The conference addressed five topics related to IP policy: current and future policy issues in IP: the case of bioinformatics, the impacts of patents on innovation and technological competences, university patenting, contributions to the history of intellectual property, and inner and outer limits to the patenting process. Here is a brief overview of the main messages of the papers. For more information, the readers are invited to read the papers and the slides of the presentations that will be available on a EPIP CD-Rom (on request).

*Current and future policy issues in IP: the case of bioinformatics and biotechnology*

Iain Cockburn gives an emblematic opening lecture, on the tensions between placing scientific data in the public domain and different instruments for exclusion. He noted that bioinformatics is especially interesting because it is at the crossroads of two key subjects for IPR policy: biotechnologies and open source software. The inter-disciplinary nature of this emerging field forces us to span established scientific boundaries and to address basic questions such as what constitutes an invention or discovery? These epistemological concerns raise concrete policy issues, including the problems of providing interdisciplinary training for patent examiners and identifying prior art. Furthermore, patentability in bioinformatics is reliant upon the current restructuring of medical research from a market-oriented structure towards a "Mertonian" organization based on peer-review.

Dominique Stoppa-Lyonnet and Maurice Cassier present a thorough analysis of the European opposition to the Myriad breast cancer patents. The consequences of the monopolistic use of the BRCA1 patents were fourthfold: dependence on the choice of a technique, high costs and limited access to genetic tests, loss of information and incompatibility with the organization of genetic testing in Europe. An opposition was then filled to the EPO, which ruled on a revocation of all three patents, on the basis of inadequate definition and description of the gene sequence. The EPO could identify these errors after a two-year collaboration with scientists. This case of a patent race within a collaborative structure is a lighting illustration of a clash between two health systems.

*The impacts of patents on innovation and technological competences*

Claire Lelarge presents joint work with Emmanuel Duguet on the impact of patenting on private incentives to innovate. Their empirical work is based on an econometric study of a sample of 1027 firms in the manufacturing sector. They analyze the innovative behavior of patenting and non-patenting firms. Lelarge and Duguet conclude that the value of patents increases the incentives towards funding product innovation but not in processes innovation and that, conversely, the value of product innovation increases the incentives to patent. Their analysis also reveals a skewness in the value of product innovation, which they explain by reference to the efficiency differences of IPR between different activities.

Joachim Henkel considers that the success of open source software calls for further investigation in the field of embedded open source software, specifically to examine how firms can innovate and protect their innovations while at the same time resting on open source software? He presents the results from a new survey counting 268 valid responses from open source community participants, presenting the revealing patterns of the firms, according to their characteristics and to the share of code that they reveal. He concludes that respondents rank lead-time and complementary assets as protection mechanisms.

J. Peter Murmann gives an exposé on the role of patents in creating technological competencies. His departure point is that no solid evidence has yet been assembled that demonstrates that a strong patent regime contributes to economic growth. He defends this point through a dynamic analysis of the history of the synthetic dye industry before World War I. In France and the United-Kingdom, patent systems helped innovative firms to control the product market for their duration (15 years), but yet, they did not contribute to the building of the technological competencies of the industry: French and British firms preferred to rely on the market power derived from their patents without developing more technological capabilities. In contrast, the absence of a patent system in Germany and Switzerland stimulated more competition and led to the development of strong and long lasting technological capabilities.

*University patenting*

Fabio Montobbio presents joint work with Stefano Breschi and Francesco Lissoni that is inserted in an ongoing wider study. The authors examine the relationship between patenting and publishing at the individual level through a bibliometric analysis of Italian data. They select 250 academic inventors (for a total of 575 patents) and match them with a control sample of 250 academic "non inventors". At this point, their main result is that inventors are more productive from a scientific point of view, in that they exhibit higher publication rates. They also find a publication delay effect around the date of the patent application.

Françoise Olivier-Utard and Patrick Llerena present a historical perspective of patenting at the university of Strasbourg. The very specific history of the university of Strasbourg led the authors to divide their analysis into four periods. After the 1870 war, the Germans conceived a university that had one of its missions to forge strong links with industry and society at large. Inventions and patents were then a constituent part of the social identity of academics. After World War I, Strasbourg returned to the French, who tried to preserve the German "model". But the lack of incentives for the professors as well as the scarcity of industrial partners made this system fail. The Colbertist approach that followed World War II marked a reorientation towards less patenting at the university. Today, the renewed interest for patent applications and ownership by the university and its members has to be understood as a tool for marketing university research rather than an intrinsic mission of the university (as it was in the German period).

Aldo Geuna presents joint work with Lionel Nesta on the effects of patenting on academic research: publishing vs. patenting, the threat to teaching quality, the impacts on the culture of open science, the diversion of research resources and the threat to future investigation. The fragmented available data show no evidence that university licensing is profitable for most universities.

*Contributions to the history of intellectual property*

Agnès Bérenger and Christophe Badel introduce this session on the history of IPR with an exposé on IPR in antiquity. With the advent of written information, Greeks and Romans have had to consider the issue of IPR. Then, invention was regarded as a discovery that was not a creation as such. Man is only the interpreter of nature. The Roman aristocracy opened a window for IPR in that they paid tribute to the writers of ancient times in the introduction of their writings. Still, no mention on IPR can be found in the Roman law, which implicitly

evoked that one can own things but not ideas. Yet, it created a sort of frustration among writers, who denounced the writings circulating without permission. The common vision was that a book has two "masters" (*domini*): the author and the bookseller.

Marco Belfanti presents the history of the privilege regime. The privileges were a form of IPR that were aimed at attracting the craftsmen from outside the city. The pioneer city to implement this incentive was the city of Venice in the 13th century, and then spread all over Europe. Privileges offered a guaranty against plagiarists within the city. Latter on (around 1624), a widespread discontent and hostility towards every form of monopoly led to the approval of a law, which limited abuses in the concession of patents. The 18th century marks a convergence towards the definition of an institution more aimed at stimulating domestic innovation rather than attracting inventors from abroad.

Liliane Hilaire-Perez and Luisa Dolza-Goldstein present two periods of the old regime: Renaissance and the Enlightenment. At the beginning of the printing system, the book became a medium for obtaining a privilege: only publishing was making the knowledge public. Inventors were those who understood the invention. The Enlightenment period saw alternative strategies develop. Under the pressure of the inventors and in the context of the development of the current of natural laws, patents were integrated in the law (1791). The economic arguments put forward to justify IPR were strongly associated to a romantic vision of the inventor.

Paul A. David reminds us of the techno-institutional co-evolution along time and depicts the end of the copyright history. He describes how the economics of publishing industries, not authorship, has shaped the evolution of IPR regimes. Each of the three major technological disruptions (Gutenberg and the invention of moveable type and screw press, c. 1450, the invention of stereotype and lithography, c. 1800 and the advent of the networked digital Information Technologies, c. 1980) engendered a cross-catalysis with the legal framework. Copyrights thus appear as a product of industrial policy, which engenders collateral damages to "open science". Nonetheless, the latest news regarding databases protection open three ways for a possible ending of the copyright area: (1) suppress "digital piracy" of music and videos, (2) develop "trusted" systems or (3) a combination of liability law and compulsory licensing. Which one of these endings would we choose?

*Inner and outer limits to the patenting process*

Leo Giannotti fits traditional financial risk analysis to the framework of patenting, focusing on volatility and disappearance. The model presented is constructed in stages, as a chain of options, taking into account the expectations of the patent applicant and the deliberations of the patent office.