

# CHS – Temadag

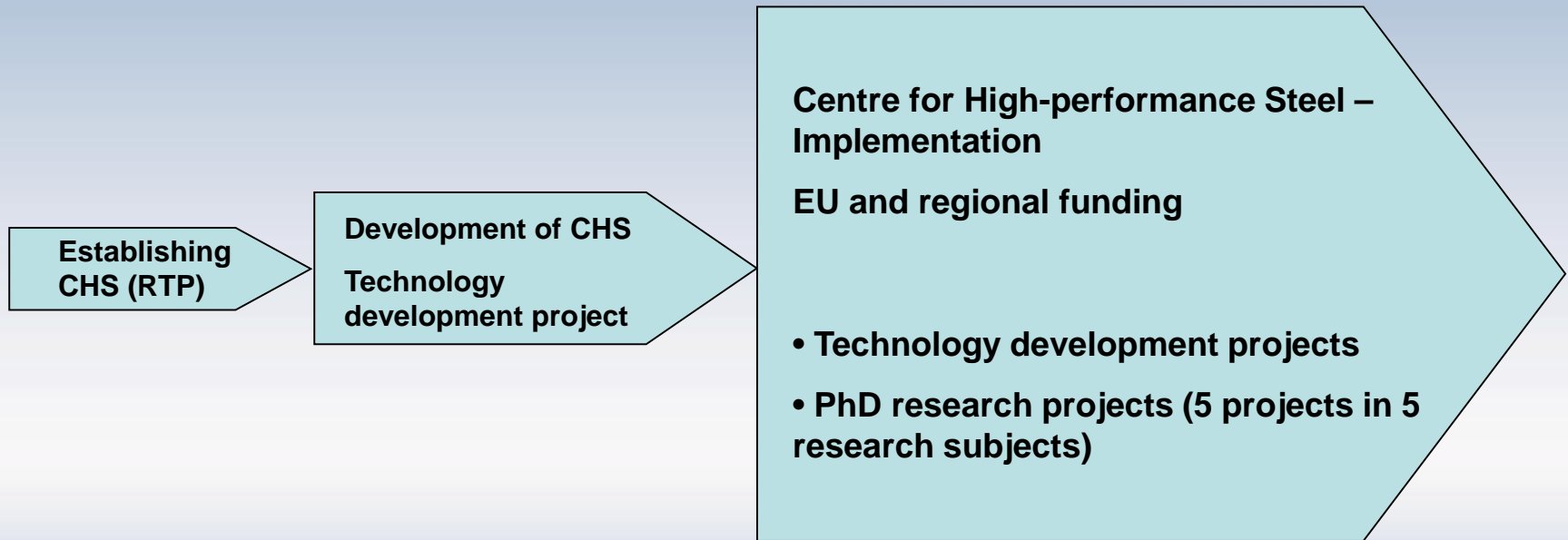
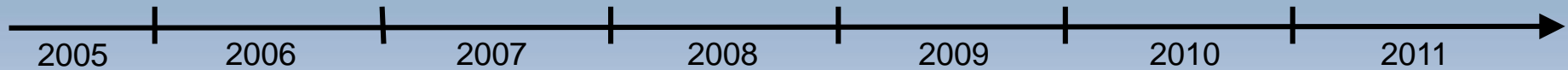


## Termomekaniska tillverkningsprocesser - ett paradigmskifte

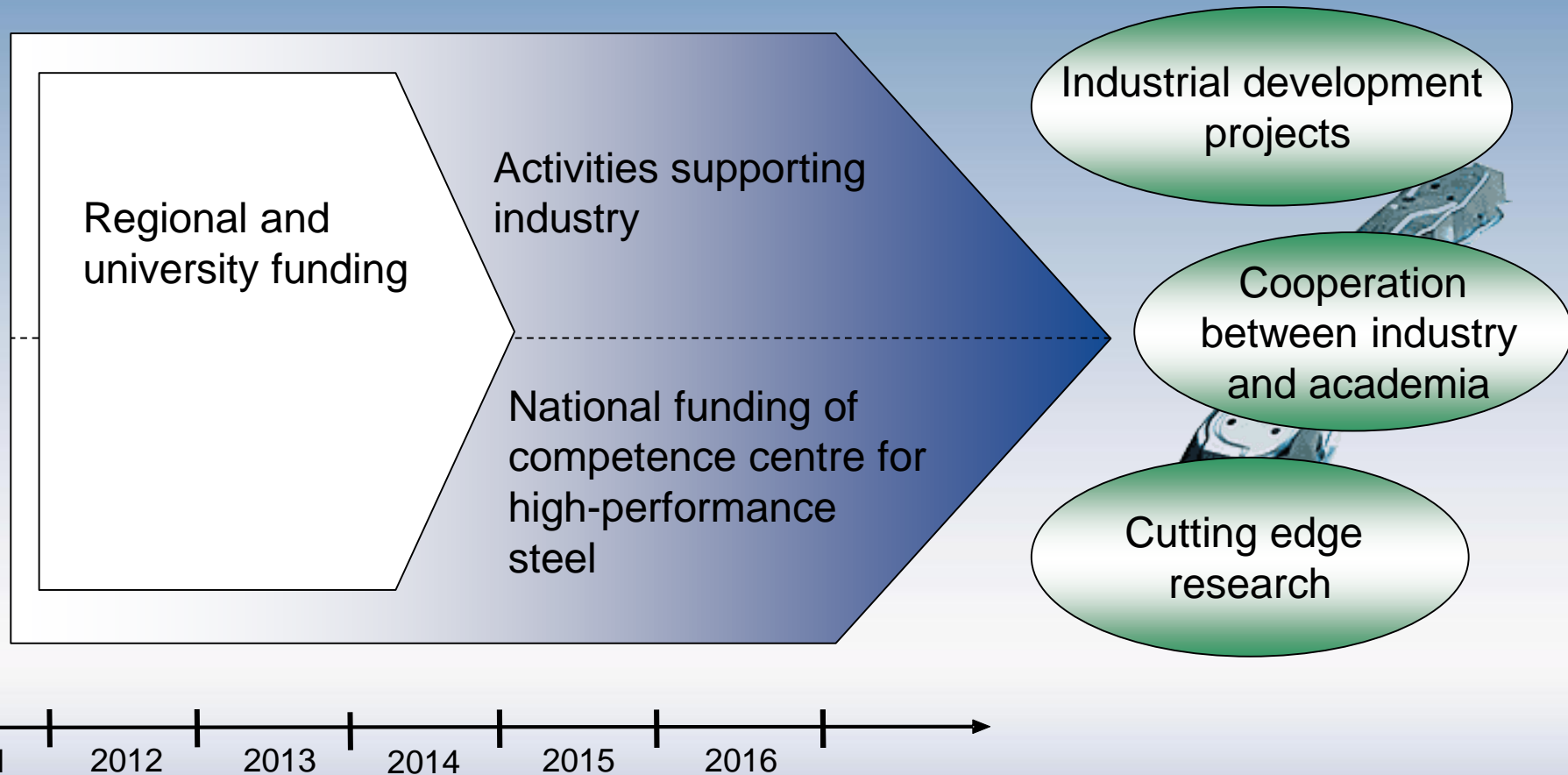
# Agenda

09.30-10.00	Registrering	
10.00-10.10	Introduktion: CHS historia och framtidsvision	Mats Oldenburg, LTU
10.10-10.30	Presshårdningssimulering och brottmodellering	Mats Oldenburg, LTU Rickard Östlund, Gestamp HardTech
10.30-10.50	Högtemperaturtribologi och nötning	Jens Hardell, LTU
10.50-11.10	Värmebehandling av metalliska material	Marta-Lena Antti, LTU Farnoosh Forouzan, LTU
11.10-11.30	Svetsning och materialmekanik	Andreas Lundbäck, LTU Qin Hao, NEVS
11.30-13.30	Lunch (ingår ej i seminariet) Studiebesök Volvo Cars	Richard Johansson, Volvo Torbjörn Appelros, Volvo
13.30-15.00	Industriella forsknings- och utvecklingsbehov Industriell implementering av forskningsresultat	Gruppdiskussioner och företagspresentationer
15.00-15.15	Paus	
15.15-16.30	Framtida samverkan mellan CHS och svensk industri Summering av temadagen	Gruppdiskussion

# CHS development stages



# CHS development



# CHS mission statement

**Centre for High Performance Steel conducts technology development and research, in the field of high-performance steel, to increase industrial competitiveness and competences with the aim of creating growth.**

**Projects are carried out in collaboration between universities, industry and research institutes.**

# Industrial development projects and collaboration partners

CHS have had industrial development projects in cooperation with a number of companies and organizations.

Results from industrial projects have resulted in patent applications, technical improvements to existing products, and basic results that can be used to develop products and processes.

**CHS**

Centre for High Performance Steel

**Credibility**

**Paradigm shift**

**Vision - Story**

**CHSi**

Centre for Hot Forming Sciences and Innovation

**Material  
development**

**Process  
development**

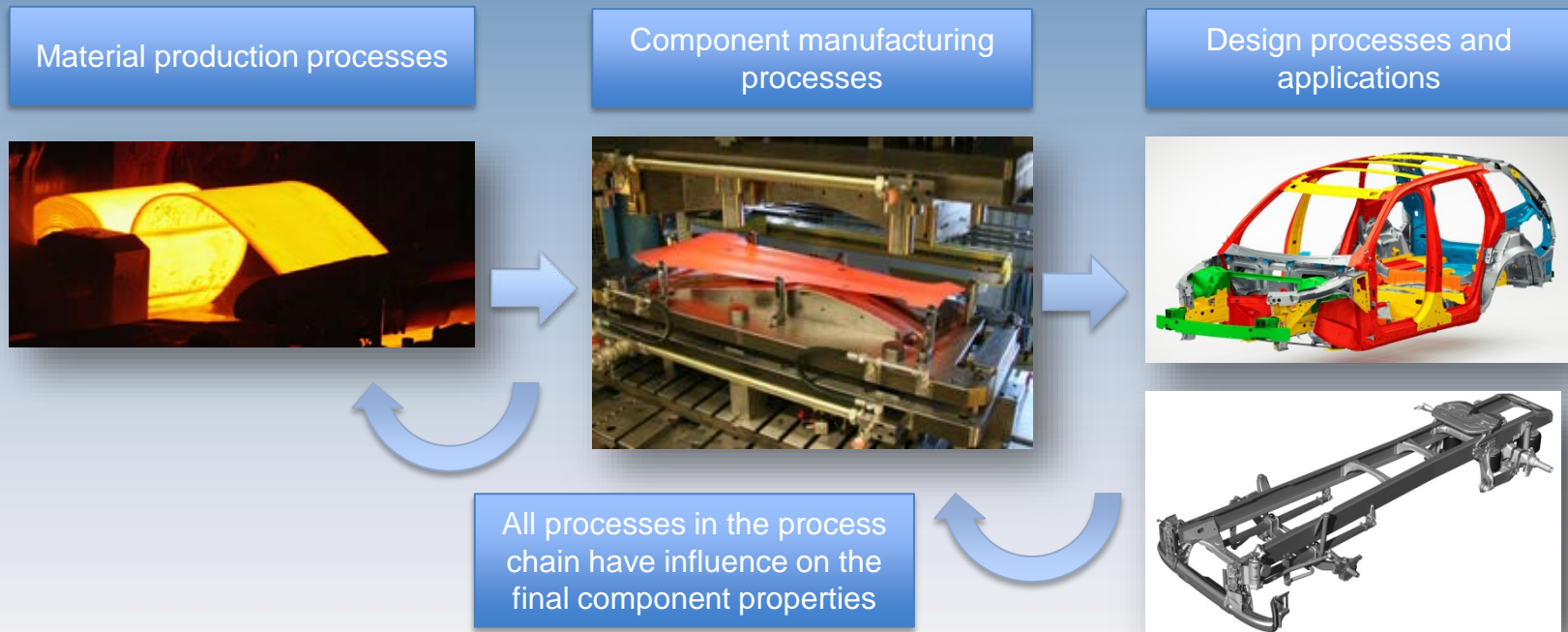
**Application  
development**

**Development of innovative and optimised  
automotive and aerospace structures**

**Development of optimised manufacturing chains**

**Development of optimised forming processes and  
tooling solutions**

# A systematic approach for adapting material and hot forming process development to end user demands



**Aim:** To increase strength, ductility and fatigue properties in hot formed components

**By:** Optimisation of component properties by accounting for all steps in the process

**Scope:**

- Relate material and hot forming processes to end user demands such as strength, deformation, failure and fatigue properties
- Simulation methods and process modelling which integrate material, process and product properties
- Material selection or development of new materials
- Press hardening and warm forming for tailored material properties and complex geometries



# CHS

Centre for High Performance Steel

## Credibility

## Paradigm shift

## Vision - Story

# CHSi

Centre for Hot Forming Sciences and Innovation

- Steel material
- Focus on hot sheet forming

- Hot forming sciences
- Thermal manufacturing processes
- Hot forming, welding, additive manufacturing, forging, ...
- Metallic materials in general

**CHS**

Centre for High Performance Steel

**Credibility**

**Paradigm shift**

**Vision - Story**

**CHSi**

Centre for Hot Forming Sciences and Innovation

Research  
subject

Solid  
Mechanics

Material  
Mechanics

Machine  
Elements

Engineering  
Materials

Research  
resources  
concerning  
hot forming  
sciences

Simulation  
methods  
Thermal  
mechanical  
forming  
Mechanical  
testing

Simulation  
methods  
Additive  
manufacturing  
Welding

Tribology  
Friction testing  
Wear testing

Material  
development  
Thermal  
treatment  
Material  
laboratory

Project proposals

Research objectives

LTU research collaboration

1.

**Hot forming of Aluminum**  
**Tooling interface optimization**

Tribological mapping  
Surface engineering  
Wear and adhesion simulations

Solid Mechanics

Machine Elements

2.

**Extreme steels**  
**Implementation of new steels for press hardening**

Material heat treatment  
Thermo-mechanical simulation models and tests

Solid Mechanics

Engineering Materials

3.

**Welding in high-performance materials**  
**Optimized final properties**

Development of welding heat treatment  
Welding Simulations

Material mechanics

Engineering materials

4.

**Additive manufacturing**  
**Final product properties**

Mechanical testing  
Simulations of additive manufacturing  
Component optimization

Material mechanics

Solid mechanics

Engineering materials

# Group discussions

## Activity

- Divide group in half (Group A + Group B)
- Four discussion areas
- 20 Minutes discussion per proposal

## Purpose with exercise

- Get industry input on research areas
- Form consortiums around research proposals

## Group A

1. Hot forming of Aluminum  
Tooling interface optimization

2. Extreme steels  
Implementations of new steels for press hardening

3. Welding in high-performance materials  
Optimized final properties

4. Additive manufacturing  
Final product properties

## Group B

3. Welding in high-performance materials  
Optimized final properties

4. Additive manufacturing  
Final product properties

1. Hot forming of Aluminum  
Tooling interface optimization

2. Extreme steels  
Implementations of new steels for press hardening

# Summary project proposal discussions

- Interested companies
  - Company contact
  - Specific interest and project role
- Contact at LTU
  - Mats Oldenburg, [mats.oldenburg@ltu.se](mailto:mats.oldenburg@ltu.se), 0920 491752
  - Hans Åhlin, [hans.ahlin@ltu.se](mailto:hans.ahlin@ltu.se), 0920 491390
- Further action
  - Form consortium
  - Write detailed proposal
  - Find suitable call

# Funding of Projects

- Funding for project will be applied a suitable calls
- Calls from eg. VINNOVA, FFI, SIO Metallic materials, Production 2020...
- Each call has its own regulations about research objectives and funding possibilities
- Consortium of industry companies together with academia

# Future cooperation between CHS and Swedish industry

- Perform multidisciplinary research projects
- Industry representation in CHS board
- Participation to influence the research
- Future focus on competence center