



Bavarian
Research Alliance



AAL Made in **Bavaria**

Bavaria's State-of-the-art Answers
for Ambient Assisted Living –
AAL Research and Technology

Supported by

■ Editorial



Dear AAL-Congress Attendees,

Bavaria has a long-standing tradition in innovation and cutting-edge technology. This rich industrial tradition and the expertise of Bavaria's highly motivated and well-regarded researchers form the ideal basis for finding solutions aimed at addressing the huge demographic challenges ahead. Like in many other regions throughout Europe, it is expected that the number of Bavarian citizens who are 65 and older will double by 2030. In Munich, for example, a city with 1.4 million inhabitants, there are already more than 300,000 people who are above the age of 60. This demographic change is having an adverse impact on the lives of many Bavarians and their families, whether at home, in elderly care facilities, hospitals or public transport.

Bavaria strives to provide answers for this demographic challenge, know-how and technology, which suit the needs of elderly end-users. The goals of research in Ambient Assisted Living are to improve the quality of life for older people, enable them to lead independent lives in their own homes, and assist people with special needs. Solutions can be based on intelligent environments that are able to adapt independently, proactively and context-sensitively to the users' needs and the tasks they wish to perform, helping them to carry out the desired actions. Adapting advanced technology to their special needs is an activity that requires creativity, time and patience and will only be successful if the developed solutions remain affordable.

With this booklet, we would like to provide you with a brief overview of the range of currently funded Bavarian R&D projects. We also would like to take this opportunity to find adequate partners for future cooperative research projects. The mission of the Bavarian Research Alliance is mainly to help such key players successfully submit grant applications for European funded R&D projects. We hope that networking at the AAL Congress will facilitate new European R&D consortia, e.g. for the 6th AAL call for proposals in 2013.

Best regards,

Martin Reichel, Managing Director, Bavarian Research Alliance

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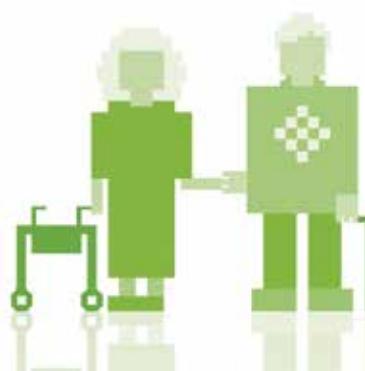
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Company

Research group

■ Project

Project partners

Coordinator:
Technische Universität München
(TUM)

Parties involved:
IUT, MLAB, COG, EURECOM,
G.TEC, FHG, PME, YOUSE

Project finance

Funding agencies:
AAL, BMBF, ANR, BMVIT

Amount of funding:
EUR 2,500,000

Objectives

The project **Adaptable Living Assistant ALIAS** encompasses the product development of a mobile robot system interacting with elderly users. Our main goal is to provide assistance in daily life and promote social inclusion by creating connections to people and events in the wider world. This includes appropriating navigation strategies for natural movement behaviour of the robotic platform to approach elderly people in a polite manner.

Providing a proactive behaviour to assist and motivate elderly people in their daily life to enrich their well-being with new information and contacts will be our main focus.

The robotic platform will include an elderly-friendly representation of web 2.0 content including recent insights gained from gerontology.

AAL deliverables

User inclusion:

D1.5 Analysis of pilot's second test-run; D1.6 Final report on requirement lists; D1.7 Comprehensive user manual

Technical realisation:

D2.4 Software package with multimodal interface to kernel of the user-machine-interface; D3.8 Final dialogue system; D4.6 Module for cross-media linking of personal events to web content, v2; D4.7 Module for recommendation of topics and activities suitable for maintaining social contacts; D4.8 Module for cross-lingual chat support; D5.3 Tests of the BCI System with the robot; D6.5 Final navigation software module; D7.4 Final ALIAS prototype

Target partners

- Non-profit organisations
- Charitable institutions
- Housing societies
- Seniors residences
- Solvent retirees

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The ALIAS robot

Company

■ Research group

Project

Staff

Currently 5
(Planned 25)

Fields of research

In May 2012 the Universität Erlangen-Nürnberg has started a new research programme funded by the Bavarian State Ministry of Sciences, Research and the Arts and focusing on Domestic Living (ElHome-Center).

The **Bavarian Technology Center for Domestic Living** seeks to foster the intelligent use of resources and to design sustainable solutions for homes. The center is aiming at developing products for energy management, infotainment and comfort & safety and will therefore cooperate with industry partners and other research institutes.

The main goal is to create integrated products that will significantly decrease energy consumption in households while increasing comfort for the users at the same time. This will help residents to live much longer independently at home. Another positive aspect is that the costs of AAL products will be reduced due to decreased energy costs.

AAL R&D experience

The demographic and social changes also have effects on the domestic area. Usable and used products can only be developed if residential expectations regarding these products are known. Against this background, social scientists and engineers will work closely together at the ElHome-Center. The interdisciplinary approach used by the parties involved combines core competencies from engineering and social sciences as well as expertise from external partners. This enables the development of a holistic concept to realise the project's objective.

For example, the ElHome-Center is already cooperating with the International DiaLog College and Research Institute (IDC) (see page 11) to technically optimize an existing prototype home in Nuremberg. The current components shall be interconnected and integrated to provide the best possible support of seniors in everyday life.

Target partners

We are looking for public and industry partners researching and developing in the fields of domestic living and smart homes and being interested in testing their solutions and products under real conditions in our prototype homes (two-room apartment for seniors in Nuremberg, apartment building in Schwabach).



Technological research focusing on people

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■ Company

Research group

Project

Staff

Dr. Axel Steinhage,
Director R&D

Christl Lauterbach,
Managing Director

Project duration
of SensFloor®

01.10.2009 – 31.01.2013

Project finance

Funding agency:
Supported by the Federal Ministry
of Education and Research (BMBF),
FKZ 16SV393X

Amount of funding:
EUR 1,260,000



The large-area SensFloor® underlay can be installed underneath conventional hard and soft floor coverings such as laminate, parquet, PVC and carpet.

Type of business

Future-Shape is specialized in large-area sensor systems with a variety of possible applications. All conductive surfaces are suitable as sensor planes, and can be combined in nearly arbitrary form and number into a sensitive area with a high spatial resolution. The sensor data are transmitted wirelessly and can be evaluated in different ways according to the aspired application.

SensFloor® is based on a textile underlay with integrated radio modules and capacitive proximity sensors. It is installable beneath all kind of flooring. Whenever a person walks across the floor, sensor signals are sent to a control unit and various different types of events are identified: the system distinguishes between a person standing or laying on the floor and determines the direction and the velocity of the movement. Static signal detection and self-test capability are important features for security applications.

AAL solutions

SensFloor® – large-area sensor system in care

Patients suffering from dementia often make great demands of their carers, because they might have an increased need to move or are suffering from additional conditions that pose the threat of causing them to hurt themselves or fall. The SensFloor® system can easily be adjusted to individual care plans. Our goal is to relieve carers, and at the same time allow high-maintenance patients more scope of freedom without the need of sedation or fixation.

In general care, SensFloor® sounds an alarm when a person falls and provides activity monitoring. The receiver can directly switch orientation light, sound alarm via call systems and forward data to the main staff computer. Multi-coloured lamps signal movement in residents' rooms or bathrooms, falls, and deactivation of the SensFloor® system. This allows care personnel to know at a glance when and where help is required.

Target partners

- Architects and planners for assisted living homes and nursing homes
- Home automation planners
- Care homes organizers
- Health care service providers

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Company

■ Research group

Project

Staff

Prof. Dr. Frieder R. Lang

Dr. Roland Rupprecht

Anja Beyer

Stefan Kamin

Eline Leen

Bettina Williger

Fields of research

The **Institute of Psychogerontology (IPG)** of the Friedrich-Alexander-Universität Erlangen-Nürnberg is strongly devoted to the topic of lifespan psychology with a focus on clinical and non-clinical aspects of aging. **IPG** is a leading teaching and research institute with three professorships and thirteen research assistants. The main research interests include health and aging, cognitive development and dementia, social relationships, personality, and psychological determinants of everyday use of technical devices.

IPG is part of the Interdisciplinary Center of Aging Research and cooperates with national and international partners in the field of psychology, geriatrics, engineering, economics, sports sciences, and ethics. **IPG** has long-term experience in test development as well as scientific study design and conduction accounting for the competences and needs of older adults.

AAL R&D experience

Our research focuses on implications and consequences of age-related differences in person-technology transactions. This involves two key questions: First, we address the question of how technology can improve functional independence, mobility, social participation, and quality of life for older adults. Second, we investigate the circumstances under which technology is successfully embraced by older adults. Both aspects require an understanding of the adaptive transactional process of personal competence with the demands of technology. Competence here refers to age-related changes and processes in cognitive, physiological, and psychological domains and their relation to social and physical places in which aging takes place. The demands of technology refer to functionality, usability, accessibility as well as design of products and services that address older adults. Our research projects cover both aspects in various domains of everyday life: mobility (EMN moves), hearing aid use (HoerGut), moving intentions (WEN-PRO), adoption of computers (e-learning motivation), autonomy and working life (FitForAge).

Target partners

IPG has interdisciplinary cooperations with partners from research and industry as well as public service, towns and municipalities. Research projects are funded by the German Research Association, the Federal Ministry of Education and Research, the Bavarian Research Foundation, and other foundations.



Senior Counseling Board (SEN-PRO) members testing a novel user interface

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Company

■ Research group

Project

Staff

Prof. Dr. Wolfram Stephan
(Head of Institute)

Fields of research

The **Institute of Energy and Building (ieg)** at the Georg Simon Ohm University of Applied Sciences under the direction of Prof. Dr. Wolfram Stephan has its main research activities on components, systems and processes for energy- and cost-oriented buildings and building systems.

In addition, the Institute compiles impartial studies and expertises on topics such as energy saving concepts, the use of regenerative energy, thermal analysis by simulation and facility management.

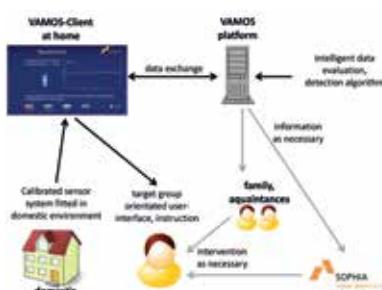
AAL R&D experience

- SOPHIA (Soziale Personenbetreuung – Hilfen im Alter – Personal social care assistance for older people)
 - BASIS (Bedienung von Anwendungen seniorengerechter Informationstechnologie mittels Sprache – Handling of applications for senior friendly information technology using language)
 - SEKOM (Seniorengerechte Kommunikationszentralen unter Verwendung von Fernsehgeräten und geeigneter Peripherie – Senior friendly communication centers using a TV set and appropriate peripheral equipment)
 - VAMOS (Versorgungseffizienz durch assistive, modulare Technologien in bedarfsoorientierten Szenarien – Efficiency in supply by assistive, modular technologies in demand-oriented scenarios)
-

Target partners

The ieg is interested in various national and international partners from industry and research to implement different project ideas. In addition, the ieg is available as a partner for projects in the fields of building systems, facility management and energy management.

For further information please contact Prof. Dr. Wolfram Stephan.



Integration Diagram

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Company

Research group

■ Project

Project partners

Coordinator:

Georg Simon Ohm University of Applied Sciences – Institute of Energy and Building (IEG)

Partner involved (short legal name):

SOPHIA living network GmbH

Project finance

Funding agency:

Federal Ministry of Education and Research (BMBF)

Amount of funding:

EUR 260,000

Objectives

In the **ADELE** project, temperature and relative humidity of living space, being vulnerable to mildew, are permanently monitored. These measured data are safely and unobtrusively transferred into a database using a standard I/O-interface.

The stored data are analyzed in real time using an appropriate algorithm that can identify discrepancies to standard temperature and humidity.

The analyzed data are edited in a senior focussed and technically correct way and passed down to the VAMOS-TV-Client to instruct the senior automatically to eliminate the cause of the unhealthy discrepancy in the climate conditions. By feed back with further data, the continued success of the procedure is guaranteed.

Depending on the senior's requirements, the transfer of the alarm can be carried out to a service station, to a relative or a person in support.

AAL deliverables

As **ADELE** will not be finished until June 2013, final statements cannot be made.

In cooperation with the already finished AAL-project VAMOS (Versorgungseffizienz durch assistive, modulare Technologien in bedarfsoorientierten Szenarien – Efficiency in supply by assistive, modular technologies in demand-oriented scenarios), upon which **ADELE** bases, following knowledge was ascertained so far:

- to raise the consumer-acceptance (senior-acceptance) it must be ensured that only simple, trouble-free and unobtrusive sensors/peripheral components are used
- the usage of familiar components (e.g. TV instead of PC) also raises consumer-acceptance
- the exact positioning of the sensors in a room is essential for precise measurement and therefore for **ADELE**'s target to avoid mildew-infestation

Target partners

To offer the functions of ADELE independently of the VAMOS system, we are looking for a meter manufacturer with know-how in temperature, humidity and CO₂ measuring to develop an independent climate station.

For further information please contact Prof. Dr. Wolfram Stephan or B.Eng. Sabine Saal.

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Display of indoor climate

Company

Research group

■ Project

Project partners

Coordinator:
Arne Manzeschke

Parties involved:
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Ludwig-Maximilians-Universität
München

Karsten Weber,
Brandenburg University of Technology
Cottbus

Heiner Fangerau, Ulm University

Project finance

Funding agency:
The Federal Ministry of Education
and Research (BMBF)

Amount of funding:
EUR 100,000



Model for the ethical evaluation of socio-technical arrangements (MEESTAR)
Green axis: stages of ethical review
Red axis: level of ethical review
Blue axis: dimensions of ethical review

Objectives

The emerging demographic change has become a political and economical issue we no longer can afford to ignore. The aging society and a health care system under financial pressure lead to many open questions of how to respond to these challenges. One approach is to prolong a self-determined and safe life for elderly people as well as full and effective participation in society by providing them health care and assistance at home. In this scope, the Federal Ministry of Education and Research (BMBF) is funding numerous research activities, including the use of assistive technology to support and augment human-provided care. Considering that older people also imply fewer younger people, looking for technology as a solution is not hard to argue. However, the impact of such technology is much harder to explain. Therefore, the BMBF decided to supplement its economical and legal assessment by an ethical evaluation of assistive technologies.

AAL deliverables

An ethical evaluation must not be a distinct activity sandwiched somewhere into an economical debate. It should rather be considered a concomitant along the complete process, ideally turning into a monitoring activity once such assistive technologies are rolled out. Consequently, the major goal of this project was quickly identified to be an evaluation model allowing for an appropriate normative assessment of socio-technical systems. The developed **model for the ethical evaluation of socio-technical arrangements (MEESTAR)** dissects the complexity into several dimensions and suggests an evaluation from three different points of view. These three views are that of the individual, the organisational level, and finally the society as a whole. The model helps classify the result of such evaluation into four stages of ethical concern. Moreover, 15 guidelines are given to simplify the participation of all involved stakeholders and thereby support the design of solutions best suited to respect all participants' needs.

Target partners

As assistive technologies are still in a very early phase, the conducted research takes a holistic approach and tries to address all stakeholders. The developed model was evaluated in three groups of researchers & developers, providers, and end users. Currently, workshops are offered to broaden the availability and provide the research results to other projects.

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Company

■ Research group

Project

Staff

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Janine Busse (Social Scientist)

Peter Jaensch (Gerontologist)

Jürgen Besser (Sport Scientist)

Sarah Memmel (Economist)

Michael Zirlit (Economist)

Monika Klement
(Business Administration Specialist)

Fields of research

Elderly or disabled people want to keep their independence and autonomy as long as possible. The enhancement of daily life activities is related to institutional incentives as well as appropriate strategies for management of patient career. The main focus of the IDC is to elicit and formulate the necessities and demands of end-users and informal caregivers for gaining independence in daily life activities including questions of management and ethical background.

The IDC was founded in 2009 by **Diakonie Neuendettelsau** to be a platform for scientific research on different topics of long-term care. The IDC aims at developing some basic frameworks for service strategies concerning the idea of independent living as well as strategies converging care and cure.

The IDC combines different scientific disciplines that are relevant for working on appropriate management solutions for the elderly.

AAL R&D experience

Requirement analysis for a sustainable implementation of patients' needs into development for care and cure by means of an organisation of more than 170 members that have declared to work within different scientific projects deliberately.

Business models for long-term care strategies including utility research and willingness to pay.

Socioeconomic integration and evaluation as a part of the overall evaluation of technological solution.

Dementia prevention – from science to practical use: a train-the-trainer educational programme based on the combination of simultaneous cognitive and physical activity.

Target partners

If you are a company in the field of AAL, health care or social services we can support you in finding solutions for your products or services. We offer:

- **Requirement analysis**
 - **Business modelling**
 - **Evaluation**
 - **Cooperation in research projects**
-

Contact details

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The IDC-team

■ Company

Research group

Project

Research group

Our highly motivated team of 3 members makes innovation tangible and understandable.

Project

Join-In – European research project

End user organisation

Cooperation with Diakonie München-Moosach

Staff

5 staff members and partners are complementing our activities. Together we create convincing solutions for the benefit of our customers and partners.

Objectives

Research and Development

Pasife's staff has a long-term experience in TV software technology and integration of wireless sensor devices.

Pasife worked successfully with partners in the AAL project "COMES" (www.comes-care.net) on telemedicine solutions.

The company is now focusing with its technical and business expertise on service solutions for the elderly.

Based on own developments and available AAL solutions from partners, **Pasife** offers seminars, training and consulting for

- end users
- institutions and
- companies

AAL deliverables

- Controller solutions, design and development for menu navigation and motion sensing
- Assistance for AAL web portals and platforms
- Installation and support for end users and institutions
- Support for exergaming
- Consulting about AAL web technology
- AAL seminars and training

Target partners

- **Seniors** who like to socialize and to stay active and healthy
- **Family members** who enjoy being in contact with grandma and granddad
- **Social clubs, church institutions and associations** wanting to maintain a lively community
- **Councils** which profit from healthy citizens
- **Carers** who benefit from easy-to-contact elderly
- **Companies** that are interested in selling AAL services



Remote pointer with motion controller

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Company

Research group

■ Project

Project partners

Coordinator:

Helmholtz Zentrum Munich

Parties involved:

Bull Hungary, Diakonie München-Moosach, Happy Wise OY, Hungarian Johanniter Charity Service, Institute of Technology Carlow, Northern Research Institute Tromsø, Norwegian Centre for Integrated Care and Telemedicine, Pasife GmbH, Valentia Technologies

Project finance

Funding agencies:

BMBF Germany, TEKES Finland, NIH Hungary, Enterprise Ireland, The Research Council of Norway, European Union

Amount of funding:

EUR 1,796,000



Seniors are joining in with fun

Objectives

Join-In supports the AAL Joint Programme by setting up a social platform and thus creating an environment that enables elderly people to communicate, socialise, play communicative multi-player computer games and exercise either by exergames or by moderated exercises.

Join-In supports people who are maintaining and setting up contacts to others sharing similar interests – foremost on a regional basis – and facilitates contacts to family and friends.

Key activities for attracting senior citizens to the network are multiplayer video gaming, exergames and exercising in a group.

Join-In assesses the user requirements and develops a methodology on how to best attract the target group to such a network.

The technical developments of the project include

- an interactive technical platform that connects PCs and TVs to the web
 - the customization of access facilities, such as controllers, and adaptation of games, which take into account the constraints of senior citizens
 - the development of computer-/exergames and virtual exercising for the targeted user group
-

AAL deliverables

- A social networking platform offering a wide variety of contact and communication facilities
 - A simple-to-use interactive social networking portal
 - Exergames adaptable to the needs of the elderly and enabling them to compete with others
 - Moderated exercising and exercises supporting physical fitness and dexterity
 - Controllers adapted to the needs of the elderly for menu navigation and exergaming
-

Target partners

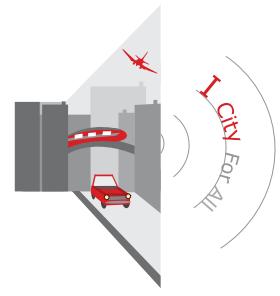
- **Seniors** who like to socialize and to stay active and healthy
 - **Family members** who enjoy being in contact with grandma and granddad
 - **Social clubs, church institutions and associations** which want to maintain a lively community
 - **Councils** which profit from healthy citizens
 - **Carers** who benefit from easy-to-contact elderly
 - **Telecom service providers** which aim to retain their clientele and to win new customers
-

Contact details

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Company

Research group

■ Project

Project partners

Coordinator:
CEA LIST (France)

Parties involved:
UPD (France)
ENEA (Italy)
TUM (Germany)
CRF (Italy)
CENTICH (France)
ACTIVE AUDIO (France)
EPFL (Switzerland)

Project finance

Funding agencies:
ANR, BMBF, MIUR, FDEA, CNSA

Amount of funding:
EUR 2,409,300



Targeted application scenarios:
(a) confined public spaces and (b) vehicle.

Objectives

The project I'CityForAll (Age Sensitive ICT Systems for Intelligible City For All) aims at enhancing the sense of security and self-confidence of presbyacousic persons, whose hearing degradation increases with age. Two situations are considered: mobility in public confined spaces and mobility in urban space. For public confined spaces, the ICT solutions consist of intelligent loudspeakers for better intelligibility of vocal messages. For urban mobility, I'CityForAll partners will develop a system embedded in vehicles for better sound alarm localization of ambulances, police cars, fire trucks, etc., as the hearing degradation alters perception of distance and direction of sound source. These systems will be "transparent" and embedded in mass products for the large public.

We target the design of embedded solutions in mass products at reasonable cost for persons with pseudo-normal and presbyacousic hearing without impacting normal hearing people (concept "for All").

AAL deliverables

Based on an end-user orientated evaluation carried out within I'CityForAll, the main deliverables are:

- Objective quality criteria for vocal announces and alarms
- Loudspeakers dedicated to large spaces (i.e. railway stations), integrating the global processing chain of emission, correction and generation of vocal announces with various ambient noises
- Vehicles equipped with automatic real-time presbycusis equalization and alarm localization systems
- Intelligibility For All recommendations

Demonstrators will be presented at the end of the I'CityForAll project, scheduled for June 2015.

Target partners

The targeted partners are companies interested in integrating the compensated loudspeaker system developed during the project, such as:

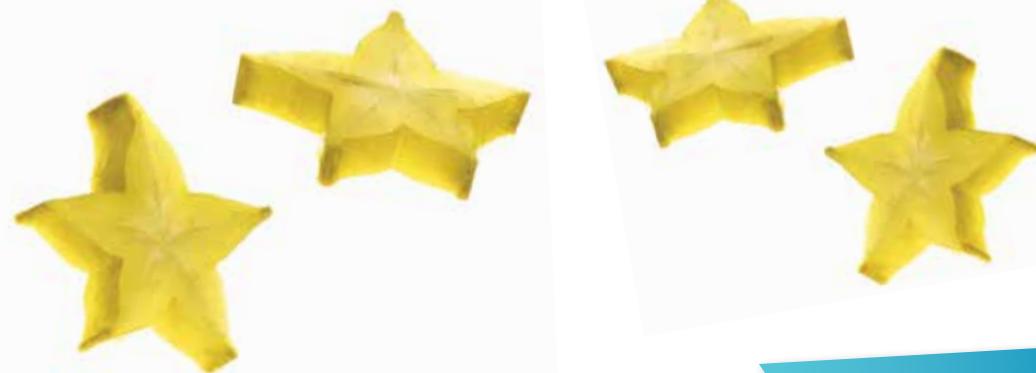
- Public transport companies
- Museums
- Supermarkets
- Associations

Contact details

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In Touch with Europe



Competent Support for
Excellent Research in Bavaria,
Europe and the World

Do you have an innovative idea in the field
of Ambient Assisted Living (AAL),
Engineering & Natural Sciences or Information
& Communication Technologies and are you
looking for Bavarian partners for your European
research project?

Talk to us today! Our expert team will help
you identify the suitable research or business
partner and actively support your application
for **EU funding**.

Seize the opportunity to be a successful player
on the European stage!



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