Publications list 1988 – 2020, Dr. Erwin Hack

Peer Reviewed Journals (SCI, SCIE)

2020 G. Lampeas, I. Diamantakos, K. Dvurecenska, E. Hack, E.A. Patterson, T. Siebert, *Comparison between simulation and experimental full-field data of a compressively loaded stiffened aircraft panel*, in preparation

T. Siebert, E. Hack, G. Lampeas, E.A. Patterson, K. Splithoff, *Uncertainty Quantification for DIC Measurements in Industrial Environments*, Exp Mech, under revision

K. Dvurecenska, I. Diamantakos, E. Hack, G. Lampeas, E.A. Patterson, T. Siebert, *The validation of a full-field deformation analysis of an aircraft panel – a case study*, Journal of Strain Analysis for Engineering Design, *accepted*

E. Hack, *Editorial*, Opt. Las. Eng. **127** (2020) 105975

A. Verma, D. Martineau, E. Hack, M. Makha, E. Turner, F. Nüesch and J. Heier, *Towards industrialization of perovskite solar cells using slot die coating*, J. Mater. Chem. C **8** (2020) 6124-6135, DOI: 10.1039/d0tc00327a

2019 S.B. Anantharaman, K. Strassel, M. Diethelm, Á. Gubicza, E. Hack, R. Hany, F.A. Nüesch, and J. Heier, *Exploiting Supramolecular Assemblies for Filterless Ultra-Narrowband Organic Photodetectors with Inkjet Fabrication Capability*, J. Mat. Chem. C **7** (2019) 14639 https://doi.org/10.1039/C9TC04773E

M. González-Castaño, C. Cancellieri, X. Maeder, E. Hack, P. Schmutz, *Enhancing the barrier properties of anodic Al2O3 on pure Aluminum*, Applied Surface Science **505** (2020) 144522, https://doi.org/10.1016/j.apsusc.2019.144522

L. Valzania, Y. Zhao, L. Rong, D. Wang, M. Georges, E. Hack, P. Zolliker, *THz coherent lensless imaging techniques – a review*, Applied Optics, OSA Digital Holography and 3-D Imaging 2019 Feature Issue, Appl. Opt. **58** (2019) G256-G275 [1]

L. Valzania, P. Zolliker, E. Hack, *Coherent reconstruction of a textile and a hidden object with terahertz radiation*, Optica **6**(2019) 518–523

D. Gesevičius, A. Neels, L. Duchêne, E. Hack, J. Heier and F. Nüesch, *Physical Vapor Deposition of Cyanine Salt and First Application in Organic Electronic Devices*, Journal of Materials Chemistry C **7** (2019) 414–423

2018 D. Gesevičius, A. Neels, S. Yakunin, E. Hack, M.V. Kovalenko, F. Nüesch and J. Heier, *Superweak Coordinating Anion as Superstrong Enhancer of Cyanine Organic Semiconductor Properties,* ChemPhysChem **19** (2018) 3356–3363*,*
DOI: 10.1002/cphc.201800863

K. Strassel, A. Kaiser, M. Diethelm, S. Jenatsch, A. Véron, S. Anantharaman, E. Hack, F. Nüesch, R. Aderne, C. Legnani, M. Cremona, R. Hany, *Squaraine Dye for Visibly Transparent All-Organic Optical Upconversion Device with Sensitivity at 1000 nm*, ACS Appl Mater Interfaces **10**:13(2018)11063-11069, *DOI: 10.1021/acsami.8b00047*

L. Valzania, T. Feurer, P. Zolliker, E. Hack, *Terahertz ptychography*, Opt. Lett. **43** (2018) 543-546 [2]

---

[1] High-lighted as an Editor's Pick on 2 Dec 2019

[2] High-lighted in OSA „Spotlight on optic“ in February 2018. Only two papers are highlighted from OSA respective journals each month.

R. Steiger, G. Fink, S. Nerbano, E. Hack, K. Beyer, *Experimental investigation of friction stresses between adjacent panels made of Oriented Strand Board (OSB) and between OSB panels and glued laminated timber (GLT) frame members*, Materials and Structures **51**:2(2018) http://rdcu.be/C9wu

D. Gesevičius, A. Neels, S. Jenatsch, E. Hack, S. Athanasopoulos, L. Vianic, F. Nüesch and J. Heier, *Increasing Photovoltaic Performance of an Organic Cationic Chromophore by Anion Exchange*, Advanced Science **5** (2018)1700496

2017 P. Zolliker, M. Rüggeberg, L. Valzania and E. Hack, *Extracting Wood Properties from Structured THz Spectra: Birefringence and Water Content*, IEEE Trans THz Science and Technol **7**(2017)722-731

S. Jenatsch, Lei Wang, N. Leclaire, E. Hack, R. Steim, S. B. Anantharaman, J. Heier, B. Ruhstaller, L. Penninck, F. Nüesch, R. Hany, *Visible light-emitting host-guest electrochemical cells using cyanine dyes*, Organic Electronics **48**(2017)77-84

L. Valzania, P. Zolliker, E. Hack, *Topography of hidden objects using THz digital holography with multi-beam interferences*, Optics Express **25** (2017) 11038-11047

N. Leclaire, F. Boudoire, E. Hack, R.Brönnimann, F. A. Nüesch, J. Heier, *Light Scattering Enhancement at the Absorption Edge in Dewetting Droplets of Cyanine Dyes*, Advanced Optical Materials **5** (2017) 1600903 [3]

F. Evangelisti, M. Stiefel, O. Guseva, R. Partovi Nia, R. Hauert, E. Hack, L.P.H. Jeurgens, F. Ambrosio, A. Pasquarello, P. Schmutz, C. Cancellieri, *Electronic and structural characterization of barrier-type amorphous aluminium oxide*, Electrochimica Acta **224** (2017) 503–516, http://dx.doi.org/10.1016/j.electacta.2016.12.090

2016 E. Hack, L. Valzania, G. Gäumann, M. Shalaby, C.P. Hauri and P. Zolliker, *Comparison of thermal detector arrays for off-axis THz holography and real-time THz imaging*, Sensors **16** (2016) 221-232; doi:10.3390/s16020221

E. Hack, G. Lampeas, E. Patterson, *An evaluation of a protocol for the validation of computational solid mechanics models*, J. Strain Analysis for Engineering Design, **51** (2016) 5-13

E. Hack, *An inter-laboratory study of the calibration of optical full-field systems for measuring deformation*, J. Strain Analysis for Engineering Design **51** (2016) 90-98

H. Zhang, B. Niesen, E. Hack, S. Jenatsch, L. Wang, A. C. Véron, M. Makha, R. Schneider, Y. Arroyo, R. Hany, F. Nüesch, *Cyanine Tandem and Triple-Junction Solar Cells*, Organic Electronics **30** (2016) 191-199

2015 E. Hack, X. Lin, E. A. Patterson, and C. M. Sebastian, *A reference material for establishing uncertainties in fullfield displacement measurements*, Meas. Sci. Technol. **26** (2015) 075004(13pp)

E. Hack, R. K. Fruehmann, R. Roos, M. Feligiotti, P. Schuetz, J. P. Tyler and J. M. Dulieu-Barton, *Flaw and damage assessment in torsionally loaded CFRP cylinders using experimental and numerical methods*, Comp.Struct.**132**(2015)109–121

P. Zolliker and E. Hack, *THz Holography in reflection using a high resolution microbolometer array,* Optics Express **23** (2015) 10957–10967

---

[3] High-lighted on AdvancedScienceNews.com

R. Longtin, I. Shorubalko, R. Furrer, J. R. Sanchez-Valencia, E. Hack, H. R. Elsener, O. Gröning, P. Greenwood, N. Rupesinghe, K. Teo, P. Gröning, C. Leinenbach, *Active vacuum brazing of CNT films to metal substrates for superior electron field emission performance*, Sci. Technol. Adv. Mater. **16** (2015) 015005

2014 E. Hack and P. Zolliker, *Terahertz holography for imaging amplitude and phase objects*, Optics Express **22** (2014) 16079–16086

2013 R. Mooser, F. Forsberg, E. Hack, G. Székely, and U. Sennhauser, *Estimation of affine transformations directly from tomographic projections in two and three dimensions,* Machine Vision and Applications **24** (2013) 419-434

C. Sebastian, E. Hack, E.A. Patterson, *An approach to the validation of computational solid mechanics models for strain analysis,* J. Strain Analysis for Engineering Design **48** (2013) 36-47 [4]

E.A. Patterson, M. Feligiotti, E. Hack, *On the Integration of Validation, Quality Assurance and Non-Destructive Evaluation*, J. Strain Analysis for Engineering Design **48** (2013) 48-58

2012 E. Hack, *Measurement uncertainty of Carré-type phase-stepping algorithms*, Opt. Las. Eng. **50** (2012) 1023–1025

F. Winnefeld, J. Kaufmann, E. Hack, S. Harzer, A. Wetzel, R. Zurbriggen, *Moisture induced length changes of tile adhesive mortars and their impact on adhesion strength*, Construction and Building Materials **30** (2012) 426–438

2011 R. Longtin, E. Hack, J. Neuenschwander, J. Janczak-Rusch, *Benign Joining of Ultrafine Grained Aerospace Aluminum Alloys using Nanotechnology*, Adv. Materials **23** (2011) 5812–5816

D. Iwaniuk, P.K. Rastogi, E. Hack, *Correcting spherical aberrations induced by an unknown medium through determination of its refractive index and thickness*, Opt. Exp.**19** (2011)19407–19414

E. Hack, J. Burke, *Invited Review Article: Measurement uncertainty of linear phase-stepping algorithms*, Rev. Sci. Instr. **82** (2011) 061101

2010 D. Iwaniuk, E. Hack, P.K. Rastogi, *Generation of a high depth of focus with constant transversal spot size using a phase-only pupil filter*, J. Mod. Opt. **57** (2010) 2141–2146

F. Forsberg, M. Sjödahl, R. Mooser, E. Hack and P. Wyss, *Full 3D strain measurements on wood exposed to three-point-bending: Analysis by use of digital volume correlation applied to synchrotron radiation µCT image data*, Strain **46** (2010) 47–60 [5]

2009 P. Wyss, E. Hack, P. Holtappels, *Application of Non-Destructive Testing to Analyse SOFC Cells and Stacks*, Fuel Cells **09**(2009) No. 6, 907–910

2008 F. Forsberg, R. Mooser, M. Arnold, E. Hack and P. Wyss, *3D micro-scale deformations of wood in bending: Synchrotron radiation µCT data analyzed with digital volume correlation*, J. Structural Biology **164** (2008) 255–262

---

[4] Among the top five most downloaded papers of J. Strain Analysis in 2013

[5] Among the top ten most cited papers published in Strain 2010/2011

M. Whelan, D. Albrecht, E. Hack, and E.A. Patterson, *Calibration of a speckle interferometry full-field strain measurement syst*em, Strain **44** (2008) 180–190

2007 P. N. Gundu, E. Hack, and P.K. Rastogi, *Adaptive optics interferometer using super-speckles for high resolution deformation measurement*, Opt. Commun. **278** (2007) 382–386

E. Hack, A. Schumacher, *ESPI-measurements of strain on a CFRP-reinforced bending beam*, Strain **43** (2007) 235-239

E.A. Patterson, P. Brailly, R.L. Burguete, E. Hack, T. Siebert and M. Whelan, *A challenge for high performance full-field strain measurement systems*, Strain **43** (2007) 167–180

E. Hack, A. Schumacher, *DSPI strain measurement on an externally reinforced bending beam: a comparison of step-by-step addition and pixel shift correlation*, Opt. Las. Eng. **45** (2007) 589-595

E. Patterson, E. Hack, P. Brailly, R. Burguete, Q. Salem, T. Siebert, R. Tomlinson, M. Whelan, *Calibration and evaluation of optical systems for full-field strain measurement*, Opt. Las. Eng. **45** (2007) 550–564

2005 P.N. Gundu, E. Hack, and P.K. Rastogi, *Superspeckles: a new application of optical superresolution*, Optics Express **13** (2005) 6468-6475

E. Hack, P. N. Gundu, and P. K. Rastogi, *Adaptive correction to the speckle correlation fringes using twisted nematic LCD,* Appl. Opt. **44** (2005) 2772-2781

P. N. Gundu, E. Hack, and P.K. Rastogi, *High efficient superresolution combination filter with twin LCD spatial light modulators*, Opt. Express **13** (2005) 2835-2842

P. N. Gundu, E. Hack, and P. K. Rastogi, *'Apodized Superresolution'- Concept and simulations,* Opt. Commun. **249** (2005)*1-3*, 101-107

E. Hack, *Guest Editorial: Optics in Switzerland: development of lasers, optical devices and production technology,* Opt. Las. Eng. **43** (2005)*3-5*, 247–249

E. Hack, *Guest Editorial: Optics in Switzerland: measurement procedures and applications,* Opt. Las. Eng. **43** (2005)*3-5*, 415–418

E. Hack, D. Leroy, *Camera based monitoring of the rigid body displacement of a mandrel in superconducting cable production,* Opt. Las. Eng. **43** (2005)*3-5*, 455–474

W. Fasnacht, E. Hack, V. Jauch, D. Rechenmacher, M. Senn, P. Vontobel, *Vier Öfen, zwölf Düsen - Archäometallurgie und dreidimensionale Erfassung römischer Schmiedeöfen*, Archäologie der Schweiz, **28** (2005) 20-27

2004 P. Dias-Lalcaca, E. Hack, F. Visintainer, St. Bernard, and U. Sennhauser, *A laser-based instrument for measuring strain in electronic packages using coherent fibre-bundles*, Microelectronics Reliability **44** (2004) 1693-1697

2002 E. Hack, *Mehrwellenlängen-Scherografie für die zerstörungsfreie Prüfung und Dehnungs-messung*, tm **69** (2002) 10, 432–436

E. Hack, *Kombinierter Einsatz von Scherografie und Thermografie zur Charakterisierung thermo-mechanischer Beanspruchung*, tm **69** (2002) 5, 213-216

2000 E. Hack *ESPI – Principles and Prospects*, in: Trends in Optical Non-destructive Testing and Inspection, eds.: P. Rastogi, D. Inaudi, Elsevier, Amsterdam, 2000, 207-222

1999 R. Kästle, E. Hack, and U. Sennhauser *Multiwavelength shearography for quantitative measurements of two-dimensional strain distributions,* Appl. Opt. **38** (1999)*1*,96–100

E. Hack, R. Brönnimann *ESPI deformation measurement on lightweight structures under thermal load* Opt. Las. Eng. **31** (1999), 213–222

1998 E. Hack, B. Frei, R. Kästle, and U. Sennhauser *Additive-subtractive two-wavelength ESPI contouring by using a synthetic wavelength phase shift,* Appl. Opt. **37** (1998)*13*,2591–7

E.M. Moser, R. Urech, E. Hack, H. Künzli, and E. Müller *Hydrocarbon films inhibit oxygen permeation through plastic packaging material,* Thin Solid Films **317** (1998), 388–392

1995 P. Tatasciore and E. Hack *Projection Moiré: Using Tensor Calculus for General Geometries of Optical Setups*, Opt. Eng. **34** (1995)*7*, 1887–99

1991 E. Hack and J.R. Huber, *Quantum Beat Spectroscopy of Molecules,* Int. Rev. Phys. Chem. **10** (1991)287–317

E. Hack, H. Bitto and J.R. Huber *Stark quantum beat spectroscopy of polyatomic molecules,* Z. Phys. D **18** (1991) 33–44

Books and Book Chapters

2016 E. Hack and P. K. Rastogi, Eds.: Proceedings of the International Conference on Processes in Combined Digital Optical and Imaging Methods applied to Mechanical Engineering, Ascona, Switzerland, 8–13 May 2016

2015 A.J. Brunner, E. Hack, J. Neuenschwander, *Nondestructive Testing of Polymers and Polymer-Matrix Composites*, in: Encyclopedia of Polymer Science and Technology, John Wiley, Hoboken N.J. USA, 2015, doi: 10.1002/0471440264.pst216.pub2

2014 P.K. Rastogi, E. Hack, Eds.: Phase estimation in optical interferometry, CRC Press, November 2014, ISBN 9781466598317

E. Hack, *Uncertainty in phase measurements*, in: P.K. Rastogi, E. Hack, Eds.: Phase estimation in optical interferometry, CRC Press, November 2014, ISBN 9781466598317

2012 P.K. Rastogi, E. Hack, Eds.: Optical Methods for Solid Mechanics: A Full-Field Approach, Wiley, Berlin, July 2012, ISBN: 978-3-527-41111-5

2010 P.K. Rastogi, E. Hack, Eds.: International Conference on Advanced Phase Measurement Methods in Optics and Imaging, Monte Verita (Ascona), 16–21 May 2010, AIP Conference Proceedings Volume **1236**, ISBN: 978-0-7354-0783-1

2008 A.J. Brunner, E. Hack, J. Neuenschwander, *Nondestructive Testing*, in: Characterization and Analysis of Polymers, John Wiley, Hoboken N.J. USA, 2008,
ISBN: 978-0-470-23300-9

2007 A.J. Brunner, E. Hack, J. Neuenschwander, *Nondestructive Testing*, in: Encyclopedia of Polymer Science and Technology, Concise 3rd Edition, H.F. Mark (ed.), John Wiley, Hoboken N.J. USA, 2007, ISBN: 978-0-470-04610-4, pp 747-751

2000 E. Hack, *ESPI – Principles and prospects,* in P.K. Rastogi, D. Inaudi, Eds., “Trends in Optical Nondestructive Testing and Inspection”, Elsevier, Amsterdam, 2000,
ISBN 978-0-08-043020-1

Conference Contributions

2020 E. Mavrona, J. Graf, E. Hack and P. Zolliker, Towards high quality 3D printed THz devices with cyclic olefin polymer, IRMMW-THz 2020, Tucson (AZ), USA, (virtual)

P. Zolliker, E. Mavrona, E. Hack, M. Rüggeberg, Zhihui Zeng, G. Siqueira, G. Nyström, *Wood – Base material for Optical Elements for Terahertz Waves?*, IRMMW-THz 2020, Tucson (AZ), USA, (virtual)

L. Luan, L. Crosbie, R. Greene, E. Hack, P. Lambert, S. Michel, C. Middleton and E. Patterson, *A prototype of a DIC System for potential Structural Health Monitoring (SHM) applications*, iDICs, Nantes (virtual), 19-22 Oct 2020

P. Lambert, R. Furrer, E. Hack, E. Patterson, *Low-cost Lock In Thermoelastic Stress Analysis*, iDICs, Nantes (virtual), 19-22 Oct 2020 [6]

E.A. Patterson, I. Diamantakos, K. Dvurecenska, R.J. Greene, E. Hack, G. Lampeas, M. Lomnitz and T. Siebert, *Application of a model validation protocol to an aircraft cockpit panel*, BSSM's 15th Int. Conf. on Advances in Experimental Mechanics, Oxford, UK, 8-10 Sep 2020 *(postponed to 2021)*

2019 E. Hack, K. Dvurecenska, E.A. Patterson, G. Lampeas, T. Siebert, E. Szigeti, *Validation Procedure for Industrial Environments (keynote)*[7], MBL meets OPTIMESS, Antwerp, BE, 18-20 Sep 2019

E. Hack, K. Dvurecenska, G. Lampeas, E.A. Patterson, T. Siebert, E.Szigeti, *Incorporating historical data in a validation process*, BSSM's 14th Int. Conf. on Advances in Experimental Mechanics, Belfast, UK, 10-12 Sep 2019

G. Lampeas, E.A. Patterson, E. Hack, *Round robin results for CWA16799:2014 – Validation of computational solid mechanics models*, BSSM's 14th Int. Conf. on Advances in Experimental Mechanics, Belfast, UK, 10-12 Sep 2019

G. Lampeas, I. Diamantakos, T. Siebert, E. Hack, E. Patterson, *Uncertainty quantification of Digital Image Correlation measurements based on projected speckle patterns* EASN 2019 Conference, Athens, Greece, 04–06 Sep 2019

Kang, B. J.; Gäumann, G.; Numan, N.; Ollmann, Z.; Waeber, Y.; Bagiante, S.; Valzania, L.; Zolliker, P.; Émond, N.; Chaker, M.; et al. *THz-induced insulator-to-metal transition in stacked VO2 nano-slits*. In Proceedings of the 44th international conference on infrared, millimeter and terahertz waves IRMMW-THz 2019, Paris, France, 1-6 Sep, 2019; IEEE: Danvers, MA, 2019; p (2 pp.). https://doi.org/10.1109/IRMMW-THz.2019.8873912

A. Alexiadis, R.L. Burguete, K. Dvurecenska, E. Hack, G. Lampeas, E.A. Patterson, T. Siebert and E. Szigeti, *A Novel Flow-chart for Model Validation: Is it Conceivable to Validate without New Measurements*, SEM Annual Conference, Reno, USA, 03–06 June 2019

L. Valzania, P. Zolliker and E. Hack, *Coherent terahertz imaging of a textile and a hidden object*, Proc. OSA Digital Holography & 3-D Imaging Topical Meeting, Bordeaux, France, 19–23 May 2019, Th4B.2

---

[6] Originally submitted and accepted for the 19th International Conference on Experimental Mechanics, Kraków, Poland, 5-9 July 2020, but withdrawn as conference was *postponed to 2021*

[7] Keynote lecture

2018 E. Hack, K. Dvurecenska, G. Lampeas, E. Patterson, T. Siebert, E. Szigeti, *Steps towards industrial validation experiments*, ICEM 2018, 01-05 July 2018, Brussels, Belgium, Proceedings **2** (2018) 391; doi:10.3390/ICEM18-05216

L. Valzania, E. Hack, P. Zolliker, R. Brönnimann and T. Feurer, *Resolution limits of terahertz ptychography*, SPIE Photonics Europe 2018, Strasbourg, France, 22–26 April, Proc. SPIE 10677*, Unconventional Optical Imaging, 1067720; doi:10.1117/12.2307157* [8]

E. Hack, L. Valzania, P. Zolliker and T. Feurer, *THz ptychography and digital holography: a comparison*, Photomechanics 2018, Toulouse, FR, 19–22 March 2018, Book of Abstracts pp.65-67

2017 E. Hack, L. Valzania and P. Zolliker, *Topography of hidden objects revealed using THz digital holography*, 12th Int Conf on Advances in Exp Mech, Sheffield, UK, 29–31Aug 2017

L. Valzania, P. Zolliker and E. Hack, *Towards the assessment of biomechanical interfaces: Topography of hidden objects obtained with THz holography*, IRMMW-THz 2017 42nd Int. Conf. on Infrared, Millimeter and Terahertz Waves, Cancun, Mexiko, 27 Aug – 1 Sep 2017

2016 P. Zolliker, M. Rüggeberg, E. Hack,*THz birefringence in wood: polarization dependent frequency gaps in THz spectra*, IRMMW-THz 2016 41st Int. Conf. on Infrared, Millimeter and Terahertz Waves, Copenhagen, Denmark, 25–30 Sep 2016

L. Valzania, P. Zolliker and E. Hack, *Topography of a fingertip through combined THz holography and optical fringe projection*, International Conference on Processes in Combined Digital Optical and Imaging Methods applied to Mechanical Engineering, Monte Verità, Ascona, Switzerland, 8–13 May 2016, pp. 145-148

P. Zolliker, L. Valzania and E. Hack, *THz Holography with Micro-Bolometers*, EMN Meeting on Terahertz Energy Materials Nanotechnology, San Sebastian, Spain, 14-18 May 2016, pp. 78-79

2015 E. Hack and P. Zolliker, *High-Resolution Terahertz Holography for Profilometry in Transmission*, Photomechanics 2015, Delft, NL, 27-29 May 2015, p.116-118

2014 P. Zolliker and E. Hack, *Resolution limits of Terahertz Holography*, IRMMW-THz 2014, Tucson, USA, 14-19 Sep 2014

E. Hack and E.A. Patterson, *An image decomposition approach to validation*, 11th World Congress on Computational Mechanics (WCCM XI), 5th European Conference on Computational Mechanics (ECCM V), Barcelona, Spain, 20–25 July 2014

2013 E. Hack, M. Feligiotti, R.K. Fruehmann, and J.M. Dulieu-Barton, *Failure and damage in CFRP torsion tubes*, Photomechanics, Montpellier, FR, 27-29 May 2013

2012 E. Hack, M. Feligiotti, A. Davighi, M. Whelan, W. V. Wang, E. A. Patterson, *Assessment of a dynamic reference material for calibration of full-field measurement systems*, Speckle 2012: V International Conference on Speckle Metrology, eds. Ángel F. Doval, Cristina Trillo, J. Carlos López-Vázquez, Proc. SPIE **8413 (2012)** 84130U1-6

2011 A. Davighi, R. Burguete, M. Feligiotti, E. Hack, S. James, E. Patterson, T. Siebert, M. Whelan, *The development of a reference material for calibration of full-field optical*

---

[8] Won the „Best student paper award". https://www.spiedigitallibrary.org/conference-proceedings-of-spie/10677/1067720/Resolution-limits-of-terahertz-ptychography/10.1117/12.2307157.full?SSO=1

measurement systems for dynamic deformation measurements, Applied Mechanics and Materials **70** (2011) 33-38

M. Feligiotti, E. Hack, G. Lampeas, W. Wang, J. Mottershead, R. Burguete, *Use of integrated simulation and experimentation to quantify impact damage*, Applied Mechanics and Materials **70** (2011) 51-56

E. Hack, G. Lampeas, J. Mottershead, E. Patterson, T. Siebert, and M. Whelan, *Progress in developing a standard for dynamic strain analysis*, SEM Annual Conference, Connecticut USA June 13 - 16, 2011, in T. Proulx (ed.)*, Experimental and Applied Mechanics, Volume 6, Conference Proceedings of the Society for Experimental Mechanics Series 999,* 425-429

E. Hack, E.A. Patterson, G. Lampeas, J. Mottershead, T. Siebert, and M. Whelan, *Using Full-Field Measurement Techniques to Validate Simulations of Dynamic Events*, Photomechanics, Brussels, 7-9 Feb 2011

2010 M. Feligiotti, E. Hack, G. Lampeas, T. Siebert, A. Pipino, A. Ihle, *Assessment of impact damage in CFRP by combined thermal and speckle methods*, in: Speckle 2010, Florianopolis (BR), 13-15 September 2010, Armando Albertazzi Goncalves, Jr., Guillermo H. Kaufmann, Eds., Proc SPIE **7387** (2010) 73870H

Feligiotti, M., Hack, E., and Lampeas, G., *Methodology for assessing impact damage using integrated simulation and experimentation*, ICEM14, Poitiers, 4.-9. July, EPJ Web of Conferences **6** (2010)46008

A. Davighi, E. Hack, E. Patterson, M. Whelan, *A reference material for dynamic displacement calibration,* ICEM14, Poitiers, 4.-9. July, EPJ Web of Conferences **6** (2010)46006

E. Hack, E.A. Patterson, T. Siebert, R. Thalmann, *Calibration and validation of full-field techniques*, ICEM14, Poitiers, 4-9 July, EPJ Web of Conferences **6** (2010) 46003

E. Hack, Burguete, R.L., Siebert, T., Davighi, A., Mottershead, J., Lampeas, G., Ihle, A., Pipino, A., and Patterson, E.A., *Validation of full-field techniques: discussion of experiences*, ICEM14, Poitiers, 4-9 July, EPJ Web of Conferences **6** (2010)46004

E. Hack and E.A. Patterson, *Experimental Validation of Simulations Using Full-field Measurement Techniques*, AIVELA, Ancona, 23-25 June, AIP Conf. Proc, **1253** (2010) 405-409

E. Hack, G. Lampeas, J. Mottershead, E. Patterson, T. Siebert, M. Whelan, *Standards for validating stress analyses by integrating simulation and experimentation*, Proc. of the SEM Annual Conference and Exposition on Experimental and Applied Mechanics 2010, Indianapolis, USA, 7-10 June 2010, p.100-106

D. Iwaniuk and E. Hack, *Wavefront Modulation for an Elongated Depth of Focus with a Homogeneous Point Spread Function*, ICAPMMOI, Int. Conf. Advanced Phase Measurement Methods in Optics and Imaging, Ascona, 16-21 May, AIP Conf. Proc.**1236** (2010)254–258

2009 E. Hack, *Combination of Phase Stepping and Fringe Tracking to Evaluate Strain from Noisy DSPI Data*, Proceedings FRINGE 2009, Stuttgart, 12.-14. September, Eds. W. Osten, M. Kujawinska, Springer, Berlin, 2009, p 211-214

D. Iwaniuk, E. Hack, *Novel technique for characterizing focusing properties of superresolving phase filters into a refractive medium*, OSA Optics & Photonics Congress

Novel Techniques in Microscopy (NTM), Advances in Imaging, April 26-30, 2009, Vancouver, BC, Canada, *NWB4.pdf*

2008 E. Hack, *Combined measurement uncertainty for phase-stepping methods*, Photomechanics 2008, eds.: J. Huntley, P. Jarron, (2008)

2007 E. Hack and A. Schumacher, *ESPI-measurement of strain components on a CFRP reinforced bending beam*, in: Proc. ICEM 13, ed.: E.E. Gdoutos, Springer, Berlin, 2007, 723-724

R. Burguete, E. Hack, E. Patterson, T. Siebert, M. Whelan, *SPOTS standard for calibrating and evaluating strain measurement systems*, Proc. ATEM, paper OS01-1-1, September 12-14, 2007 in Fukuoka, Japan

D. Albrecht, M. Whelan, E. Hack, E. Patterson, *Quantifying uncertainties in optical measurements of strain*, Proceedings of the SEM Annual Conference and Exposition on Experimental and Applied Mechanics, 3-6 June 2007, Springfield, MA, p. 554-560

2006 E. Hack and P. N. Gundu, *Improvement of speckle correlation fringes by adaptive correction using twisted nematic LCD*, in: SPECKLE 2006, eds.: P. Slangen, C. Cerrutti, Proc. SPIE **6341** (2006) 63410L1-63410L6

Burguete, R.L., Hack, E., Kujawinska, M., Patterson, E.A., Saleem, Q., Siebert, T., Whelan, M., '*Standards project for optical techniques of strain measurement*', Proc. SEM Annual Conf. on Experimental and Applied Mechanics, June 4-7, 2006, Saint Louis, Missouri, USA paper, 2006, 1486-1492

E. Hack and A. Schumacher, *ESPI-measurement of strain gradients in a CFRP-reinforced bending beam*, Photomechanics 2006, Clermont-Ferrand, 10-12 July 2006

M. Kujawinska, E.A. Patterson, R. Burguete, E. Hack, D. Mendels, T. Siebert, M. Whelan, *Calibration and assessment of full-field optical strain measurement procedures and instrumentation*, in: Speckle06, eds.: P. Slangen, C. Cerrutti, Proc. SPIE **6341** (2006) 63410Q1-63410Q7 [9]

2005 E. Hack and P. N. Gundu, *Adaptive correction to the speckle correlation fringes using twisted nematic LCD*, Proceedings FRINGE 2005, Stuttgart, 12.-14. September, Ed. W. Osten, Springer, Berlin, 2005, p 158-165

P.N. Gundu, E. Hack, P.K. Rastogi, *Adaptive technique for phase noise reduction from the speckle correlation fringes,* in: Optical Information Systems III; Bahram Javidi, Demetri Psaltis; Eds., Proc. SPIE **5908** (2005) 263-269

R. Burguete, E. Hack, M. Kujawinska, E. Patterson, L. Salbut, Q. Saleem, T. Siebert, M. Whelan, *Recent issues on development of reference materials and standarized tests of optical methods of strain measurement,* Conference on Optical Measurement Systems for Industrial Inspection IV, Jun 13-17, 2005 Munich, edited by Wolfgang Osten, Christophe Gorecki, Erik L. Novak, Proc SPIE **5856** (2005) 657-663

E. Hack, R. Burguete, E. Patterson, *Traceability of optical techniques for strain measurement*, Proc. Int. Conf. Advances in Experimental Mechanics IV, Appl. Mechanics and Materials **3-4**(2005)391-396

M. Whelan, E. Hack, T. Siebert, R. Burguete, E.A. Patterson, Q. Saleem, *On the calibration*

---

[9] Invited paper

of optical full-field strain measurement systems, Proc. Int. Conf. Advances in Experimental Mechanics IV, Appl. Mechanics and Materials **3-4**(2005)397-402

E.A. Patterson, M. Whelan, E. Hack, T. Siebert, R. Burguete, Q. Saleem, *Standard test for the evaluation of optical strain measurement systems*, Proc. Int. Conf. Advances in Experimental Mechanics IV, Appl. Mechanics and Materials **3-4**(2005)403-408

E. Hack, E. Patterson, R. Burguete, T. Siebert, M. Whelan, D. Mendels, *SPOTS – Standardisation Project for Optical Techniques of Strain Measurement: Traceability and Reference Materials*, Proceedings of TEST 2005, Nuremberg, 10.-12.5., AMA Service, Wunstorf, 2005, C5, 81-86

R. Burguete, E. Hack, M. Kujawinska, E. Patterson, Q. Saleem, T. Siebert, M. Whelan, *Developing Standards for Optical Methods of Strain Measurement*, Proc. SEM IMAC XXIV, 24th Conference and Exposition on Structural Dynamics 2006, 30 Jan - 2 Feb 2006, St Louis, Missouri,USA, 1142-1147

2004 P. N. Gundu, E. Hack, P. K. Rastogi, *Improved superresolution with dynamic complex filters*, in: Optical Information Systems II; edited by Bahram Javidi, Demetri Psaltis, Denver, Proc. SPIE **5557** (2004) 303-308

E. Hack, G. Sims, D. Mendels, *Traceability, reference materials and standardised tests in optical strain measurement*, in: Advances in Experimental Mechanics, C. Pappalettere, Ed., Proceedings of ICEM12, Bari, 28.8.-2.9., McGraw-Hill, Milano, 2004, 693-694

L. Salbut, M. Kujawinska, E. Patterson, E. Hack, R. Burguete, M. Whelan, D.A. Mendels, *Development of standard measurement chain for full-field optical strain measurement methods*, Conference on Interferometry XII - Applications, Eds. Wolfgang Osten, Erik Novak, Aug 04-05, 2004, Denver, CO, Proc. SPIE **5532** (2004) 268-277

D. Mendels, E. Hack, P. Siegmann, E. Patterson, L. Salbut, M. Kujawinska, H.R. Schubach, M.M. Dugand, L. Kehoe, C. Stochmil, P. Brailly, M. Whelan, *Round robin exercise for optical strain measurement*, in: Advances in Experimental Mechanics, C. Pappalettere, Ed., Proceedings of ICEM12, Bari, 28.8.-2.9., McGraw-Hill, Milano, 2004, 695-696

R. Burguete, E. Hack, M. Kujawinska, E. Patterson, *Classification of operations and processes in optical strain measurement*, in: Advances in Experimental Mechanics, C. Pappalettere, Ed., Proceedings of ICEM12, Bari, 28.8.-2.9., McGraw-Hill, Milano, 2004, 697-698

R. Burguete, E. Hack, T. Siebert, E. Patterson, M. Whelan, *Candidate reference materials for optical strain measurement*, in: Advances in Experimental Mechanics, C. Pappalettere, Ed., Proceedings of ICEM12, Bari, 28.8.-2.9., McGraw-Hill, Milano, 2004, 699-700

2003 E. Hack, P. Dias-Lalcaca, U. Sennhauser, *Characteristics of imaging fibre-bundles for use in an ESPI-based instrument for distributed high-resolution measurements,* Proceedings of Speckle Metrology 2003, Trondheim, 17-19 June 2003, Eds. K. Gastinger, O.J. Løkberg, S. Winther, Proc. SPIE **4933** (2003) 256-260

P. Dias-Lalcaca, E. Hack, and U. Sennhauser, *Evaluation of coherent fibre-bundle characteristics for use in an ESPI-based instrument for measuring strain in electronic packages,* Proceedings of TEST 2003, Nuremberg, 15 May 2003, (2003), A6.2,123-128

2001 E. Hack, *Combined shearography and thermography measurements on microelectronic systems,* Proceedings of FRINGE 01, Bremen, 17-19 September 2001, Elsevier, Data Science Library, Paris, 2001, 41-46

E. Hack, *Application of endoscopic ESPI in NDI*, Laser Metrology for Precision Measurement and Inspection in Industry, Ed. A. Albertazzi, Proc. SPIE, **4420** (2001) 107-111

E. Hack, M. Riner, *3D ESPI and 3D shearography measurements applied to NDT and FEM analysis validation for industrial quality control*, Optical Measurement Systems for Industrial Inspection II: Application in Industrial Design, 18.-20. Juni 2001, edited by Wolfgang Osten, Werner P. O. Jueptner, Malgorzata Kujawinska, Proc.SPIE Vol. **4398**[10] (2001)155 - 167

E. Hack, *Multi-Wavelengths Shearography for NDT and Strain Measurements*, MAT 2001, 8.-10. 5.01, Nürnberg, Proceedings, p.141–146

E. Hack, *Uncertainty in ESPI deformation measurements*, MAT 2001, 8.-10.5.01, Nürnberg, Proceedings, p.391–395

M. Riner, E. Hack, *3D-ESPI deformation measurement on hip-prostheses implanted in a model femur*, MAT 2001, 8.-10. 5.01, Nürnberg, Proceedings, p.157–162

2000 E. Hack, P. Nellen, *ESPI – Principles and Prospects,* Trends in Optical Nondestructive Testing, Lugano, 3.-5. Mai 2000

E. Hack, *Rigid body effects in shearographic strain measurements,* Interferometry in Speckle Light, eds. P. Jacquot and J. Fournier, Springer, Berlin, 2000, p. 327-334 Lausanne, 27. Sept. 2000

1999 R. Kästle, E. Hack, U. Sennhauser *Shearography for determination of 2D strain distributions*, in: „Optical Measurement Systems for Industrial Inspection", edited by Malgorzata Kujawinska, Wolfgang Osten, Proc SPIE, **3824** (1999) 38-44, Europto Conference, München, 16-17 Juni 1999

E. Hack, *Application of endoscopic ESPI in NDI*, Laser Metrology 1999, Florianopolis, Brazil, 13.10.1999, p. 4.1–4.5

E. Hack, R. Kästle *Multi-wavelengths shearography for optical whole-field strain measurements*, Colloque SFO, Nouveaux moyens optiques pour l'industrie II, Mittelwihr (F) 17.-19.11.99

1998 E. Hack, R. Brönnimann *ESPI deformation measurement on lightweight structures under thermal load* Int. Conf. Appl. Opt. Metr., edited by P. K. Rastogi, F. Gyimesi, Proc. SPIE **3407** (1998) 318-323

R. Kästle, E. Hack, U. Sennhauser *Multi-wavelength shearography for evaluation of in-plane strain distributions*, in: „Three-dimensional Imaging, Optical Metrology and Inspection IV" , SPIE Proceedings, **3520** (1998) 248-253, Photonics EAST, Boston, USA

1997 E. Hack *In-Situ Kalibration von Streifenprojektions-Messsystemen an zylindrischen Objekten*, in: „Optische Formerfassung“, GMA-Bericht **30**, 261-70

E. Hack, J. Blaich *Application of ESPI to assess the quality of crack-bridging fabrics* Structural Faults and Repair, Edinburgh, 9.7.97, p....

---

[10] Invited paper

E. Hack *Calibration and Validation of fringe projection measurement systems,* Optical 3-D Measurement Techniques IV", ETH, 30.9.97

R. Buchhold, U. Büttler, A. Nakladal, K. Sager, E. Hack, R. Brönnimann, U. Sennhauser *Combination of different methods to characterize micromechanical sensors*, Mat. Res. Soc. Symp. Proc. **Vol. 459** (1997), 243-248

1995 E. Hack, T. Steiger and H. Sadouki *Application of Electronic Speckle Pattern Interferometry (ESPI-) to Observe the Fracture Process Zone* in: "Fracture Mechanics of Concrete Structures (FRAMCOS-2)", ed. F.H. Wittmann, AEDIFICATIO Publishers, Freiburg i.Br., 1995, 229–238

E. Hack, U. Mühlematter, T. Steiger, F.H. Wittmann *FE-Calculations and 3D-ESPI-Measurements of Mechanical and Thermal Stresses Induced to Machine Beds Made of Polymer Concrete* in: "Non-Destructive Testing in Civil Engineering (NDT-CE)", DGZfP Berichtsband **48** (1995),*1,* 219–227

M. Dammann, E. Hack, R. Brönnimann, U. Sennhauser *Optische Charakterisierung von Siliziumdrucksensoren mittels Michelson Interferometrie* MicroMat '95, Berlin, 1995

1994 E. Hack *Moiré Measurements of the Displacement Field of a Wall under Dynamic Load* in: "Optical 3-D Measurement Techniques II: Applications in Inspection, Quality Control, and Robotics", edited by Armin Gruen, Heribert Kahmen, Proc. SPIE **2252** (1994) 564-571

1993 E. Hack *Moiré Measurements of the Displacement Field of a Wall under Dynamic Load* in: "Optical 3-D Measurement Techniques", eds. A. Gruen, H. Kahmen, Wichmann Verlag, Karlsruhe, 1993, 564–571

A.J. Brunner, E. Hack, J. Neuenschwander, S. Tanner, P. Flüeler, *Kohlenstofffaserverstärkter Kunststoff: Charakterisierung von Bauteilen aus CF-PEEK mit Kombinationen von zerstörungsfreien Prüfmethoden,* DGZfP Berichtsband **37** (1993) 514–521

Workshops and Conferences without proceeding

2020 E. Hack, *Demonstration of a validation process on a fuselage panel*, Third Workshop on [almost] Virtual Testing of Structures, Airbus, Toulouse, 5 March 2020

E. Hack, L. Valzania, E. Mavrona, P. Zolliker, Coherent Lensless Imaging Techniques Using Terahertz Radiation, 9th Int. Workshop on THz Technology and Applications, Kaiserslautern, 3-4 March 2020

2019 E. Hack, *Using Historical Measurement Data for Validation of Engineering Simulations*, Fourth International Workshop on Validation of Computational Mechanics Models, Zürich, Switzerland, 5 November 2019

L. Valzania, S. Gigan, P. Zolliker and E. Hack, Coherent imaging of a scattering barrier and a hidden object, Face2phase, October 21-23, Delft, NL

Th. Siebert, K. Dvurecenska, E. Hack, G. Lampeas, E. Patterson, K. Splithoff and E. Szigeti, *New Method for DIC Uncertainty Quantification in Industrial Environments*, iDICs 2019 Conference, October 14–17, 2019, Portland, OR

E. Hack, *Use of historical data in validation processes*, Second Workshop on [almost] Virtual Testing of Structures, Airbus, Filton, 17 January 2019

2018 T. Siebert, E. Hack R. Burguete, K. Dvurecenska, E.A. Patterson, G. Lampeas, E. Szigeti, *Industrial validation experiment based on using digital image correlation*, Int. Conf. on Digital Image Correlation and Noncontact Experimental Mechanics, iDICs 2018, Hangzhou, China, 15-18 October 2018

K. Dvurecenska, E. Hack, G. Lampeas, T. Siebert and E. Patterson, *Comparative Study of Orthogonal Decomposition of Surface Deformation in Composite Automotive Panel*, ECCM18 - 18th European Conference on Composite Materials, Athens, Greece, 24–28 June 2018

E. Hack, *Quantitative validation of computational solid mechanics models*, Workshop on [almost] Virtual Testing of Structures, Airbus, Toulouse, 19 March 2018

2014 E. Hack, G. Lampeas and E. Patterson, Chairs, 3rd Int. Workshop on Validation of Computational Solid Mechanics Models, Munich, 12 June 2014

2013 R. Longtin, I. Shorubalko, J-R. Sanchez, E. Hack, H. Elsener, O. Groening, P. Groening, P. Greenwood, N. Rupesinghe, K. Teo; C. Leinenbach, *Conductive high-temperature resistant carbon nanotube-substrate contacts by active vacuum brazing*, Materials Science & Technology 2013, Oct 27-31, 2013, Montreal, Canada

E. Hack, *Quantifying model quality using measured strain fields*, 2nd Int. Workshop on Validation of Computational Solid Mechanics Models, London, 5 Nov 2013 [11]

E. Hack, *Calibration Inter-Laboratory Study*, CEN WS71 on Validation of computational solid mechanics models using strain fields from calibrated measurements systems, 9th Int. Conf. on Advances in Experimental Mechanics, Cardiff, 3-5 Sep 2013

2011 E. Hack, *Standards and traceability to international standards*, Int. Workshop on Validation of Computational Solid Mechanics Models, Shanghai, 18-20 Oct 2011

E. Hack, *Uncertainty and its role in calibration and validation*, Int. Workshop on Validation of Computational Solid Mechanics Models, Shanghai, 18-20 Oct 2011

E. Hack, E.A. Patterson, G. Lampeas, J. Mottershead, T. Siebert, M. Whelan, *Using Full-Field Measurement Techniques to Validate Simulations of Dynamic Events*, ICAIM 2011, Int. Conf. on Applications for Image based Measurements, 22nd – 23rd March 2011 Schloss Großlaupheim, Ulm, DE

E. Hack, E.A. Patterson, G. Lampeas, J. Mottershead, T. Siebert, M. Whelan, *Advanced Dynamic Validation using Integrated Simulation and Experimentation*, Fachtagung Modelling and Simulation – Challenge and Benefit, ETH Zürich, 2nd Feb 2011.

2010 E. Hack, Standardisation Activities on Full Field Optical Deformation Measurement, ICAIM 2010, Int.Conf. on Applications for Image based Measurements, 2nd – 3rd March 2010 Schloss Großlaupheim, Ulm, DE

2009 R. Mooser, E. Hack, U. Sennhauser, G. Székely, *Estimation of Affine Transformations directly from Tomographic Projections*, Proc. 6th International Symposium on Image and Signal Processing and Analysis (ISPA 2009), September 16-18, 2009, Salzburg, Austria, pp.377-382

---

[11] Keynote presentation introducing the topic „Solid mechanics model validation“

P. Holtappels, P. Wyss, E. Hack, A. Braun, C. Soltmann, L. Holzer, *Application of advanced and non destructive testing in solid oxide fuel cells*, International Symposium on Diagnostics Tools for Fuel Cell Technologies - revealing the state of health of fuel cells, Mid-summer, June 23-24 2009 in Trondheim, Norway

D. Iwaniuk, E. Hack, P. Rastogi, *Correcting the aberrations of a planar refractive index mismatch with a superresolution phase pupil-filter*, Yearly meeting of the Biomedical Photonics Network, St. Gallen, 10th of June, 2009

2008 A. Schumacher, C. Czaderski, E. Hack, M. Motavalli, *Flexural strengthening of beams using externally bonded plates: advanced optical measurements at the beam-to-plate interface*, 'Creating and Renewing Urban Structures – Tall Buildings, Bridges and Infrastructure', 17th Congress of IABSE, September 17-19, 2008, Chicago, DOI:10.2749/222137908796291895

A. Schumacher, E. Hack, *Comparison of measured and calculated interfacial strains at CFRP plate end*, Fourth International Conference on FRP Composites in Civil Engineering (CICE2008) 22-24 July 2008, Zurich, Switzerland

F. Forsberg, R. Mooser, E. Hack, and P. Wyss, *Deformation in Wood Exposed to Three Point Bend: Analysis by use of Digital Volume Correlation Applied to Synchrotron Radiation µCT Data*, Photomechanics 2008, July 7-9, Loughborough

P. Holtappels, A. Braun, P. Wyss, E. Hack, *Application of non-destructive testing to analyse SOFC cells and stacks,* 8th European SOFC Forum, June 30 - July 4, 2008, Lucerne

W. Fasnacht, D. Rechenmacher, E. Hack, *A complete iron age copper smelting furnace from Cyprus – reconstructed digitised and virtualised*, Int. conf. AMITEM 2008. Ancient mining in Turkey and The Eastern Mediterranean, June 15-22 2008, Ankara, Turkey

2007 C. Czaderski, M. R. Aram, E. Hack, M. Motavalli, *Stable Debonding at discontinuity*, FRPRCS-8, Patras, July 16-18, 2007

2006 N. Pini, A. Belloli, H.R. Schubach, E. Hack, M. Barbezat, and P. Ermanni, *Characterisation of Active Fibre Composites with polypyrrole finger electrodes*, Proceedings of ICAST2006: 17th International Conference on Adaptive Structures and Technologies, Oct. 16-19, 2006, Taipei, Taiwan

2005 T. Siebert, M. Whelan, R. Burguete, E. Hack, Q. Saleem, E. Patterson, *Physical Reference Materials for Standardisation of Optical Strain Measurements*, DAS 2005, 22nd DANUBIA-ADRIA Symposium on Experimental Methods in Solid Mechanics, Sep 28 - Oct 1, 2005, Monticelli Terme / Parma, Italy

R. Burguete, E. Hack, M. Kujawinska, E. Patterson, L. Salbut, Q. Saleem, T. Siebert, M. Whelan, *Recent issues on development of reference materials and standarized tests of optical methods of strain measuremen*t, Laser 2005, Munich

R. Burguete, E. Hack, M. Kujawinska, E. Patterson, T. Siebert, and M. Whelan, *Design of reference materials and standardised tests for optical strain measurement***,** Proc. SEM Annual Conf. on Experimental and Applied Mechanics, Portland, Oregon, USA, paper no 295

2004 Richard Burguete, E. Hack, Eann Patterson, Process Maps for Optical Strain Measurement, *Proc. ASTM Symposium on Full-Field Optical Deformation Measurement: Applications and User Practice,* Salt Lake City, Utah, *May 19-20, 2004*

E. Hack, P.N. Gundu, P. Rastogi, *Adaptive correction to the speckle correlation fringes using twisted nematic LCD,* paper 238, Book of Abstracts p.47, SPS Annual Meeting, Neuchâtel, March 4, 2004

2003 W. Fasnacht, D. Rechenmacher and E. Hack, *Iron Age Copper Smelting in Cyprus as seen in a puzzle of 498 tuyere fragments from Agia Varvara - Almyras*, Poster presented at the Int. Conf. ARCHAEOMETALLURGY IN EUROPE, 24-26 September 2003, Mailand

2000 P. Wyss, M. Stampanoni, R. Abela, F. Beckmann, T. Lüthi, U. Sennhauser, R. Brönnimann, E. Hack, and P. Rüeggsegger *Ultraprecise translation and rotation devices for X-ray tomographic microscopy (XTM)*, 1st international workshop on mechanical engineering design of synchrotron radiation equipment and instrumentation (MEDSI 2000), 13.-14. Juli 2000, PSI, Villigen, Switzerland

1996 E.M. Moser, R. Urech, E. Hack, H. Künzli and E. Müller *Hydrocarbon films inhibit oxygen permeation through plastic packaging material* in: EVC–5, 5th European Vacuum Conference and 10th Int. Conference on Thin Films, Salamanca [12]

1988 E. Hack and J.R. Huber *Theorie der Linienstärken in Stark Quantum Beat Spektren: Anwendung auf Propinal,* 24. Symposium für theoretische Chemie, 25.-30.Sept, Pontresina

H. Bitto, E. Hack, P. Schmidt and J.R. Huber *Determination of Molecular Structure Parameters by Quantum Beat Spectroscopy* , EQEC, Hannover, 12.-15.9. 1988

Seminars, lectures and media

2020 Erwin Hack, *Important statistical principles, Calculation of measurement uncertainty using MonteCarlo and SW-Tools*, Empa, 18 August 2020

2018 Erwin Hack, Lorenzo Valzania, and Peter Zolliker, *Durchblick mit Holografie - Bildgebende Verfahren mit Terahertzstrahlen*, Physik in unserer Zeit **6**:49 (2018) 290-295

Erwin Hack, *Optische Messmethoden im Maschinenbau*, Fachapéro Fachgruppe Mechanik & Industrie, ETH, Zürich, 30. Januar 2018

2017 Erwin Hack, Lorenzo Valzania, and Peter Zolliker, *Terahertz topography of hidden objects*, Imaging and Image Analysis IX, Empa, 4 April 2017

2016 Erwin Hack, Lorenzo Valzania, and Peter Zolliker, *Terahertz imaging of biomechanical interfaces*, SPIE Newsroom, 7 November 2016, DOI: 10.1117/2.1201608.006615

Erwin Hack, *Bildgebende Interferometrie an optisch rauen Oberflächen*, swissPhotonics, NTB Photonik Kolloquium, 27 Sep 2016

R. Klose, E. Hack, P. Zolliker, *Terahertz-Strahlung zur Erforschung des Wundscheuerproblems*, Technische Textilien, 3/2016, 122-123

---

[12] Award for the Best Poster of all Poster Sessions

R. Klose, E. Hack, P. Zolliker, *Terahertz radiation to study the problem of chafing*, Technical Textiles, 3/2016, E112-E113

Rainer Klose, *Tera incognita - Terahertz macht Textilien durchsichtig*, Empa Quarterly, #52, April 2016

2015 E. Hack, *Digital Image Correlation*, lecture at EPFL, Doctoral school, 08 October 2015

2014 "The mystery of Stradivarius", Japanese TV, 19 April 2014, (Explanation of DSPI vibration measurements)

2013 E. Hack, *Introduction to calibration procedures for full-field strain measurements,* CEN-WS71 Kick Off Meeting, Brussels, 11-13 June 2013

2012 E. Hack, *Goal Line Technology*, 74. Sitzung „Zuverlässigkeits-Pool“, EMPA, Dübendorf, 09. November 2012

E. Hack, M. Camenzind, *Goal Line Technology*, IFAB-Meeting, Zurich, 05 July 2012

E. Hack, *Ellipsometrie und Anwendungen auf Photovoltaik*, 73. Sitzung „Zuverlässigkeits-Pool“, EMPA, Dübendorf, 23. März 2012

E. Hack, *Goal Line Technology*, 126th IFAB-Meeting, Bagshot, Surrey (UK), 03 March 2012

2011 E. Hack, *Digital Image Correlation*, lecture at EPFL, Doctoral School, 08 November 2011

E. Hack, *Messunsicherheit, 6-sigma, Worst Case*, ganztägige Schulung beim „Zuverlässigkeits-Pool“ Partner Diehl Aerospace GmbH, Überlingen, 7. Juli 2011

E. Hack, *Bildgebende Eigenspannungsanalyse an Kunststoffbauteilen,* 71. Sitzung „Zuverlässigkeits-Pool“, EMPA, Dübendorf, 18. März 2011

E. Hack, *Goal Line Technology*, 125th IFAB-Meeting, Newport, 01 March 2011

2010 E. Hack, *Interferometrische und thermografische Charakterisierung von Luft- und Raumfahrtstrukturen*, SVMT, 7. Metallographie-Tagung, Dübendorf, 8. November 2010

2009 P. Toggweiler, E. Hack, *So gefährlich sind die unscheinbaren Dinger*, 20 minuten online http://www.20min.ch/print/story/17849384, 9. April 2009

E. Hack, *Measurement Uncertainty – dimensional measurement*, EMPA Topical Day on measurement uncertainty, Dübendorf, 18. Juni 2009

2007 E. Hack, *Thermografie als ZfP-Methode*, SGZP-Vortragsabend, FH-Aargau, Brugg-Windisch, 18. Januar 2007

2005 E. Hack, *DORMOUSE – Distributed Optical Reliability Monitors for On-board Use in Electronic Devices*, 55. Sitzung „Zuverlässigkeits-Pool“, EMPA, Dübendorf, 16. März 2005

2004 E. Hack, *Measurement Uncertainty-Beware these errors*, EMPA PhD seminar, Dübendorf, 13. Mai 2004

E. Hack, *Messgrösse, Messwert, Messunsicherheit*, Tagung „Bildgebende ZfP-Methoden“, EMPA-Akademie, Dübendorf, 1. April 2004

E. Hack, *Messunsicherheit in SOP und Prüfbericht*, Tagung „Bildgebende ZfP-Methoden“, EMPA-Akademie, Dübendorf, 1. April 2004

2002 E. Hack, *Bildgebende Interferometrie*, Tagung „Fortschrittliche ZfP-Methoden, EMPA-Akademie, Dübendorf, 12. September 2002

E. Hack, *Bestimmung der Messunsicherheit- Eine Einführung*, Kurs, EMPA-Akademie, Dübendorf, 17. April 2002

E. Hack, *Unsicherheit von Fitparametern bei Ausgleichsrechnungen*, Interne Schulung, EMPA, Dübendorf, 16. Januar 2002

2001 E. Hack, *Uncertainty in ESPI deformation measurements*, MAT 2001, 8.-10.5.01, Nürnberg, Proceedings, p.391–395

E. Hack, *Bildgebende Interferometrie*, ETH Zürich, Seminar Messtechnik Nordostschweiz (Perspektiven Optischen Messens, K. Ruhm), 27. Juni 2001

E. Hack, *Unsicherheiten von Materialkennwerten, die aus Kraft-Weg-Messungen ermittelt werden*, Interne Schulung, EMPA, Dübendorf, 28. März 2001

2000 E. Hack, *Einflüsse und Unsicherheiten beim Messen elektrischer Grössen*, Interne Schulung, EMPA, Dübendorf, 2.11.2000

E. Hack *Bildgebende interferometrische Verformungsmessungen,* Seminar: Das Bild als Qualitätsmassstab, 7.11.2000, EMPA-Akademie, Dübendorf

E. Hack, R. Brönnimann *Genügt die Kalibrierung für die Messung im Alltag?,* SAPUZ-Tagung Block B: Ermittlung der Messunsicherheit, Messung elektrischer Grössen 6.-7.12. 2000, EMPA-Akademie, Dübendorf

E. Hack *Abgeleitete Grössen der Geometrie und Materialkennwerte,* SAPUZ-Tagung Block E: Ermittlung der Messunsicherheit, Dimensionelle Messtechnik 6.-7.12.2000, EMPA-Akademie, Dübendorf

1999 E. Hack *Principles of Shearography,* Workshop: New Developments in Shearography, 20.1.1999, EMPA, Dübendorf, Switzerland

E. Hack, Einführung in die Messunsicherheitsbestimmung, Interne Schulung, EMPA, Dübendorf, 1. Dezember 1999
E. Hack, Der Leitfaden zur Angabe der Unsicherheit beim Messen "GUM" Interne Schulung, EMPA, Dübendorf, 2. Dezember 1999
E. Hack, Messunsicherheit bei dimensionellen Messungen, Interne Schulung, EMPA, Dübendorf, 2. Dezember 1999

1998 E. Hack, *Speckle Effekt und Speckle Korrelations Interferometrie,* Seminarvortrag, Physikalisch-Chemisches Institut, Uni Zürich, 18. Juni 1998

E. Hack, *Bildgebende Methoden in der Materialprüfung,* EMPA, Optik Kolloquium 29. Oktober 1998

1997 E. Hack, *Optische Messtechnik in der Materialprüfung,* ETH Zürich, Workshop Optische Messmethoden, 6. November 1997

E. Hack, *Bildgebende interferometrische Methoden in der Materialprüfung*, ETH Zürich, Institut für Geodäsie und Fotogrammetrie, Seminarvortrag, 7. November 1997

1995 E. Hack, ETH Zürich, Institut für Leichtbau und Seilbahntechnik, Vorlesungsvortrag über Projektions-Moiré mit Demonstrationen (Dezember)

1994 E. Hack, ETH Zürich, Institut für Leichtbau und Seilbahntechnik, Vorlesungsvortrag über Projektions-Moiré mit Demonstrationen (Dezember)

1992 E. Hack, B*ildgebende interferometrische Methoden*, Uni Zürich, Physikalisch-Chemisches Institut, Seminarvortrag

Exhibitions

2004 E. Hack, P. Dias: Hannover fair, 19-24 April 2004, Exhibition of HIRONDELLE Laboratory-Prototype, Joint booth of "ETH-Rat" and “Technologiestandort Schweiz“

1999 Kästle Ralf, Hack Erwin: Laser 99, München, 14.-16. Juni 1999, Ausstellung und Vorführung MuWaS 3D-Shearography-Messgerät

Kästle Ralf, Hack Erwin: ETH Zürich, SATW Tagung, 23.-25. September 1999, Ausstellung und Vorführung MuWaS 3D-Shearography-Messgerät

1998 E. Hack, E.M. Moser: Hannovermesse, April 1998, Ausstellung und Vorführung einer laseroptischen Apparatur zum Nachweis von Beschichtungsrissen im Folienzugversuch, Gemeinschaftsstand “Technologiestandort Schweiz