

Colloquium Final Report

N. 617 – Multiscale mechanics, multiphysics modeling and simulations for energy storage

Dates and location: **29/08/2022 - 31/08/2022, Lake of Garda, Italy**

Chairperson **Prof. Alberto Salvadori, Università degli Studi di Brescia, Italy**

Co-Chairperson **Prof. Robert McMeeking, UCSB, USA ; Dr. Edwin Knobbe, BMW AG, Germany**

Conference fees

- Early bird [15/5/2022] - full registration **250.0 €**
- Late [after 16/5/2022] - full registration **300.0 €**
- Online registration **100.0 €**
- Accompanying fee (dinner) **80.0 €**
- Poster registration **250.0 €**

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What other funding was obtained? **Sponsors: University of Brescia ; BMW Group ; Dassault Systemes ; Comsol ; Sabic** Conference fees: **Early registration speakers: 250 euros ; Late registration speakers: 300 euros ; Poster registration speakers: 250 euros ; Remote attendance registration: 100 euros ; Euromech provided 2000 euros support, and the platform cost for remote attendance was 2500 euros.**

What were the participants offered? - **Three days of scientific presentations and round-table discussion, in hybrid format (30 speakers, 11 posters, 4 in-person attendees; 7 video-conf) at the Congress Center in Sirmione, Lake of Garda.**

- **Five coffee breaks with pastries and cookies.**

- **1 colloquium dinner at the winery "Borgo la Caccia", Pozzolengo. The dinner included bus transport, a performance by a duet (Daniela Fusha arpa and violin ensemble); cocktail.**

- **Welcome address from the Rector of the University of Brescia, from the Major of Sirmione.**

- **Service of remote connectivity, safety, cleaning.**

- **11 Posters printing.**

Number of members of Euromech (reduced registration fee) **33**

Applicants (members)

- Matteo Arricca
- Apu Basak
- Manuel Berlato
- Nicole Blum
- Claudia Bonanno
- Kingshuk Bose
- Adam Boyce
- Luigi Cabras
- Nicolò Curati
- Vikram Deshpande
- Claudio Di Leo
- Eta Forshamn
- Juan Hurtado
- Marc Kamlah
- Satheesh Kandasamy
- Ulrike Krewer
- Arno Kwade
- Arnulf Latz
- Gueric Lemoine
- Emilio Martinez-Paneda
- Robert McMeeking
- Matthias Neumann
- Birgit Regner-Kamlah
- Alberto Salvadori
- Maria Schmidt
- Volker Schmidt
- Paul Shearing
- Brian Sheldon
- Jessica Smith
- Kandler Smith
- Robert Taylor
- Wolfgang A. Wall
- Bai-Xiang Xu

Applicants (non members)

- Marzieh Bastanfar
- Sascha Berg
- Giovanna Bucci
- Pieremanuele Canepa
- Yanyu Chen
- Andrea Colavitto
- Marvin Cronau
- Dmitri Danilov
- Tanmay Dev
- Sahar Esmizadeh
- Alejandro A. Franco
- Orkun Furat
- Kai Guo
- Souzan Hammadi
- Han Kil Kim

- Matthias Lachner
- Massimiliano Luzi
- Matthew McDowell
- Simone Montalto
- Victor Oancea
- Daniele Panfiglio
- Sreekanth Pannala
- Omar Perego
- carlo piccinato
- Yue Qi
- IRENE QUINZENI
- Michele Rizzotti
- Kenneth Runesson
- Christoph Schmidt
- Mattia Serpelloni
- Congcong Shang
- Don Siegel
- Stephan Sinzig
- Paul Specker
- Christiaan Stoker
- Negin Valizadeh
- Tejs Vegge
- Erkin Yildiz

Scientific Report

The purpose of the Euromech Colloquium "MULTISCALE MECHANICS, MULTIPHYSICS MODELING AND SIMULATIONS FOR ENERGY STORAGE" was to bring together the most active international research and industrial groups (with a special focus on Europe) to discuss fundamental issues for the development of next generation batteries - typically lithium or sodium ion.

Safety issues have led to the development of solid-state batteries, which present many open problems, most of which - perhaps surprisingly to non-experts - mechanical in nature. Although the usual audience for these kind of conferences is the academic one, the times we live in and a natural inclination of the organizers call for a strong presence of industrial groups, both large players in the manufacturing of batteries and automotive or consumer in general. One third of the scientific committee was selected from industry (BMW, Dassault Systemes Simulia Corp.) and representatives of several industrial groups attended the colloquium (Sabic, Ferrari Automotive, Fincantieri among others).

Most leading academic research groups from the field were represented, of course. The colloquium was attended by a total of 52 participants (30 invited speakers, 11 posters, 4 in-person attendees; 7 video-conf).

Participants came from institutions in Italy, France, Germany, Spain, UK, Russia, China, USA, Sweden, Denmark, and Singapore. 30 oral face-to-face presentations of 30 minutes each - including Q&A, were given over the three days of the colloquium.

The keyword of the colloquium was interdisciplinarity. The stage hosted mathematicians, mechanicians, computational experts, experimental and theoretical electrochemist, academic and industry-oriented talks. Such a strong multi-disciplinary organization was largely appreciated and made the colloquium a unique forum, capable to foster and boost interactions among the scientific groups.

Number of participants from each country

| COUNTRY | PARTICIPANTS |
|----------------|--------------|
| Italy | 23 |
| Germany | 20 |
| United Kingdom | 4 |
| United States | 16 |
| Sweden | 3 |
| Belgium | 1 |
| France | 1 |
| Singapore | 2 |
| Denmark | 1 |
| TOTAL | 71 |

Please send this report in electronic form to the Secretary General of EUROMECH, within one month after your Colloquium.