Chair: Nicholas Roy

Predicting Pedestrian Trajectories using Velocity-Space Reasoning

Sujeong Kim, Stephen Guy, Wenxi Liu and Ming Lin

Convex Hull Asymptotic Shape Evolution

Maxim Arnold, Yuliy Baryshnikov and Steven Lavalley

Robust Online Motion Planning with Regions of Finite Time Invariance

Anirudha Majumdar and Russ Tedrake

Distributed Construction of Truss Structures

Quentin Lindsey and Vijay Kumar

Convex receding horizon control in non-Gaussian belief space

Robert Platt

Planar Uncertainty Propagation and a Probabilistic Algorithm for Interception

Andrew Long, Kevin Wolfe and Gregory Chirikjian

Toggle PRM: A Coordinated Mapping of C-free and C-obstacle in Arbitrary Dimension

Jory Denny and Nancy Amato

On the Power of Manifold Samples in Exploring Configuration Spaces and the Dimensionality of Narrow Passages

Oren Salzman, Michael Hemmer and Dan Halperin

Intention-Aware Motion Planning

Tirthankar Bandyopadhyay, Kok Sung Won, Emilio Frazzoli, David Hsu, Wee Sun Lee and Daniela Rus

Scale-Free Coordinates for Multi-Robot Systems with Bearing-only Sensors

Alejandro Cornejo, Andrew Lynch, Elizabeth Fudge, Siegfried Bilstein, Majid Khabbazi and James McLurkin

Sparse Roadmap Spanners

Andrew Dobson, Athanasios Krontiris and Kostas Bekris

Efficient Collision Checking in Sampling-based Motion Planning

Joshua Bialkowski, Sertac Karaman, Michael Otte and Emilio Frazzoli

Faster Sample-based Motion Planning using Instance-based Learning

Jia Pan, Sachin Chitta and Dinesh Manocha

6:15-8:30 **Interactive Session: Stata Center 4th Floor R&D Common Area**

Technical Sessions: Thursday, June 14th

Stata Center 32-155

- 9:00-10:00 **Invited talk:** Andreas Krause, Eidgenössische Technische Hochschule Zürich
Session Chair: Emilio Frazzoli
- 10:00-10:30 **Break**
- 10:30-12:30 **Oral Session 3**
Session Chair: Devin Balkcom
- Hierarchical Decision Theoretic Planning for Navigation Among Movable Obstacles*
Martin Levihn, Jonathan Scholz and Mike Stilman
- From Discrete to Continuous Motion Planning*
Nicolas Perrin
- Space-time Group Motion Planning*
Ioannis Karamouzas, Roland Geraerts and A. Frank van der Stappen
- Direct Trajectory Optimization of Rigid Body Dynamical Systems Through Contact*
Michael Posa and Russ Tedrake
- 12:30-2:00 **Lunch**
- 2:00-3:00 **Invited talk:** Geoff Gordon, Carnegie Mellon University
Session Chair: Emilio Frazzoli
- 3:00-4:00 **Oral Session 4**
Session Chair: Russ Tedrake
- The path inference filter: model-based low-latency map matching of probe vehicle data*
Timothy Hunter, Pieter Abbeel and Alexandre Bayen
- Mapping polygons with agents that measure angles*
Yann Disser, Matus Mihalak and Peter Widmayer
- 4:00-4:30 **Break**
- 4:30-6:00 **Oral Session 5**
Session Chair: Ken Goldberg
- Sampling extremal trajectories for planar rigid bodies*
Weifu Wang and Devin Balkcom
- Ray-Shooting Algorithms for Robotics*
Yu Zheng and Katsu Yamane
- From Formal Methods to Algorithmic Implementation of Human Inspired Control on Bipedal Robots*
Shishir Nadubettu Yadukumar, Murali Pasupuleti and Aaron Ames
- 6:30-10:00 **Conference Banquet, MIT Museum**

Technical Sessions: Friday, June 15th

Stata Center 32-155

- 9:00-10:00 **Invited talk:** David Hsu, National University of Singapore
Session Chair: Tomas Lozano-Perez
- 10:00-10:30 **Break**
- 10:30-12:30 **Oral Session 6**
Session Chair: Nick Patrikalakis
- Counting Moving Bodies Using Sparse Sensor Beams*
Lawrence H. Erickson, Jingjin Yu, Yaonan Huang and Steven M. Lavelle
- Multi-Robot Coverage and Exploration in Non-Euclidean Metric Spaces*
Subhrajit Bhattacharya, Robert Ghrist and Vijay Kumar
- Lion and Man with Visibility in Monotone Polygons*
Narges Noori and Volkan Isler
- Min-Max Latency Walks: Approximation Algorithms for Monitoring Vertex-Weighted Graphs*
Soroush Alamdari, Elaheh Fata and Stephen L. Smith
- 12:30-2:00 **Lunch**
- 2:00-3:30 **Oral Session 7**
Session Chair: Stephen Smith
- Towards Consistent Vision-aided Inertial Navigation*
Joel A. Hesch, Dimitrios G. Kottas, Sean L. Bowman and Stergios I. Roumeliotis
- Learning to Segment and Track in RGBD*
Alex Teichman and Sebastian Thrun
- Point-Based Policy Modifier: Coping with Changes in POMDP Models*
Hanna Kurniawati and Nicholas Patrikalakis
- 3:30-4:00 **Break**
- 4:00-5:00 **Oral Session 8**
Session Chair: Daniela Rus
- Optimal Gap Navigation for a Disc Robot*
Rigoberto Lopez-Padilla, Rafael Murrieta and Steven Lavelle
- The Minimum Constraint Removal Problem with Three Robotics Applications*
Kris Hauser

