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UNIVERSITÄT
ERLANGEN-NÜRNBERG

Science Sets Sail

Join FAU on a voyage of scientific discovery on the Baltic Sea

Summer 2017

SCIENCE
SETS SAIL

www.fau.eu

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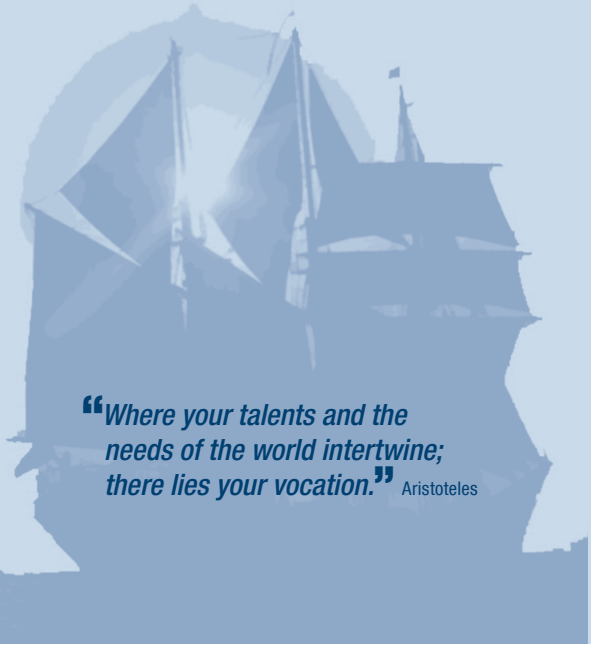


"Where your talents and the needs of the world intertwine; there lies your vocation." Aristoteles

Forging new ideas while sharing experiences

Drawing on mankind's earliest spirit of adventure, FAU created Science Sets Sail as a trip of scientific discovery on the Baltic Sea. FAU researchers and their guests from the Baltic region and beyond will forge new ideas together on the sailing ship 'Thor Heyerdahl.' The ship is named after the Norwegian researcher and explorer famous for leading the 'Kon-Tiki' expedition in 1947. Thor Heyderdahl showed that it was possible for ancient Polynesians to travel large distances using only materials and technologies available at that time.

I believe that the researchers that join us on the Science Sets Sail trip during the summer of 2017 – and their academic institutions – will benefit from building close and long-lasting relationships with FAU, a centre of excellence for innovation and international research.

Our goal is to build strong and committed teams by sharing new experiences, both on board and in port, while strengthening interdisciplinary research on a range of highly-relevant selected topics.

Local municipalities and chambers of commerce, higher education institutions, researchers at different stages of their career, highly talented students and members of the general public are cordially invited to join Open Ship Day events in five cities – Malmö (Sweden), Riga (Latvia), Helsinki (Finland), Tallinn (Estonia), and Danzig (Poland) – during the Science Sets Sail trip.

I am really excited about the new scientific horizons that Science Sets Sail will enable us to cross – in order to change the world.

Prof. Dr. Joachim Hornegger,
President Friedrich-Alexander-Universität Erlangen-Nürnberg

SCIENCE
SETS SAIL

During summer 2017, FAU researchers and their guests from the countries bordering the Baltic Sea and beyond will forge new ideas together on the sailing ship 'Thor Heyerdahl'. Through moderated discussions, presentations, on-board life and teamwork, our goal is to grow together by sharing new experiences, while strengthening interdisciplinary research on a range of specific themes that are critical to our world today.

In doing so, we intend to encourage international individuals with high potential to participate in FAU's cutting-edge research projects. Science Sets Sail was created as an innovative way to establish new forms of cooperation with academics in Estonia, Finland, Latvia, Poland and Sweden, not to mention attract potential students and researchers to come to Germany.

For more information, please see:
www.science-sets-sail.fau.eu

About FAU

FAU, founded in 1743, is one of the ten largest Universities in Germany with almost 40,000 students, 576 professorships, and a clear strategy for internationalisation that seeks to:

1. Increase the percentage of internationally-renowned top researchers and highly-qualified young researchers from abroad
2. Improve FAU's international visibility as an institution via specific research priorities
3. Expand FAU's appeal to international graduates

We've defined eight Key Research Priorities to sharpen FAU's research profile, and to facilitate interdisciplinary research across its five Faculties: Business Economics & Law, Engineering, Humanities & Theology, Medicine, and Sciences. These are:

- **Cultural Values, Religion and Human Rights**
- **Electronics, Analytics and Digital Transformation**
- **Future Energy Systems**
- **Medical Engineering**
- **Medicine, Life Sciences and Health**
- **New Materials and Processes**
- **Optics and Optical Technologies**
- **The World of Work**

Industry is already recognizing FAU's excellent research performance. For example, around a third (63 million Euro in 2015) of the University's third-party funding comes from industry (Total in 2015: 180 million Euro). This ranks FAU among the top three German universities on this measure.

Our Voyage of Scientific Discovery

Leg One – Saturday 15 July to Tuesday 25 July

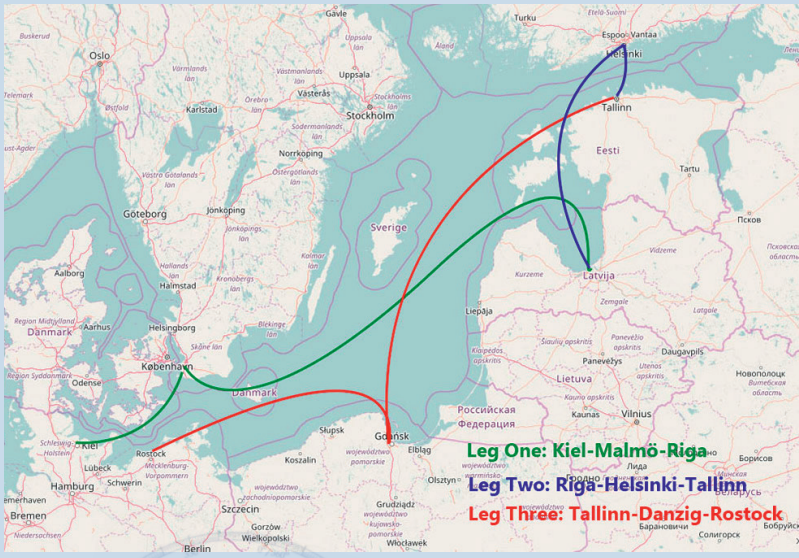
Beginning in Kiel, Germany, the 4-week Science Sets Sail voyage gets underway following the arrival of FAU moderators, and teams representing the University's Institute for Factory Automation and Production Systems (FAPS), Centre for Human Rights Erlangen-Nürnberg (CHREN), and GeoZentrum Nordbayern (GZN) – not forgetting invited guest researchers from the Baltic Sea region! During this leg, the ship stops at **Malmö, Sweden (18-19 July)**, and says goodbye to these first crews at **Riga, Latvia (23-25 July)**.

Leg Two – Tuesday 25 July to Wednesday 2 August

In each port, local business and academic institutions, not to mention interested members of the public, are invited to an 'Open Ship Day' at the dockside and on board the Thor Heyerdahl. After the second of these in Riga, three fresh teams representing researchers and guests join the ship for leg two of the voyage. These are Graduate School of Advanced Optical Technologies (SAOT), Erlangen Nürnberg Excellence Track – Leistungszentrum Elektroniksysteme (ENET^{LZE}), and the Chair of Economics – Discrete Optimization – Mathematics (EDOM). On this leg, the ship calls in at **Helsinki, Finland (29-30 July)** and **Tallinn, Estonia (31 July – 2 August)**.

Leg Three – Wednesday 2 August to Friday 11 August

Now comes the turn of researchers and guests of the Engineering of Advanced Materials (EAM) Cluster of Excellence, Department of Chemistry and Pharmacy, and the Medical Faculty. Boarding in Tallinn, these new crews have plenty of opportunity to discuss collaboration projects and exchange ideas. During leg three, the ship calls in at **Danzig, Poland (6-8 August)** and lands at its final port of Rostock, Germany on Friday 11 August.



About the ‘Thor Heyerdahl‘

Named after the famous Norwegian researcher and adventurer, Thor Heyerdahl, this majestic three-masted topsail schooner has voyaged around the world on countless journeys.

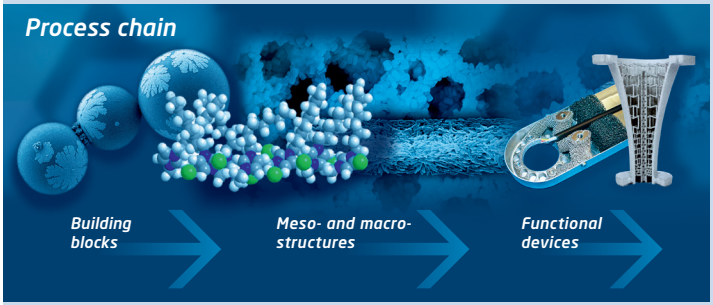
From spring to autumn, the ship sails mainly on the Baltic Sea as a venue for sailing training events. In the winter months, it has repeatedly crossed the Atlantic Ocean and sailed in the Caribbean, especially as a ‘classroom under sail’ with teenage crews.

Length:	49.48 m overall
Beam:	6,52 m
Height:	29 m
Draft:	2.95 m
Main Engine:	400 HP Deutz-Diesel, 6 cylinders, constructed in 1951, max. 410 RPM
Sail plan:	Three-masted topsail schooner (830 m²)
Navigation system:	Radar, echo sounder, satellite navigator, VHF radio, transient and shortwave radio, Inmarsat C (according to GMDSS), magnetic compass, weather fax, satellite telephone and fax, AIS
Cabins:	4 cabins for captain and regular crew, 10 guest cabins with berths for 34 persons

“I have never seen boundaries, but I have heard that they exist in the heads of some people.” Thor Heyerdahl, 1970

ENGINEERING OF ADVANCED MATERIALS

Cluster of Excellence Engineering of Advanced Materials (EAM)



Grafik: EAM

"A sailing trip is the perfect place for creativity, new ideas and cooperation. This extraordinary challenge provides new perspectives and personal experiences for our young scientists, while simultaneously strengthening the Cluster's international profile."

EAM will present its expertise on the FAU Key Research Priority New Materials and Processes – widely recognized at an international level – to researchers, institutions and other audiences around the Baltic Sea. The participating EAM team was selected via a scientific competition amongst the cluster's bright young researchers. Winners of the EAM call for proposal were Dr. Doris Segets and Dr. Jakob Albert. They plan to discuss and progress their project idea "Engineering of tailor-made catalysts based on polyoxometalates and nanoparticles for enhanced catalytic performance." Around this, they plan to set up a highly interdisciplinary team of young scientists over the following EAM disciplines: Functional Particle Systems, Catalysis and Nanoanalysis & Microscopy. For EAM, Science Sets Sail is an excellent way to initiate and intensify exchange with partners, both on board and at the harbors visited during open ship days.

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SAOT erlangen graduate school in advanced optical technologies

Graduate School in Advanced Optical Technologies (SAOT)

Composing: SAOT

"Science Sets Sail offers a great opportunity – particularly for our doctoral candidates – to strenghten and extend our network in the Baltic States. The Thor Heyerdahl is an inspiring environment for collaborative research initiatives."

SAOT provides an interdisciplinary research and education program of excellence within a broad international network of distinguished experts to promote innovation and leadership.
During the trip our team will work on the topic Industry 4.0. We want to explore a different way to improve process control for additive manufacturing (AM). On the one hand, the continuing lack of process understanding of this still comparably young field impedes process planning and quality control based on expert knowledge and understanding. On the other hand, a lot of the data collected during production processes – in particular the potential for combining different sensors – is often ignored. Therefore, we want to find out whether we can use statistical, big data and pattern recognition approaches to gain new insight into the process itself and use this information for feedback control.

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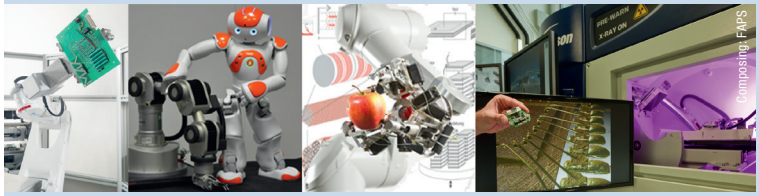
Institute for Factory Automation and Production Systems (FAPS)



"Extraordinary environments like Science Sets Sail create the perfect atmosphere to confront new multidisciplinary topics, and accordingly, develop relevant initiatives and ideas. We welcome the scope to develop research and teaching within a network of international cooperation."

FAPS will use the inspiring environment of Science Sets Sail to strengthen its current research and industry cooperation with key Nordic partners. FAPS is one of the leading institutes for teaching and research in the field of automation and mechatronic systems. Its interdisciplinary and holistic approach optimises social welfare advantages. We innovate through the integration of knowledge from various disciplines, in particular the specialised disciplines within mechanics, electronics, information technology, bionics and optics. This includes all levels of integration, from automation components such as controllers, sensors and actuators up to the whole system. We cover the entire product life cycle, from concepts, through to development, sustainable and efficient methods of production, use and reuse of resources. We work on tasks including research and teaching, which are the result of high-quality scientific practices. The aim of our work is to ensure value and to expand new job opportunities.

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Centre for Human Rights Erlangen-Nürnberg (CHREN)

Photo: FAU/Kurt Fuchs

"Human rights are a fundamental European heritage that we share. Fostering cooperation on human rights issues with new democracies from eastern European states and within the Council of Europe will strengthen this historic responsibility."

The European Convention on Human Rights and the European Court of Human Rights have built the most successful protection scheme of human rights worldwide. In recent years, however these acquisitions have come under scrutiny by political as well as technical developments. Nationalist political parties in Europe undermine liberty rights; social media, fake news and hate speech conflict with freedom of speech; the refugees are excluded from participating in education and work; asylum rights are being cut. Together with our guests from Scandinavian human rights institutes and from the new Baltic democratic states we want to explore both the new challenges for human rights and the common European historic responsibilities.

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www.humanrights-centre.fau.eu
www.iclu.rw.fau.de

GeoZentrum Nordbayern

GeoZentrum Nordbayern (GZN)

Composing: GZN

"As geologists, we are familiar with the fruitful environment of scientific cruises for making new discoveries and forging new relationships. Science Sets Sail provides a great opportunity to initiate new projects with Universities in the region and attract Masters-level students."

The GeoZentrum Nordbayern hosts a variety of working groups focusing on the Evolution of life, the Earth's surface and interior as well on Applied Geology. Science Sets Sail will give us the opportunity to present prominent research directions to attract researchers and students from Scanadinavian and Baltic countries. We will invite colleagues from the Universities of Lund, Göteborg and Kopenhagen to discuss our science, expand existing collaboration and initiate new international cooperation projects with colleagues from the Baltic Sea region.

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Erlangen Nürnberg Excellence Track – Leistungszentrum Elektroniksysteme (ENET^{LZE})

Photo: Kurt Fuchs/Fraunhofer IIS

"Science Sets Sail is an excellent opportunity for ENET^{LZE} participants to expand their personal network and to train in collaboration skills. We also see it as a perfect opportunity to get to know other FAU members and to strategically develop new ideas for future joint projects."

ENET^{LZE} is a new Excellence Programme developed between Fraunhofer Institute for Integrated Circuits (IIS), Fraunhofer Institute for Integrated Systems and Device Technology (IISB) and FAU, combining excellent basic and applied research with career development for young academics. In addition to mentoring, coaching and networking, it builds on role-swapping among partners to gain new work experiences in different organisations. The special feature of this programme is that an industrial partner is the third party supporting the programme. So industry, applied research and basic research work together to create new high-level research topics and, at the same time, to develop excellent high-potential academics.
Science Sets Sail will allow us to strengthen our relationship with the universities of Tallinn, Helsinki and Turku, which are all strong academic partners. Additionally, ENET^{LZE} represents a variety of internationally-active companies and will create opportunities to enhance exchange between academia and industry in the visited cities and amongst participating researchers.

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Department of Chemistry and Pharmacy

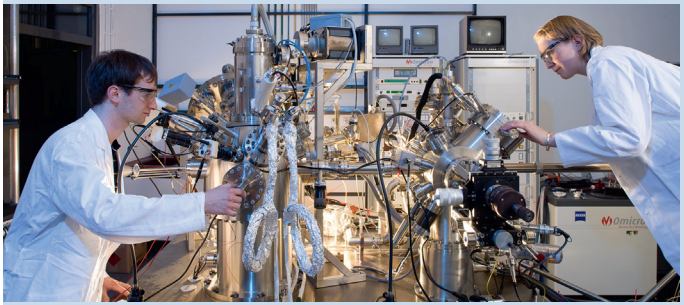

Photo: FAU/Erich Malter

"Science is very much driven by personal interactions. As an already highly-internationalised FAU department, we aim to develop new contacts with established research institutions and young researchers that will result in long-term scientific exchange and collaborative projects."

FAU's Department of Chemistry and Pharmacy has a long tradition of excellence and is ranked amongst the best in Germany. Our research activities cover a wide spectrum in the areas of Chemistry, Materials Sciences, Food Chemistry and Pharmaceutical Science. To build up a basis for future collaborations with partners in the Baltic Sea region we will present some highlights of our ongoing research activities: neurotrition, characterisation of odor-active substances of relevance to human food and the environment, surface and interface science, computational chemistry, and the application of an arsenal of spectroscopic and microscopic techniques to a variety of molecular systems to explore new molecular hybrids, quantum dots, quantum rods and nanoparticles.

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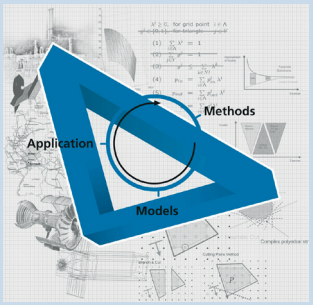
The Chair of Economics – Discrete Optimization – Mathematics (EDOM)



Composing: EDOM

"This Sailing trip is the perfect opportunity to strengthen collaboration in joint projects and to initiate new cooperation. Science Sets Sail provides a very special environment that promotes creativity and interdisciplinary research. As optimization problems occur in many different fields, we look forward to many fruitful scientific discussions."

Mathematical Optimization has become an important component in modern applied mathematics over recent years. Many challenging problems from business, engineering and industry can be modeled as discrete-continous optimization problems. The study and solution of these problems is the main focus of our research group. This includes the development of mathematical models for real-world problems, their theoretical analysis (mainly using methods from graph theory, polyhedral combinatorics, differential equations, variational methods of optimization and integer programing), and the design and implementation of fast algorithms as well as their evaluation in practice. Our group possesses vast experience in topics including logistics, optimization in physics, engineering and energy. Currently, we also coordinate the Collaborative Research Centre TRR 154 "Mathematical Modelling, Simulation and Optimization using the Example of Gas Networks". On Thor Heyerdahl, we will firstly focus on topics related to gas-network optimization. Secondly, we will investigate relations between optimization and machine learning.

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Faculty of medicine and Collaborative Research Center 1181

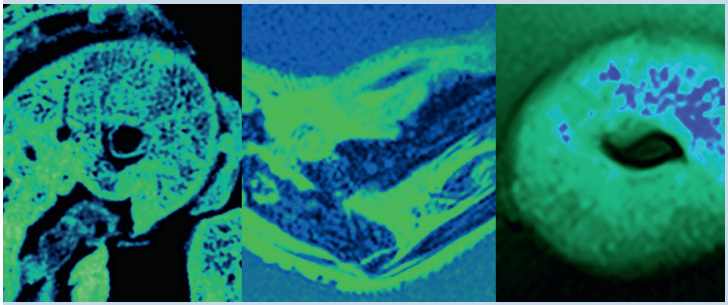

Photo: Collaborative Research Center (CRC) 1181

"Ongoing and prior interdisciplinary collaborative work with physicists, chemists and others proved to be an invaluable source for ideas and elaborate research at the Faculty of Medicine. We are convinced, that this trip will facilitate the strengthening and establishment of innovative research projects."

The Faculty strives for excellence in all spheres of biomedical research. In the last years, we have built up special expertise in five core areas: Infection and immunology research, kidney and vascular research, neurosciences, tumor research and medical engineering. The Collaborative Research Center (CRC) 1181 – Checkpoints for the Resolution of Inflammation" funded by the German Research Foundation (DFG) in 2015 is a highly interdisciplinary network of scientists at the FAU. We aim to expand this network, in order to develop novel research projects together with the Baltic partners as well as other scientists from Erlangen. Science sets sails will allow our team to foster ideas for the investigation of new therapy options or novel diagnostic tools. These collaborations harbor the potential to generate results that can be translated into clinical applications in the near future.

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Science Sets Sail Events – Share in the Experience with Us

At each scheduled port, the Science Sets Sail teams, look forward to sharing some of their experience with local regional, town, business and academic representatives. Please help us to attract potential people considering studying abroad, or just interested in learning about Research in Germany, Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), or what daily life is like on board a sailing ship!

Help us to make the most of the Open Ship Day near you!

Open Ship Days

Malmö, Sweden	18 July, 2017
Riga, Latvia	24 July, 2017
Helsinki, Finland	29 July, 2017
Tallinn, Estonia	1 August, 2017
Danzig, Poland	7 August, 2017

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