Handbook on Dynamic Data Drive Application Systems (DDDAS) (Vol. II)

Call for Chapter Submissions

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DDDAS (or InfoSymbiotics) is a paradigm whereby instrumentation data are dynamically integrated into an executing application model while in reverse the executing model controls the instrumentation. The scope of application areas where DDDAS methods create new and advanced capabilities ranges from the nano-scale to the extra-terra-scale, including (but not limited to) applications in aerospace, critical infrastructures, biological sciences and geosciences, cyber security, and resilient systems architectures.

In the DDDAS paradigm, data inputs into dynamically determined parts of the model phase-space increase modeling speed and accuracy for enhanced analysis and prediction of system behavior and evolution, and create decision support systems with the accuracy of full-scale models. Dynamic control of instrumentation enables efficient operation of large instruments and adaptive management of distributed and heterogeneous collections of sensor and controller resources. The DDDAS paradigm also implies dynamic integration across the range of computational platforms – from the high-end to the real-time. It synergistically exploits computing at the high-end as well as the tremendous computational power of collections of sensors and controllers (Large-Scale-Big-Computing) and the "Big Data" that they entail (Large-Scale-Big-Data).

Participants from academia, industry, government and international counterparts will report original work where DDDAS research is advancing scientific frontiers, engendering new engineering capabilities, and designing operational processes

Call for Contributions

1. Theoretical Systems that exploit the symbiotic nature between data-driven, physics-informed, model-based, and knowledge-aided processes.
2. Optimization Solutions that optimize the entire Modeling, Estimation, Sampling, Planning and Control cycle for Efficiency, Robustness, Resilience, Agility or Trust, and Test and Evaluation.
3. Measurement Control that facilitates DDDAS paradigms including computing at the edge, instrumentation building multi-fidelity computational frameworks for the Internet of Everything.
4. Numeric, non-Numeric and Stochastic Methods for multi-resolution, multi-dimensional, and multi-fidelity modeling, uncertainty quantification, with the integration of data.
5. Cybernetic Approaches including Data fusion, inference learning, and decision support.

Important Dates

The dates for submissions and other key dates will be posted to the conference website.

20 Oct 19 – Interest in Submission (and tentative title for the Chapter)
31 Oct 19 – 3-page abstract (per Introduction section of Springer Template, can contain figures)
10 Jan 20 – Full Chapter submitted for review
20 May 20 – Chapter reviews and selections
01 June 20 – Round II submissions
01 Sept 20 – Final edits to publisher

Application spaces

The scope of application areas covered include (but not limited to):

Materials modeling;
Structural Health Monitoring;
Energy Systems and Efficiencies;
Space Weather and Adverse Atmospheric Events; Environmental Systems
Autonomic Coordination of U(A/G)S Swarms;
Co-operative Sensing for Surveillance - Situational Awareness;
Cognition; Human and Societal environments;
Manufacturing, Production Planning;
Test and Evaluation;
Systems Software Environments
CyberSecurity;

Aerospace (e.g., space weather, air vehicle controls, surveillance),

Critical infrastructures (e.g., power-grids, transportation systems, smart cities),

Bio- and geo-sciences (e.g. environment analysis, health monitoring, disaster response), and

Cyber security (e.g., data flow, and resilient architectures)

Systems Software (e.g., autonomic runtime for heterogeneous computing environments spanning the high-end, real-time, edge computing, IoT)

Test and Evaluation (e.g., lifecycle T&E for capabilities and performance optimization)