



CONFERENCE SCHEDULE

All times in Central European Standard Time (CEST)

Saturday, 26 April

8:00 AM – 12:30 PM **RESEARCH COMMITTEE MEETING**
1:00 – 4:30 PM **LEADERSHIP MEETING**

Sunday, 27 April

8:00 AM – 5:00 PM **SMRI TECHNICAL CLASS:** Solution Mining (*Optional with additional charge; repeated from Fall 2024 conference*)

Monday, 28 April

8:00 – 10:00 AM **BUSINESS MEETING**
Members Only

10:30 AM – 5:00 PM **TECHNICAL PAPER PRESENTATIONS**

10:00 AM – 2:00 PM **FRIENDS & SPOUSES WALKING TOUR**

5:45PM – 11:00PM **MONDAY EVENING NETWORKING EVENT**
Optional; additional charge

Tuesday, 29 April

8:00 AM – 5:00 PM **TECHNICAL PAPER PRESENTATION**

9:00 AM – 4:00 PM **FRIENDS AND SPOUSES TOUR**

Wednesday, 30 April

8:00 AM – 5:00 PM **FIELD TRIP 1:** *NWKG Oil Storage Facility & Wilhelmshaven Boat Cruise*

8:00 AM – 5:00 PM **FIELD TRIP 2:** *Oil and Gas Storage Facility Stora Etzel, Friedeburg & NWO Oil Tank Farm, Wilhelmshaven*

8:00 AM – 5:00 PM **FIELD TRIP 3:** *EWE Gas Storage Facility Huntorf & Uniper CAES Plant Neuenhuntorf*

CONTACT

CONFERENCE ASSISTANCE

SMRI Membership Issues

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Registration Assistance

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 Conferences and Education
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PROGRAM QUESTIONS CONTACT

Program Chair 2025

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Assistant Program Chair 2025

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CLASS QUESTIONS CONTACT

Technical Class Chair 2025

Mr. Dirk Zapf Secretary-Treasurer
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Research Coordinator

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REGISTRATION INFORMATION

IN-PERSON ATTENDEES

All conference attendees must be in the SMRI database and register online in advance, with payment required for confirmation. Non-technical guests must be registered as "guests" before finalizing the online payment. Event space is limited. The delegate registration fee includes access to Sunday Icebreaker, breakfast, AM/PM breaks, and Monday and Tuesday lunches. Registering after 2 April incurs a \$250 additional charge, subject to space availability.

REMOTE ATTENDEES

SMRI plans to broadcast the Wilhelmshaven meeting in a hybrid format. The same platform as previous events will be used, and details will be shared closer to the conference date. Virtual attendees must register separately with a link on the registration page. The remote delegate registration fee is the same as in-person rates, covering live feed broadcast, on-demand videos, and a file of all presented papers. Register before 18 April to avoid additional \$250 charge. *The Technical Class will be live-streamed only and not available on-demand afterward.*

conference pricing

MEMBER COST: \$700
 (\$600 w/o Monday Night Event)

NON-MEMBER COST: \$1,200
 (\$1,100 w/o Monday Night Event)

Discounts available for Class Instructors and one Speaker per paper. University students contact John Nadeau (jnadeau@solutionmining.org) to apply for discounted registration.

registration dates

12 FEBRUARY
 Member registration begins

12 MARCH
 Non-member registration begins

2 APRIL
 Registration ends;
 no refunds after this date

HOTEL & TRAVEL DETAILS

HOTEL

Atlantic Hotel Wilhelmshaven

Jadeallee 50, 26382
 Wilhelmshaven, Germany

Book the Atlantic Hotel Here

SMRI RATE **RESERVATIONS**
 185.00 EU +49 04421/733 38-162
veranataaltung.ahw@atlantic-hotels.de

AIRPORT

Wilhelmshaven is 61 miles from Bremen Airport (BRE). Bremen Hbf (train station) is a 10-minute drive from the airport and about 1.5 hours from Wilhelmshaven.

OVERFLOW HOTEL

B&B Hotel Wilhelmshaven

Jadeallee 100, 26382
 Wilhelmshaven, Germany

RESERVATIONS
 +49 (0)4421 / 755792-0
 Group Code: 882442

The Atlantic Hotel Wilhelmshaven is nearly full. Other hotels within a 10 min. walking distance include: Hotel Banterhof, Beans Parc Hotel Jade, Wilhelms Haven Hotel, and Neubau Wohnungen.



CONFERENCE ANNOUNCEMENT



SMRI **SPRING 2025** WILHELMSHAVEN | GERMANY
APRIL 27-30

SPRING 2025 SPONSORS

Sponsorships help defray costs of hosting conferences, keep conference fees affordable, and allow more of member dues to be directed towards active research. Members or non-members may be sponsors. Current sponsorship information is available [online](#) or contact Rachel Cunningham (rcunningham@solutionmining.org or +1 713-724-3342) for more information. No commercial advertising is accepted, but SMRI will acknowledge contributions of all sponsors.

Thank you to our sponsors of the Spring 2025 Wilhelmshaven Conference!

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TECHNICAL CLASS INFORMATION

TECHNICAL CLASS

Solution Mining

SUNDAY, 27 APRIL | 8 AM - 5 PM

The Technical Class, typically held on Sunday prior to the Technical Session, is designed to be an introductory course or refresher course for the variety of disciplines and management levels that work in the solution mining environment and with solution mined caverns. Solution Mining was chosen as the topic for the Technical Class for Fall 2024 and Spring 2025 based on a survey by SMRI leadership to members.

The SMRI has continued to be a leader in solution mining concepts with many research projects and technical presentations over the past 50 years. To outline this

historical knowledge and provide further insight into these concepts, the SMRI has proposed a tentative list of topics for the Technical Class including:

- Theories regarding leaching and modeling
- Geological impacts on control of mining/developing a leaching concept
- Mining of non-halite materials
- Well hydraulics, hanging string design, and flow rates
- Overview of simulation software (SALGAS, SANSMIC, UBRO4, & others)
- Various case studies

technical class registration fees

MEMBERS

\$400

MEMBER REGULATOR

\$200

NON-MEMBERS

\$650

NON-MEMBER REGULATORS*

\$400

**STUDENTS
(SUBJECT TO SPACE)**

***No Charge**

The SMRI does include in the schedule of the Technical Class sufficient time for questions and open discussion during the sessions. Additionally, the structure of the session breaks and lunch breaks are great opportunities to continue the discussion with cavern peers.

FUTURE CONFERENCES

Fall 2025

28 Sept -1 Oct
 Wichita, Kansas, USA

Spring 2026

26 -29 April
 Edinburgh, Scotland



ICE BREAKER

Sunday, 27 April | 6:30 – midnight

Join SMRI friends in celebration of our 60th Anniversary. Guest will enjoy appetizers, wine, beer, coffee, tea, and soft drinks. It's a great way to kick off the Spring 2025 Wilhelmshaven Conference. No charge for delegates. \$75 fee for guests.

MONDAY NIGHT EVENT

Monday, 28 April | 5:45 – 10:30 pm (optional)
\$100/person | Max. 300 guests

Guests will visit the German Marine Museum, featuring exhibits in German and English, including the Destroyer "Molders," Speedboat "Gephard," Submarine "U10," and Mine Hunting Vessel "Weilheim." After the museum, guests will walk 350m to LaPatron for a European buffet. Barge passage to the museum starts at 5:45 pm; dinner is from 8:15 pm to 10:30 pm. Buses will return guests to the hotel.



FRIENDS & SPOUSES

Wilhelmshaven Walking Tour

Monday, 28 April – 10:00 am– 2:00 pm

On Monday, the group will take a 2-hour walk around Wilhelmshaven, exploring its history and current happenings. Afterward, enjoy free time for lunch, shopping, or further exploration. The walk back to the hotel takes 15-20 minutes. Wear comfortable shoes and dress accordingly.

15 persons max. \$20 per person.

Oldenburg Bus Tour

Tuesday, 29 April – 9:00 am–4:00 pm

Join local guide Alke-Lowin Acht for a 2-hour tour of Oldenburg, including the City Center and Castle Garden. Afterward, enjoy lunch at Ratskeller, located in the town hall cellar. You'll have free time for exploration or shopping before the bus departs for Wilhelmshaven, arriving by 4 pm.

20 persons max. \$50 per person.

WEDNESDAY TECHNICAL FIELD TRIPS

FIELD TRIP 1

NWKG Oil Storage Facility & Wilhelmshaven Boat Cruise

MAX CAPACITY: 50

COST: \$35 (all inclusive of transportation from/to hotel to the facilities, guided tours, lunch)

ANTICIPATED TIME: 8:00 am - 5:00 pm.

Nord-West Kavernengesellschaft mbH (NWKG) based Wilhelmshaven is one of the largest cavern operators in Europe storing around 15 million cubic meters of crude oil and mineral oil products for the Petroleum Stockpiling Association. NWKG operates further cavern locations at Bremen-Lesum, Sottorf near Hamburg and Heide. Under the background of decarbonization and change of the energy system NWKG is actively working on the preparation of conversion of their storage sites for a future hydrogen storage.

The site program will include a guided tour at the NWKG premises and the presentation of technical aspects developed for the site (e.g. oil/hydrogen wellheads, cavern simulator tour and virtual 3D geological tour). A BBQ will be served for lunch at the NWKG site.

In the afternoon there will be a boat tour starting from Hooksiel along the coast at Wilhelmshaven. The boat will be passing the Floating Storage & Regasification Unit (FSRU), a power plant, the oil and the navy ports. The final destination of the cruise is the Atlantic hotel.

FIELD TRIP 3

EWE Gas Storage Facility Huntorf and Uniper CAES Plant Neuenhuntorf

MAX CAPACITY: 30

COST: \$90 (all inclusive of transportation from/to hotel to the facilities, guided tours, lunch)

ANTICIPATED TIME: 8:00 am - 5:00 pm.

EWE GASSPEICHER GmbH is one of the largest storage operators in the Germany and Europe. A capacity of around 2 billion cubic meters of working gas is stored at four facilities in Huntorf, Nüttermoor, Jemgum and Rüdersdorf. Part of the the field trip will be a visit of the cavern storage facility at Huntorf where EWE is operating 7 gas storage caverns. EWE is planning to convert one cavern for hydrogen storage in the next years.

The Huntorf power plant is a combined compressed air energy storage and gas turbine power plant operated by Uniper Kraftwerke. When it was commissioned in 1978, the power plant was the first commercially used compressed air energy storage in the world. The compressed air for operation of the power plant is stored in 2 nearby salt caverns.

The site program will include presentations about the facilities and guided tours. Lunch will be provided between the both visits in a nearby restaurant.

FIELD TRIP 2

Oil and Gas Storage Facility Storag Etzel, Friedeburg & NWO Oil Tank Farm, Wilhelmshaven

MAX CAPACITY: 50

COST: \$90 (all inclusive of transportation from/to hotel to the facilities, guided tours, lunch)

ANTICIPATED TIME: 8:00 am - 5:00 pm

STORAG ETZEL GmbH is the largest independent provider of cavern storage in Germany. The company is building, maintaining and leasing underground storage capacity for gas and oil at the Etzel site since 1971. Currently, around 3.9 billion cubic meters of gas are stored in 51 caverns and over 10 million cubic meters of crude oil can be stored in a further 24 caverns. STORAG is working on the preparation of the site for potential future hydrogen storage as part of the H2CAST project.

The site program will include a presentation about the facilities and a guided tour at the STORAG premises. Lunch will be provided at the STORAG site.

In the afternoon, a visit to the tank storage facility of NWO (North West Oil) at the coast close to Wilhelmshaven is planned. The tank storage farm is wherefrom the oil transport pipelines to/from Storag and NWKG start/end and oil tankers are loaded/unloaded.

TECHNICAL PAPER LIST WITH ALL AUTHORS Page 1 of 2

Author(s)	Organization(s)	Title
Vincent Barrere, Arnaud Réveillère, Mehdi Karimi-Jafari	Geostock	Mechanical Integrity Tests in Salt Caverns: Modeling of the Leakage of Nitrogen, Hydrogen and Methane Through a Given Leakpath to Support Tests Interpretation
Matthias Brandt ¹ , Tobias Fabig ¹ , Eddy Kuperus ² , Jeroen Dirven ²	Institute for Geomechanics ¹ , Nederlandse Gasunie N.V. ²	Fast Multicyclic Storage of Hydrogen in Salt Caverns
Isabelle Tézenas, Jean-Paul Crabeil, Stéphane Walrave, Thibaut Crabeil	FLODIM	10 Years of EZ Cutter Experience, a Proven Contribution to Salt Cavern Development
Katarzyna Cyran, Tomasz Tobola, Pawel Kaminski	AGH University of Krakow	Correlation Between Macro- and Micro- Mechanical Behavior of Rock Salt Under Uniaxial Compression
Sabine Donadei, Amirhossein Enayati, Saeed Izadi, Uwe Krüger	Uniper Energy Storage GmbH	Huntorf Compressed Air Storage Power Plant Adjustment of Storage Performance and Capacity in Line with the Requirements of the Energy Transition
Hajar Habbani ¹ , Hippolyte Djizanne ¹ , Amade Pouya ² , Benoit Brouard ³	Ineris ¹ , Laboratoire Navier ² , Brouard Consulting ³	Thermomechanical Analysis of Wall Spalling in Salt Caverns for Gas Storage: Insights from DISROC Fracture Modeling.
Gregoire Hevin ¹ , Hippolyte Djizanne ² , Maurice Schlichtenmayer ³ , Benoit Brouard ⁴	Storengy SAS ¹ , Ineris ² , ESK GmbH ³ , Brouard Consulting ⁴	HyPSTER Project - Results of the Pilot of salt Cavern Hydrogen Storage in France
Silvan Hoth ¹ , Patryk Tomaszewski ² , Hendrik Wilke ² , Farideh Sarikhany ¹ , Heinz Michael Springer ¹ , Dirk Knaust ¹ , Janiche Beeder ¹ , Christopher McMichael ² , Fritz Wilke ² , Jamie Slingsby ³ , Victoria Spooner ³	Equinor ASA ¹ , AtkinsRéalis ² , SSE Thermal ³	Aldbrough Hydrogen Storage - Legacy Data for New Caverns in Deep Bedded Zechstein Salt
Christian Jakob ¹ , Tobias Pinkse ² , Marinus den Hartogh ³ , Els Wijermars ³ , Paul Oonk ³ , Siebe Viersen ³	K-UTEC AG ¹ , REinvent Solutions B.V. ² , Nobian Industrial Chemicals ³	The Bekendam-Jakob-Pinkse (BJP) Subsidence Prognosis Algorithm for Migrating Salt Caverns in a Bedded Salt Deposit near Hengelo, The Netherlands
Maximilian O. Kottwitz ¹ , Tobias S. Baumann ¹ , Joyce Schmatz ² , Anton A. Popov ¹ , Benoit Brouard ³ , Richard R. Bakker ⁴ , Marinus den Hartogh ⁴	smartTectonics GmbH ¹ , Microstructure and Pores GmbH ² , Brouard Consulting ³ , Nobian Industrial Chemicals BV ⁴	3D THM-Coupled Simulations of Low-Stress Creep Experiments Using Digital Twins of Heterogeneous Rock Salt
Wolfgang Littmann ¹ , Gökalp M.ŞENER ²	PSE Engineering ¹ , BOTAS Petroleum Pipeline Corp. ²	A Case Study of Salt Cavern Leaching Simulation, Using Cartesian Grids and Multiple Wells

TECHNICAL PAPER LIST WITH ALL AUTHORS Page 2 of 2

Author(s)	Organization(s)	Title
Jan Bernd Meyer ¹ , Andre Gassner ¹ , Johannes Brüning ¹ , Jonas Hase ² , Jens Langer ² , Sophie Emmerlich ² , Malte Simon ² , Janine Langer ²	NWKG ¹ , DEEP.KBB ²	Transforming an Oil Cavern Field for Hydrogen Storage with Insights from the Rüstringen K410
Gesa Netzeband ¹ , Helen Werner ¹ , Nicole Grobys ¹ , Heike Behrendt ^{1,2} , Roman Przyrowsky ^{1,3} , Jürgen Rückheim ^{1,4,5}	DGMK e.V. ¹ , DEEP.KBB GmbH ² , Uniper Energy Storage GmbH ³ , PGR & Permitting Consultant ⁴ , Vermilion Energy Germany GmbH & Co. KG ⁵	Subsurface Expertise and Joint Research - the DGMK Recipe for a Successful Transformation of Energy Storage
Patrick Roordink ¹ , Fraser Murray ² , Bert De Vries ² , Darrell Adkins ² , Arpana Verma ² , Sandeep Thatathil ² , Shashwat Shuckla ²	Nederlandse Gasunie N.V. ¹ , Halliburton ²	Evaluation of Downhole Completion Technology and Material Samples Following a Successful Underground Hydrogen Storage Demonstration in the Netherlands
Matteo Scapolan, Sophie Minas	RESPEC	Uncertainty Propagation Method Applied to Nitrogen-Brine Interface, Mechanical Integrity Test Analysis
Thomas Schicht, Tobias Brestrich, Julia Wondrak	K-UTEC AG Salt Technologies	Concept and Implementation of Seismic Monitoring in Salt and Potash Cavern Fields
Maurice Schlichtenmayer ¹ , Michael Glöckner ¹ , M. Rockenschaub ¹ , Andreas Bannach ¹ , Hippolyte Djizanne ² , Gregoire Hevin ³	ESK GmbH ¹ , Ineris ² , Storengy SAS ³	Impact of Infrastructural Constraints on the Potential for Hydrogen Storage in European Countries
Joyce Schmatz ¹ , Mingze Jiang ¹ , Eva Wellmann ¹ , Tobias Baumann ² , Benoit Brouard ³ , Richard R. Bakker ⁴ , Marinus den Hartough ⁴	Microstructure and Pores GmbH ¹ , smartTectonics GmbH ² , Brouard Consulting ³ , Nobian Industrial Chemicals B.V. ⁴	On the Generation of 3D Microstructural Models to Analyze Creep and Permeation Behavior through Digital Twin Simulations
A.J. Smit, P.A. Fokker	Nedmag	Pre-Abandonment Mg-Salt Cavern Monitoring for Leak-off Events
Gion Strobel, Annette Lenze, Catharina Lesche, Maxim Stein-Khokhlov	Uniper Energy Storage GmbH	Prediction of Microbial Impurities During Hydrogen Storage in Salt Cavern
Ryan Vickers	Texas Brine Company, LLC	Replacing Intermediate Casings with Large Diameter Liners to cost Effectively Reduce Downhole Risk
Or Yogev ¹ , Tzvi Joshua ¹ , Dror Tapiero ¹ , Tjeerd Koopmans ²	Augwind ¹ , Mole Underground Projects and Consultancy ²	Isothermal Compressed Air Energy Storage (I-CAES) in Solution Mined Salt Caverns

CONFERENCE ANNOUNCEMENT



SMRI **SPRING 2025** WILHELMSHAVEN | GERMANY
APRIL 27-30

TECHNICAL CLASS SCHEDULE

Time	Instructor	Title	Objectives
8:00 Technical Class Introduction: Tim Bauer/Dirk Zapf			
8:10	Charles Chabannes <i>Texas Brine Company, LLC</i>	General Introduction to Solution Mining	Overview of Mining for Mineral Production and Storage overview. NaCl, KCl salts, sulfates, etc; gas and liquid storage.
8:30	Yvan Charnavel <i>Storengy</i>	Theory of Leaching and Modeling	Basic science of solution mining
9:00	Hendrik Wilke <i>AtkinsRéalisis</i>	Solution Mining as Part of Cavern Project Development	Optimization of cavern development (leaching) by coordinated discipline integration and evaluation. (with examples and exercises)
10:00 MID-MORNING BREAK: Coffee/Tea, Refreshments (20 Mins)			
10:20	Gerald Ziegenbalg <i>IBZ-Salzchemie GmbH & Co. KG</i>	Solution Mining as Part of Cavern Project Development (cont.)	Selected solid-liquid phase equilibria examples and application.
11:30	Yvan Charnavel <i>Storengy</i>	Simulation Software Tools Overview (SALGAS/UBRO/OTHERS Overview of Modeling)	What's inside a solution mining software; historical review of evolution of software, applicability and disclaimers
12:00 LUNCH BREAK: Included with Class Registration (1 Hour)			
1:00	Arnaud Reveillere <i>Geostock</i>	Well Hydraulics, Hanging String Design, Flow Rates	Review of Physical well/flow/cavern considerations during mining.
1:30	Sebastiaan van der Klauw <i>ERCOSPLAN GmbH</i>	Mining of Non Halite Minerals, K/Mg Salts, Sulfates	Discussion and overview of impacts on dissolution from differing materials.
2:00	Gary Jones <i>Leaf River Energy Center LLC</i>	Case History - Initial Leaching, Re-Leaching and Solution Mining Under Gas	Focus on Solution Mining Under Gas (SMUG) application, example and discussion.
2:30	Dan Bach <i>Texas Brine Company, LLC</i>	Case History - Gulf Coast Salt Dome Cavern	Using Ubro for Asymmetrical Mining in Gulf Coast Salt Domes
3:00 MID-AFTERNOON BREAK: Coffee/Tea, Refreshments (30 Mins)			
3:30	Heike Bernhardt & Jens Langer <i>DEEPKBB GmbH</i>	European Domal and Bedded Salt Cases	Review of Domal and Bedded salt in Europe, unique characteristics and examples of cavern development
4:15	Wilfred Brandt	Solution Mining Field Closure	Challenges and Solutions In Closure Operations and Field Monitoring
4:40	Kiko Friguglietti <i>Sabine Storage & Operations, Inc.</i>	Case History Issues With Mining (Lessons Learned)	Review of several examples of recent and historical solution mining impacts/issues
5:15 Tim Bauer: Technical Class Concluding Remarks			