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CREATE

10 Guest Editors' Introduction

Douglass Post, Chris Atwood, Kevin Newmeyer, Sandra Landsberg, and Forrest Shull

The Computational Research and Engineering Acquisition Tools and Environments (CREATE) Program

14 CREATE: Software Engineering Applications for the Design and Analysis of Air Vehicles, Naval Vessels, and Radio Frequency Antennas

Douglass E. Post, Chris A. Atwood, Kevin P. Newmeyer, Robert L. Meakin, Miles M. Hurwitz, Saikat Dey, John N. D'Angelo, Richard L. Vogelsong, Nathan S. Hariharan, Richard P. Kendall, Oscar A. Goldfarb, and Loren K. Miller

To help spur innovation in the acquisition of major defense systems and reduce their cost, time, and risks, the Department of Defense launched the Computational Research and Engineering Acquisition Tools and Environments (CREATE) program to develop and deploy physics-based, high-performance computing software applications.

25 A Fixed-Wing Aircraft Simulation Tool for Improving DoD Acquisition Efficiency

Scott A. Morton and David R. McDaniel
The CREATE-AV Kestrel software product is a modularized, multidisciplinary, fixed-wing virtual aircraft simulation tool that incorporates aerodynamics, structural dynamics, kinematics, and kinetics. The current version is being both used extensively in the government aircraft acquisition process and evaluated by industry for suitability in commercial aircraft acquisition.

32 Capstone: A Geometry-Centric Platform to Enable Physics-Based Simulation and System Design

Saikat Dey, Romain M. Aubry, B. Kaan Karamete, and Eric L. Mestreau
Capstone provides a software platform with well-abstracted and compact interfaces to create, modify, and query geometry, mesh, and attribution information for a model. This forms a foundation for geometry-based design environments and solvers that can access geometry at runtime for scalable and accurate a-posteriori mesh adaptation.

40 A Risk-Based, Practice-Centered Approach to Project Management for HPCMP CREATE

Richard P. Kendall, Douglass E. Post, Chris A. Atwood, Kevin P. Newmeyer, Lawrence G. Votta, Paula A. Gibson, Deborah L. Borovitsky, Loren K. Miller, Robert L. Meakin, Miles M. Hurwitz, Saikat Dey, John N. D'Angelo, Richard L. Vogelsong, Oscar A. Goldfarb, and Sunita B. Allwerdt

Based on lessons learned from the high-performance computing and computational engineering communities, the Computational Research and Engineering Acquisition Tools and Environment (CREATE) program has developed and implemented a risk-based, practice-centered strategy that has led to a good balance between ensuring a sufficiently structured workflow and providing the flexibility necessary to develop usable software tools for the DoD acquisition community.

52 HPCMP CREATE-AV Quality Assurance: Lessons Learned by Validating and Supporting Computation-Based Engineering Software

Benjamin P. Hallissy, Joseph P. Laiosa, Theresa C. Shafer, David H. Hine, James R. Forsythe, Jennifer Abras, Nathan S. Hariharan, and Cynthia Dahl

A successful fielding of computation-based engineering software requires quality assurance to be built into development and deployment processes. The HPCMP CREATE Air Vehicles (AV) project has gathered best practices and lessons learned over the course of an extended effort to field next-generation tools for aviation design and multidisciplinary analysis.

For more information on these and other computing topics, please visit the IEEE Computer Society Digital Library at www.computer.org/esdl.

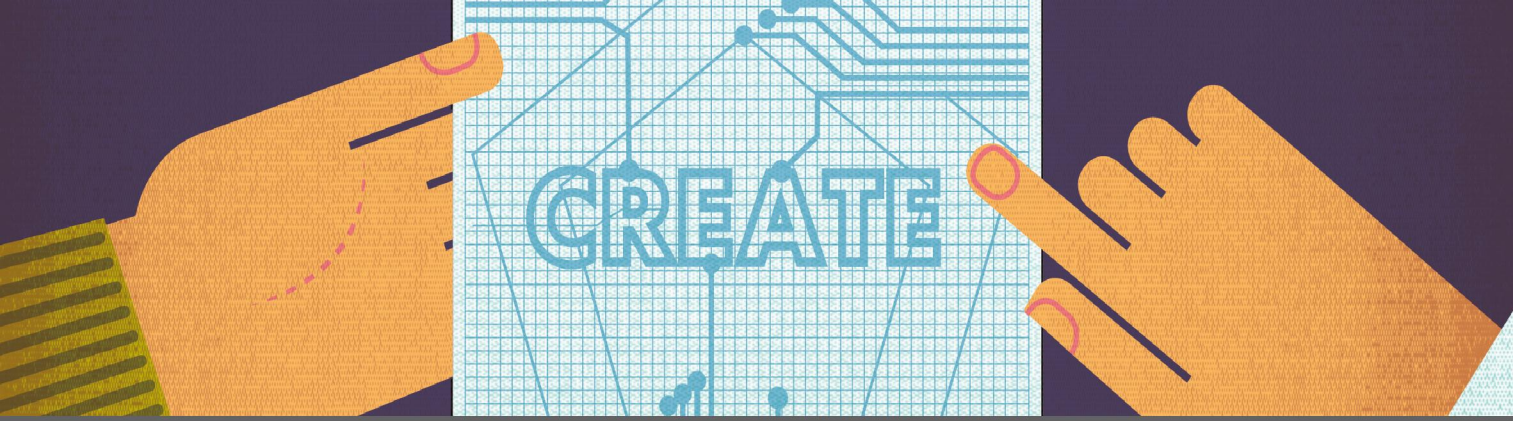


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Computing in Science & Engineering (CiSE) aims to support and promote the emerging discipline of computational science and engineering and to foster the use of computers and computational techniques in scientific research and education. Every issue contains broad-interest theme articles, departments, news reports, and editorial comment. Collateral materials such as source code are made available electronically over the Internet. The intended audience comprises physical scientists, engineers, mathematicians, and others who would benefit from computational methodologies. All articles and technical notes in *CiSE* are peer-reviewed.





- 63 Secure Web-Based Access for Productive Supercomputing**
Christopher A. Atwood, Randy C. Goebbert, Joshua A. Calahan, Theodore V. Hromadka III, Thomas M. Proue, Weston Monceaux, and Jason Hirata
US Department of Defense High Performance Computing Modernization Program communities are increasingly in need of access to highly capable computing, networking, storage, and software resources from their user enclaves that are administratively prevented from installation of applications due to malicious software risks. The HPC Portal enables a productive and secure computational science environment.

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