

## SE<sup>2</sup>A Newsletter 08/2021



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

what events await us in the coming months? And what else is happening at the SE<sup>2</sup>A Cluster of Excellence? We would like to answer these questions and many more in our sixth issue of the SE<sup>2</sup>A Newsletter.

Also, we are looking forward to the second half of 2021, when we will meet again for our annual event. What we already know as SE<sup>2</sup>A Symposium, will be a special edition this year: SE<sup>2</sup>A Conference 2021. You can read more about this year's focus in this newsletter.

We are keeping an eye on the current happenings that can make us hope to meet again in person in the near future. Stay healthy and see you soon!

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

#### 2nd Call for Proposals: Three new Junior Research Projects in the SE<sup>2</sup>A Cluster of Excellence

The Cluster of Excellence SE<sup>2</sup>A offers additional financial support to advance highly innovative ideas and approaches of young scientists, thereby fostering the early career of highly qualified junior researchers. We are pleased to announce the following three new projects:

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

„Hydrogen in sustainable aviation: Macroeconomic impacts and state intervention“ - Dr. Steven Gronau, Institute for Environmental Economics and World Trade, 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)

We welcome the new Junior Research Projects and wish them great success!



Call for  
Proposals

## SE<sup>2</sup>A International Female Programme: Research Internships

After our programme for international Master projects for excellent female students, we have recently started the second branch of our “International Female Programme”: the research internships. Participants will work for six months on a research project defined by the SE<sup>2</sup>A hosting institute with the aim of starting their PhD after the successful completion of the programme. It is open to female academics from abroad at the very beginning of their career after graduation with a master’s degree who are interested in experiencing firsthand the research environment at one of the institutions of the SE<sup>2</sup>A cluster. Openings for internship positions can be found on the SE<sup>2</sup>A website.

[Find open positions here](#)

## // LATEST NEWS

May 2021

### Paper of the Month– newest publications of SE<sup>2</sup>A

Since February 2021, the young researchers in SE<sup>2</sup>A use this platform to present their freshly published papers and newest findings. Up to now we had five presentations across all research areas (ICAs) and disciplines.

We thank the speakers:

[February](#) „Impact of Current Density and Cooling on the Weight Balance of Electrical Propulsion Drives for Aviation“ by Jan Hoffmann

[March](#) „Active Flow Control Devices for Wing Load Alleviation“ by Khalid Khalil

[April](#) "Identification and Handling of Heterogeneous Lifetimes in Product Architecture Design" by David Inkermann

[May](#) „Sustainability Assessment & Engineering of Emerging Aircraft Technologies - Challenges, Methods and Tools“ by Sofia Pinheiro Melo

[June](#) „Experimental investigations of boundary layer transition on a flat plate with suction“ by Michelangelo Corelli Grappadelli

With a lively exchange as well as enriching interdisciplinary discussions with other participating doctoral researchers as well as PIs, we draw a pleasing first balance.

In September, the series will be continued by Chetan Talwar with his publication: "How much can electric aircraft contribute to reach Flightpath 2050 CO<sub>2</sub> emissions goal? A system dynamics approach for European short haul flights".

We are already looking forward to it!



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

- Let your colleagues know
- Discuss high quality Cluster Research
- Establish interdisciplinary exchange

Every last Wednesday of the month at 4:30 pm



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](#)

June 2021

### SE<sup>2</sup>A participates at NFDI4Ing

An efficient and user-friendly environment for save data exchange becomes increasingly important in large scientific networks. In SE<sup>2</sup>A, researchers from 5 different institutions work on a common goal, and therefore an own SE<sup>2</sup>A platform for data exchange is developed for the cluster. Additionally, SE<sup>2</sup>A contributes own experience to NFDI4Ing, the National Research Data Infrastructure Initiative by the German government and the governments of the federal states.

[Read more about NFDI4Ing](#)

# NFDI4ing



July 2021

### Virtual Cluster visit by DFG on 7th July 2021

Instead of a personal visit, a virtual exchange took place between the DFG programme officer Dr. Monika Zwerger and the members of the SE<sup>2</sup>A cluster. In three different discussion rounds with the SE<sup>2</sup>A board members, PIs of the Cluster projects, as well as young researchers current challenges and achievements could be discussed together. We thank Dr. Monika Zwerger for her visit and looking forward to a personal meeting next time.



July 2021

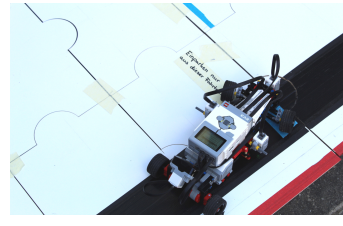
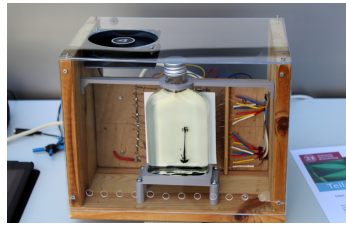
## The SE<sup>2</sup>A research club changING releases the first cohorts into the summer break

Finally, the time had come! The 2019 and 2020 cohorts of changING were able to review their time in the research club so far on July 15. After a warm welcome and a few words from Prof. Dr.-Ing. Rolf Radespiel, vice speaker of the Cluster of Excellence SE<sup>2</sup>A, the two researchers and coordinators of the program M.Sc. Dina Al-Kharabsheh and Dr. Anne Geese (both at the Institute for Didactics of Science) summarized the completed stations in the research club, such as an [acoustic treasure hunt](#).

The groups visited various institutes and facilities and were also able to become active themselves: They were guided in implementing their own projects from the idea to the prototype and later participated with great dedication in the proclaimed [autumn vacation challenge "#rube-goldberg"](#)!

The final event was a great success with a total of more than 40 participants and we are already excited to see what interesting, creative tasks and stations the changING team will come up with for the students of tomorrow in the coming cohorts.

[Read more](#) and find changING on [Instagram](#)



Dina Al-Kharabsheh, M.Sc. & Dr. Anne Geese and two of the produced prototypes

July 2021

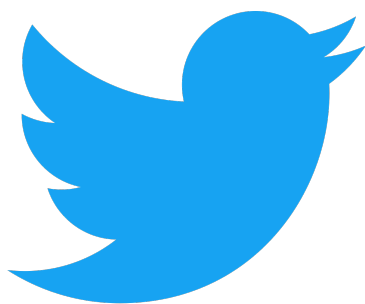
## Hendrik Traub on „Carolos Fallobst. Ein Wissenschafts-Podcast"

In the second episode of the science podcast, the topic is "Active laminar flow control on flight systems".

Host Ferdinand Cerbe talks to the researcher of the [Institute of Mechanics and Adaptronics](#) at TU Braunschweig about his research in the Cluster of Excellence SE<sup>2</sup>A - Sustainable and Energy-Efficient Aviation, his personal connection to Braunschweig, and why he would like to have a chat with the forefathers of aerodynamics. And all that in a compact 19 minutes talk!

You can find the current episode of the podcast on Spotify. [Click here](#)

More about Carolos Fallobst on [Instagram](#)



August 2021

## One year SE<sup>2</sup>A on Twitter

Since June 2020, the Cluster of Excellence SE<sup>2</sup>A is active with an account on Twitter and since then shares notes about the Cluster of Excellence, its members and everything interesting from and about the field of sustainable aviation.

Currently with 95 followers, 2821 profile visits, nearly 100 tweets, and over 60,000 impressions, we are growing steadily and working to share lots of interesting

information. In addition to official announcements and events, however, we are also interested to make our members more visible and connected, such as in our "#YoungResearchersOfSE2A" campaign. To keep the feed up to date and diverse, we welcome your comments on new articles, interesting conferences, and anything else you would like to share with everyone. [Visit SE<sup>2</sup>A on twitter](#)

August 2021

## "Auf eine Limo mit ... Dr. Doris Pester" - Interview with our SE<sup>2</sup>A managing director

In the new episode of "Auf eine Limo mit ..." of the innovation portal "Besser Smart", host Jennifer Haacke meets Dr. Doris Pester at the research airport. The managing director of the SE<sup>2</sup>A cluster of excellence - "Sustainable and Energy-Efficient Aviation" - explains the cluster's goals, outlines the most urgent questions and challenges regarding research on sustainable aviation, and provides insights into current approaches to solutions. The twelve-minute interview, including making-of and further information, can be found [here](#)



## // 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](#)



### Interdisciplinarity in action

The SE<sup>2</sup>A Cluster of Excellence is a complex endeavour that includes more than a 150 researchers of different academic disciplines. To ensure collaborative interdisciplinary research with different perspectives and approaches as well as methods and vocabulary is a challenging – and at the same time intriguing – task.

To organize the research accordingly, SE<sup>2</sup>A has three Integrated Cluster Areas (ICA) that meet regularly to exchange their results. During the last meeting, we even went a step further and implemented a participatory Cross-ICA-Exchange format with the online meeting tool wonder.me. The exchange was accompanied by short impulse presentations on different kinds of methodology. The lively and constructive discussions could hardly be stopped when the time was up. This shows that cross-disciplinary research can also succeed under Corona conditions.

### Prof. Dr. Ali Elham at the MUSEN Colloquium

Cluster of Excellence PI Prof. Dr. Ali Elham gave a talk at the MUSEN Colloquium entitled: "An Aircraft from Nothing - Towards the design of future aircraft using multidisciplinary topology optimization" in which he explains his aircraft model. Anyone interested who missed the talk can now watch it on [Youtube](#).



### An Aircraft from Nothing; Toward the design of future aircraft using multidisciplinary topology optimization

Prof. Dr. Ali Elham

### The best of both - Joint doctoral supervision with TU Delft

In aeronautics research the Delft University of Technology (TU Delft) is one of the leading universities in Europe. Together with the Cluster of Excellence “SE<sup>2</sup>A -Sustainable and Energy-Efficient Aviation” at TU Braunschweig, both partners identified Sustainability in Aviation as a major strategic mission and want to bundle their scientific efforts for this challenging task.

What could be better for a doctoral student for his or her research project than to have the input of those two excellent research institutions?

The ambitions to develop technologies for a sustainable and eco-friendly air transport system connects TU Delft throughout several research activities in the past with the aviation research at TU Braunschweig. Initiated by the Aeronautics Research Centre Niedersachsen (NFL) as an alliance of the aerospace engineering institutes of the TU



Braunschweig, the German Aerospace Center (DLR) and the Leibniz University Hannover (LUH) this strategic partnership was further strengthened by a common agreement in February 2020 between both partners. One major element in this agreement is to intensify the scientific exchange by a joint supervision of doctoral thesis projects. The doctoral researchers have the possibility to work at both, TU Delft and SE<sup>2</sup>A institutions with full integration into the scientific networks. At both places, participation in the offers of the respective graduate schools at TU Delft and the SE<sup>2</sup>A research training group is possible and provides good opportunities to connect with colleagues for the future.

We welcome our first doctoral researcher in the Cluster of Excellence SE<sup>2</sup>A at TU Braunschweig in September and wish him every success for his research project as a contribution to the realization of the energy transition in aviation.



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

### SE<sup>2</sup>A Summer School 2021

Main focus of the 2021 SE<sup>2</sup>A Summer School in September is the optimal preparation for the PhD-Thesis. In a two-day workshop the SE<sup>2</sup>A doctoral researchers will tackle challenges from time management to structuring their topic and will – hopefully – complete the workshop with an outline of their thesis. After two intense days of brain work, social interaction and networking should not be lacking either: depending on the Corona-Situation we will either spend a day in the Harz or meet for an online-team-challenge.

[Review SE<sup>2</sup>A Summer School 2020](#)



**Summer School**  
for doctoral researchers

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

Already for the 3rd time the annual event of the SE<sup>2</sup>A Cluster of Excellence takes place. After a great start in 2019, the second edition in 2020, like almost all events this year, took place under difficult conditions. Despite these circumstances, we were able to draw a positive balance for 2020: Up to 130 participants took the opportunity to look from different perspectives and discuss technological developments in the two key sessions: "Aircraft Design" and "Technological Requirements/ Technology Assessment".

This year's focus will be on the main topics: „**Liquid hydrogen and SAF in future aircraft**“ and „**Electric drive systems and power electronics**“.

Although it is still open whether in presence or virtually, we are looking forward to the scientific exchange at the SE<sup>2</sup>A CONFERENCE 2021.

Registration will be possible soon on our website.



**SE<sup>2</sup>A** Sustainable and  
Energy-Efficient Aviation  
Cluster of Excellence

**CONFERENCE**

7<sup>th</sup> to 8<sup>th</sup> October 2021

### Special Session 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 Mr. Bauknecht and all the people involved for their commitment!



## // ABOUT THE CLUSTER

## New members in the managing office

We are pleased to welcome Sarah Kubs and Svenja Bartels in our Cluster of Excellence. Sarah Kubs joined the SE<sup>2</sup>A managing office as project assistance and Svenja Bartels is the new scientific coordinator of the cluster area ICA B - "Flight Physics and Vehicle Systems". Both joined us in June 2021.

[Contact information](#)

## // EVENT ANNOUNCEMENT



**Summer School**  
for doctoral researchers

### SE<sup>2</sup>A Summer School for doctoral researchers

**September, 2021 | Braunschweig & online**

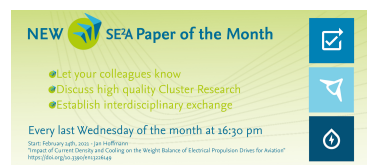
The annual SE<sup>2</sup>A Summer School for doctoral researchers will take place in the second week of September 2021. Among other topics on the programme, there will be a 2-day-workshop on „How to approach your PhD-Thesis“ to prepare the researchers optimally for writing their thesis.



### NFL-Workshop

**September 27-28, 2021 | online**

The Aeronautics Research Centre Niedersachsen is offering the workshop in its usual quality again this year. The event will take place online.



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

**September 29, 2021 | online**

In the upcoming edition of our seminar format, Chetan Talwar will give a presentation on "How much can electric aircraft contribute to reach Flightpath 2050 CO<sub>2</sub> emissions goal? A system dynamics approach for European short haul flights".

The event will take place on September 29, 2021 at 4:30 pm.



### SE<sup>2</sup>A Cluster of Excellence Conference

**October 7-8, 2021 | Braunschweig & online**

Please make a note! The lively scientific exchange will continue at the SE<sup>2</sup>A Cluster of Excellence Conference in October 2021: External speakers, SE<sup>2</sup>A researchers and guests will have again the opportunity to exchange their ideas, discuss approaches, and network. See all topics in the text above.



### The Aerospace Europe Conference 2021

**November 23-26, 2021 | Warsaw**

The conference will be organized by CEAS together with Polish Society of Aeronautics and Astronautics, Łukasiewicz Research Network – Institute of Aviation & Warsaw University of Technology.

The main motto for the conference is 3R triptych “Restore, Rethink, Redesign”.



### 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".

#### Contact

Technische Universität Braunschweig  
Sustainable and Energy-Efficient Aviation  
Hermann-Blenk-Str. 42  
38108 Braunschweig

Tel.: (0531) 391-66661  
Mail: [se2a@tu-braunschweig.de](mailto:se2a@tu-braunschweig.de)

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#### Imprint

SE<sup>2</sup>A - Sustainable and Energy- Efficient Aviation

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