

## SE<sup>2</sup>A Newsletter 12/2021



Dear members and friends of the cluster SE<sup>2</sup>A,

even though this year was again not without restrictions, many steps forward could be made. We would therefore like to thank all those who, despite all obstacles, are pursuing the cluster goals and bringing us a little closer to sustainability in aviation with their research contributions.

In this newsletter, let us look back at the numerous SE<sup>2</sup>A events. And we are already looking forward to the upcoming activities such as the SE<sup>2</sup>A Science Slam, the planned Summer School with TU Delft and the own SE<sup>2</sup>A sessions at AIAA SciTech conference as the first event in early 2022.

In this sense, we wish you joyful Christmas holidays and a good start into the New Year. Stay healthy!

With best regards,

**Prof. Dr.-Ing. Jens Friedrichs**  
(Spokesperson SE<sup>2</sup>A)

**Dr. Doris Pester**  
(SE<sup>2</sup>A-Managing-Director)

The SE<sup>2</sup>A-newsletter will be published three times per year. For further information please visit our website: [www.tu-braunschweig.de/se2a](http://www.tu-braunschweig.de/se2a)

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### // YOUNG SCIENTISTS

#### New Junior Research Projects

In the last newsletter, we were very pleased to announce three new junior research projects funded by SE<sup>2</sup>A to support the first steps toward an independent own scientific career. We would like to present them to you one after the other and start in this newsletter issue with the project of Dr. Steven Gronau.

"Hydrogen in sustainable aviation: Macroeconomic impacts and state intervention"



Dr. Steven Gronau from the [Institute of Environmental Economics and World Trade](#) at Leibniz Universität Hannover will conduct research on the topic of hydrogen in aviation within the Cluster of Excellence SE<sup>2</sup>A. Within the framework of his Junior Research Project, he will investigate the macroeconomic effects of a future hydrogen-based aviation in comparison with a continuation of conventional aviation. Thus, his research will close a research gap, as the discourse on hydrogen in aviation is currently dominated by a purely technical view.

Dr. Gronau has already started in December to build his team. Together with a doctoral researcher and in combination with up to three bachelor's and two master's theses from the field of economics he will work on this project intensively within the next 18 months.

The full-length article (in german) can be found on the [website of the Leibniz University Hannover](#).

Find out more about the three projects in our next newsletters



**„Hydrogen in sustainable aviation: Macroeconomic impacts and state intervention“** Dr. Steven Gronau, Institute for Environmental Economics and World Trade, Leibniz University Hannover



**„Machine-Learning Based Unsteady Thermal Compressor Prediction - MLUTComp“** Dr.-Ing. Dajan Mimic, Institute of Turbomachinery & Fluid Dynamics, Leibniz University Hannover



**„Permeation assessment for cryogenic applications by means of Fiber Bragg Grating sensors“** Dr.-Ing. Daniel Stefaniak, Institute of Composite Structures and Adaptive Systems, German Aerospace Center (DLR)

## Call for applications SE<sup>2</sup>A International Fellowships and International SE<sup>2</sup>A Award for sustainable aviation

The Cluster of Excellence SE<sup>2</sup>A offers long-term research stays for excellent experienced researchers from abroad at the two recognition levels defined as "SE<sup>2</sup>A-Fellowships" and "SE<sup>2</sup>A-Awards". Close collaboration during a research stay with the scientists of the Cluster SE<sup>2</sup>A ensures scientific exchange in a direct way, builds trust, and creates joint research results.

We welcome you to spread this information among your colleagues! More information about the programmes and the selection procedures:

[SE<sup>2</sup>A International Fellowships](#)  
[International SE<sup>2</sup>A Award for sustainable aviation](#)

## Activities of the SE<sup>2</sup>A Research Training Group 2021

An eventful year has passed for the SE<sup>2</sup>A Research Training Group (RTG). Especially important for us were three topics: the successful publication of our scientific results, learning and applying helpful scientific tools and preparing for the final year for the first cohort of SE<sup>2</sup>A doctoral researchers in 2022 - which will hopefully end with many successfully defended PhD-theses. For this, we had numerous different workshops and doctoral seminars with

topics like scientific presentation, scientific writing, publishing open access or software development in science with Python.



**Summer School**  
for doctoral researchers



### SE<sup>2</sup>A Summer School

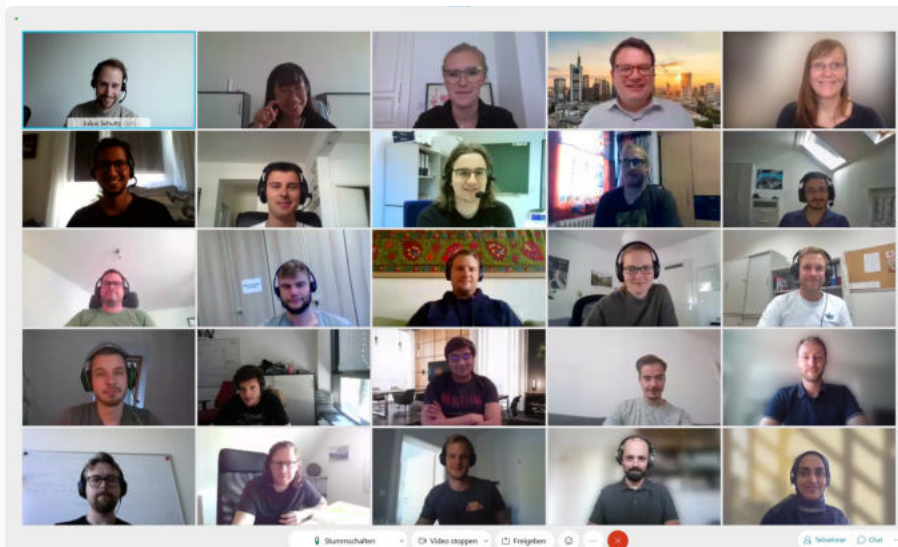
One particular highlight was the 2021 Summer School in September: During the first part of the Summer School, the doctoral researchers attended a workshop on „How to approach your PhD-Thesis?“ and reflected on topics like time- and self-management as well as finding a structure for their PhD-projects. Day 3 was dedicated to networking activities. With those who wanted to attend personally (and were fully vaccinated) we spent a day hiking in the Harz mountains with a lot of opportunity to explore the area and get to know each other. Those who would or could not attend the trip to the Harz, met online for a thrilling „escape game“.

### International Exchange: Lecture and Discussion with Prof. Zoltan Spakovszky (MIT)

The topic of approaching the PhD-Thesis was resumed in a discussion with contributions by Prof. Dr. Zoltan Spakovszky, Massachusetts Institute of Technology (MIT), Dr.-Ing. David Burzynski, Coldsense Technologies GmbH, Dr.-Ing. Dajan Mimic, Institute of Turbomachinery and Fluid Dynamics, LUH Hannover and Dr. Christian Thies, Institute of Automotive Management and Industrial Production, TU Braunschweig, who shared their experiences with the SE<sup>2</sup>A doctoral researchers.

### Special Thanks

Without the active participation of many people, the RTG programme would not be what it is. Therefore, we would like to take this opportunity to thank all those who initiated, organized and carried out the workshops. A special element of the RTG are the self-organized doctoral seminars of the SE<sup>2</sup>A doctoral researchers, in which they shared their knowledge on reference management systems, visualisation and simulation tools etc. Many thanks for special commitment in 2021 go to: **Michelangelo Corelli Grappadelli, Andrea Franco, Daniel Hahn, Bastian Kirsch, Maximilian Rolinck, Marcel Seidler, Hendrik Traub, Jonas Voigt.**



### Interview with SE<sup>2</sup>A Junior Research Group leader Dr. Camli Badrya



Dr. Camli Badrya leads the junior research group "Flow Physics of Laminar Wing and Fuselage" in the cluster SE<sup>2</sup>A at the Institute of Fluid Mechanics at TU Braunschweig since June 2019. In the interview, she not only gives insights into her research, but also tells us what she plans for the future and who her very personal heroes of aviation are. Find the

## Stefanie Ollenburg develops future scenarios in the Cluster of Excellence SE<sup>2</sup>A

Stefanie Ollenburg joined the Cluster of Excellence SE<sup>2</sup>A in July 2021. In her PhD Thesis at the Institute for Design Research under the direction of Professor Gerhard Glatzel at the Hochschule für Bildende Künste Braunschweig (HBK) she conducts scenario development and user research. Read more about her research [here](#) (german language).



## SE<sup>2</sup>A Paper of the Month presenters awarded



To honor their commitment to the cluster, the limited SE<sup>2</sup>A mugs were handed out as a small gift, this time to presenters of our seminar format. Dr. Doris Pester, CEO of the managing office, handed over the cups in a small, festive round and talked to Nicole Geffert about the many advantages that the seminar offers not only to doctoral researchers, but also to all the other SE<sup>2</sup>A researchers as well as the international cooperation partners. You can find the interview [here](#) in the TU Braunschweig Magazine.



Latest information about the upcoming Paper of the Month seminars will be published on our [news page](#) and on our [twitter account](#). All of you are kindly invited to join this seminar. Other interested colleagues at your institute are welcome as well. Please register your interested colleagues [here](#)

September 2021

### Stadtradeln: SE<sup>2</sup>A on bike participates again successfully

This year again, the team "SE<sup>2</sup>A on bike" participated in the city cycling for the city of Braunschweig. With a total of 1,625 cycled kilometers, our SE<sup>2</sup>A team saved an amount of 239 kg CO<sub>2</sub>! We think this result is something to be proud of!

The "Stadtradeln - Radeln für ein gutes Klima" ("City Cycling - Cycling for a Good Climate") is an annual competition in which the aim is to cycle as many everyday distances as possible in a climate-friendly way for 21 days. Next year it will start again - feel free to join the team!

[More about Stadtradeln](#)



October 2021

### SE<sup>2</sup>A Conference 2021

Already for the 3rd time the annual event of the Cluster of Excellence SE<sup>2</sup>A took place.

Also this year our conference took place virtually. It was opened by the speaker and vice speaker of the cluster, Prof. Jens Friedrichs and Prof. Rolf Radespiel, and the new president of the TU Braunschweig, Prof. Angela Ittel.

The two days focused on the topics "**Liquid hydrogen and SAF in future aircraft**" and "**Electric drive systems and power electronics**". The diverse program, including three keynotes, was again international in scope: The speakers were from Tampere University, the University of Nottingham, TU Delft and Brandenburg University of Technology, among others.

Networking was also not left out but virtually: At the end of each of the two days, there was the opportunity to further exchange information and network about the program and research.

A total of 178 participants listened to the very insightful presentations. We'd like to thank all speakers & participants for their active exchange and are already looking forward to next year's event!



November 2021

### Research Day at the Aeronautics Research Centre Niedersachsen

For the first time the NFL Research Day took place in hybrid form on November 9, 2021. The program of this year focused on "**New findings from the Cluster of Excellence SE<sup>2</sup>A**". After the welcome by NFL board speaker Prof. Dr.-Ing. Rolf Radespiel and

the new president of the TU Braunschweig, Prof. Dr. Angela Ittel, a diverse program of lectures by the SE<sup>2</sup>A members Prof. Dr.-Ing. Sabine Langer, Dr. Camli Badrya and Prof. Dr.-Ing. Georg Garnweitner followed. The highlight of the event was the awarding of the following prizes. The Hermann Blenk Researcher Award as well as the Karl Doetsch Young Scientist Awards and the VDI Aerospace Award were presented. Find all information about the award winners and the research day [here](#).



November 2021

### Increasing great interest in changING - the SE<sup>2</sup>A research club started a new round

With great pleasure we can announce that the research club is attracting so much enthusiasm: 39 school students from 12 schools will research, experiment and get exciting insights into research for sustainable aviation. The research club started the new round on November 18, 2021. Again, the vice speaker of the Cluster of Excellence SE<sup>2</sup>A Prof. Dr. Rolf Radespiel did not miss the opportunity to personally welcome the interested students and potential researchers of the future at the start of their program. The scientific researchers of the research club [Dina Al-Kharabsheh, M.Sc.](#) and [Dr. Anne Geese](#) (Institute for Science Education), once again put together a great program for the young researchers: by the end of their first year in the research club, they will have attended a total of 17 events and digital workshops in the fields of acoustics, simulation, programming and design.

The research club changING of the Cluster of Excellence SE<sup>2</sup>A started in October 2019. Students from the 10th grade onwards are given the opportunity to gain insights into various research areas of the cluster and to experiment on their own. The aim is to introduce and attract underrepresented student groups and female students, in particular, to technical courses of study.

[Find changING on Instagram](#)



ChangING Kick-Off



Opening by Prof. Rolf Radespiel

November 2021

### Prof. Martin Wiedemann at „TU for Future“ lecture series

As active contribution to the TU for Future programme, Prof. Martin Wiedemann (Institute of Adaptronics and Function Integration) held a lecture on the future of aviation on November 17th.

In the lecture series "TU for Future", scientists from the Technische Universität Braunschweig and other

institutions present their research on topics such as aviation, climate change and infectious diseases, urban development and climate emergency, or the influence of global warming on insects.

In case you missed Prof. Wiedemanns talk, you can [watch it on YouTube](#).

Read more about the programme and the upcoming lectures in 2022 [here](#).



November 2021

## Technological Leap in Aviation necessary - Appointment of Professor Sebastian Heimbs

Since September 2021, Prof. Sebastian Heimbs has headed the Chair of Aircraft Design at the Institute of Aircraft Design and Lightweight Structures. After completing his doctorate at TU Kaiserslautern, he worked at Airbus for more than 17 years and now enriches TU Braunschweig and our Cluster of Excellence SE<sup>2</sup>A with his many years of experience in the aviation industry and in the joint implementation of research projects in collaboration with national and international universities. János Krüger talked to him about his work and his ambitious goals.

You can find the whole interview in the TU Braunschweig Magazine: [„Technological Leap in Aviation necessary - Appointment of Professor Sebastian Heimbs“](#)



Prof. Klaus Dröder, Prof. Sebastian Heimbs and president of the TU Braunschweig Prof. Angela Ittel

December 2021

## Open position as Scientific Coordinator (m/f/d) in SE<sup>2</sup>A

The Cluster of Excellence SE<sup>2</sup>A is looking for a Scientific Coordinator (m/f/d) in the field of Assessment of the Air Transport System (ICA A).

In addition to supporting the ICA A lead, the coordinator's tasks include coordinating the SE<sup>2</sup>A program for young scientists, the equal opportunity program in SE<sup>2</sup>A, and other tasks in the managing office.

Find more information [here](#)

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## // 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

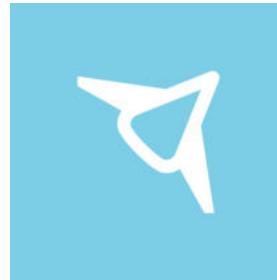
The goal of this cluster area is the development of comprehensive criteria and metrics for sustainable air transport that can serve as a basis for decision-making and future scenarios.

[more](#)

## 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.

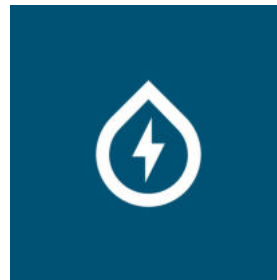
[more](#)



## 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](#)



## // UPCOMING SE<sup>2</sup>A EVENTS

### Special SE<sup>2</sup>A Sessions in Aircraft Design Sub-Conference at AIAA Scitech 2022

We are pleased to announce that the Cluster of Excellence SE<sup>2</sup>A will be represented with eight papers in two sessions at AIAA SciTech Forum 2022! Both sessions are titled "Key Technologies for Sustainable



and Energy-Efficient Aviation." This is achieved thanks to the initiative of the engaged board member and Junior Research Group leader Dr. André Bauknecht. Therefore, we would like to especially thank Dr. Bauknecht and all the people involved for their commitment!

### SE<sup>2</sup>A Science Slam

The research projects in the SE<sup>2</sup>A Cluster of Excellence are now in the third year of their funding. We think this is a good time to present intermediate results to the public. A high level of entertainment is guaranteed, as we have chosen an innovative format: a SE<sup>2</sup>A Science Slam - hopefully with an audience in presence. In a maximum of ten minutes, the SE<sup>2</sup>A researchers will give their best to present their research topic in an understandable and exciting way to get the audience on their side. The audience will evaluate the presentations and choose a "SE<sup>2</sup>A Science Slam Champion 2022" at the end of the evening.

We are looking forward to a lively participation and an exciting evening that shows us that science can also be entertaining. A detailed programme will follow.

## // ABOUT THE CLUSTER

We are pleased to announce and welcome Prof. Sebastian Heimbs at the Cluster of Excellence SE<sup>2</sup>A as head of the Chair of Aircraft Design at the Institute of Aircraft Design and Lightweight Structures.

At the same time we say goodbye to Prof. Ali Elham and we would like to thank him very much for his valuable contributions to SE<sup>2</sup>A and wish him all the best for his future career.



We also say goodbye to Maren Evers, who has been the Scientific Coordinator of ICA A "Assessment of the Air Transport System" from the beginning of the Cluster and we wish her the best for everything to come.

## // EVENT ANNOUNCEMENT



### **AIAA SciTech Forum and Exposition January 3-7, 2022 | San Diego, CA & Online**

The 2022 forum will explore the science, technologies, and policies that are shaping our industry's future and enabling sustainability. The Cluster of Excellence SE<sup>2</sup>A will be represented with eight papers in two sessions both titled "Key Technologies for Sustainable and Energy-Efficient Aviation".



### **SE<sup>2</sup>A internal General Assembly January 25, 2022 | Online**

This year's SE<sup>2</sup>A General Assembly will take place on January 25, 2022 from 10:00-14:00.



### **SE<sup>2</sup>A Paper of the Month February 23, 2022 | online**

In the upcoming edition of our seminar format, Gil Felix Greco will give a presentation on Sound quality assessment of a medium-range aircraft with enhanced fan-noise shielding design". The event will take place on February 23, 2022 at 4:30 pm.

#### Contact

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#### Imprint

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