



Comisión Nacional de Investigación
Científica y Tecnológica - CONICYT

NATIONAL PROGRAM FOR RESEARCH CENTERS OF EXCELLENCE
(FONDAP)

FINAL EVALUATION REPORT

This form is intended to facilitate your work as a referee and standardize the evaluation reports. Each topic is expected to be evaluated with concepts ranging from outstanding to poor and detailed technical comments supporting your points on the report.

If the Center report does not contain information on the given topic, please indicate so in your evaluation.

Your final overall comments and recommendations are an important part of the review process.

I- PROJECT INFORMATION	
CENTER'S NAME: CNN	
DIRECTOR: Jaime San Martin	

II- EVALUATION PANEL			
REFeree NAME	ORGANIZATION/ INSTITUTION	E - MAIL	SIGNATURE



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Científica y Tecnológica - CONICYT

III. CENTER ACHIEVEMENTS

1.- Scientific achievements and their impacts to local, national and international community.

i.- Comments

CMM has become the premier center in Applied Mathematics in South America and one of the most reknown around the world. Its most impressive achievement is, in my opinion, the close collaboration with industry in several scientific projects, in particular with CODELCO.

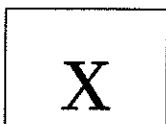
In basic research CMM is also very strong. The groups in discrete mathematics, mathematical mechanics, non-linear analysis and partial differential equations, optimization, stochastics and numerical analysis are recognized throughout the world. These groups have publications in the some of the best journals mathematical journals in the world. The members of these groups have also developed international collaborations with several groups in many countries, including France, Germany, Italy, Japan, the Unites States and several countries in Latin America. This collaborations has been possible through numerous individual visits of researchers in CMM abroad and from researchers abroad to CMM and an impressive number of workshops and summer schools that have been organized by members of the center.

CMM has also increased scientific collaboration with groups in other Universities in Chile which is very welcome development, compared to 5 years ago. It had also had therefore scientific impact in developing Applied Mathematics in Chile.



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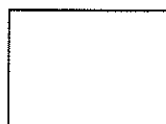
ii.- Evaluation



Outstanding



Very Good



Good



Poor



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Científica y Tecnológica - CONICYT

2.- Educational achievements and impact. Pay attention to integration of research and educational activities, and also in training advanced human resources, participation in PhD Programs.

i.- Comments

CMM has had a significant impact education in undergraduate education in Chile and graduate education in Chile and Latin America.

Most of the members of the CMM direct undergraduate's thesis. The connections with industry of the members of the center give undergraduate students of an invaluable research opportunity, internships increasing significantly their job prospects. Unfortunately there was no data in the report on where did the students find jobs. The new course in modeling is a very commendable new initiative as it is the creation of a diploma in financial engineering and risk management.

Also CMM has made significant strides in graduate education. The number of PhD students have increased to 50 in just 10 years and about 9 students per year graduate with a PhD from the program. There was no data in the report on what the students did after they graduated. The students have the possibility also of interacting with numerous visitors who give lectures and teach courses. Several of the students get joint degrees with Universities in France through several agreements. Another important aspect is the small increase in the number of graduate students from other countries in Latin America. This is one direction that could be expanded further.

Because CMM is a unit from CNRS several postdocs from France come to Chile regularly for extended periods of time. Also from several postdocs come to CMM from other countries, especially Latin America, attracted by the high level of research.

In summary the education impact of CMM at all levels has increased significant in the 10 years of the center.



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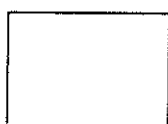
ii.- Evaluation



Outstanding



Very Good



Good



Poor



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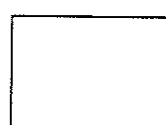
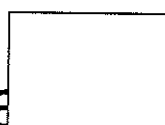
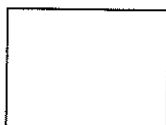
3.- National and international collaboration achievements. Pay attention to activities that contributed to national and international networking.

i.- Comments

CMM is a unit of CNRS in France and this has given the opportunity to the center to develop a very close collaboration at all levels with researchers in France including training of PhD students and postdocs, the organization of conferences, workshops and summer schools. As mentioned earlier several students receive joint degrees with Universities in France. Also CMM has international agreements with PIMS in Canada and USA, MITACS in Canada, MATHEON in Germany, MASCOS in Australia. CMM has also joined PRIMA, an umbrella organization of Universities and Centers in the Pacific Rim. This is an impressive list of international networks.

CMM has reached out more to other Universities and centers in Chile in the last 5 years which is a very commendable development. Besides of the strong links with U. Concepcion since the numerical group there is part of CMM it has developed closed connections with UFTSM in Valparaiso which is also a premier engineering school in Chile and also U. Adolfo Ibañez. CMM also has reached recently a collaboration agreement with the Chilean Army. Another very welcome initiative is the possibility of faculty from other institutions to visit CMM for extended periods.

ii.- Evaluation



nda



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Outstanding

Very Good

Good

Poor



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4.- Outreach Achievements. Pay special attention to those activities that tied the Center with the external community such as elementary or high schools, institutions, companies, among others.

i.- Comments

Also CMM is primarily a research center it has a significant group dedicated to education and outreach with the goal of helping the national effort to improve education in Chile. This includes a project to train high school teachers, in particular through the production of pedagogical materials. This is done in collaboration with the Ministry of Education and the Academy of Sciences of Chile. Also during January CMM organizes short courses for math teachers. These are all important activities in this direction.

As mentioned earlier CMM has developed a close connection with several industries in Chile in particular CODELCO.

ii.- Evaluation



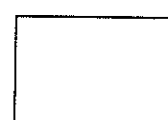
Outstanding



Very Good



Good



Poor



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IV. OTHER RELEVANT ASPECTS

If the Center report does not contain information on other relevant aspects, please indicate so in your evaluation.

i.- Comments

None



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V. CENTER PROJECTIONS

Please comment about the center projections after the 10 -year FONDAP grant. If the Center report does not contain information on the Center projections, please indicate so in your evaluation.

i.- Comments

There was no information about this aspect.



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VI. INSTITUTIONAL COMMITMENTS

Please comment about the facilities available to the Center, the commitment of the administration of the leading and partner institutions to the Center, and the commitment of the partner institutions to achieve the Center goals.

i.- Comments

CMM has impressive facilities for its members and visitors. Several rooms with first class technical equipment are available for conferences and workshops. Also the computational facilities are first rate. These were obtained through grants and contributions from industry. This is very important given the interdisciplinary nature of the center.

ii.- Evaluation



Outstanding



Very Good



Good



Poor



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VI. ADVISORY COMMITTEE

Please comment about the commitment of the advisory committee, and its contribution to the Center development.

i.- Comments

I saw no information on this on the report.

ii.- Evaluation

☐

Outstanding

☐

Very Good

☐

Good

☐

Poor



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Científica y Tecnológica - CONICYT

VI. FINAL OVERALL COMMENTS AND RECOMMENDATIONS

Please provide a final overall and recommendations for the Center. Include here aspects that were not covered in the previous sections, which you consider significant for the Center.

i.- Comments

As mentioned earlier in 10 years CMM has become one of the premier centers in Applied Mathematics in the world. It is very strong in basic research, in developing contacts with industry, in training of undergraduate and graduate students and postdocs. It has also a commendable outreach program to improve education of Mathematics in Chile.

ii.- Evaluation



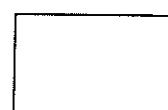
Outstanding



Very Good



Good



Poor

NATIONAL PROGRAM FOR RESEARCH CENTERS OF EXCELLENCE
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I. PROJECT INFORMATION	
CENTER'S NAME:	Center for Mathematical Modeling
DIRECTOR:	Jaime San Martin

II. EVALUATION PANEL			
REFeree NAME	ORGANIZATION/ INSTITUTION	E - MAIL	SIGNATURE

III. CENTER ACHIEVEMENTS

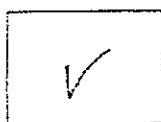
1.- Scientific achievements and their impacts to local, national and international community.

i.- Comments

In the last 9-10 years The Center produced 700 articles, many published in very good journals. 85% of these articles were written in collaboration with researchers abroad. This collaboration was facilitated by continuous movement of researchers between CMM and variety of international research centers. Those activities make the Department of Mathematical Engineering a player in the international arena.

The Ph.D. graduates and postdoctoral fellows are also very much connected internationally. As for the local impact, it would be interesting to know how many of the Ph.D. graduates and the postdoctoral fellows eventually settled in Chile, thus contributing more directly to the local community. I did not see such data.

ii.- Evaluation



Outstanding



Very Good



Good



Poor

2.- Educational achievements and impact. Pay attention to integration of research and educational activities, and also in training advanced human resources, participation in PhD Programs.

i.- Comments

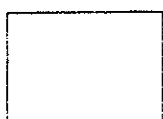
CMM contributes to the undergraduate and graduate programs of the Department of Mathematical Engineering. At the undergraduate level CMM faculty introduced new modeling courses that aim at formulating and solving problems – an excellent preparation for engineering and applied mathematics students.

At the Ph.D. level students are strongly involved with their mentors' research, especially in industrially related projects.

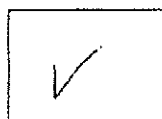
The enrollment of students at all levels keeps increasing.

There is a strange situation: many graduating students proceed to the Ph.D. degree going abroad, while most Ph.D. students at CMM come from abroad. This sounds good in terms of international collaborations, but it would be worthwhile to follow up on this trend and see how many of the Ph.D.s from both groups eventually settled in Chile.

ii.- Evaluation



Outstanding



Very Good



Good



Poor

3.- National and international collaboration achievements. Pay attention to activities that contributed to national and international networking.

i.- Comments

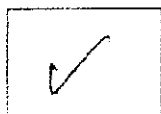
The international collaboration is impressive; in particular, the collaboration with France is outstanding.

85% of all research articles are in collaboration with researchers abroad. A fairly large number of visitors come from abroad, and CMM faculty visit international research centers. These visits also enable students of CMM to network to the international community.

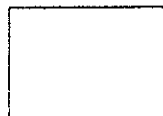
In addition to the research network developed by individual members of the Center, CMM also set up bilateral agreements with other international centers, such as CNRS in France, MITACS and CIMS in Canada, IMPA and USP in Brazil, and others in Germany, Singapore, etc.

PIMS

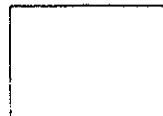
ii.- Evaluation



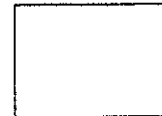
Outstanding



Very Good



Good



Poor

4.- Outreach Achievements. Pay special attention to those activities that tied the Center with the external community such as elementary or high schools, institutions, companies, among others.

i.- Comments

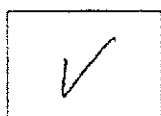
Outreach activities are primarily in two areas: industry and education.

As for industry, students are involved with faculty in research projects. This opens the door for employment of students in the private and public sectors as soon as they graduate.

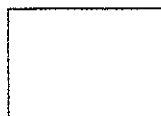
In education: high school teachers are trained by CMM faculty, this training includes introduction to case-study methodology. Based on experience gained in working with high school teachers, the Center is contemplating extending the program to public school teachers.

Other outreach activities include exhibition and school tournaments which will increase students interest in mathematical sciences, and mathematical awareness in the general public.

ii.- Evaluation



Outstanding



Very Good



Good



Poor

IV. OTHER RELEVANT ASPECTS

If the Center report does not contain information on other relevant aspects, please indicate so in your evaluation.

i.- Comments

Relevant information which was not available in the Center report:

- (1) What was the first job that Ph.D. students took after graduation?
- (2) The column "Associate Institute" in the listing of postdoctoral fellows is not clear: does it mean "coming from the previous institution" or "going to the next institution"?
- (3) Information on the Center's projections for the next 5 years.

V. CENTER PROJECTIONS

Please comment about the center projections after the 10 -year FONDAP grant. If the Center report does not contain information on the Center projections, please indicate so in your evaluation.

i.- Comments

Industrial funding now constitutes 50% of the Center budget; this is very impressive. It is also impressive to see the increase* in all categories which characterize the Center productivity: 50% in number of researchers, 150% in postdoctoral fellows, 30% in Ph.D. students, 100% in Master students, 30% in publication, 300% in industrial projects, etc.

Thus the projection for the future looks excellent. However, the documents I received do not include information on the Center's projection.

* from 9 years ago

VI. INSTITUTIONAL COMMITMENTS

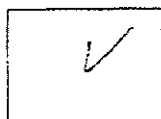
Please comment about the facilities available to the Center, the commitment of the administration of the leading and partner institutions to the Center, and the commitment of the partner institutions to achieve the Center goals.

i.- Comments

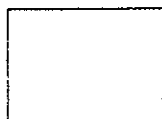
With recent update the Center's computational facilities seem to be quite adequate for the current activities. The Center is taking an ambitious project for the creation of a National Laboratory on HPC, which will provide free access NLHPC to every research group in Chile; this is commendable.

The commitment of partner institutions is stated, in the Center report, in general terms: joint conferences and summer schools, exchange of students, and exchange of researchers. Although I have not seen specific numbers, agreements between centers usually take the form of above language in terms of exchange among people and of setting joint programs.

ii.- Evaluation



Outstanding



Very Good



Good



Poor

VI. ADVISORY COMMITTEE

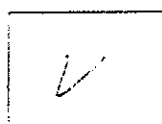
Please comment about the commitment of the advisory committee, and its contribution to the Center development.

i.- Comments

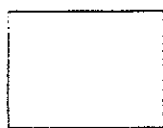
Having an advisory committee is essential for the successful growth of the Center. The charter for committees is well written and those members whom I know are world class.

I would have liked to see some specific suggestions the committee has made that led to improved activities of the Center.

ii.- Evaluation



Outstanding



Very Good



Good



Poor

VI. FINAL OVERALL COMMENTS AND RECOMMENDATIONS

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i.- Comments

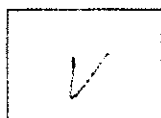
The quality of the research done at the Center is at the level of the top applied mathematics departments in the U.S. and elsewhere. The Center delivers quality education to undergraduate and graduate students.

The Center receives remarkable financial support from industry, with faculty and students engaged in industrial research projects.

The Center's success can serve as a role model to other institutions in other countries.

I recommend that CONICYT continues to fund the Center for the next 5 years.

ii.- Evaluation



Outstanding



Very Good



Good



Poor