Newsletter #5
CRC 1461 – Neurotronics: Bio-inspired Information Pathways

Dear members and friends of the CRC 1461,

in this newsletter we would like to introduce a new section: **Honors, Awards and Publication Highlights**. We are looking forward to your future contributions to this section! Also in this newsletter: The first, but certainly not the last appearance of our science outreach project (SOP).

New CRC-Homepage!

The new homepage of the CRC 1461 is now online!
https://www.crc1461-neurotronics.de/en

Honors, Awards and Publication Highlights

The CRC-publication "*An efficient plasma-surface interaction surrogate model for sputtering processes based on auto-encoder neural networks*" (Journal of Vacuum Science and Technology B 40, 012802) by Tobias Gergs, Borislav Borislavov, and Jan Trieschmann received special attention: The paper was not only chosen as Editor's Pick, but also featured as a publication highlight in the "Beneath the AVS Surface Newsletter".

Focus Group "Dynamic Networks"

The new Focus Group *Dynamic Networks* will meet on March 24 (see Upcoming Events below).

In contrast to typical technical networks with a predefined connectivity and functionality, neural networks have the capability to form dynamic connections and respond dynamically to applied stimuli. The Focus Group *Dynamic Networks* aims to bring together researchers with the common interest to develop a technological platform that captures the aspects of network formation, dynamic coupling and stimulus responsiveness.

C4 is working closely with C3 to investigate the critical behavior of nanoparticle networks under electrical potential. This shall be done via in situ biasing in the SEM and by measuring the dynamic current paths through the network with an Electron Beam Induced Current (EBIC) setup.

Zinc Oxide is an interesting material due to its many properties including UV light sensitivity. Therefore, C2 attempts to produce UV-sensors utilizing tetrapod Zinc Oxide (t-ZnO) via a 3D printing technique called Direct Ink Writing. Furthermore, C2 is working on the fabrication of Ag nanoparticle based memristive devices with the intention of understanding the transition from local memristive switching to collective dynamics in highly interconnected nanoparticle networks (C3). By integrating memristive devices and the UV-sensors, memsensors will be investigated to observe their collective behavior towards stimuli.

B1 is working closely with C3 to investigate the possible influence of relaxation-type oscillators on nanoparticle network growth. Therefore, the relaxation-type oscillators are coupled over the nanoparticle network during deposition. The synchronization of the relaxation-type oscillators changes with the network resistance. The resulting nanoparticle network with oscillator influence is analyzed by scanning electron microscopy.

The link is available in the OLAT calendar and was sent out via email on March 7.

News from the iRTG

Four **ATMs** by projects A1, B1, C3 and C4 were held at Kiel University this month. A total of 13 participants from 8 different projects and 3 different institutions joined to learn something about LTspice simulation of neuron models (A1), the theory and practice of the synchronization of relaxation oscillators (B1), templated gold growth and nanoparticle networks (C3), and the preparation, analysis and evaluation of memristive/neuronal devices by means of TEM or SEM (C4).

Participants of ATM C3 in the clean room at CAU, from left to right: Sahitya, Blessing (organizer), Torben, Luca, and Rouven

The organizing team for the **Summer School 2022** has formed! Roshani Madurawala (C2), Rafael Ashkrizzadeh (B2) and Folke Rolf (B3) will organize the event this year. Planning already took of to a very good start as date and location are almost fixed – We keep you posted!

Info from the Office

The grant request for the second quarter of 2022 was timely submitted to the DFG.

Here is a reminder of the upcoming admin-deadlines in March 2022:

SFB 1461

Mar. 31, 2022 Final deadline annual status report (submission to DFG)

Upcoming Events

Mar. 24, 2022, 09:00 – 11:00 Focus Group (online): *Dynamic Networks*

Mar. 24, 2022, 16:00 – 17:00 Colloquium (online): *Research topics of the CRC 1461: An international survey* – Hermann Kohlstedt

Mar. 31, 2022, 14:00 – 15:30 Information event (online): *How to plan my International Research Stay?*

Apr. 27 - 28, 2022 **CRC Spring Retreat** (Seeburg, Kiel)

Jun. 29 – Jul. 01, 2022 Intelligent Materials Conference (CAU Kiel)

Sep. 05 – 08, 2022 **CRC International Workshop** (CAU and Color Line)

The Science Outreach Project (SOP) starts networking!

Text by Insa (SOP, IPN)

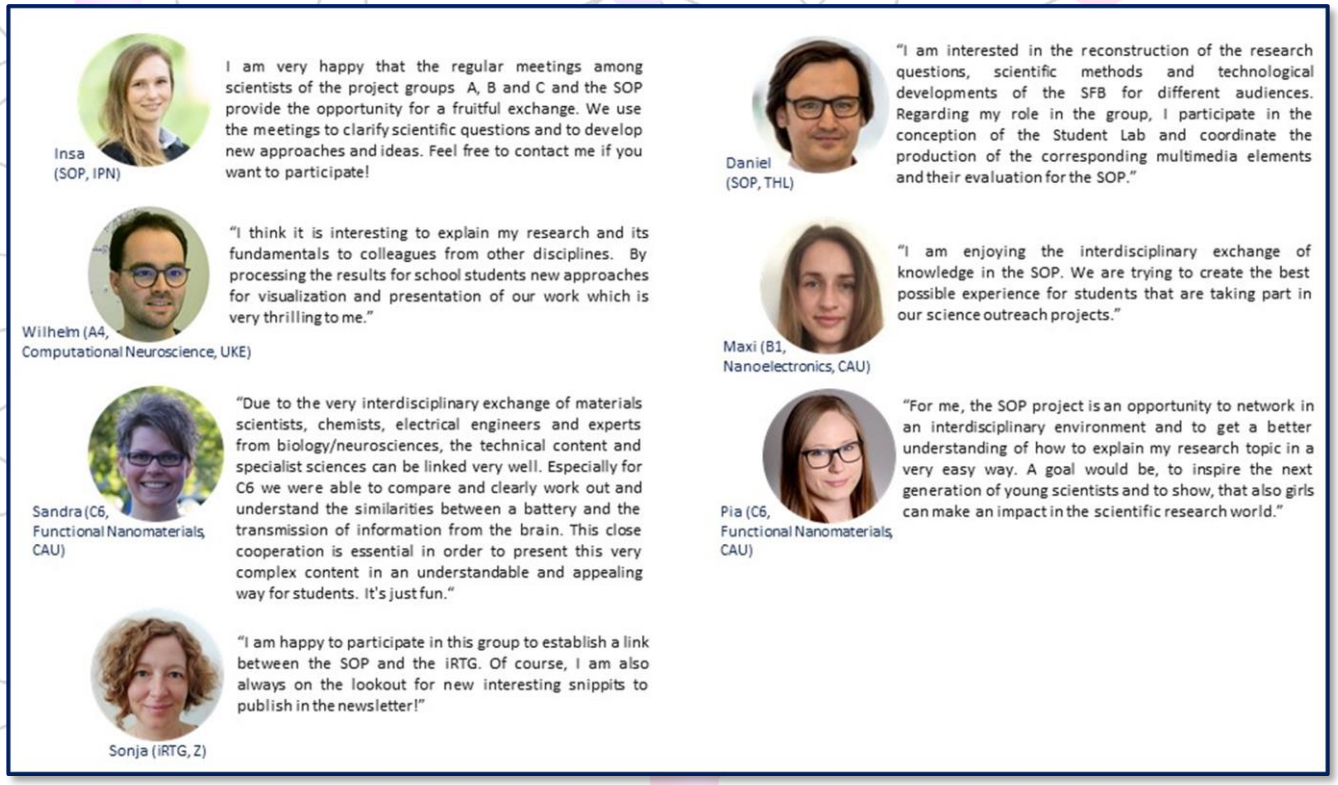
Since January 2022 scientists of the project groups A, B and C and the SOP started to meet on a monthly basis to ensure a regular exchange between the projects (see also "Members of the CRC"). This provides the opportunity to clarify questions in detail in a technically correct way and also provide the setting to develop new approaches and ideas.

One aim of the SOP is the development of a new student laboratory program with experiments close to the CRC research for upper grade high-school school students (more about this in future newsletters!). It is particularly important that the experiments are not just interesting and informative, but that the content is mediated scientifically correct. That's why these meetings are of great importance to the SOP. However, the scientists of the subprojects A, B and C benefit from these meetings as well. If you would like to join the meeting, please contact Insa Stamer (stamer@ipn.uni-kiel.de).

CRC 1461 - Publication Performance	
Journal papers (peer-reviewed)	16
Conference papers (peer-reviewed)	7
Conference contributions	21
Total	**44**

Members of the CRC

And this is the SOP-Networking group:



Insa (SOP, IPN)
I am very happy that the regular meetings among scientists of the project groups A, B and C and the SOP provide the opportunity for a fruitful exchange. We use the meetings to clarify scientific questions and to develop new approaches and ideas. Feel free to contact me if you want to participate!

Wilhelm (A4, Computational Neuroscience, UKE)
"I think it is interesting to explain my research and its fundamentals to colleagues from other disciplines. By processing the results for school students new approaches for visualization and presentation of our work which is very thrilling to me."

Sandra (C6, Functional Nanomaterials, CAU)
"Due to the very interdisciplinary exchange of materials scientists, chemists, electrical engineers and experts from biology/neurosciences, the technical content and specialist sciences can be linked very well. Especially for C6 we were able to compare and clearly work out and understand the similarities between a battery and the transmission of information from the brain. This close cooperation is essential in order to present this very complex content in an understandable and appealing way for students. It's just fun."

Sonja (iRTG, Z)
"I am happy to participate in this group to establish a link between the SOP and the iRTG. Of course, I am also always on the lookout for new interesting snippits to publish in the newsletter!"

Daniel (SOP, THL)
"I am interested in the reconstruction of the research questions, scientific methods and technological developments of the SFB for different audiences. Regarding my role in the group, I participate in the conception of the Student Lab and coordinate the production of the corresponding multimedia elements and their evaluation for the SOP."

Maxi (B1, Nanoelectronics, CAU)
"I am enjoying the interdisciplinary exchange of knowledge in the SOP. We are trying to create the best possible experience for students that are taking part in our science outreach projects."

Pia (C6, Functional Nanomaterials, CAU)
"For me, the SOP project is an opportunity to network in an interdisciplinary environment and to get a better understanding of how to explain my research topic in a very easy way. A goal would be, to inspire the next generation of young scientists and to show, that also girls can make an impact in the scientific research world."

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Cheers, Sonja, Leonie and Hermann