

Versie 2022.01

Wafer fabrication meet our community

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

BRABANT
IS BRIGHT

In Brabant a number of key ingredients have been fruitfully mixed together, creating one of the strongest hightech systems regions in the world. Here you will find an 'Industry Based Ecosystem', where people know what it takes to get a product into the market. 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 systems. The most complete and advanced wafer fabrication equipment (WFE) cluster in the world is in Brabant. Brainport Eindhoven is the home of ASML, NXP, FEI, VDL, and the full value chain of the most advanced tier 1, 2, and 3 suppliers on the planet.

**BRABANT
IS BRIGHT**

100 years of HTSM innovation

HISTORY

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, Philips 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). Research and Development were always the core of Philips' existence.

TODAY

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 systems. The ecosystem is built around dedicated top players such as ASML, NXP, Philips, Thermo Fisher, Smart Photonics, suppliers (often highly specialized SMEs), various campuses and renowned (applied) research institutes. In other words, the entire value chain is present in Brabant.

1891



TU/e EINDHOVEN
UNIVERSITY OF
TECHNOLOGY



2022



TELEDYNE DALSA
Everywhere you look

ThermoFisher
SCIENTIFIC

HIGH TECH CAMPUS
EINDHOVEN

**SMART
PHOTONICS**
Independent InP Foundry

Kulicke & Soffa

Why Brabant excels in Wafer fabrication?

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 adaptive 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 educational institutes.

LEADING COMPANIES AND A FULL HIGH TECH SUPPLY CHAIN



Brabant is the home to the most powerful lithography-based wafer fabrication equipment cluster in the world (ASML a.o.). A perfectly woven network of knowledge institutes, specialized high tech suppliers and 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.

Eindhoven



TU/e EINDHOVEN
UNIVERSITY OF
TECHNOLOGY

EASI
Eindhoven
Applied
Science
Institute
TU/e

Fontys

Holst Centre
Open Innovation by Intel and TNO

PITC

EHCI
Eindhoven
Health
Care
Institute
TU/e



WORLD CLASS RESEARCH

1. **Eindhoven University of Technology (TU/e)** is a research university specializing in engineering science & technology.
2. **EASI 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 its partners to transform their innovative technologies into new products and new manufacturing processes.
5. **Photonic Integration Technology Center (PITC)** supports companies that want to make the step towards high-quality production or want to enter the photonics supply chain.
6. **Hendrik Casimir Institute:** By bringing together photonics, electronics, quantum technology, EHCI drives exponential computing, communication and sensing technologies, to enable a sustainable information society.

**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 Smart and Green Mobility.

Breda



Eindhoven



Brainport
Industries



LEADING COMPANIES

1. **ASML:** gives the world's leading chipmakers the power to mass produce patterns on silicon, helping to make computer chips smaller, faster and greener.
2. **VDL** headquartered in Eindhoven, is a supplier of high quality components and complete mechatronic modules and systems.
3. **NXP** is a global semiconductor company creating solutions that enable secure connections for a smarter world.
4. **Anteryon designs** and manufactures key optical components and assembles high tech modules and systems.
5. **Prodrive** embedded computing, motion & mechatronics, power conversion, automation control systems, vision & image processing systems and internet of things products
6. **Marvell:** moves, stores, processes and secures the world's data with semiconductor solutions.
7. **Zeiss:** Leading optics- and opto electronics company.
8. **Teledyne DALSA** is a global leader in high performance digital imaging and semiconductor technology,
9. **Brainport Industries:** Cluster of more than 100 Tier 1, 2, 3 high tech companies.

Key Research Institutes

Fontys



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.



FOCUS AREAS

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



DOMAINS

- Additive Manufacturing
- AI and Big Data
- Industrial Engineering and Entrepreneurship
- Distributed Sensor Systems
- Future Powertrain
- Health, Innovation and Technology
- High Tech Embedded Software
- Mechatronics and Robotics
- Serious Game Design
- Smart Manufacturing
- Virtual Reality

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 km² 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, Telemedicine 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



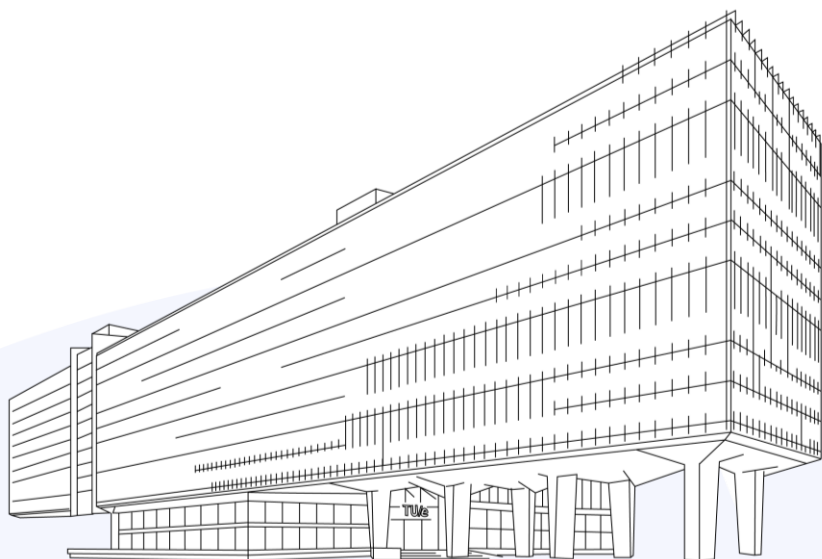
KEY CHARACTERISTICS

- 42% of all patent applications in the NL come from the Campus
- >85 nationalities
- AI innovation Centre
- 12,500 Smart People
- Total 350,000 m²
- 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.



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

Key Research Institutes

Eindhoven University of Technology



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

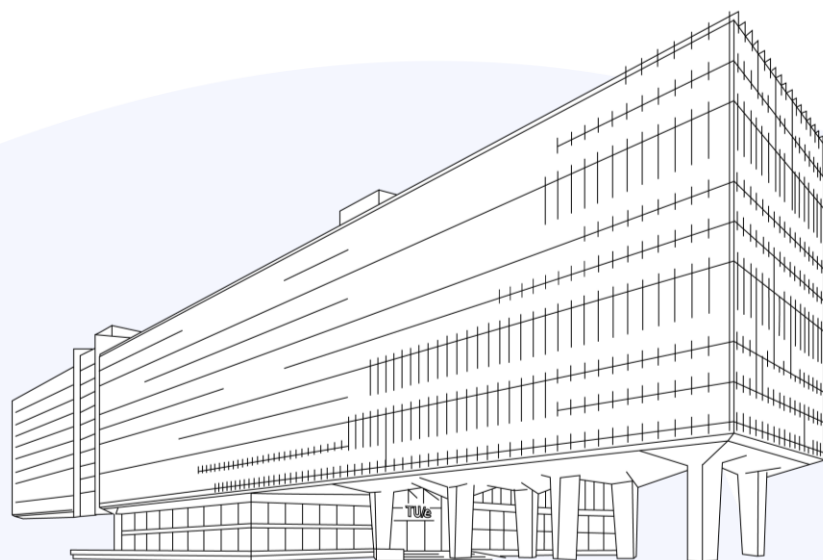
Research Groep

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

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).



CO-CREATION

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



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.



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.



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 BALANCE ITS SCIENTIFIC STRATEGY WITH INDUSTRIAL NEEDS.”

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

Holst Centre wants to transform healthcare. We want to make health management a natural and unobtrusive part of life. A focus for us is innovative patient monitoring solutions that fit into everyday life. We develop technologies and applications that unobtrusively deliver medical-grade data in any setting.



HEALTH APPLICATIONS

- Medical imaging
- Health patches
- Non-contact sensing
- Smart Clothing



KEY CHARACTERISTICS

High-quality medical imaging is the cornerstone of diagnostics and an increasing suit of image-guided therapies. Using thin-film technologies, we are opening up new possibilities for various medical imaging modalities by offering detection over larger areas. For example, our flexible X-ray detectors are lighter and more robust than traditional glass-based detectors, making X-ray systems more portable. The detectors can also be curved, enabling more compact systems.

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 m²
- 6,000 m² of shared facilities
- 6,000 m² of shared warehousing



HIGH TECH MANUFACTURING

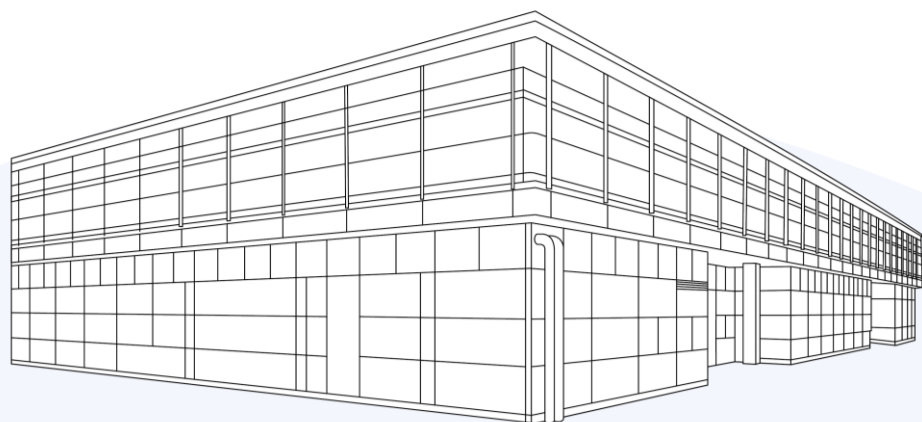
Brainport Industries Campus is the place to be for far-reaching partnerships between suppliers, specialist companies and innovative education and knowledge institutes. This is where the next generation of professionals in the hightech manufacturing industry is trained in a state-of-the-art working and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





Ecosystem

COMPANIES

17

MILLION TURNOVER

60

FTES

550

MLN TOTAL INVESTMENTS

110

State-of-the-art facilities

PhotonDelta

PhotonDelta is an independent growth accelerator for the integrated photonics industry.



COLLABORATION

PhotonDelta has established a collaborative ecosystem of organisations that is able to design, develop and manufacture the next generation chip technology. It was created as a public private partnership to accelerate the emerging Dutch integrated photonics industry and was granted € 240 million to execute the national plan for photonics.



SUPPORT ACTIVITIES

PhotonDelta actively supports the ecosystem through a wide range of activities, including funding, coaching, and connecting them to industry. This is providing an environment that stimulates the creation of companies, products and applications that contribute to a better world.



PITC

PhotonDelta, TNO, Eindhoven University of Technology and University of Twente signed a cooperation agreement in 2021 for the new Photonic Integration Technology Center (PITC) in the Netherlands. This centre will speed up the commercialization of Integrated Photonics for applications such as autonomous mobility, healthcare, data & communications.



PhotonDelta
Gateway to Integrated Photonics

Quality Research Institutes

TNO

TNO, the Netherlands Organisation for applied scientific research, connects people and knowledge to create innovations that boost the competitive strength of industry and the well-being of society in a sustainable way.



OBJECTIVES

Effective innovation in close cooperation with companies, governments and a whole range of organisations. Through collaboration TNO creates innovations that sustainably strengthen the competitiveness of companies and the wellbeing of society. Developing knowledge not for its own sake but for real applications.



IMPACT

TNO works on issues that concern the environment, safety and security, the energy transition, innovations in industry and how to keep the ageing population actively engaged.



NANO INSTRUMENTATION FOR ULTRA-CLEAN LITHOGRAPHY

Demanding environments, like semiconductor manufacturing, require ultra-clean and high performance processes, equipment and materials. And ultra-clean equipment with high demands on flow and thermal conditioning, plays a major role in a manufacturer's ability to achieve high yields. TNO explores the methods and materials that create value. We help to develop equipment that lasts longer and performs better. As chips become smaller, less expensive and more powerful, TNO designs the tools that can keep the pace.

Showcase

ASML



HEADQUARTERS

ASML headquarters are located in Europe's top tech hub, the Brainport Eindhoven region in the Netherlands. Global operations are spread across the world. ASML, with 13,000 highly-skilled employees in the Eindhoven region, is by far the largest Dutch investor in research and development, spending two billion euros on R&D in the Netherlands in 2019. ASML's turnover in 2019 was a record high of 11.8 billion euros.



INNOVATION LEADER

ASML is an innovation leader in the semiconductor industry. The company provides computer chip manufacturers with everything they need – hardware, software, and services – to mass produce patterns on silicon using lithography. An ASML lithography system contains tens of thousands of parts, and nearly all of them are manufactured by outsourced suppliers.



KNOWLEDGE NETWORK

ASML's knowledge network includes more than a hundred key suppliers, universities, and research institutes around the globe. A high concentration of these key suppliers can be found right next door in Brainport Eindhoven. The manner in which suppliers contribute to successful innovation illustrates how companies in Brainport Eindhoven operate.



*“Nowhere else in the world
do suppliers play such an important
role in the research and development
of such complex machines as
they do in Brainport Eindhoven”.*