NASA Goddard Workshop on
ARTIFICIAL INTELLIGENCE
Workshop **Agenda**

National Aeronautics and
Space Administration

DAY 1 **TUESDAY, NOVEMBER 27, 2018**

7:30 am – 9:00 am   **ARRIVAL**
Goddard Badging for non-NASA Attendees at the Visiting Center
Workshop Check-in for All Outside of Building 8 Auditorium

9:00 am – 10:30 am   **OPENING CEREMONY**
Jacqueline Le Moigne, Chair – General Introduction to the Workshop
Christopher Scolese, Director, NASA Goddard – Welcome and Speaker Introduction

KEYNOTE: David Gunning, DARPA
DARPA's Explainable Artificial Intelligence (XAI) Program

10:30 am – 10:45 am   **BREAK**

10:45 am – 12:25 pm   **PANEL: AI at NASA**
(Session Chair: Jacqueline Le Moigne)
Dan Crichton/JPL – Data Science at JPL: Integrating Data Analytics into the Full Data Lifecycle
James Ecker/LaRC – Deep Learning for Neuro-visualization and Continuous
Control in Autonomous Systems
Nikunj Oza/ARC – Artificial Intelligence in the NASA Ames Intelligent Systems Division
Brian Roberts/GSFC – AI & Computer Vision for Satellite Servicing at NASA Goddard
Brian Thomas/HQ – Elements of an AI/ML Architecture for NASA

12:25 pm – 1:30 pm   **LUNCH**

1:30 pm – 2:30 pm   **KEYNOTE: Kirk Borne**, Booz Allen (Introduction: Barbara Thompson)
AI at NASA: From Data to Insights to Actionable Intelligence

2:30 pm – 4:40 pm   **SESSION 1**
Invited Talk: **Bart Paulhamus,** APL (Introduction: Ron Zellar)
Intelligent Systems Research at JHU/APL

SHORT TALKS: *(Session Chairs: Ioana Rus and Dave Batchelor)*
3:00 – D. Sekora, AI's Missing Real-World Connection, and Its Essential and Multifaceted Roles
3:10 – J. Nanda, Explainable Machine Learning for Aviation Safety Assurance
3:20 – A. Deane, A Cognitive Processing Enhanced Smart Interface Framework
For Situational Awareness
3:40 – W.R. Huang, Data Poisoning Attacks Can Compromise Machine Learning Systems

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Break: 3:50 pm to 4:00 pm
(Session Chairs: Alinda Mashiku and Manohar Deshpande)
4:00 – B. Dean, Deep Multi-Layer Networks for Optical Wavefront Sensing and Control
4:10 – S.R. Alimo, Machine Learning Approaches for General Satellite Maneuvers
4:20 – A. Mashiku, Supervised-machine Learning for Intelligent Collision Avoidance Decision-making and Sensor Tasking
4:30 – J. Krishnan, SEVA-OIE: Open Information Extractor for the Systems Engineering Virtual Assistant (SEVA)

4:40 pm – 5:45 pm   *Introduction Breakout Sessions: Burcu Kosar and Jacqueline Le Moigne*
BREAKOUT SESSION: AI for NASA Science Applications

DAY 2   **WEDNESDAY, NOVEMBER 28, 2018**

8:30 am – 9:40 am   *Introduction: **Christyl Johnson,** NASA Goddard*
KEYNOTE: William Buzz Roberts, NGA
Real World Artificial Intelligence, Automation and Augmentation – Geospatial Intelligence Successes, Challenges and Way Forward

9:40 am – 11:00 am   **PANEL: AI in Academia**
(Session Chair: Grey Nearing)
Cynthia Matuszek/UMBC – Learning Grounded Language For and From Interaction
Ray Ptucha/RIT – Deep Learning on Graph Data
Dinesh Manocha/UMD – Autonomy and AI Research at UMD

11:00 am – 11:30 am   **BREAK**

11:15 am – 12:15 pm   **KEYNOTE: Henry Kautz,** NSF
(Introduction: Jacqueline Le Moigne)
Artificial Intelligence: Everything Old is New Again

12:15 pm – 12:45 pm   **BREAK – Grab Lunch**

12:45 pm – 1:15 pm   **Brown Bag Lunch with Lika Guhathakurta**, NASA ARC *(Introduction: Michael Kirk)*
The Frontier Development Lab (FDL): Applied Artificial Intelligence for Science and Exploration

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1:15 pm – 1:30 pm   **BREAK**

1:30 pm – 2:40 pm   **SESSION 2**
Invited Talk: **Tom Goldstein,** UMD *(Introduction: Nargess Memarsdeghi)*
Multi-Scale Neural Networks for Image Processing

SHORT TALKS: *(Session Chairs: Barbara Thompson and Ryan McGranaghan)*
2:00 – Z.liu, Improving NASA Earth Science Data and Information Access Through
Natural Language Processing Based Data Analysis and Visualization
2:10 – M. Reiss, Improvements On Coronal Hole Detection Using
Supervised Classification
2:20 – K. Tran, X-Net: Bimodal Feature Representation Learning in Satellite Imagery
2:30 – S. Sabogal, Hybrid Semantic Image Segmentation using Deep Learning for
On-board Space Processing

2:40 pm – 2:50 pm   **BREAK**

2:50 pm – 4:20 pm   **SESSION 3**
Invited Talk: **Victor Pankratius,** MIT *(Introduction: Sujay Kumar)*
**Towards Deriving Theories from Data: Frontiers for Model Inference
in Astro-&Geophysics**

SHORT TALKS: *(Session Chairs: Craig Pelissier and Troy Ames)*
3:20 – C. Keller, Atmospheric Chemistry Modeling using Machine Learning
3:30 – J. Kouatchou, Implementation of Gaussian Processes in an
Hydrological Model
3:40 – D. Josyula, Autonomous Seasonality Adaptation
3:50 – N. Thomas, Machine Learning in Global Scale Classification of Mangrove
Forests From remotely sensed imagery
4:00 – T. Maxwell, Machine Learning in the Earth Data Analytic Services (EDAS)
Framework
4:10 – M. Halem, RNN/LSTM Ensemble Data Assimilation for the Lorenz
Chaotic Models

4:20 pm – 5:10 pm   **BREAKOUT SESSION: AI for NASA Engineering Applications**

5:10pm – 5:30 pm   **BREAK** (and Poster Setup)

5:30 pm – 6:30 pm   **POSTER SESSION**

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8:30 am – 9:40 am   *Introduction:* **Peter Hughes,** *NASA Goddard*
KEYNOTE: Vikash Mansinghka, MIT
Probabilistic Programming and Artificial Intelligence

9:40 am – 11:25 am   **PANEL: AI in Industry** *(Session Chair: Ron Zellar)*
John Hebeler/Lockheed Martin –Determining Normal (and Abnormal) using Deep Learning
Graham Katz/IBM – Watson Intelligent Advisors: Discovery and Conversational Technology
for Now and the Future
Jon Neff/Aerospace – Overview of Aerospace Corporation AI Initiatives
Susie Adams/Microsoft – Democratizing AI - Amplifying Human Ingenuity With Intelligent Technology
Larry Brown/NVIDIA – GPU Accelerated High Performance Data Analytics for
Federal Applications

11:25 am – 11:40 am   **BREAK**

11:40 am – 12:30 pm   **SESSION 4**
BREAKOUT SESSION: AI for Intelligent Mission Autonomy

12:30 pm – 1:30 pm   **LUNCH**

1:30 pm – 3:10 pm   **SESSION 5**
Invited Talk: John Calhoun, Amazon AWS *(Introduction:* **Craig Pelissier***)*
Improving Time to Science Using AWS Machine Learning

SHORT TALKS: *(Session Chairs: Nargess Memarsadeghi and Jorge Pinzon)*
2:00 – H. Amiri, Spaced Repetition for Training Artificial Neural Networks
2:10 – T. Yuan, "Application of a Deep U-Net to Automatic Detection of Ship-Tracks
Multispectral Images from both Polar-Orbiting and Geostationary Satellites
2:20 – R. McGranaghan, "Ushering in a New Frontier in Geospace Through Data Science
2:30 – R. Attié, Tracking Optical Flows for Better Data Mining on Solar Images
2:40 – D.Hall, Deep Learning Applied to Satellite Data Processing
2:50 – S. Sharma, Data-driven Modeling, Prediction and Predictability: The Complex
Systems Framework
3:00 – A. Annex, Automated Stratigraphic Mapping using Convolution Neural Networks

3:10 pm – 3:30 pm   **GENERAL DISCUSSION** - CONCLUSIONS and ADJOURN

4:00 pm – 5:00 pm   **SPECIAL TUTORIAL** *(Organizer: Craig Pelissier)*
Thursday, November 29
Python Anaconda Machine Learning Tutorial