

# **ELN** CONFERENCE BELGIUM 2024



## **4th EUROPEAN LIGHTWEIGHTING NETWORK CONFERENCE**

**Hotel Van der Valk Selys, Liege, Belgium**

**28 and 29<sup>th</sup> of May 2024**

This conference takes place under the auspices of the Belgian Presidency of European Council



## THE EUROPEAN LIGHTWEIGHTING NETWORK

The purpose of ELN is to establish a European platform and strategy for define common goals concerning the reduction of CO<sub>2</sub> emissions and raw material usage through reduced weight in products. The network is an initiative by public authorities from, up to now, Austria, Belgium, Germany, Slovakia, Spain, and Sweden. The network activities focus on building a European industrial and academic strength based on lightweighting technologies to implement the European Green Deal Goals.



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## THE EUROPEAN LIGHTWEIGHTING NETWORK CONFERENCE

The conferences of the European Lightweighting Network aim at establishing a shared European Lightweighting strategy. The ELN conference is an opportunity for all participants to be inspired by best practices in other EU countries and industries, and to become part of our ELN networking and open collaboration platforms.

We are going to discuss lightweighting technologies in various application fields as an important part of the solution in moving towards a sustainable society and thus contributing to the European Green Deal.

There will be facilitated workshops with round table discussions and interactions with the audience to identify key strategies such as circular supply chains or new design procedures and to develop together lightweight initiatives. The agenda will review boiling topics of how lightweight technologies contribute to a sustainable growth and will showcase concrete examples of how lightweight has been deployed in various European countries and industries, ranging from clean mobility, fossil free energy generation, sustainable construction. The hereunder tentative agenda will give you a look at the treated topics during Liège conference.

## **THE 4th ELN CONFERENCE IN LIEGE**

The 4<sup>th</sup> ELN conference takes place in the historical centre of Liège on May 28 and 29, 2024 under the auspices of the Belgian Presidency Council of the European Union. Liège is close to Brussels (100km), the heart of Europe, in the leading region of EU integration, the Maas Rhine triangle between Netherlands (Maastricht, 40 km) and Germany (Aachen, 45 km). The conference is attended by government representatives from different EU countries, and stakeholders from industry and academia.

## **CITY OF LIEGE**

Located at the heart of Europe, the city of Liège borders on the towns of Maastricht, Aachen and Hasselt (Meuse-Rhine Region) and is part of the Greater Region, which includes the border regions of Germany, Belgium, France and Luxembourg.

Liège represents a true logistical and strategic crossroads and is so a breeding ground for new ideas, creativity and research innovation, thanks, in particular, to the presence of its innovative economic industries (from start-ups to large companies), its research centres and its teaching and research institutions, as the University of Liège, named the “Alma Mater”.

Known as the “Fiery city” for its cultural abundance and its warm and festive atmosphere, Liège is the must-see Walloon destination.

Welcome to Liège, a cosmopolitan city on a human scale...

## **UNIVERSITY OF LIEGE**

## THE LOCAL ORGANIZATION COMMITTEE

### **Pierre Duysinx**

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Automotive Engineering  
President of Local Organising Committee at  
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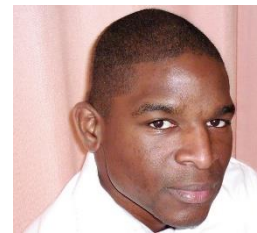
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# PROGRAM

## DAY I – Tuesday the 28<sup>th</sup> of May 2024

### 11:00 Conference Opening

Welcome address.

- Pierre DUYSINX, Local organization committee, Vice-rector for International Affairs and Mobility, University of Liège, Belgium

Presentation of the Innovation Initiative of Specialization (IIS) Contribute and its commitment in developing lightweighting technologies:

- Jean-Christophe DEPREZ, IIS CONTRIBUTE of Wallonia

The EU advanced material initiative 2024 and lightweighting technologies:

- EU: Jürgen TIEDJE, Head of Unit, RTD Research and innovation

### 11.45 Session 1: Voice to policy makers

- Lionel BONJEAN, Research and Innovation Advisor, Walloon Region, Belgium,
- Lena KILLANDER, Program Manager, Industrial Technologies, Vinnova, Sweden,
- Michael KELLNER, Parliamentary State Secretary, BMWK Germany.

### 12.15 Lunch

- Informal discussions and networking opportunities

### 13.00 Session 2: Additive manufacturing and lightweight materials

*Additive manufacturing has drastically changed the manufacturing capabilities enabling more freedom to designers. Combined with innovative redesign tools such as topology optimization, large mass and material savings are possible. Everyday researchers and experts highlight some remarkable applications exhibiting the great potential of additive manufacturing in aerospace, mechanical or civil engineering. This session will discuss the recent developments of additive manufacturing techniques able to manufacture plastic, metallic, large scale metallic parts (WAAM), reinforced plastic with continuous fibres or even concrete structures.*

**Keynote:** “State of the art and recent developments of additive manufacturing techniques”

- Stephan UCSNIK, Austrian Institute of Technology (AIT), Austria

**Panel discussion:**

- Vincent THOMAS, SAFRAN Aero Booster, Belgium (Moderator),
- Stefanie BRICKWEDE, DB Fahrzeuginstandhaltung GmbH, Germany,
- Amaya IGARTUA, TEKNIKER, Spain,

- Jonas GALLE, VALCUN, Belgium,
- Tomasz DUDZIAK, Krakowski Instytut Technologiczny, Poland.

### 13.50 Session 3: Advanced simulation and digital twins for lightweight structures

*Description of the topics: Designing lightweight structures and materials is boosted by the continuous development of numerical simulation and computer aided software tools. Nowadays, the modern concept of digital twins is the incandescence of preceding computer techniques.*

**Keynote:** “Advanced simulation, digital twins and lightweight designs”

- Samson COOPER, Dassault Systems, France

**Panel discussion:**

- Michael BRUYNEEL, GDTECH (Moderator),
- Martin SCHWAB, 4a engineering GmbH, Germany,
- Marie JONSSON Linköping University, Sweden,
- Christian HAMM Christian HAMM, Synera GmbH and Alfred Wegener Institute, Germany,
- Rafael CEBOLLA, Go Ahead Engineering, Spain.

### 14.40 Coffee break and networking

Informal discussions and networking opportunities

### 15.10 Session 4: Reducing mass, CO<sub>2</sub> and Cost in Aeronautics

*Description of the topics: Advanced composite materials are key technologies to tackle energy consumption reduction in aerospace. Developing new manufacturing technologies can also reduce their cost and CO<sub>2</sub> footprint. The session will review current trends and inspiring proof of concepts showing it is possible to envision simultaneously lighter and more cost-effective components for future aircrafts.*

**Keynote:** “The challenge of lightweight airframe structure”

- Miguel Angel CASTILLO, AERNNOVA, Spain.

**Panel discussion :**

- Etienne MAILLARD, SONACA, Belgium (Moderator),
- Peio OLASKOAGA, IDEKO, Spain,
- Michael EFFING, AMAC, Germany,
- Harald CREMER, NMWP.NRW, Germany.

### 16.00 Session 5 : Wood and natural material solutions for lightweight applications

*“Nature provides many lightweight materials such wood, plant or rock fibres, or clays ... Natural materials can present a high recyclability and sustainability, while also being able*

*to exhibit high strength and physical performance in dedicated applications. Natural materials coupled with a matrix are known as composites, and they offer superior strength and durability over petroleum-based or human-manufactured products. While they have been used in human constructions for centuries, there is a great revival interest to revisit the (optimized) implementation of natural materials in present and future lightweight structures in construction, but also energy systems (e.g. wind turbines) or even ground and aerospace vehicles. The session 5 will brush the state-of-the-art of current research on various natural materials and their implementation in lightweight applications that are highly inspiring.”*

**Keynote:** “Multi-scale modelling and design strategies to minimise the variability of natural wood-based composite structures”

- Anita CATAPANO, Bordeaux Institute of Science and Technology, France

**Panel discussion:**

- Bernard VOSS, Isomatex, Belgium, (Moderator),
- Thomas KRENKE, Innovation center W.E.I.Z., Austria,
- Herfried LAMMER, Competence Center for Wood Composites and Wood Chemistry, Austria,
- Riccardo PANCIOLO, Fuko, Italy.

**16.50 Session 6: White paper “Lightweighting for Climate Action”**

*This session is devoted to share the last version of the White Paper “Lightweighting for Climate Action”. Rapporteurs will present the latest status of the White Paper and to discuss the dissemination strategy.”*

**Presentation of the white paper:**

- Werner LOSCHEIDER, BMWK, Germany

**Panel discussion with the audience:**

- Pierre DUYSINX, University of Liège, Belgium (Moderator),
- Alexander POGANY, Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology, Austria,
- Boel WALDMAN, RISE Research Institute of Sweden, Sweden,
- Martin NOSKO, Slovak Academia of Sciences, Slovakia.

**17.30 Conclusion of Day 1**

- Pierre DUYSINX, University of Liège, Belgium.

**17.40 Free time**

**19.00 Departure to Colonster Castle by Bus**

**19.30 Gala Diner at Colonster Castle on ULiège Sart Tilman Campus**



## 21.30 Return by bus to Sélys Hotel

# DAY II – Wednesday the 29<sup>th</sup> of May 2024

## 09.00 Welcome for the opening of day II

- Pierre DUYSINX, University of Liège, Belgium.

## 09.10 Session 7: Circular materials and lightweighting

*“Is it possible to combine materials from circular economy and lightweighting? The session will discuss if it is possible to break the paradoxical situation and will share different success stories from different domains and kinds of materials.”*

### Keynote:

- Marco DIANI, Politecnico di Milano, Italy

### Panel discussion:

- Eric PIRARD, University of Liège, Belgium, (Moderator),
- Carina SCHLÖGL, Austrian Institute of Technology (AIT), Austria,
- Olivier MANTAUX, University of Bordeaux, France
- Jean-François NIVART, CIRKLA Interreg Greater- Region, Belgium-Grand Duchy of Luxembourg, France, Germany

## 10.00 Session 8: Reducing mass, CO<sub>2</sub> and Cost in Transportation

*Description of the topics: Multimaterial and composite structures have shown a remarkable potential to reduce simultaneously the mass of components in aerospace and transportation industry. However recently the Light Vehicle 2025 in EUREGIO has showed with 4 demonstrators that it was possible to reduce simultaneously the mass, the CO<sub>2</sub> emissions and the cost of the 4 automobile components when considering the holistic redesign of the components.*

### Keynote:

- Frantisek SIMANCIK, , Slovak Academy of Sciences, Slovakia.

### Moderator:

- Jean-Pierre HEIJSTER, RAI Automotive Industry NL, The Netherlands (Moderator),
- Karl RADLMAYR, Voestalpine Metal Forming, Austria,
- Sai CHENNOJU, Automotive Management Consulting, Germany,
- Cecilia WARROL, Technology industries, Sweden,
- Stefan GEH, SGL Carbon, Germany.

### 10.50 Coffee Break and networking

Informal discussions and networking opportunities

### 11.20 Session 9: EU Advanced Materials Initiative 2023 opportunities

*“Advanced materials are obviously a major trend in EU research and leading-edge technological industry. Information about partnerships. Coordination between EU and national/regional calls. Feedback from industrial actors.”*

#### **Keynote:**

- Amaya IGARTUA, Coordinator of Materials Initiatives (EUMAT, AMI), TEKNIKER, Spain.

#### **Panel Discussion:**

- Anne MERTENS, University of Liège, Belgium, (Moderator),
- Lars MONTELIUS, Lund University, Sweden,
- Ahmed RASSILI, CRM Group, Belgium,
- Alexander POGANY, Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology, Austria,
- Tomasz DUDZIAK, Krakowski Instytut Technologiczny, Poland.

### 12.00 Final discussion and conclusion of the 4<sup>th</sup> ELN conference

### 12.15 Lunch and networking

## ABOUT OUR SPEAKERS

### Welcome session



#### **Pierre DUYSINX**

University of Liège, Belgium

Pierre DUYSINX has a master in Electromechanical Engineering (professional focus on Aerospace, 1990) and a PhD in Aerospace from University of Liege (1996). After a Post Doc at Danish Technical University, he becomes professor (2003) at University of Liege heading the Automotive Engineering Laboratory of Aerospace and Mechanical Engineering Department of University of Liege. Since October 2022, he is the Vice Rector for Mobility and International Affairs of University of Liege.

Pierre Duysinx is an expert in Shape and Topology Optimization applied to lightweight Automotive and Aerospace structures. Since 1990, he has developed new computer aided methods for industry to create innovative concepts in structural designs, multilateral and composite structures, electromagnetic energy convertors and MEMS, and machine components made by additive manufacturing... He works in collaboration with major Automotive and Aerospace Companies in Europe and Japan.



#### **Jean-Christophe DEPREZ**

IIS Contribute Wallonia

CETIC Rsearch Centre

Dr. Jean-Christophe Deprez has been at Centre d'Excellence en Technologies de l'Information et de la Communication (CETIC) in Charleroi, Belgium, since 2005 where he is Innovation and Research Director. He received his doctorate from the University of Louisiana in Lafayette in May 2003. Since 2008, Dr Deprez is an ISO representative for Belgium in various ISO/IEC JTC1 Subcommittees, namely, SC7 on Software and System Engineering, SC27 on Security, and TR215 on Health Informatics.

He is also the CETIC lead contact point to the European Cybersecurity Organisation (ECISO). He has coordinated CETIC contributions to H2020 and FP7 European projects such as TANGO, ASCETiC, EVIDENCE, REDIRNET, and DEPLOY and coordinated the FP6 project QualOSS on Quality in Open Source.

Prior to joining CETIC, Dr. Deprez was an assistant professor at Pace University, New York, USA (2001-2005). From his initial steps in Research, his work has been dedicated to improving the

quality of software through the coupling of static and dynamic analyses of software project data at the code and program level as well as studying development processes to improve human stakeholders interactions during the development lifecycle.

## Session 1: Voice to Policy Makers



### **Jürgen TIEDJE**

DG Research&Innovation, EU

Jürgen Tiedje, working with the European Commission since 1992; German nationality; lawyer as educational background, wide experience in different Commission departments of European policy making. Between January 2017 and March 2021, he has been in charge of a unit focusing on advanced manufacturing, energy intensive industries, energy efficient buildings and biotechnologies in DG Research and Innovation.

Since April 2021, he is Head of the Industrial Transformation Unit in the Prosperity Directorate in DG Research&Innovation. The activities of the unit covers research and innovation priorities ranging from chemicals, design of new materials (advanced materials), manufacturing (discrete and process manufacturing), metrology. Its primary focus is to facilitate the twin green and digital transition. The unit is in charge of preparing:

- The work programmes in the cluster “digital, industry, space” under Horizon Europe, namely covering relevant industrial technologies;
- Implementing the Commission recommendation on Safe and Sustainable by design chemicals and advanced materials;
- Preparing the Advanced Materials Communication for industrial leadership published on 26 Feb
- Driving as a public partner the following partnerships: PARC (chemical risk assessment), Made in Europe (discrete manufacturing); Process4Planet (energy intensive industries), Clean Steel Partnership (steel sector) and European Metrology Partnership;
- Contributing to other industry partnerships, notably Chips Joint Undertaking and Circular Bio-Based Joint Undertaking.



**Lionel BONJEAN**

Director General of the DG Economy, Employment and Research, within the Public Service of Wallonia.

In his current role, Lionel Bonjean is dedicated to advancing research and innovation, fostering sustainable growth and employment in Wallonia. He plays a pivotal role with his teams in shaping policies that not only promote a thriving and innovative ecosystem for the region's development but also seamlessly align with the goals of the broader European Research Area.

Before taking on the position of Director General at SPW Economy, Employment and Research, Lionel Bonjean served as the General Administrator of the Public Enterprise for Digital Technologies and Information Technology for the Wallonia-Brussels Federation for seven years. With a background in Political and Administrative Sciences, specialising in European and International Affairs Management, he possesses a solid academic foundation. He further enhanced his qualifications with a certificate in Business Management and successfully completed an Interuniversity Executive Master in Public Management.



**Lena KILLANDER**

Programme manager, Industrial Technologies, Vinnova, Sweden

Lena KILLANDER works for Vinnova in industrial Technologies and am an expert in cluster 4 for industry.

## Session 2: Additive manufacturing and lightweight materials



### **Stephanie BRICKWEDE**

Managing Director – Mobility goes Additive e.V.  
& Head of AM – DB Fahrzeuginstandhaltung GmbH, Germany

Stefanie Brickwede graduated from the TU Hanover as an economics major and started her career in the mobility sector. She held various management positions at the Deutsche Bahn AG before in 2015 she took over as Head of the corporate project 3D printing. She is responsible for the introduction of Additive Manufacturing throughout the DB group.

With this background came an understanding of the opportunities and challenges for AM users and Stefanie Brickwede passionately set up the international leading network "Mobility goes Additive" in 2016 with the aim of pushing industrial 3D printing into series production. With the „Medical goes Additive“-division launched in 2019 the focus of the network was widened to assist Hospitals, companies and institutions throughout the medical sector to extend the use of Additive Manufacturing. Now, MGA has more than 140 member companies active in close to 20 working and focus groups. In addition, Ms. Brickwede is the initiator of the "Women in AM" network and actively promotes women in the AM industry.



### **Amaya IGARTUA**

Doctor in Sciences (Chemistry), Coordinator of Materials Initiatives (EUMAT, AMI), TEKNIKER, Spain.

Amaya Iguarta is presently the Coordinator of European Actions in Materials in the Research Institution TEKNIKER and co-secretary of the European Platform of Materials EUMAT and the Alliance for Materials ([www.eumat.eu](http://www.eumat.eu)).

She is member of the core team of AMI2030 initiative. She has been for 10 years, the Head of the Tribology Unit in TEKNIKER. She has been participating in more than 50 EU Projects coordinating 4 of them, and she is author of more than 200 publications in peer review papers, congress, or book chapters.

She has been involved in several EU Projects related to surface treatments and light materials enhancing tribological properties and corrosion resistance of magnesium (NANOMAG), titanium (BIOTIDE) and aluminum (MUSIC, ALEPRE), for transport, energy, biomedical applications, and home appliance.





**Jonas GALLE**

Co-founder and CEO of ValCUN.

Dr.ir. Jonas Galle is CEO of ValCUN that has developed the Molten Metal Deposition technology. The main is bringing metal additive manufacturing towards industrial production. Jonas has more than 7 years in metal AM, has dealt with complex engineering problems in past professional activities. He is close connection with industry to understand their needs and struggles with existing AM technologies.



**Tomasz DUDZIAK**

Krakowski Instytut Technologiczny, Poland.

Dr Tomasz Dudziak (DSc.) - graduated Faculty of Materials Science and Ceramics at University Science and Technology (AGH). PhD degree in material science obtained in 2010 in the United Kingdom at Northumbria University in Newcastle upon Tyne. In 2019, Tomasz obtained a habilitation degree at the Faculty of Materials Science and Engineering of the Warsaw University of Technology.

Since 2013, he has been an employee of the Institute (formerly Foundry Research Institute), he was the last Director of Foundry Research Institute (FRI) (2018-2020). As a researcher, he carried out industrial research mainly high temperature coatings, high temperature corrosion degradation of the materials (Ti, Fe, Ni based alloys mostly). He done research in the past for the following companies: EDF Poland, Arcelor Mitall, Endurance Technologies Canada and many others. From 2015 to the present day, he is and has been involved in the research projects as a leader (leading partner, principal investigator) financed from external sources (National Science Center in Poland (basic research), The National Centre for Research and Development. (applied research) M.ERA-net, Horizon Europe). He is author or co-author of about 80 papers, including 64 papers.

Tomasz Dudziak established High Temperature Corrosion Area (HTCA) in the Materials Research Centre (currently Centre of Materials and Manufacturing Research) in 2018 aimed to launch World Class Centre (WCC) within the research focusing on degradation of materials applicable at high temperatures for special attention to aerospace and energy application. The research area covers the exposures of the metallic alloys (iron, nickel, titanium substrates, oxide dispersion-strengthened alloy (ODS), high entropy alloy (HEA)) as well as exposures of coatings for high temperatures application in various atmospheres including: natural air atmosphere, steam atmosphere taking into account different steam flow and oxygen activity. Furthermore, the research scope in HTCA is addressed as well to help resolve today's critical corrosion issues in aggressive atmospheres ( $\text{Cl}_2$ ,  $\text{H}_2\text{S}$ ,  $\text{SO}_2$  (up to 1% Vol.), fireside corrosion and finally hot corrosion. Post exposure investigations are conducted on the state of the art equipment that obeys: microstructure and chemical analyses using standard Scanning Electron Microscope (SEM) coupled with Energy-Dispersive X-ray Spectroscopy (EDS),

Scanning Electron Microscope – Field Emission Gun (SEM-FEG) + EDS, phase analyses using X-ray diffractometer (XRD), Energy Backscatter Diffraction (EBSD). In addition, HTCA produces diffusion coatings using pack cementation coatings, the coatings are applied on various metallic substrates. The HTCA is active in different projects related to material science with special attention to corrosion issues.

### Session 3: Advanced simulation and digital twins for lightweight structures



#### **Samson COOPER**

Academic Lead for SIMULIA, Dassault System

Samson cooper is the Academic Lead for SIMULIA Academic software portfolio at Dassault Systemes EuroNorth. He is responsible for simulation engagement and activities across universities and research centres within EuroNorth.

He has previously worked and held technology roles for CMTG, Anthony Best Dynamics and Siemens Digital Industries Software.

Samson cooper received his bachelor's degree in Aerospace Engineering from the university of the West of England and his PhD in Mechanical Engineering from the University of Bristol. His research is focused in the area of nonlinear structural dynamics and vibrations with specific interest in aerospace applications.



#### **Michael BRUYNEEL**

Ph D, Scientific Director at GDTech (Global Design Technology), Liège, Belgium.

Michaël Bruyneel graduated in 1995 as Mechanical Engineer from the Faculté Polytechnique de Mons (Belgium). He obtained his PhD in 2002 at the University of Liège (Belgium) in the field of optimization of composite structures. From 2002 to 2015, he worked for SAMTECH (A Siemens Company) in the field of finite element numerical simulation and optimization, as developer of the SAMCEF finite element code and of the BOSS Quattro optimization toolbox.

He headed the SAMCEF solver development team from 2011 to 2015. Since July 2015, he is Scientific Director at GDTech (Global Design Technology, Liège). His fields of expertise and scientific interests are structural optimization, computational fracture mechanics, composite damage modeling, and design of composites structures. Since 1996, he's been involved in more than 40 R&D projects with top players of aeronautics, space and automotive industries. He is also Assistant Professor at the University of Liège, where he teaches Mechanics of Composites.





**Martin SWAB**

PhD, CEO of 4a engineering GmbH.

Dr. Martin Schwab was appointed as CEO of 4a engineering GmbH beginning of 2021. He is an expert in the field of material modelling and characterization, as well as battery technology. Before he joined 4a engineering, he was leading an international team of engineers within AVL group, responsible for the virtual development and validation in crash and durability with special focus on electrification and high-voltage traction batteries.

He obtained his PhD in mechanical engineering at the Vienna University of Technology and is actively contributing to various international research consortia. Dr. Schwab has a strong background in the fields of Finite Element Analysis and constitutive modelling and published more than 22 scientific papers and presentations up to now.



**Marie JONSSON**

PhD, Linköping University, Sweden.

Marie Jonsson has a PhD in Industrial manufacturing and has worked in academia, institute and the industry sectors with research and development of cross-disciplinary nature. She currently leads a project that leverages digital twin with a production, material and lightweight context.



**Christian HAMM**

Synera GmbH and Alfred Wegener Institute, Germany

Christian Hamm was born in Bergen op Zoom/NL. He studied marine biology, botany, geology/paleontology and ecology in Tübingen, Miami, Tromsø and Bremen and completed his doctorate at the Alfred Wegener Institute (marine research) and at the Technical University of Munich (biophysics).

His work focuses on the effective transfer of technology and knowledge from basic research to industry and society. With an interdisciplinary, diverse team, he investigates complex 3D structures of marine organisms such as diatoms, radiolarians and corals using innovative microscopy and employs digital tools (CAD, FEA, AI, software development) to gain insights and

integrate them into technical product development processes. The focus is on stable lightweight constructions, because these are realized in nature in a variety of highly effective ways and significantly improve the development of economical and sustainable products and buildings in the economy.

He is co-founder of the software company Synera GmbH, a low-code Platform for complete process automation, which integrates digital twins and AI-tools. He works with his AWI team on technology transfer for aerospace, shipbuilding, the automotive industry, mechanical engineering, and medical technology, among others. Architecture, design and culture is playing an increasingly important role in his current projects. He was a juror at the 2022 Bremen Film Festival for the topic of sustainability and is involved in urban development projects and knowledge transfer for STEAM, which was exhibited at the Berlin Science Week 2023.



**Rafael CEBOLLA**

Go Ahead Engineering, Spain

Rafael is an industrial engineer with a professional experience of more than 18 years working with hydrogen technologies. First steps of his career were related to experimental research on these technologies, performed at reference facilities at national (National Aerospace Technology Centre in Spain) and international level (European Commission DG-JRC). This experience provide him with a deep understanding of the potential and the operational challenges of the majority of hydrogen technologies.

Later on, while serving for the European Commission, his career focused on overarching aspects of hydrogen technologies, such as regulations, codes and standards, funding programmes, safety and environmental impact. He has performed the review of European hydrogen projects and funding programmes (FCH JU). He has also developed international regulations related to hydrogen technologies and provide scientific support for the elaboration of European legislation regarding these technologies. Moreover, he has participated in international experts groups analysing regulatory and technical challenges on the integration of hydrogen technologies in different sectors (industry, transport...).

Currently, he is part of the Spanish start-up GoAhead developing innovative hydrogen storage tanks. Additionally, he is providing consulting and engineering services as a freelance, supporting the implementation of hydrogen projects. This support comprises technical, regulatory and safety aspects. Additionally, he is supporting the development of European standards involving hydrogen technologies.

## Session 4: Reducing mass, CO2, and cost in aeronautics.



### **Miguel Angel CASTILLO ACERO**

AERNNOVA, Spain.

Born in Granada (Spain) in 1965, married and father of two. Ph.D. in Aerospace Engineering, Escuela Técnica Superior Ingenieros Aeronáuticos (ETSIA), Universidad Politécnica Madrid, Spain. Post-graduate studies in Science and Technology Management, Universidad Carlos III, Getafe, Spain.

Prior to joining Aernnova in 2000, 11 years technical international career as aerospace analyst in C.A.S.A. now Airbus (Getafe, Spain), Boeing (Seattle, USA) and Hispano Suiza currently SAFRAN (Le Havre, France)..

Miguel Ángel has held management, direction, and corporate responsibilities in Aernnova, currently VP Technology Development of the group. He has attained a balanced background in the aviation industry, general management including experience in engineering, research and development, operations, contract negotiations, financial management and strategic business development. Demonstrated success in leadership, business, development, and people achieving integral management skills.

He has been representing Aernnova in the board of the Aero Space and Defence Spanish association (TEDAE) and currently in the Aero Space and Defence Industries Association of Europe (ASD) Civil Aviation Business Unit.

He is also author of scientific and divulgation articles, book chapters and patents and collaborates as Visiting Assistant Professor with “Universidad Europea de Madrid”, Spain



### **Etienne MAILLARD**

PhD, SONACA GROUP EXPERTS, Belgium

Etienne MAILLARD is a technical expert with more than 25 years of experience within aerospace industry. His technical expertise recognized in the crashworthiness and vulnerability community involves development and validation of methodologies for impact analyses in industrial conditions including highly non-linear dynamic numerical simulations and physical impact testing.



**Peio OLASKOAGA**  
IDEKO, Spain

Peio Olaskoaga is Mechanical Engineer of the University of the Basque Country. He has developed his more than 25 years long career at IDEKO Research Center, working on the development of new machine concepts and innovative manufacturing processes. Sustainability of processes and energy consumption reduction strategies in manufacturing are topics in which he has focused for some years.

In particular for the last eight years, he has been developing manufacturing systems for the sustainable production of composite parts for the aerospace industry. He is responsible for Automated Dry Material Placement (ADMP) development and for its demonstration cell.

Mr. Olaskoaga will talk about sustainable processes for carbon composite manufacturing, from machine and process to design of structures.



**Dr Michael EFFING**  
AMAC, Germany

Founder and CEO of AMAC GmbH in 2012 in Aachen/ Germany. Michael Effing has a PhD in Mechanical Engineering from the University of Technology Aachen (RWTH), Germany, specialist field Polymers/Composites. He has over 30 years-experience as a strategic and innovative Executive Manager with key focus on Marketing & Sales Excellence and unmatched international experience in executive positions with global Industry leaders such as DuPont, Berkshire Hathaway, Owens Corning, Huntsman or DSM.

Michael Effing is Chairman of the Board of the trade associations Federation of Reinforced Plastics AVK in Frankfurt/ Germany ([www.avk-tv.de](http://www.avk-tv.de)) and Composites Germany ([www.composites-germany.org](http://www.composites-germany.org)) and Board Member and Vice President of the Polymer Plastics Trade Association GKV in Bad Homburg/ Germany ([www.gkv.de](http://www.gkv.de)).





### **Harald CREMER**

Cluster manager Nano-Micro-Materials-Photonics-NRW state cluster (NMWP.NRW)

Dr. Cremer has been cluster manager of the North Rhine-Westphalian state cluster NanoMicroMaterialsPhotonics.NRW since 2009. Since 2012 he is also Managing Director of NMWP Management GmbH which is a well-known partner in business, science and the public sector for innovation-promoting services in the field of the key technologies. In addition to innovation consulting, the preparation of strategy papers, roadmaps and studies etc., the service portfolio includes the planning and realization of events and congresses as well as shared booths at trade fairs and congress fairs.

Dr. Cremer is an engineer and has a doctorate degree in Materials Science and Engineering from RWTH Aachen University. He has been in executive and leading positions in academia, industry and the public sector for nearly 20 years. As initiator of various projects and initiatives related to key enabling technologies, Dr. Cremer promotes among other things the technology and knowledge transfer from universities to industrial applications.

## **Session 5: Wood and natural material solutions for lightweight applications**



### **Anita CATAPANO**

Bordeaux Institute of Technology, France

Anita CATAPANO is Full Professor at Bordeaux Institute of Technology (Bordeaux INP), Engineering School of Electronics, Computer Sciences, Telecommunications, Mathematics and Mechanics as well as at the research laboratory of mechanics of Bordeaux, I2M. She is the Head of the MSc in Advanced Modelling of Structures as well as the Head for Mobility and International Affairs. She leads the research team on Mechanical Analysis and Modelling of IMC department of I2M lab.

After obtaining a master degree at Aerospace Engineering School of University of Pisa in 2009 she defended her PhD thesis in 2013 on "Stiff ness and Strength Optimisation of the Anisotropy Distribution for Laminated Structures" at Sorbonne Université, Campus Pierre et Marie Curie. She was Associate Professor at Bordeaux INP from 2015 until 2023. She defended the HDR (Habilitation à Diriger les Recherches, the highest scientific degree in France) in 2021 on "Multi-scale models to design anisotropic and heterogeneous media" at University of Bordeaux.

Anita CATAPANO serves as editorial board member as well as associate editor for Scientific Reports (Springer Nature), Journal of Mechanical Engineering Science and Advances in

Mechanical Engineering (SAGE). She is coordinator for several national and regional research projects as well as industrial collaborations with CEA, Naval Group, MBDA Systems, Safran, Gascogne Bois, Ollow (3DiTEx)...

Her main research activities focus on the development of light multi-scale models to be integrated into design/optimisation strategies for anisotropic/heterogeneous materials and structures (variable stiffness composites obtained through additive manufacturing, wood-based composites, particle-based composites, cellular structures). These models are based on tensor invariants formulations, analytical and semi-analytical strategies for non-linear homogenisation, quasi-trivial closed-form solutions. The fields of application are manifold: aerospace, military, biomedical, civil engineering.



**Bernard VOSS**  
ISOMATEX, Belgium

Bernard Voss, Business Development & Sales Manager, with 20 years' experience in the composites industry, Bernard has headed the Sales & Marketing department at Isomatex for the past 10 years.



**Thomas KRENKE**  
Innovation center W.E.I.Z., Austria

Thomas Krenke is a distinguished expert in sustainable lightweight construction, currently serving as the Team Leader and Scientific Leader at W.E.I.Z. Forschungs & Entwicklungs gGmbH. His academic journey began at the Technical University of Dresden, where he pursued a degree in Process Engineering from 2006 to 2011, specializing in wood and fibre materials.

In 2012, Thomas embarked on doctoral studies at the University of Natural Resources and Life Sciences, Vienna, specifically at the Institute of Wood Technology and Renewable Resources. He completed his doctorate (Dr. rer. techn.) in wood technology in 2017.

Thomas's professional career started at Kompetenzzentrum Holz GmbH, where he worked as a Junior Researcher from 2012 to 2017, focusing on solid wood and wood composites. He was then promoted to Senior Researcher, continuing his work in the same field until 2019.

Since 2019, Thomas has been leading sustainable lightweight construction projects at W.E.I.Z., combining his extensive knowledge and experience in wood technology to drive innovative research and development in this critical area.



**Herfried LAMMER**

Competence Center for Wood Composites and Wood Chemistry, Austria

Herfried Lammer is Area Manager at Wood K plus - the leading Austrian research institute in the areas of wood composites and wood chemistry - responsible for the Research area Wood & Paper Surface Technologies, which includes the research teams Green Long Fiber Materials and Data Based Material Development.

The research team Green Long Fiber Materials investigates and develops high-performance materials made from wood fibers and natural fibers for lightweight applications in the automotive and non-automotive sector. One highlight of the team Data based Material Development are outstanding paper based sensors for process control and structural health monitoring of classical and biobased lightweight solutions.



**Riccardo PANCIROLI**

FUKO, Italy

Riccardo Panciroli is a Full Professor of Machine Design at Niccolò Cusano University. He manages several research projects in the field of composite materials and has a particular interest in the impact resistance of natural-fibre composites and recycled carbon fibres. In 2021, he co-founded Fuko, a spinoff aiming to bridge the gap between university research and industrial applications in the aeronautical sector.

**Session 6: White Paper “Lightweighting for Climate Action”**



**Werner LOSCHEIDER**

Head of division – Lightweight, Federal Ministry for Economic Affairs and Climate Action, Germany.

Born on January 9, 1963, married, one daughter. Werner Loscheider is Head of Division IVB4 for construction industry, lightweight construction/new materials, resource efficiency since 2014 in the Department of Industrial Policy at the Federal Ministry for Economic Affairs and Climate Action.

Prior to this, he was Head of the LA2 Political Coordination Division and Head of Division IIA4 Tourism Policy at the Federal Ministry of Economic Affairs and Climate Action.

Mr. Loscheider holds a Diploma in Agricultural Engineering from the Rheinische Friedrich-Wilhelms-University, Bonn.



**Alexander POGANY**

Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology, Austria.

Alexander Pogány has a MSc. in Microbiology and worked for about 3 years at Baxter Bioscience as validation expert in the Quality Control.

Since 2004 he works as senior expert in the national and international research policy in the area of Key Enabling technologies (Nanotechnology, Materials research and production).

This includes the coordination of several research programmes. He is Austrian Delegate for the Horizon Europe Cluster 4 programme, the Working Party BNCT (Bio, Nano and converging Technologies) and WPMN (Manufactured Nanomaterials) of the OECD, and of Mirror Groups in several European Technology Platforms.



**Boel WADMAN**

Research and business developer, RISE, Sweden.

Boel Wadman has a background in materials research from Chalmers. Since 1998, she is working at RISE with the introduction of new materials and processes in industry, where she has managed several projects on Technology infrastructures for materials and manufacturing.

Boel coordinates the international strategy of the Swedish Innovation Programme LIGHTer.

Boel WADMAN has been a member of the organizing committee of the 3rd ELN Conference.





**Martin NOSKO**

Institute of Materials and Machine Mechanics,  
Slovak Academy of Sciences

Martin Nosko is a materials scientist, working at the Institute of Materials and Mechanics of Machines of the Slovak Academy of Sciences since 2003. He has headed the Microstructure Characterisation Department and is currently the Director of the Institute. The Institute is involved in many national and international projects in the fields of transport, energy, health and space.

In lightweighting, the Institute's research focuses on developing innovative solutions and lightweight materials through powder metallurgy and foaming technologies for the transport and energy sectors. The main aim is to optimise the structure by studying the relationship between the materials' production, microstructure, and properties and finding the proper solution for specific applications.

Martin is the official representative of Slovakia in the European Lightweight Network and the AMI2030 initiative. He establishes and coordinates the work between the Ministry, stakeholders and representatives of the initiative.

**Session 7: Circular materials and lightweighting**



**Marco DIANI**

Politecnico di Milano, Italy

Marco Diani is an Assistant Professor at the Department of Mechanical Engineering at Politecnico di Milano since 2023. His research topic is on Circular Economy, in particular on demanufacturing. He focuses on the development of Cyber-Physical Systems (CPS) for the optimization and control of mechanical recycling processes.

His work led to the implementation of a CPS, with a patent-pending, to control size reduction processes, maximizing the quantity of reusable target material and minimizing process costs, with application in the specific case study of glass fiber-reinforced plastics. Thanks to his involvement in several EU research projects (as FiberEUUse, DigiPrime, DeremCo and YouRban), he acquired horizontal competencies in Circular Economy and demanufacturing processes with applications in different fields such as composites to mechatronics and electronics.

He is co-owner of Fibereuse Tech, a start-up that has received the 2023 first prize award from the EIT Manufacturing in the sustainability field.



**Eric PIRARD**

University of Liège, Belgium

Prof. Dr. Eric Pirard is professor at the University of Liège and defines his mission as engineering the circular economy of materials and metals. He is the academic coordinator of the European Master in Resources Engineering (EMerald) which, in collaboration with the Universities of Lorraine (FR), Lulea (SE) and Freiberg (DE), offers a triple diploma for engineers specialising in the evaluation and beneficiation of both primary and secondary mineral resources.

This programme is officially labelled by the European Institute of Innovation and Technology (EIT). He leads an international research team of 20+ engineers who develop innovative technologies for the characterisation, sorting and extraction of metals from complex and low-grade raw materials.

Professor Pirard is the Walloon representative to EIP RawMaterials and a visiting professor at the Universities of Lorraine, Madrid and Lubumbashi.

He is cofounder of three start-up companies in the raw materials sector.



**Carina SCHLÖGL**

Austrian Institute of Technology (AIT), Austria  
Deputy Managing Director Light Metals Technologies Ranshofen GmbH  
Group leader “Advanced Forming Processes and Components”

Dr. Carina M. Schlögl studied materials science at University of Leoben (AT) and wrote her dissertation on the surface treatment of recycled aluminum.

Dr. Carina M. Schlögl has been working as a thematic coordinator at the Light Metals Competence Center Ranshofen for 8 years, where she is involved in innovative solutions for efficient forming processes, sustainable alloy concepts and overall digital solutions. She leads numerous research projects with a focus on sustainability and efficiency in light metal processing. She has also been part of the management team at LKR for four years.

Since 1994, the LKR Light Metals Technologies Ranshofen GmbH of the AIT Austrian Institute of Technology is delivering research on light metal alloys and sustainable manufacturing processes. Located in the high-performing industry hub Ranshofen in the province of Upper Austria, LKR is renowned for its cutting-edge research & development of safe, efficient and green mobility solutions.

LKR develops high-grade light metal alloys, sustainable and energy efficient processing methods and functionally integrated lightweight components, thus covering the entire value chain.



### **Olivier MANTAUX**

University of Bordeaux, France.

Olivier MANTAUX has been an associate professor at the University of Bordeaux (France) since 1996. He currently heads the I2M / Bordeaux University laboratory's recycling research group, whose research activities focus on the recycling of polymer and composite materials.

The main aim of this research is to develop innovative recycling processes and high-performance recycled materials.

The challenges of recycling research have led to the development of several areas of highly applied research:

- how to produce materials that are technically, environmentally and economically efficient,
- how to exploit the 'disadvantages' of recycled materials as new advantages,
- how to develop innovative applications using the new functionalities of recycled materials.

Olivier Mantaux and his colleagues at I2M have developed and patented an innovative process for realigning and reshaping recycled carbon fibres. This process is currently the only one that makes it possible to produce structural applications using recycled fibre composites.

The recycling team of I2M/Bordeaux University has just completed the European Manifica project on carbon fibre recycling in partnership with Toray CFE, PAPREC and VESO. This project has demonstrated the industrial feasibility of recycling carbon fibres and producing aeronautical parts from recycled carbon.



### **Jean-François NIVART**

Coordinator of **UniGR-CIRKLA** Interreg project, at University of Liège

Jean-Francois Nivart holds an Executive International MBA (Louvain School of Management, 2007) and a degree in Electrical Engineering (University of Liège, 1990). With over 30 years of experience, he founded and led ventures such as EVS Digital Cinema, XDC, intoPIX, Image Matters, and StabiloGreen, spanning industrial vision, media technology, and environmental sustainability.

Renowned for his passion, innovation, and entrepreneurial spirit, Jean-Francois is now focused on the circular economy and the future of our planet.

Jean-Francois Nivart is currently the coordinator of UniGR-CIRKLA, a European project focused on developing the circular economy in the Greater Region.

## Session 8: Reducing mass, CO2, and cost in transportation



### **Dr. Ing. František Simančík**

Institute of Materials and Machine  
Mechanics, Slovak Academy of Sciences

František Simančík is an expert in non-ferrous metals, composites and technologies of their production and processing. As the main coordinator, he led a number of research projects, including 2 projects of the EU Framework Programs, the MNT Eranet project, ESA, 8 state projects, several of which ended up as success stories in the given program.

He also acted as a coordinator in 7 projects granted by European Structural Funds, the result of which is the Centre of Excellence for Composites Research for Engineering, Construction and Medical Applications in Bratislava (CEKOMAT) and the Innovation Centre for Light Metals and Composites (Inoval) in Žiar nad Hronom, which he still leads. He was a tutor of 8 doctoral students, all of whom remain active in research, and is the co-author of more than 360 publications, including 70 invited lectures at major scientific events, and co-author of more than 50 patents granted. He won several awards, including the Crystal Wing in the category of medicine and science in 2011, the Technology of the Year award in the Slovak Republic in 1998, resp. Personality of Science and Technology of the Slovak Republic 2011. At present he works as the head of the application centre of the Institute of Materials and Machine Mechanics of the Slovak Academy of Sciences, where his research is devoted to lightweight construction and efficient use of energy. He is also a member of the SAS Presidium, where he is responsible for the transfer of scientific knowledge into applied practice.



### **Karl RADLMAYR**

Voestalpine Metal Forming, Austria

Karl RADLMAYER is senior Vice President in charge of Research, Development & Digitalization in Voestalpine Metal Forming





### **Sai CHENNOJU**

Automotive Management Consulting,  
Germany

Agility is important, Sustainability and Lightweight Design should always be a top priority.

As a Technical Product Manager at Automotive Management Consulting GmbH (AMC), Penzberg, Germany, Sai Chennoju is specialized in planning and steering R&D and Industrial projects towards Sustainable Lightweight Solutions.

His tasks and responsibilities involve integrating Sustainability and Lightweight Design considerations throughout the entire Product Lifecycle, from conceptualization to prototype and series development.

One of his key responsibilities is the development and realization of Sustainable Design and Circularity Concepts, particularly utilizing AMC's »Frontloading« process to optimize Digital Process Chains. By leading cross-functional teams, he drives innovations in different directions of Sustainable Lightweight Materials and Design for Manufacturing processes, ensuring that products meet the highest value of Sustainability and Lightweight Design while maintaining optimal performance.

A Holistic approach includes conducting measurable and assessable Eco-Management systems like »Sustainability Value Analyses«, enables all industrial market sectors to make well-founded decisions regarding materials and digital prototypes. Additionally, he actively collaborates with suppliers and shareholders to align efforts to reach sustainability goals and industrial and scientific standards in lightweight and sustainable technologies.



### **Cecilia WARROL**

Technology industries, Sweden

Cecilia WARROL is also

- Program Director for Produktion2030, the Swedish platform for Industry 4.0.
- Senior expert in production, industrial research and innovation Senior adviser to Swedish government, funding authorities on R&D policy
- EU engagements: EFFRA supervisory board, Manufature High Level Group and EIT Manufacturing CLC North.

Cecilia WARROL has an extensive experience of industry research, innovation and collaboration. My experience includes driving technology and competence innovations in industry, in education and research organizations in Sweden and in Europe.

She has more than 20 years of experience developing industry R&D policy, R&D funding tools, as well as developing industry relevant test and demonstration facilities. My work includes building networks and collaboration's with industry, research institutes and universities in Sweden and internationally.



**Stefan GEH**

Senior Vice President, Head of Business Unit Composite Solutions SGL Carbon SE

Stefan Geh has a diploma in mechanical engineering as well as a master's degree in technology management from the university of applied science in Augsburg. He has more than 15 years' experience in composite products & applications, especially in the automotive industry.

Stefan Geh has been with SGL Carbon since 2007 in various leadership positions, e.g., as Director Technology for Fibers & Materials as well as Vice President Product Management in the Business Unit Composites – Fibers & Materials. He also worked in Corporate as Head of Board Office & Chief Transformation Officer. Since 2021 Stefan Geh has been in the role as Senior Vice President, Head of Business Unit Composite Solutions. In leading the Business Unit Composite Solutions, his main business focus are composite components for various automotive applications like battery housings, leaf springs, roofs, rear wings, and front hoods as well as friction components.

**Session 9: EU advanced material initiative 2024 opportunities**



**Amaya IGARTUA**

Doctor in Sciences (Chemistry), Coordinator of Materials Initiatives (EUMAT, AMI), TEKNIKER, Spain.

Amaya Iguarta is presently the Coordinator of European Actions in Materials in the Research Institution TEKNIKER and co-secretary of the European Platform of Materials EUMAT and the Alliance for Materials ([www.eumat.eu](http://www.eumat.eu)).

She is member of the core team of AMI2030 initiative. She has been for 10 years, the Head of the Tribology Unit in TEKNIKER. She has been participating in more than 50 EU Projects coordinating 4 of them, and she is author of more than 200 publications in peer review papers, congress, or book chapters.

She has been involved in several EU Projects related to surface treatments and light materials enhancing tribological properties and corrosion resistance of magnesium (NANOMAG), titanium (BIOTIDE) and aluminum (MUSIC, ALEPRE), for transport, energy, biomedical applications, and home appliance.



**Prof. Dr. Ir. Anne MERTENS**

University of Liège, Belgium

Anne Mertens has a Master in Materials Engineering (1997) and a PhD in Applied Science (2002) from the Université catholique de Louvain (Belgium). After post-doctoral stays in the Netherlands (Delft University of Technology) and Canada (McMaster University, Hamilton (ON)), she joined the Metallic Materials Science (MMS) Unit led by Prof. Lecomte-Beckers, within the Aerospace & Mechanics Department, University of Liège in 2011 as a senior researcher.

Dr Meters is keen to investigate fundamental mechanisms underlying the production of metals by innovative processing routes as friction stir processing and additive manufacturing. Since October 2017, Anne Mertens has been assistant professor with the A&M Department, also heading the MMS Unit. Prof. Mertens current research activities focus on additive manufacturing of metallic materials. A first main line of work aims at optimizing the additive manufacturing and post-processing of conventional commercial metallic alloys, while relying on the development and validation of numerical models of AM processes and of further post-treatments. A second main axis of research explores the design of metal matrix composites and of new metallic alloys “for” additive manufacturing, aiming towards enhanced usage properties (mechanical, wear or corrosion resistance).



**Lars MONTELIUS**

Lund University, Sweden

Lars Montelius is Professor Emeritus at Lund University, Sweden and his +30 years of work in nanotechnology have centered around development of Nanotechnology and Advanced Materials.

During the years 2014-2022 he was the Director-General of the International Iberian Nanotechnology Laboratory ([www.inl.int](http://www.inl.int)).

Lars Montelius is the Co-Chair of the Steering Group of the Advanced Materials Initiative ([www.ami2030.eu](http://www.ami2030.eu)) and he is a board member of the Malta Initiative ([www.malta-initiative.org](http://www.malta-initiative.org)) and the European Technology Platform EuMat ([www.eumat.eu](http://www.eumat.eu)). He has been President of the IUVSTA, the International Union for Vacuum Science, Technique and Applications ([www.iuvsta.org](http://www.iuvsta.org)), and the Director for Øresund University & Øresund Science Region, the cross-border cooperations between eleven universities and three regional authorities of two countries in the Øresund Region and Chair of the Swedish Technical Standardization Committee on Nanotechnology. He is also the founder & funder of several Swedish deep-tech companies



**Ahmed RASSILI**  
CRM GROUP, Belgium

Dr. Ahmed RASSILI earned his PhD in theoretical physics at the University of Liège, and conducted his carrier on R&D in both departments of electrical engineering and aerospace and mechanics as a postdoc then a research director and associate professor on advanced manufacturing. He gains a teaching experience working at the University of Liège, the German University of Technology in Oman (RWTH) and EUROMED University, dealing with applied thermodynamics, fluid dynamics, thermal power stations and manufacturing processes for the automotive sector.

Since 2016, he started a new carrier in business development in research center mainly focusing on advanced manufacturing, recycling and waste valorization sectors, including other activities such as zero waste, circular economy, energy efficiency and digitalization. Ahmed Rassili has developed a well-known experience and grant management in European funding programs such as ERANET, H2020 and Horizon Europe, COST actions.



## White Paper “Lightweighting for Climate Action”

Lightweighting is a multidisciplinary and cross-sectoral technology field with a focus on saving materials and energy. It contributes dramatically to a decrease of resource consumption, to a lowering of the carbon footprint, and to the achievement of the EU Green Deal Goals through a reduced overall environmental impact along the entire value chain.

A core group of European countries are prioritizing lightweighting as a technology to achieve cross-sectoral resource efficiency, aiming at a significant reduction of their total materials and energy consumption, and promoting the creation of resilient secure circular industrial value chains. The European Lightweighting Network (ELN) is a joint initiative of public authorities from (as of today) Austria, Belgium, Germany, Slovakia, Spain, and Sweden, with the aim of developing a shared understanding of the potential of lightweight solutions in Europe, which will flow into a European lightweighting strategy.

By 2030, the estimated annual sales potential for lightweighting is expected to exceed 300 billion euros globally [McKinsey, 2012, Lightweight, heavy impact]. Austria has created a satellite account for lightweighting, which quantified its significant economic impact in terms of employment, innovation and gross national product in a comparable and standardized way. Currently, Germany and Sweden are developing corresponding concepts.

Achieving global leadership in this key technology, with its cross-sectoral impact on areas such as energy, mobility, construction, mechanical and plant engineering, and infrastructure, requires close cooperation between all stakeholders, strong networks, and continuous R&D efforts.

### Contribution of lightweighting to climate targets

Lightweighting technology and construction is a means to promote climate action and resource protection, as well as to create highly qualified, sustainability-oriented jobs. Especially when combined with digitalization, artificial intelligence or bionics, it opens entirely new markets. Digital product development and cost-efficient production facilitate and foster responsible and sustainable use of resources and energy through weight optimization, recyclable design and advanced manufacturing processes and materials. The focus is on technologies, processes, and products that optimize material cycles, allowing for multiple life cycles and conserving natural resources.

Circular solutions based on smart lightweight design and technology for materials, products, and production provide beneficial results in terms of reducing greenhouse gas emissions and the consumption of primary raw materials. The positive impacts of lightweighting on sustainability have an even greater long-term effect if the technology is applied early in the development process of products and it is implemented in circular value chains.

Holistic lightweighting deals with all stages of the value chain: design, manufacture, use, recycling and reuse phases are all targets of material-efficient and sustainable lightweight design and construction. Vehicle design for the automotive, aviation, and maritime industries is often seen as a lightweighting pioneer. Beyond this, however, the scope for resource efficiency offered by lightweighting is also being harvested across many other industrial sectors. Construction, mechanical and plant engineering, rail transportation, energy technology, the furniture industry, and life sciences are examples of industries where lightweighting offers promise from an environmental, economic, and social perspective on sustainability.

## How to make the most of the lightweighting potential?

To bring lightweight technologies to large-scale exploitation, it is crucial to facilitate and foster the exchange of views at a policy level on the contribution of lightweighting technologies to the European Green Deal objectives and to provide long term funding outlooks for European industry and the research community. Currently, Europe lacks a common framework which would enable stakeholders to align scattered lightweight technology initiatives. The proposed co-programmed partnership for Advanced Materials, M-ERA.NET, Eureka and at a policy level the “Coordinated Plan on Advanced Materials of the European Commission and Member States” need to be aligned to form a strategic approach to research policy on lightweighting which could drive cross-sectoral industrial innovation by supporting new applications across a number of industrial sectors. Lightweighting technologies should become an integral part of all initiatives to ensure systematic collaboration of developers, users, public authorities and citizens. With the European Lightweighting Strategy, such a strategic approach is offered.

## European Lightweighting Strategy

Companies along the production value chain must analyze each stage of the life cycle of their products and incorporate the concept of lightweighting and sustainability from the beginning of the design phase. Holistic approaches and business models striving for more resource-efficient material loops which consistently respect an increased lifetime, reuse, remanufacturing, and recycling offer new business models. Where technologies to extend lifetime are combined with digital solutions such as generative AI for design and calculation models, advanced production processes, e.g. additive manufacturing, and traceability are essential for driving lightweight innovations as a sustainability catalyst in all contexts. Reliable and secure accessibility of big data and cybersecurity are crucial for the transformation of data to enable circular value chains in line with the AMI2030 initiative and the proposed “Innovative Advanced Materials for EU” partnership.

A European lightweighting strategy offers a systematic approach to reducing greenhouse gas emissions and the consumption of primary raw materials across Europe. Lightweight solutions play to their strengths, particularly when combined with the concept of the circular economy. In addition, the successful development and implementation of the strategy will counter dependency on energy and raw material imports, strengthen industry's ability to innovate, and safeguard and create jobs in Europe. Thus, such a strategy can be considered as an instrument to strengthen economic resilience and technological sovereignty.

This white paper proposes a strategy, like a topical masterplan, that could be developed by the European Commission, DG Grow or DG Climate in cooperation with relevant stakeholders in a bottom-up process. It is advisable to flag up lightweighting as a political topic on the European level, and this paper can serve as an initial step to achieve this objective. The process should commence with the upcoming new European Commission, thus creating the political framework to push lightweighting into the public and political focus, addressing a comprehensive lightweighting agenda.

Further important areas of focus include: reducing dependencies on raw materials at the EU level by optimally complementing existing industries in EU countries; expanding value creation cycles by combining different national recycling strategies and industries; creating European research infrastructures for lightweight construction by granting European partners access to national centres; supporting the development of European standardization and regulation to improve market penetration and recyclability; and raising awareness for lightweight construction as a

cross-sectional technology to promote further dissemination in member states and encourage R&D activities.

### The role of the European Lightweighting Network (ELN)

The ELN works collaboratively to identify and implement activities in support of lightweight solutions, with a particular focus on contributing to the targets of the Green Deal. In a longer term, the focus of the ELN lies on establishing a contact point and responsibilities for lightweighting at European level within the European Commission and in collaboration with associations and clusters, as well as developing a European lightweight strategy based on national industrial lightweighting agendas. This white paper is an approach towards a European lightweighting strategy that must be set up in the next few years.

Additionally, a joint research agenda “Lightweight for a Sustainable Future” is a key element to realize the potential of lightweighting for achieving the Green Deal goals. It builds on national and regional strengths and expresses a common vision for the direction of European and national activities. The ELN has already initiated joint calls for the funding of bilateral or multilateral projects to implement its research agenda. ELN currently uses existing funding instruments such as Eureka but is open to setting up new ones to achieve a maximum of impact with the available resources.

The ELN is expanding and deepening areas of cooperation through delegation visits to connect research institutions and industrial partners from partner countries. Instruments to be developed further include R&D cooperation on thematic challenges and the establishment of an EU-wide PhD network to tackle the skilled workforce demand. ELN members organize and promote dedicated events, e.g. a side event on lightweighting at the UN GLOBAL summit, the Lightweighting Summit at the Hannover Messe in Germany, or the LIGHTer International conference in Sweden.

## ELN CONFERENCE BELGIUM 2024



Federal Ministry  
for Economic Affairs  
and Climate Action



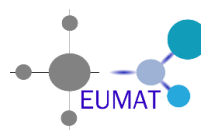
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