## Geometry Modeling, Visualization and Computational Environments

Papers Presented at the AIAA SciTech Forum and Exposition 2024

Orlando, Florida, USA 8 – 12 January 2024

ISBN: 979-8-3313-0447-8

## Printed from e-media with permission by:

Curran Associates, Inc. 57 Morehouse Lane Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

The contents of this work are copyrighted and additional reproduction in whole or in part are expressly prohibited without the prior written permission of the Publisher or copyright holder. The resale of the entire proceeding as received from CURRAN is permitted.

For reprint permission, please contact AIAA's Business Manager, Technical Papers. Contact by phone at 703-264-7500; fax at 703-264-7551 or by mail at 34922 Uwptkug'Xcmg{'Ftkxg."Uwkg'422, Reston, VA 20191, USA.

## TABLE OF CONTENTS

GEOMETRY MODELING, VISUALIZATION AND COMPUTATIONAL ENVIRONMENTS
Utilizing Parallelism and Multithreading for Iterative Refinement of Antenna Pattern Visualization
Implicit Neural Compression for Aerospace Simulation Visualisation
GPU-Accelerated Interactive Ray Casting Visualization for Discontinuous Finite Elements
Continued CAPS and M4 Structures Studio Interfacing and Integration for Scaled Flutter Analysis
Importance of Control and Stability Analysis on Hypersonic Vehicle Design
MESH CENEDATION METHODS FOR STRUCTURED UNSTRUCTURED AND OVERSE
MESH GENERATION METHODS FOR STRUCTURED, UNSTRUCTURED AND OVERSE MESHES
Mesh Generation for Flow Analysis by Using Deep Reinforcement Learning
Integration of Large Data Based on HDF5 in a Collaborative and Multidisciplinary Design Environment, Part B: Application to Structural Mechanics of Gas Turbine Engines
Automated Unstructured Quad/Hex Meshing for High-Order Discontinuous Galerkin CFD
ADAPTIVE MESHING, ERROR ESTIMATION, AND UNCERTAINTY QUANTIFICATION
Uncertainty Quantification in Crater Formation for Gas-Granular Flows Due to Plume Surface
Interaction
A Generalized Continuous Mesh Framework for Explicit Mesh Curving
Warped-Element Refinement Method for Fluid Simulations with Moving Or Deforming Domains
Anisotropic Metric-Based Curved Meshing Using Prismatic Layers
Anisotropic Mesh Adaptation for High-Order Meshes in Two Dimensions

## MOVING MESHES AND MESH ADAPTATION

Towards a Simulation System for Virtual Flight - Dynamic High-Order Overset Grids Method
Validation of Moving-Overset 6-DOF Algorithm for Gas-Granular Two-Phase Flows
A Robust Mesh Moving Method for Moving-Boundary Problems
The Moving Discontinuous Galerkin Method with Interface Condition Enforcement for Three-Dimensional Simulations of Viscous Flows with Strong Shocks
CAPS SPECIAL SESSION
An Overview of the Engineering Sketch Pad
Using Faceted Geometries for Analysis and Design
Analysis Driven Shape Design Using Free-Form Deformation of Parametric CAD Geometry
LARGE-SCALE MESHES FOR COMPLEX AIRCRAFT CONFIGURATIONS
Dynamic Mode Decomposition for Improved Numerical Stability of Finite Volume Simulations
Approximate Jacobian Eigenanalysis for Unstructured Mesh Optimization of Finite-Volume Simulations
Author Index