DAY-1 – Thursday, October 6, 2022 (Venue: Bartos Theater)

8:30-9:00 Opening Remarks–*Erik Blasch, Sai Ravela, Frederica Darema*
9:00-9:45 Keynote-1 (Session-Chair: Frederica Darema)
DDDAS for Systems Analytics in Applied Mechanics
Yuri Bazilevs
9:45-10:45 DDDAS Session 1: Aerospace Systems – I **(Session-Chair:** Frederica Darema)
Generalized multifidelity active learning for Gaussian-process-based reliability analysis
Anirban Chaudhuri, Karen Willcox
Essential Properties of a Multimodal Hypersonic Object Detection and Tracking System
Zachary Mulhollan, Marco Gamarra, Anthony Vodacek and Matthew Hoffman
10:45-11:00 Break
11:00-12:30 DDDAS Session 2: Aerospace Systems – II **(Session-Chair:** Artem Korobenko**)**
Dynamic Airspace Control via Spatial Network Morphing
David Sacharny, Thomas Henderson and Nicola Wernecke
Towards the formal verification of data-driven flight awareness: Leveraging the Cramér-Rao lower bound of stochastic functional time series models
Peiyuan Zhou, Saswata Paul, Airin Dutta, Carlos Varela and Fotis Kopsaftopoulos
Coupled Sensor Configuration and Path-Planning in a Multimodal Threat Field
Chase St. Laurent and Raghvendra Cowlagi
12:30-13:30 Lunch Break
13:30-15:00 DDDAS Workshop - Session 1: Earth Planets, Climate and Life
13:30 Introduction to CLEPS -- Information-Inference Couplings in Climate, Life, Earth and Planets
Sai Ravela (MIT)
14:00 AI Research for Climate Change and Environmental Sustainability
Claire Monteleoni (CU)
14:30 Knowledge-guided Machine Learning: Advances in An Emerging Field Combining Scientific Knowledge with Machine Learning
Anuj Karpatne (Virginia Tech)
15:00-15:15 Break
15:15-17:15 DDDAS Workshop - Session 2: Earth Planets, Climate and Life
15:15 New Systems for Intelligent Atmospheric Sensing from Space: CREWSR and VIDEO
William Blackwell (MIT-LL)
15:45 Monitoring and Accelerating Sustainable Development with AI
Stefano Ermon (Stanford)
16:15 Localizing Climate Impacts for Sustainable Strategies
Mayank Ojha and Miho Mazereeuw (MIT)
16:45 The role of social-media advertising algorithms in mediating the climate discourse
Aruna Sankaranarayanan (MIT)

17:00 – End of Day-1

DAY-2 – Friday, October 7, 2022 (Venue: Bartos Theater)

8:15-8:30 2nd Day Opening Comments - Erik Blasch and Sai Ravela
8:30-9:15 Keynote-2: (Session-Chair: Sai Ravela**)**
Computing for Emerging Aerospace Autonomous Vehicles
Sertac Karaman
9:15-10:45 DDDAS Session 3: Space Systems (Session-Chair: Carlos Varela)
Geometric Solution to Probabilistic Admissible Region Based Track Initialization
Utkarsh Mishra, Suman Chakravorty, Islam Hussein, Weston Faber, Siamak Hesar and Benjamin Sunderland
Radar cross-section modeling of space debris
Justin Henry, Ram Narayanan and Puneet Singla
High Resolution Imaging Satellite Constellation
Xiaohua Li, Yezhan Wang, Yu Chen and Erika Ardiles-Cruz
10:45-11:00 Break
11:00 -12:30 DDDAS Session 4: Network Systems (Session-Chair: Nurcin Celik)
Reachability Analysis to Track Non-cooperative Satellite in Cislunar Regime
David Schwab, Roshan Eapen and Puneet Singla
Physics-Aware Machine Learning for Dynamic, Data-Driven Radar Target Recognition
Sevgi Gurbuz
DDDAS for Optimized Design and Management of Wireless Cellular Networks
Nurcin Celik, Frederica Darema, Temitope Runsewe, Walid Saad and Abdurrahman Yavuz
12:30-13:30 Lunch Break
13:30-15:30 DDDAS Workshop - Session III: Earth Planets, Climate and Life
13:30 Learning from observations by combining data assimilation and machine learning
Tijana Janjic (LMU)
14:00 Deep Gaussian Processes for Parameter Estimation and Uncertainty Quantification in Nonlinear Dynamical Systems - Applications to Earth System Modeling
Nishant Yadav (Microsoft)
14:30 Modeling our future: Advancing climate research and optimization intervention strategies using AI
Peetak Mitra (PARC)
15:00 Improving Generalization in Learning Spatiotemporal Dynamics
Rose Yu (UCSD)
15:30-15:40 Break
15:40-17:20 DDDAS Session 5: Systems Support Methods (Session-Chair: Alex Aved)
DDDAS-based Learning for Edge Computing at 5G and Beyond 5G
Temitope Runsewe, Abdurrahman Yavuz, Nurcin Celik and Walid Saad
Monitoring and Secure Communications for Small Modular Reactors
Maria Pantopoulou, Stella Pantopoulou, Madeleine Roberts, Derek Kultgen, Lefteri Tsoukalas and Alexander Heifetz
Data Augmentation of High-Rate Dynamic Testing via a Physics-Informed GAN Approach
Celso Do Cabo, Mark Todisco and Zhu Mao
Unsupervised Wave Physics-Informed Representation Learning for Guided Wavefield Reconstruction
Joel B. Harley, Benjamin D Haeffele and Harsha Vardhan Tetali
Passive Radio Frequency-based 3D Indoor Positioning System via Ensemble Learning
Lianggi Yuan, Houlin Chen, Robert Ewing and Jia Li

17:20 – 17:30 Break
17:30 – 18:15 POSTERS (Session-Chair: Frederica Darema)
18:15 – End of Day-2

DAY-3 – Saturday, October 8, 2022 (Venue: Bartos Theater)

8:15-8:30 2nd Day Opening Comments – Erik Blasch and Sai Ravela

8:30-9:15 Keynote-3: (Session-Chair: Frederica Darema**)**
From genomics to therapeutics: Single-cell dissection and manipulation of disease circuitry
Manolis Kellis

9:15-10:45 DDDAS Session 6: Deep Learning - I (Session-Chair: Luda Werbos)
Deep Learning Approach for Data and Computing Efficient Situational Assessment and Awareness in Human Assistance and Disaster Response and Damage Assessment Applications
Jie Wei, Weicong Feng, Philip Morrone, Erika Ardiles-Cruz and
SpecAL: Towards Active Learning for Semantic Segmentation of Hyperspectral Imagery
Aneesh Rangnekar, Emmett Ientilucci, Chris Kanan and Matthew Hoffman
Multimodal IR and RF based sensor system for real-time human target detection, identification, and Geolocation
Peng Cheng, Peter Lin, Yunqi Zhang, Erik Blasch and Genshe Chen

10:45-11:00 Break

11:00-12:30 DDDAS DDDAS Session 7: Deep Learning - II (Session-Chair: Luda Werbos)
Learning Interacting Dynamic Systems with Neural Ordinary Differential Equations
Song Wen, Hao Wang and Dimitris Metaxas
Relational Active Feature Elicitation for DDDAS
Nandini Ramanan, Phillip Odom, Kristian Kersting and Sriraam Natarajan
Explainable Human-in-the-loop Dynamic Data-Driven Digital Twins
Nan Zhang, Rami Bahsoon, Nikos Tziritas and Georgios Theodoropoulos

12:30-13:30 Lunch Break

13:30-15:30 DDDAS Workshop: Earth Planets, Climate and Life - Session IV
13:30 Enhancing Exoplanet Discovery with Deep Learning: Progress and Paths Forward
Andrew Vanderburg (MIT)
14:00 Dynamic Data Driven Downscaling
Anamitra Saha (MIT)
14:30 Beyond Correlations: Deep Learning for Seismic Interferometry
Hongyu Sun (Caltech)

15:30-15:45 Break

15:45-17:00 DDDAS Workshop: Earth Planets, Climate and Life - Session V
15:15 Exploring the Deep with Active Learning
Genevieve Patterson (Climate.AI)
15:45 Cooperative control of utility-scale wind farms through flow modeling, uncertainty quantification, and optimization
Michael Howland (MIT)
16:15 Data-Efficient Machine Learning for Smart and Energy-Efficient Buildings
Hari Prasanna Das (Berkeley)

17:00 – End of Day-3

DAY-4 – Sunday, October 9, 2022 (Venue: Bartos Theater)

8:15-8:30 2nd Day Opening Comments – Erik Blasch and Sai Ravela

8:30-9:15 Keynote-4: (Session-Chair: Erik Blasch**)**

Data Augmentation to Improve Adversarial Robustness of AI-Based Network Security Monitoring
Nathanael Bastian

9:15-10:45 DDDAS Workshop: Earth Planets, Climate and Life - Session VI

9:15 Data-Efficient Automated Machine Learning (AutoML) for High Performance Precision Agriculture (HiPPA)
Bryan Low (NUS)
9:45 SICKLE: A Multi-Sensor Satellite Imagery Dataset Annotated with Key Cropping Parameters
Saket Anand (IIIT)
10:15 Climate and Computation
Raf Ferrari (MIT)

10:45-11:00 Break

11:00-12:30 DDDAS Session 8: Tracking (Session-Chair: Dimitri Metaxas)

Transmission Censoring and Information Fusion for Communication-Efficient Distributed Nonlinear Filtering
Ruixin Niu
Distributed Estimation of the Pelagic Scattering Layer using a Buoyancy Controlled Robotic System
Cong Wei and Derek A. Paley
Towards a data-driven bilinear Koopman operator for controlled nonlinear systems and sensitivity analysis
Damien Gueho and Puneet Singla

12:30-13:30 Lunch Break

13:30-15:00 DDDAS Session 9: Security (Session-Chair: Alex Aved**)**

Tracking Dynamic Gaussian Density with a Theoretically Optimal Sliding Window Approach
Yinsong Wang, Yu Ding and Shahin Shahrampour
Dynamic Data-Driven Digital Twins for Blockchain Systems
Georgios Diamatopoulos, Nikolaos Tziritas, Rami Bahsoon and Georgios Theodoropoulos
Adversarial Forecasting through Adversarial Risk Analysis within a DDDAS Framework
Tahir Ekin, Roi Naveiro and Jose Manuel Camacho Rodriguez

15:30-15:30 Break

15:30-17:00 DDDAS Session 10: Distributed Systems **(Session-Chair:** Alex Aved)

Power Grid Resilience: Data Gaps for Data-Driven Disruption Analysis
Maureen Golan, Javad Mohammadi, Erika Ardiles Cruz, David Ferris, and Philip Morrone
Attack-resilient Cyber-physical System State Estimation for Smart Grid Digital Twin Design
Masud Rana, Sachin Shetty, Alex Aved, Erika Cruz, David Ferris and Philip Morrone
Applying DDDAS Principles for Realizing Optimized and Robust Deep Learning Models at the Edge
Robert Canady, Xingyu Zhou, Yogesh Barve and Aniruddha Gokhale

17:00 – End of Day-4

DAY-5 – Monday, October 10, 2022 (Venue: 1-190)

8:15-8:30 2nd Day Opening Comments – Erik Blasch and Sai Ravela

8:30-9:15 Keynote-5: (Session-Chair: Frederica Darema**)**
Improving Predictive Models for Environmental Monitoring using Distributed Spacecraft Autonomy
Sreeja Nag

9:15-9:30 Break

9:30-12:00 Panel on Wildfires Session Chairs: Frederica Darema and Sreeja Nag
Panelists: Ilkay Altintas (UCSD); Jan Coen (NCAR), Fatemeh (Clemson); Milton Halem (UMBC); Thomas Huang (NASA JPL); Mrinal Kumar (Ohio State U); Kamran Mohseni/UFl)

12:00-13:00 Lunch Break

13:30-15:00 DDDAS Workshop: Earth Planets, Climate and Life - Session VII
Seismic and Nuclear Explosion Monitoring Panel (ARA)
Eli Baker (AFRL), Karianne Bergen (Brown), Abdullah Mueen (UNM), Delaine Reiter (ARA), William Rodi (MIT), Jesse Williams (GTC), TBD (AFTAC).

15:00 Closing Remarks - Erik Blasch and Sai Ravela

IMPORTANT COVID RELATED INFORMATION FOR ONSITE ATTENDEES

There are several COVID related items you must adhere to when visiting campus.

- COVID Policies - MIT Now
- Face coverings - MIT Now
- Building access and visitors - MIT Now

Attendees must attest that they have been fully vaccinated against Covid-19 or have a religious belief or medical condition that prevents them from receiving the vaccine. Tim Ticket users who are eligible for a booster vaccination must also attest to having received the booster shot. Follow this link to obtain Tim Tickets.

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- Click or tap on Visitor.
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- Enter your contact details and complete the health attestation.
- The app will display a private QR code for you to scan at the electronic readers stationed outside building entrances to gain access.
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- Scan your QR code by holding your phone at least 6 inches below the scanner, with the QR code face up.
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- You must repeat the health attestation each day prior to visiting campus. Questions? Email Alma Pellecer: pellecer@mit.edu

Information for online attendees has been provided. Any issues, please email dddas2022@easychair.org