

# **Meshing, Visualization, and Computational Environments**

Papers Presented at the AIAA SciTech Forum and Exposition  
2020

Orlando, Florida, USA  
6 – 10 January 2020

ISBN: 978-1-7138-1097-1

**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 Uwytkug'Xcmg{'Ftkxg.'Uwky'422, Reston, VA 20191, USA.

# TABLE OF CONTENTS

## **GEOMETRY AND MESHING APPLICATIONS**

UNSTRUCTURED GRID DEVELOPMENT FOR THE SPACE LAUNCH SYSTEM LIFTOFF AND TRANSITION LINELOADS COMPUTATIONAL ANALYSIS .....	1
<i>Nalin A. Ratnayake, Steven E. Krist, Farhad Ghaffari, Varda Ahmed</i>	
SKETCH-TO-SOLUTION: A CASE STUDY IN RCS AERODYNAMIC INTERACTION .....	29
<i>William L. Kleb, Mark Schoenenberger, Ashley M. Korzun, Michael A. Park</i>	
EVALUATION OF FLIGHT PARAMETERS DURING APPROACH AND LANDING PHASES BY APPLYING PRINCIPAL COMPONENT ANALYSIS .....	44
<i>Sameer K. Jasra, Gianluca Valentino, Alan Muscat, David Zammit-Mangion, Robert Camilleri</i>	
VERIFICATION OF ANISOTROPIC MESH ADAPTATION FOR COMPLEX AEROSPACE APPLICATIONS.....	59
<i>Aravind Balan, Michael A. Park, Stephen Wood, William K. Anderson</i>	

## **GEOMETRY AND MESH GENERATION**

GEOMETRY REPAIR AND CONSTRUCTION USING NURBS REFITTING IN CAPSTONE.....	78
<i>William Szymczak, Saikat Dey, Eric Mestreau, Romain Aubry, Michael Williamschen</i>	
CREATING & EXPLORING A DESIGN SPACE VIA DIGITAL GEOMETRY .....	84
<i>William N. Dawes</i>	
FLEXIBLE 3D MEDIAL PARTITIONING FOR CFD AND FEA MESHING .....	95
<i>Mark R. Gammon, John H. Bucklow, Robin Fairey, Shakeel Seebooa</i>	
ADVANCING LAYER SURFACE MESH GENERATION .....	104
<i>Jasmeet Singh, Carl F. Ollivier Gooch</i>	

## **MESH ADAPTATION**

EXPLORING UNSTRUCTURED MESH ADAPTATION FOR HYBRID REYNOLDS-AVERAGED NAVIER-STOKES/LARGE EDDY SIMULATION .....	125
<i>Michael A. Park, William L. Kleb, William K. Anderson, Stephen L. Wood, Aravind Balan, Beckett Yx Zhou, Nicolas R. Gauger</i>	
SMOOTH GRADATION OF ANISOTROPIC MESH BASED ON LOG-EUCLIDEAN METRICS.....	149
<i>Zhoufang Xiao, Carl F. Ollivier Gooch</i>	
COMPARISON OF ALGORITHMS FOR HIGH-ORDER, METRIC-BASED MESH OPTIMIZATION .....	172
<i>Devina P. Sanjaya, Krzysztof Fidkowski, Scott M. Murman</i>	
ROBUST IMPLEMENTATION OF TANGENTIAL ADAPTIVITY .....	204
<i>Romain Aubry, Eric Mestreau, Michael Williamschen, Saikat Dey, William Szymczak</i>	

OUTPUT-BASED ERROR ESTIMATION AND MESH ADAPTATION USING CONVOLUTIONAL NEURAL NETWORKS: APPLICATION TO A SCALAR ADVECTION- DIFFUSION PROBLEM .....	208
<i>Guodong Chen, Krzysztof Fidkowski</i>	

## **MESH GENERATION**

GENERATION OF EXASCALE MESHES BY SUBDIVISION OF COARSE MESHES.....	231
<i>Carl F. Ollivier Gooch</i>	
HIGH-ORDER MESHING IN HPCMP CREATE™-MG CAPSTONE.....	257
<i>Michael Williamschen, Eric Mestreau, Romain Aubry, Saikat Dey, William Szymczak</i>	
AUTOMATIC MULTIGRID GENERATION FOR AN UNSTRUCTURED PARALLEL OVERSET-GRID SOLVER .....	265
<i>Longlong Chang, Alberto Rigo, Néstor O. Pérez-Arancibia</i>	
DUAL-GRID INTERPOLATION FOR CELL-CENTERED OVERSET GRID SYSTEMS .....	275
<i>Ralph W. Noack, Nicholas J. Wyman, Greg McGowan, Cameron Brown</i>	
IMPLEMENTATION OF A SIZE FIELD BASED ISOTROPIC HEX CORE MESHING ALGORITHM.....	307
<i>John P. Steinbrenner, Nicholas J. Wyman, Mike S. Jefferies, Steve L. Karman, Jeremy Shipman</i>	

## **Author Index**