A Joint Research Centre between

KTH Royal Institute of Technology and Chalmers University of Technology

Centre X - Advanced Manufacturing Solutions for Next Generation Powertrain

Introduction to the Centre

Director Andreas Archenti, professor

Collaborating today for the powertrains of tomorrow

Centre X was established through a shared vision between **academia and industry.**

Future powertrain manufacturing challenges require **long-term strategic collaboration.**

Isolated projects are insufficient to address the complexity of the transition.

DRIVING TRANSFORMATION IN

SUSTAINABLE PRODUCTION

Resource-efficient processes, circular economy and reduced emissions.

DIGITAL MANUFACTURING

Smart factories, automation, data-driven decisions and AI.

ADVANCED MATERIALS

High-performance materials and next-generation manufacturing.

ELECTRIFICATION

Electric machines, power electronics and integrated e-powertrain systems.

ENABLING CLOSE COLLABORATION BETWEEN

RESEARCHERS
Pioneering knowledge and innovation.

ENGINEERS
Turning ideas into impactful solutions.

INDUSTRY PARTNERS
Driving industrial relevance and global competitiveness.

CREATING A PLATFORM FOR INNOVATION, KNOWLEDGE EXCHANGE AND INDUSTRIAL IMPACT

CX Origin Story

A collaborative journey bringing together academia and industry to drive the powertrains of tomorrow.

Jan 2023

5 CENTRE INITIATION MEETING

Jan 2024

8 CENTRE INITIATION WORKSHOPS INCLUDING ISG

15 KTH-CHALMERS DISCUSSION MEETINGS

Jan 2025

CENTRE X OPENING EVENT

FIRST FORMAL CENTRE X STEERING GROUP & RESEARCH COUNCIL MEETING

CENTRE AGREEMENT SIGNED

CENTRE RESEARCH COUNCIL STARTS

PILOT PROJECTS KICK-OFF MEETING

Vision

"Together we advance world-class research and competence in next-generation powertrain manufacturing, driving innovation, sustainability and industrial impact."

Mission

- Together, we advance powertrain manufacturing through world-class research, industrial collaboration, and knowledge dissemination.
- By integrating advanced manufacturing technologies, fostering industry-academia partnerships, and accelerating MRLs, we develop competence and drive sustainable, high-quality production solutions.
- Through interdisciplinary research and innovation and a collaborative environment, we strengthen Sweden's position as a global leader in powertrain manufacturing.

Objectives

- Advancing Powertrain Manufacturing
- Develop next-gen manufacturing methods & tools for powertrains

- Advanced Manufacturing Innovation
- Advanced machine tools, machining and metrology to enhance efficiency

- Accelerating MRL
- Bridge research & industry by validating high MRL solutions

- Industry-Academia Partnership
- Foster joint projects & interdisciplinary research

- Building Knowledge & Competence
- Develop workforce skills, training & knowledge sharing

- Enhancing Industrial Resilience
- Strengthen Sweden's leadership in powertrain manufacturing

FOUNDING PARTIES

INDUSTRY FOUNDERS

SCANIA

VOLVO

CX
CENTRE X
Advanced Manufacturing Solutions for Next Generation Powertrain

ACADEMY FOUNDERS

KTH
VETENSKAP OCH KONST

AVANCEZ 1829
CHALMERS
UNIVERSITY OF TECHNOLOGY

INDUSTRY DRIVEN
Real-world impact

STRONG COLLABORATION
Uniting expertise

INNOVATING TOGETHER
Powering the future

Opening Ceremony - February 2025

Centre Focus

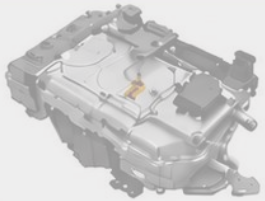
Electric motor

ICE engine

Gearbox

Axles

Power electronics



Battery packs

POWERTRAIN COMPONENTS

High-performance components engineered for reliability, efficiency and durability.

ROBUST AND FLEXIBLE MANUFACTURING

Advanced manufacturing capabilities enabling scalability, quality and adaptability.

KNOWLEDGE DISSEMINATION

Sharing expertise and innovation to drive continuous improvement and growth.

Focus Areas and Research Topics

SUSTAINABILITY
CIRCULARITY
PRODUCT PERFORMANCE

POWERTRAIN COMPONENTS

High-performance components engineered for reliability, efficiency and durability.

- New materials
- Lightweighting
- Surface engineering
- Remanufacturing

ROBUST AND FLEXIBLE MANUFACTURING

Advanced manufacturing capabilities enabling scalability, quality and adaptability.

- Data driven decision making (Digitalization)
- Integrated metrology
- Equipment reliability and performance

KNOWLEDGE DISSEMINATION

Sharing expertise and innovation to drive continuous improvement and growth.

- Project results dissemination
- On-site trainings and workshops
- PhD and student education

TEST BEDS (REALIBILITY, EFFICIENCY, NVH, DIGITALISATION etc.)

Personnel


CX
CENTRE X
Advanced Manufacturing Solutions for
Next Generation Powertrain
ECOLUBRIC

Research Activities

Project Types

COLLABORATIVE PROJECTS

Project carried out within CX with most or all partners involved on common research interests.

PUBLIC FUNDED PROJECTS

Research and innovation projects supported by public funding programs involving members of CX.

INDIVIDUAL PROJECTS

Research project carried out within CX with specific industry partner on confidential research needs.

THESIS PROJECTS

Graduate level student projects supported by CX.

Ongoing projects

Pilot projects
2025


Machining Systems


Gear-Grinding


Surface Characterization


Cast Iron Machining

Collaborative projects
2026


Machining Systems II


Gear Testing


Gear-Grinding II


Technical Cleanliness I


Optical Metrology


Technical Cleanliness II


Cast Iron Machining II

Individual projects

In Pipeline

Individual projects in development to address emerging needs and opportunities.

Note: Exact project titles and additional project details are confidential and are meant only for **CX Partners**.

Infrastructure – DMG MORI

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NMV5000+ DCG

Infrastructure – DMG MORI

NTX2000

CX Operational Calendar

Steering Group Meeting
Update on the year's activities and decision on collaborative projects for the following year.
Strategic planning for the following year.

Research Council Meeting
Final proposal ppt and selection of projects for the year to be forwarded to SGM

Steering Group Meeting
Updates on first half of the year

Research Council Meeting
Project proposal pitch for feedback

CX Day
Ppt of research work of the year including outcomes of the collaborative projects

Research Council Meeting
CP kick-off, Research trends

Steering Group Meeting
Intro and presentation of activities for the year

Research Council Meeting
Project idea 1 slide proposals

Steering Group Meeting (Online)
Brief update before the summer break

DEC JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV

CENTRE X
Advanced Manufacturing Solutions for Next Generation Powertrain

Coming events

User forum for machine tools

Spring meeting: 27 May @KTH

Opening of the new lab: 15 December @KTH

Coming events

Spring meeting: 27 May @KTH

Coming events

Organized by KTH and DMG MORI

User forum for machine tools

Spring meeting: 27 May @KTH

Swedish userforum of machine tools – Spring meeting 2026

When: 27 May 2026, kl 09:00-15:00
Where: KTH Royal Instute of Technology, XPRES room, Brinellvägen 68, Stockholm

Agenda

08:30 – 09:00	Registration and welcome *Coffee and fika*
09:00 – 09:15	Introduction *Short introduction to the day and hosts*
09:15 – 10:30	Ongoing research at KTH related to machine tools *Short reports on ongoing research related to precision manufacturing and machine tools*
10:30 – 10:45	**Break and mingle**
10:45 – 12:15	Advanced machining applications *Latest developments in high-precision manufacturing solutions. The session will focus on innovative technologies for gear production, integrated software systems, and advanced on-machine measurement for improved productivity and quality*
12:15 – 13:15	**Lunch och mingle**
13:15 – 14:30	Demonstrations *Machining of test artefacts, machine and surfaces measurements*
14:30 – 15:00	Concludning talk *Concludning remarks and future meetings*

Abstract
As part of ongoing collaboration activities in advanced manufacturing, we are pleased to welcome representatives from the DMG MORI design and development team to the Nordics. Mr. Kanto and Mr. Nishiki will participate in a workshop focused on next-generation manufacturing technologies and industrial applications. Their department leads the development of advanced solutions in gear manufacturing and precision measurement, including GearProduction+ by NMV5000, GearProduction+ Software, and wireless on-machine measurement systems. The workshop will provide an opportunity to exchange knowledge, discuss industrial needs, and explore future collaboration in smart, precise, and sustainable production systems.

Hosts of the day:

Thank You

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KTH VETENSKAP OCH KONST

SCANIA

VOLVO

CHALMERS UNIVERSITY OF TECHNOLOGY

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