

SATELLITE EVENTS

IN 32ND INTERNATIONAL CONGRESS ON SOUND AND VIBRATION (ICSV32)

ACOUSTICS & VIBRATION ACADEMY (AVA)

Current Trends and Advanced Methods in Acoustics and Vibration

MODULE 3

“Non-Linear Modal Analysis and Substructuring”

Organiser: Prof. Dr. H. Nevzat Özgüven

AVA Acoustics &
Vibration
Academy

ICSV32

32nd International Congress
on Sound and Vibration

05 - 10 JULY 2026
I S T A N B U L

The annual congress of the International
Institute of Acoustics and Vibration (IIAV)

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CONSTRUCTION RESEARCH CENTRE

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Current Trends and Advanced Methods in Acoustics and Vibration

 **04-05 July 2026**

 **Mimar Sinan Fine Arts University, Bomonti Campus**

Cumhuriyet Mah. Silahşör Cad. No:71 Bomonti
Şişli, İstanbul, Türkiye

 **Registration** (open until April 30, 2026): **\$150**

 **Participation Grants** (open until April 30, 2026):
Scholarships of **\$150**, covering the registration
fee will be awarded to **10 students each**.



MODULE 3

“Non-Linear Modal Analysis and Substructuring”

Organiser: Prof. Dr. H. Nevzat Özgüven

3.1. Experimental Modal Analysis of Linear Systems

Dario Di Maio, University of Twente, Netherlands

3.2. Frequency Based Substructuring (FBS)

Matt Allen, Brigham Young University, USA

3.3. Analytical and Experimental Modal Analysis of Nonlinear Systems

H. Nevzat Özgüven, Middle East Technical University, Türkiye

PBL: Structural Vibration Measurements

Giancarlo Kosova, Siemens Digital Industries Software, Belgium

The Experimental Linear Modal Analysis module will focus on deriving modal properties from Frequency Response Functions (FRFs). The course is focussed on Single and Multi-Degree of Freedom systems for which many intuitive analysis techniques will be explained and applied. Moreover, examples of FRF visualisations will show how to inspect the linearity of an FRF.

A frequency based substructuring (FBS) framework is used to cover linear substructuring fundamentals such as compatibility, equilibrium and primal/dual assembly. Interface considerations are reviewed including virtual point transformations and the transmission simulator method. Modal substructuring methods, such as the Hurty/Craig-Bampton method, are also briefly introduced and related to these concepts.

Analytical and experimental modal analysis of nonlinear systems will be investigated based on the quasi-linear property of nonlinear systems. Response-controlled harmonic testing provides quasi-linear FRFs from which a response-dependent modal model of a nonlinear system can be derived. Applications of the method on benchmark structures and complex engineering systems will be presented.

PBL: Structural Vibration Measurements

This workshop offers a live demonstration of structural vibration measurements. Learn practical techniques like FRF acquisition using impact or shaker testing, and perform experimental modal analysis with commercial software. Discover pre-test optimization, model correlation with FEA, and how to leverage experimental data for advanced research. This workshop complements the theory sessions.

EDUCATORS



Dario Di Maio

University of Twente, Netherlands

Dr Di Maio graduated in Mechanical Engineering from the University of Politecnico di Marche. He obtained his PhD at Imperial College London. After a short postdoctoral position, he moved to the University of Bristol as a postdoctoral researcher and was later appointed a lecturer in the Mechanical Engineering department. He joined the MS3 department at the University of Twente in late 2017, where he is an Associate Professor of Structural Dynamics.

He is currently leading the Chair in Applied Mechanics and Data Analysis. He founded XCTE startup in January 2026, a company focused on accelerated fatigue testing and nonlinear structural dynamics.



Matt Allen

Brigham Young University, USA

Matt Allen is a Professor in Mechanical Engineering at Brigham Young University. Prior to that he taught for 15 years in the Department of Engineering Physics at the University of Wisconsin-Madison. He received a B.S. in Mechanical Engineering from BYU, M. S. and PhD degrees from the Georgia Tech in 2005 and was a post-doc at Sandia National Laboratories. He has developed robust experimental/analytical substructuring methods, a new framework for identifying linear time-periodic systems, continuous-scan laser vibrometry methods, and model updating techniques for geometrically nonlinear systems based on nonlinear normal modes. Recently his work is concerned with reduced order models for structures with energy dissipation due to friction such as bolted joints and improved methods for dynamic environment testing employing multiple shakers simultaneously. He enjoys skiing, hiking, biking or almost anything to do with mountains.



H. Nevzat Özgüven

Middle East Technical University, Türkiye

H. Nevzat Özgüven is a Professor Emeritus in the Mechanical Engineering Department at METU. He received his Ph.D. from The University of Manchester. He served as a Visiting Professor at The Ohio State University and at the Technical University of Munich. Over the course of his career, he has held several high-level administrative positions, including serving as a Vice President of Scientific and Technological Research Council of Turkey for over five years and Vice President of METU for eight years. He has represented Türkiye on numerous international platforms, and has served on the boards of various national and international organizations. His recent research focuses on nonlinear structural dynamics. He has published over 200 scientific papers, authored a book, supervised more than 80 graduate students, and received several awards from prestigious national and international institutions. He is a Fellow of the American Society of Mechanical Engineers and a full member of the Science Academy (Türkiye).



Giancarlo Kosova

Siemens Digital Industries Software, Belgium

Giancarlo Kosova is a Research Engineer at Siemens Digital Industries Software in Leuven, Belgium. He earned his MSc in Aerospace Engineering from the University of Naples Federico II in 2015, with a thesis in operational modal analysis of rotating wind turbines through a collaboration with Siemens. Before joining Siemens again in 2018, he spent over three years as a Stress Engineer, contributing to aerostructure development for Airbus. His extensive research interests span structural dynamics testing and analysis, including nonlinear system identification, nonlinear localization (the focus of his PhD studies), nondestructive testing, both linear and nonlinear Finite Element Model updating, fixed-base decoupling, and aeroelasticity.

PROGRAM

MODULE 3: NON-LINEAR MODAL ANALYSIS AND SUBSTRUCTURING			
04.07.2026 - Saturday		05.07.2026 - Sunday	
TIME	TOPIC	TIME	TOPIC
09.00-13.00	1- Experimental Modal Analysis of Linear Systems Dario Di Maio	09.00-13.00	3- Analytical and Experimental Modal Analysis of Nonlinear Systems H.Nevzat Özgüven
13.00-14.00	Lunch	13.00-14.00	Lunch
14.00-18.00	Technology meet	14.00-18.00	Technology meet
	2- Frequency Based Substructuring (FBS) Matt Allen		PBL: Structural Vibration Measurements Giancarlo Kosova
		18.00-18.30	Exam (optional – for students)

ORGANISING COMMITTEE



Bilge Şan Özbilen



Ayça Şentop Dümen



Papatya Nur
Dökmeci Yörükoğlu



Konca Şaher



Dilara Kelle

*The program is subject to change until the event date.