

The Center for Mathematical Modeling (CMM) and a brief chronology of the cooperation between Chile and France

Franco-Chilean scientific cooperation in the field of Applied Mathematics began in the 1960s. At that time, research in Applied Mathematics in Chile was virtually non-existent. A first period, from 1965 to 1975, was characterized by the arrival of many French “cooperants” to teach in the Department of Mathematics of the University of Chile.

The second period, from 1975 to 1985, saw the departure of many young engineers and researchers to France to work on doctoral theses in French universities.

Since 1985, the cooperation has been consolidated thanks in part to the creation of the Association of French and Chilean Mathematicians, which was established as a vehicle for cooperation between researchers from both countries.

Today, the Center for Mathematical Modeling, recognized as an international unit of CNRS, inaugurated in 2000 plays a major role in Chile and Latin America in Mathematics and its applications.

Important dates and events:

1965: Foundation of the Department of Mathematics and Computer Sciences of the University of Chile, where many French mathematicians would come to work and teach over the years, and where the UMI CMM would be created 35 years later.

From 1965 to 1974 many young French mathematicians came to Chile and teach Statistics, modern mathematical analysis and numerical analysis. They helped modernizing the curricula in mathematical engineering, statistics and other topics.

In 1974 Professor Rafael Correa returned from his doctoral studies in France and introduced the teaching of the theory and practice of Mathematical Optimization. At the same time, he created a research group formed by young engineers and mathematicians, which is at the base of the development of Applied Mathematics in Chile, until today. All the young researchers of the time are currently active, either in this Center or in other academic institutions (including some French institutions).

In 1976 took place the First Days of Applied Mathematics, the first symposium on Applied Mathematics in Chile. The organizers were two young Chilean doctors, Rafael Correa and Luis Contesse, who had just returned home after studying in France, and Patrick Chenin, a French co-worker.

Between 1976 and 1984 about fifteen young Chilean graduates left for France to work on their PhD studies. All of these researchers will return later, despite the enormous political and economic difficulties of the Chilean dictatorship. Among them important figures in Chilean Mathematics, like Servet Martinez, Eric Goles (Science Prize in Chile in 1993 and currently President of CONICYT (National Commission for Investigation and Scientific and Technological Change, the equivalent of the CNRS)). Carlos Conca, Exact Sciences Prize of the OAS (Organization of American States) in 1994, member of the Committee of the International Mathematical Union (IMU) and Honorary Doctorate from the University of Metz.

In 1985 was created the Association of French and Chilean Applied Mathematicians. This helped to support the research and organize many scientific activities, such as the Franco-Chilean Congresses of Applied Mathematics. At the same time, through the Association, Chilean and French researchers were able to move between the two countries to develop their research projects.

In 1986 took place the first Franco-Chilean Congress of Applied Mathematics and in 1988 Professors Eric Goles and Servet Martínez organized the first FIESTA congress (Física Estadística), in collaboration with French researchers. This meeting is organized every two years, until today.

In 1989 took place the second Franco-Chilean and Latin-American Congress of Applied Mathematics. This congress, attended by thirty-three lecturers, including seventeen from French universities, was organized in honor of the mathematician Gaspar Monge (1746-1818), on the occasion of the bicentennial of the French Revolution. A few days after the end of the Congress, on December 14, 1989, Chile recovered democracy after the first presidential elections since 1973.

In 1992 was organized the third Franco-Chilean and Latin American Congress of Applied Mathematics. At the same time the First Chile School - CCE of Optimization took place.

The same year was created the ECOS Committee (Evaluation-Oriented Scientific Cooperation), by decision of the French Ministry in charge of Foreign Affairs, National Education and Research. This committee's goal was to become the instrument for evaluating and funding scientific and academic cooperation projects with Spanish-speaking America. Chile was the first country to want to set up such a program in partnership with France and three scientific days in Applied Mathematics were organized in the ECOS framework: at INRIA, University of Limoges and University of Avignon.

In 1995 took place the fourth IV Franco-Chilean and Latin-American Congress of Applied Mathematics. Organized by the University of Concepción, this congress was dedicated to the Numerical Methods Applied to Mechanics, in honor of Henri Poincaré (1824-1912).

In 1993: Pierre Collet (Ecole Polytechnique) was appointed as Honorary Professor of the University of Chile and in 1996 Professor Jacques-Louis Lions (Academy of Sciences) received the Doctorate Honoris Causa from the University of Chile.

1996: Through the Association of French and Chilean Applied Mathematicians, the University of Chile received, as a donation, a CAPITAN parallel super-computer manufactured by MATRA CAP SYSTEMS. This computer was the first of its kind installed in Latin America and will be used to develop computational algorithms for the resolution of large-scale Chilean industrial problems.

1998 was the year of the fifth Franco-Chilean and Latin American Congress of Applied Mathematics. This congress was jointly organized by the University of Chile, Paul Sabatier University (Toulouse), and the University of Limoges. At the same time was held the II School of Optimization, a postgraduate course attended by thirty Latin American students, funded by the CONICYT and the French Cooperation.

1999: Carlos Conca (Center for Mathematical Modeling) is distinguished with the Doctorate Honoris Causa from the University of Metz.

The same year took place the Joint French-Chilean Workshop on Multidisciplinary Complex Systems (Integrated Numerical Tools for Urban and Transport Systems) and Rafael Correa, Director of the Mathematical Modeling Center, was honored by the French government with the Chevalier Medal of the Order of Merit, for his contributions to scientific cooperation between France and Chile.

In 2000 the President of the Republic of Chile inaugurated the **Center for Mathematical Modeling (CMM)**. The agreement was signed by Catherine Brechignac, Director General of CNRS, Luis Riveros, Rector of the University of Chile and Eric Goles, President of CONICYT.

The mission of the Center for Mathematical Modeling (CMM) is to create new mathematics and use it to solve problems coming from other sciences, the industry and public policies. Its aim is to develop science with the

highest standards, which also guides its endeavors in industrial research and education. CMM is envisioned as a world-class center of excellence for research and advanced training in applied mathematics, internationally recognized as a platform for mathematical industrial modeling with a deep impact in innovation. CMM is a CNRS unit, the first ever created in mathematics outside France, and by the level and quality of its publications is among the best in Latin America and among the best 100 worldwide. Concurrently, CMM became a leading platform for mathematical modeling with sustained actions in industrial/public projects, a relevant actor for the improvement of school education and dissemination of mathematics and a major leader for training in applied mathematics in Chile.

CMM activities are structured around two core groups: The Center for Mathematical Modeling (CMM) from the University of Chile leading the project and the research group on numerical analysis at the Center for Research in Mathematics (CI2MA) at the University of Concepción (UDEC). CMM has three other associated groups at the Universidad Técnica Federico Santa María (UTFSM) in Valparaíso, the Universidad Adolfo Ibáñez (UAI) and the Universidad Andrés Bello (UNAB) in Santiago.

This center is one of the most important ones for Mathematics in Latin America and is very active in various directions, not only in research, but also in knowledge transfer, in public awareness activities and in the international relations with many countries of this continent. This center has played an important role in the animation of Mathematics in several countries in South America.

With the creation of the CMM the exchanges between France and Chile in applied mathematics have increased in number and duration. The flux of senior and junior mathematicians between the two countries is very intense and the center is an important source for the research activities in both countries.