*Versie 2022.01*

# **Advanced Manufacturing** meet our community

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

Based on a history of over 100 years of high-tech innovation initiated by Philips, Brabant is an increasingly popular location for technology driven companies. This region is a frontrunner in new production techniques and advanced manufacturing. In Brabant you will find an ‘Industry Based Ecosystem’, where people know what it takes to get a product into the market. With innovation hotspots like High Tech Campus Eindhoven the smartest square kilometer of Europe, and Brainport Industries Campus – the Factory of the Future – Brabant is the ideal place for companies that want to shape the future of the hightech manufacturing industry.

BRABANT IS BRIGHT

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 groundbreaking innovations followed, both in medical systems and consumer electronics. In the late 1970s Philips invented the Compact Disc and its successors (DVD – Blu-Ray).

## TODAY

2021

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 sys-tems. The ecosystem is built around dedicated top players such as Philips, ASML, NXP, DAF Trucks, suppliers (often highly specialized SMEs), various campuses and renowned (applied) research institutes all the way through to engineering companies, system integrators, software developers and certification bodies. The region embraces developments in the domain of advanced manufacturing and is the ideal place for constantly improving production techniques and fostering innovation.

PHILIPS

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

DAF

ASML

NXP

HIGH TECH CAMPUS EINDHOVEN

ThermoFisher SCIENTIFIC

PHILIPS Healthcare

TELEDYNE DALSA Everywhereyoulook

DIMENCO

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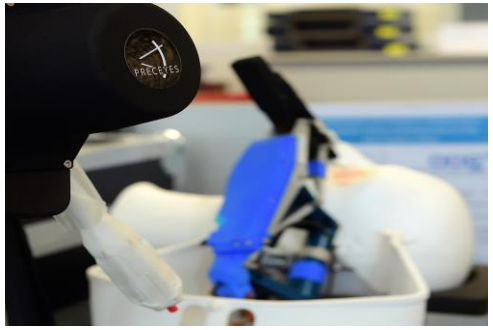
# Why Brabant excels in Advanced Manufacturing?

### 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

Eindhoven is the home of **Royal Philips, AMSL and NXP**, and, over the space of 125 years, a perfectly woven network of knowledge institutes (TU/e, Holst Centre), specialized high-tech suppliers and partners has evolved in the region.

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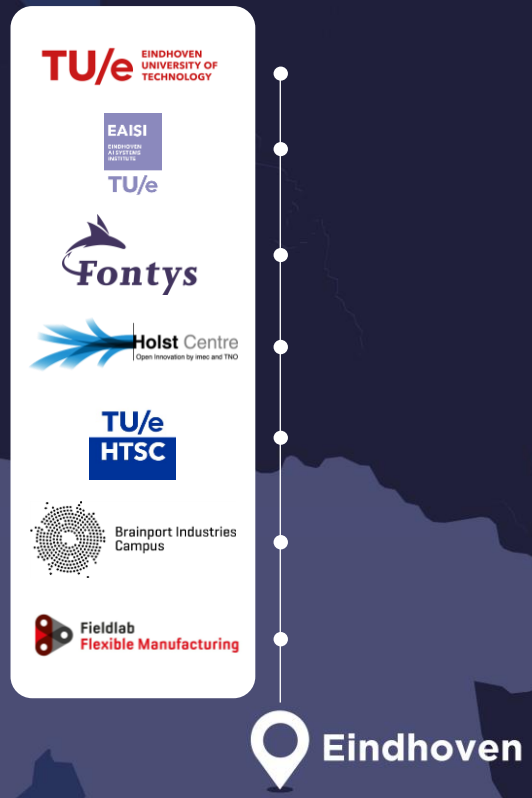
# Our **Ecosystem**

## World Class Research

*Within a radius of 150 km around Brabant, there are 22 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. **Holst Centre (Eindhoven)** is an independent R&D centre supporting it partners to transform their innovative technologies into new products and new manufacturing processes.
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. At **Brainport Industry Campus** high tech suppliers innovate and manufacture together, and companies share cleanrooms, production areas and warehouses.
7. **Flexible Manufacturing Lab** facilitates development of flexible production automation, assembly, robotisation and digitisation solutions for flexible and high-quality small series production at mass production costs.

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# 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 Advanced  Manufacturing.*


### LEADING COMPANIES

1. **Philips,** originated in Eindhoven and headquartered in The Netherlands, is one of the largest suppliers of state-of-the-art manufacturing equipment in the nation.
2. **Thermo Fisher Scientific**, formerly **FEI** located in Eindhoven, is a worldwide operating group that develops a large number of electron microscopes.
3. **VDL**, headquartered in Eindhoven, is a supplier of high quality components and complete mechatronic modules and systems.
4. **Additive Industries** is a manufacturer of 3D metal printers aimed at demanding industrial markets, such as aerospace, automotive and energy.
5. **KMWE** designs, builds and continuously improves high tech components, modules and systems based on precision engineering and machining.
6. **Yaskawa** is an industrial equipment supplier in Eindhoven, manufacturing robotics, propulsion and control systems.
7. **Omron** is a Manufacturer of control equipment, factory automation systems, electronic components, automotive electronics, ticket vending machines and medical equipment.

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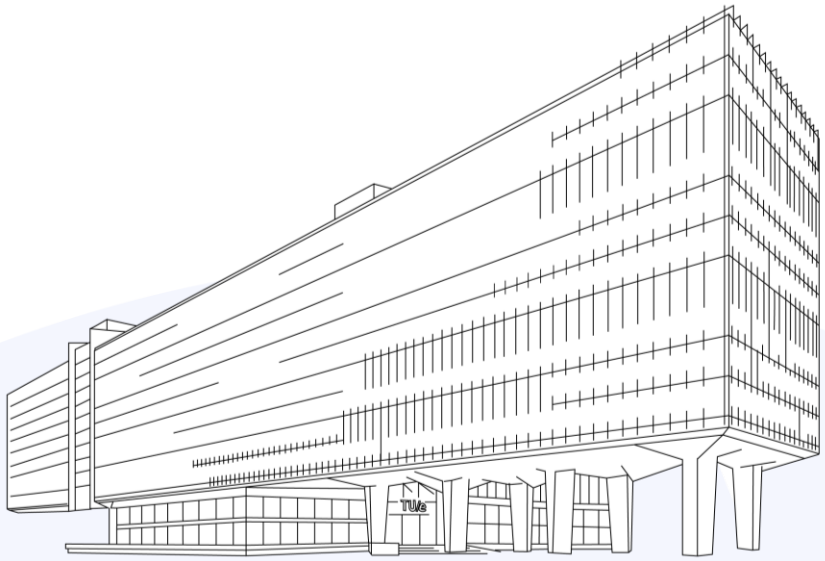
# Key Research Institutes

## 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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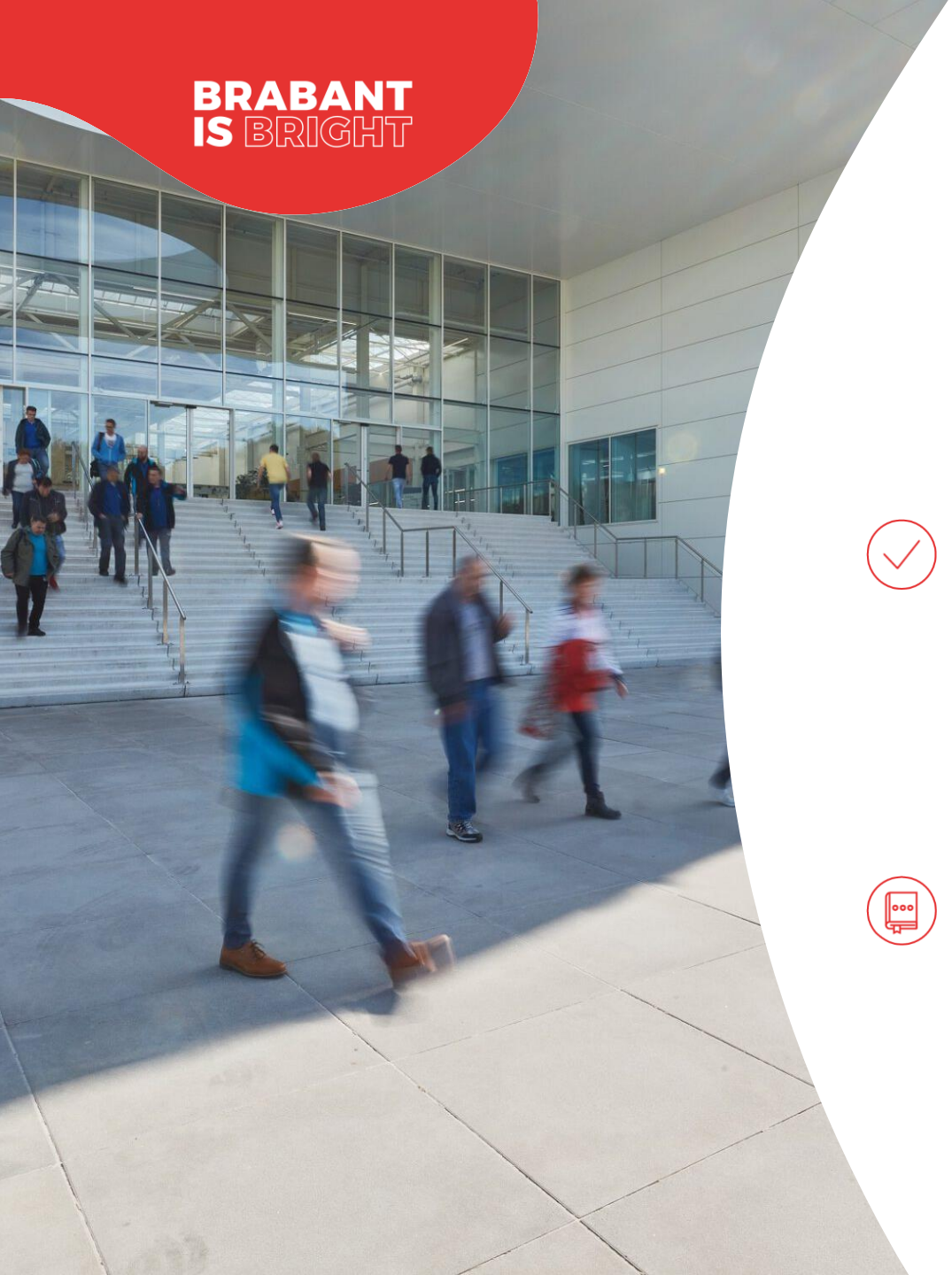

# State-of-the-art facilities

## Brainport Industries Campus

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

### 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

### 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.

### 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

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# Key Research Institutes

## Fontys Centre of Expertise HTSM

### OBJECTIVES

Fontys is one of the largest universities of applied sciences in the Netherlands and located in the most innovative region of our country and perhaps the whole of Europe. It is the most exciting possible place to be for anyone with an interest in technology, entrepreneurship and creativity. Students of more than 100 nationalities study at one of our campuses.

### LECTORATES AND RESEARCH GROUPS

- Additive Manufacturing
- Agro-Mechatronics
- Business Service Innovation
- AI and Big Data
- Industrial Engineering and Entrepreneurship
- High Tech Embedded Software
- Mechatronics and Robotics
- Smart Manufacturing

### KEY CHARACTERISTICS

**As a high-tech entrepreneur, you can innovate together with Fontys!**

Fontys Centre of Expertise High Tech Systems and Materials (HTSM) connects higher education and the business community. Together, we carry out research and develop innovative technologies that improve both education and the business community. In addition, we offer lifelong learning solutions to promote the mobility and flexibility of technical professionals.

Fontys

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# Key Research Institutes

## Holst Centre

**The Holst Centre** is an independent R&D centre that develops technologies for wireless autonomous sensor technologies and flexible electronics, in an open innovation setting and in dedicated research processes.

### OBJECTIVES

- Being an independent research and innovation center that focuses on innovations for improving health and wellbeing and on guaranteeing sustainable environments
- Improving quality of life while controlling healthcare spending

### CORE COMPETENCES

- At the forefront of developments in personal health and biomedical sensing technologies
- Multifunctional solutions for wearable and non-contact monitoring
- Energy & Climate: improving well-being by creating a cleaner, greener world.
- Mobility & Industry 5.0: making infrastructure and industry more efficient and future proof.

### KEY CHARACTERISTICS

Holst Centre innovation helps the automotive industry in a wide range of areas, from smart interior surfaces and non-contact monitoring of drivers to power source and battery management. At the same time their microelectronics enable the transition to Industry 5.0, for instance with UWB and Bluetooth micro-location technologies for safe and secure logistics.

Combining expertise in wireless sensor technologies and flexible electronics under one roof puts Holst in a unique position, in both domains as well as in the synergy between them.

### Holst Centre in numbers

EMPLOYEES
**180**

NATIONALITIES
**28**

PROJECTS SERVING INDUSTRIAL PARTNERS
**40**

“A KEY FEATURE OF THE HOLST CENTRE IS ITS PARTNERSHIP MODEL WITH INDUSTRY AND ACADEMIA, BASED ON ROADMAPS AND PROGRAMMES. IT IS THIS KIND OF CROSS-FERTILIZATION THAT ENABLES THE HOLST CENTRE TO BALANE ITS SCIENTIFIC STRATEGY WITH INDUSTRIAL NEEDS.”

Holst Centre
Open Innovation by imec and TNO

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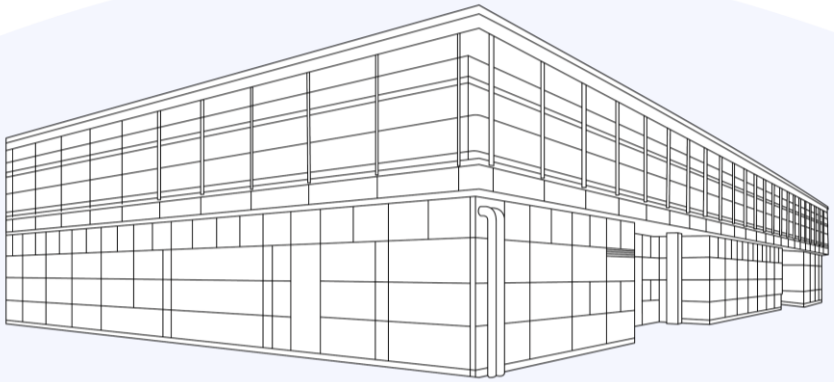
# Key Research Institutes

## Eindhoven Engine

The **Eindhoven Engine** accelerates innovation in the Brainport Region through challenge-based research in its public-private research facility on the TU/e campus.



### Founders of the Eindhoven Engine

The founders of the eindhoven engine are the know-ledge institutes fontys, tno and the eindhoven uni-versity of technology, together with philips healthcare, signify, asml, vdl, nts, and nxp. Eindhoven engine's funds (75 million euros between 2019 and 2025) have been made available through the brain-port regional deal (national funding) and by industry partners.

### MISSION

The Eindhoven Engine accelerates innovation in the Brainport Region through challenge-based research in its public-private research facility on the TU/e campus.

### COLLABORATION

The Eindhoven Engine unlocks the collective intelligence in the Brainport region. Thanks to a unique formula, innovators from companies can join forces with students and experienced researchers and employees from knowledge institutes to work together to accelerate innovation and create disruptive co-creation projects in which colocation is a prerequisite.

### INSPIRATION

The program is inspired by three regional and highly successful concepts:

- The renowned former Philips NatLab (Philips Physics Laboratory) in Eindhoven,
- The successful Knowledge Worker Program from the last economic crisis, when companies could temporarily outplace their R&D employees to a knowledge institute with a substantial subsidy.
- The Eindhoven student teams, which have a knack for innovating quickly and disruptively.

EINDHOVEN ENGINE

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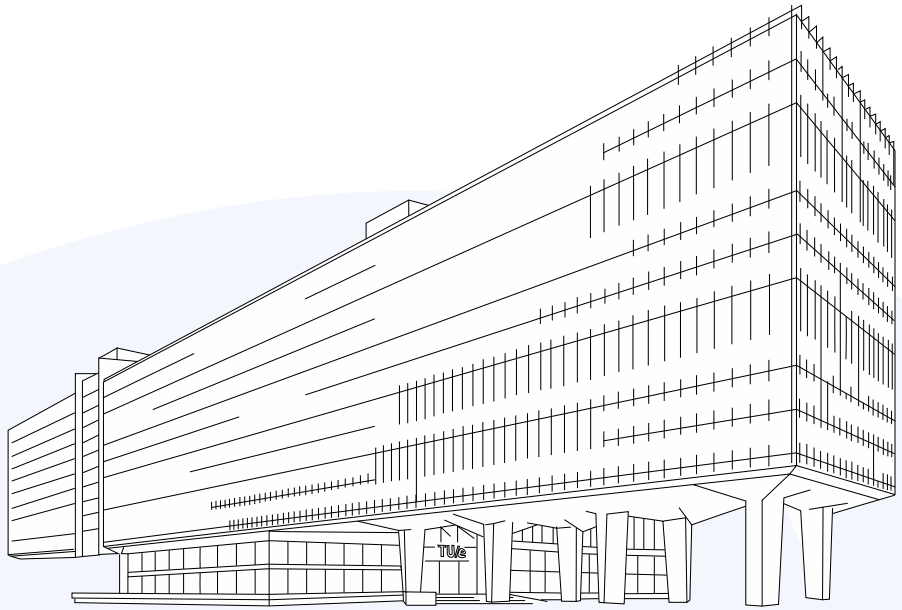
# Key Research Institutes




## EASI 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

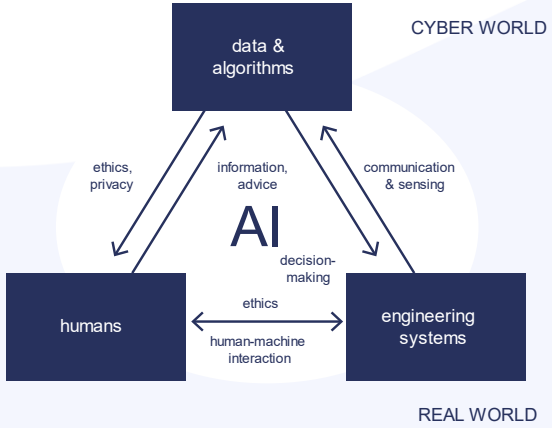
The Eindhoven AI Systems Institute combines all TU/e Artificial Intelligence activities. Top researchers from various research groups work together to create new and exciting AI methodologies and applications with a direct impact on the real world. TU/e has been active in the field of AI for many years,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

### COLLABORATION WITH INDUSTRY

Building on the traditionally close ties of TU/e with industry, EAISI is partnering with several leading companies and organizations, both at a regional, national and European level. These include: ASML Philips Healthcare, NXP Brainport Eindhoven AI NL Coalition 4TU.Federation EuroTech.

### KEY DOMAINS

An integrated system view of AI will be developed in this multidisciplinary institute, with key contributions from three key domains:




### EASI Institute

“EASI IS WORKING ON THE MOONSHOT PROJECT “HEALTHCARE ANYWHERE.” WITH GROUND-BREAKING PROJECTS LIKE ARTIFICIAL INTELLIGENCE FOR MEDICAL IMAGE REGISTRATION OR ASSISTING MEDICAL DECISION WITH EXPLAINABLE AI.”

EAISI
EINDHOVEN AI SYSTEMS INSTITUTE

TU/e

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## Jheronimus Academy of Data Science (JADS)

At JADS, researchers and students work closely with the business community. In addition to education and research, JADS also offers space for innovative, data-driven entrepreneurship and public-private partnerships.

APPLIED RESEARCH LABS
**3**

PROFESSIONAL EDUCATION CERTIFICATES

NATIONALITIES
**30**

JOINT DEGREES DATA SCIENCE AND ENTREPRENEURSHIP

IN PDENG PRGRAM DATA SCIENCE
**77 trainees**

# Key Research Institutes

## Jheronimus Academy of Data Science (JADS)

**Data Science is essential to finding answers to today's challenges in the Agrifood sector. JADS offers data science bachelor and master programs, PDEng education, professional education and help organizations shape their data driven future.**

### OBJECTIVES

- Enhance the relevance of academic research to business and society
- Adding value with data science, such as data entrepreneurship and data innovation. It entails the fundamental question on how to create societal and economic value with data.
- Optimizing industrial applications with algorithms and methods.

### QUOTE FROM OMRON

*"The Omron IPC is a Build-to-Order product and has thousands of variants. With CERTIF-AI we automate and integrate the validation process of new variants in the normal production process in order to significantly shorten the delivery time of new variants."*

***TIM FOREMAN, OMRON***

### SHOWCASE

**CERTIF-AI:**
Over the next four years, a consortium of academic and industrial partners, led by Jheronimus Academy of Data Science (JADS) and TU/e, will be collaborating to develop an Artificial Intelligence (AI) toolkit, consisting of algorithms and methods, for industrial applications. The project, CERTIF-AI (Certification of production process quality through Artificial Intelligence) is funded by the Dutch Research Council NWO.

JADS Jheronimus Academy of Data Science

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# Key Research Institutes

## Data Value Center - Smart Industry

In the **Data Value Center - Smart Industry**, 10 partners work together to help companies develop new services and business models that make use of data.

### MISSION

By combining and providing access to knowledge, expertise, partnerships and initiatives, the DVC-SI wants to contribute to an accelerated development of the data economy.

### FOCUS

The DVC-SI is a Brabant initiative, but is open to all companies in the Dutch Smart Industry cluster. It focuses on the hightech manufacturing industry where a lot of data is generated in the production process, maintenance and logistics. With 6,000 companies, this target group is strongly represented in Brabant. At a later stage, companies from other top clusters in Brabant that are linked to the high-tech manufacturing industry will also be involved.

### INSPIRATION

The establishment of the DVC-SI is in line with the Smart Industry aim to eventually set up similar centres in more Dutch regions.

Companies can come to the DVC-SI for information and workshops on the possibilities of big data, open data and their own data. But also for a quick scan, tailor-made advice and experiments with new earning models. Furthermore, we can put companies in contact with suppliers, consultants and knowledge institutions, or offer support in finding partners for cooperation projects.

DVCSI

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# Key Research Institutes

## EIT Digital

**EIT Digital** is a European innovation and entrepreneurial education organisation that stimulates the digital transformation in Europe for economic growth and quality of life.

### MISSION

EIT Digital delivers digital innovations to the market and educates entrepreneurial talent in the EIT digital Academy including a Master-, Doctoral- and Professional School, and online learning.

### FOCUS

Mobilising a pan-European ecosystem of over 130 top European corporations, SMEs, start-ups, universities and research institutes. EIT Digital invests in strategic areas to accelerate the market uptake of research-based digital technologies focusing on societal challenges: Digital Industry, Digital Cities, Digital Wellbeing, Digital Infrastructure and new since 2017 Digital Finance.

### GROWTH

Since its launch in 2010, EIT Digital has equipped more than 2,200 students with the skills to innovate and become entrepreneurs; EIT Digital has supported more than 370 start-ups and scaleups to grow internationally, created more than 200 ventures and launched more than 530 products and services commercially.

EIT Digital matured against the background of a fast-accelerating digital world and a growing focus on entrepreneurship in Europe. Complementing the strong European research base, this entrepreneurial mindset will strengthen Europe’s position in a digital world driven by data, platforms, and the network economy.

eit Digital

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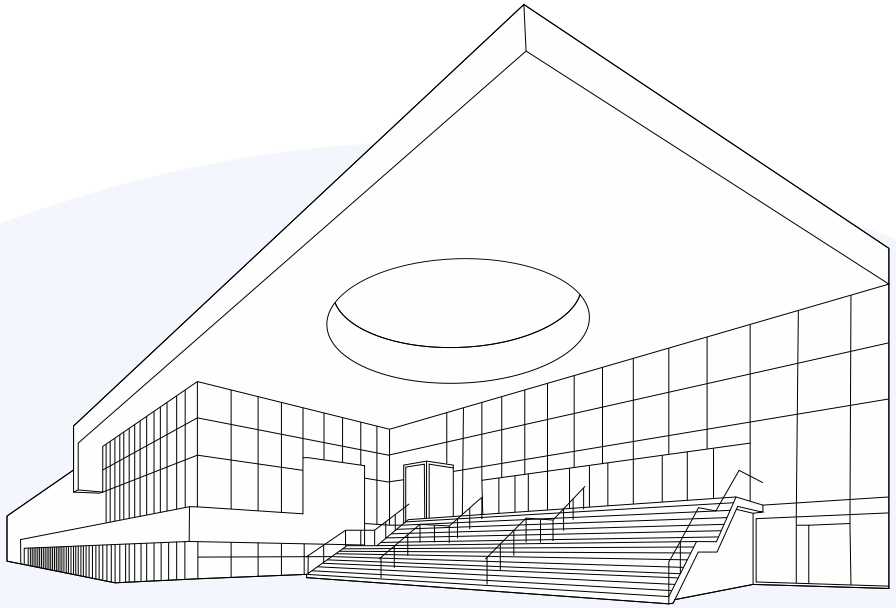
# Key Research Institutes

## Flexible Manufacturing Lab

**Flexible Manufacturing Lab** facilitates development of flexible production automation, assembly, robotisation and digitisation solutions for flexible and high-quality small series production at mass production costs.



### MISSION

In the Fieldlab Flexible Manufacturing, companies and knowledge institutes work together to develop and demonstrate flexible production automation.

### FOCUS

In the field lab, inspiration can be found through demonstrations of flexible, robotic and augmen-ted reality supported activities. We use and develop modern robotics and digitisation solutions for use in production processes. In this lab, we support operators and optimise work processes with cobots, vision systems and augmented reality.

### INNOVATION

An ecosystem that focuses on capitalising on market opportunities through flexible production and assembly solutions;

- Flexible production and assembly solutions
- Automated and flexible experiment lab
- Robotisation of production processes

### K3D-ADDFAB

The ambition of K3D-AddFab is to further develop a wide range of high-tech and high-end production applications for 3D metal printing towards industrial series production and to scale up the capacity for high-end applications.

### Partners of the Flexible Manufacturing Lab

Partners of the Flexible Manufacturing Lab include, among others, BOM, Brainport Industries, Rexroth, Festo, Berenschot, Perfect, Accerion, Fontys, Yasakawa, Avans, Smart Robotics, KMWE, TU/e, Neways, Omron and TNO, and is supported by the Province of Noord-Brabant.

Fieldlab Flexible Manufacturing

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# 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*

BRABANT IS BRIGHT

# Showcase

## Additive Industries

### THE NEXT STEP IN 3D PRINTING

Additive Industries is a 3D metal printer manufacturer for high-quality metal parts. It ofers a system specifically aimed at high-end and demanding industrial markets. With class-leading build volume, robustness as well as productivity, Additive Industries redefines the business case for aerospace, automotive, energy and high-tech equipment.

### CLOSE COOPERATION

By putting the customer first in everything we do, we enable them to improve their designs, product performance and business cases for the best competitive position in their market. Additive Industries has renowned customers such as Formula One Team Alfa Romeo Racing ORLEN, ArcelorMittal, K3D, the Volkswagen.

### BRABANT BUSINESS

Established in 2012 in the “Brainport Ecostructure” around Eindhoven in The Netherlands, Additive Industries is the world’s first dedicated equipment manufacturer for industrial metal additive manufacturing systems. Built on the high tech systems, optics and electronics heritage of this region, founders Jonas Wintermans and Daan Kersten have created a company of talented professionals committed to industrialising 3D printing using ‘open innovation’ principles to capitalise on proven technology.