

Engineering Education at the University of Luxembourg

Hand in hand with national industry

Agenda

Structure of Engineering Education in Luxembourg

Bachelor, Master, PhD

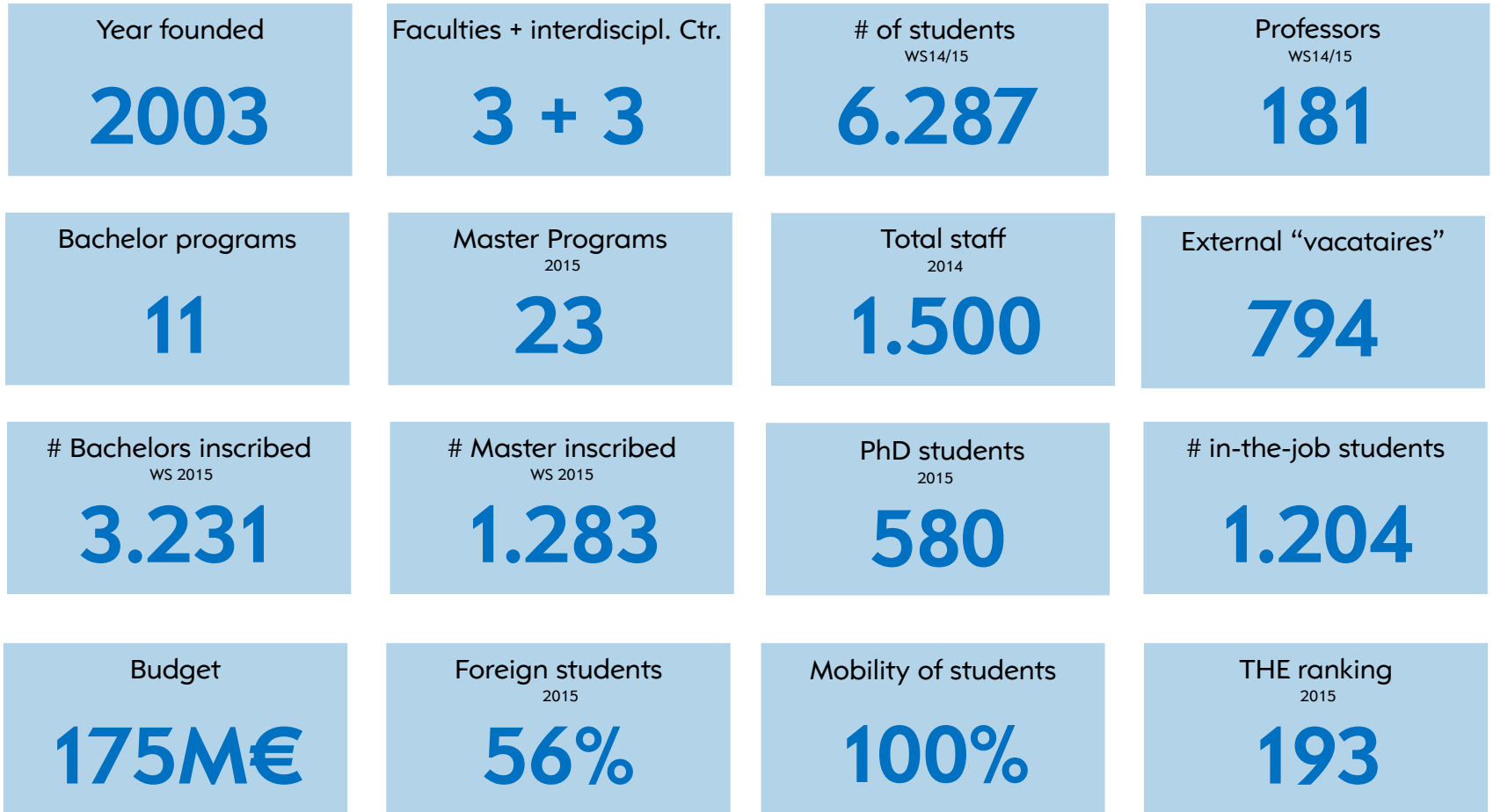
Example of involvement of industrial partners in Master education

Executives as teachers & Program Accompanying Committee

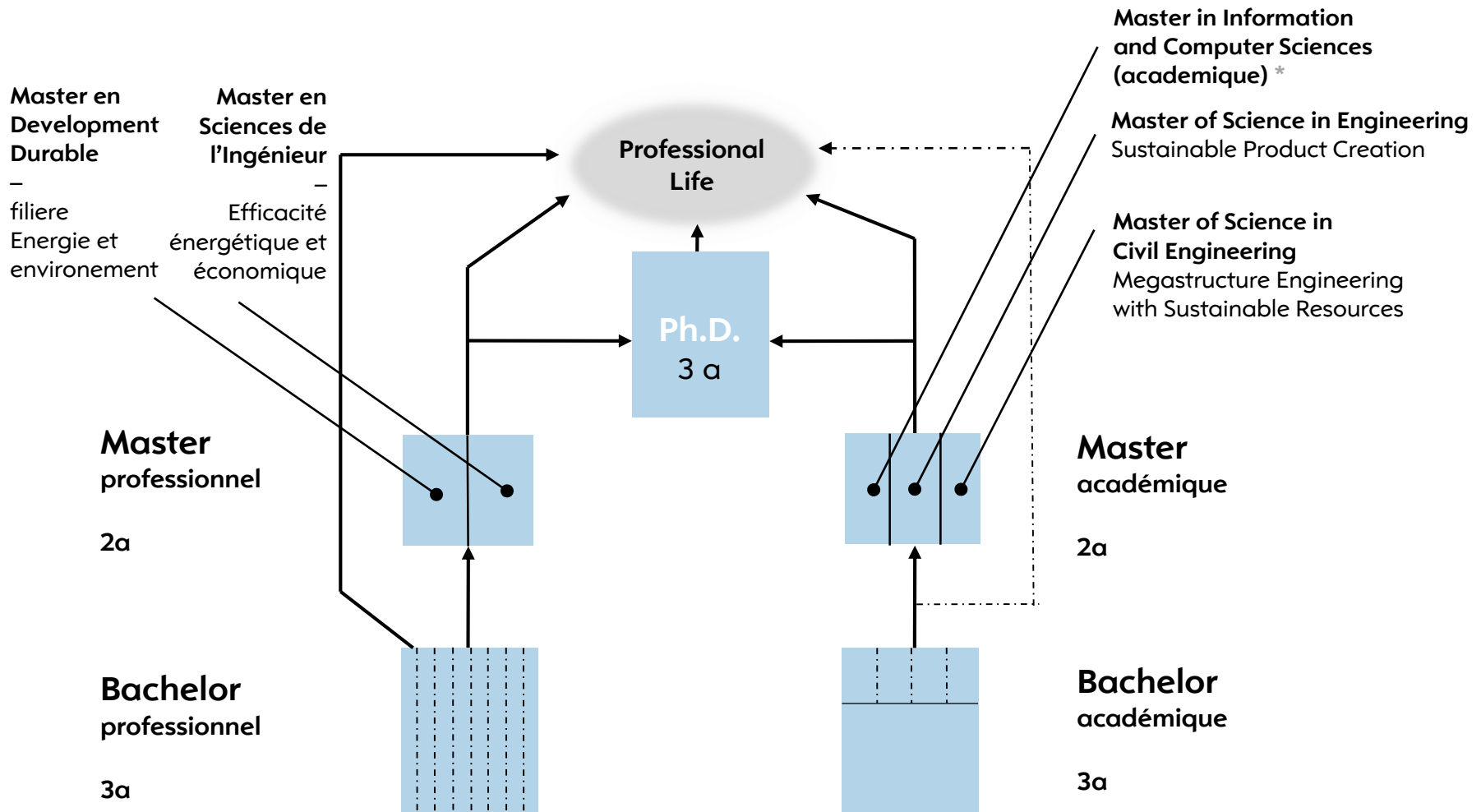
Cooperation with industry on PhD level

Research aligned with industry needs

The University scorecard



Structure of Engineering Education in Luxembourg



* Courses offered by FSTC- CSC



Classes related to Production Technologies

■ Bachelor

Fertigungstechnik

Prof. Dr. P. Plapper

Werkzeugmaschinen I

Prof. Dr. K. Hofmann-von Kap Herr

Werkzeugmaschinen II

Prof. Dr. P. Plapper

Robotik

Prof. Dr. W. Gerke

■ Master

Production Technologies

Prof. Dr. P. Plapper

Assembly Technologies

Dr. H. Thommes, **industry**

Assembly Machines

Dr. Th. Tentrup, **industry**

Operational Excellence Laboratory

Prof. Dr. P. Plapper

Total Preventive Maintenance

J. Papin, **industry**

Robotic

Prof. P. Plapper, Müller, Brüs

Example of teaching NC technology in the Bachelor professionnel

Three step approach

1. Class

Understanding and comprehension of NC Syntax

2. Simulator

Programming of different parts using a NC Simulator

3. Practical Exercise

Milling of „own“ parts on DMG 50

Übung

Lernziel

- Kennenlernen der Bedienelemente der Heidenhain Steuerung
- Schrittweises Verstehen der IIC Programmierung anhand von Beispielprogrammen
- Selbst
- Fräse

HEIDENHAIN Klartext-Dialog Befehle

Bahnfunktion Gradenbewegung L

Verfahren von Werkzeug gegenüber dem Werkstück
Anzugeben sind Koordinaten, Absolut oder Inkremental (=relativ zur Werkzeugposition)

- **Beispiel:**

```
0 BEGIN PGM 1 MM  
1 BLK FORM 0.1 Z X+0 Y+0 Z-40 Rotiert Min Koordinaten  
2 BLK FORM 0.2 X-100 Y+100 Z+0 Rotiert Max Koordinaten  
....  
.....  
.....  
100 L X+20 Y+30  
....  
.....  
200 L IX+20 IY+  
....  
500 END PGM 1
```

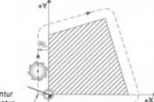
HEIDENHAIN Klartext-Dialog Befehle

Radiuskorrektur

Der Korrekturwert ist wirksam, sobald Sie ein Werkzeug in der Bearbeitungsebene mit R- oder RR verfahren.

Hilfspunkt : L X... Y... R0
Startpunkt : L X... Y... R0 / RR
Hilfspunkt : L X... Y... R0

Orientierung:
RL: Verfähre Sie Nüz, links von der Kontur
RR: Verfähre Rechts von der Bauteil-Kontur



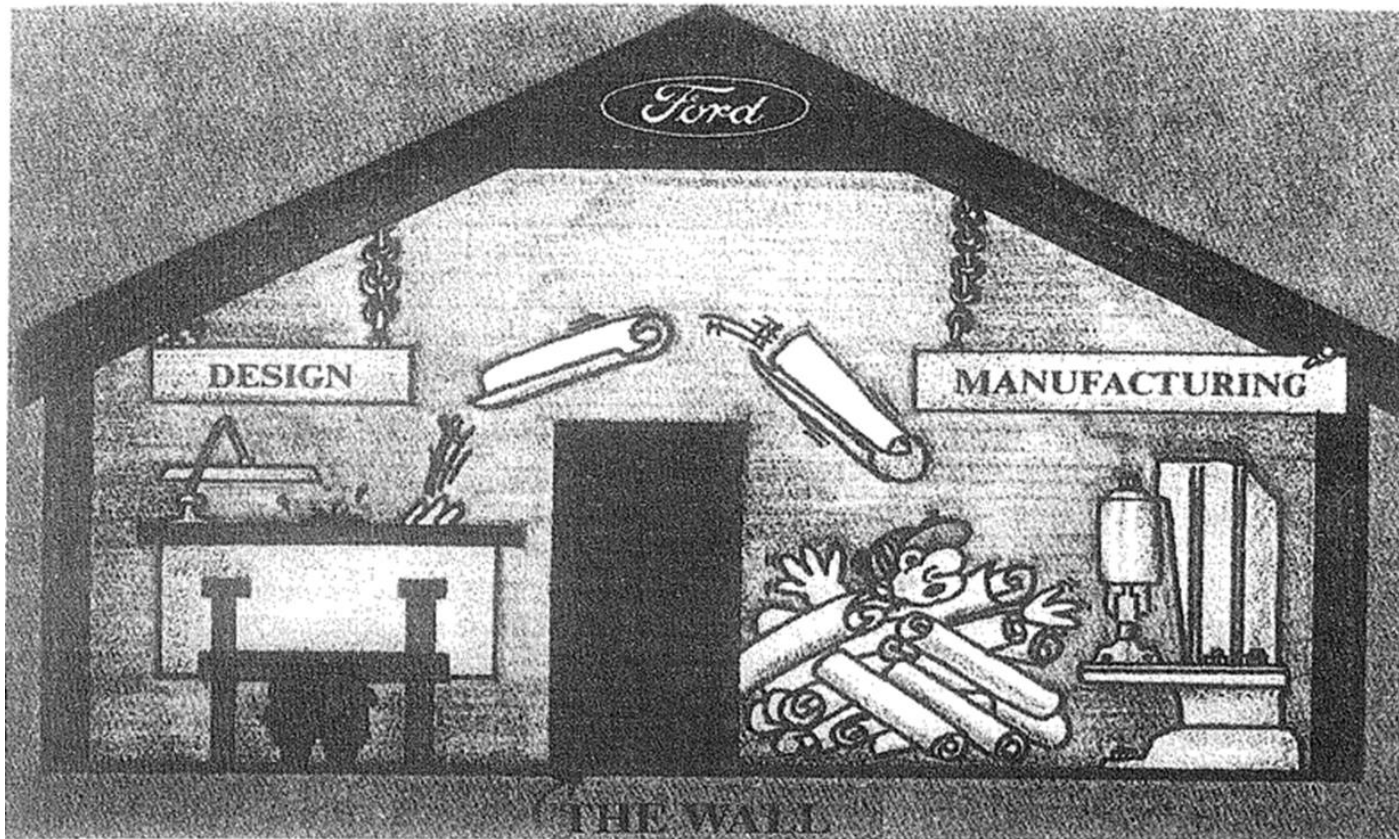
Radius ist der Maschine aus Werkzeugradius (Tool Call) bekannt
Bei Außen- oder Innenkreisen berechnet die TNC den Übergangskreis bzw. Schnittpunkt automatisch.

P. Plapper



Industrial experience ...

... shows a wall separating product design and manufacturing engineering



Master of Science in Engineering - Sustainable Product Creation

Started WS 2014

Teaching language: English

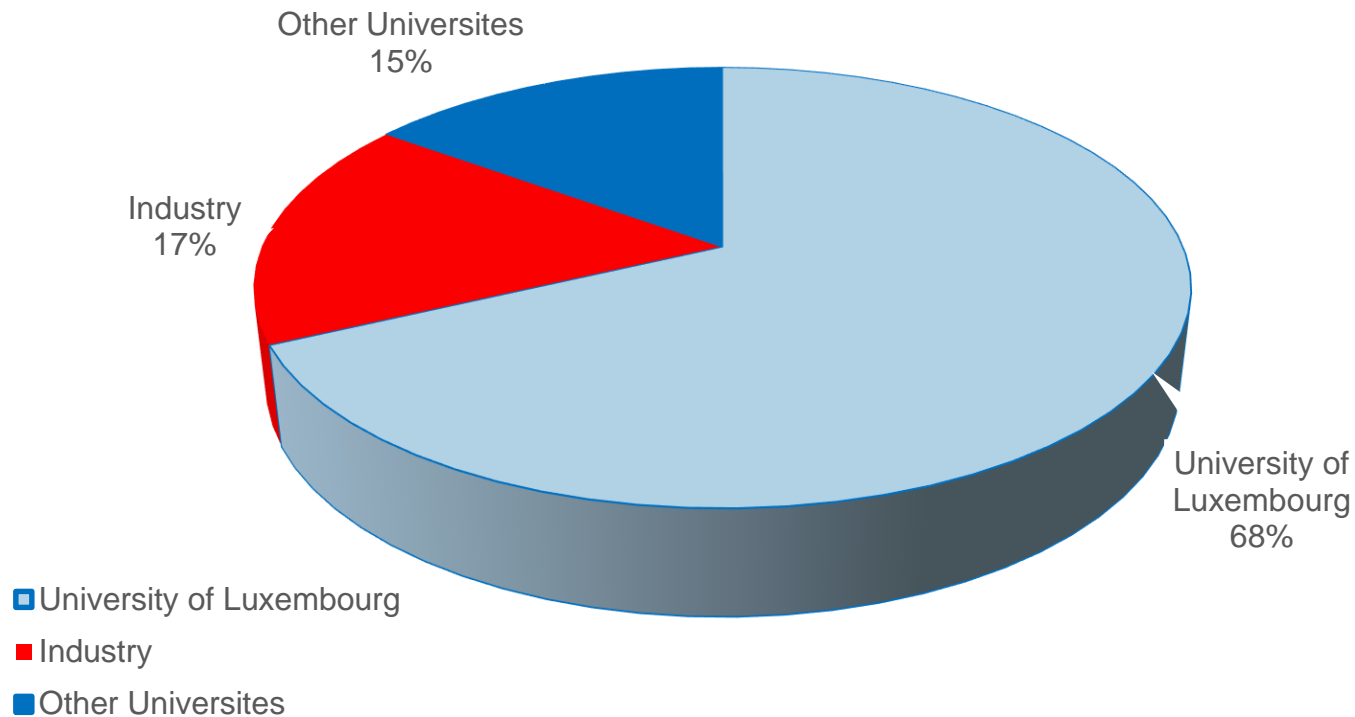


- Complete product creation chain
- Sustainability
- Interdisciplinary (Mechanical, Electrical, Mechatronic)

Pictures: internet

Master of Science in Engineering - Sustainable Product Creation

Distribution of ECTS taught



- **Get contact to future engineers**
- **National companies send “future COO/CTO” to teach at the University**

Master of Science in Engineering - Sustainable Product Creation

Nomination of Program Accompanying Committee (PAC)

Programme(s) :	Master of Science in Engineering – Sustainable Product Creation
Durée du mandat :	4 ans à partir de la date de signature

Comité de pilotage (ROI art. II.5.402)

Membres de la Faculté		
Plapper, Peter	Prof. Dr.-Ing.	Chair, Course director
Kedziora, Slawomir	Ass. Prof. Dr.-Ing.	Co-Chair, deputy course director
Maas, Stefan	Prof. Dr.-Ing.	Full faculty member
Gericke, Kilian	Dr.-Ing.	Teacher in program

Employeurs, experts et consultants		
Lanners, Jacques	Ceratizit	Industrial representative, owner
Delé, Francois	Goodyear	Industrial representative, mfg.
Wintgens, Willi	Euro Composites	Industrial representative, R&D
Lessmann, Hansjürgen	Paul Wurth	Industrial representative, HRM

Enseignants vacataires		
Papin, John	Nexans	Vacataire, industrielle
Tatjana König	htw Saarbrücken	Vacataire, academique

Alumni		
Quentin Ghysens	Universty of Luxembourg (tbc)	(future) Alumni

Etudiants		
Paula Hernandez	Etudiant	student



Luxembourg, le 13-Avril 2016



Example of teaching Operational Excellence

Exercise to understand „complete assembly plant“



External trainings

Lifelong learning supporting “in-the-job-students”

- In-house training offered at the site of the industrial partners
- Luxinnovation – Automotive Campus Initiative
- Training hub for Luxembourg Automotive Cluster

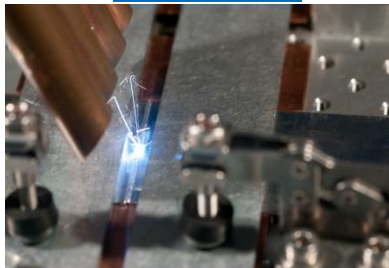
Manufacturing Engineering Research Strategic direction of PhD education

Support national industry
to increase manufacturing competitiveness

Laser assembly

Robotic assembly

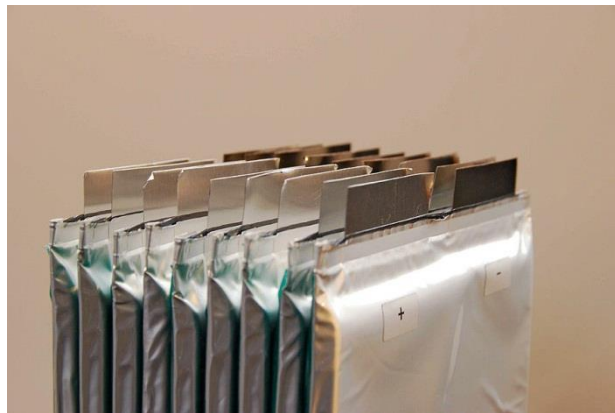
Operational Excellence



Laser Research

Laser joining of non ferrous metals

- Cu-Al
- Brittle
- Low conductivity
- Corrosion (ageing)



- Electro-mobility
- Heat exchangers
- Solar energy generation



Picture: ams,

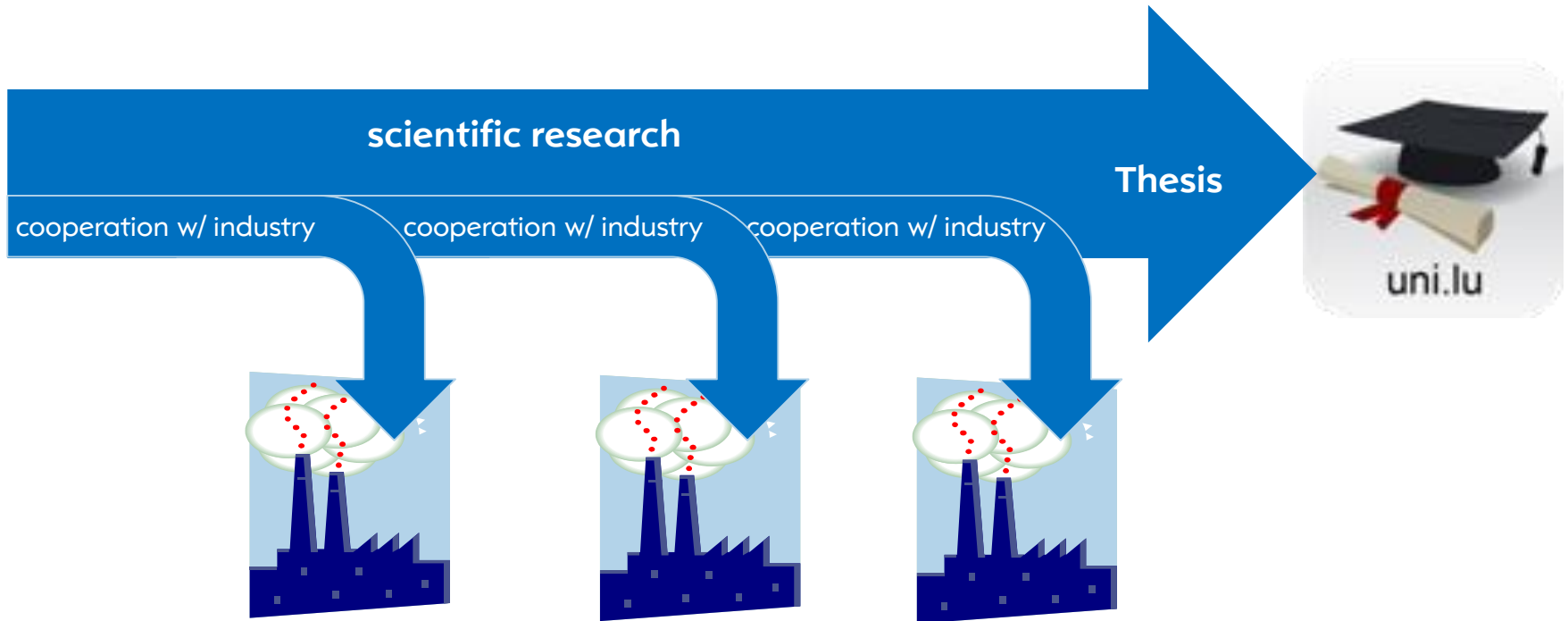
Project partners & supporters of manufacturing research



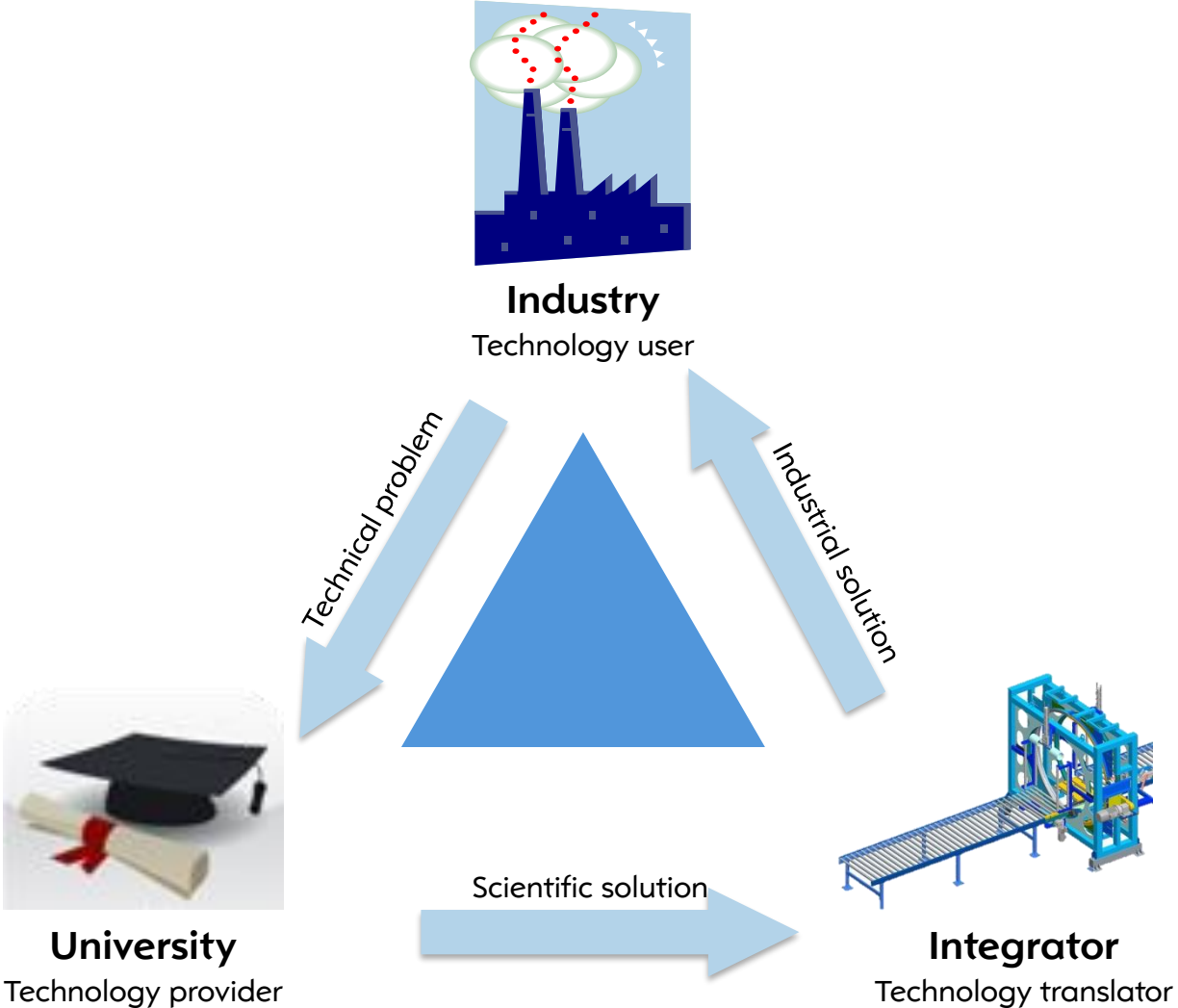
Mission statement of PhD education / Research

“Support industry to improve manufacturing competitiveness”

- All research / PhD projects are in cooperation with industrial partners



Link from research to manufacturing industry



Summary

- **Engineering education at the University of Luxembourg**

- **Bachelor**

Three level approach toward hands-on application

- **Master with industrial leaders as teachers**

Future COO / CTO as teachers

Program Accompanying Committee

- **PhD with target of industrial application**

Prepare the PhDs for a career in academia and industry.

- **Mission: Support national industry to improve their competitiveness**

