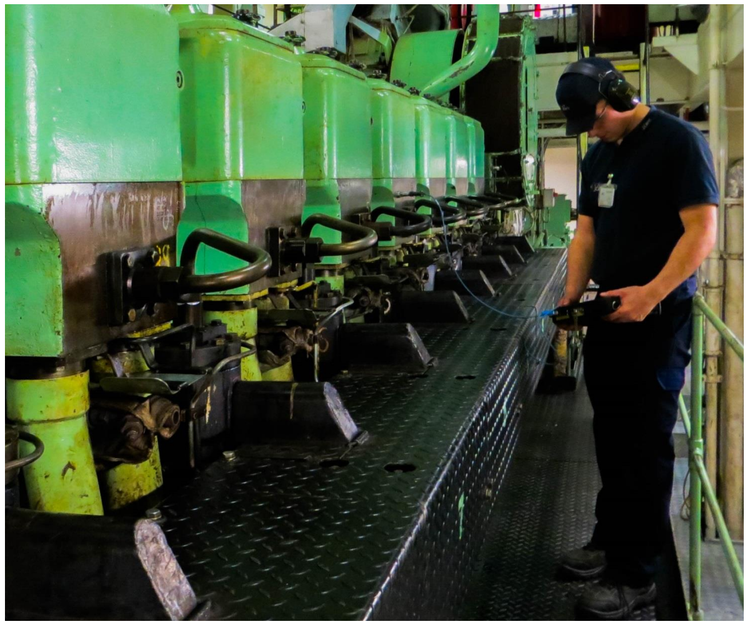
Development of predictive maintenance tools for reciprocating engines

Project description:

The purpose is to experiment a combination of different measurement technics to detect engine operating faults. Thanks to this knowledge, the performance of reciprocating engines as well as their health monitoring are assured. It allows to make an engine diagnostic and also to establish its complete health status.



Vibration monitoring of Marine Diesel Engine

Technics of measurement:

- vibration analysis,
- cylinder pressure analysis,
- oil analysis,
- exhaust gas analysis,
- ultrasounds analysis,
- infrared thermography.

The combination of these tools enables to identify defective components and mechanical condition.

This expertise can improve performance, reduce maintenance costs and avoid unexpected failures. It leads to reliable and efficient maintenance operations. It can also reduce fuel consumption and emission.

We are looking for partnerships to improve expertise in the described technics.

CERISIC

Centre of Studies and Researches associated to the Technical Department of the HELHa

Chaussée de Binche, 159
7000 Mons
www.cerisic.be

Research areas

Mechanical & Thermal Engineering
Electronics & Electrical Engineering
Chemical & Biotechnological Engineering

Existing partnerships

I-care

Contact Details

Ing. Jan Callemeyn
Mechanical & Thermal manager of CERISIC
+32.477.25.00.38
jan.callemeyn@cerisic.be

Ing. Medhi Diakourakis
Project Engineer
medhi.diakourakis@cerisic.be

FRED – Additive Manufacturing & Eco-Design

FRED
Fabrication Rapide & Éco-Design

A consortium of 11 partners to demonstrate to SMEs that eco-design and additive manufacturing technologies are:

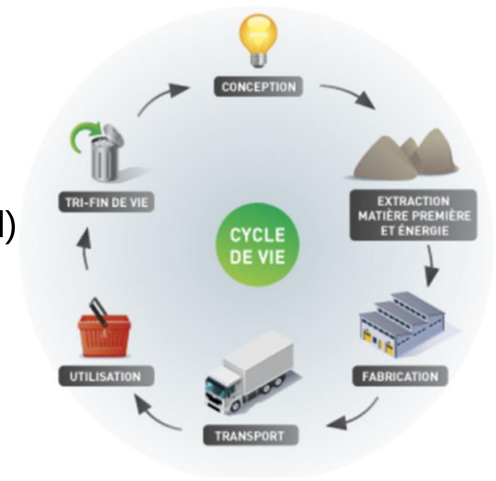
- ✓ new sources of development and **innovation**,
- ✓ mobilizing tools to address **environmental challenges**,
- ✓ opportunities to significantly **reduce production costs**, bringing a **competitive advantage** in marketing.

FRED's main objectives :

- ✓ develop university and continuing **training modules** on additive manufacturing and eco-design
- ✓ develop **new tools and methods** specifically adapted for SMEs in the mechanical industry
- ✓ **support** companies interested in the implantation of an eco-design approach

Future Developments and Research Partnerships :

- ✓ Continue raising awareness and supporting enterprises :
  - **enlarge** the eligible area (the whole Wallonia, Germany, ...)
  - applying the approach to **any type of business** (not only mechanical)
  - …
- ✓ New thematic:
  - the micro-electricity
  - the production peaks smoothing
  - the energy's micro-storage
  - …



Interreg IV-A Großregion - Grande Région
Wallonie
UNION EUROPÉENNE

Haute Ecole
Namur-Liège-Luxembourg
HENALLUX
Research Center FoRS
(BELGIUM – 6760 Virton)

Research areas :
Applied research in Energy, Robotics, Electromechanics, Automation, Life-Cycle Assessment, Integrated manufacturing, IT, …

Existing partnerships :
Enterprises, Universities, R&D centers, Business Interfaces…
6 long term projects since 2012
10 short term projects planned for 2015

héna llux HAUTE ÉCOLE DE NAMUR-LIÈGE-LUXEMBOURG
FORS

Contact Details

Lecointre Julien
Département Ingénieur Industriel
+32 63 58 89 40
julien.lecointre@henallux.be
www.fors-ing-henallux.be

Mobilizing Universities of Applied Sciences for Horizon 2020

Brussels, 4 February 2015

Bavarian Research Alliance

Product development
textiles – wood – 3D prototyping
clothing manufacturing

Nutrition
food technology - brewery
analysis - safety - dietetics

Plant
greenery management
breeding - horticulture

Animal
breeding – nourishment – care

HoGent
SCIENCE AND TECHNOLOGY

Material testing
textiles - wood

Real Estate & Land Surveying

Biochemistry & Environment

Statistical Analysis

University College Ghent

Research areas:

- **Agro- and biotechnology**
- **Fashion, textile and wood technology**
- **SME policy and organization**
- **Community building and (cultural) diversity**
- **Quality of life and people in vulnerable situations**
- **Well-being and health promotion**
- **Design and organization of interior and exterior space**
- **Artistic research**

HoGent

Contact Details

University College Ghent
Office of Research Affairs

research@hogent.be
http://english.hogent.be/research

Bio-inspired Innovation - Biomimetics

Biomimetics - an interdisciplinary approach, that combines biology and technology.

The goal of Biomimetics is to solve technical problems by using the knowledge of biological systems. Through understanding of the basic prinicples of natural systems, their abstraction, transfer and application in technology, Biomimetics may lead to optimization of products and to innovation. Furthermore, biological principles can be used to face organizational challenges, like higher complexity.

„Learning from Nature“ sounds easy and attractive, the process is complex, though. In order to make Biomimetics a well established method in product engineering, we work in different research topics and projects for an efficient knowledge transfer, for a suitable methodolgy of application and for a responsible innovation managment.

We would like to collaborate within projects along the value chain to foster innovation – inspired by Nature.

Universities	Industry	Society/Nature
R&D	Innovation in SME	Innovative and reflective societies
Transdiciplinary education	Sustainable and responsible innovation	Protection of Biodiversity
New approaches in education		

Deggendorf Institute of Technology
Technische Hochschule Deggendorf
Technologie Campus Freyung

Deggendorf/Freyung, Germany

Research areas:

- **Biomimetics**
- **Methodology of Biomimetics and Bio-inspired design**
- **Functional surfaces of polymers**

Partnerships:

TU Munich, Upper Austria University of Applied Sciences, Campus02
University of Applied Sciences Graz

DEGGENDORF INSTITUTE OF TECHNOLOGY DIT

Contact Details

Kristina Wanieck
Research group: Biomimetics & Innovation

Phone: +49 8551 91764 -51
Email: kristina.wanieck@th-deg.de

www.tc-freyung.th-deg.de

icma

Instituto de Ciencia de Materiales de Aragón

SCIENTIFIC EXCELLENCE

TEACHING
TRAINING
DISSEMINATION

OBJECTIVES

TECHNOLOGICAL DEVELOPMENT
TECHNOLOGY TRANSFER
INTERNATIONALISATION

RESEARCH LINES

1 FUNCTIONAL ORGANIC MATERIALS

- Molecular and polymeric materials
- Materials based on liquid crystals
- Organic solar cells
- Bio-inspired materials
- Molecular electronics

MICROSTRUCTURES A LA CARTE

2 MATERIALS FOR ENERGY & LASER PROCESSING

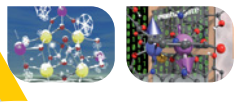
- Structural and functional ceramics
- Laser chemistry of surfaces, coatings and nanostructures
- Superconductors and thermoelectric materials
- Compounds, nanocomposites and nano-fibers for energy applications

POLARITONIC MATERIALS

3 MAGNETIC MATERIALS

- Structural and electronic properties of strongly correlated transition metal oxides
- Physics of materials at low temperatures
- Nanostructured magnetic materials
- Thermal and magnetic properties of multifuncional molecular material
- Physical properties of graphene

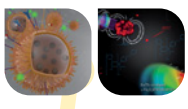
MATERIALS FOR QUANTUM COMPUTATION AND MAGNETIC REFRIGERATION



4 MATERIALS FOR BIOLOGICAL APPLICATIONS

- Nanoparticles for biological applications
- Image and vision
- Macromolecules for biological applications

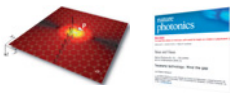
NANOPARTICLES FOR BIOLOGICAL APPLICATIONS AND MOLECULAR THERMOMETRY



5 THEORY AND SIMULATION IN MATERIAL SCIENCE

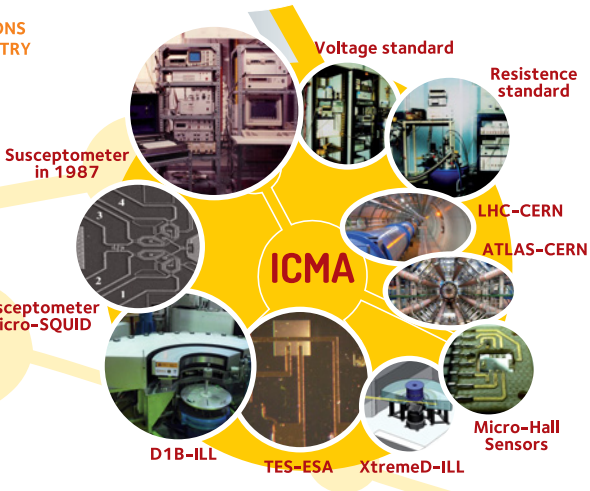
- Nano-photonics
- Complex systems and nonlinearity
- Quantum computing circuits

PLASMONICS OF GRAPHENE

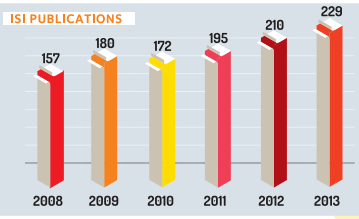


HIGH INVOLVEMENT IN LARGE SCALE FACILITIES

ADVANCED SCIENTIFIC INSTRUMENTATION



SCIENTIFIC RESULTS



LEADERSHIP

- Magnetism and calorimetry at very low temperatures
- Physics and chemistry of molecular and polymeric materials
- Nanophotonics and graphene plasmonics
- Ceramic materials
- LASER technology
- Advanced scientific instrumentation

www icma.unizar-csic.es

CSIC
Consejo Superior de Investigaciones Científicas

Universidad Zaragoza
1542

Development of Preform Forming Process

Background: The majority of polymer manufacturing SMEs use primarily injection moulding to produce their products and secondarily thermoforming process to produce packaging of the products. The average waste generated during thermoforming at local SMEs is between 25 and 75% of the thermoforming films. Since their main business is in injection moulding, most of the SMEs are not capable or do not give enough effort to recycle/reuse such material waste, although the materials are recyclable and this waste generation causes them financial burdens.

Proposal: This project proposes to develop a new thermoforming process using injection moulded preforms instead of extruded flat film. Ideally, the preforms should have the same size as the packaging or any products to be thermoformed so that no waste will be generated. The clamping area of preform, which is not formed and cut out during thermoforming, will remain with the final products and features such as company logo, thread, snap-fitting can be added on the clamping area. Compared to conventional thermoforming, the thickness distribution of the final products should be much more controllable by using partially different thickness and thus pattern heating of the preform.

Potential partner(s): one SME and/or one large enterprise

Looking for:

- University in the field of material science, heat transfer and thermoforming simulation
- Industry in partial/pattern heating, thermoforming, plastic manufacturer with thermoforming department

Fabrication of Micro Components with Undercuts

Potential applications: microfluidic devices, micro pumps

Looking for:

- University in the field of material science, micro system technology (MST) / micro electro mechanical systems (MEMS)
- Industry in micro manufacturing, micro system technology (MST) / micro electro mechanical systems (MEMS)

University of Malta

Msida, MALTA

Research Areas:

Polymer & Composite Manufacturing

Micro (Injection) Moulding

Additive Manufacturing

Rapid Tooling

UNIVERSITY OF MALTA
L-Università ta' Malta

Contact Details

Dr Arif Rochman

Dipl. Ing. (FH) (HM Munich), M.Sc. (HTW Aalen), Ph.D. (QUB Belfast)

Department of Industrial & Manufacturing Eng.

University of Malta, Msida, MSD2080, MALTA

Phone: (+356)2340 2394

Fax: (+356)2134 3577

E-Mail: arif.rochman@um.edu.mt

Web: http://staff.um.edu.mt/arif.rochman

Centre of Expertise High Tech Systems & Materials

The CoE HTSM aims to be Brainport Eindhoven Region's centre for applied research and training at the intersection of high-tech industry and knowledge institutions. It will contribute substantially to both improve the quality, and increase the quantity of outflow of university schooled technicians. Furthermore, the CoE HTSM aims to tackle the key innovation issues for SMEs (suppliers and OEMs) through applied research.

Interested in cooperative research projects in the following areas:

Additive Manufacturing (3D Printing)

The centre focuses on research and education in the field of production technology. In the new ObjeXlab – equipped with a variety of (metal) 3D printers – there are plenty of possibilities to research what new production technology, such as additive manufacturing, could mean for your organization.

Adaptive Robotics

In the Mechatronic & Adaptive Robotics Centre students, lecturers and professors work together to improve the knowledge base, as well as to disseminate the existing knowledge from research and education to SMEs on the major research theme of Human Aware Robust Robotics Interacting Effectively.

Agriculture and Food

Get more out of your agro business by technical automation. The GreenTechLab team consists of engineers with a background in mechatronics, mechanical engineering, process engineering and industrial product design. The multidisciplinary team focuses on important questions in the field of agro mechatronics, e.g. how can adopting sensors and intelligent handling help companies earn more profit?

Fontys University of Applied Sciences

Brainport Eindhoven Region
The Netherlands

Main research areas include:

- **Additive Manufacturing**
- **Adaptive Robotics**
- **Agriculture and Food**

Existing partnerships (among others):

- **Brainport Industries**
- **High Tech NL**
- **FME**

Fontys University of Applied Sciences

Contact Details

Program Manager CoE HTSM
Mr. Kees Adriaanse
+31651841505
c.adriaanse@fontys.nl
www.fontys.nl/htsm / www.fontys.edu/htmm