

PRESS RELEASE 23 March 2018

Grenoble Alpes, where nanocellulose takes centre stage



"An American professor visiting the Laboratory of Pulp and Paper Science and Graphic Arts (LGP2) in 2016 told me how proud he was to be in Grenoble, the number one location in the world when it comes to nanocellulose research. I knew we were good, but I didn't realise we were that good. So how do we rank? What are our areas of expertise, our strengths, our weaknesses? And most of all, how can we stay ahead of the rest and capitalise on our lead?"

To help answer his questions, Julien Bras, Associate Professor and Deputy Director of LGP2, called upon the Grenoble Alpes National Technology Transfer Fund (FNV), which comprises Linksium and its four partners: Grenoble Alpes University, Grenoble INP, Savoie Mont-Blanc University and the CNRS. A sectoral study was commissioned and launched as a technology transfer booster. At Grenoble INP-Pagora on 11 December 2017, the area's scientific community, who attended in large numbers, heard its main conclusions.

The study had been entrusted to TKM, which is reputed for its data mining expertise. Its objective was threefold: *"We were keen to establish a global map of the organisations currently working in the nanocellulose sector, position the Grenoble Alpes Cluster through an objective and quantified approach, and identify a few promising industrial contacts,"* explains Romain Billet, who led the study at TKM. By analysing the global database of scientific publications, patents and collaborative projects produced since 1980 – a body of around 15,000 documents – TKM reached a number of extremely interesting conclusions.

The Grenoble Alpes Cluster boasts numerous strengths

"The main results show that the Grenoble Alpes Cluster leads the world in terms of the number of citations and organisations with which it collaborates, and ranks second when it comes to the number of documents and collaborations," adds Romain Billet. This is a track record that Grenoble Alpes can be proud of! The region's importance is further amplified when we discover that nanocellulose is entering something of a golden age: *"With a 1,400% increase in the number of bibliographic references made since 2004, the rise in interest in the field has been 3 or 4 times higher than that*

The Laboratory of Pulp and Paper Science and Graphic Arts (LGP2) is a joint research unit (UMR 5518) run by the CNRS, Grenoble INP and the Agefpi and conducting its scientific activities in connection with the academic community Université Grenoble Alpes. It is home to three teams: *Biorefinery: chemistry and eco-processes – Multiscale biobased materials – Surface functionalization by printing processes*. The research conducted by LGP2 strives to meet society's expectations when it comes to sustainable development (green chemistry, clean processes, recycling, biobased materials, renewable energy) and traceability & safety (functional materials, smart paper and packaging). <http://pagora.grenoble-inp.fr/research/>

Grenoble INP-Pagora, the international school of paper, print media and biomaterials Quality Safety & Environment certified, it is part of Grenoble INP, Institute of Engineering whose objective is to train *"engineers creative, responsible, committed to a sustainable world"*. The school trains engineers for the sectors of green chemistry, paper, printing, packaging, biomaterials and printed electronics. It also offers a vocational degree (*Interactive Printed and Digital Media*). Its wide range of courses, its pedagogical expertise and its strong partnerships with companies allow it to constantly tailor its training to industry's needs and, for its 60 graduates a year, to access stimulating careers in France and abroad. Grenoble INP-Pagora also provides international training in conjunction with several European universities; the 2nd year of the engineer course and a Post Master *Biorefinery: bioenergy, bioproducts & biomaterials* are delivered in English. The innovative research performed by its LGP2 laboratory helps to improve processes and create products that meet all the latest requirements, notably those linked to the environment. The Cerig's role is to keep an active eye on technological developments in these industries. These various activities ensure that the training offered is up to date with the latest scientific and technological advances. <http://pagora.grenoble-inp.fr> – <http://cerig.pagora.grenoble-inp.fr>



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usually observed," says TKM. The first lesson to learn from this observation is that, in such a competitive sector, certain ideas inevitably need to be protected and transferred to industry. This is backed by the fact that the demand clearly exists, as highlighted by industry's unusual level of involvement in research.

Strong technology transfer prospects

While our research can claim to lead the world, can the same be said for technology transfers? Today, Grenoble Alpes is involved in a significant number of industrial collaborations (N.B.: this type of technology transfer was not covered by the study). The site has also filed numerous patents – some of which are of great interest to industry. However, these are relatively few compared to the number of articles published, as Carole Silvy, Head of the Linksium Maturation Cluster, points out. Reacting to this undeniably impressive rate of progress, Gilles Talbotier, President of Linksium, concluded: *"This is a growth sector. We need to take advantage!"*

"When we speak to industrial firms, this study will enable us to demonstrate our know-how and skills," says Julien Bras. Another factor that will make this task easier is the study's findings that Grenoble Alpes works primarily on marketable applications and that 50% of its publications relate to composites, the sector's most promising avenue.

The technology transfer possibilities offered up to the biomass experts of Grenoble Alpes are therefore huge. Thanks to the crucial support provided by the FNV via this sectoral analysis, other stakeholders working within the local technology transfer chain – at research establishments and at Linksium – will be able to take the baton from researchers while benefiting from tailored support and funding. *"It is precisely because of the presence of this complete chain, from research to development and, ultimately, the transfer of technology to companies, that this can all work. The sector is incredibly vibrant here!"* declares Gaëlle Calvary, Professor and Vice President of Technology Transfer at Grenoble INP.

Photo: LinkGrenobleAlpes_EtudeStrategiqueNanocellulose

Video & Presentation of the results of the strategic study available at

<http://pagora.grenoble-inp.fr/media-+--/grenoble-alpes-stronghold-of-nanocellulose-950062.kjsp>

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