What is *enGlobe*?

enGlobe is a DAAD funded internationalization project under the roof of THI's Latin America Center **AWARE** which offers **scholarships each year from 2020-2023** to master students from the Department of Mobility Engineering of UFSC (Joinville) for research stays of **5 months** at THI's research and testing center CARISSMA.
The 04 topics you find below are offers from CARISSMA professors for which you can apply. If you were successful in the application procedure for the research stay in one of the topics, you automatically receive the *enGlobe* scholarship (no separate application process necessary):

- Single travel allowance: 1,575€
- Monthly scholarship rate: 934€

The research stay itself does not include any remuneration or further financial support.

Who can apply?

Master students from the Technology Center Joinville **with a level of English of minimum B1** (please consider the requirements of the offers). **The stay should preferably be connected to writing a final master's thesis.**
Exceptions:

- If you would like to plan your stay as "voluntary internship", i.e., not connected to your master's thesis, please indicate it accordingly in the application form.
- If none of the below listed topics fits to your thesis topic, you have the option to find a THI supervising professor yourself who supports your topic. Please indicate it accordingly in your application form.

How to apply?

1st phase: Documents are to be submitted until **November 22 (23:59, Brasília) in English in one pdf file (max. 15 MB)** to aware@thi.de:

- Application form, indicating the topic you apply for (find the form under https://aware.thi.de/en/studying-and-internships/germany/englobe-research-stay-at-thi)
- Motivation letter (1-2 pages) explaining choice of topic and motivation for the stay
- CV (max. 2 pages)
- Letter of support of the supervising professor at UFSC[1]
- Current transcript of records of master studies; if not available: scan of certificate of bachelor's degree with transcript of records[2]
- Letter of support of the planned supervising professor at THI
- Proof of sufficient English language skills (B1 or B2, see requirements of offers)[3]
- Optional: Proof of international experience (studies/internships abroad, participation in international conferences/seminars/courses etc., active membership in international organizations, etc.)[2]

2nd phase: After the deadline, your application will be evaluated, and the selection committee will then decide on the scholarship holders **by November 28**.

[1] If your supervisor needs more details on the topic(s), please contact aware@thi.de, we will forward the contact of the THI professor accordingly.
[2] Can be submitted in Portuguese if not available in English.
[3] A confirmation of UFSC or a simple online test are also accepted.

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3rd phase: After being selected for the scholarship, you must apply at THI as exchange student **until November 30**.[4] THI's International Office will then support you in your preparation and offers an orientation week one week before the start of the semester on March 15 which will also be your first day of your research stay at CARISSMA.[5]

Contact

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Research Stay at CARISSMA

March 15 – August 14, 2023

The THI research and test center CARISSMA - *Center of Automotive Research on Integrated Safety Systems and Measurement Area* has been designed as leading scientific center for vehicle safety in Germany. The aim of this facility is to conduct applied research in order to enhance traffic safety in Germany and abroad. To this end, CARISSMA works with car manufacturers, scientists and research institutions all over the world. Working on an interdisciplinary basis, the scientists involved seek to tackle the social challenge of "Vision Zero" – achieving the ultimate goal of zero traffic deaths. Currently some 39,000 people are killed per year on Europe's roads alone.[6]

Three institutes are located at the CARISSMA research and test center:

The **CARISSMA Institute of Safety in Future Mobility (C-ISAFE)** is dedicated to predictive accident detection and accident consequence mitigation. It works on global vehicle safety using all available information to protect occupants and vulnerable road users. Its predictive accident detection and mitigation of crash severity contribute actively to the EU's Vision Zero. This includes safety systems ranging from sensors to actuators and their evaluation in the context of automated driving. One focus in this context is on safety in poor weather conditions

The **CARISSMA Institute of Automated Driving (C-IAD)** focuses its research on the development, testing and validation of automated driving functions. In the context of improving overall road safety (Vision Zero), the primary focus is on accident avoidance - i.e., active vehicle safety and its influencing factors: human - vehicle - environment. For this very reason, the Institute is intensively engaged in research into human factors (e.g., trust, acceptance, ethics) as well as the evaluation of the user experience (user experience/usability) related to automated driving.

The **CARISSMA Institute of Electric, Connected and Secure Mobility (C-ECOS):** Safe and sustainable solutions for future mobility are the focus of the C-ECOS. Research focuses on electromobility, Car2X communication, vehicle IT security as well as accident analysis and safety of aerostructures, which are investigated in an interdisciplinary team together with national and international partners.

The three institutes use synergy effects both among themselves and with other THI facilities, including in the areas of testing and validation and safe automated driving.

[4] More details on the application here: https://www.thi.de/en/studies/international-students/exchange-students
[5] Practical information for your stay here: https://www.thi.de/en/studies/international-students/practical-information-for-internationals/
[6] Find out more about CARISSMA here: https://www.thi.de/en/research/carissma/

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Topics of C-IAD

1. Adaptive Sensor Fusion in Extreme Weather Environments

Supervising professor CARISSMA: Prof. Dr.-Ing. Werner Huber/Yuri Poledna

Environmental perception is essential towards a fully automated vehicle. In this way, these systems must be reliable. Multiple sensor data fusion is one way to have a robust perception system, in which the benefits of camera, radar, lidar and others are compounded. Testing fusion algorithms in ideal scenarios does not represent the multiple possibilities real world provides. It is needed that the vehicle adapts and comprehends the environment it is situated in and adaptively alters its perception to the best possible in such scenario. This project proposes the implementation of a fusion algorithm in a real-time environment and tests it in ideal and adverse conditions. During the stay in Ingolstadt the student will have the opportunity to learn working together with the CARISSMA Institute of Automated Driving (C-IAD) the following tasks: 1) Implement and improve a fusion algorithm based on statistical methodologies; 2) Using real world data, test the fusion algorithm in multiple ideal, and adverse weather conditions; 3) Introduce novel methodologies for adaptive fusion.

Special Requirements

English language skills of B2; Python3

2. Method for Rapid Parametrization of Vehicle Dynamics Models

Supervising professor CARISSMA: Prof. Dr.-Ing. Werner Huber/Maikol Funk Drechsler

The testing virtualization in the automotive industry requires the development of precise and real-time capable models of the whole vehicle. The measurement of parameters necessary to describe the dynamic behavior of the vehicle mechanical systems require an extensive procedure. In this way, this project proposes a rapid method that will enable the measurement from these parameters by dynamic manoeuvres on the test track. During the stay in Ingolstadt the student will have the opportunity to learn working together with the CARISSMA – Institute of Automated Driving in the following tasks: 1) Definition of an AI-based or regression methods to extract the parameters of the model from the dynamic manoeuvres 2) Using simulation software as IPG CarMaker the student will define the manoeuvres necessary to obtain the parameters of the vehicle model. 3) Collect the respective data from a real car, performing the defined manoeuvres and obtaining the vehicle model.

Special Requirements

English language skills of B2; Programming skills and knowledge of dynamic vehicle models are required

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3. Intelligent Infrastructure - The Application of Embedded Computing in the Future Mobility Ecosystem

Supervising professor CARISSMA: Alessandro Zimmer

With the rising maturity the smart cities concept and digital roads, more processing is being required from the intelligent systems that are being/will be installed in cities to monitor the traffic, road users, infrastructure and such. For that we believe that edge computing will play an increasing role. In this context we want to study the viability of using real time embedded computation to pre-process sensor data smart. Tasks: Implement on embedded devices traditional machine learning/ deepl learning object detection algorithms. Validate the use of those algorithms and evaluate the performance by the use of existing datasets.

Special Requirements

English language skills of B1; Programming knowledge (ideally C++/Python/C#), embedded systems notions

4. Occupant Monitoring Systems - The Application of Embedded Computing in the Future Mobility Ecosystem

Supervising professor CARISSMA: Alessandro Zimmer

Driver Monitoring systems are becoming mandatory in new cars in order to fulfill safety requirements for drowsiness detection, inattention and, in a near future, deployment of safety features. A natural extension will be the protection of all occupants by the use of as OMS. We believe that the use of embedded edge computing will allow the manufacturers to install complex systems into the vehicles without relying on powerful centralized control units, that will demand a lot of energy and generate a lot of heat that is difficult to be dissipated. Tasks: Implement on embedded devices traditional machine learning/deepl learning passenger detection algorithms. Validate the use of those algorithms and evaluate the performance by the use of previously collected datasets.

Special Requirements

English language skills of B1; Programming knowledge (ideally C++/Python/C#), embedded systems notions

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