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SE²A Newsletter 12/2022



Dear members and friends of the cluster SE²A,

an eventful year of our cluster research is coming to an end and we would like to take a look back on the last months.

At the same time, we look forward with excitement and ambition to the new research projects that will start in January in each of our three cluster areas.

Enjoy now reading through the highlights of the year 2022, in which the fact that personal meeting could take place again, stays in our memory.

With best regards,

Prof. Dr.-Ing. Jens Friedrichs
(Spokesperson SE²A)

Dr. Doris Pester
(SE²A-Managing-Director)

The SE²A-newsletter will be published three times per year. For further information please visit our website: <https://www.tu-braunschweig.de/se2a>

// LATEST NEWS

November 2022

NFL Research Day 2022

The NFL Research Day, with this year's focus on the topic "Pollutants in aviation", took place on the 9th of November. The event consisted of three lectures of experts in atmospheric research as well as experts from SE²A on the one hand and the awarding of research prizes on the other.

The lectures were about the climate impact of today's air traffic, the progress made in avoiding pollutants, and about current and upcoming guidelines of the German government regarding pollutant emissions. Three research projects that contributed new approaches to topics in different fields of aviation research, were awarded with the Hermann-Blenk-Researcher Prize, as well as the Karl-Doetsch-Young Scientist Prize and the VDI Aerospace Prize.

We are very pleased that Stanislav Karpuk and his supervisor Prof. Dr.-Ing. Ali Elham, both members in the Cluster of Excellence SE²A, have received the Hermann-Blenk-Researcher Prize. Awarded was their work on the effects of new technologies on the feasibility of an all-electric regional aircraft (Institute of Aircraft Design and Lightweight Structures). Congratulations!

More information: <https://magazin.tu-braunschweig.de/en/pi-post/nfl-awards-researcher-prize-and-two-junior-researcher-prizes/>



SE²A researcher Stanislav Karpuk awarded for his work on innovative airframe technologies.



The winners of the research prizes.

November 2022

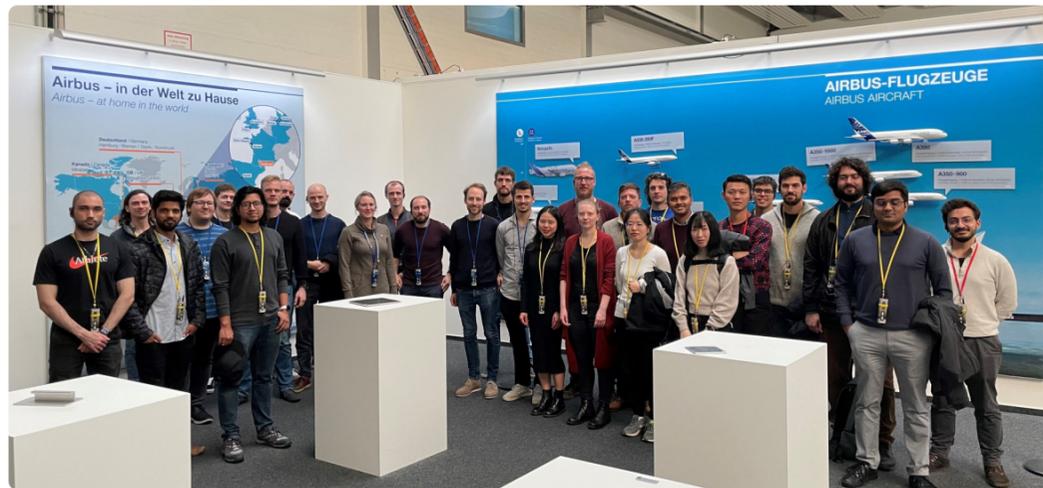
Research club ChangING: Here we go again!

The research club ChangING started in October 2019, and offers young pupils in Braunschweig and the surrounding area the opportunity to perform research and experiment in different institutes and facilities of the cluster.

The club is targeted at pupils from 10th grade onward and started this year again with a kick-off event on the 10th of November! Prof. Jens Friedrichs, speaker of the SE²A Cluster of Excellence, welcomed the new participants. Afterwards they had time to get to know each other before they will start their programme for the upcoming year. This year, 20 new faces joined the research club. You can find more information here : www.tu-

// WE LOOK BACK: RESEARCH TRAINING GROUP 2022

Summer School for SE²A doctoral researchers 2022



We are very pleased that the third SE²A Summer School for doctoral researchers could take place entirely in presence. From 20th to 21st of October, there were two short courses as well as a day trip to Airbus in Hamburg scheduled.

On the first day, the doctoral researchers met in the NFF auditorium and, after being welcomed by PD Dr. Gabriele Raabe and Tatjana Szalkau, listened to two exciting lectures. First, Prof. Sabine C. Langer and Dr. Tobias Ring held a lecture on the topic of acoustics, followed by Stanislav Karpuk's presentation on aircraft conceptual design.

On the second day of the Summer School, the group went to Hamburg to visit the German Airbus headquarters. The guided tour led the doctoral researchers through the site and enabled them to take a look behind the scenes. During the tour, the doctoral researchers got to know different Airbus aircrafts as well as production steps. On leaving the Airbus site, they were even able to watch the landing of a Beluga, a transport aircraft that carries components between the different Airbus production sites.

We are happy that the Summer School 2022 offered a great opportunity for exchange and exploration for the doctoral researchers who will soon finish their program at SE²A. We are also looking forward to welcoming new candidates at next year's Summer School!

Pilot projects in the Research Training Group: "Short Courses" and Retreat „Cross-Project-Research Workshop"

Short Courses

The Short Courses intended to give an overview of the cluster's major topics in the integrated cluster areas and served as an introduction to these topics. The courses were very well attended by the doctoral researchers and will be established as a new successful format in the following year.



Short Courses 2022

Sabine Langer & Tobias Ring
Noise Assessment

Richard Hanke-Rauschenbach & Arno Kwade
Alternative aircraft energy supply systems, Fuel Cell, Battery

Rolf Radespiel
Fundamentals of Aerodynamics

Christoph Herrmann & Felipe Cerdas
Life-Cycle-Assessment/ Engineering

Jens Friedrichs & Friedrich Dinkelacker
Fundamentals of Aircraft Propulsion & Combustion for Sustainable Aviation

Stanislav Karpuk
Aircraft Conceptual Design

Sebastian Heimbs
Fundamentals of Light Weight Structures

Axel Mertens & Bernd Ponick
Fundamentals of Electrification of Aircraft

"Cross-Project-Research Workshop"

The aim of the "Cross-Project-Research Workshop" is to support the interdisciplinary exchange for cross-project-publications of the doctoral researchers. The retreats offered enough time for solid interdisciplinary exchange and networking.

In the next funding phase, a similar format will be a part of the SE²A Research Training Group.

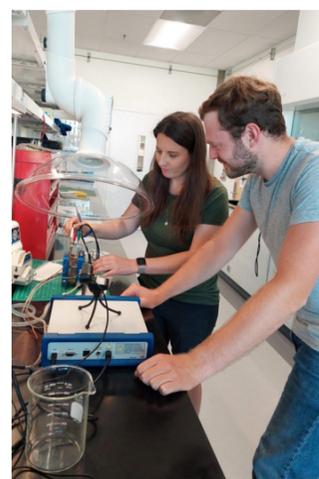
Research stays abroad programme for SE²A doctoral researchers

The programme encourages and financially supports research stays abroad for gaining further insights in different partner research institutions and to foster exchange.

This year, research exchange took place with sites in Australia, Korea, Ireland, the Netherlands, Switzerland and the USA.

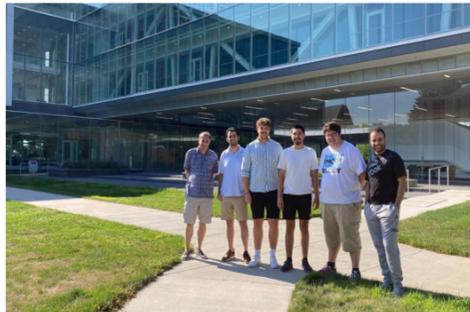
Some impressions of their stays:

On this picture (right) we see Tim Wittmann, who visited California (USA) in context of his research stay: More information here: <https://magazin.tu-braunschweig.de/en/m-post/mail-from-irvine/>





Maximilian Rolinck spent his research stay in Melbourne (Australia). [More information: https://twitter.com/_se2a_/status/1585235571072372737](https://twitter.com/_se2a_/status/1585235571072372737)



Alexander Barke (third one from the left) experienced his research stay in Rhode Island (USA). [More information: https://magazin.tu-braunschweig.de/m-post/post-aus-rhode-island/](https://magazin.tu-braunschweig.de/m-post/post-aus-rhode-island/)

SE²A celebrates first Diversity Day of TU Braunschweig

The purpose of the event was to promote Networking between students, employees and interested people in an open atmosphere. TU Braunschweig celebrated their first Diversity Day on July 14th and the Cluster of Excellence SE²A was happy to be part of it



and to represent the values of our cluster. Five of our doctoral researchers talked to interested people about diversity and anti-discrimination in the context of an international Cluster of Excellence. More information:

<https://magazin.tu-braunschweig.de/en/pi-post/first-tag-der-vielfalt-at-tu-braunschweig/>

From left to right: Yannik Hüpel, Gil Felix Greco, Tatjana Szalkau, Sahar Rabet, Stanislav Karpuk, Zhuzhell Montano Rejas

First SE²A Science Slam

A great event took place in cooperation with the Haus der Wissenschaft on May 20th. It was the first SE²A Science Slam! The event was almost sold out and the atmosphere was great. To use the words of Prof. Angela Ittel, President of the TU Braunschweig: "It was a blast! Great slams and a wonderful audience".

And finally Thorben Lenk (front row, second from the left) was the winner of the Science Slam! He slamed about electrochemical synthesis of fuels of the future and underlined his research topic with music and the story of an unicorn with friends.

We also want to thank SE²A Science Slammers Dr. Steven Gronau, Stefanie Ollenburg, Yannik Hüpel, Hendrik Schefer and Sahar Rabet for bringing their research topic to the audience in such an entertaining way!



// RESEARCH

The Cluster of Excellence "Sustainable and Energy-Efficient Aviation" is an interdisciplinary research center with the purpose of investigating technologies for a sustainable and eco-friendly air transport system. Scientists from aerospace, electrical, energy and chemical engineering are working on the reduction of emissions and noise, as well as recycling and life-cycle concepts for airframes and improvements in air traffic management. Technische Universität Braunschweig, the German Aerospace Center (DLR), Leibniz University Hannover (LUH), the Braunschweig University of Art (HBK) and the National Metrology Institute of Germany (PTB) have joined forces in this extraordinary scientific undertaking. The Cluster organisation is structured in three Integrated Cluster Areas (ICAs) reflecting the mission-critical research demands and following a coherent and coordinated roadmap. The three ICAs resulting from our assessment of critical research demand are:

ICA A: Assessment of the Air Transport System

The goal of this cluster area is the development of comprehensive criteria and metrics for sustainable air transport that can serve as a basis for decision-making and future scenarios.

More information:

<https://www.tu-braunschweig.de/en/se2a/research/projects/ica-a>

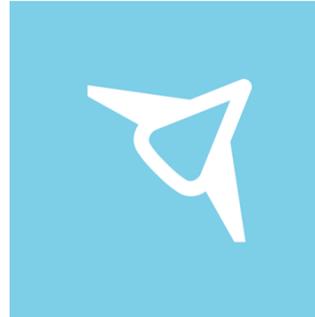


ICA B: Flight Physics and Vehicle Systems

This cluster area takes an in-depth look at technologies that have the potential to significantly reduce the power required from the propulsion system.

More information:

<https://www.tu-braunschweig.de/en/se2a/research/projects/ica-b>



ICA C: Energy Storage and Conversion

Even with major advances in aircraft drag and propulsion efficiency, carbon emissions can only be reduced, while carbon-free aviation requires new concepts for the energy supply. The cluster looks at advanced lithium-sulfur chemistry for solid-state batteries as well as load bearing batteries.

More information:

<https://www.tu-braunschweig.de/en/se2a/research/projects/ica-c>



// SE²A EVENTS

Joint SE²A Retreat in September

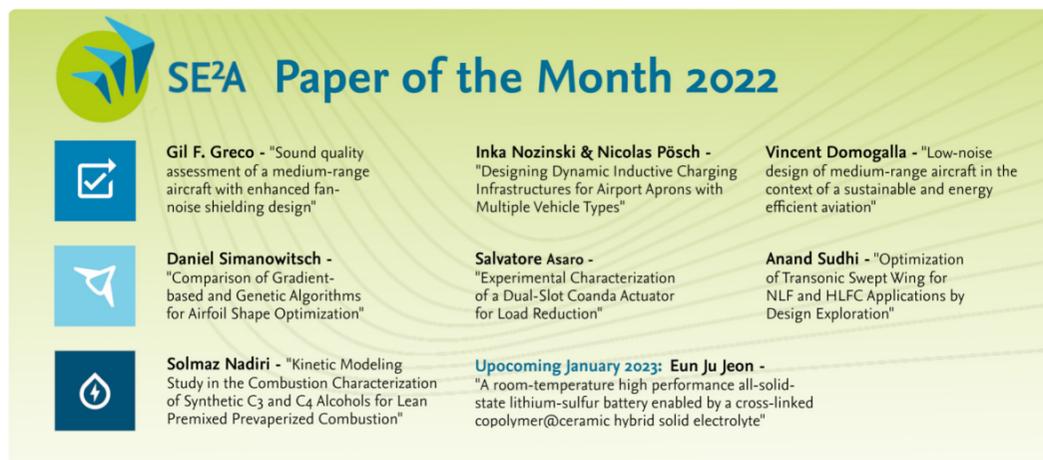


Three days of exchange about results and future development of the clusters projects, of networking and listening to keynotes from external speakers of Airbus and TU Delft were possible again in person.

During the Joint SE²A Retreat principle investigators and doctoral researchers could get a broader view on the main research lines in the Cluster and discuss further ideas for the upcoming second internal project phase, beginning in 2023.

Paper of the Month

In our seminar "Paper of the Month" you have the opportunity to present your high ranking SE²A-publication, to learn about the projects of your colleagues in the Cluster, and to exchange ideas.



SE²A Paper of the Month 2022

 <p>Gil F. Greco - "Sound quality assessment of a medium-range aircraft with enhanced fan-noise shielding design"</p>	 <p>Daniel Simanowitsch - "Comparison of Gradient-based and Genetic Algorithms for Airfoil Shape Optimization"</p>	 <p>Solmaz Nadiri - "Kinetic Modeling Study in the Combustion Characterization of Synthetic C₃ and C₄ Alcohols for Lean Premixed Prevaperized Combustion"</p>	 <p>Inka Nozinski & Nicolas Pösch - "Designing Dynamic Inductive Charging Infrastructures for Airport Aprons with Multiple Vehicle Types"</p>	 <p>Salvatore Asaro - "Experimental Characterization of a Dual-Slot Coanda Actuator for Load Reduction"</p>	 <p>Vincent Domogalla - "Low-noise design of medium-range aircraft in the context of a sustainable and energy efficient aviation"</p>
			 <p>Anand Sudhi - "Optimization of Transonic Swept Wing for NLF and HLFC Applications by Design Exploration"</p>		
			 <p>Upcoming January 2023: Eun Ju Jeon - "A room-temperature high performance all-solid-state lithium-sulfur battery enabled by a cross-linked copolymer@ceramic hybrid solid electrolyte"</p>		

We had many interesting talks and presentations this year and we are happy that so many took the opportunity to learn more about the work of other SE²A researchers and to foster exchange!

New meeting date in 2023:

In the new year, the event will move to every last **Thursday** of the month on a regular basis. It remains at 4:30pm.

The new year will start with a presentation by the SE²A doctoral researcher Eun Ju Jeon on the topic "A room-temperature high performance all-solid-state lithium-sulfur battery enabled by a cross-linked copolymer@ceramic hybrid solid electrolyte": <https://www.sciencedirect.com/science/article/abs/pii/S2211285522009909?via=ihub>

If you are also interested in presenting your high ranking SE²A-publication you can reach out to the managing office: <https://www.tu-braunschweig.de/en/se2a/about-us/contact>



// ABOUT THE CLUSTER

Open positions at SE²A

We are currently offering many vacancies in various areas of aviation research! You can find more information here:

<https://www.tu-braunschweig.de/en/se2a/open-positions/open-positions>

// EVENT ANNOUNCEMENT



SE²A Paper of the Month January 26, 2023 | online

In the upcoming issue of the SE²A Paper of the Month, Eun Ju Jeon will present her publication "A room-temperature high performance all-solid-state lithium-sulfur battery enabled by a cross-linked copolymer@ceramic hybrid solid electrolyte". The presentation will take place on January 26th, 4:30 pm.

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