

53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference

20th AIAA/ASME/AHS Adaptive Structures Conference

14th AIAA Non-Deterministic Approaches Conference

13th AIAA Gossamer Systems Forum

8th AIAA Multidisciplinary Design Optimization Specialist Conference



www.aiaa.org/events/sdm

EVENT PREVIEW

23-26 April 2012

Sheraton Waikiki, Honolulu, Hawaii



WHAT'S INSIDE

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The 53rd Structures, Structural Dynamics, and Materials Conference (SDM) is sponsored by AIAA, ASME, ASCE, AHS, and ASC. This established annual conference is a widely acknowledged event that provides a unique forum dedicated to the latest developments in the collective disciplines of structures, structural dynamics, materials, design engineering, and survivability. Plenary presentations by recognized, forward-thinking invited speakers will be a special feature of the conference. This year's presentations will be organized around the potential applications of structures, structural dynamics, and materials in the next generation of aircraft.



CONFERENCE OVERVIEWS

The 53rd SDM Conference will also host:

- **The 20th AIAA/ASME/AHS Adaptive Structures Conference**

Bringing together basic and applied researchers from diverse disciplines in academia, government, and industry, this is the premier conference focused on the advancement of adaptive structures technology and its application to aerospace systems.

- **The 14th AIAA Non-Deterministic Approaches Conference**

The aerospace industry increasingly recognizes the need for non-deterministic approaches (NDA) to manage uncertainty. These approaches include both probabilistic and non-probabilistic methods, and provide treatment of high consequence of failure events associated with the development and operation of aerospace systems.

- **The 13th AIAA Gossamer Systems Forum**

An emerging class of large-scale, lightweight structures is enabling a paradigm shift in design, launch, and operation of spaceflight systems. Spacecraft with structural characteristics optimized for operation in space and for the ability to collapse into small packages for launch yield order-of-magnitude reductions in mass, launch volume, and life-cycle cost, as compared to large spaceflight systems.

- **The 8th AIAA Multidisciplinary Design Optimization Specialist Conference (MDO)**

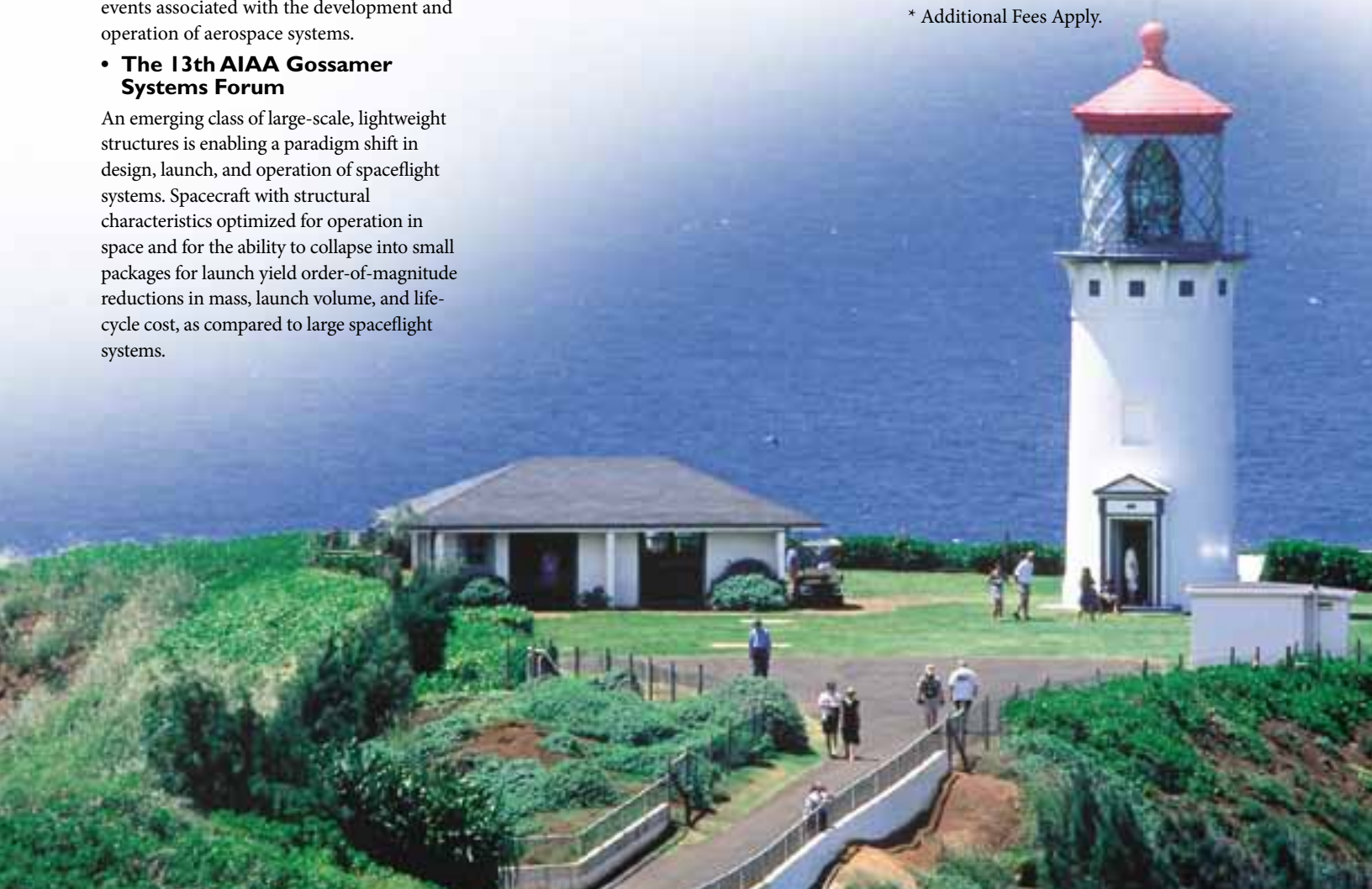
Multidisciplinary design optimization (MDO) focuses on optimizing the performance and reducing the costs of complex systems that involve multiple interacting disciplines, such as those found in aircraft, spacecraft, automobiles, industrial manufacturing equipment, and various consumer products, as well as on the development of related methodologies. MDO is a broad area that encompasses design synthesis, sensitivity analysis, approximation concepts, optimization methods and strategies, artificial intelligence, and rule-based design—all in the context of integrated design dealing with multiple disciplines, and interacting subsystems or systems of systems.

1st AIAA Aeroelastic Prediction Workshop (AePW-1)



The 1st AIAA Aeroelastic Prediction Workshop (AePW-1), held in conjunction with the 53rd SDM Conference, will take place on 21–22 April 2012, the weekend just prior to the conference. The purpose of the AePW series is twofold: (1) to provide a forum for code-to-code comparisons in order to assess the current state of the art in computational aeroelasticity (CAe) methods; and (2) to stimulate upgrades for existing codes and the development of new codes. The intent is for the workshops to proceed in a building-block manner, increasing the complexity of both the aeroelastic phenomena of interest and the model geometry as we progress in the evaluation of our computational aeroelastic tools.

* Additional Fees Apply.



BENEFITS OF ATTENDANCE

Why Attend?

Nowhere else will you get the depth and breadth of sessions on Structures, Structural Dynamics and Materials, Non-Deterministic Approaches, Gossamer Systems, and MDO than at the AIAA Conference in Honolulu, Hawaii.

- Expand your knowledge as expert engineers and scientists share their latest research and development findings.
- Find out what lies ahead as senior leaders in industry discuss their programs and business challenges during plenary and interactive panel sessions.
- Network, discuss challenges, and share ideas during technical sessions, luncheons, networking breaks, and social activities.

Who Should Attend?

- Engineering managers and industry executives
- Engineers, researchers, and scientists
- Young aerospace professionals
- Educators and students
- Media representatives

What to Expect?

Discussion with distinguished invited speakers, including:

- Larry Ilcewicz, Chief Scientific and Technical Advisor for Advanced Composite Materials, Federal Aviation Administration
- Michael Hyer, N. Waldo Harrison Professor Emeritus of Engineering Science and Mechanics, Virginia Polytechnic Institute and State University
- Natalia Alexandrov, Senior Research Scientist, NASA Langley Research Center
- Sankaran Mahadevan, John R. Murray Sr. Chair in Engineering, Vanderbilt University
- George A. Lesieutre, Professor and Head, Aerospace Engineering Pennsylvania State University
- David W. Trop, Chief Engineer – Structures, Product Development and Technology, Boeing Commercial Airplanes

Networking and interaction with your peers during:

- Monday Evening Reception
- Coffee Breaks
- Wednesday Awards Luncheon

Opportunities to enhance your career through:

Continuing Education: 2-day short courses

- Advanced Composite Structures
- Introduction to Bio-Inspired Engineering
- Aeroelasticity: State-of-the-Art Practices
- Introduction to Non-Deterministic Approaches

Workshops

- Aeroelastic Prediction Workshop (AePW-1)

(see page 10 for more information)



PROGRAM OVERVIEW

Saturday, 21 April 2012

0815–1700 hrs

Continuing Education Courses

Sunday, 22 April 2012

0815–1700 hrs

Continuing Education Courses

Monday, 23 April 2012

0800–0900 hrs

SDM Keynote

“Composites Safety and Certification Initiatives”

Larry Ilcewicz, Chief Scientific and Technical Advisor for Advanced Composite Materials, Federal Aviation Administration, Renton, WA

1330–1430 hrs

SDM Lecture

“Tailoring of Composite Structures Using Spatially Varying Fiber Orientations”

Michael Hyer, N. Waldo Harrison Professor Emeritus of Engineering Science and Mechanics, Virginia Polytechnic Institute and State University, Blacksburg, VA

1800–1930 hrs

Welcome Reception



Tuesday, 24 April 2012

0800–0900 hrs

MDO Keynote

“Multidisciplinary Design Optimization: What Remains to Be Done”

Natalia Alexandrov, Senior Research Scientist, NASA Langley Research Center, Hampton, VA

1330–1430 hrs

NDA Keynote:

“Uncertainty Quantification in System Risk Assessment and Decision-Making”

Sankaran Mahadevan, John R. Murray Sr. Chair in Engineering, Vanderbilt University, Nashville, TN

Wednesday, 25 April 2012

0800–0900 hrs

ASC Keynote

“Adaptive Structures: The Journey to Flight”

George A. Lesieutre

Professor and Head, Aerospace Engineering
Pennsylvania State University

1200 hrs

Awards Luncheon

Mr. David W. Trop, Chief Engineer – Structures, Product Development and Technology, Boeing Commercial Airplanes, Seattle, WA

1800–1900 hrs

ASME Lecture

Thursday, 26 April 2012

0800–0900 hrs

GSF Keynote

“Gossamer Systems for Satellite Deorbiting: The CUBESAIL and DEORBITSAIL Space Missions”

Vaios Lappas

University of Surrey, Guildford, UK



PROGRAM AT-A-GLANCE

	Saturday 21 April 2012	Sunday 22 April 2012	Monday 23 April 2012			
0700 hrs			Speakers' Breakfast			
0800 hrs	<div style="border: 1px solid black; padding: 10px; background-color: #e0e0e0;"> <p style="text-align: center;">Continuing Education Courses</p> <ul style="list-style-type: none"> Advanced Composite Structures Introduction to Bio-Inspired Engineering Aeroelasticity: State-of-the-Art Practices Introduction to Non-Deterministic Approaches </div> <div style="border: 1px solid black; padding: 10px; background-color: #ffff00; text-align: center;"> <p>1st AIAA Aeroelastic Prediction Workshop (AePW-I)</p> </div>		SDM Keynote			
0900 hrs			Networking Coffee Break	Ne		
1000 hrs			Technical Sessions			
1100 hrs						
1200 hrs			Lunch Break			
1300 hrs			SDM Keynote			
1400 hrs			Networking Coffee Break	Ne		
1500 hrs						
1600 hrs				Registration Open	Technical Sessions	
1700 hrs						
1800 hrs			Opening Reception			
1900 hrs						
2000 hrs		Committee Meetings	Committee Meetings			
2100 hrs						

Tuesday 24 April 2012	Wednesday 25 April 2012	Thursday 26 April 2012	
Speakers' Breakfast	Speakers' Breakfast	Speakers' Breakfast	0700 hrs
MDO Keynote	ASC Keynote	GSF Keynote	0800 hrs
Networking Coffee Break	Networking Coffee Break	Networking Coffee Break	0900 hrs
Technical Sessions	Technical Sessions	Technical Sessions	1000 hrs
			1100 hrs
Lunch Break	Awards Luncheon	Lunch Break	1200 hrs
NDA Keynote		1300 hrs	
Networking Coffee Break	Networking Coffee Break	Technical Sessions	1400 hrs
Technical Sessions	Technical Sessions		1500 hrs
			1600 hrs
	ASME Lecture		1700 hrs
			1800 hrs
Committee Meetings	Committee Meetings		1900 hrs
			2000 hrs
			2100 hrs

REGISTRATION INFORMATION

Save by Registering Early
Early Bird Registration Deadline
26 March 2012

By 26 MARCH 2012

Registration Type		AIAA Member	Nonmember	Conference Sessions	Online Proceedings	Monday Reception	Wednesday Awards Luncheon
Option 1	Full Conference	\$720	\$875	■	■	■	■
Option 2	Full-Time Undergraduate Student	\$20	\$50	■			
Option 3	Full-Time Undergraduate Student with Networking	\$153	\$183	■		■	■
Option 4	Full-Time Graduate or Ph.D. Student	\$60	\$90	■			
Option 5	Full-Time Graduate or Ph.D. Student with Networking	\$193	\$223	■		■	■
Option 6	AIAA Retired Member Only	\$40	n/a	■		■	■
Option 7	Discounted Group Rate*	\$648	n/a	■	■	■	■
Option 8	Continuing Education (CE) Course and Full Conference With Online Proceedings	\$1,260	\$1,338	■	■	■	■
Option 9	Aeroelastic Prediction Workshop	\$250	\$250				
Extra Tickets					\$170	\$85	\$48

Pricing subject to change.

* **Advance only.** 10% discount off early-bird member rate for 10 or more people from the same organization who register at the same time and pay with a single form of payment. Includes sessions Monday–Thursday, Monday evening reception, Wednesday awards luncheon, and single-user access to the online conference proceedings. A complete typed list of registrants, along with completed individual registration

forms, must be received by the Standard Registration deadline of 20 April 2012. No substitutions.

Cancellations should be made no later than 26 March 2012. There is a \$100 cancellation fee. Registrants who cancel beyond 26 March 2012 or fail to attend the conference will forfeit the entire fee. For more information, please call 703.264.7500.

AIAA Membership. Nonmembers paying the full conference registration rate will receive a year of AIAA membership – and all of the benefits of AIAA membership – with their conference registration. To find out more about AIAA membership, visit www.aiaa.org/membership, visit the AIAA Pavilion in the exhibit hall, or simply talk to anyone who is wearing their AIAA membership pin!

GENERAL CONFERENCE INFORMATION

Registration Hours

Sunday, 22 April	1500–1900 hrs
Monday, 23 April	0700–1700 hrs
Tuesday, 24 April	0700–1700 hrs
Wednesday, 25 April	0700–1700 hrs
Thursday, 26 April	0700–1700 hrs

Hotel Information

AIAA has made arrangements for a block of rooms at the:

Sheraton Waikiki Beach
2255 Kalakaua Ave
Honolulu, HI 96815
Phone: 888.488.3535 or direct
808.921.4611

Rates are \$200 plus applicable taxes for city/mountain view or \$225 plus applicable taxes for ocean view, for single or double occupancy. Rooms will be held until 8 March 2012 or until the block is full. Please make your reservations early to avoid missing the discounted rate. In addition, please mention AIAA when you make your reservations to be included in this block. A direct booking URL is listed on the AIAA website for your convenience in booking your hotel rooms. Please visit aiaa.org/events/sdm.

Attention Federal Government Employees: A limited number of rooms have been blocked at the current federal per diem rate at the hotel. Please ask for the AIAA Government Block when making your reservations, as there may not be rooms available at that rate outside the AIAA block. A direct booking URL is listed on the AIAA website for your convenience in booking your hotel rooms. Please visit aiaa.org/events/sdm.

Cyber Café Hours

Sunday, 22 April	1500–2000 hrs
Monday, 23 April	0700–2000 hrs
Tuesday, 24 April	0700–2000 hrs
Wednesday, 25 April	0700–2000 hrs
Thursday, 26 April	0700–1700 hrs

Pre-Conference Publications Sale—Save An Extra 15% Off

Conference attendees can save an extra 15% off any books* prior to the conference. Details about how to participate are posted on the conference website under Publications Sale, on the right-hand side of the page.

*(Exclusions Apply)

Conference Sponsorship Opportunities

When your brand is on the line, AIAA sponsorship can raise the profile of your company and put you where you need to be. Available packages offer elevated visibility, effective marketing and branding options, and direct access to prominent decision makers from the aerospace community. Contact Cecilia Capece at ceciliac@aiaa.org or 703.264.2570 for more details.

ITAR

U.S. nationals (U.S. citizens and permanent residents) are reminded that it is their responsibility to comply with ITAR and Technology Transfer restrictions. Visit www.aiaa.org/ITAR for more details.

Awards Luncheon

Join fellow attendees at the Wednesday, 25 April 2012, AIAA Awards Luncheon. The prestigious Walter J. and Angeline H. Crichlow Trust Prize, along with other AIAA awards, will be presented. The luncheon is included in the registration fee where indicated. Additional tickets may be purchased for \$48 via the registration form found at www.aiaa.org/events/sdm or on site at the AIAA registration desk, based on availability.

Student Paper Awards

A limited number of students will receive recognition for their papers at the Wednesday awards luncheon, at which the Jefferson Goblet Award, The Harry H. and Lois G. Hilton Student Paper Award in Structures, the Lockheed Martin Student Paper Award in Structures, and the American Society for Composites Student Paper in Composites Award.

Honolulu Has It All

Downtown Honolulu is home to some of Oahu's most historic places. Next to the skyscrapers of the island's main business district you'll find important landmarks like the Iolani Palace, the King Kamehameha I statue, the Kawaiahao Church, and the Aloha Tower. This area is also the seat of Hawaii's government, home to the Hawaii State Capitol, Washington Place (the governor's mansion), and Honolulu Hale (Honolulu's City Hall). Clustered within blocks of each other, it's easy to take a walking tour of these important cultural landmarks and architectural wonders.

EDUCATIONAL OPPORTUNITIES

Continuing Education Courses

Let AIAA Continuing Education courses pave the way to your future and continuing success! As the premier association for professionals aeronautics and astronautics, AIAA has continued professional education for more than seventy years. AIAA offers the best instructors and courses, and is committed to keeping aerospace professionals at their technical best.

On 21–22 April at the Sheraton Waikiki, AIAA will be offering Continuing Education courses in conjunction with the AIAA Structures Conferences. Please check the SDM Conference website for more information and the most current list of courses.

Register for any one of these courses and attend the SDM Conference for FREE!

(Registration fee includes full conference participation: admittance to technical and plenary sessions; receptions, luncheons, and online proceedings.)

Advanced Composite Structures

Instructor:
Carl H. Zweben

Independent Consultant Composites and Advanced Thermal Materials

Introduction to Bio-Inspired Engineering

Instructor:
Chris Jenkins

Head of Mechanical & Industrial Engineering, MSU

Aeroelasticity: State-of-the-Art Practices

Instructors:
Thomas W. Strganac,
Texas A&M University

Carlos E. S. Cesnik,
University of Michigan

Walter A. Silva,
NASA Langley Research Center

Jennifer Hegg,
NASA Langley Research Center

Rick Lind,
University of Florida

Paul G. A. Cizmas,
Texas A&M University

Gautam SenGupta,
The Boeing Company

John Lassiter,
NASA Marshall Space Flight Center

Introduction to Non-Deterministic Approaches

Instructors:
Ben H. Thacker,
Director, Materials Engineering Department

Michael P. Enright,
Principal Engineer, Materials Engineering Department

Sankaran Mahadevan, Professor,
Civil, Environmental and Mechanical Engineering, Vanderbilt University

Ramana V. Grandhi, Professor,
Department of Mechanical and Materials Engineering, Wright State University

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codes and the development of new codes. The intent is for the workshops to proceed in a building-block manner, increasing the complexity of both the aeroelastic phenomena of interest and the model geometry as we progress in the evaluation of our computational aeroelastic tools.

The first workshop will focus on the prediction of unsteady aerodynamic pressures due to forced modal oscillations.

Comparative computational studies will be performed on the three configurations that have been selected to serve as test cases: (1) the NASA Rectangular Supercritical Wing (RSW); (2) the NASA Benchmark Supercritical Wing (BSCW); and (3) the RWTH Aachen University / DFG High Reynolds Number Aero-Structural Dynamics (HIRENASD) model.

Registration: \$250 (early-bird), \$300 (standard), \$350 (on-site). Deadline for submittal of computational results: 20 March 2012

ORGANIZING COMMITTEES



Special Thanks to the 2012 Organizing Committees:

53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference

General Chair

Steven G. Russell
Triumph Aerostructures

Technical Program Chair

Stephen B. Clay
Air Force Research Laboratory

Student Papers Technical Chair

Robert M. Taylor
Lockheed Martin Aeronautics Company

20th AIAA/ASME/AHS Adaptive Structures Conference

General Chair

Edward V. White
The Boeing Company

Technical Program Chair

David F. Voracek
NASA Dryden Flight Research Center

14th AIAA Non-Deterministic Approaches Conference

General Chair

Thiagarajan Krishnamurthy
NASA Langley Research Center

Technical Program Chair

Gianluca Iaccarino
Stanford University

13th AIAA Gossamer Systems Forum

General Chair

Professor Sergio Pellegrino
California Institute of Technology

Technical Program Chair

James D. Moore
ManTech Nexolve

8th AIAA Multidisciplinary Design Optimization

General Chair

Vladimir O. Balabanov
The Boeing Company

Technical Program Chair

Karen Willcox
Massachusetts Institute of Technology

**Early Bird Registration Deadline
26 March 2012**

**Final Manuscript Deadline
2 April 2012**

www.aiaa.org/events/sdm

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23–26 April 2012

Sheraton Waikiki, Honolulu, Hawaii



AIAA is the world's largest technical society dedicated to the global aerospace profession. With more than 35,000 individual members worldwide, and 90 corporate members, AIAA brings together industry, academia, and government to advance engineering and science in aviation, space, and defense.

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