Student Exchange Project:

Collaboration between Fraunhofer, Technical University of Munich and Tel Aviv University

We, the Fraunhofer Center Secure intelligent Systems, proudly present our first student exchange program to you, which combines the expertise of our core partners: Fraunhofer IGCV, Technical University of Munich and Tel Aviv University! This program is part of our Fraunhofer Innovation Platform for Sensors and Applied Systems (FIP-SENS@TAU) which we opened in 2022 in Tel Aviv, to promote top level multi - and interdisciplinary research and development.

Join the exceptional student exchange program and collaborate with top minds at the forefront of innovation and technology. This program offers a unique opportunity to immerse yourself in Israel's dynamic start-up ecosystem, renowned for its creative and entrepreneurial spirit and to gain insights from the largest applied research organization in Europe, Fraunhofer-Gesellschaft.

This exchange program not only fosters innovation and practical applications but also provides a unique cultural experience that broadens perspectives and enriches approaches to solving global challenges.

Apply now to become a part of this transformative opportunity!

Project Description:

In 2023, Tel Aviv University (TAU) formed a dedicated team of mechanical engineering students to represent Israel in the prestigious international RoboBoat competition held in Sarasota, USA. The RoboBoat competition challenges teams to design, build, and deploy a fully Autonomous Surface Vehicle (ASV) that navigates a rigorous obstacle course. The team developed an ASV equipped with LIDAR, Computer Vision, and a sensor array to precisely map its surroundings.
During the 2023 competition, the ASV faced significant challenges due to high winds and sharp turns, causing it to capsize. Despite the setback, the team demonstrated resilience by retrieving and repairing the boat. Our current objective is to enhance the ASV's stability to prevent similar issues in future competitions.

We invite German students from the Technical University of Munich to join us in this exciting project. Your collaboration will be crucial in finding innovative solutions to stabilize the boat for the next competition in 2025. This is an excellent opportunity to apply your skills, learn from experts, and contribute to an international engineering challenge. Discover more about the work of the Israeli team and be part of this transformative experience!

Here you can find more insights into the work of the Israeli Team!

You can choose between three Projects with different focus:

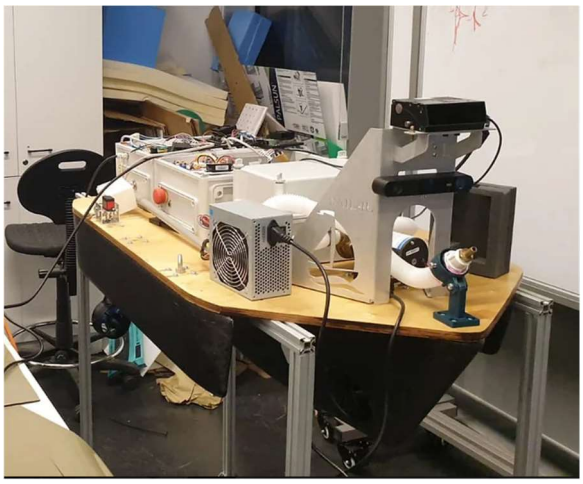
For application please write an e-mail to Daniel Günther (Fraunhofer IGCV and TUM Department UTG) (daniel.guenther@igcv.fraunhofer.de) together with your Transcript of Records.

If you are interested in more than one project, please prioritize them in your e-mail.

Course places are limited. The allocation of places is based on the first come first serve principle.

We will contact you at the end of the application deadline and let you know whether you have received a place.

For more information please visit our website.



See below for detailed information on the three projects.

(1) Project Name: Autonomous boat instability sensing (2024/2025)

Topic	Technical University of Munich
Course of Study	B.Sc. Mechanical Engineering Students (Maschinenwesen), 3rd-5th Semester
Application Start (by email)	July 2024
Application Deadline	28.07.2024
Application Requirements	Student Record and afterwards Interview with Advisor
Advisors	Daniel Günther E-Mail: daniel.guenther@igcv.fraunhofer.de Phone: +49 1522 1816163 Wolfram Volk E-Mail: wolfram.volk@utg.de Phone: +49 89 289-13791
Course Timeline	Start: 4.11.2024 End: Flexible if one or two semesters: Either 25.06.2025 or end of March
Language	English
Credit Points	10
No. of students	4-6
Course Structure	Every two weeks virtual meetings with a mixed group of students of Technical University of Munich and Tel Aviv University.
Marketing Websites	https://www.lz-sis.de/en/student-exchange-program.html#

Focus:

Stability sensing and control: The team will test the mechanical changes to the boat and their influence on the boat stability in a swimming pool, wave tank available at TAU or lake with the help of sensors installed on the boat. The team will run simulation analyses with Ansys or any other software to validate their new design.

(2) Project Name: Autonomous boat stability improvements (2024/2025)

Topic	Technical University of Munich
Course of Study	B.Sc. Mechanical Engineering Students (Maschinenwesen), 3rd-5th Semester
Application Start (by email)	July 2024
Application Deadline	28.07.2024
Application Requirements	Student Record and afterwards Interview with Advisor
Advisors	Daniel Günther E-Mail: daniel.guenther@igcv.fraunhofer.de Phone: +49 1522 1816163 Wolfram Volk E-Mail: wolfram.volk@utg.de Phone: +49 89 289-13791
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No. of Students	4-6
Course Structure	Every two weeks virtual meetings with a mixed group of students of Technical University of Munich and Tel Aviv University.
Marketing Websites	https://www.lz-sis.de/en/student-exchange-program.html#

Focus:

Improved hydrodynamics – stability: The team will use CAD software such as SolidWorks/Catia to design an improved boat platform. The team will manufacture the mechanical kit and integrate it into the boat.

(3) Project Name: Multi-material components on base of casted parts (2024/2025)

Topic	Technical University of Munich
Course of Study	B.Sc. Mechanical Engineering Students (Maschinenwesen), 3rd-5th Semester
Application Start (by email)	July 2024
Application Deadline	28.07.2024
Application Requirements	Student Record and afterwards Interview with Advisor
Advisors	Daniel Günther E-Mail: daniel.guenther@igcv.fraunhofer.de Phone: +49 1522 1816163 Wolfram Volk E-Mail: wolfram.volk@utg.de Phone: +49 89 289-13791
Course Timeline	Start: 4.11.2024 End: 25.06.2025
Language	English
Credit Points	10
No. of students	4-6
Course Structure	Every two weeks virtual meetings with a mixed group of students of Technical University of Munich and Tel Aviv University.
Websites	https://www.lz-sis.de/en/student-exchange-program.html#

Focus:

Refine cast parts using the Directed Energy Deposition (DED) additive manufacturing process

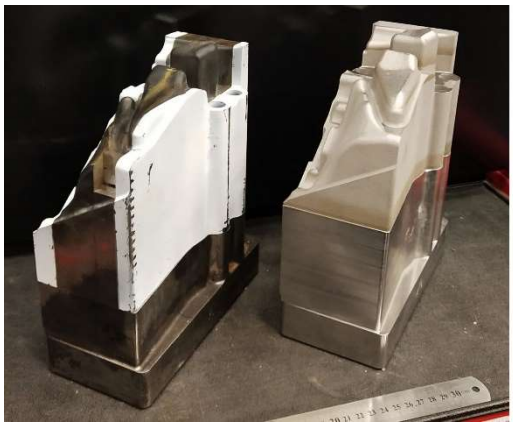
Cast parts can integrate many functions into one component. This aspect can be enhanced by realizing material mixtures. The focus here is on reducing the negative properties resulting from the cast structure through hybrid or combined construction. The project goal is to refine cast parts using the Directed Energy Deposition (DED) additive manufacturing process. The use of additive manufacturing in combination with casting enables the production of bigger multi-material parts with complex geometries. The proposed material combinations are to be tested and their metallic structure and interface integrity characterized. The combination with the sub-project "Autonomous boat" will also be the focus of the project. Individual parts or the entire hull are to be produced as castings. The target parameters for the hybrid solution should be strength, hardness, ductility, and thermal conductivity. Moreover, DED process parameters (e.g. laser power, laser scan speed, etc.) will be investigated and optimized according to the required physical properties of the components. The students evaluate in detail using test geometries:

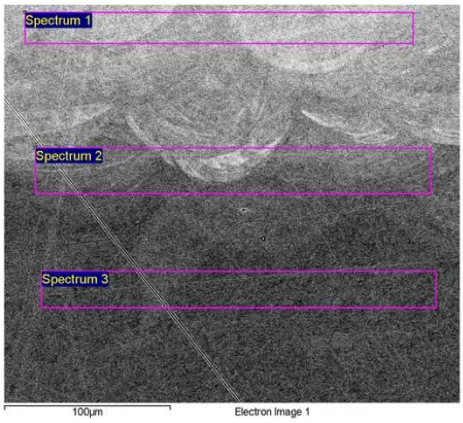
- A combination of AlSi7Mg casting and titanium alloys DED manufacturing

- A combination of AlSi7Mg casting with Al 5083 DED manufacturing.

The material and the composite are characterized on the basis of the above target variables. The most promising technology will then be validated on components of the "autonomous boat".

Pictures:





Example of the hybrid part, where base part was manufactured by subtractive manufacturing from H13 steel, and the top having complex inner cooling channels, was additive manufactured using maraging steel. The illustrated interface is dense and homogeneous.