

Dear members and friends of the CRC 1461,

welcome to the summer edition of the CRC newsletter and thanks a lot for your great contributions! Please continue to keep us updated with news you would like to see published on the [news-section](#) of the homepage or in the quarterly newsletter.

Science News

Insights from 'Artificial Intelligence and Intelligent Matter' Workshop

We are thrilled to share some exciting news from the recent workshop on 'Artificial Intelligence and Intelligent Matter' that took place on the 13th and 14th of July 2023 at the historic Münster Schloss.

Jannes Freiberg and Roshani Madurawala, delivered a joint talk on the intriguing topic of 'Intelligence without a brain? Perspectives from the aneural slime mold as a

model for intelligence.' The presentation explored perspectives from biology and psychology, unveiling the fascinating world of the slime mold's intelligence without a nervous system.

The collaboration between projects A3 and C2 shed light on the intelligence exhibited by this multinucleate giant amoeba, known as the *Physarum polycephalum*. The behavior of this organism can be altered through training, revealing new strategies such as the remarkable 'eat and run' technique. Moreover, experiments demonstrated that single-cell learning is indeed possible, hinting at the presence of intelligent behavior in the slime mold.

In addition to these intriguing findings, the speakers also presented electrical experiments showcasing pinched hysteresis behavior. This behavior was observed exclusively in well-fed slime mold, thriving under optimal temperature and humidity conditions, which highlights the direct influence of the slime mold being alive and functional.

The conclusion of the talk was a thought-provoking statement: 'The brain should not be the only model for artificial intelligence.'

Afterwards, Prof. Christian Kaernbach gave a humorous yet deeply insightful philosophical talk about his thoughts on AI, leading with the provoking question of 'how it would feel to be a nail'.

This talk gave both a philosophical and psychological perspective on compassion with AI and led the audience to muse on how far current AI is from true life, concluding with a famous quote from Abraham Lincoln: "You can fool all the people some of the time, and some of the people all the time, but you cannot fool all the people all the time".

Stay tuned for more enlightening updates about the slime mold and stay curious!

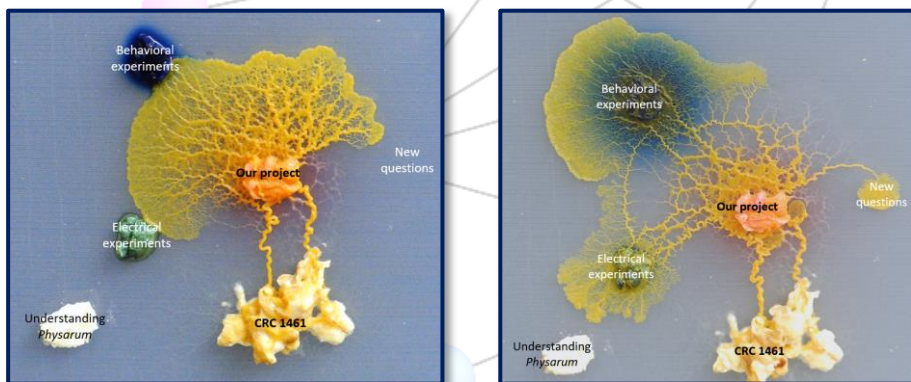
by Roshani Madurawala and Jannes Freiberg

Honors, Awards and Publication Highlights

Rainer Adelung, PI of subprojects C2 and C6, receives DGM Prize 2023 by the German Society for Materials Science. Please [click here](#) for full article.

Luca Vialetto (C5) and his co-host Aaron Hu from the Dutch Institute for Fundamental Energy Research have been awarded the Rutherford Plasma Physics Communication Prize 2023 for their video podcast "[Coffee-BreakDown](#)". Please [click here](#) for a full article.

Bakr Al Beattie (B1) received three prizes for his excellent master thesis: the "[VDE Rhein-Ruhr Absolventenpreis](#)" 2023, the Faculty Award of the Faculty of Electrical Engineering and Information Technology at RUB for best master thesis as well as the Young Talent Award for fastest master thesis.



The slime-mold project illustrated by its own subject *Physarum polycephalum*



Report: International Research Stay

My International Research Stay at Trinity College Dublin

by Pia Pooker

My international research stay journey began at TF. With the entire CRC, we embarked on a bus trip to Groningen for the international summer school. In the best weather, we spent a few cool and instructive days there.



Tetrapods: The “all girls” winning team of the Groningen pub quiz

On Saturday, June 17th, I set off for Dublin. The day started quite early with a train ride to the airport in Amsterdam, and from there, onwards to Dublin. We took off in 28 °C and sunshine, and landed in 18 °C and rain. But well, that’s Ireland for you. I arrived at my accommodation in the afternoon after about 9 hours of travel. Luckily, I had 1 ½ days to explore the area a bit and get to know the city a little.

My first day of work at TCD was on Monday, June 19th. I met with a colleague who showed me the offices, my workspace, and the laboratories. After a trip to HR to get my employee card and my own TCD email address, we started the exfoliation of MoS₂ in the afternoon. By Wednesday, I had completed all safety inductions and briefings, so I was allowed to work alone in the lab. Unfortunately, there were some issues with the samples I sent, so I spent two days mostly communicating with the local post to find out the whereabouts of my package. Thankfully, it was eventually located, and I could finally get started properly!



At Trinity College Dublin

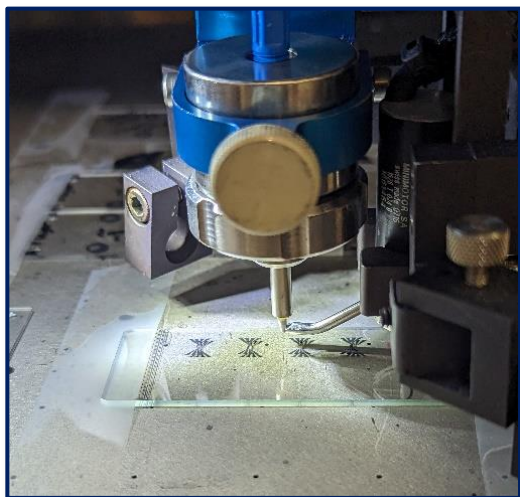
Valeria Nicolosi's group is generally focused on 2D materials and TMDs, as well as energy storage systems, which is perfect for a scientific exchange. I set myself the goal of creating new dispersions from exfoliated TMDs and learning more about sodium and potassium batteries. Unfortunately, the glovebox used for building batteries was broken, so I couldn't build a battery with the materials myself. However, I could observe others at the beginning and learn a lot that I will try out in Kiel.

(Continue on page 3)



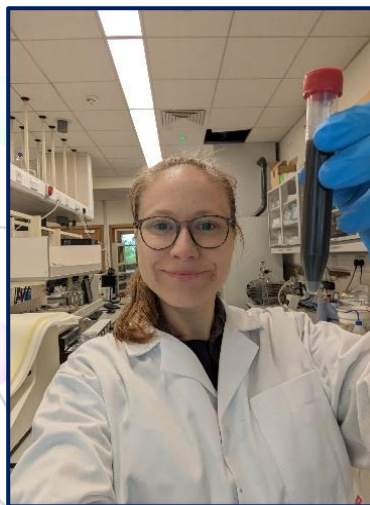
Old library with the book of Kells at Trinity College Dublin

Another task was to utilize the expertise in 3D printers and print my material. We decided on a crossbar array made of conductive MXene tracks and interfaces from exfoliated MoS₂, which we produced using the Aerosol Jet printer. I will test these for memristive properties in Kiel. The printers there were very cool, and the scale they can print at was truly impressive!



Aerosol Jet Printer with a resolution of 10 μm

The colleagues there were also all incredibly kind and open. A highly international department welcomed me warmly and showed me a lot. My colleague Dahnan and I collaborated extensively since he also researches aero-materials, and we have several ideas to continue our co-operation. Towards the end, I created many dispersions that I will take to Kiel. Further work on the material and the creation of new aero-structures will take place here.



Pia in the lab trying cool stuff 😊

I used the weekends to get to know the area a bit and to be outdoors in nature or learn about the country. The old buildings, the culture and the landscape are truly impressive and beautiful!

After the research stay, I spent a few days traveling to Cork and Galway. This country is simply stunning and definitely worth a visit. It was also really cool to get to know a different country not as a tourist, but through work. However, if you're looking for a sunny summer, Ireland might not be the right place. The constant gray sky and frequent rain at around 15-18 °C was a July that could have been nicer weather-wise.

Overall, it was an incredibly exciting experience. From the planning, the journey, being alone abroad for so long, joining a new group, finding my way around a different lab, and everything in between. I can only advise everyone to have this experience, even if it might seem exhausting and scary! I am very grateful that I was able to have this experience through the CRC!



View of Howth peninsula near Dublin



Cliffs of Moher

SFB 1461

More News from the iRTG

International Summer School in Groningen

For the first time this year's Summer School was an international cooperation with doctoral researchers from [CogniCron](#). Therefore, 20 iRTG-members travelled to Groningen, the Netherlands to enjoy a carefully curated programme of workshops focusing on topics related to doing a PhD, such as dealing with imposter syndrome, thinking out of the box or developing leadership skills. Special thanks go to the organizers Maxi Noll and Rouven Lamprecht, to the organizing team in Groningen Foelke Janssen, Julien van der Ree and Jasper van der Felde, and to Beatriz Noheda for her inspiring talk. We are looking forward to future collaborations!



Summer School 2024

The organizing team is complete: Kamran Naderi Beni (B2), Bharath Muralidhar (B2), Ole Gronenberg (C4) and Ceylan Steinecke (A3) just started planning the CRC Summer School 2024.

ATMs (check OLAT for more pics!)

Sebastian Jenderny (A1), Bakr Al Beattie (B1), Sahitya Yarragolla (C5) and Torben Hemke (C5) teamed up and offered their ATMs for the first time in Bochum at RUB. Over the course of four days the participants learned about the simulation of neuron models using LTspice, the theory of synchronization of relaxation oscillators as well as modeling and simulation on a device scale.



From left to right: Sebastian Jenderny, Jonas Röhrig, Bharath Muralidhar, Blessing Adejube, Sahitya Yarragolla and Rohit Gupta at RUB (ATM C5)

Project C3 offered their ATM for a second time at CAU Kiel. The three participants representing all three project groups spend two days working on templated gold growth and nanoparticle networks.



From left to right: Niklas Lundt, Dijana Pavleska, Bharath Muralidhar and Fatemeh Abshari (organizer) in the clean room at CAU Kiel (ATM C3)

Members of the CRC

The CRC welcomes Jonas Röhrig as a new member. Jonas is doing his PhD with Karlheinz Ochs in project B1 at RUB.

Luca Vialetto left the CRC to start a new position as post-doctoral scholar at the Department of Aeronautics and Astronautics at Stanford University. The CRC wishes him all the best for his future!

Upcoming Events

Aug. 24, 2023, 16:00 h CRC 1461 Colloquium *Advances on Battery and Supercapacitor Materials* – Mozaffar Abdullahifar (CAU Kiel)

Aug. 29, 2023 PI-Meeting: Planning of the 2nd funding period

Sep. 14, 2023 ATM SOP: *A Student Laboratory Program: Check OLAT for more information and registration!*

Sep. 28, 2023, 16:00 h CRC 1461 Colloquium: *Integrative Modeling of Paramecium, a "Swimming Neuron"*– Romain Brette (Sorbonne University)

Oct. 20, 2023 Meeting of the CRC steering committee

Nov. 14-15, 2023 **CRC Fall Retreat** (Seeburg, Kiel)

Nov. 16, 2023 PI-Meeting II: Planning of the 2nd funding period

CRC 1461 - Publication Performance	
Journal papers (peer-reviewed)	53
Conference papers (peer-reviewed)	18
Conference contributions	57
Total	128

Cheers, Sonja, Leonie and Hermann