European CMetAC

# ECMetAC Newsletter No. 8

**January 2022**

Dear colleagues of the ECMetAC network,

Best wishes for 2022 from the Executive Board!

Planning events has never been so uncertain but our motivation to disseminate our latest results, to maintain & develop collaborations, to exchange ideas and to meet colleagues remains intact. Our passion for Science is key and gives us the energy to overcome all recent organisational obstacles, continuously readapting to the situation.

We are pleased to present you with our first Newsletter of 2022. This year again we have a rich program ahead with several exciting events and workshops already lined up for the coming months. This Newsletter is also a great opportunity to learn more about our recent Laureates.

At this stage, the Euroschool 2022 joint with the 5th International School on Aperiodic Crystals is planned as an on-site meeting. Similarly, the ECMetAC days 2022 should be held in Split from 21st – 24th November 2022. More details about these events and other news will be regularly posted on our website. Do not hesitate to send us your latest results or open positions or indeed any other important information for our members.

We are looking forward to seeing you soon!

Stay healthy and best wishes.

Julian Ledieu, Ronan McGrath,
Marc Armbrüster, Jean-Pierre Celis
and Émilie Gaudry

## News from the Research and Activity Domains (RADs)

### RAD Materials for Energy becomes RAD Energy and Quantum Materials

Thermoelectric materials, a research focus of the European C-MetAC since its early days, are frequently built of heavy elements, for instance Bi and Pb. This typically leads to low Debye temperatures and phonon velocities and, by consequence, low lattice thermal conductivities and enhanced thermoelectric performance. On the other hand, heavy elements feature large atomic spin orbit coupling, and this favours the formation of topologically nontrivial phases. In view of the numerous activities of C-MetAC scientists in this young field of research, it was agreed during the Governing Board meeting on December 9, 2021 to include them as an additional focus in this RAD and, to make this visible also in the title, renaming it RAD Energy and Quantum Materials.
We announce here a first external workshop on this topic, co-organized by Silke Buehler-Paschen: The International Focus Workshop "Topological Materials: From Weak to Strong Correlations", to be held from 11 - 13 April 2022 at the Max Planck Institute for Complex Systems in Dresden. We encourage C-MetAC members to participate. Some funding will be available to support your attendance.
https://www.pks.mpg.de/topcor22

Further reading on the recent developments in the field can be found here:
Silke Paschen & Qimiao Si, EPN 52, 30 (2021), DOI:10.1051/epn/2021407.

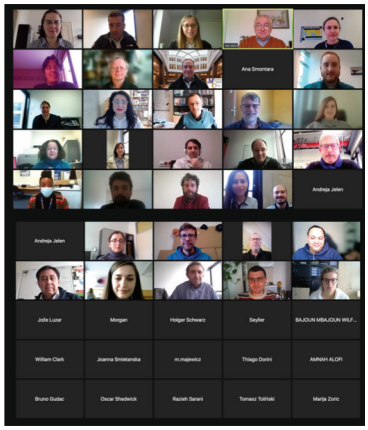
### RAD Equality and Diversity in Materials Science - Action December 2021: on-line

The last RAD workshop was co-organised by Dr. Magdalena Wencka and Michalina Konkel on “Intercultural cooperation in project team for researchers”. The 4-hour workshop was held online and gathered about 20 participants. The workshop goals were to increase knowledge about D&I (diversity and inclusiveness) area in researcher’s teams, to raise awareness of cultural influence on the way how trust is built within scientific teams, to understand cultural differences and similarities in cooperation in project teams, and to name best practices on how to inclusively cooperate in project teams in spite of cultural differences. Very successful, the workshop offered also a nice opportunity for exchanges in small groups on the different topics tackled, hence mixing different cultures and bringing ECMetAC members together.

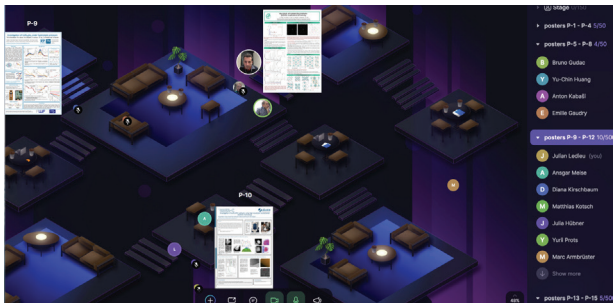
## Reports

### ECMetAC Days 2021

Similar to last year format, the ECMetAC Days 2021 event took place online and was hosted by Prof. A. Bilušić and his team from the University of Split. The event started on Monday 6th following the workshop on “Intercultural Cooperation in Project Team for Researchers” co-organised by M. Konkel and Dr. M. Wencka. More than 70 participants attended the three day event that included 33 oral and 15 poster presentations with a priority given to young scientists. We were also delighted to welcome three invited speakers contributing to the ECMetAC Days in the fields of Catalysis and Intermetallics (Dr. Penner), Crystal Growth (Dr. Schlich) and Defects in Quasicrystals and Approximants (Dr. Goyhenex).



As last year, the high quality of the presentations led to fruitful interactions. The poster session was organised via a virtual platform. The oral and poster prizes were announced at the end of the meeting and the laureates are presented hereafter.



More details about the ECMetAC Days 2021 program can be found here.

### ECMetAC Young Scientists Poster Presentation Award: Diana Kirschbaum

Diana Kirshbaum is a PhD student in the Quantum Materials group lead by Prof. Silke Bühler-Paschen at the Institute of Solid State Physics at TU Wien (Vienna, Austria). She started a PhD work this summer (July 2021) after finishing a master thesis in the same group.
Her work is part of a project on nontrivial electronic topology in strongly correlated materials. This is an emerging area of great interest as it may open the way to realize entirely new quantum phases. Her task is to probe the phase diagram of candidate materials such as $CeRu_4Sn_6$ by means of electrical transport and specific

heat measurements under multiple extreme conditions of high pressure, low temperature, and high magnetic field. Ce-$Ru_4Sn_6$ shows evidence for pristine quantum criticality and was also proposed to be a correlated Weyl semimetal. It thus offers an interesting setting to study the possible role of quantum criticality in the formation mechanism of so-called Weyl-Kondo semimetals.
What excites her about this project is that it frequently reaches the limits of currently known physics. This means she gets to deal with many interesting and innovative concepts that often push the boundaries of her imagination. On top of that, she really enjoys the manual work required to prepare a pressure cell as well as the experimental challenges that come with low temperatures.
Her favourite hobby is field hockey, which she has been playing since she was 6 years old. She regularly participates in national championships with her team, where she plays as a goalkeeper. She likes the team spirit, but also the individual challenges and responsibilities that come with this special position on the field. It usually allows her to clear her head and immerse herself in another world, far away from her studies and work.

## ECMetAC Young Scientists Poster Presentation Award: Bruno Gudac

Bruno Gudac comes from a small town of Kraljevica, on the Adriatic coast, and has finished his master's degree studies in Zagreb. His master's thesis focused on the synthesis of topological insulators and brief characterization of transport properties in high magnetic field. He was employed by the Faculty of Science as an assistant in research and education in 2017. His academy work is holding 'Laboratory exercises from general physics' and his laboratory work is mostly monocrystal growth with several different techniques. Currently he is the only PhD student in the group, where alongside his mentor, Prof. Mario Novak, he researches various Dirac materials. His basic motivation is to reconstruct the Fermi surface of ZrSiS using quantum oscillations in magnetization for different angles of magnetic field and to test chemical pressure in material gained by Hf-Zr substitution. It is still a work in progress. He would like to include an invite here to whoever wants to learn and see basic techniques for crystal growth to get in touch. He says "the work environment is really great in the faculty, where a lot of foreign guest researchers are invited and often have teambuilding events, usually sports and/or beers."

## ECMetAC Young Scientists Oral Presentation Award: Julia-Maria Hübner

Julia-Maria Hübner obtained her PhD at the Max-Planck-Institute for Chemical Physics of Solids and the TU Dresden under the supervision of Yuri Grin and Ulrich Schwarz and is currently a postdoctoral researcher at the Lund University in the group of Sven Lidin. She uses different synthesis techniques to obtain, often metastable, intermetallic compounds comprising complex crystal structures. Recent research projects are rare earth ruthenium compounds with 3D+1 periodicity and clathrate-I borosilicides. Her objective is to clarify structural arrangements to unveil the driving forces behind their formation and the correlation with observed properties.

An anecdote about work: when Walter Jung introduced me to his washing process for borosilicide clathrates, he put his bare finger on a tube filled with a strong base and said, “As an old school chemist, my fingers can handle this, but you, of course, should always use gloves.”
And what about free time? Some of her free time is dedicated to archery and portrait photography.

### ECMetAC Young Scientists Oral Presentation Award: Joanna Smietanska

Joanna Smietanska is a fourth year PhD student at the AGH University of Science and Technology in Krakow. Her research work focuses on the application of novel corrections for phonons and phasons in structure refinement of modulated Hyp-1/ANS protein complexes. She carries out her interdisciplinary work in cooperation with the Center of Biocrystallographic Research affiliated with the Institute of Bioorganic Chemistry PAS in Poznan. She is fascinated and enthusiastic about the topic of her research because she sees in it a chance to develop methods of solving and refining aperiodic structures in macromolecular systems. A great advantage is also the interdisciplinary nature of her work - during her internship at the Institute of Bioorganic Chemistry she had the opportunity to work in a wet laboratory and learn the techniques of obtaining protein crystals. She participated in remote synchrotron measurements on ESRF in Grenoble. In addition to learning about experimental work, her research also allows her to develop her programming skills by preparing computational scripts in the Matlab environment.
The little story: “One year I was teaching a physics class to first-year students who had not yet had a course in X-ray crystallography. At one point they asked me what my research work was, so I started telling them that it was about studying the modulated crystal structures of proteins. They were confused and then one of them interrupted me "wait a minute, I was already lost, when I heard about crystals I thought it was about rocks, minerals and something didn't fit.”
And what about free time? “In my spare time I am passionate about the history of the Middle Ages in Western Europe, the works of J.R.R. Tolkien and Stanley Kubrick. In addition, I like mountain hiking and playing basketball or floorball”.

## Upcoming Events

We list below some events that may be of interest to Network members:

### ECMetAC EuroSchool 23rd-27th May 2022, Kutna Hora, Czech Republic

The next Euroschool 2022 will be joint with the 5th International School on Aperiodic Crystals. It is being organized over 5 days in Kutna Hora, a historical town located 80 km east of Prague. Experts in the field of aperiodic crystals will give lectures and organize tutorials on a step by step basis different classes of aperiodic crystals. Various examples will then be presented, together with overviews on phase transitions, phonon and phasons, simulations and aperiodic crystal stability.
The target audience of the event is Ph.D. students, doctorate fellows, and people new to the field of material science and physics. The list of previous EuroSchools is accessible on our website.

**Pre-registration : Deadline 15 April 2022**
http://aperiodic.iucr.org/isac2022/isac2022.html

**MONACOSTE School: 8th-13th May 2022, Frejus, FRANCE**

Designing new materials to store or convert waste energy is becoming an urgent challenge for the 21st century. Numerical techniques are important to tackle this challenge. Indeed, these last years have seen the flourishing development of new methods to new methods to model matter at nanometric scales. The objective of the summer school "Modeling of nanostructured materials for energy conversion and transport" is to train scientists in numerical techniques and tools for the modeling of energy transport and conversion in nano-structured materials.

https://smerabia8.wixsite.com/monacoste

**Topological Materials: From Weak to Strong Correlations, 11th-13rd April 2022**

*"This three-day Focus Workshop will bring together the weakly-correlated and strongly-correlated electron communities interested in topology. It will highlight the extensive recent developments in each of the two areas, and foster interactions between the two communities."*

Max Planck Institute for Complex Systems in Dresden.

https://www.pks.mpg.de/topcor22

**SCTE 2022 –14th-17th June 2022, Bordeaux, France**

*"The SCTE conferences allow every 2 years to report new discoveries in chemistry and solid state physics of compounds and materials based on d and f electron elements. Several axes are discussed such as the crystal structure, the chemical bond as well as the various and varied physical properties (magnetic, transport and spectroscopic) of various families of intermetallics (and derivatives such as: hydrides, borides, carbides, silicides, pnictides, chalcogenides, oxides, halides)."*

Abstract submission deadline: **1st March 2022.**

https://scte2022.sciencesconf.org/

**Aperiodic 2022 – 19th-24th June 2022, Sapporo, Japan**

*"Aperiodic 2022 provides an excellent opportunity to learn about new results in the field of aperiodic crystals, including incommensurately modulated phases, composite crystals, and quasicrystals."*

Abstract submission deadline: **10th March 2022.**

https://wcp2-ap.eng.hokudai.ac.jp/aperiodic2021/

**IMCAT 2022 – 13th-15th September 2022 Chemnitz, Germany**

*"The symposium will cover all aspects of intermetallic compounds in catalysis in the fields of gas- and liquid-phase as well as in electro catalysis. This includes - but is not limited to - synthesis and characterisation, material development as well as catalytic properties."*

https://www.tu-chemnitz.de/chemie/mc/imcat/IMCAT.php

**Polish Conference on Crystal Growth 2022 – 19th-24th June – Gdansk, Poland**

*"The program of PCCG 2022 is focused on current research and development topics in the field of crystal growth, epitaxy, nanocrystals and advanced materials"*

Abstract submission deadline: **1st May 2022.**

https://event.mostwiedzy.pl/event/2/

**2022 Joint European Magnetic Symposia, Hybrid conference – 24th-29th July 2022, Warsaw, Poland.**
*"JEMS covers a wide breadth of cutting-edge topics in magnetism and magnetic materials research, ranging from the fundamental to the applied."*

Abstract submission deadline: **4th March 2022.** https://jems2022.pl/

**33rd European Crystallographic Meeting 23rd-27th August, Versailles, France**
Online registration opens on 15/02/2022
https://www.ecm33.fr/

## Missing Content?

If you have any news items for circulation, either on our website or in this newsletter, please send them to Julian Ledieu.

## Newsletter Subscription

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## Imprint

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