



Centro Internazionale
di Scienze Meccaniche



**UNIVERSITÀ
DEGLI STUDI
DI UDINE**

1st symposium on

VIBRATION FATIGUE AND RELATED TOPICS

Final Announcement and Programme

GENERAL INFORMATION

Information about registration, travel and accommodation is available at
www.cism.it

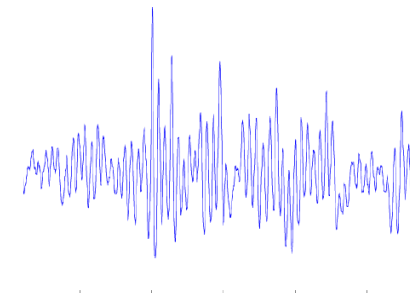
VENUE

CISM - International Centre for Mechanical Sciences
Palazzo del Torso - Piazza Garibaldi 18 - 33100 Udine (Italy)

CONTACT

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<https://cism.it/en/activities/courses/J2502/>

In celebration of the
40° anniversary of Turan Dirlik's thesis



September 17 - 18, 2025
Udine, Italy

1st symposium on Vibration Fatigue and Related Topics

Udine, September 17-18, 2025

SYMPOSIUM CO-CHAIRS

Denis Benasciutti (University of Udine, Italy)
Filippo Cianetti (University of Perugia, Italy)
Adam Niesłony (Opole University of Technology, Poland)
Janko Slavič (University of Ljubljana, Slovenia)

INTERNATIONAL SCIENTIFIC COMMITTEE

Denis Benasciutti (University of Udine, Italy)
Neil Bishop (CAEfatiue Ltd, MSC Software, UK)
Michał Böhm (Opole University of Technology, Poland)
Martin Česnik (University of Ljubljana, Slovenia)
Huaihai Chen (Nanjing University of Aeronautics & Astronautics, China)
Filippo Cianetti (University of Perugia, Italy)
Turan Dirlik (Dirlik Controls Ltd, UK)
Tom Irvine (Vibrationdata, USA)
Leila Khaliq (INSA Rouen, France)
Curtis Larsen (Nadelos Engineering, USA)
Adam Niesłony (Opole University of Technology, Poland)
Massimiliano Palmieri (University of Perugia, Italy)
Jan Papuga (Czech Technical University in Prague, Czech Republic)
Janko Slavič (University of Ljubljana, Slovenia)
Giovanni Teixeira (Dassault Systèmes, UK)
Arvid Trapp (Munich University of Applied Sciences, Germany)
Peter Wolfsteiner (Munich University of Applied Sciences, Germany)

LOCAL ORGANISING COMMITTEE

University of Udine (Italy)

Hassan M. A. Abdalla	Marco Pelegatti
Emanuele Avoledo	Enrico Salvati
Denis Benasciutti	Noel Sheshi
Francesco De Bona	Alessandro Tognan
Manish Kumar	Jasen Zenzerovic

PROGRAMME AT A GLANCE

Wednesday - September 17	Thursday - September 18
08.30-09.10 Registration and Opening	SESSION 5: Shaker testing
SESSION 1: Fatigue Damage Spectrum (FDS)	08.50-09.10 S. Ren
09.10-09.30 T. Irvine	09.10-09.30 A. Alvino
09.30-09.50 T. Lucchesi	09.30-09.50 M. Wylie
09.50-10.10 A. Trapp	09.50-10.10 M. Dal Borgo
10.10-10.30 F. Foiani	10.10-10.30 P. Li
10.30-11.00 Coffee Break	10.30-11.00 Coffee Break
SESSION 2: Theoretical and experimental approaches 1	SESSION 6: Industrial case studies
11.00-11.20 G. Curti	11.00-11.20 G. de Morais
11.20-11.40 Z. Qiu	11.20-11.40 M. Olofsson
11.40-12.00 J. R. Steengaard	11.40-12.00 N. Ristić
12.00-12.20 J. Durodola	12.00-12.20 J. Bernardi
12.20-12.40 M. Böhm	12.20-12.40 M. Pinelli
12.40-13.00 A. T. Schmidt	12.40-13.00 B. Bahia Monteiro
13.00-14.30 Lunch	13.00-14.30 Lunch
SESSION 3: Theoretical and experimental approaches 2	SESSION 7: Multiaxial fatigue
14.30-14.50 T. Mušič	14.30-14.50 A. Bäckstrand
14.50-15.10 A.-N. Bădăluță	14.50-15.10 A. Garcia de Miguel
15.10-15.30 M. Česnik	15.10-15.30 C. Delonnoy
15.30-15.50 A. Zanarini	15.30-15.50 J. Šonc
15.50-16.10 S. Sarkani	15.50-16.10 A. Nieslony
16.10-16.30 A. Awad	16.10-16.30 D. Benasciutti
16.30-17.05 Ceremony celebrating T. Dirlik	16.30-16.40 Closing
17.05-17.20 Coffee break	
SESSION 4: Non-stationary/non-Gaussian processes	
17.20-17.40 M. Palmieri	
17.40-18.00 K. Ahlin	
18.00-18.20 G. Zucca	
18.20-18.40 J. Weber	
18.40-19.00 P. Wolfsteiner	
19.50-22.30 Gala Dinner	

SCIENTIFIC PROGRAMME

Wednesday - September 17

08.30-09.00 Registration

09.00-09.10 Opening Ceremony

SESSION 1: Fatigue Damage Spectrum (FDS)

09.10-10.30 *Stress and Cumulative Damage Index Response Spectra*
T. Irvine

09.30-09.50 *Synthesis of an equivalent Fatigue Damage Spectrum sine on random profile for rotorcraft equipment qualification*
T. Lucchesi, F. Vincenzo

09.50-10.10 *Dynamic source discrimination: an FDS-based framework for identifying excitation sources in structural dynamics*
A. Trapp, K. Schneider, M. Sperber, K. Rother, S. Wokusch

10.10-10.30 *Fatigue-modal spectral moments-spectra (FMSMS): a design procedure for random vibration test*
M. Palmieri, F. Foiani, G. Curti, F. Cianetti

10.30-11.00 Coffee Break

SESSION 2: Theoretical and experimental approaches 1

11.00-11.20 *Parametric characterization of generic response loads for vibration fatigue assessment*
G. Curti, M. Palmieri, F. Cianetti

11.20-11.40 *A novel spectral method for random vibration fatigue life prediction of aerospace structures in wide temperature ranges*
Z. Qiu, H. He

11.40-12.00 *Comparison of frequency-based methods for weld fatigue*
J. R. Steengaard, L. D. Avendaño-Valencia, M. Lützen¹, M. L. Larsen

- 12.00-12.20** *Computational performance of spectral methods for random fatigue loading damage analysis*
J. Durodola, S. Angel, Anand Thite
- 12.20-12.40** *The use of Dirlik method for fatigue life calculation in terms of different standardized loading spectra*
M. Böhm
- 12.40-13.00** *Estimation of the cycle-dependent deviation of the damage calculation as a function of the sequence of the broadband Gaussian random noise with reference to the Dirlik distribution*
A. T. Schmidt
- 13.00-14.30** Lunch
- SESSION 3: Theoretical and experimental approaches 2**
- 14.30-14.50** *Estimation of contact-induced vibration fatigue of a nonlinear dynamic system using frequency response functions and 1D convolutional neural network*
T. Mušič, G. Čepon, M. Česnik
- 14.50-15.10** *Vibration fatigue of aluminium foams: a multiscale modelling approach*
A.-N. Bădăluță, I.-I. Ailinei, S.-V. Galațanu, L. Marșavina
- 15.10-15.30** *Temperature–Amplitude Spectrum for early full-field vibration-fatigue-crack identification*
M. Česnik, J. Slavič
- 15.30-15.50** *Hybrid full-field receptances-based extension of Dirlik’s approach to map the crack initialisation*
A. Zanarini
- 15.50-16.10** *Improving runout analysis in fatigue investigation*
S. Sarkani, T. Mazzuchi, C. Larsen

- 16.10-16.30** *Innovative seismic isolation strategies for equipment and non-structural components: experimental investigation and analytical modeling of systems isolated with spring-viscoelastic mounts*
A. Awad, C. Bernuzzi, M. Simoncelli
- 16.30-17.05** Ceremony celebrating **Turan Dirlik**
- 17.05-17.20** Coffee Break

SESSION 4: Non-stationary/non-Gaussian processes

- 17.20-17.40** *Modal central moments spectra (MCMS): higher-order moments caching method for vibration fatigue under non-Gaussian random loads*
M. Palmieri, G. Curti, F. Cianetti
- 17.40-18.00** *Generation of amplitude modulated non-Gaussian signals considering kurtosis transmission*
K. Ahlin
- 18.00-18.20** *Modification of the Dirlik probability distribution for Sine-on-Random processes*
G. Zucca, M. Palmieri, C. Braccesi, F. Cianetti
- 18.20-18.40** *Statistical fatigue assessment for non-stationary random vibration by decomposing modal solutions into Gaussian portions*
J. Weber, A. Trapp, P. Wolfsteiner
- 18.40-19.00** *Statistical fatigue prediction: a data-driven approach covering non-stationarity to critical plane evaluation*
A. Trapp, P. Wolfsteiner, K. Rother
- 19.50-22.30** Gala dinner

Thursday - September 18

SESSION 5: Shaker testing

- 08.50-09.10** *Random shaker testing and control: a review*
S. Ren, H. Chen, R. Zheng
- 09.10-09.30** *ASM (Adjusted Splitting Method): reducing power consumption in shaker testing while maintaining damage potential using Dirlik's approach*
A. Alvino, T. Irvine
- 09.30-09.50** *Testing of spacecraft launcher Shock Response Spectrum and interactions with crystal oscillators*
M. Wylie, R. Mohammadi
- 09.50-10.10** *Energy based severity metrics for multi-DOF transient testing*
M. Dal Borgo, A. Garcia De Miguel, U. Musella, E. Di Lorenzo
- 10.10-10.30** *Vibration fatigue life analysis of notched components: a TCD approach and experimental validation*
J. Sun, H. Yin, **P. Li**, L. Susmel
- 10.30-11.00** Coffee Break

SESSION 6: Industrial case studies

- 11.00-11.20** *Structural validation procedure for bus seats subjected to vibration loads*
V. do Nascimento, C. Carvalho, **G. de Morais**
- 11.20-11.40** *DURATWIN – Vibration fatigue condition monitoring*
M. Olofsson, A. Bäckstrand
- 11.40-12.00** *Requirements of (railway) industry on structural integrity assessment of vibrating components*
N. Ristić, M. Leitner
- 12.00-12.20** *Vibration-induced fatigue in small bore connection - Stress assessment and fatigue life estimation*
J. Bernardi, L. Lenzi, J. Vargas, O. Silva, E. da Rosa, A. Lenzi

- 12.20-12.40** *Analysis of stochastic loads and structural response in industrial trucks*
M. Pinelli, F. Mammini, M. Sgamma, T. Pessa, F. Bucchi, F. Frendo
- 12.40-13.00** *Fast fatigue load evaluation for wind turbine blades considering active control*
B. Bahia Monteiro
- 13.00-14.30** Lunch

SESSION 7: Multiaxial fatigue

- 14.30-14.50** *Modelling multiaxial stationary Gaussian base excitation for structure fatigue assessment*
A. Bäckstrand, M. Olofsson
- 14.50-15.10** *Mission synthesis for accelerated multi-axial testing*
A. Garcia de Miguel, U. Musella, R. Araujo, M. Dal Borgo, E. Di Lorenzo
- 15.10-15.30** *Effect of frame flexibility modelling for multiaxial fatigue design*
C. Delonnoy, L. Khalij, O. Bareille, A. Azianou, Y. Aktir, L. Caumette
- 15.30-15.50** *Thermoelasticity in multiaxial vibration fatigue*
J. Šonc, K. Zaletelj, J. Slavič
- 15.50-16.10** *Challenges in determining the critical plane position for multiaxial criteria in vibration fatigue*
A. Niesłony
- 16.10-16.30** *A fast algorithm for critical plane search in random multiaxial fatigue based on 3D matrices*
D. Benasciutti
- 16.30-16.40** Closing