UNIVERSITY OF STUTTGART | FACULTY 5
COMPUTER SCIENCE DEPARTMENT
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University of Stuttgart
Germany

COMPUTER SCIENCE

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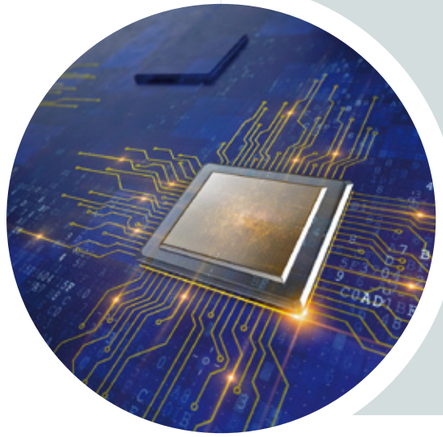
UNIVERSITY OF STUTTGART | FACULTY 5

CONTENTS

THE COMPUTER SCIENCE DEPARTMENT

BASIC RESEARCH AND APPLICATION-ORIENTED RESEARCH FOR MODERN-DAY TECHNOLOGIES.



Computer science is a fundamental science for modern-day technologies. The Computer Science department of the University of Stuttgart carries out top-notch basic research and application-oriented research in this field. Our objectives are to be recognized worldwide as an authority in our disciplines and research focus areas and to be a sought-after place of education for dedicated students.

Approx. 1,700 students, 8 institutes, 23 professorships, 3 junior professorships.

Since it was founded in 1970 as the "Institute for Computer Science", the number of professors, institutes, the topic areas covered and the equipment in the department has grown continuously. The department now belongs to the Computer Science, Electrical Engineering and Information Technology faculty and has become an internationally recognized institution with a strong reputation for research. The department's research strength is reflected in our excellent external funding position: We are placed third (as of 2015) in the DFG Funding Atlas, thanks also to our involvement in several Collaborative Research Centers. We are an important partner in the Simulation Technology (SimTech) Cluster of Excellence and the Graduate School of advanced Manufacturing Engineering (GSaME) as well as in several of the University's joint research projects.

Cooperations with research organizations, with neighboring universities and with universities of applied science are part of our research profile. We feel closely connected to the high-tech region of Baden-Württemberg. This also applies with respect to our numerous research partners in industry, in particular to our partnerships in connection with the Hermann Hollerith Center and the IBM Technology Partnership Center.

Our study programs take account of the huge breadth of computer science and allow students lots of options as well as scope for independent work. We offer six Bachelor's study programs: B.Sc. Computer Science, B.Sc. Software Engineering, B.Sc. Media Informatics, B.Sc. Data Science, B.Sc. Natural Language Processing and B.A. Computer Science Teaching Qualification. We also have five Master's on offer: the two German-language Master's programs M.Sc. Informatik (Computer Science) and M.Sc. Softwaretechnik (Software Engineering) as well as the three English-language Master's programs M.Sc. Computational Linguistics, M.Sc. Computer Science and M.Sc. INFOTECH (in collaboration with the Electrical Engineering and Information Technology department). We are also involved in several interdisciplinary study programs.

Five locations on the Vaihingen campus: Main building Universitätsstrasse 38, Pfaffenwaldring 5a (SimTech), Pfaffenwaldring 5b (Computer linguistics), Allmandring 19 (VISUS), Pfaffenwaldring 47 (ITI/RA).

INSTITUTES AND EXPERTS

OUR INSTITUTES COMPRISE HIGHLY SPECIALIZED
EXPERTS WITH INTERNATIONAL RESEARCH EXPERIENCE.

1 **Institut für Architektur von Anwendungssystemen (IAAS):** Prof. Dr. Dr. h.c. Frank Leymann (Architecture of Application Systems); N.N. (Service Computing)

2 **Institute of Formal Methods of Computer Science (FMI):** Prof. Dr. Volker Diekert (Theoretical Computer Science); Prof. Dr. Stefan Funke (Algorithmics), Apl. Prof. Dr. Ulrich Hertrampf

3 **Institute of Computer-Based Engineering Systems (IRIS):** Prof. Dr. Dieter Roller

4 **Institute of Natural Language Processing (IMS):** Prof. Dr. Jonas Kuhn (Fundamentals of Computational Linguistics); Prof. Dr. Grzegorz Dogil (Experimental Phonetics); Prof. Dr. Sebastian Pado (Theoretical Computational Linguistics); Jun.-Prof. Dr. Ngoc Thang Vu (Computational Linguistics); Apl. Prof. Dr. Uwe Reyle; N.N. (Digital Phonetics)

5 **Institute of Parallel and Distributed Systems (IPVS):** Prof. Dr. Bernhard Mitschang (Application of Parallel and Distributed Systems); Prof. Dr. Melanie Herschel (Data Engineering); Prof. Dr. Marc Toussaint (Machine Learning and Robotics); Prof. Dr. Sven Simon (Parallel Systems); Prof. Dr. Miriam Mehl (Simulation of Large Systems); Jun.-Prof. Dr. Dirk Pflüger (Simulation of Large Systems); Prof. Dr. Dr. h.c. Kurt Rothermel (Distributed Systems)

6 **Institute of Software Technology (ISTE):** Prof. Dr. Erhard Plödereder (Programming Languages and Compiler Group); Prof. Dr. Stefan Wagner (Software Engineering); N.N. (Reliable Software Systems)

7 **Institute of Computer Architecture and Computer Engineering (ITI):** Prof. Dr. Hans-Joachim Wunderlich (Computer Architecture); Prof. Dr. Martin Radetzki (Embedded Systems)

8 **Institute of Visualization and Interactive Systems (VIS):** Prof. Dr. Dr. h.c. Thomas Ertl (Graphic-Interactive Systems); Prof. Dr. Andrés Bruhn (Intelligent Systems); Prof. Dr. Daniel Weiskopf (Visualization); Prof. Dr. Albrecht Schmidt (Human-Computer-Interaction); N.N. (Virtual and Augmented Reality); Jun.-Prof. Dr. Niels Henze (Socio-Cognitive Systems)

9 Prof. Dr. Ralf Küsters (Information Security)

DEPARTMENT EQUIPMENT

WE WORK WITH STATE-OF-THE-ART TECHNOLOGY – INCLUDING A POWERWALL, ROBOTICS LABORATORY AND ANECHOIC CHAMBER.

TOP-LEVEL RESEARCH AND TEACHING REQUIRES ULTRA-MODERN LABORATORIES, TECHNICAL EQUIPMENT AND COMPUTER POOLS.

As a central facility, the University's Institute of Visualization and Interactive Systems (VISUS) is closely linked to the Computer Science department. VISUS has a powerwall that is the only one of its kind in Europe. The high-resolution 3D rear-projection system can show images with a size of 6 times 2.25 meters in stereo. Ten 4K projectors allow for interactive computer graphics with around 44 megapixels and thus for the preparation of data sets from a wide range of different areas of Natural and Engineering Science.

The Institute of Natural Language Processing has several laboratories for research and teaching, including an anechoic chamber for speech recordings and an acoustics laboratory. The institute also has various text and speech analysis programs, some of which were developed internally.

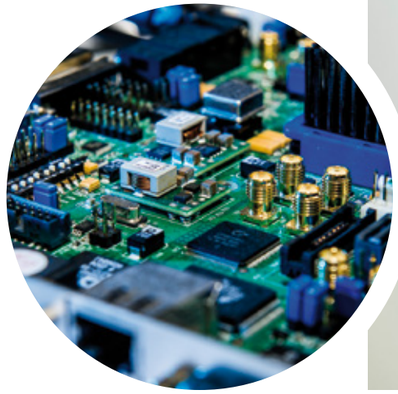
The large-scale robotics laboratory is part of the Institute of Parallel and Distributed Systems. A PR2 robot allows to undertake research into machine learning in a wide range of different situations. Of course human-machine interaction is also studied using the various installations and scenarios.

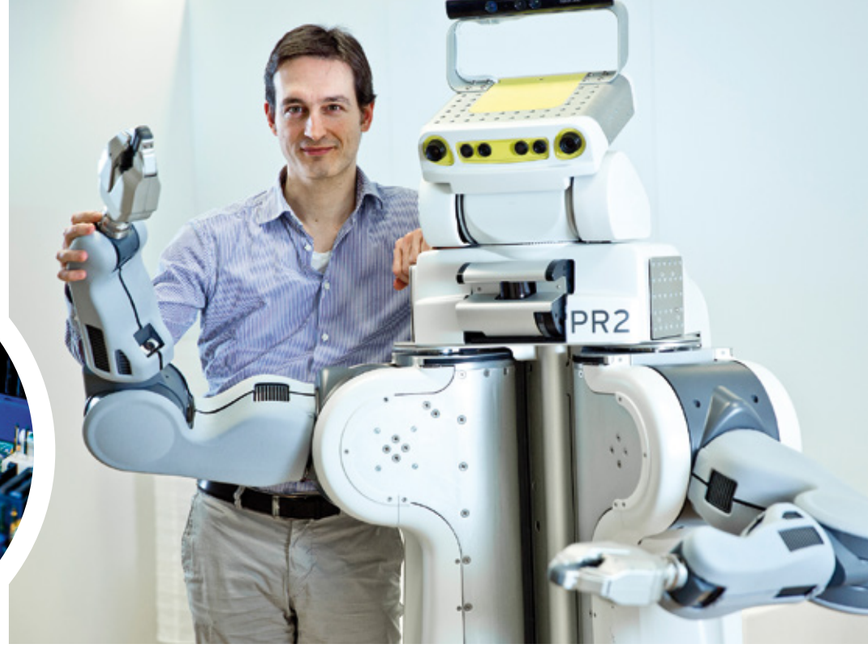
The hardware laboratory of the Institute of Computer Architecture and Computer Engineering is where research is carried out into design methods and hardware structures that can meet high standards of system reliability, safety and accuracy. This laboratory is also heavily involved in the basic training of our students. In general, a large number of student study and computer rooms are available for teaching. These are accessible round the clock using ID cards.

The department's institutes are supported by the Central Services Computer Science (ZDI) and the Computer Science institute association (IvI). Access to the High-Performance Computing Center (HLRS) and the services of the Information and Communication Center of the University (IZUS) round off the department's technical equipment.

RESEARCH AREAS

OUR WORK IS CHARACTERIZED BY A BROAD PROFESSIONAL AND INTERDISCIPLINARY APPROACH, BASIC RESEARCH AND HIGHLY COMPLEX APPLICATION RESEARCH.





OUR DEPARTMENT CARRIES OUT RESEARCH INTO VIRTUALLY ALL AREAS OF MODERN COMPUTER SCIENCE AND COMPUTATIONAL LINGUISTICS. THIS BROAD PROFESSIONAL BASE ENCOMPASSES THE FOLLOWING EXTENSIVE DOMAINS OF COMPETENCE:

Reliable, secure, safe and fault-tolerant systems: Ever-increasing areas of society are based on the reliable secure functioning of IT applications, which in safety-critical systems also decide on the life, health and wealth of people. We develop holistic and systematic methods for specific, reliable and fault-tolerant systems in close cooperation among all areas of computer science and even engineering sciences.

Simulation and visualization: These two areas are heavily interdisciplinary in their approach. They are permeating the natural and engineering sciences more and more, entering many further areas of everyday life. Our contributions in this realm relate to the development of efficient and highly parallel simulation algorithms, in particular for data and calculation management as well as for interactive data analysis and visualization.

Autonomous and interactive systems: This field stretches from interacting robots to the autonomous control of vehicles and interconnected, interactive systems. We undertake research into special challenges such as perception by sensors, embodied intelligence and the learning of behaviors, the presentation of complex information as well as natural interaction of intelligent systems with humans.

Complex information and communication systems: The efficient and intelligent handling of heterogeneous information is key to the preparation and operation of modern applications. We are working on basic methods of information integration, searching and provision in order to provide the requisite information in the right form, in the right place and at the right time. We also work on communication systems as well as on the management of complex, distributed, mobile and ubiquitous systems.

Language and knowledge processing: The automatic processing of human language allows for verbal human-system communication and access to information and knowledge. Our competences lie in particular in the areas of speech recognition, speech synthesis, (semi)automatic resource creation, parsing, semantic processing, digital humanities, static language processing, information extraction and retrieval.

RESEARCH FOCUS AREA

RELIABLE, SECURE, SAFE AND FAULT-TOLERANT SYSTEMS

FROM HARDWARE TO PLATFORM SOFTWARE AND APPLICATIONS – WE CONDUCT RESEARCH ON THE DEPENDABILITY OF THE SYSTEMS.

MORE AND MORE AREAS OF OUR LIVES AND OF SOCIETY ARE INFLUENCED BY SOFTWARE OR HARDWARE SYSTEMS.

This trend will continue to progress due to ongoing miniaturization and increased performance in hardware, combined with advances in software. The areas involved range from personal devices such as smartphones and tablets to wearables and smart homes at the level of individual consumers to the digitalization of factory production or autonomous driving.

This central role played by hardware/software systems also means that they must guarantee critical properties such as system reliability, safety and fault tolerance. We examine these properties intensively, from the hardware level to platform software and the applications. We develop holistic and systematic methods for specific, reliable and safe systems in close interdisciplinary cooperation with all areas of computer science, with automation technology and the engineering sciences.

At the level of hardware, research focuses on the design, reliability, testability and error diagnosis of microelectronic circuits and systems. We develop methods and algorithms for automating the design of reliable and testable systems and the related test and diagnostic procedures. One special area of application includes semiconductor components and electronic systems in the automotive field: These provide assistance for self-tests and self-diagnostics during the start, online diagnostics during operation, repair assistance in the workshop and failure analyses at the manufacturers. Another focus area involves reliable, run-time self-reconfigurable systems.

There is also a diverse range of research activities at software level. For example, we are working on systems-theoretical approaches to functional safety analysis that can search through the entire socio-technical system for hazards and check directly in the software using corresponding quality assurance methods. Similar methods can also be used in the field of information security.

We are also working on the optimization of cryptographic methods to lay the foundations for protecting the systems from attacks. Last but not least, we are also involved in the description and automated safeguarding of data protection requirements.

PROFESSORS AND PARTICIPATING INSTITUTES:

Prof. Dr. Erhard Plödereder
ISTE, Programming Languages and Compiler Group

Prof. Dr. Stefan Wagner
ISTE, Software Engineering

N.N.
ISTE, Reliable Software Systems

Prof. Dr. Stefan Funke
FMI, Algorithmics

Prof. Dr. Hans-Joachim Wunderlich
ITI, Computer Architecture

Prof. Dr. Ralf Küsters
Information Security

RESEARCH FOCUS AREA

SIMULATION AND VISUALIZATION

WE IMPROVE SIMULATION AND VISUAL ANALYSIS METHODS AND SIMPLIFY THE MANAGEMENT OF DATA AND COMPUTERS.

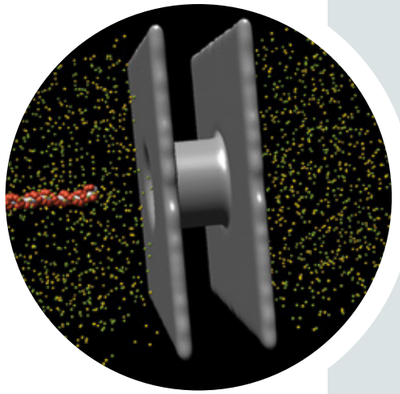
SIMULATION SCIENCES AND VISUALIZATION HAVE A FIXED PLACE IN THE NATURAL AND ENGINEERING SCIENCES AS A PREREQUISITE FOR NEW SCIENTIFIC FINDINGS.

They are a central component of the Cluster of Excellence and of the Simulation Technology Graduate School as well as of the new Stuttgart Center for Simulation Technology (SC SimTech) founded at the end of 2015.

While mathematical models and numerical approaches to simulation are commonplace in many areas, above all the extremely fast-paced transformation of computer architectures to massive parallel and heterogeneous systems is posing new challenges for simulation and visualization technology. Advances in simulation technology and hardware go hand in hand with a surge in the scope and complexity of simulation data, which calls for improved visual analysis methods for this data.

The Computer Science department has risen to these challenges: At the IPVS, the Simulation of Large Systems group is involved with massively parallel multi-physics simulations and efficient grid structures as well as hardware-efficient iterative solvers. The Simulation Software Engineering group focuses on hardware-related methods for high-performance computing as well as high-dimensional problems in the areas of simulation, data mining and quantifying uncertainties. Both groups are involved in Priority Program SPP 1648 (Software for Exascale Computing) of the German Research Foundation (Deutsche Forschungsgemeinschaft). The ITI's Computer Architecture group carries out research into the simulation of innovative hardware under the aspects of safety, reliability and fault-tolerance, which will be relevant in the future.

The VIS and VISUS focus on the topics of visualization methods, computer graphics and visual computing. As part of SimTech and the Collaborative Research Centers SFB 716 (Dynamic Simulation of Systems with Large Particle Numbers) and SFB/Transregio 75 (Droplet Dynamics under Extreme Ambient Conditions), we study visualization techniques in close connection with the underlying simulation methods, in particular for the visualization of volume, currents and multi-dimensional data. Visualization research is also material for the SFB/Transregio 161 (Quantitative Methods for Visual Computing), as underlying methods are being examined for the visual representation of data, computational photography, computer vision and human-computer interaction to make their quality measurable.



PROFESSORS AND PARTICIPATING INSTITUTES:

Prof. Dr. Miriam Mehl
IPVS, Simulation of Large Systems

Jun.-Prof. Dr. Dirk Pflüger
IPVS, Simulation Software Engineering

Prof. Dr. Joachim Wunderlich
ITI, Computer Architecture

Prof. Dr. Thomas Ertl
VIS, Graphic-Interactive Systems

Prof. Dr. Daniel Weiskopf
VIS, Visualization

N.N.
VIS, Virtual and Augmented Reality

RESEARCH FOCUS AREA

AUTONOMOUS AND INTERACTIVE SYSTEMS

WE DEVELOP NEW CONCEPTS FOR ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING.

ARTIFICIAL INTELLIGENCE, AUTONOMOUS DRIVING, MODERN ROBOTS FOR INDUSTRY AND CARE, SMART AND ADAPTIVE HOMES AND WORKPLACES OR NEW MEDICAL DEVICES FOR DIAGNOSIS AND THERAPY.

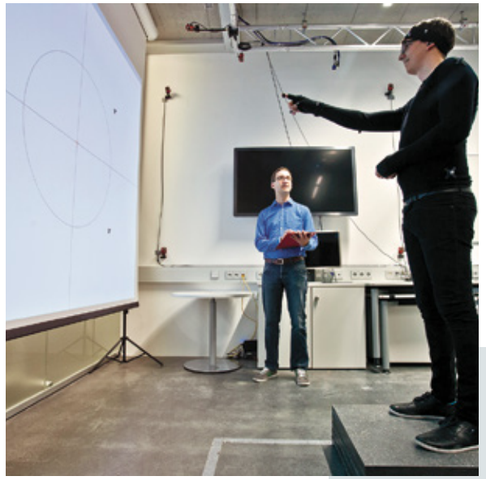
These are all examples of current developments in the field of autonomous and interactive systems. More and more aspects of our interactions in the physical world are interactions with complex and interconnected computer systems. Our daily experiences in all areas of our lives are increasingly determined by software and user interfaces.

New concepts and technologies (e.g. wearable computers, assistant robots) will also progress the enhancement of human abilities. Thus the central challenge is to create an intuitive and comfortable interaction with digital systems and at the same time ensure control by the user.

Sensors allow technical systems to perceive their environment and their interaction partners. These include simple distance and contact sensors but also complex multi-camera structures. Such systems can use artificial intelligence and machine learning methods to interpret the information and learn situation-aware behavior. Actuators then allow for them to move in their environment, change the environment or interact and cooperate with people. To do this, we need new system concepts and system architectures as well as new models and algorithms.

Another research focus area is computer vision. The main tasks here are the robust extraction of movement information from single image and stereo image sequences (optical flow, scene flow) as well as the precise reconstruction of 3D information from one or several images (Shape from Shading, Stereo). Possible areas of application include video processing and use in driver assistance systems.

We also carry out research in the field of decision theory and machine learning with the aim of developing autonomous, intelligent robots. Systems should be in a position to reflect their own knowledge, quantify uncertainty and use this to make decisions. The decision criterion can be the information gain or the expected learning progress, which gives the system the possibility to improve itself autonomously and to learn more. We approach problems like these through reinforcement learning and planning in probabilistic models. An example for a specific application goal are robots that learn in communicative interaction with humans how to support them in manual tasks.



PROFESSORS AND PARTICIPATING INSTITUTES:

Prof. Dr. Marc Toussaint
IPVS, Machine Learning and Robotics

Prof. Dr. Albrecht Schmidt
VIS, Human-Computer-Interaction

Prof. Dr. Andrés Bruhn
VIS, Intelligent Systems

Jun.-Prof. Dr. Nils Henze
VIS, Socio-Cognitive Systems

RESEARCH FOCUS AREA

COMPLEX INFORMATION AND COMMUNICATION SYSTEMS

WE DEVELOP METHODS FOR USING FAST AND FLEXIBLE INFORMATION SYSTEMS.

THE EFFICIENT AND INTELLIGENT HANDLING OF HETEROGENEOUS INFORMATION – FROM DATABASES, SENSORS, SCIENTIFIC EXPERIMENTS, THE CLOUD AND THE WEB – IS ESSENTIAL FOR THE CREATION AND OPERATION OF MODERN APPLICATIONS.

Basic methods for information integration, searching and provision as well as for application integration are necessary in order to provide the required information adequately at all times. Modern methods of metadata management, data analysis and preparation as well as of knowledge extraction, structuring and processing allow for model-based system and application development. Together with flexible virtualization and container techniques, cloud technologies as well as process and service based concepts, complex information systems can be used in many areas and companies.

Modern communication technologies now form the basis for virtually all application systems. The paradigm of event-based communication has emerged as a basic component of corresponding applications for the Internet of Things in particular. A special challenge in this area of application is to guarantee short delays despite a potentially high communications burden. Methods for high-level availability of the communication function are likewise of central importance.

Software-Defined Networks (SDN) allow for a large degree of flexibility, efficiency and manageability. The basis for broad use is provided by measures to increase the scalability and availability of SDN through the physical distribution of network control. The development of suitable methods for partitioning and replicating the network status recorded as well as adequate consistency concepts are needed for this purpose. Increasing the flexibility and efficiency through the use of Network Functions Virtualization (NFV) and shifting middleware functions into the programmable network are also of interest.

Nowadays, data protection and data security concepts are the basic prerequisite for the acceptance of any system. Context data, e.g. users' locations, play a central role in many applications. Disclosing such personal data is critical and requires corresponding protective measures. Due to the increasing shift of data processing to cloud infrastructures, it is important to enable efficient protection of personal data even in environments that are not fully under the user's control.

PROFESSORS AND PARTICIPATING INSTITUTES:

Prof. Dr. Frank Leymann
IAAS, Architecture of Application Systems

Prof. Dr. Bernhard Mitschang
IPVS, Application Software

Prof. Dr. Melanie Herschel
IPVS, Data Engineering

Prof. Dr. Sven Simon
IPVS, Parallel Systems

Prof. Dr. Kurt Rothermel
IPVS, Distributed Systems

Prof. Dr. Hans-Joachim Wunderlich
ITI, Computer Architecture

RESEARCH FOCUS AREA

LANGUAGE AND KNOWLEDGE PROCESSING

WE ARE WORKING TO HELP COMPUTERS UNDERSTAND US BETTER.

THE MAIN OBJECTIVES OF AUTOMATIC LANGUAGE PROCESSING ARE TO RESEARCH LANGUAGE AS THE MOST IMPORTANT MEANS OF HUMAN COMMUNICATION, TO TAP KNOWLEDGE IN ELECTRONIC TEXTS, AUDIO AND VIDEO DATA AS WELL AS HUMAN-MACHINE COMMUNICATION THROUGH NATURAL LANGUAGE.

The challenges in processing natural language stem for example from their multiple meanings and fragmented nature, which are compensated in human-human communication through a situational and world knowledge. Machine modeling requires an interdisciplinary approach that combines statistical and rule-based methods of linguistics, computer science and signal processing.

The Institute of Natural Language Processing deals with written and spoken language as well as the interaction between the two.

In the field of spoken language, speech recognition, speech synthesis, automatic recognition of intonation (prosody) and emotion of the speaker, the analysis of the speech signal as well as speech perception and production, in particular also in natural dialogue, as well as simulations all play an important role. In written language, we carry out research on the topics of syntactic analysis (parsing), word formation (morphology), meaning processing and representation (semantics), speech understanding, sentiment analysis, machine translation, search methods and information retrieval. As far as the interaction between spoken and written language is concerned, we examine for example how intonation (prosody) and meaning interact.

The IMS is involved both in basic research and in the implementation of the findings obtained in practical language-understanding systems, e.g. in large research groups like the Collaborative Research Centre (SFB) 732 "Incremental Specification in Context". The provision of effective methods of metadata management, knowledge extraction, structuring (ontologies) and processing as well as efficient scalability for large data volumes are all extremely relevant for such practical systems. As a result, our research is often geared to developing methods that are as independent of language as possible. At the same time, it deals with multilingual and cross-lingual methods, thus covering research of the German language as well as topics that are linked to the large diversity of the world's languages. In close cooperation with Linguistics, Literature Studies, Political Science and other disciplines the IMS advances methods for the critical analysis of large text corpora.

PROFESSORS AND PARTICIPATING INSTITUTES:

Prof. Dr. Jonas Kuhn
IMS, Fundamentals of Computational Linguistics

Prof. Dr. Grzegorz Dogil
IMS, Experimental Phonetics

Prof. Dr. Sebastian Pado
IMS, Theoretical Computer Linguistics

Jun.-Prof. Dr. Ngoc Thang Vu
IMS, Computer Linguistics

Apl. Prof. Dr. Uwe Reyle, IMS

N.N.
IMS, Digital Phonetics

THE UNIVERSITY OF STUTTGART

WE ARE ONE OF THE LEADING NINE TECHNICAL UNIVERSITIES – WITH OUR OWN UNIQUE PROFILE.

Around 28,000 students on more than 150 study programs; 10 faculties, 150 institutes, roughly 5,000 employees, including around 300 professors; in excess of EUR 180 million in external funding annually.

The University of Stuttgart was founded in 1829 and became a technical university in 1890. From its very beginnings, its special strength lay in the cooperation between technical and natural science as well as between the humanities and social science. Today the University of Stuttgart is one of the TU 9, the nine leading technical universities in Germany. Its special profile, referred to as "the Stuttgart model", with the integration of engineering, natural science, humanities, social and economic science facilitates complex solutions to global challenges. The research activities of the university are focused on eight areas: modeling and simulation technologies, new materials, complex systems and communication, sustainable energy supply and the environment, mobility, integrated product design and production organization, the design and technology of sustainable living as well as concepts of technology and technology evaluation. The university has international visibility as a research university and houses the Simulation Technology Cluster of Excellence, the Graduate School of advanced Manufacturing Engineering, the ARENA 2036 Research Campus as well as numerous Special Research Areas and Research Training Groups.

Numerous outstanding institutions where highly specialized research is carried out or that support teaching and research operations are located at the university. These include for example the High-Performance Computing Center, the Visualization Research Center, the Automotive Simulation Center Stuttgart, an extremely high-performing wind canal, Europe's largest driving simulator, the Materials Testing Institute and the Aerospace Center Baden-Württemberg with the airborne observatory SOFIA.

The university is an important and attractive employer in the Stuttgart region. It is a campus university with two locations, in the city center and in Vaihingen, that are well connected by public transport and offer attractive recreation possibilities. It is certified as a family-friendly university since 2012.

The Computer Science department has a strong network within the university. Its research focus areas are reflected in the university's central strategic research focus areas. For example, we make a major contribution to the SimTech Cluster of Excellence and to the Graduate School of Excellence advanced Manufacturing Engineering (GSaME). Our department works together with other faculties in several Collaborative Research Centers, for example with the Humanities faculty in the context of a longstanding cooperation between Linguistics and Natural Language Processing, as well as in the area of Digital Humanities or with other Engineering and Natural Science faculties in the field of particle simulation. Within the faculty, we cooperate closely with the Electrical Engineering and Information Technology department and can use this constellation to cover the entire range of information and communication technology: from micro-, opto- and power electronics, hardware and computer architectures to signal processing and complex information systems, machine learning and autonomous systems as well as automation technology.

STUTTGART AS A RESEARCH REGION

WE TAKE ADVANTAGE OF OPPORTUNITIES TO COLLABORATE WITH DYNAMIC PARTNERS.

Innovative Research Campus: ARENA2036

Baden-Württemberg ranks first in Europe in terms of its innovative power, and within Baden-Württemberg the Stuttgart region is top of the list.

The University of Stuttgart is located in the midst of a dynamic business region that is home to both large enterprises and highly specialized small and medium-sized businesses in the areas of automotive, IT, production and manufacturing technology and biosciences. Baden-Württemberg ranks first in Europe in terms of its innovative power, and within Baden-Württemberg the Stuttgart region is top of the list. The University of Stuttgart has built up research collaborations spanning several years with many of these research-intensive industries. These companies in turn are attractive employers for the university's graduates.

The region is also characterized by a high density of universities, universities of applied science and research organizations such as the Max Planck Society (Max Planck Institute for Solid State Research, Max Planck Institute for Intelligent Systems), the second-largest research center of the Fraunhofer-Gesellschaft in Germany with several institutes, the German Aerospace Center or the German Literature Archive in Marbach. Institutes at the university regularly work together with researchers from these organizations in joint projects. One new form of collaboration is the "ARENA2036" Research Campus, where different partners from science and industry join together under one roof to undertake research into innovative topics relating to automobile production and lightweight construction.

The institutes of the Computer Science department collaborate closely with different universities, research associations and companies from the region on a regular basis. For example, we work with the University of Hohenheim on the Information Systems study program and have cooperative doctoral programs with Stuttgart Media University (Hochschule der Medien) and Reutlingen University. We are also linked to Reutlingen University through the Hermann Hollerith Center, where we work together with other partners from science and industry on various areas of information science, in particular service computing.

Our research projects are carried out mainly with institutes at the University of Tübingen (in the field of theoretical computer science as well as language processing), at the University of Hohenheim (in the field of service computing and information science) and at the University of Konstanz (SFB Quantitative Methods for Visual Computing).

We have also been carrying out research with partners from industry for several years. In addition to other well-respected companies from the IT industry, we have developed a Technology Partnership Lab with IBM.

One new form of collaboration is the "ARENA2036" Research Campus, where different partners from science and industry join together under one roof to undertake research into innovative topics relating to automobile production and lightweight construction.

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