

Program at a Glance

Monday, Oct. 15	Tuesday, Oct. 16	Wednesday, Oct. 17	Thursday, Oct. 18
09:00 - 12:00 Tutorial Classes 1-2* M1: Model validation and material identification via full-field data M2: How to pattern...everything	09:00 - 09:30 Opening	09:00 - 10:30 Keynotes 5-7	09:00 - 10:00 Keynotes 10-11
	09:30 - 10:30 Keynotes 1-2		10:00 - 10:30 Coffee Break
	10:30 - 11:00 Coffee Break & Group Photo	10:30 - 11:00 Coffee Break	10:30 - 11:30 Keynotes 12-13
	11:00 - 12:00 Keynotes 3-4	11:00 - 12:00 Keynotes 8-9	11:30 - 12:00 Concluding
12:00 - 13:00 Lunch			
13:00 - 16:30 Tutorial Classes 3-4* M3: An introduction to GOM correlate M4: DIC user variables and data optimization overview	13:00 - 14:50 Parallel Sessions T1: DIC Computational Methods T2: Mechanical Engineering Applications T3: Adaptive DIC T4: SHM and Deep Learning T5: Vendor Session I	13:00 - 14:50 Parallel Sessions W1: Civil Engineering Applications W2: Uncertainty Quantification I W3: Experimental Mechanics I W4: Noncontact Sensing II W5: Vendor Session II	West Lake Tour
	14:50 - 15:20 Coffee Break		
	15:20 - 17:00 Parallel Sessions T6: DIC Standardization T7: Aeronautics Engineering Applications T8: Material Identification and Characterization T9: Noncontact Sensing I T10: Committee Meeting I	15:20 - 16:30 Parallel Sessions W6: Volumetric DIC W7: Uncertainty Quantification II W8: Experimental Mechanics II W9: Machine and Computer Vision W10: Committee Meeting II	
17:00-18:30 Expert Panel Discussion** Good and bad DIC practices and recognizing the difference		16:30-17:20 Move to ZJU	
	18:00 - 20:00 Banquet	17:20-18:20 Technical Tour	
18:30 - 20:00 Reception		18:30-20:00 Dinner	

*: Extra fee: \$75 for half day; **: Free to all registered attendances.

Day 1, Monday, 15 October 2018

09:00 - 12:00 **Tutorial Classes 1-2**

Model Validation and Material Identification via Full-field Data

Pascal Lava, MatchID, Belgium

How to Pattern...Everything

Tim Schmidt, Trillion Quality Systems, USA

12:00 - 13:00 **Lunch**

13:00 - 16:30 **Tutorial Classes 3-4**

An Introduction to GOM Correlate

Xin Yang, Dawn Optical Technology (Shanghai) Co., Ltd., China

DIC User Variables and Data Optimization Overview

Tim Schmidt, Trillion Quality Systems, USA

17:00 - 18:30 **Expert Panel Discussion**

Moderators: Phillip L. Reu (Sandia National Laboratories) and Mark Iadicola (NIST)

Good and Bad DIC Practices and Recognizing the Difference

Pascal Lava (Match ID), Hubert Schreier (CSI), Tim Schmidt (Trillion/GOM), Thorsten Seibert (Dantec Dynamics), Elizabeth Jones (Sandia National Laboratories), Stephanie Jaminion (CorreliSTC), Markus Klein (GOM)

18:30 - 20:00 **Reception**

Day 2, Tuesday, 16 October 2018

08:30 - 17:00 **Registration**

09:00 - 09:30 **Opening Session**

09:30 - 10:30 **Session TK1 Keynote Lectures 1 and 2**

Chairs:

K-1: Recent applications of stereo DIC for civil engineering structures and materials

Michael A. Sutton, S. Rajan, F. Matta, R. Ghorbani, D. Rizos, University of South Carolina, USA

K-2: "SEE" in civil engineering

Hui Li, Zhicheng Chen, Yang Xu, Jin Zhao, Fangqiao Hu, Yuequan Bao, Harbin Institute of Technology, China

10:30 - 11:00 **Coffee Break & Group Photo**

11:00 - 12:00 **Session TK2 Keynote Lectures 3 and 4**

Chairs:

K-3: Vision-based displacement and strain measurement for quantitative structural assessment

Billie F. Spencer, Y. Narazaki, V. Hoskerc, University of Illinois at Urbana-Champaign, USA

K-4: Bayesian compressive sensing for image processing and structural condition assessment

Yi-Qing Ni, The Hong Kong Polytechnic University, China

12:00 - 13:00 **Lunch Buffet**

13:00 - 14:50 **Session T1: DIC Computational Methods**

Chairs:

T1-1: An unmanned aerial vehicle aided camera calibration for outdoor applications (Invited Paper)

Dongsheng Zhang, Shanghai University, China

T1-2: On algorithms in FE-DIC

J. C. Passieux, R. Bouclier, Université de Toulouse, INSA Toulouse, France

T1-3: Improving the metrological performance of full-field measurements

M. Grédiac, B. Blaysat, Université Clermont Auvergne, France; F. Sur Université de Lorraine, France

T1-4: A simple, Robust and accurate local smooth technique based on Tikhonov regularization for high-gradient strain measurement with DIC

X. Li, J. Q. Zhao, Z. M Zhang, J. G. Shuai, X. X. Wu Tsinghua University, China

T1-5: A unified framework of IC-GN algorithm for spatial-temporal subset-based digital image correlation

Yuxi Chi, Bing Pan, Beihang University, China

T1-6: High-precision digital image correlation for investigation of fluid-structure interactions in a shock tube

E. M. C. Jones, K.P. Lynch, J. Wagner; Sandia National Laboratories, Albuquerque, NM, USA

13:00 - 14:50 Session T2: Mechanical Engineering Applications

Chairs:

T2-1: Identification of moving loads based on the information fusion of weigh-in-motion system and multiple camera machine vision (Invited Paper)

Dan-hui Dan, Tongji University, China

T2-2: A multiscale framework to quantify the competing failure mechanisms in metal matrix composites

Yan Li, California State University, USA

T2-3: Investigation of thermo-mechanical behavior of a super-alloy thermal protection system under aerodynamic heating using digital image correlation technique

V. T. Le, N. S. Goo, Konkuk University, Korea

T2-4: Industry applications of digital image correlation method

T. L. Jin, W.S. Kim, OMA, Korea

T2-5: Digital image correlation measurements during full-scale gusset plate experiments

Mark A. Iadicola, National Institute of Standards and Technology, USA; Yavuz Menten, MMI Engineering, USA; Robert Zobel, Federal Highway Administration, USA

T2-6: Plasticity of nanostructured and high-entropy alloy materials under complex stresses – necking instability

N. N. Liang, Nanjing University of Science and Technology, China

13:00 - 14:50 Session T3: Adaptive DIC

Chairs:

T3-1: Systematic errors and speckle pattern assessment in digital image correlation (Invited Paper)

Q. C. Zhang, University of Science and Technology of China, China

T3-2: Dynamic subset size selection considering gray and deformation gradient scales

Z. H. Liang, Nanjing University of Aeronautics and Astronautics, China

T3-3: Pyramid-based initial guess estimation for 2D-DIC algorithm realized using heterogeneous (CPU-GPU) framework

Mullai Thiagu, Indian Institute of Technology Madras, India

T3-4: Digital image correlation accelerated with heterogeneous parallel computing

Z. Y. Jiang, South China University of Technology, China

T3-5: Full-field measurements using digital image correlation: Improved imaging conditions and measurement accuracy

L. L. Wang, Z. L. Luo, China University of Petroleum, China

T3-6: Analysis of strain uniformity in split hopkinson bar experiments based on DIC full-field strain measurements

Z. X. Jiang, T. Y. Shi, Y. G. Wang, Ningbo University, China

13:00 - 14:50 Session T4: SHM and Deep Learning

Chairs:

T4-1: Crack identification approach for concrete structures using unmanned inspection equipment and deep learning (Invited Paper)

In-Ho Kim, Hyung-Jo Jung, KAIST, Korea

T4-2: Semantic concrete damage detection using mask R-CNN for rapid structural inspection

S. Cho, B. Kim, University of Seoul, Korea

T4-3: Deep learning-based automatic tensile force estimation of pre-stress concrete bridge girder using embedded magnetic coil sensors

S. Park, J. Kim, J. Park, Sungkyunkwan University, Korea

T4-4: Application of a deep learning-based hybrid image scanning technique to in-situ bridge

Yun-Kyu An, Keunyoung Jang, Soonkyu Hwang, Sejong University, Korea

T4-5: Structural damage detection with automatic feature-extraction through deep learning

Y. Z. Lin, Z. H. Nie, Jinan University, China; H. W. Ma, Dongguan University of Technology, China

T4-6: Big-data integration for preventive maintenance of infrastructures

Ki-Tae Park, Wongi-Na, Ga-Young Kim, Byeong-Cheol Kim, KICT, Korea

13:00 - 14:50 Session T5: Vendor Session I

To Be Announced

14:50 - 15:20 Coffee Break

15:20 - 17:00 Session T6: DIC Standardization

Chairs:

T6-1: PrEN4861 – A new standard for DIC measurements

Nicolas Swiergiel, Ariane Group, France

T6-2: Elasticity modulus and poisson's ratio measurement based on digital image correlation method: Standardization Study

Y. Zhang, Beijing Institute of Aeronautical Material, China

T6-3: Industrial validation experiment based on using digital image correlation

Th. Siebert, Dantec Dynamics GmbH; Hack E, EMPA, Material Science and Technology; Burguete R, National Physical Laboratory; Dvurecenska K, Szigeti E, University of Liverpool; Lampeas G, Athena Reserch and Innovation Center; Szigeti E, Airbus Operations Ltd, Germany

T6-4: The application of digital speckle technique in surgery

Chi Xiao, Xin-Yu Zhang, Kun Ma, Kunming University of Science and Technology, China

T6-5: Anti-overturning monitoring and evaluation of box-girder ramp bridge based on weigh-in-motin and machine vision system

Liangfu Ge, Department of Civil Engineering, Tongji University, China

T6-6: Computer vision-based measurements in wind tunnel tests for transmission tower-line systems

Baiyan Zhang, Mingfeng Huang, Zhejiang University, China

15:20 - 17:00 Session T7: Aeronautics Engineering Applications

Chairs:

T7-1: Application of DIC technology in aircraft structural stability test

J. Q. Zhang, Bastri, Comac, China

T7-2: Evaluation of aero-optical effects in DIC deformation measurements

Y. Liu, T. Suo, Y. L. Li, Q. F. Yu, Northwestern Polytechnical University, China

T7-3: Image noise analysis for digital image correlation in high-speed and high-temperature deformation

Xiang Guo, Yulong Li, Tao Suo, Northwestern Polytechnical University, China

T7-4: Simultaneous FE DIC and IR thermography: Advantage of a formulation in the world coordinate system

J. M. Baleynaud, J.-C. Passieux, M.L. Pastor, J.-N. Périé, Université de Toulouse, France

T7-5: DIC measurement for high temperature strain field near the crack tip in Ni-base superalloys

Y. Kurokawa, Y. Otsuka, M. Sakaguchi, H. Inoue, Tokyo Institute of Technology, Japan

15:20 - 17:00 Session T8: Material Identification and Characterization

Chairs:

T8-1: Microstructural digital image correlation: Effective approaches for strain mapping in magnesium and aluminum alloys

S. Nagarajan, Indian Institute of Technology Kanpur; India, M.K. Jain, D.S. Wilkinson, McMaster University, Canada; R.K. Mishra, General Motors Research and Development Center, U.S.A

T8-2: Characterization of material properties and structural responses of UHPFRC using DIC method

Xiu-Jiang Shen, Gilles Guignet, Eugen Brühwiler, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland

T8-3: Application of digital image correlation to the local strain analysis of mouse aortas: Novel method to create speckle pattern

Liya Du, Brooks Lane, John Eberth, Susan Lessner, University of South Carolina, USA

T8-4: Using digital image correlation to validate the mechanical response of a synthetic intervertebral disc emulator

Hassan Raheem, Skip Rochefort, Brian K. Bay, Oregon State University, USA

T8-5: Study on the fractal characteristics of fracture network evolution using digital Image correlation

J. Chai, Y.B. Ouyang, Xi'an University of Science and Technology, China

15:20 - 17:00 Session T9: Noncontact Sensing I

Chairs:

T9-1: Statistical analysis of operational modes of bridge with long term monitoring data

Ting-Hua Yi, Xiao-Mei Yang, Bo-Wen Du, Tiejun Liu, Dalian University of Technology, China

T9-2: Application of acoustic emission technique for bridge cable monitoring

Gayoung Kim, Department of Infrastructure Safety Research, Korea Institute of Civil Engineering and Building Technology, Korea

T9-3: Effect of ablation on the formation of laser-induced lamb waves

S. E. Lee, S. Jin, and J. W. Hong, KAIST, Korea

T9-4: Investigation of conducting the PZT based health monitoring technique with varying impedance signature amplitudes

Wongi S Na, Dong-Woo Seo, Byeong-Cheol Kim, Ki-Tae Park, Korea Institute of Civil Engineering and Building Tech. Korea

T9-5: A stereovision measurement method considering epipolar constraint

B. H. Shan, Harbin Institute of Technology, Harbin, China

T9-6: Deep CNN-based cavity detection using ground penetrating radar

Namgyu Kim, Sejong University, Korea

T9-7: Computer vision-based condition monitoring and safety evaluation of transportation infrastructure

Tao Jin, Xiao-Wei Ye, Zhejiang University, China

15:20 - 17:00 Session T10: Committee Meeting I

To Be Announced

18:00 - 20:00 Banquet

Day 3, Wednesday, 17 October 2018

08:30 - 17:00 Registration

09:00 - 10:30 Session WK1 Keynote Lectures 5, 6 and 7

Chairs:

K-5: R&D governmental program in Japan for efficient maintenance, renovation and management of infrastructure

Yozo Fujino, Yokohama National University, Japan

K-6: Camera series networks for deformation measurement of large-scale structures

Qi-Feng Yu, Zhang Li, National University of Defense Technology, China

K-7: A self-consistent software for image processing in structural health monitoring

Fabio Casciati, University of Pavia, Italy

10:30 - 11:00 Coffee Break

11:00 - 12:00 Session WK2 Keynote Lectures 8 and 9

Chairs:

K-8: New insights and recent advances in digital image/volume correlation

Bing Pan, Beihang University, China

K-9: Mission impossible: Making invisible visible using noncontact active thermography

Hoon Sohn, S. Hwang, J. Park, and G. Han, Korea Advanced Institute of Science and Technology, Korea

12:00 - 13:00 Lunch Buffet

13:00 - 14:50 Session W1: Civil Engineering Applications

Chairs:

W1-1: Rapid impact testing and system identification of footbridges using particle image velocimetry (Invited Paper)

Jian Zhang, Southeast University, China

W1-2: Study on interface failure of steel-concrete composite structure using digital image correlation technique

Y. Yu, Shantou University, China

W1-3: Topology optimization of structural systems using full field 3D digital image correlation

Mehrdad S. Dizaji, University of Virginia, USA; Shuzhen Yang, Beijing Jiaotong University, China; Devin K. Harris, University of Virginia, USA

W1-4: Improving road management and safety with DIC: Solving a £2bn/year problem

N. J. Saiger, University of Surrey, UK

W1-5: Non-contact Deformation Measurement of Bridge Structure Based on Image Features

Shanshan Yu, Southeast University, Nanjing, China

W1-6: Stress estimation of concrete using digital image correlation and stress relaxation

J. Lee, E. Kim, S. Gwon, S. Cho, S.-H. Sim, Ulsan National Institute of Science and Technology, Korea

13:00 - 14:50 Session W2: Uncertainty Quantification I

Chairs:

W2-1: Non-model-based damage detection methods using scanning laser vibrometry and digital image correlation (Invited Paper)

W. D. Zhu, University of Maryland, USA

W2-2: Uncertainty qualification of DIC measurements

Th. Siebert., Dantec Dynamics GmbH, Germany

W2-3: Update on the 2D-DIC challenge: Results and conclusions

P. L. Reu, E. Jones, D. Turner, Sandia National Laboratories; E. Toussaint, University Clermont; H. Bruck, University of Maryland; M. Iadicola, National Institute of Standards and Technology; R. Balcaen, P. Lava, MatchID; T. Siebert, Dantec; M. Simonsen, Correlated Solutions, USA

W2-4: Evaluation of sensitivity-based virtual fields for non-linear parameter identification including DIC filtering effects

P. Lava, Deinssesteenweg Gent, Belgium; J. Furmanski, ExxonMobil Corporate Strategic Research; F. Pierron, University of Southampton, UK.

W2-5: Spatial resolution in DIC

Th. Siebert. Splitthof K., Dantec Dynamics GmbH, D, Germany

W2-6: Strain errors in DIC due to under-matched fitting polynomials

Bang-Jian Li, Quan-Bao Wang, Deng-Pin Duan, Shanghai Jiao Tong University, Shanghai,

China

13:00 - 14:50 Session W3: Experimental Mechanics I

Chairs:

W3-1: Automated as-built 3D reconstruction of civil infrastructure using computer vision: Achievements, Opportunities, and Challenges (Invited Paper)

Fei Dai, West Virginia University, USA

W3-2: Residual strain measurement on composite by digital image correlation

Peter Mäckel, Antonius Simon, isi-sys GmbH, Germany; Hubert Schreier, Correlated Solutions Inc., USA; Thomas Rief, Institut für Verbundwerkstoffe GmbH, Germany

W3-3: Mirror-assisted panoramic-digital image correlation for full-surface 360-deg shape and deformation measurement

Bin Chen, Bing Pan, Beihang University, Beijing, China

W3-4: Application of non-contact extensometer based on digital speckle technique in strain measurement of similar materials

J. Chai, Y. L. Liu, Xi'an University of Science and Technology, China

W3-5: Size effects of the auxetic behavior in sintered metal fiber sheets

Tian-Fei Zhao, Northwestern Polytechnical University, China

W3-6: Fatigue crack propagation in hardmetal composites

G. A. Arzoumanidis, Psylotech, USA

13:00 - 14:50 Session W4: Noncontact Sensing II

Chairs:

W4-1: In situ digital Volume correlation in composites: Revealing hidden failure mechanisms in 3D (Invited Paper)

Brendan Croom, Xiao-Dong Li, University of Virginia, USA

W4-2: Correcting scanning artifacts in SEM images using orthogonal scans

Jan Neggiers, Marc Bonnet, Stéphane Roux, François Hild, Université Paris-Saclay, France

W4-3: One-dimensional camera calibration based on PSO algorithm

L.J. Wu, Z.C. Chen, FuZhou University, China

W4-4: Fractal analysis of granite cracks under high temperature

W. Z. Mao, Zhejiang University, China

W4-5: Application of 3D optical strain testing system in structural static test

Xue Ge, Tongji University, China

W4-6: Symmetrical Taylor impact using digital image correlation

P. Jannotti, C Meredith, Army Research Laboratory, Aberdeen Proving Ground, MD, USA

W4-7: Harnessing a direct scan-to-modeling approach for experimental structural mechanics

S. Z. Yang, University of Virginia, USA

13:00 - 14:50 Session W5: Vendor Session II

To Be Announced

14:50 - 15:20 Coffee Break

15:20 - 16:30 Session W6: Volumetric DIC

Chairs:

W6-1: Multi-camera DIC: Innovative approach for upgrade of 3D DIC

Th. Siebert, Splitthof K., Lomnitz M, Dantec Dynamics GmbH, Germany

W6-2: Optical 3D metrology for vibration analysis

Markus Klein, GOM GmbH, Schmitzstraße Braunschweig, Germany

W6-3: The application of VDIC in internal strain by means of VIC-Volume software

J. T. Li, K. Chen, S. J. Sun, L. He, Beijing Ruituo Tech Co., Ltd. Beijing, China

W6-4: Robust digital volume correlation combining inverse compositional image alignment with scale-invariant feature transform

Z. Y. Jiang, South China University of Technology, China

15:20 - 16:30 Session W7: Uncertainty Quantification II

Chairs:

W7-1: Measurement errors caused by the glass plates in the high temperature experimental mechanics using 2D digital image correlation

J. G. Shuai, J. Q. Zhao, L. P. Lei, X. Li, P. Zeng, Tsinghua University, China

W7-2: The application and discussion of DIC in large-scale measurement

J. T. Li, S. J. Sun, K. Chen, S. H. Deng, Beijing Ruituo Tech Co., Ltd. China

W7-3: Comparing DIC with TSA when applied to fatigue measurements

Jan Neggers, Juliette Gamot, Louis Richard, Thibaut Lasserre, François Hild, Université Paris-Saclay, France

W7-4: On the metrological performance of local and global DIC

B. Blaysat1, M. Grédiac, Université Clermont Auvergne, France; J. Neggers2, Université Paris-Saclay, France; F. Sur, Université de Lorraine, France

15:20 - 16:30 Session W8: Experimental Mechanics II

Chairs:

W8-1: Local full field information for understanding materials response subjected to extreme

conditions

Addis Kidane, University of South Carolina, USA

W8-2: A single lens 3D digital image correlation system based on a bilateral telecentric lens and a bi-prism

J. G. Zhu, Jiangsu University, China

W8-3: Microstructure-dependent strain localization along a welded joint of 25Cr2NiMoV steel

Shi-Dong Liu, Ming-Liang Zhu, Fu-Zhen Xuan; East China University of Science and Technology, China

W8-4: Timber features impact on cross-layered structural panels full-field mechanics

Dietrich Buck, Olle Hagman, Luleå University of Technology, Sweden

15:20 - 16:30 Session W9: Machine and Computer Vision

Chairs:

W9-1: Displacement measurement method of sphere joints based on machine vision and deep learning

Y. J. Wang, Zhejiang University, China

W9-2: Wind turbine blade surface scratch feature extraction method based on machine vision

W.R. Li, Lanzhou University of Technology, China

W9-3: Vision-based mobile impact testing method for mode shape and flexibility identification of large structures

Y. D. Tian, J. Zhang, Southeast University, China

W9-4: Structural identification of a footbridge using computer vision techniques

Chuan-Zhi Dong, Necati Catbas, University of Central Florida, Orlando, USA

15:20 - 16:30 Session W10: Committee Meeting II

To Be Announced

16:30-17:20 Move to Zhejiang University

17:20-18:10 Technical Tour at Zhejiang University

18:10-20:00 Dinner at Zhejiang University

Day 4 , Thursday, 18 October 2018

08:30 - 12:00 **Registration**

09:00 - 10:00 **Session ThK1 Keynote Lectures 10 and 11**

Chairs:

K-10: Computer vision technologies for structural health monitoring of civil infrastructure systems

Necati Catbas, University of Central Florida, USA

K-11: The “underestimated” unseen component in DIC

Pascal Lava, Leuven University, Belgium

10:00 - 10:30 **Coffee Break**

10:30 - 11:30 **Session ThK2 Keynote Lectures 12 and 13**

Chairs:

K-12: Deformation/Vibration measurement of meso-scale structures using digital image correlation method

Nam-Seo Goo, Konkuk University, Korea

K-13: Non-contact 3D measurement: Key technologies, systems and applications

Jin Liang, Xi'an Jiaotong University, Zheng-Zong Tang, Xintuo 3D Technology Co., Ltd., China

11:30 - 12:00 **Concluding Session**

12:00 - 13:00 **Lunch Buffet**