



**Gesellschaft für
Umweltsimulation e.V.**

Program

9th European Weathering Symposium EWS

(XXXIst Colloquium
of Danubian Countries
on Natural and Artificial
Ageing of Polymers)

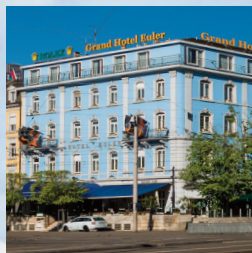
September 18 - 20, 2019
Basel, Switzerland

HUNTSMAN

Enriching lives through innovation



Confederation of European
Environmental Engineering
Societies



9th European Weathering Symposium EWS

(XXXIst Colloquium of Danubian Countries
on Natural and Artificial Ageing of Polymers)

Invitation

It is with great pleasure that we invite you to participate in the 9th EWS (XXXIst Colloquium of Danubian Countries on Natural and Artificial Ageing of Polymers) to be held in Basel, on September 18 - 20, 2019.

Launched in 1967 by four relevant institutes from Austria, Czechoslovakia, Hungary and Yugoslavia, the Colloquia of Danubian Countries have been the only exclusive meetings in the field of natural and artificial weathering of polymers in their time. Relaunching as EWS they have attracted a broader scope of attendees.

In the tradition of these colloquia, the EWS is a meeting point for experts from industry and academia to learn from each other. The main topics in 2019 will be:

- Weathering of Polymeric Products – Plastics and Coatings
- Determination, Simulation and Effects of Relevant Climatic Quantities
- New Test Procedures and Devices
- Weathering Reference Materials
- Analysis of Polymer Degradation
- Service-Life Prediction

Schedule

September 18, 2019

- 02.00 p.m. - 05.00 p.m. Technical tour to laboratory Huntsman Advanced Materials (Switzerland) GmbH, Basel
- 07.00 p.m. - 09.00 p.m. Welcome reception

September 19, 2019

- 09.00 a.m. - 05.00 p.m. Conference day 1
- 05.30 p.m. - 07.30 p.m. Sightseeing tour
- 08.00 p.m. - 11.00 p.m. Conference dinner

September 20, 2019

- 09.00 a.m. - 04.00 p.m. Conference day 2

General Information

Language

The conference language will be English.

Program

The program will be available on www.weathering-symposium.org

International Scientific Committee

Volker Wachtendorf (Chairman), BAM, Berlin, D
Domenico Acierno, UniNa, DIMP, Naples, I
Sahar Al-Malaika, AU, CEAC, Birmingham, UK
Eva Bejarano, AIMPLAS, Paterna, ES
Marjolein Diepens, DSM Ahead TP, Geleen, NL
Jean-Luc Gardette, CU, CNRS, Aubière, F
António Guerreiro de Brito, IBB-UMinho, Braga, P
Markus C. Grob, FH Nordwestschweiz, Windisch, CH
Ali Harlin, VTT, Espoo, FIN
Anne-Lise Høg Lejre, DTI, Taastrup, DK
Anna Jansson, RISE, Borås, S
Leopold Kranner, ÖGUS, Vienna, A
Constantine Papaspyrides, NTU Athens, LPT, GR
Krzysztof Pielichowski, CUT CTP, Cracow, PL
Béla Pukánszky, BME, Budapest, HU
Vesna Rek, UZ, Zagreb, HR
Lyda Rychla, PI, Bratislava, SK
Yoshimitsu Takane, JWTC, Choshi City, J
Jiri Tochacek, CEITEC BUT, Brno, CZ
Peter Trubiroha, Berlin, D
Mireille Wenkin, CoRI, Limette, B
Christopher White, NIST, Gaithersburg, USA

Chairman

Thomas Reichert, Fraunhofer ICT, Pfingsttal, Germany

Organisation/Conference Management

The European Weathering Symposium is being organised on behalf of CEEES by the German Society for Environmental Engineering GUS (Gesellschaft für Umweltsimulation e.V.), supported by the Swiss Society of Environmental Engineering SVU (Schweizerischer Verein für Umweltsimulation).

Participation Fee

The participation fee is € 550,-- for registrations up to June 14, 2019. This fee includes conference proceedings, lunches and refreshments, technical tour, welcome reception, sightseeing tour as well as the conference dinner. For registrations after June 14, 2019 the fee is € 650,--.

Cancellation

If written cancellation is received before August 19, 2019, a refund will be given minus € 100,-- administration charge. No refunds can be provided for registrations cancelled after this date.

General Information

Registration

Please register online at
www.weathering-symposium.org
or mail the attached registration form to:
Gesellschaft für Umweltsimulation GUS
Sabine Aref
c/o Fraunhofer ICT
P.O. Box 1240
D-76318 Pfinztal, Germany
Phone: +49 (0) 721 46 40-391
Fax: +49 (0) 721 46 40-345
secretariat@gus-ev.de
www.gus-ev.de

The registration fee must be paid on receipt of invoice from the secretariat or in cash in Euros on arrival at the venue. Credit cards are not accepted.

Conference Venue

The symposium will be held at:

Hotel Euler 4****
Centralbahnplatz 14
4002 Basel, Switzerland

Accommodation

Room contingents at special convention rates are reserved at:

Hotel Euler 4****
Budget Design Hotel City Inn 3***
(in the same building as Hotel Euler)

Reservations must be made before July 31, 2019

Please see the attached Hotel Information Form with the contact details and send your room reservation directly to the selected hotel before July 31, 2019.

Transportation

The hotel is located directly at the train station (SBB/SNCF). Direct access to tram and trains. Shuttle bus (No. 50) to the airport one minute walk away. Basel Airport 15 minutes away by car/bus/taxi (10 km). Underground parking (limited spaces) with parking service..

Visit

Technical tour to laboratory Huntsman Advanced Materials (Switzerland) GmbH, Basel

Sightseeing Tour

Guided Tour Basel

Pre-Program

CEEES Meeting Program

(Additional Registration is necessary)

Tuesday, September 17, 2019

2.00 p.m. - 5.00 p.m.

CEEES Technical Advisory Board Meetings

Air Pollution and Climatic Effects

Mechanical Environment

Reliability and ESS

8.00 p.m.

CEEES Dinner

Wednesday, September 18, 2019

9.00 a.m. - 12.30 p.m.

CEEES General Assembly

1.00 p.m. - 2.00 p.m.

Lunch at Hotel Euler "Lobby"

2.00 p.m. - 5.00 p.m.

Join Technical Tour to laboratory Huntsman Advanced Materials (Switzerland) GmbH, Basel, CH

Meeting Point: Hotel Euler "Lobby"

Pre-Symposium Program

Wednesday, September 18, 2019

1.00 p.m. - 2.00 p.m.

Lunch at Hotel Euler "Lobby" for Technical Tour participants and registration

2.00 p.m. - 5.00 p.m.

Technical Tour to laboratory Huntsman Advanced Materials (Switzerland) GmbH, Basel, CH

Meeting Point: Hotel Euler "Lobby"

7.00 p.m. - 9.00 p.m.

Welcome Reception

Hotel Euler "Lobby"

Conference Program
Thursday, September 19, 2019

9.00 a.m.

Opening of the Conference

Thomas Reichert, CEEES, GUS and Fraunhofer ICT, Pfinztal, D

Greetings

Ueli Grossen, Swiss Society of Environmental Engineering SVU, Grenchen, CH

Session 1

Overviews

Chair: Dieter Kockott, Hanau, D

9.20 a.m.

OP 01

History of Weathering

Andreas Riedl, Atlas Material Testing Technology GmbH, Linsengericht-Altenhasslau, D

9.45 a.m.

OP 02

40 years of Global-UV-Test weathering device: with fluorescent UV lamps and a precise microclimatical control into the future

Peter Trubiroha, Berlin, D

Anja Geburtig, Volker Wachtendorf, BAM, Berlin, D

10.10 a.m.

Coffee Break

10.40 a.m.

OP 03

The reproducibility of weathering tests: influencing factors and measures

Andreas Ruth, Matt Mc Greer, Florian Feil, Atlas Material Testing Technology GmbH, Linsengericht-Altenhasslau, D

Session 2

Spectral Sensitivity

Chair: Peter Trubiroha, Berlin, D

11.05 a.m.

OP 04

Study of the light stability of colour photographic reflection prints under LED lighting

Shigeo Suga, Hideo Kita, Suga Test Instruments Co., Ltd. Shinjuku, Tokyo, J

11.30 a.m.

OP 05

Spectral and degradation effective irradiances of solar radiation depending on geographic location, time of the year, and time of the day

Dieter Kockott, Hanau, D

11.55 a.m.

Lunch Break

Session 3

1.15 p.m.

PP 1

Review of Statistical and Analytical Degradation Models for PV Modules and Systems and Improvements

Ismail Kaaya, Sascha Lindig, Karl-Anders Weiß, David Moser, Fraunhofer Institute for Solar Energy (ISE), Freiburg, D

PP 2

Training the Next Generation of PV Reliability Experts - Project SOLAR-TRAIN with 14 PhD projects

Karl-Anders Weiß, Ismail Kaaya, Amantin Panos Mehilli, Enikő Bedő, Fraunhofer Institute for Solar Energy (ISE), Freiburg, D

PP 3

Durability test methodology for bondings exposed to heat transfer fluids

Andreas Piekarczyk, Tanja Soukup, Karl-Anders Weiß, Fraunhofer Institute for Solar Energy (ISE), Freiburg, D

PP 4

Functional coatings on glass in extreme arid climatic conditions - investigation of surface degradation effects

Elisabeth Klimm, Fraunhofer Institute for Solar Energy (ISE), Freiburg, D

PP 5

Black Panel Temperature Sensors in Solar Testing

Riitta Perälä, Solar Simulator Finland Ltd., Littoinen, FIN

PP 6

Modification of F48T12 UV fluorescent lamps to improve performance and lifetime in accelerated weathering testers

Mandy Göring, NARVA Lichtquellen GmbH + Co. KG, Brand-Erbisdorf, D

PP 7

Round robin weathering test of various polymeric back-sheets for PV- modules with different ultra-violet irradiation and sample temperatures

Michael Köhl, Fraunhofer Institute for Solar Energy (ISE), Freiburg, D

PP 8

Evaluation of UV- weathering tests of various polymeric backsheets for PV- modules with different spectral irradiation and sample temperatures

Michael Köhl, Fraunhofer Institute for Solar Energy (ISE), Freiburg, D

Conference Program
Thursday, September 19, 2019

PP 9

Ageing studies on plastic coatings for automotive applications – the search for early occurring material changes related to long-term durability

Lars Passauer, Jens Uhlemann, Jana Peters,
Dresden Institute of Wood Technology - Institut für
Holztechnologie Dresden gemeinnützige GmbH,
Dresden, D

PP 10

Environmental Factors and their Impact on the Transition, Safety and Function of selected Processes, Systems and Products

Helmut Schmid, Fraunhofer Institute for Chemical
Technology ICT, Pfinztal, D

Session 4

Service Life Prediction

Chair: Anja Geburtig, BAM, Berlin, D

2.15 p.m.

OP 06

Validating Predictive Models with Outdoor Data

Christopher C. White, Don L. Hunston, National
Institute of Standards and Technology, Gaithersburg,
MD, USA

2.40 p.m.

OP 07

Limitations of the Arrhenius methodology for predicting the lifetime of polymeric materials

Pierre-Olivier Bussière, Camille Blivet, Jean-Luc
Gardette, Sandrine Therias, Université Clermont
Auvergne, CNRS, SIGMA Clermont, Clermont-
Ferrand, F
Jean-Francois Larché, Nexans Research Center (NRC),
Lyon, F

3.05 p.m.

Coffee Break

Conference Program
Thursday, September 19, 2019

Session 5

3.35 p.m. **OP 08**

**Natural Weathering and Correlation
Natural-Artificial Weathering**

Chair: Andreas Riedl, Atlas MTT GmbH,
Linsengericht-Altenhasslau, D

Polymer Weathering in Antarctica

Jiri Tochacek, Petr Polacek, CEITEC, Brno University
of Technology, Brno, CZ
Kamil Laska, Pavel Kapler, Klara Cizkova, Faculty of
Science, Masaryk University, Brno, CZ
Radka Balkova, Faculty of Chemistry, Brno Univer-
sity of Technology, Brno, CZ
Lukas Krmicek, Faculty of Civil Engineering, Brno
University of Technology, Brno, CZ
Jan Merna, University of Chemistry and Technology,
Praha, CZ
Michael Tupy, Fatra, a.s., Napajedla, CZ
Zdenek Buran, Unipetrol RPA, Polymer Institute
Brno, Brno, CZ

4.00 p.m. **OP 09**

**ASTM D7869: Field report compared to other
artificial weathering standards and outdoor
weathering in Florida**

Walter Rauth, Covestro Deutschland AG,
Leverkusen, D

4.25 p.m. **OP 10**

**Clearcoat on polycarbonate for automotive
headlights: Issues on photo-ageing**

Nicoleta Radutoiu, Groupe Renault, Titu, RO
Nathalie Oudin-Barrois, Groupe Renault,
Guyancourt, F

5.30 p.m. - 7.30 p.m.

Sightseeing-Tour Basel

8.00 p.m. - 11.00 p.m.

Conference Dinner

Conference Program
Friday, September 20, 2019

Session 6

9.00 a.m. **OP 11**

Monitoring Sensors and Detection of Weathering Effects

Chair: Andy Francis, Q-Lab Corporation, Westlake, OH, USA

Use of ESR spectroscopy for detection of photodegradation of coatings and their components

Matthias Wanner, Fraunhofer Institute for Manufacturing Engineering and Automation IPA, Stuttgart, D

9.25 a.m. **OP 12**

Discussion on Weathering Reference Materials

Anja Geburtig, Volker Wachtendorf, BAM, Berlin, D
Peter Trubiroha, Berlin, D

9.50 a.m. **OP 13**

Application of a newly proposed sensor for effective UV-irradiance for the monitoring of both natural and artificial weathering conditions

Volker Wachtendorf, Anja Geburtig, BAM, Berlin, D
Peter Trubiroha, Berlin, D

10.15 a.m.

Coffee Break

Session 7

Artificial Exposure

Chair: Christopher C. White, NIST, Gaithersburg, MD, USA

10.45 a.m. **OP 14**

Strain hardening as an indicator for the intrinsic time to failure of semi-crystalline polymers in artificial ageing

Matthias Gössi, Sika Technology AG, Zürich, CH

11.10 a.m. **OP 15**

Water delivery during accelerated weathering testing of coatings for improved correlation to outdoor results

Andy Francis, Bill Tobin, Sean Fowler, David Duecker, Andreas Giehl, Brad Reis, Q-Lab Corporation, Westlake, OH, USA

11.35 a.m. **OP 16**

Laboratory Weathering with H₂O₂ Spraying

Artur Schönlein, RAWES, Rüsselsheim, D
Shigeo Suga, Suga Test Instruments Co., Ltd. Shinjuku, Tokyo, J

12.00 p.m.

Lunch Break

Conference Program
Friday, September 20, 2019

1.20 p.m. **OP 17**

Development of condition monitoring methods for polymeric components including low dose rate radiation exposure

Anna Jansson, Johan Sandström, RISE Research Institute of Sweden AB, Borås, S

1.45 p.m. **OP 18**

Accelerated Thermal Ageing of Thermoplastic Materials: Characterization and Modeling

Ingo Alig, Dirk Lellinger, Harald Oehler, Karsten Rode, Frank Malz, Lena Mavie Herkenrath, Fraunhofer Institute for Structural Durability and System Reliability LBF, Darmstadt, D
Jee young Youn, Hyundai Motor Company, Research & Development Division, Gyeonggi-do, ROK

2.10 p.m.

Short Coffee Break

Session 8

Photovoltaics

Chair: Michael Köhl, Fraunhofer ISE, Freiburg, D

2.30 p.m. **OP 19**

Ecological footprint of PV electricity: influence of waste management, degradation and lifetime

Karl-Anders Weiß, Sina Herceg, Sebastián Pinto, Fraunhofer Institute for Solar Energy Systems (ISE), Freiburg, D

2.55 p.m. **OP 20**

Material Combinations in PV-Modules: Real Behaviour vs. Accelerated Ageing Tests

Yuliya Voronko, Gabriele Eder, Paul Grillberger, OFI, Austrian Research Institute for Chemistry and Technology, Wien, A
Gernot Oreski, PCCL, Polymer Institute for Chemistry and Technology, Wien, A
Wolfgang Mühleisen, CTR, Carinthian Tech Research AG, Villach/St. Magdalen, A

3.20 p.m. **OP 21**

Development of Climate Specific Accelerated Ageing Tests for Photovoltaic Modules

Gabriele Eder, Yuliya Voronko, P. Grillberger, OFI, Austrian Research Institute for Chemistry and Technology, Wien, A
Karl A. Berger, Újvári Gusztáv, AIT, Austrian Institute of Technology, Wien, A
Karl Knöbl, FH-TW, University of Applied Sciences Wien, A

3.45 p.m.

Closing Remarks



**Gesellschaft für
Umweltsimulation e.V.**

Gesellschaft für Umweltsimulation e.V.

Sabine Aref

P. O. Box 12 40

76318 Pfinztal

Germany



Registration Form

Gesellschaft für Umweltsimulation e.V.

Sabine Aref

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76327 Pfinztal

Germany

Fax: +49 (0) 721 46 40-345

E-mail: secretariat@gus-ev.de

Invoice Address

Surname/First Name

Title

Organisation

Street

Postal Code/City

Country

Phone

Fax

E-mail

Please type or print

Conference Fee

☐ Registration before June 14, 2019: € 550,--

☐ Registration after June 14, 2019: € 650,--

☐ Accompanying person (welcome reception, dinner, sightseeing tour) € 110,--

Payment

☐ By money order (after receipt of invoice) ☐ Cash on arrival

I agree that pictures taken during this event may be published and the data collected in the registration form could be used for registration and communication with the organizer.

Date

Signature

Hotel Room Reservation

GUS has reserved a special room contingent at the following hotels:

Hotel Euler 4**** (Conference Venue)

Budget Design Hotel City Inn 3*** (in the same building as Hotel Euler)

Please make your reservation directly with the hotel by using the booking code EWS 2019. Please see the attached Hotel Information Form.