

# **Special Notice**

Machine Common Sense (MCS)

Proposers Day

DARPA-SN-18-81

September 28, 2018



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Defense Advanced Research Projects Agency  
675 North Randolph Street  
Arlington, VA 22203-2114

**DARPA-SN-18-81**  
**DARPA Information Innovation Office**  
**Machine Common Sense (MCS)**  
**Proposers Day – October 18, 2018**  
**Arlington, VA**

<https://www.schafertmd.com/darpa/i2o/MCS/pd/>

The Defense Advanced Research Projects Agency (DARPA) Information Innovation Office (I2O) is sponsoring a Proposers Day, to provide information to potential proposers on the objectives of the anticipated Machine Common Sense (MCS) Broad Agency Announcement (BAA). If released, the BAA will be posted on the Federal Business Opportunities (FBO) website at <https://www.fbo.gov/>. This Proposers Day will be held at the unclassified level. There is no fee to attend. This meeting is not open to the general public or members of the media.

The Proposers Day will be held on October 18, 2018, from 9:00 AM to 1:00 PM (ET) at the DARPA Conference Center, located at 675 N. Randolph Street, Arlington, Virginia 22203. Check-in begins at 8:00 AM (ET). The Proposers Day will also be webcast live. Advance registration is required to either attend Proposers Day in person or view the webcast. Attendance at the MCS Proposers Day is voluntary and is not required to propose to subsequent solicitations (if any) on this topic. The Proposers Day does not constitute a formal solicitation for proposals. This notification is issued solely for information and program planning purposes, and is not a Request for Information (RFI). Since this is not an RFI, no submissions against this notice will be accepted by DARPA. DARPA will not provide reimbursement for costs incurred to participate in this Proposers Day. Interested parties to this notice are cautioned that nothing herein obligates DARPA to issue a solicitation.

The Proposers Day will include overview presentations by DARPA personnel. There will be a Question & Answer session following the presentations. Additionally, in order to facilitate teaming discussions, proposers may indicate on the registration website that they authorize their contact information to be shared among meeting participants. Teaming will not be actively managed by DARPA.

Following the Proposers Day, DARPA anticipates posting additional information regarding the MCS program (e.g., DARPA materials presented at the Proposers Day and a Frequently Asked Questions (FAQ) document) to <http://www.darpa.mil/work-with-us/opportunities>.

DARPA hosts Proposer Days to promote teaming arrangements between researchers, provide potential performers with information on whether and how they might respond to the Government's research and development solicitations, and to increase efficiency in proposal preparation and evaluation. Therefore, Proposer Days are open only to registered potential proposers.

## SUMMARY

MCS will create the computing foundations needed to develop machine commonsense services to enable AI applications to understand new situations, monitor the reasonableness of their actions, transfer learning to new domains, and communicate more effectively with people.

Machine common sense has long been a critical—but missing—component of Artificial Intelligence (AI). Recent advances in machine learning have resulted in new AI capabilities, but in all of these applications, machine reasoning is narrow and highly specialized. Developers must carefully train or program systems for every situation. General commonsense reasoning remains elusive. Common sense is the basic ability to perceive and understand the world that is shared by ("common to") nearly all people. Typical AI systems lack a general understanding of how the physical world works (i.e., intuitive physics), a basic understanding of human motives and behavior (i.e., intuitive psychology), and knowledge of the common facts that are obvious to an average adult.

The absence of common sense prevents an intelligent system from understanding its world, communicating naturally with people, behaving reasonably in unforeseen situations, and learning from new experiences. This absence is perhaps the most significant barrier between the narrowly focused AI applications we have today and the more general AI applications we would like to create in the future. However, there has been significant progress in AI along a number of dimensions that make it possible to address this difficult problem now. There continues to be rapid progress in all aspects of machine learning, especially deep learning, that is producing new representations and new techniques for semi-supervised, self-supervised and unsupervised learning, as well as techniques for integrating learning and reasoning.

The MCS program proposes to take on the common sense problem by pursuing two diverse strategies to develop two different commonsense services, each with its own evaluation method:

- Foundations of Human Common Sense (Technical Area 1): to learn from experience, like a child, to construct computational models that mimic the foundational core knowledge systems of human cognition for objects (intuitive physics), agents (intentional actors), and places (spatial navigation). To evaluate the computational models against cognitive development milestones, as evidenced in developmental psychology research studies and literature a Foundations of Human Common Sense Test Environment (Technical Area 2) will be used.
- Broad Common Sense (Technical Area 3): to learn from reading the Web, like a research librarian, to construct a commonsense knowledge repository capable of answering natural language and image-based queries about commonsense phenomena. This service will mimic the general knowledge of an average American adult in 2018, as measured by the Allen Institute for Artificial Intelligence (AI2) Common Sense benchmark tests.

## PURPOSE

The purpose of the Proposers Day is to outline the MCS technical goals and challenges, and to promote an understanding of the BAA proposal requirements. In addition, the Proposers Day will familiarize participants with DARPA's interest in the area of enabling AI systems to acquire and reason with common sense knowledge.

## REGISTRATION INFORMATION

Please register at <https://www.schafertmd.com/darpa/i2o/MCS/pd/> no later than 12:00 PM (ET) on October 15, 2018. Attendance is open to individuals who are U.S. citizens, U.S. permanent residents, and foreign nationals.

Any U.S. citizen wishing to attend in person, who has not pre-registered on the MCS Proposers Day registration website, will be required to submit a completed Form 104 at the registration table prior to admittance into the event. The Form 104 can be found directly on the DARPA website at <http://www.darpa.mil/attachments/DARPA104b.pdf>.

Any registrant wishing to attend in person, who is not a U.S. citizen must complete and submit a DARPA Form 60 (U.S. Permanent Resident and Foreign National Visit Request) no later than October 15, 2018 at 12:00 PM (ET). This form and submission instructions are provided on the registration website, <https://www.schafertmd.com/darpa/i2o/MCS/pd/>.

Late registrations may be admitted after all pre-registered attendees are admitted, and only if room capacity allows. In addition, late registration processing requires significant coordination and may not be completed in time to attend the Proposers Day.

Due to space limitations of the conference facility, attendance will be limited to the first 160 registrants. No more than two representatives per organization unit may attend this Proposers Day in person. Registrants are strongly encouraged to coordinate in person attendance internally within their organizations prior to registration. Upon entry to the event, all attendees will be required to present valid, Government-issued photo identification.

For interested parties not able to attend in person, the live webcast is viable option. Information regarding the webcast can be found at <https://www.schafertmd.com/darpa/i2o/MCS/pd/>.

## TENTATIVE AGENDA

Start	End	Duration	Item
8:00 AM	9:00AM	1:00	<b>Registration</b>
9:00 AM	9:05 AM	0:05	<b>Security Briefing</b> Leon Kates, DARPA SID
9:05 AM	10:10 AM	1:05	<b>Machine Commons Sense (MCS) Presentation</b> Dave Gunning, Program Manager, DARPA I2O
10:10 AM	10:30 AM	0:20	<b>Contracts Management Office Briefing</b> Mark Jones, DARPA CMO
10:30 AM	11:30 AM	1:00	<b>Break</b>
11:30 AM	1:00 PM	1:30	<b>Q&amp;A Session</b> (Answer questions provided by both in-person and webcast attendees)

## ATTENDEE TEAMING

To assist those wanting to establish collaborative teaming efforts and business relationships, potential proposers may indicate on the registration website that they authorize their contact information to be shared among meeting participants. For organizations new to DARPA, this may be of use in connecting with potential partners. Team formation, communications, and networking are the sole responsibility of the participants. As noted above, the Proposers Day agenda has time for informal teaming discussions.

## POINT OF CONTACT

All questions regarding the Proposers Day should be sent to [MCS@darpa.mil](mailto:MCS@darpa.mil).