CSI 2022

CONFERENCE ON SURFACE INTEGRITY

6th CIRP
CONFERENCE ON

SURFACE INTEGRITY

LYON
FRANCE
8th – 10th
June 2022

PROGRAMME

CENTRALELYON
ENISE

Arts et Métiers
Sciences et Technologies

6th. CIRP Conference On Surface Integrity

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Conference scope

On behalf of the organizing committee of the 6th CIRP Conference on Surface Integrity (CIRP CSI 2022), it is a great honor for us to welcome you to participate in this important event to be held in Lyon, France, June 8-10, 2022. This conference will address recent technical and scientific achievements and future trends in surface integrity. New materials and manufacturing processes bring new challenges. Thus, a better understanding of surface integrity and its influence on functional performance and component lifetime is still needed. In order to increase the scientific discussion and exchange on this topic, the CIRP Liaison Committee approved the launch of a CIRP Conference on Surface Integrity, which was first organized in 2012 by the University of Bremen (Germany). Subsequent conferences were hosted by the University of Nottingham (UK) in 2014, by the University of North Carolina at Charlotte (USA) in 2016, and by Tianjin University (China) in 2018. Finally, due to the COVID-19 pandemic, the last CIRP CSI conference was hosted online by Mondragon University (Spain) in 2020.

Due to some travel restrictions, the CIRP CSI 2022 conference is organized in hybrid mode. Approximately 230 participants physically attend the conference, and about 30 attend remotely. The program includes 5 keynote addresses and 156 oral presentations. The conference themes focus on the influence of traditional manufacturing processes (cutting, forming, etc.) and surface treatments (coating, heat treatments, etc.) on surface integrity (residual stresses, surface roughness, microstructure) and on the functional performance and lifetime of components. Although most of the research is based on an experimental approach, modeling and simulation of surface integrity using numerical methods and artificial intelligence is growing significantly in the context of Industry 4.0. In addition, additive manufacturing (AM) are emerging technologies that can produce components with complex free-form geometries, most of which must be finished using advanced and/or non-traditional finishing processes. This poses new challenges for surface integrity characterization, and for this reason, about 30% of the oral presentations are related to this topic.

Finally, we would like to express our gratitude to the participants for sharing their recent advances in surface integrity, to the members of the scientific committee for helping us select the best research papers, to our sponsors who joined us in making the conference a success, to the organizing committee who worked hard to make this conference possible. We would also like to extend special thanks to CIRP, the steering committee and the scientific committee for their support and guidance.

Prof. Joel RECH & Prof. José OUTEIRO

Chairmen of the 6th CIRP Conference on Surface Integrity

Chair
Pr.Joël RECH
Centrale Lyon ENISE

Chair
Pr.José OUTEIRO
Ensam Cluny—LaBoMaP

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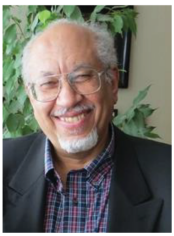
ZHANG Jun *(DEU)*
ZHOU Jinming *(SWE)*

Keynote speaker



Helmi Attia,
Ph.D. , P Eng., FASME, FCIRP, FSME, FIAAM

Biography

Helmi Attia is a Principal Research Officer, and former Manager of Advanced Material Removal Processes, Aerospace Manufacturing Technology Centre, National Research Council Canada (NRC). Before joining the NRC in 2002, he was a Principal Research Engineer at Ontario Hydro Research Division (1980-2002), and Manager of Fabrication Technology at Spar Aerospace Technology Ltd. (1979-80).
He is an Adjunct Professor of Mechanical Engineering at McGill University since 2002, and Adjunct Professor, Chalmers University of Technology, Sweden. He held also Adjunct Professorship with Concordia University (1981-1990) and McMaster University (1991-2002).

Helmi is professional engineer of Ontario since 1980. He is a Fellow of SME (Society of Manufacturing Engineers), Fellow of the College International pour la Recherche en Productique (CIRP), and Fellow of the American Society of Mechanical Engineers (ASME). He is the recipient of 'Queen Elizabeth II Diamond Jubilee Medal' (2013), and the prestigious 'ASME Blackall Machine Tools and Gage Award, (1989). He received numerous recognitions from ASME and ASTM for being the principal organizer and editor of symposia related to manufacturing and tribology. Helmi is on the editorial board of a number of international journals and was an Associate Editor of the ASME Transactions, Journal of Engineering for Industry (Metal cutting), 1990-1996.

Helmi Attia is recognized by his peers in the areas of machining, thermal deformation of machine tools and fretting wear/fatigue. To his credit, Helmi has authored/coauthored some 260 papers in archival journals and refereed conference proceedings, and some 125 technical research reports. He was also the principal editor of 6 ASME and ASTM books and bound volumes.

Abstract

Surface Integrity in Machining Aerospace Materials and Its Impact on Functional Performance

Surface integrity is one of the most critical output of a machining operation. It has significant impact on the safety, performance, and fatigue life of aerospace components subjected to dynamic loads in harsh environments. The typical aspects of machining-induced integrity including residual stresses, surface roughness and defects, microhardness, near-surface microstructure modification, dynamic recrystallisation and grain refinement are discussed and correlated to the variables of machining system. Special attention is paid to how to control the machining-induced residual stresses by optimizing the cutting parameters, tool geometry, and the cooling strategy. Post-processing options, such as shot peening, burnishing and laser-assisted surface treatment are discussed as means for mitigating induced surface defects and for further improving surface integrity.

The fundamental aspects of residual stress formation during cutting are discussed in relation to: (a) the contribution of thermal and mechanical loads and (b) the effect of the coupling of thermal load and phase transformation. In addition to its effect on fatigue life reduction, the effect of machining-induced residual stresses on the distortion of thin-walled aerospace components is assessed in comparison with the magnitude of distortion produced by the bulk stresses. An overview of the effect of cryogenic cooling strategy of selected difficult-to-machine materials, aerospace alloys, and lightweight materials on machining-induced residual stresses is presented and compared to dry, minimum quantity lubrication, and flood cooling.

Thomas Bergs,
Prof. Dr.-Ing., MBA

Biography

Thomas Bergs is head of the Chair of Manufacturing Technology at the Laboratory for Machine Tools and Production Engineering WZL at RWTH Aachen University. In his capacity as a Member of the Board of Directors of the Fraunhofer Institute for Production Technology IPT Aachen, he also leads its Process Technology Division. Born in 1967 he studied mechanical engineering at the University of Duisburg GH and the RWTH Aachen University. He graduated in 1995 having written his diploma thesis at the Engineering Research Center for Net Shape Manufacturing in Columbus, Ohio.

In 2001 he went on to earn a doctorate in engineering at the RWTH Aachen University for which he was awarded the Borchers Plaque. He also graduated as an Executive Master of Business Administration in 2011.

Thomas Bergs was a research associate in the Process Technology Section at the Fraunhofer Institute for Production Technology IPT in Aachen from 1995 to 2000. In the year 2000, he was appointed Manager of the Laser Engineering Group and of the Business Unit »Aachener Werkzeug- und Formenbau« (Aachen Tool and Die Making).

From 2001 until 2018 he also held the position of Managing Chief Engineer. Thomas Bergs additionally was the Managing Director of Aixtooling GmbH in Aachen, whose core area of expertise is in tool making for the precision glass molding sector. As the successor to Professor Fritz Klocke, Thomas Bergs was appointed as Professor at the Chair of Manufacturing Technology at WZL in 2018.

Abstract

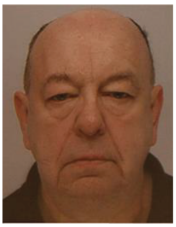
From Process Signature to Digital Twin for Part Surface Integrity in Manufacturing

The keynote gives an overview on the development of digital twins for manufacturing processes based on the concept of process signatures to describe the influence of the machining process on the workpiece and therefore the resulting final part quality. It especially focuses on the industrial- and application-driven perspective to develop the digital twin for the physical assets – meaning the workpiece.

The keynote will also consider the tool, which can also be represented as a digital twin in its usage phase, interacting with the workpiece. This is straight forward in its methodology development as the physical asset reflects the only directly applicable data and information carrier along its overall life cycle from the manufacturing up to the use phase of the components involved. The individual manufacturing process is finally indirectly represented by the modelling of the mechanical, thermal and chemical material loads and the resulting surface modifications during the interaction as a kind of "transfer function" represented by the process signature.

The contribution exemplarily shows the current state of realization for various manufacturing processes, the potential benefits of this new approach and necessary next steps for successful implementation. It will also provide a general framework, how to implement the digital twin approach in a digital manufacturing environment.

Keynote speaker



Philippe Gilles ,
Expert consultant for AREVA group, GEP-INT Consulting CY

Keynote sponsored by the institut Carnot, Ingenierie@Lyon

Biography

He graduated ENSMA, a top French university for mechanics and aeronautics. During 4 years, he worked on fatigue crack path prediction at the French research institute of aeronautics O.N.E.R.A.

He joined AREVA-NP (Formerly FRAMATOME) in 1981. He was assigned as Technical Manager of the IPIRG program, and was a Visitor Scientist at Battelle Columbus Division in 1988. He participated to numerous international conferences and research projects. In 1990, he has been appointed senior expert in Fracture Mechanics. In 1995 he developed a J-estimation scheme for elbows now included in the French RSEM code. He managed during more than ten years a large Research and Development activities in the mechanical field on the large components. The corresponding activities covered a large spectrum: design, fatigue, fracture, and welding and wear numerical simulation.

In 2006 he was appointed AREVA Fellow for the AREVA group. He was in charge of expertise for the AREVA group in the domain of mechanics and materials.

In 2013 he belonged to the Scientific Direction of AREVA within AREVA BS.

His highest priority task was to develop within AREVA the numerical simulation of manufacturing, welding and mitigation treatments processes. For this purpose he supervised several theses, masters or post-doctorate and he maintains active excellent connections with laboratories working on these topics in Europe and Asia. He has published more than one hundred and seventy papers.

In 2016, he created a French Limited Company GEP-INT offering services in Fracture Mechanics, welding simulation and surface integrity. At present he is consulting for AREVA.

Abstract

Surface integrity in civil nuclear industry

Nuclear plant components are designed for long term operation and to withstand severe accidents. According to the reactor type, their components are submitted to high pressure or high temperatures, thermal shocks, seismic events. Therefore, structural integrity is the main concern in nuclear engineering. The second matter is the aging of materials by irradiation embrittlement, loss of ductility under in service temperature generation of cracks by fatigue or corrosion. The third matter is the prevention of fast fracture.

These three issues are addressed at the design level, by a selection of materials minimizing aging and exhibiting a minimum fracture resistance. Standards and specifications are required to prevent or to detect defects at the manufacturing and welding steps. Over the plant's operating lifetime, in service inspection is conducted on the boundaries of the coolant systems.

In the past decade, stress corrosion and thermal fatigue cracking problems led to define guidelines introducing surface treatments such as laser de-sensitization or compressive residual stress. Furthermore, visual examination or pressure vessel components has taken increased importance.

Vendors and utilities have conducted a considerable amount of R&D studies on the effect of machining on surface integrity and developed mitigation techniques such as laser shock or water jet peening.

In nuclear plants, surface integrity issues are addressed through several recommendations included in construction and maintenance codes as well as in mitigation procedures. However, a link should be made between surface finish characterization, residual stress fields and subsurface behavior laws in the perspective of integration at the design stage.

Bernhard Karpuschewski,
Professor

Biography

Bernhard Karpuschewski graduated from the University of Hannover, Germany.
He received his Ph.D. degree in 1995 with a thesis titled "Micromagnetic surface integrity analysis of case hardened steel workpieces" at the Institute for Production Engineering and Machine Tools (IFW), University of Hannover.

From 1995 until April 1999 he worked as chief engineer of the Institute. From May 1999 until October 2000 he accepted a position as Associate Professor at the Keio University, Yokohama (Japan). Following this he was appointed as full professor for production engineering and head of the Laboratory for Production Technology and Organisation (PTO) at the Technical University of Delft (Netherlands), where he worked until March 2005.

From April 2005 until August 2017 he worked as full professor for production engineering and managing director of the Institute for Production Technology and Quality Management (IFQ) at the Otto-von-Guericke-University in Magdeburg (Germany).

Since September 2017, he is professor at the University of Bremen (Germany) and director of the Division Manufacturing Technology at the Leibniz Institute for Materials Engineering IWT.

Since August 2001 he is a member of the International Academy for Production Engineering Research (CIRP) and became a fellow in 2005. He is currently Editor-in-chief of the CIRP Journal.

Abstract:

Process Signature – Knowledge-based approach towards function-oriented manufacturing

Surface layer properties are of crucial importance for the functional behavior of manufactured components. For the vision of a function-oriented production, the relevant surface layer properties for the considered functional properties (e.g. fatigue strength, corrosion resistance) are to be generated by an adequate selection and adjustment of the manufacturing process. In order to accomplish this in a resource-efficient manner, extensive knowledge about the impact of manufacturing processes on the workpiece material is required.

During the process, the material responds to external loads (e.g. process forces, temperature in the contact zone) which are transformed into internal material loads (e.g. strain, temperatures within the material, chemical potential), which then are responsible for the resulting material modifications (e.g. changes in hardness, residual stress, chemical composition). The correlation between material modifications and internal material loads is described in Process Signatures. This keynote shows exemplary Process Signatures and their use in generating targeted surface layer properties.

The key scientific challenges are developments towards a deeper understanding of the underlying mechanisms leading to modifications in the microstructure and the derivation of suitable descriptive quantities for the responsible internal material loads, which can usually only be obtained from process simulations. Based on this, a prediction and knowledge-based generation of depth profiles of surface layer properties is possible, wherefore first approaches are presented in this keynote.

Guillaume Kermouche,

Professor at "Mines Saint-Etienne" France, head of the "Physics and Mechanics of Materials" group, deputy director of the Georges Friedel Laboratory (LGF)

Biography

After a MSc degree in Mechanical Engineering in 2002, G. Kermouche received his PhD in Mechanical Science (Tribology, Mechanics of Materials) in 2005 from "Ecole Centrale de Lyon". He received the award of the best PhD thesis in tribology in France (HIRN award).

G. Kermouche was first appointed as an assistant professor in ENI St-Etienne from 2006 to 2012 before joining "Mines Saint-Etienne" as a full professor in 2012.

In 2015, he was a "visiting professor" for 4 months at McGill University (Montreal, Canada) in the group of Professor Chromik in the "Mining and Materials Engineering" department. Guillaume Kermouche's main contributions deal with the measurement and the modelling of mechanical properties of materials at the micronscale, and microstructure evolution induced by surface thermomechanical loadings, i.e. dynamic recrystallization, grain fragmentation …

He is particularly involved in the development of (sub)surface characterization methods to investigate consequences of manufacturing processes in terms of surface integrity. In the very past few years he developed novel approaches to investigate small-scale mechanical properties under extreme conditions (high strain rate, high temperature).

Abstract

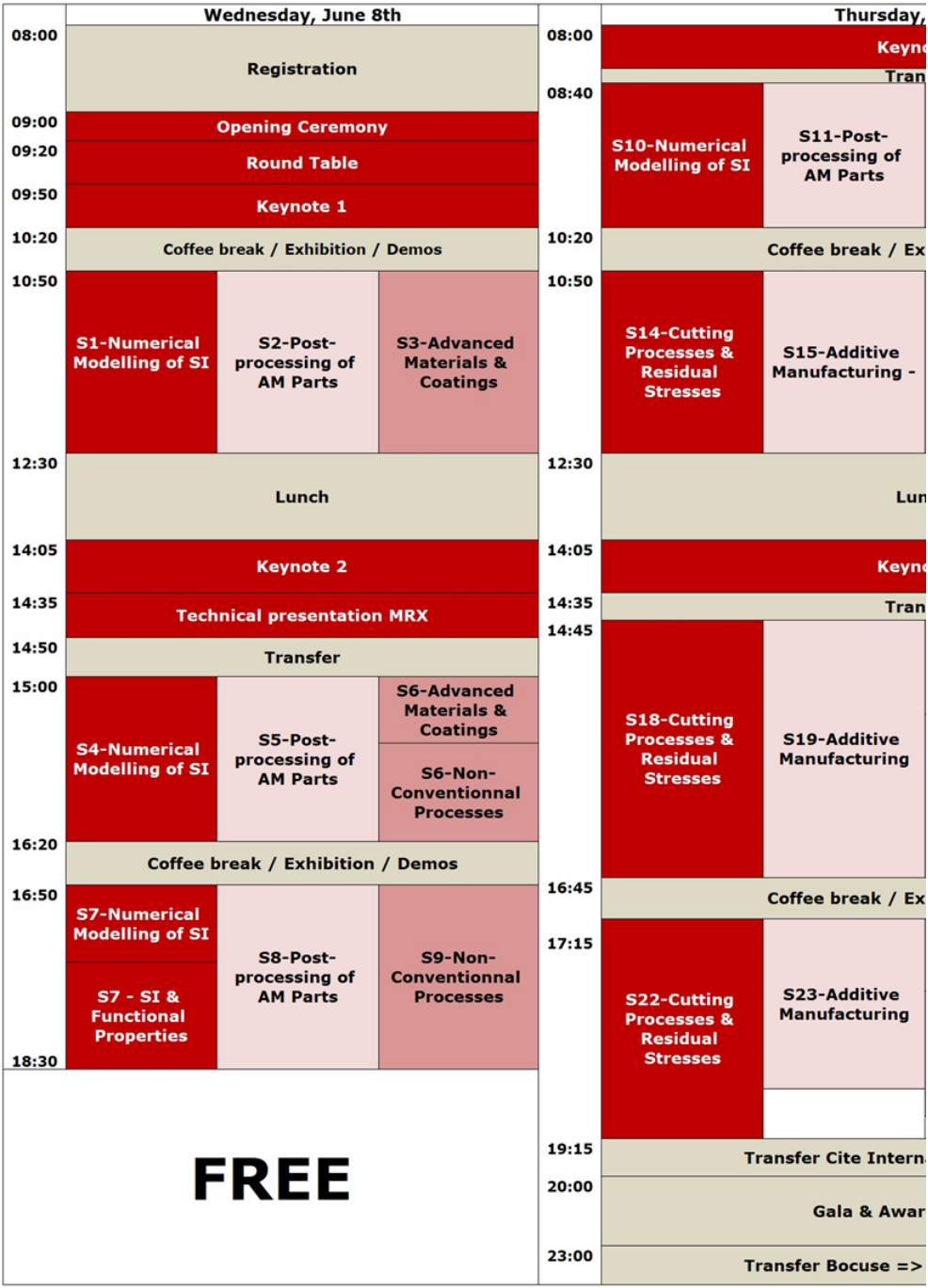
On the use of nanomechanical testing to characterize transformations of materials induced by surface manufacturing processes.

Surface manufacturing processes - such as machining, shot peening, burnishing, polishing …, - are known for their consequences on surface integrity. They are mostly triggered by repeated and intense contact loadings leading to large plastic deformation, high strain strain rate and high temperature rise in the near-surface. A significant in-depth gradient of mechanical properties is usually observed over 10 to 100 µm depending on the process. This gradient is a consequence of near-surface materials transformation and can play on materials performance (fatigue, stress-corrosion, wear). The accurate characterization of the mechanical properties of these new materials at the right scale is therefore of primary importance. It can be made through the use of suitable methodologies based on nanomechanical testing –i.e. micropillar compression, nanoindentation. The nanomechanical testing field is actually reaching a maturity level that allows its deployment to materials transformation induced by surface manufacturing processes.

The first part of this presentation will be dedicated to a brief review of the last developments in the nanomechanical testing field, with a special focus on high temperature, high strain rate and fatigue testing.

The second part will deal with the application of nanomechanical testing to investigate consequences induced by manufacturing processes. More specifically, various cases ranging from severe shot peening to sliding friction contacts are investigated.

The last part of this presentation will focus on a new high-temperature nanoindentation procedure developed on purpose to investigate the thermal stability of these surface-processed materials.


Wednesday, June 8th
08:00
Registration
09:00
Opening Ceremony
09:20
Round Table
09:50
Keynote 1
10:20
Coffee break / Exhibition / Demos
10:50
S1-Numerical Modelling of SI
S2-Post-processing of AM Parts
S3-Advanced Materials & Coatings
12:30
Lunch
14:05
Keynote 2
14:35
Technical presentation MRX
14:50
Transfer
15:00
S4-Numerical Modelling of SI
S5-Post-processing of AM Parts
S6-Advanced Materials & Coatings
S6-Non-Conventionnal Processes
16:20
Coffee break / Exhibition / Demos
16:50
S7-Numerical Modelling of SI
S7 - SI & Functional Properties
S8-Post-processing of AM Parts
S9-Non-Conventionnal Processes
18:30
FREE
Thursday,
08:00
Keyn
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08:40
S10-Numerical Modelling of SI
S11-Post-processing of AM Parts
10:20
Coffee break / Ex
10:50
S14-Cutting Processes & Residual Stresses
S15-Additive Manufacturing -
12:30
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S18-Cutting Processes & Residual Stresses
S19-Additive Manufacturing
16:45
Coffee break / Ex
17:15
S22-Cutting Processes & Residual Stresses
S23-Additive Manufacturing
19:15
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June 9th			Friday, June 10th		
te 3		08:00	Keynote 5		
sfer			Transfer		
S12-Non-Conventionnal Processes	S13-Cutting Processes & Microstructure	08:40	S26-Cutting Processes & Residual Stresses	S27-SI & Functional Properties	S28-Abrasive Processes
hibition / Demos		10:20	Coffee break / Exhibition / Demos		
S16-Composite structures	S17-Cutting Processes & Microstructure	10:50	S29-Cutting Processes & Residual Stresses S29-Cutting Processes & Surface Topography	S30-SI & Functional Properties	S31-Abrasive Processes
ch		12:30	Closing ceremony		
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S20-Composite Structures	S21-Cutting Processes & Microstructure				
S20-Surface Mechanical Treatments	S21-Cutting Processes & Surface Topography				
hibition / Demos					
S24-Surface Mechanical Treatments	S25-Surface Integrity & Functional Properties				
S24-Abrasive Processes					
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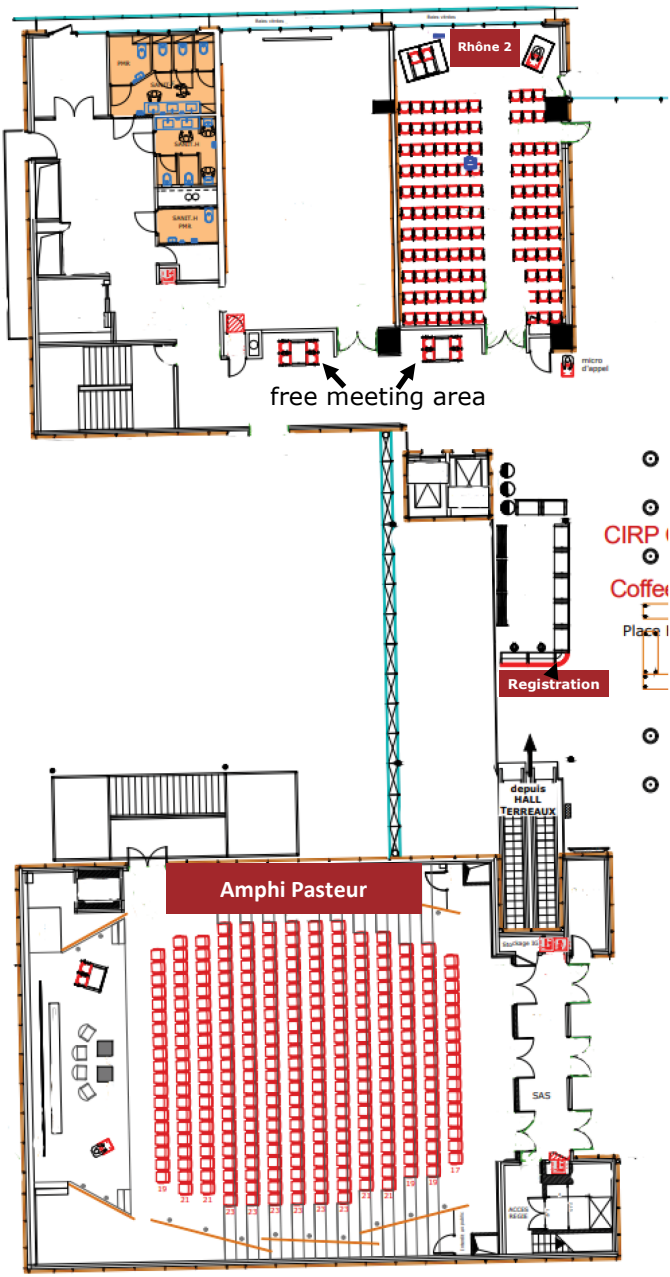
Room AMPHI PASTEUR
Room RHONE 3A
Room RHONE 3B
Room RHONE 2

Room plan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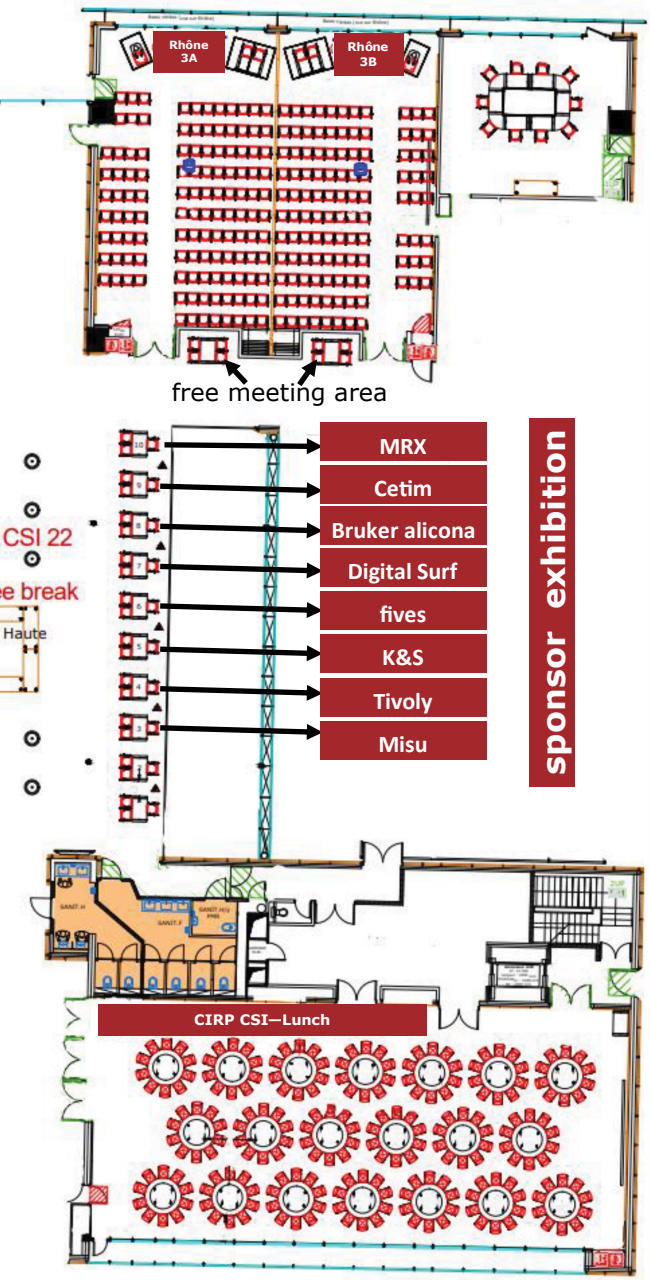
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sponsor exhibition
CSI 22
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Haute
CIRP CSI—Lunch

Wednesday, June 8th, Morning session			
	Room AMPHI PASTEUR		
08:00-09:00	REGISTRATION		
09:00-09:20	OPENING CEREMONY		
09:20-09:50	ROUND TABLE		
09:50-10:20	**Keynote 1** **B.KARPUSCHEWSKI** Process Signature – Knowledge-based approach towards function-oriented manufacturing		
10:20-10:50	Coffee break / Exhibition / Demos		
10:50-11:10	S1-Numerical Modelling of SI Chair: F.DUCOBU		A Finite Element Analysis Based Approach to Understand the Effects of Targeted Minimum Quantity Cutting Fluid Application on Surface Integrity C. S. Rakurty, Nithin Rangasamy, A. K. Balaji, **Swapnil Pandey**
11:10-11:30			Numerical prediction of machining induced residual stresses when hard cutting AISI 4140 **Markus Meurer**, Berk Tekkaya, Daniel Schraknepper, Thomas Bergs, Sebastian Münstermann
11:30-11:50			Thermal process signature in machining of Ti-6Al-4V with worn tools **E-Lexus Thornton**, Julius Schoop
11:50-12:10			Numerical investigations on residual stresses in orthogonal cutting of Ti-6Al-4V Kejia Zhuang, Yujian Huang, **Jian Weng**, Delai Zhang, Jinming Zhou
12:10-12:30			Machining subsurface deformation under various rake angles **Dong Zhang**, Shuang Zhao, Xiao-Ming Zhang, Han Ding
12:30-14:05	LUNCH		

Wednesday, June 8th, Morning session					
Room RHONE 3A			**Room RHONE 3B**		
Coffee break / Exhibition / Demos					
S2-Post-processing of AM Parts - Chair: R.M'SAOUBI		Analysis of Plasma-Electrolytic Polishing Process Initiation H.Zeidler, T. Bottger, S. Schroder, M.Schneider, C. Lammel, F.Sahr, J.Tardelli, **Loic Exbrayat**	**S3-Advanced Materials & Coatings - Chair: I.S.JAWAHIR**		Influence of Surface Integrity and Coating on the High Cycle Fatigue Properties of 300M Steel from Self-Heating Tests under Cyclic Loads **P. Lepitre,** S. Calloch, C. Doudard, M. Dhondt et M. Surand
		Electropolishing of 316L stainless steel parts elaborated by selective laser melting: from laboratory to pilot scale **Marie-Laure Doche**, J.-Y. Hihn, E. Drynski, F. Roy, A. Boucher, J.Rolet, J.Tardelli			Effect of actual surface area on adhesion strength of copper electroplated on ABS plastic via photolithography micro-texturing **Ruslan Melentiev,** R. Tao, L. Fatta, A. K. Tevtia, G. Lubineau
		Surface integrity of new dry-electropolishing technology on WC-Co cemented carbides **Guiomar Riu**, Dominik Weil, Luis Llanes, Kurt E. Johanns, Warren C. Oliver, Joan Josep Roa			Surface hardening in finishing of sintered and thermal sprayed X120Mn12 **Hendrik Liborius,** T. Lindner, A. Nestler, T. Uhlig,T. Lampke, G. Wagner, A. Schubert
		Small-scale mechanical response at intermediate/high temperature of 3D printed WC-Co Guiomar Riu, **Joan Josep Roa**			Modification of Surface and Sub-Surface Conditions of Cemented Carbide by Pressurized Air Wet Abrasive Jet Machining for PVD Coatings **A.L.Meijer,** A. Ott, D.Stangier, W. Tillmann, D.Biermann
		Efficient polishing of additive manufactured titanium alloys K.Navickaitė, K.Nestler, F. Bottger-Hiller, C.Matias, A.Diskin, Oz Golan, A. Garkun, E.Strokin, R.Biletskiy, D. Safranchik, **H.Zeidler**			Amorphous Carbon Coated Silicon Wafer as Mold Insert for Precision Glass Molding **Lin Zhang,** Jiwang Yan
LUNCH					

	Wednesday, June 8th, Afternoon session		
14:05-14:35	**Room AMPHI PASTEUR** Keynote 2 **P.GILLES** Surface integrity in civil nuclear industry		
14:35-14:50	**Technical presentation MRX**		
14:50-15:00	**Transfer**		
15:00-15:20	**S4-Numerical Modelling of SI Chair:G.GERMAIN**		Micro-texture dependent temperature distribution of CVD diamond thick film cutting tools during turning of Ti-6Al-4V E. Uhlmann, **D. Schroter**, E. Gartner
15:20-15:40			Effect of Chip Segmentation on Machining-Induced Residual Stresses during Turning of Ti6Al4V **Bin Shi**, E. Abboud, M. Helmi Attia, V.Thomson
15:40-16:00			Simulation of internal material loads caused by simultaneous contacts in grinding with predominantly mechanical impact **Marco Eich**, A. Karahan, B. Ljatifi, L. Langenhorst, D. Meyer, C. Heinzel
16:00-16:20			Effect of thermomechanical loads and nanocrystalline layer formation on induced surface hardening during orthogonal cutting of AISI 4140 **German Gonzalez**, F. Sauer, M. Plogmeyer, M. Gerstenmeyer, G. Brauer, V. Schulze
16:20-16:50	Coffee break / Exhibition / Demos		
16:50-17:10	**S7-Numerical Modelling of SI Chair: Y.KAYNAK**		Influence of local material loads on surface topography while machining steel 42CrMo4 and Inconel 718 **Tjarden Zielinski**, A. Vovk, O.Riemer, B.Karpuschewski
17:10-17:30			3D Numerical modelling of turning-induced residual stresses in 316L stainless steel **Abderrahmen Aridhi,** T. Perard, B. Truffart, M. Girinon, A. Brosse, H. Karaouni, F. Valiorgue, J. Rech
17:30-17:50			Investigation performance of holders with shape memory dampers against chatter vibration J.Henrique Schiavon Mota, E.Bruno Lara Rosa, J. Vitor Carvalho Fontes, S. Bruce Shiki, P.Gargarella, C.Eiji Hirata Ventura, **A. Italo Sette Antonialli**
17:50-18:10	**S7 - SI & Functional Properties Chair: Y.KAYNAK**		Free surface energy evaluation in the laser texturing of a carbon steel s275 **Fermin Banon**, R. Montano, J. Manuel Vazquez-Martinez, J. Salguero
18:10-18:30			Experimental investigation on friction under machining conditions with cutting fluid supply **Nicklas Gerhard**, T.Gottlich, D. Schraknepper, T. Bergs

Wednesday, June 8th, Afternoon session					
Room RHONE 3A			**Room RHONE 3B**		
Transfer					
S5-Post-processing of AM Parts Chair: H.CHANAL		A comparison of post-processing techniques for Additive Manufacturing components **Matthieu Rauch**, Jean-Yves Hascoet	**S6-Advanced Materials & Coatings Chair: D.MEYER**		Cr/CrN multilayer coating effect on the surface integrity of Ti-6Al-4V alloy under fatigue loadings **M.Ferreira Fernandes**, V.M. de Oliveira Velloso, H. J. Cornelis Voorwalda
		Superhydrophobic surface process.for selective laser melting of metal parts W.Huang, B. Nelson, R. Mullennex, D.Kokabi, H. Hu, C.Eluchie, Hui Hc, A. Samanta, E.Faierson, **H. Ding**			Residual stress assessment during cutting tool lifetime of CVD-diamond coated indexable inserts E. Uhlmann, **D. Hinzmann**
		Surface finishing of EBM parts by (electro)chemical etching **Laurent Spitaels,** E. Riviere-Lorphevre, M. Cantero Diaz, J.Duquesnoy, F.Ducobu	**S6-Non Conventionnal Processes Chair: D.MEYER**		Surface defect detection and prediction in carbide cutting tools treated by lasers **Kafayat Eniola Hazzan,** Manuela Pacella
		The effect of femto-second laser shock peening on the microstructures and surface roughness of AlSi10Mg samples produced with (SLM) **Erica Liverani,** Yuxin Li, A. Ascari, X. Zhao, A. Fortunato			Experimental validation of workpiece deformation simulations by means of rigorous boundary condition analysis **Andreas Tausendfreund,** F.Frerichs, D. Stobener, A.Fischer
Coffee break / Exhibition / Demos					
S8-Post-processing of AM Parts Chair: M.L.DOCHE		Post-Process for ALM parts in aerospace industry. A. Poloni, **M.Dessoude,** D.Ohier	**S9-Non-Conventionnal Processes Chair: F.SALVATORE**		Comparison of temperature and displacement measurements with load simulations for the determination Process Signatures **F.A.Frerichs**, A.B.Tausendfreund, T.Lübben
		Areal surface texture and tool wear analysis from machining during powder bed fusion **Kossi Loic M. Avegnon**, D. C. Schmitter, S. Meisman, H.Hadidi, B. Vieille, M. P. Sealy			Surface Integrity of Wire Electrochemical Machined Inconel 718 T.Herrig, **L.Heidemanns**, L.Ehle, T.E.Weirich, T.Bergs
		Enhancing Surface Integrity of Additively Manufactured Inconel 718 by Roller Burnishing Process N. Yamana, N. Sunay, M. Kaya, **Y.Kaynak**			Discharge energy based optimisation of sinking EDM of cemented carbides **T.Petersen**, U.Küpper, A.Klink, T.Herrig, T.Bergs
		Numerical modelling of the drag finishing process at a macroscopic scale to optimize surface roughness improvement on additively manufactured (SLM) Inconel 718 parts **I. Malkorra**, H. Souli, F. Salvatore, P. Arrazola, A. Mathis, J. Rolet			The influence of surface finishing on laser heat treatments of a tool steel **J N Lagarinhos**, S Santos, G Miranda, D Afonso, R Torcato, C Santos, J M Oliveira
		Influence of dry ice blasting process properties on surface roughness &residual stresses of machined & additive manufactured workpieces **S.Amon**, A. Jobst, M.Merklein, N. Hanenkamp			

Thursday, June 9th, Morning session						
	Room AMPHI PASTEUR				Room RHONE 3A	
08:00-08:30	**Keynote 3** **T.BERGS** From Process Signature to Digital Twin for Part Surface Integrity in Manufacturing					
08:30-08:40	**Transfer**					
08:40-09:00	**S10-Numerical Modelling of SI / Chair: B.KARPUSCHEWSKI**		Effect of cutting edge radius on cutting force & surface roughness in machining of Ti-6Al-4V **K.Zhuang**, Ji. Gao, T. Ye, Xing Dai	**S11-Post-processing of AM Parts / Chair: T.BERGS**		Quantification and Surface Analysis on Blasting of PBF-LB Additively Manufactured Components **C. Maucher**, P. Cera, H.-Christian Mohring
09:00-09:20			Correlation between subsurface properties, the thermo-mechanical process conditions & machining parameters using the CEL simulation method **V. Guski,** R.Wegert, S.Schmauder, H.-Christian Mohring			Force-controlled burnishing process for high surface integrity on additive manufactured parts **M. Dix**, M. Posdzich
09:20-09:40			A modified Johnson-Cook constitutive model for improved thermal softening prediction of machining simulations in C45 steel **J.Priest,** H. Ghadbeigi, S.Ayvar-Soberanis, A. Liljerehn, M.Way			Effect of Process Parameters on Surface Integrity of LPBF Ti6Al4V **D. Simson**, S. Kanmani Subbu
09:40-10:00			Numerical analysis of process-tool-interactions in micro milling **A. Lange**, D. Müller, B. Kirsch, Jan C. Aurich			Effect of mechanical finishing on residual stresses and application behavior of wire arc additive manufactured aluminum components B. Denkena, M. Wichmann **Ph. Pillkahn**
10:00-10:20			Effects of asymmetric passivation of tool cutting edge on microstructure evolution when cutting Inconel 718 alloy **C.Hu**, J.Wang, L. Lin, F. Lin, C. Fu, J. Outeiro, K.Zhuang			Machinability of maraging steel multilayered claddings obtained via laser direct energy deposition in micromilling operations L. Lizzul, M. Sorgato, **R. Bertolini,** A. Ghiotti, S. Bruschi
10:20-10:50	**Coffee break / Exhibition / Demos**					

Thursday, June 9th, Morning session

	Room RHONE 3B	Room RHONE 2
	Transfer	
S12-Non-Conventionnal Processes / Chair: F.PUSAVEC	Research on surface integrity optimization of TC-4 alloy surface structureprocessed by picosecond laser G. Xiao, **O.Lin,** S. Song, Z.Deng	**S13-Cutting Processes & Microstructure / Chair: F.SALVATORE** Surface integrity in high-feed roughing of Inconel 718 with SiAlON end mills **R.Zimmermann,** N. Michel-Angeli, D.Welling, Ph. Ganser, Th. Bergs
	Application of RISA grinding method to multiple optical glasses **Hinata Takamaru**, T. Kawasato, K. Watanabe, M. Fukuta, K. Tanaka, Y. Chibc, H. Kato, M. Naganc, Y. Kakinuma	Machining-induced Surface Integrity in Brass Alloys E. Tascioglu, **N. Zoghipour,** S.Sharif, Y. Kaynak
	Electric Discharge Assisted Surface Texturing of Stainless Steel 304 R. Khandizod, V. Varghese, **Soham Mujumdar**	Effect of microstructure on the surface integrity of aluminium alloy during orthogonal turning with edge radiused tool **S. Ellappan,** A. Ahmed, M.Azizur Rahman
	Comparisons on localized surface modifications of stainless steels induced by laser shock peening and robotic hammer peening **Hongfei Liu,** Tzee Luai Meng, Jing Cao, Chee Kiang Ivan Tan, Yuefan Wei, Niroj Maharjan	Surface Integrity of Diamond Turned (100)Ge M. Tunesi, **D.A. Lucca,** M.A. Davies, A. Zare, M.C. Gordon, N.E. Sizemore, Y.Q. Wang
	Numerical Investigation of the EDM Induced Temperature Field in a Composite Ceramic **R. Hess**, M. Olivier, S. Schneider, L. Heidemanns, A. Klink, T. Herrig, T. Bergs	Modeling of surface hardening and roughness induced by turning AISI 4140 QT under different machining conditions B.Stampfer, J. Bachmann, D.Gauder, **David Bottger**, M.Gerstenmeyer, G. Lanza, B. Wolter, V. Schulze
	Coffee break / Exhibition / Demos	

Thursday, June 9th, Morning session						
	Room AMPHI PASTEUR				Room RHONE 3A	
10:50-11:10	S14-Cutting Processes & Residual Stresses / Chair: F.VALIORGUE		Effects of residual stresses on part distortion in machining of 7075-T6 aluminum alloy **M.Ali Louhichi**, G. Poulachon, P. Lorong, J. Outeiro, E. Monteiro	S15-Additive Manufacturing / Chair: D.A.LUCCA		Effect of additive manufacturing process parameters on the titanium alloy microstructure, properties and surface integrity **S.-Saeid Biriaie**, M.Nouari, H. Ben Boubaker, P. Laheurte
11:10-11:30			Depth-resolved characterization of cryogenic hard turned surface layer of AISI 52100 by X-ray diffraction and scanning electron microscopy investigations **W. Ankener**, M.Smaga, J. Uebel, J. Seewig, F. Grossmanc, S. Basten, B.Kirsch, J. C. Aurich, T. Beck			Microstructure, texture and mechanical properties with raw surface states of Ti-6Al-4V parts built by L-PBF **Q. Gaillard**, S. Cazottes, X. Boulnat, S. Dancette, Ch. Desrayaud
11:30-11:50			Investigation on surface integrity in laser-assisted machining of Inconel 718 based on in-situ observation **H.Zhang,** R. Yan, B. Deng, J.Lin, M. Yang, F. Peng			PIM-like EAM of steel-tool alloy via bio-based polymer N. Charpentier, **T. Barriere**, F. Bernard, N. Boudeau, A. Gilbin, P. Vikner
11:50-12:10			Analysis of chip segmentation frequencies in turning Ti-6Al-4V for the prediction of residual stresses **F. Pachnek**, G. Gonzalez, D. Diaz Ocampo, M.Heizmann, F.Zanger			Surface Feature Characteristics of Laser Powder Bed Fusion of Nickel Super Alloy 625 Bulk Regions **J. C. Fox**, A. Sood, R.Isaacs, P.Brackman, B. Mullany, E. Morse, A. Allen, E. Costa Santos,Ch. Evans
12:10-12:30			Thermoelectric monitoring of surface properties in turning of aluminum alloys applying different cooling strategies **T.Junge**, T. Mehner, A. Nestler, A. Schubert, T. Lampke			Understanding the Parameter Effects on Densification and Single Track Formation of Laser Powder Bed Fusion Inconel 939 **G. Dursun**, A. Orhangul, A.Urkmez, G. Akbulut
12:30-14:05	LUNCH 12:30-14:05					

Thursday, June 9th, Morning session

	Room RHONE 3B		Room RHONE 2	
S16-Composite structures / Chair: M.CHERIF		Effect of Tool Geometry and LCO2 Cooling on Cutting Forces and Delamination when Drilling CFRP Composites Using PCD Tools **I. Rodriguez,** D. Soriano, G. Ortiz-de-Zarate, M. Cuesta, F.Pušavec, P.J. Arrazola	S17-Cutting Processes & Microstructure / Chair: V.WAGNER	An evaluation of non-destructive methods for detection of thermallyinduced metallurgical machining defects **M. Brown,** D.Curtis, G. McKee, P.Crawforth
		Study of the surface integrity during CFRP trimming: Tool material and geometry, fiber orientation and tool wear effect analysis **I. Urresti**, I.Llanos, L.N. Lopez de Lacalle, O.Zelaieta		Setting of deformation-induced martensite content in cryogenic external longitudinal turning B.Denkena, B. Breidenstein, M.-Andre Dittrich, M. Wichmann, **H. Nam Nguyen**, L. Vivian Fricke, D. Zaremba, S. Barton
		Surface integrity quantification in machining of aluminum honeycomb structure **H. Makich**, M. Nouari, M. Jaafar		Investigation of surface integrity on laser pre-heat assisted diamond turning of binderless tungsten carbide **K. You**, G. Liu, F. Fang
		Surface Quality in Dry Machining of CFRP Composite/Ti6Al4V Stack Laminate **Lh. Boutrih**, H. Makich, M.Nouari, L. Ben Ayed		Detecting material defects during turning of DA718 components **D. Pfirrmann**, P. Wiederkehr
		Hole quality analysis of AISI 304-GFRP stacks using robotic drilling **Th. Beuscart**, P.-Jose Arrazola, E. Riviere-Lorphevre, P. Flores, F. Ducobu		Investigation of the thermomechanical loads on the bore surface during single-lip deep hole drilling of steel components **J. Nickel**, N. Baak, F. Walther, D.Biermann

LUNCH 12:30-14:05

Thursday, June 9th, Afternoon session 14:05-17:15						
	Room AMPHI PASTEUR				Room RHONE 3A	
14:05-14:35		Keynote 4 H.ATTIA Surface Integrity in Machining Aerospace Materials and Its Impact on Functional Performance				
14:35-14:45	Transfer					
14:45-15:05	S18-Cutting Processes & Residual Stresses / Chair: Z.LIAO		Predictive modelling of cryogenic hard turning of AISI 52100 based on response surface methodology for the use in soft sensors **F.Grossmann**, S. Basten, B. Kirsch, W. Ankener, M. Smaga, T. Beck, J. Uebel, J.Seewig, J.C. Aurich	S19-Additive Manufacturing/ Chair: J.OUTEIRO		Machining-induced characteristics of microstructure-supported LPBFIN718 curved thin walls **S. Kumar Mishra**, G.Gomez-Escudero, H. Gonzalez-Barrio, A. Calleja-Ochoa, S. Martinez, L. Norberto Lopez de Lacalle
15:05-15:25			Evaluation of the influence of different milling parameters and tool wear on the rim zone of a 5-axis milled large gear **Ch.Zachert**, R. Greschert, D. Schraknepper, J. Brimmers, Th. Bergs			Assessment of Additive Manufacturing Surfaces Using X-ray Computed Tomography **C. Sen**, G. Dursun, A.Orhangul, G. Akbulut
15:25-15:45			Residual stress profiles induced by machining of two types of 27MnCr5 hardened steels **S. Han,** O. Cherguy, F. Cabanettes, H. Pascal, M. Cici, J. Rech			Revisiting the influence of the scanning speed on surface topography and microstructure of IN718 thin walls in directed energy deposition additive manufacturing **M. Brehier,** D. Weisz-Patrault, Ch. Tournier
15:45-16:05			Advanced experimental setup for in-process measurement of thermo-mechanical load and tool wear when drive shaft turning **M. Abouridouane**, Th.Augspurger, N. Reinisch, A.Rajaei, M.Fernandez, T. Viehmann, Th. Bergs			Build orientation effect on Ti6Al4V thin-wall topography by electron beam powder bed fusion **G. Maculotti**, G. Piscopo, G. Marchiandi, E. Atzeni, A. Salmi, L. Iuliano
16:05-16:25			Effect on surface integrity of high-productivity finishing on Ti-6Al-4V with wiper edge length tool **A. Dangremont Di Crescenzo,** M. Mousseigne, W. Rubio			Evolution of Residual Stresses induced by different L-PBF build orientations along a post-processing chain of 20MnCr5 steel **L. Robatto**, R. Rega, J. Mascheroni, A. Kretzer, I.Criscuolo, A. Borille
16:25-16:55			Influence of the reaming process on hole's surface integrity and geometry **T.Leveille,** F.Valiorgue, C.Claudin, J.Rech, A.Van-Robaeys, U.Masciantonio, A.Brosse, T.Dorlin			The effect of pre- and post-heat treatment on hardness and residual stress by laser metal deposition process of tungsten carbide (MetcoClad 52052) cladding on a CK45 substrate **M.Rabiey**, Ph. Würsten, L.Senne, L. Urban
16:55-17:15	**Coffee break / Exhibition / Demos**					

Thursday, June 9th, Afternoon session 14:05-17:15

	Room RHONE 3B		Room RHONE 2		
		Transfer			
S20-Composite Structures		Ultrasonic Vibration and Cryogenic assisted drilling of Aluminum-CFRP Composite Stack – An innovative approach **R. Bertolini,** N.Tamil Alagan, A. Gustafsson, E. Savio, A. Ghiotti, S. Bruschi	S21-Cutting Processes & Microstructure Chair : G.FROMENTIN		Characterization of deformation-induced martensite by cryogenic turning using eddy current testing **L. Vivian Fricke**, H.Nam Nguyen, J.Appel, B.Breidenstein, H. Jürgen Maier, D.Zaremba, S.Barton
S20-Surface Mechanical Treatments / Chair: V.SCHULZE		Monitoring the Surface Quality for Various Deep Rolling Processes – Limits and Experimental Results **O. Maiss**, K. Rottger	S21-Cutting Processes & Surface Topography/ Chair: G.FROMENTIN		Influence of the cutting edge on the surface integrity in BTA deep hole drilling – part 1: Design of experiments, roughness and forces **R.Schmidt**, S. Strodick, F.Walther, D.Biermann, A. Zabel
		Microstructural influence of consecutive deep rolling of AISI 4140 **M. Hettig,** D. Meyer			Influence of the cutting edge on the surface integrity in BTA deep hole drilling – part 2: Residual stress, microstructure and microhardness **S. Strodick,** R.Schmidt, D. Biermann, A. Zabel, F.Walther
		Main time-parallel mechanical surface treatment and surface texturing during machining **J. Schwalm**, F. Mann, M. Gerstenmeyer, F. Zanger, V. Schulze			An experimental study on surface quality of Al6061-T6 in ultrasonic vibration-assisted milling with minimum quantity lubrication **R. Hakkı Namlu**, O. Deniz Yılmaz, B. Lotfisadigh, S. Engin Kılıc
		Enhancing surface integrity of A7050-T7451 aluminum alloy by pneumatic machine hammer peening **A. Madariaga,** M. Cuesta, E. Dominguez, A. Garay,, G. Ortiz-de-Zarate, P.J. Arrazola			Dental Prosthesis Surface Integrity After CAD/CAM Milling **Lebon N.,** Tapie L.
		Numerical and experimental investigation on the residual stresses generated by scanning induction hardening **M. Areitioaurtena**, U.Segurajauregi, M Fisk, M. J. Cabello, E. Ukar			Machine learning models for surface roughness monitoring in machining operations **M.Prado Motta,** C.Pelaingre, A.Delameziere, L. Ben Ayed, C.Barlier
		Coffee break / Exhibition / Demos			

Thursday, June 9th, Afternoon session

	Room AMPHI PASTEUR		Room RHONE 3A	
17:15-17:35	S22-Cutting Processes & Residual Stresses / Chair: E.BRINKSMEIER	Empirical modeling of residual stress profiles in Ti6Al4V after face-milling A. Robles, M. Aurrekoetxea, S. Plaza, **I. Llanos**, O. Zelaieta	S23-Additive Manufacturing / Chair: N.MICHAILIDIS	Integrated design and dimensional compliance of Bound Powder Extrusion technology: A case study of an aircraft engine bracket **J. Kauffmann**, M. Chemkhi, J. Gardan
17:35-17:55		Investigation of residual stresses and workpiece distortion during high-feed milling of slender stainless steel components **H. Liu**, D. Schraknepper, Th.Bergs		Criticality of manufacturing defects on the fatigue resistance of Ti-6Al-4V alloy processed by Laser Powder Bed Fusion **F.Steinhilber**, J.Y.Buffiere, R. Dendievel, G.Martin, J.Lachambre, D.Coeurjolly
17:55-18:15		Residual Stress Maps Determination with global Digital Image Correlation **Th.Jovani**, H. Chanal, B.Blaysat, M. Grediac		Support Structure Impact in Laser-Based Powder Bed Fusion of AlSi10Mg **M. Schmidt**, S. Greco, D. Müller, B. Kirsca, Jan C. Aurich
18:15-18:35		Influence of lubrication mode onto residual stress generation in turning **E. Chaize**, F. Dumont, B. Truffart, M. Girinon, A. Brosse, T. Dorlin, F. Valiorgue , J. Rech		Innovative Additive Manufacturing Cutting Tool Design Methodology for Automotive Large Boring Operations such as E-Motor housing **Q. Massard**, J. Munoz, M. Raffestin, C.Urville, P. Faverjon
18:35-18:55		Investigation and reduced model of the variability of residual stress field of forged and machined parts **H.Chabeauti**, M.Ritou, B.Lavisse, G. Germain, V. Charbonnier		
18:55-19:15		Experimental investigation on surface integrity in a face milling operation **T. Perard**, F Valiorgue, C. Mehmet, J. Rech, M. Dumas, F. Lefebvre, J. Kolmacka, T. Dorlin		
19:15-20:00	**Transfer Cite Internationale => Bocuse**			
20:00-23:00	**Gala & Award Ceremony**			
23:00	**Transfer Bocuse => Cite Internationale**			

Thursday, June 9th, Afternoon session

	Room RHONE 3B		Room RHONE 2	
S24-Surface Mechanical Treatments Chair: F.CABANETTES		Impact of pre-machining on the surface and subsurface characteristics of deep rolled metastable austenitic 18CrNiMo7-6 **R.Zmich**, N. Mensching, M. Steinbacher, D. Meyer	S25-Surface Integrity & Functional Properties / Chair: H.GHADBEIGI	Study of machining strategies for CNC milling of cavities on Ultra High Molecular Weight Polyethylene **Roosevelt A. Santos**, Jorge L. Amaya, Carlos G. Helguero, Fausto A. Maldonado
		Effects of the Manufacturing Chain on the Surface Integrity when Machining Fir Tree Slots with Alternative Manufacturing Processes U. Küpper, **T. Seelbach**, L. Heidemanns, S. Prinz, T. Herrig, T. Bergs		Numerical Studies of Smart Structure With Piezoelectric Actuators to Enhance Surface Integrity **C. Zaccardi**, A. Mazette, L. Chamoin
S24-Abrasive Processes Chair: F.CABANETTES		Investigations of grinding burns on a nitrided steel B. Lavisse, L. Weiss, N. Kokanyan, A. Lefebvre, E. Henrion, O. Sinot, A. Tidu		Influence of the kinematic roughness resulting from facing of AMC specimens on preconditioning of friction surfaces **P. Eiselt**, S. J. Hirsch, A. Nestler, Th.Grund, A. Schubert, Th. Lampke
		Influence of superimposed low frequency oscillations on single-pass honing of long-chipping steel E. Uhlmann, **A. Rozek**		Interlaminar shear of FML produced with surface treatment by mechanical abrasion E. Pires Bonhin, E. Cocchieri Botelho, **M.Valerio Ribeiro**
		Magnetic-abrasive machining in manufacturing of medical implants B. Karpuschewski, Y.Kotsun, V. Maiboroda, **D. Borysenko**, M. Herbster, J. Solter		Effect of innovative finishing operations on the tribological performance of steel 27MnCr5 **A. Madariaga**, F. Abedrabbo, D. Soriano, R. Fernandez, P.J. Arrazola, O. Cherguy, F. Cabanettes, J.Rech, E. Butano , F. Gili, D. Mangherini

Transfer Cite Internationale => Bocuse

Gala & Award Ceremony

Transfer Bocuse =>Cite Internationale

	Friday, June 10th , Morning session		
	Room AMPHI PASTEUR		
08:00-08:30	**Keynote 5** **G.KERMOUCHE** On the use of nanomechanical testing to characterize transformations of materials induced by surface manufacturing processes		
08:30-08:40	Transfer		
08:40-09:00	S26-Cutting Processes & Residual Stresses Chair: P.ARRAZOLA		Machine Learning based Approach for the Prediction Surface Integrity in Machining **V. Kryzhanivskyy,** R. M'Saoubi, M. Bhallamudi, M. Cekal
09:00-09:20			A Multiscale Study on Machining Induced Surface Integrity in Ti-6Al-4V Alloy **Nithin Rangasamy**, C. S. Rakurty, A. K. Balaji
09:20-09:40			Experimental analysis of the impact of a simplified tool wear on the residual stresses induced by 15-5PH steel turning **F.Clavier**, F.Valiorgue, C.Courbon, J.Rech, H.Pascal, A.Van Robaeys, Y.Chen, J.Kolmacka, H.Karaouni
09:40-10:00			Tool development for hybrid finishing milling of iron aluminides **Julien Witte**, Dirk Schroepfer, Martin Hamacher, Heiner Michels, Christoph Hamm, Michael Appelt, Andreas Boerner, Thomas Kannengiesser
10:00-10:20			Microstructure analysis of single-lip deep hole drilled bores by electron backscatter diffraction and magnetic Barkhausen noise **Nikolas Baak**, Jan Nickel, Dirk Biermann, Frank Walther
10:20-10:50	**Coffee break / Exhibition / Demos**		

Friday, June 10th, Morning session					
Room RHONE 3A			**Room RHONE 3B**		
Transfer					
S27-SI & Functional Properties Chair: A.MADARIAGA		Analysis of the contact mechanics in machining using a novel high-speed tribometer **Joshua Priest,** Hassan Ghadbeigi, Sabino Ayvar-Soberanis, Anders Liljerehn, Matthew Way	**S28-Abrasive Processes Chair: A.FORTUNATO**		Honing process parameters influence on surface topographies C. Urville, T. Souvignet, Z. Dimkovski, **F. Cabanettes**
		Wear resistance enhancement of AISI 1045 steel by vibration assisted ball burnishing process **Eric Velazquez-Corral**, Ramon Jerez-Mesaa, Jordi Llum, Vincent Wagner, Gilles Dessein, J Antonio Travieso-Rodriguez			Surface parameters study of stainless steel 304L and nickel-based alloy 690 after grinding: effect of vortex cooling **Maxime Berthaud,** Jacqueline Caballero Hinostroza, Yoann Vidalenc
		On the tribological and machining performance of laser textured sintered carbide cutting tools in turning of Al2024 **Paul Butler-Smith**, Reza Nekouie Esfahani, Aneta Chrostek-Mroz, TianLong See			Structure Integrity Analysis on Nickel-Diamond Blade in Dicing Process of Hard-brittle Ceramic Die S.K. Lim, M. F. Zamri, A**.R. Yusoff**
		Impact of the drilling process on the surface integrity and residual fatigue strength of 2024-T351 aluminum parts **Yann Landon,** A.Lacombe, L. Arnaud K. Souop, A. Daidi, M.Paredes, C. Chirol, A. Benaben			Diamond coatings for advanced cutting tools in honing and grinding **S. Baron**, T. Tounsi, J. Gabler, G. Mahlfeld, C. Stein, M. Hofer, V. Sittinger, H.-W. Hoffmeister, C. Herrmann, K. Droder
		Effect of cryogenic friction conditions on surface quality **El Mehdi Skalante**, Hamid Makich, Mohammed Nouari			Research on Surface Integrity of GH4169 Superalloy Processed by Laser Belt Guijian Xiao, **Shuai Liu**, Yi He, Yun Huang
Coffee break / Exhibition / Demos					

	Friday, June 10th, Morning session		
	Room AMPHI PASTEUR		
10:50-11:10	29-Cutting Processes & Residual Stresses G.POULACHON		Ultrasonic assisted milling of a CoCrFeNi medium entropy alloy **Tim Richter**, Diego Delgado Arroyo, Andreas Boerner, Dirk Schroepfer, Michael Rhode, Thomas Lindner, Martin Loebel, Bianca Preu, Thomas Lampke
11:10-11:30	29-Cutting Processes & Surface Topography G.POULACHON		Investigation of the surface integrity when cryogenic milling of Ti-6Al-4V using a sub-zero metalworking fluid **Kevin Gutzeit**, Georgis Bulun, Gerhard Stelzer, Benjamin Kirsch, Jorg Seewig, Jan C. Aurich
11:30-11:50			Surface integrity in ultrasonic-assisted turning of Ti6Al4V using sustainable cutting fluid **Jay Airao**, Chandrakant K. Nirala, Jose Outeiro, Navneet Khanna
11:50-12:10			Marker-free identification of milled surfaces by analyzing stochastic and kinematic surface features by means of wavelet transformation Berend Denkena, Bernd Breidenstein, Marcel Wichmann, **Henke Nordmeyer**, Leon Reuter, Hendrik Voelker
12:10-12:30			Roughness values obtained in tests with ceramic tools Nilson Rodrigues da Silva, Marcelo Antunes de Paula, Jose Vitor Candido de Souza, Manoel Cléber de Sampaio Alves, **Marcos Valerio Ribeiro**
12:30	**Closing Ceremony**		

Friday, June 10th, Morning session

	Room RHONE 3A		Room RHONE 3B	
S30-SI & Functional Properties Chair: C.COURBON		Surface interactions of SiO2-nanofluids with 100Cr6-steel during machining **Christian Kohn**, Robar Arafat, Annelise Jean-Fulcrand, Tim Abraham, Christoph Herrmann, Georg Garnweitner	S31-Abrasive Processes Chair: Y.LANDON	Effect of abrasive grains size on surface integrity during belt finishing of a 27MnCr5 carburized steel **O. Cherguy**, U. Elicegui, F. Cabanettes, S. Han, M. Cici, H. Pascal, J. Rech
		Characterization of friction for the simulation of multi-pass orthogonal micro-cutting of 316L stainless steel N. Fezai, **L. Chaabani**, N.F. Niang, M.H. Bin Haamsir, M. Fontaine, A. Gilbin, P. Picart		Hybrid approach to evaluate surface integrity based on grinding power and Barkhausen noise **Jonas Heinzel,** Rahel Jedamski, Maximilian Rossler, Bernhard Karpuschewski, Jeremy Epp, Martin Dix
		Open hole surface integrity and its impact on fatigue performance of Al 2024-T3/Ti-6Al-4V stacks **Jia Ge,** Toby Feist, Alexander Elmore, Rincy Reji, Brian McLaughlin, Yan Jin		Influence of the hybridization of machining processes on surface integrity. A comprehensive approach to improving technological quality **W. Grzesik**
		The Effects of Substrate Material on Chitosan Coating Performance for Biomedical Application **Michela Sanguedolce**, Maria Rosaria Saffioti, Giovanna Rotella, Federica Curcio, Roberta Cassano, Domenico Umbrello, Luigino Filice		Hardness Penetration Depth Prediction in the Grind-Hardening Process through a Combined FEM model Flavia Lerra, Alessandro Ascari, **Alessandro Fortunato**
				A study on abrasive waterjet multi-stage machining of ceramics **M. Schüler,** T. Herrig, T. Bergs

Closing Ceremony

Cetim, the Technical Centre for Mechanical Industry, was established in France in 1965 in order to improve companies' competitiveness through mechanical engineering, transfer of innovations and advanced manufacturing solutions

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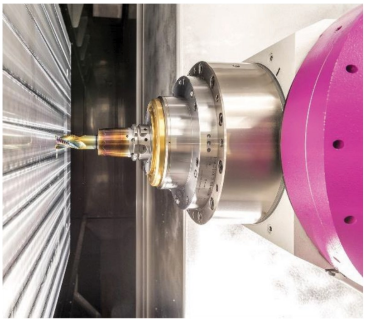

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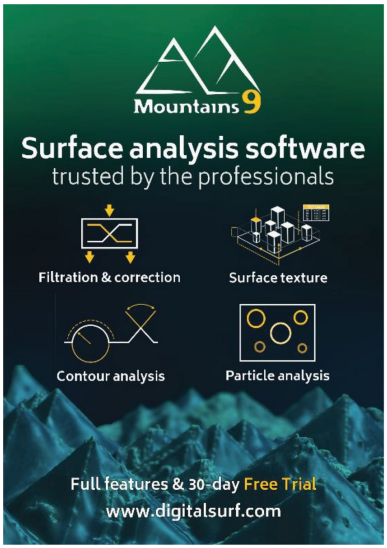

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FONDATION ENISE

The ENISE Foundation's strategy includes taking into account environmental, digital and societal changes. Within the framework of this strategy, its missions are to support the promotion and development of the School in its three areas of activity (training, research and transfer), to support students, particularly in the areas of entrepreneurship and international development, and finally to support innovation and research with companies in the framework of projects and chairs.

By placing people at the heart of its thinking, ENISE includes in its strategy the response to current transitions (social, societal, environmental, organizational, technical, economic, etc.). This concerns Engineering through Sustainable Development, Digitalization and Innovation.

The ENISE Foundation is under the aegis of the University of Lyon Foundation.

More information :

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LABEX MANUTECH-SISE
UNIVERSITÉ DE LYON

www.manutech-sise.universite-lyon.fr

The LABEX 2020-2024 project has the ambition to extend the MANUTECH «success story» that started in 2009 with the pioneering joint work of the Laboratoire de Tribologie et Dynamique des Systèmes, the Laboratoire Hubert Curien and HEF-IREIS on the subject of laser texturation for tribological applications.

LABEX 2020-2024 supports the development of scientific interactions between the «Optics-Photonics» and «Tribology-Mechanics» communities, whose partnership and scientific production is now internationally recognized.

Axis 1 «Surface Design & Manufacturing» focuses on the development of advanced laser processes and hybrid approaches – chemical, electrical, mechanical and optical – to structure surfaces on extreme scales, from large areas to the nanoscale.

Axis 2 «Surface & Interface Probing»:

The development of surface and interface engineering requires a constant progress in dedicated characterization methods. These methods allow to determine optical, mechanical and/or physico-chemical properties of surfaces/interface and, occasionally, their spatial distribution and time evolution. This information is crucial, for instance to validate a surface texturing protocol, or to interpret the response of an interface to various external stimuli (mechanical, optical, chemical).

Axis 3 «Multi-functional Surface Behavior» develops an interdisciplinary, multifunctional and multiscale approach to design surface properties subjected to specific solicitations, mostly in severe conditions such as those encountered in tribology, (tribo-)corrosion, photonics and optics, thermics, chemistry or sensorial perception.

Axis 4 «Innovative Integrated Surfaces & Processes»: The objective is to allow the production of demonstrators and/or prototypes, involving for example innovative functional surfaces from previous LABEX projects. In particular, support projects that allow to progress from a proof of concept (TRL3) to a technological demonstration and validation in a representative environment (TRL5).

Coordinator manager: Yves JOURLIN (Laboratoire Hubert Curien, UJM)
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Deputy coordinators: Bernard NORMAND (Mateis, INSA), Denis MAZUYER (LTDS, ECLyon)
Assistant manager: Aurélie GUILLARME (Université de Lyon) :
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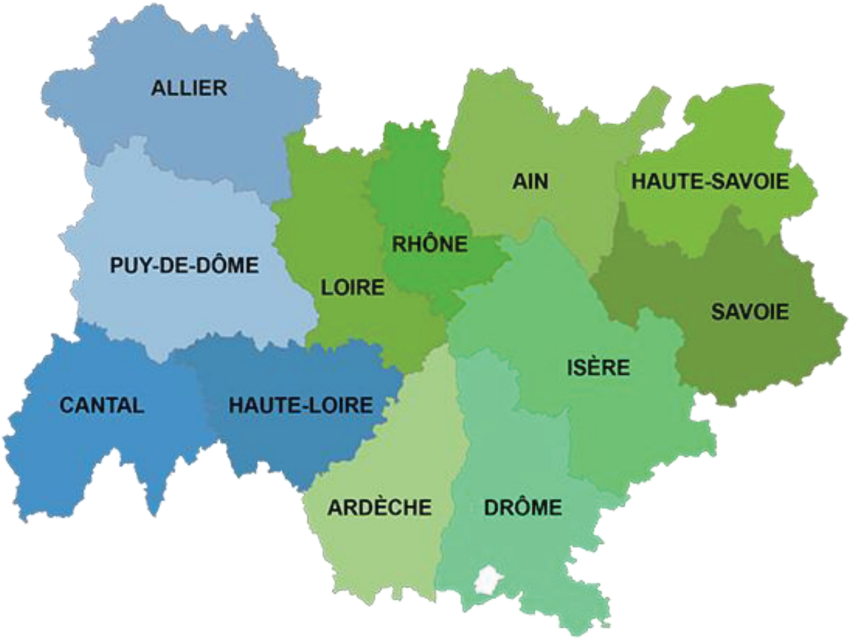
The conference is supported by the Rhône Alpes Auvergne Region

The Auvergne-Rhône-Alpes region is made up of the following 12 departments.



La Région
Auvergne-Rhône-Alpes

Contact : https://www.auvergnerhonealpes.fr

The Club Usinage association brings together the main French industrial and academic players who innovate in the field of machining.
Industrial members operate in sectors such as automotive, aerospace, medical, CNC and equipment, etc… Academic members operate in higher education and institutional research.
Over the years, the Club Usinage has been able to create a large network within which relevant technical and convivial exchanges between machining experts take place, in conjunction with R&D.
Meetings are organized around a theme of the Factory of the Future in the field of machining, with visits to industrial sites.

Contact : https://clubusinage.fr

IngéLySE, fédération de recherche CNRS en Ingénierie du site Lyon/Saint-Etienne, regroupe plus de 2400 chercheurs et enseignants-chercheurs, personnels techniques et administratifs, post-doctorants et doctorants, répartis dans 24 laboratoires de 5 Ecoles d'Ingénieurs (ECAM, ECL, ENTPE, INSA Lyon, Mines Saint-Etienne) et 2 Universités (Lyon 1 – Claude Bernard, Jean Monnet – Saint Etienne). Ce potentiel en fait la plus grosse fédération de recherche académique de France en Ingénierie.
IngéLySE offre un cadre de rencontre et d'animation propice à mettre en commun les connaissances et les dispositifs susceptibles de positionner le site dans la concurrence internationale, et mettre en valeur la mutualisation des travaux des chercheurs pour répondre à des appels à projets plus ambitieux, plus innovants. IngéLySe est intrinsèquement un lieu d'échange où la réflexion sur les projets futurs intègre une prise de conscience toujours plus grande de la contribution de la recherche aux enjeux sociétaux et au tissu économique. Cette responsabilisation incite à plus de multi-disciplinarité pour plus de synergie… source de progrès.
IngéLySE favorise donc le brassage des cultures des différentes unités d'Ingénierie du site Lyon/Saint- Etienne. Cette mixité est un atout majeur pour le développement scientifique et économique du territoire. Par ses activités, la fédération est le reflet du haut niveau scientifique des campus et assure la cohésion et l'unité de la communauté scientifique en Ingénierie sur Lyon/Saint-Etienne.

Thèmes abordés au sein de la Fédération

Les axes de recherches fédératifs en Ingénierie sur Lyon/Saint Etienne ont été établis sur la base des activités phares des unités qui constituent la Fédération. Ils s'articulent en quatre domaines dits d'excellence (Simulation – modélisation - imagerie ; Procédés avancés d'élaboration et matériaux ; Surfaces et interfaces ; Dynamique - systèmes complexes) et quatre axes en réponse aux enjeux de sociétés (Mobilité – transport - aéronautique et espace ; Energie et environnement ; Ingénierie pour le vivant ; Dispositifs et systèmes pour la société numérique). Ces axes ont été proposés en ayant à cœur de formuler une offre fédérative et collective qui couvre tous les champs de l'Ingénierie portés par l'INSIS du CNRS, et respectant les stratégies de recherche des établissements, tutelles des laboratoires.

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Ingénierie@Lyon est institut Carnot depuis 2007 avec pour objectif le développement d'une recherche partenariale d'excellence avec les entreprises, afin de construire avec elles les réponses scientifiques et technologiques à leurs besoins d'innovation à un fort impact sociétal et économique. Le label Carnot inscrit durablement Ingénierie@Lyon comme un acteur de premier plan de la recherche avec l'entreprise dans le domaine de l'ingénierie. L'institut a rassemblé, structuré, consolidé l'offre de recherche partenariale de l'ingénierie lyonnaise au cœur d'un écosystème riche d'acteurs de l'innovation, en cohérence avec les grands enjeux et transitions d'aujourd'hui. Il impulse une dynamique collective régionale pour un partenariat recherche-industrie renforcé et efficace !

Ingénierie@Lyon enrichit tous les maillons de la chaîne de valeur « de la molécule à l'usage du produit » grâce à 1308 ETP recherche, dont 718 doctorants, de 13 laboratoires académiques sous tutelles INSA Lyon, Centrale Lyon, Lyon 1, CNRS, ENTPE, UJM, ECAM et de 2 centres techniques Innovation Plasturgie Composites et Manutech USD. A l''écoute des problématiques technologiques des entreprises, en particulier des TPE-PME-ETI, Ingénierie@Lyon est en capacité de monter des projets alliant recherche amont et livrables de forte valeur ajoutée dans les domaines des matériaux & procédés innovants et des machines intelligentes au service du transport, de l'énergie, des matériaux et de l'ingénierie pour la santé.

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- 25,2M€ de volume de recherche avec les entreprises dont 11,5M€ de recettes contractuelles
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CSI 2022

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