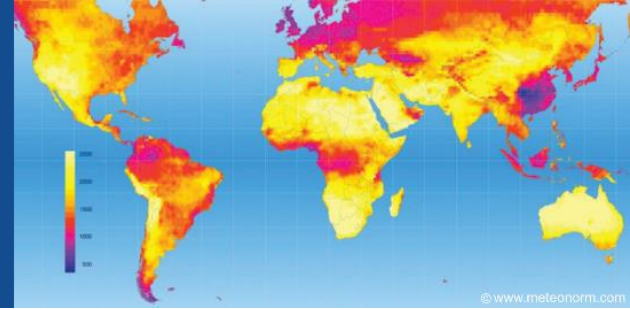


September 27 - October 1, 2021  
Online Event

27<sup>th</sup> SolarPACES Conference



## SolarPACES 2021 Online Conference Program

*All times are shown in UTC!*

### Wednesday, September 29

#### **10:30 WED-1A: Receivers and Heat Transfer Media and Transport: Point Focus Systems**

*Chair: Wesley Stein, CSIRO*

10:30 Innovative 3D-Shaped Structures as Volumetric Absorbers

*Robin Tim Broeske, German Aerospace Center, Institute of Solar Research*

10:45 MW-Scale Fluidized Particles-in-Tube Solar Loop at Themis Tower. Implementation and Commissioning

*Gilles Flamant, CNRS*

11:00 A Non-Intrusive Optical (NIO) Method to Measure Optical Errors of in-situ Heliostats in Utility-Scale Power Tower Plants: Characterizing Utility-Scale Power Plants

*Tucker Farrell, National Renewable Energy Laboratory*

11:15 VoCoRec - a Novel Two-Stage Volumetric Conical Receiver

*Matthias Offergeld, German Aerospace Center (DLR), Institute of Solar Research*

#### **10:30 WED-1B: Advanced Materials, Manufacturing, and Components**

*Chair: Cristina Prieto (University of Seville)*

10:30 Mitigation of Fabrication Risks in a Micro-Pin Supercritical Carbon Dioxide Solar Receiver

*Bryan Siefering, Oregon State University*

10:45 Mitigation of Stress Relaxation Cracking in Hot Thermal Energy Storage Tank Welds

*Timothy Pickle, Colorado School of Mines*

11:00 Performance of A High-Temperature Particle-Based Shell-And-Tube Crossflow Heat Exchanger Suitable for CSP Power Generation Application

*Hany Al-Ansary, King Saud University*

11:15 The Potential of Refractory Alloys for Solar Applications

*Ludovic Charpentier, PROMES-CNRS*

11:30 Properties of Silicon Carbide Fiber Composite Receiver Tubes Manufactured by PIP Process

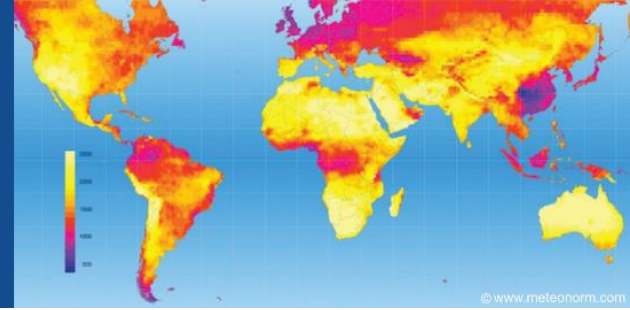
*Farhad Mohammadi-Koumleh, Ceramic Tubular Products*

11:45 Secondary Reflectors Tested at High Temperatures and High Radiation Intensities

*Sophie Gledhill, Fraunhofer Institute for Solar Energy Systems*

September 27 - October 1, 2021  
Online Event

27<sup>th</sup> SolarPACES Conference



**10:30 WED-1C: Analysis and Simulation of CSP and Hybridized Systems**

*Chair: Giampaolo Manzolini (Politecnico di Milano)*

10:30 Accelerating Raytracers for Central Receiver Systems using a GPU

*Pascal Richter, RWTH Aachen University*

10:45 Aim Point Management System

*Laurin Oberkirsch, Institute of Solar Research, German Aerospace Center (DLR)*

11:00 Towards a Neural Network Based Flux Density Prediction – Using Generative Models to Enhance CSP Raytracing

*Max Pargmann, German Aerospace Center*

11:15 Static Optimal Control: A Closed-Loop Control Strategy for Heliostat Aiming in Solar Power Towers

*David Zanger, German Aerospace Center (DLR)*

**10:30 WED-1D: Receivers and Heat Transfer Media and Transport: Linear Systems**

*Chair: Eduardo Zarza (Plataforma Solar de Almería)*

10:30 Development of an Equivalent Porous Medium Model for a Tubular Receiver Equipped with Raschig Rings

*Hossein Ebadi, Dipartimento Energia "Galileo Ferraris"*

10:45 Heat Capacity of Molten Solar Salt

*Christian Jung, DLR*

11:00 Hydrogen Mitigation Performance at Nevada Solar One

*Greg Glatzmaier, National Renewable Energy Laboratory*

11:15 Jumbo-Reflectors: A Solution for Further Reduction of LCOE for Parabolic Trough Collectors

*Francisco Torres Sartori, Fraunhofer Institute for Solar Energy Systems ISE*

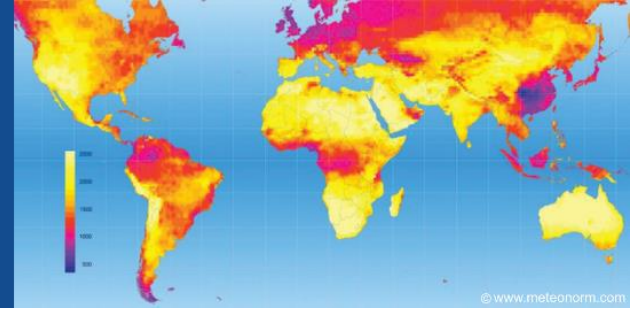
11:30 Numerical Investigation of a Trapezoidal Cavity Multi-tube Receiver for a Linear Fresnel Collector

*Sergio Alcalde-Morales, CIEMAT - Plataforma Solar de Almería*

12:30 *Break - Visit our Sponsors*

September 27 - October 1, 2021  
Online Event

27<sup>th</sup> SolarPACES Conference



### 13:00 Plenary: Heat Transfer Fluids

*Chair: Athanasios Konstandopoulos, Aristotle University*

- 1 Progress in the Development of Molten Salt  
*Thomas Bauer, German Aerospace Center*
- 2 Silicone-based Heat Transfer Fluids - Overcoming the Thermal Limits of Parabolic Trough Plants with Bankable Systems  
*Erich Schaffer, Wacker Chemie AG*
- 3 Particle-Based CSP: A Step Closer to Commercialization  
*Hany Al-Ansary, King Saud University*
- 4 Sodium HTF - driving deployment by unlocking modular tower CSP, and future-proofed for high temperature applications  
*Craig Wood, Vast Solar*
- 5 Development of SCO<sub>2</sub> Power Cycles and Its Relevance to CSP  
*Jeff Moore, Southwest Research Institute*

### 15:00 Break - Visit our Sponsors

#### 15:30 WED-2A: Receivers and Heat Transfer Media and Transport: Point Focus Systems

*Chair: Clifford Ho (Sandia National Laboratories)*

- 15:30 Lessons Learnt from Permitting Process of the HiFlex Project  
*Miriam Ebert, DLR*
- 15:45 A Numerical Radiation Model for Centrifugal Particle Solar Receiver  
*Serdar Hicdurmaz, DLR Institute of Solar Research*
- 16:00 Numerical Simulation of Convective Heat Transfer Coefficient in Wire Mesh Absorbers with 0.1 mm wire diameter  
*Daniel Sanchez-Señoran, CIEMAT-PSA*
- 16:15 Thermal Performance Analysis of a Scaled-up Suspension Flow Receiver for Generation of Industrial Process Heat: A Computational Study  
*Daniel Ang, The University of Adelaide*

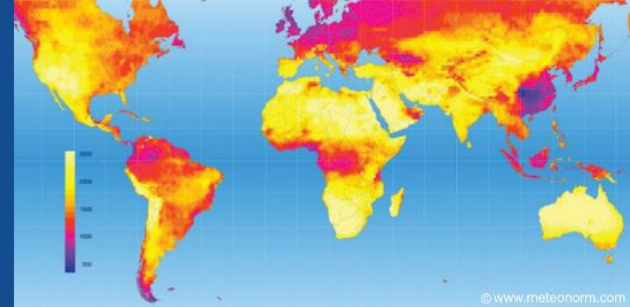
#### 15:30 WED-2B: Thermal Energy Storage Materials, Media, and Systems

*Chair: Nicolas Calvet (Masdar Institute)*

- 15:30 Numerical Analysis and Design Optimization of an Innovative Radial Flow Packed Bed Thermal Energy Storage  
*Silvia Trevisan, KTH Royal Institute of Technology*
- 15:45 Progress on Molten Nitrate Salt Storage Above 600 °C  
*Alexander Bonk, German Aerospace Center (DLR)*

September 27 - October 1, 2021  
Online Event

27<sup>th</sup> SolarPACES Conference



16:00 A Simply Method to Determine the Thermal Capacity of Fillers for Sensible Heat Thermal Storage Under Operating Conditions  
*Elisa Alonso, CIEMAT-PSA*

16:15 Steady & Transient Heating & Cooling Analysis for High-Temperature Chloride Molten Salt Storage Tanks  
*Kenneth Armijo, Sandia National Labs*

### **15:30 WED-2C: Analysis and Simulation of CSP and Hybridized Systems**

*Chair: Marco Binotti (Politecnico di Milano)*

15:30 A Comparison Between Model Predictive and PID-Based Control of a Molten Salt Solar Tower Receiver  
*Rudolf Popp, Institute of Automatic Control, RWTH Aachen University*

15:45 Model Predictive Assistance for Operational Decision Making in Molten Salt Receiver Systems  
*Christian Schwager, Solar-Institut Jülich, FH Aachen University of Applied Sciences*

16:00 Fast Heuristics for Receiver Life Estimation and Design  
*Bipul Barua, Argonne National Laboratory*

16:15 Evaluating the Thermal Efficiency of Multistage Falling Particle Receiver Subject to Wind  
*Jae Bok Lee, Sandia National Laboratories*

16:30 Model Validation of Falling Particle Receivers with On-sun Experiments  
*Brantley Mills, Sandia National Laboratories*

16:45 Sensitivity Analysis of Moving Packed Bed Heat Exchanger Models  
*Christopher Bowen, Sandia National Laboratories*

### **15:30 WED-2D: Measurement Systems, Devices, and Procedures**

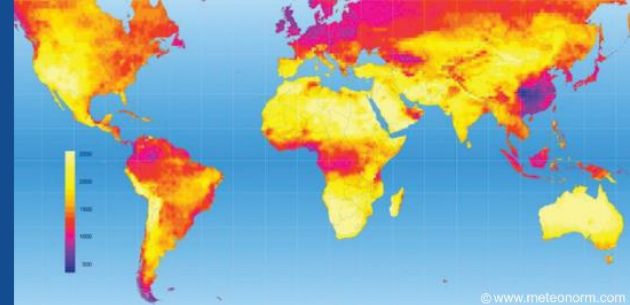
*Chair: Marc Röger (German Aerospace Center / DLR)*

15:30 Automated Optical Analysis of Parabolic Trough Concentrating Solar Collectors Using Deep Learning and Computer Vision  
*Devon Kesseli, National Renewable Energy Laboratory*

15:45 Distortion Effects in CSP Mirror Reflections  
*Randy Brost, Sandia National Laboratories*

16:00 A Non-Intrusive Optical (NIO) Method to Measure Optical Errors of in-situ Heliostats in Utility-Scale Power Tower Plants: Overall Progress and Field Test  
*Guangdong Zhu, National Renewable Energy Laboratory*

16:15 Rapid In-situ Metrology of a Heliostat Field using Starlight  
*Roger Angel, Steward Observatory, University of Arizona*



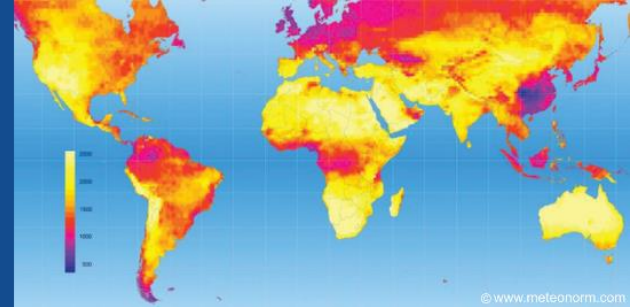
### 17:30 Poster Session 3

L - Solar Fuels and Chemical Commodities | M - Solar Industrial Process Heat and Thermal Desalination | N - Solar Resource Assessment | O - Thermal Energy Storage Materials, Media, and Systems

- L-01 Effect of Heating Rate on Thermochemical Pyrolysis of Spent Coffee Ground in a Windowed Internally-Circulating Fluidized Bed Reactor  
*Nobuyuki Gokon, Niigata University*
- L-02 Temperature Impacts on Reactivity of  $\text{La}_{0.7}\text{A}_{0.3}\text{Mn}_{0.9}\text{Cr}_{0.1}\text{O}_3$  of Perovskite Oxides in a Thermochemical Two-step  $\text{H}_2\text{O}/\text{CO}_2$  Splitting  
*Nobuyuki Gokon, Niigata University*
- L-03 Thermochemical Two-step  $\text{H}_2\text{O}/\text{CO}_2$  Splitting Using  $\text{La}_{0.7}\text{Sr}_{0.3}\text{XO}_3$  of Perovskite Oxides for Solar Fuel Production  
*Nobuyuki Gokon, Niigata University*
- L-04 Thermal Study of a Liquid Metal Reactor for Methane Cracking  
*Angel Martínez-Rodríguez, Universidad Politécnica de Madrid*
- L-05 A New Hybrid Solar/Electric Reactor for Gas or Liquid Media Methane Pyrolysis  
*Malek Msheik, PROMES/CNRS*
- L-06 Development Of An Accelerated Ageing Method For Solar Receiver' Materials In Solar Chemical Reactors  
*Alfonso Vidal, CIEMAT-PSA*
- M-01 Numerical Study on Multi-effect and Multi-stage  $\text{NH}_3/\text{H}_2\text{O}$  Absorption Chillers for Negative Cooling in SHIP Systems  
*Fabio Aste, CEA - Atomic Energy and Alternative Energies Commission*
- M-02 Thermal Losses Characterization for the Receiver of the SunDial, the Rotary Fresnel Collector  
*Antonio J Rovira, Universidad Nacional de Educación a Distancia (UNED)*
- M-03 Dynamic Analysis of the SunDial, the Rotatory Fresnel Collector  
*Magdalena Barnetche, Universidad Politécnica de Madrid*
- M-04 Feasibility Analysis of an Industrial Turbocharged Solar Air Heater Using Linear Fresnel Collectors  
*Antonio Famiglietti, Universidad Carlos III de Madrid*
- M-05 Design and Integration of a Solar Heat System Based on the SunDial Collector for Industrial processes  
*Mercedes Ibarra, Universidad Nacional de Educación a Distancia (UNED)*
- M-06 Effect of Solar Field Thermal Energy Variability on the Output of a Multiple Effect Desalination System Coupled with Thermal Storage  
*Kranthi Jonnalagadda, Cranfield University*
- N-01 Validation of HelioClim-3-derived Solar Radiation Products in Arid Desert Conditions  
*Dunia Bachour, QEERI*
- N-02 Comparison between Measured and Calculated DNI for Various Cities in Saudi Arabia  
*Abdelrahman Elleathy, King Saud University*
- N-03 Performance Comparison of Direct Solar Radiation Separation Model in South Korea  
*Myeongchan Oh, Korea Institute of Energy Research*

September 27 - October 1, 2021  
Online Event

27<sup>th</sup> SolarPACES Conference



- O-01 Experimental Investigation of an Air-Tight Thermal Storage Tank Design Suitable for Particle-Based CSP Systems  
*Hany Al-Ansary, King Saud University*
- O-02 Thermodynamics of Fe-doped magnesium manganate for thermochemical energy storage  
*Alicia Bayon, Arizona State University*
- O-03 Optimization of an Innovative Thermal Energy Storage System based on the Combination of Latent and Sensible Heat Storage for Molten Salts CSP Plants  
*Fritz Zaversky, CENER*
- O-04 Thermo-Fluid-Dynamic Modelling and Optimization of an Indirect Molten-Salt Thermocline Energy Storage System  
*Mattia Cagnoli, Politecnico di Torino*
- O-06 Energy Evaluation of Different Materials with Low Melting Point for Solar Thermal Storage  
*Mauro Henriquez, Universidad de Antofagasta, Centro de Desarrollo Energético*
- O-07 Evaluation of Thermal Storage Technologies for the Use of Electrical Energy Discharges in the Northern Macrozone of Chile  
*Mauro Henriquez, Universidad de Antofagasta, Centro de Desarrollo Energético*
- O-08 Defining a Business Model for Utility-Scale Thermal Energy Storage – Value Proposition, Needs, and Opportunities  
*Hendrik Laubscher, Sandia National Laboratories*
- O-09 Thermal Hydraulic Static Operation of a Chloride Molten Salt Shut-Off Valve  
*Dimitri Madden, Sandia National Laboratories*
- O-10 New Material Solutions from Saint-Gobain for Thermal Energy Storage  
*Samuel Marlin, Saint-Gobain CREE*
- O-11 Transient System Analysis of a Gen3 Particle-Based CSP Plant with Spatially Resolved Thermal Storage Charging and Discharging  
*Kaden Plewe, The University of Texas at Austin*
- O-12 Thermal Water-Steam Storage for CSP: Modeling and Identification of Liquid Level Fluctuations during Unloading Phases  
*Edouard Butaye, PROMES-CNRS*
- O-13 Carbonation Reaction of the CaO-Mayenite System: Kinetic Analysis at Different CO<sub>2</sub> Partial Pressures  
*Luca Turchetti, ENEA*
- O-14 Nanofluids Specific Heat Capacity: a Sampling Study.  
*Adela Svobodova-Sedlackova, Universitat de Barcelona*
- O-15 Experimental Study of the Impact of Fluid Distribution on Thermocline Storage Performance  
*Ségolène Vannerem, PROMES-CNRS*
- O-16 Design and Development of a Cold Prototype Pressurized Fluidized Bed Heat Exchanger for Discharging Thermal Energy in a Long-Duration Particle Thermal Energy Storage System  
*Xingchao Wang, Colorado School of Mines and National Renewable Energy Laboratory*