Versie 2022.01

Robotics
meet our community

We invite you to meet our community and discover our success story!

BRABANT IS BRIGHT

More than 100 years in the making. In Brabant a number of key ingredients have been fruitfully mixed together, creating one of the strongest hightech systems regions in the world. In Brabant you will find an ‘Industry Based Ecosystem’, where people know what it takes to get a product into the market. As opposed to many other regions in the Netherlands and beyond, Brabant has a unique opportunity to provide many of the solutions to the challenges echoed by national and international studies. Brabant has evolved into a leading High Tech Systems and Materials region in the Netherlands and boasts a long and world class track record in high complexity machine building and complex robotics systems.

BRABANT IS BRIGHT

100 years of **HTSM innovation**

HISTORY

1891

More than 100 years in the making. In Brabant a number of key ingredients have been fruitfully mixed together, creating one of the strongest high tech systems regions in the world. In 1891, the brothers Gerard and Anton Philips founded their light bulb factory in the city center of Eindhoven. Already in 1919, Phillips started producing X-ray tubes for medical applications. Other groundbrea-king innovations followed, both in medical systems and consumer electronics. In the late 1970s Philips invented the Compact Disc and its successors (DVD – Blu-Ray). Research and Development were always the core of Philips' existence.

TODAY

2022

As opposed to many other regions in the Netherlands and beyond, Brabant has a unique opportunity to provide many of the solutions to the challenges echoed by national and international studies. Brabant has evolved into a leading High Tech Systems and Mate-rials region in the Netherlands, and boasts a long and world class track record in high complexity machine building and complex sys-tems. The ecosystem is built around dedicated top players such as Vanderlande, VDL, Preceyes, NXP, suppliers (often highly specia-lized SMEs), various campuses and renowned (applied) research institutes all the way through to engineering companies, system integrators, software developers and certification bodies.

PHILIPS

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

DAF

ASML

VANDERLANDE

VDL

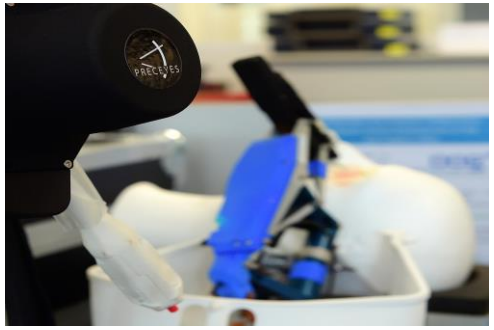
PRECEYES

NXP

BRABANT IS BRIGHT

Why Brabant excels in Robotics?

INDUSTRY BASED ECOSYSTEM



The **Brabant HTSM cluster** can invent, design, engineer, assemble, manufacture, commercialize, install, and maintain any machine, integrated and/or cyber-physical system and also houses the whole spectrum of HTSM suppliers in the region.

DEVELOPED KNOWLEDGE INFRASTRUCTURE

Highly innovative **universities and research institutes,** such as High Tech Campus Eindhoven, BIC, University of Technology Eindhoven, contribute to a unique ecosystem, home to innovators, researchers, engineers that create business of tomorrow.

ADAPTIVE COLLABORATIVE CULTURE

The people in Brabant have an adap-tive and collaborative culture. People are used to change and are working in a highly international environment for innovative OEM's, SME's, startups, scale-ups and knowledge and educa-tional institutes.

LEADING COMPANIES AND A FULL HIGH TECH SUPPLY CHAIN

Brabant is home to **Philips** and a perfectly woven network of knowledge institutes (University of Technology, TNO, EAISI), specialized high tech suppliers such as Vanderlande, Smart Robotics, NXP), and other partners has evolved in the region.

BRABANT IS BRIGHT

Our **Ecosystem**

World Class Research

Within a radius of 150 km around Brabant, there are 27 universities in three countries: a total of 605,340 students, 255,680 of which in the field of nature, health or technology. These are the leading research institutes for HTSM.

WORLD CLASS RESEARCH

1. **Eindhoven University of Technology (TU/e)** is a research university specializing in engineering science & technology.
2. **EAISI Institute - TU/e (Eindhoven)** is an AI community at TU/e. EASI has various research labs in cooperation with partners in the fields of mobility, robotics and high tech systems.
3. **Fontys University of Applied Sciences (Eindhoven)** offers High Tech Systems & Materials programs. Fontys has also established a research group, where students and teachers work together to research topics in design guidelines for additive manufacturing.
4. **Breda Robotics:** Breda Robotics is the breeding ground for innovation and robotics in West-Brabant. Applied knowledge is key: increasing the innovation power of the make- and maintenance industry.
5. **High Tech Systems Center (HTSC)** conducts fundamental research and design around new concepts and prototypes in the field of High-tech and mechatronic systems, while focusing on the needs of the industry.
6. **Meulensteen House of Robotics**: a dynamic hotspot for robotics start-ups.

BRABANT IS BRIGHT

Our **Ecosystem**

Leading companies

Brabant accounts for 15,560 companies in its HTSM-cluster, that represent more than 40% of the total Dutch production volume. These are the leading companies in the field of Robotics.

LEADING COMPANIES

1. **VDL**, headquartered in Eindhoven, is a supplier of high quality components and complete mechatronic modules and systems.
2. **Vanderlande Industries:** Vanderlande is the global market leader for future-proof logistic process automation at airports.
3. **Smart Robotics:** Smart Robotics offers complete picking solutions for your production and logistics processes, from palletizing to order picking.
4. **Preceyes:** The PRECEYES Surgical System is a robotic assistant for eye surgery. This high surgical precision aims to improve treatment outcomes and empowers surgeons to establish new innovative surgical techniques.
5. **Pixelfarm Robotics:** offers an alternative approach for implementing a digital technology and robotics in agriculture.
6. **Microsure:** Microsure's MUSA is the world's first clinically available CE-certified surgical robot for microsurgery.
7. **Avular:** is an agile and innovative robotics company, aiming to make the world of complex mobile robotics accessible to everyone.

BRABANT IS BRIGHT

State-of-the-art facilities

High Tech Campus Eindhoven

Often recognized as the smartest square km in Europe, the **HTCE campus** is built around an ecosystem of 235 companies with a range of application fields. Home to over 12,000 innovators, researchers, engineers that create the technologies and business of tomorrow.

OBJECTIVES

High Tech Campus is Eindhoven, the smartest km^2 in Europe is an ecosystem of 235 high tech companies. It's home to more than 12,000 innovators, researchers and engineers. Each company at High Tech Campus Eindhoven shares a common goal: developing new technologies and applications that help solve social problems and challenges, and successfully bringing these to the market.

LEADING COMPANIES

- Multinationals such as Philips Healthcare, Teleledyne Dalsa, NXP and Intel
- Research institutes like the Holst Centre, Philips Research and Innovation lab
- Scale ups and startups like Usono, Lifesense Group, Bambibelt, GTX medical and Sirius Medical

KEY CHARACTERISTICS

- 42% of all patent applications in the NL come from the Campus
- >85 nationalities
- AI innovation Centre
- 12,500 Smart People
- Total 350,000 m^2
- 25,000 sqm R&D facilities
- 1 billion private R&D
- Top 7 incubator for start-ups

APPLICATION AREAS

HTCE is a global hotspot in the areas of Health & Vitality, Sustainability, Applied Intelligence, Smart Environments & Connectivity and Software & Platforms.

HIGH TECH CAMPUS EINDHOVEN

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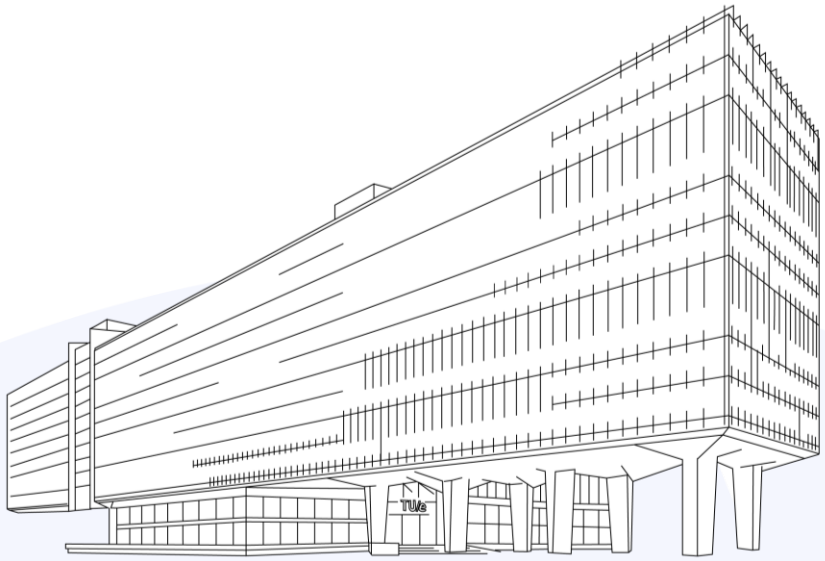
Key Research Institutes

Eindhoven University of Technology



Eindhoven University of Technology in numbers

SCIENTIFIC PUBLICATIONS
3,000

PHD-AWARDS
140

PATENTS EVERY YEAR
40

BACHELOR COLLEGE WITH
15 DIFFERENT MAJORS

MASTER PROGRAMS IN THE FIELDS OF:
- ARTIFICIAL INTELLIGENCE
- ENGINEERING & HEALTH
- HUMANS AND TECHNOLOGY
- SMART CITIES
- SMART MOBILITY
- SUSTAINABLE ENERGY

COLLABORATION

A spirit of collaboration is at the heart of the university community. Globally, the university stands out when it comes to collaborating with advanced industries, as it has done with Royal Philips since its inception. Academic education is driven by both fundamental and applied research. The TU/e Campus is in the centre of one of the most powerful technology hubs in the world, Brainport Eindhoven.

Its research institutes, the Eindhoven Artificial Intelligence Systems Institute (EAISI), the Eindhoven Institute for Renewable Energy Systems (EIRES), the Institute for Complex Molecular Systems (ICMS), and the Institute for Photonic Integration (IPI), combine the strengths of the university with industry needs and government strategy.

DEPARTMENT OF MECHANICAL ENGINEERING

Research Groep
- Control systems technology
- Dynamics and control
- Energy technology
- Polymer technology
- Power & flow

DEPARTMENT OF ELECTRICAL ENGINEERING

Research Groep
- Center for wireless technology Eindhoven (CWTE)
- Advanced network management and control
- Control systems
- Electromagnetics
- Electronic systems
- Photonic integration

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

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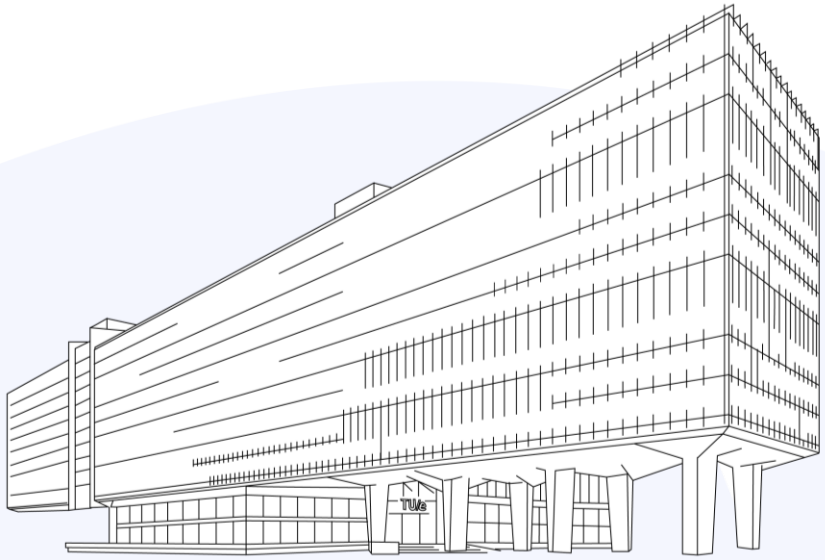
Key Research Institutes

EAISI Institute

World class Research: The Eindhoven Artificial Intelligence Systems Institute (EAISI) is the new institute of Eindhoven University of Technology in the field of artificial intelligence (AI).



OBJECTIVES

The Eindhoven AI Systems Institute combines all TU/e Artificial Intelligence activities. Top researchers from various research groups work together to create new and exciting AI methodologies and applications with a direct impact on the real world. TU/e has been active in the field of AI for many years, which gives the new institute an excellent starting position to build upon.

COLLABORATION WITH INDUSTRY

ICAI is a network of Dutch research programs that is designed to bring together AI-researchers. The network helps TU/e to further strengthen its already close ties with Dutch industry, and exchange AI expertise and talent with other universities and knowledge institutes.

CO-CREATION

AI-research in close collaboration with student teams and industry representatives.

FOUR ICAI LABS

EAISI AIMM LAB has been set up to improve decision making in manufacturing and maintenance using AI, together with Nexperia, KMWE, Marel and Lely.

E/MTIC AI LAB is aimed at improving personalized treatment by having AI work in close collaboration with the clinical staff and MedTech industries to make more reliable decisions.

EAISI FAST LAB researches how mobile robot systems can operate safely whilst performing in environments that are subject to static and dynamic changes.

EAISI MOBILITY LAB focuses on accident-free mobility. It aims to help mobile systems understand the environment that they operate in.

EAISI
EINDHOVEN AI SYSTEMS INSTITUTE

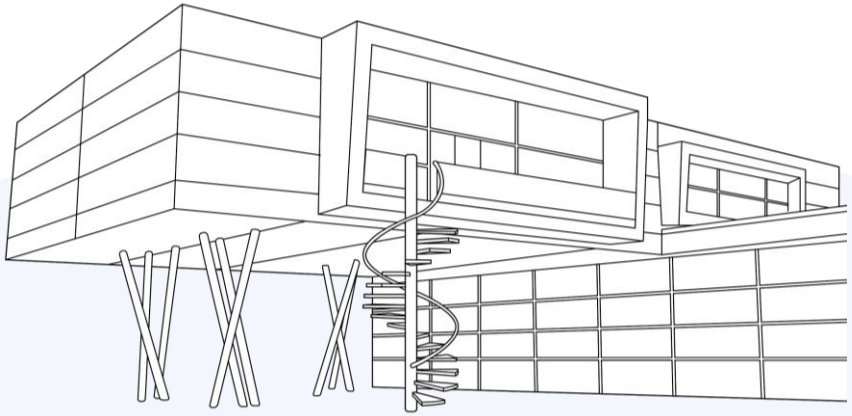
TU/e

BRABANT IS BRIGHT

Key Research Institutes

High Tech Systems Center

HTSC of Eindhoven University of Technology groups its research activities in the domain of complex high tech mechatronic systems into a one top level research center.



FUNDAMENTAL RESEARCH

At the TU/e High Tech Systems Center (HTSC), fundamental research and design around new concepts and prototypes takes place while focusing on the needs of the industry. Using systems design paradigms forms a central part of the program and challenges within HTSC.

FOUR DEPARTMENTS

By combining the expertise from four departments: Mechanical Engineering, Electrical Engineering, Mathematics and Computer Sciences and Applied Physics, the HTSC addresses the complexity problem of future high tech systems design in a multi-disciplinary way, with strong emphasis on System Engineering. The High Tech Systems Center performs fundamental research and design of new concepts and prototypes, and understands the needs of the industry.

FOCUS AREAS

The seven focus areas of HTSC are innovative and will continue to develop complex engineering: Robotics, Digital Engineering, Industrial Internet of Things, Scientific Instrumentation and Metrology, Optomechatronics, Artificial Intelligence and Contamination Control.

Currently HTCS had more than:

T-shaped engineers

150

Working on projects related to our center's focus

Of which PhD students

80%

And PFEng trainees

20%

HTSC HIGH TECH SYSTEMS CENTER TU/e

BRABANT IS BRIGHT

Key Research Institutes

Fontys

OBJECTIVES

The Mechatronics and Robotics Lectorate focuses on applied research and educational innovation. Over the past four years, the application direction of the research has shifted further to Industry 4.0, Flexible Manufacturing and Manufacturing Logistics for SMEs in the manufacturing industry.

LECTORATE ROBOTICS

The activities of the lectorate are in line with the government's top sector policy, within the HTSM top sector and the movement that the Netherlands is increasingly becoming an (autonomous) manufacturing country. The lectorate fits in well with the needs in the brainport region of Eindhoven, where many SMEs fulfill a supplier role to large companies such as ASML and DAF and the issues these SMEs have.

RESEARCH AREAS

Flexible Manufacturing

The subject of Flexible Manufacturing is about the flexible production of multiple products by 1 machine or robot, with as little changeover time as possible. So it's actually about making machines and robots multifunctional. Research is on new gripper technology, new applications, and communication between different machines.

Human Robot Interaction

Is about how humans and robots can work together. Research is conducted on how to make robots exhibit intuitive behavior so that people can anticipate what the robot will do in order to make the robots safer.

Fontys

BRABANT IS BRIGHT

State-of-the-art facilities

Brainport Industries Campus

The most innovative and successful companies and institutions in the Brainport region come together as one on the **Brainport Industries Campus**.

HIGH TECH MANUFACTURING

Brainport Industries Campus is the place to be for far-reaching partnerships between suppliers, specialist companies and innovative education and knowledge institutes. This is where the next generation of professionals in the hightech manufacturing industry is trained in a state-of-the-art working and learning environment.

KEY FIGURES

- Over 35 companies
- 2,000 high level staff
- 1,500 students
- Surface 105,000 m^2
- 6,000 m^2 of shared facilities
- 6,000 m^2 of shared warehousing

COOPERATION

Brainport Industries Campus is the very first location where high tech suppliers innovate and manufacture together, where the most successful companies share high-quality facilities, such as cleanrooms, flexible production areas, warehouses, and other advanced facilities, and where they present themselves as a unified force that they can showcase to their national and international customers.

Brainport Industries Campus

BRABANT IS BRIGHT

Showcase

Tech United

ABOUT

Tech United is a multidisciplinary team of students, PhD's and employees of Eindhoven University of Technology which are involved in the development of robotics. Knowledge in the field of mechanical engineering, electrical engineering and computer algorithms are used to solve problems. The home of Tech United is the RoboCup stadium on the university.

ROBOT SOCCER TEAM

The dream of this project is to have a fully autonomous robot soccer team that can win from the human FIFA world champions of that time. They see this as a big challenge in the field of software and mechatronics. The annual world championship and the popularity of soccer are good motivator. The goal behind RoboCup goes even further than soccer. A lot of technologies and innovations are applied to functional robots like a service robot.

CONTRIBUTE TO SOCIETY

Service robots can assist with cleaning, lifting patients and administer medication. This makes elderly able to live at home for a longer period of time. Another societal goal is to make children enthusiastic about technologie.

"In the near future Tech United wants to develop a service robot that can reduce the workload of nurses."

Tech United