

ASSOCIATIVE RESEARCH PROGRAM
SUPPORT TO SCIENTIFIC AND TECHNOLOGICAL CENTERS OF EXCELLENCE WITH BASAL FUNDS
ANNUAL EVALUATION

GUIDELINES

This evaluation is an almost free format one, although it has to consider the main objectives of Basal Funds for Research Centers of Excellence which in general terms is to perform Research and research -related activities (publications, dissemination to academic sectors through workshops, symposia, etc., young researchers formation, student training, aid to smaller research groups) but also to actively provide other sectors (mainly industries and enterprises but also public services) their knowledge and resulting products in order to contribute to the country development as well as keep the society informed on their advances.

The sections below will guide you to express your expert opinion in each of these aspects. These Centers are been financed by public and private funds following the same strict rules of Basal funding. Their main source of public funds is provided from this Program and has an extension of three years.

PRESENTATION (To be completed by the Program)

REPORT PERIOD : 1ST Year X 2ND Year ☐ 3RD Year ☐

PERIOD COVERED : From Jun 2018 to May 2019

NAME OF THE CENTER	CODE
Centro de Excelencia en Astrofísica y Tecnologías Afines (CATA)	AFB170002
DIRECTOR OF THE CENTER	SIGNATURE
Dr. Maria Teresa Ruiz	
EXECUTIVE / DEPUTY / CO-DIRECTOR	
Dr. Guido Garay	
MANAGER (if applicable)	SIGNATURE
SPONSORING INSTITUTION (if applicable)	
Universidad de Chile	
ASSOCIATED INSTITUTION(S) (if applicable)	
CENTER WEBSITE ADDRESS	
www.cata.cl	

I. MAIN ACADEMIC-SCIENTIFIC CONTENTS OF THE REPORTING PERIOD

Please provide information related to the following sections taking into account the written report, the indicators that the same proponents gave for their follow-up (Table 2-indicators) and some information on productivity of the latest period that the Program is sending or accessing to:

<https://www.dropbox.com/sh/r0d1uunoh1iydf3/AAD-7a-N1xxXhpifjKWNsAxpA?dl=0>

1) Research advances and relevance, student training and collaboration to other research groups.

Considering the objectives established as fundamental for these Centers: give your opinion upon the advance in research lines and activities, national and international scope of the science developed and impact on the corresponding disciplines from a global point of view. Include here your perception on influence/impact that this research has had on young scientist's generation and smaller national research groups if any.

It is difficult to comment on the activities of the members of the Center for Astrophysics and Associated Technologies (CATA) with quoting from my previous reviews. The research focus of this group aligns well with the global astrophysical enterprise in prioritizing the most critical science targets today, especially cosmic structure, exoplanet research, and star & planet formation. They also have a robust astronomical instrumentation program. These efforts unify the three premier institutions of Chilean astronomy Concepcion, Universidad de Chile (UC) and Catolica, which nucleates the larger enterprise that includes a growing number of Chilean universities. This consortium has delivered consistent high impact research since its inception and shrewdly leveraged a unique Chilean natural resource – the remarkable astronomical observing sites in Northern Chile – to vault the Chilean scientific community to a central position in the global intellectual community. They have involved themselves in many of the international collaborations that dominate scientific and generalist attention, such as the Event Horizon Telescope (EHT). The recent “picture” the EHT took of the black hole at the center of the external galaxy, M87, appeared on the front page of a majority of the world's newspapers last month. Their vision is also forward looking, for example, as they involve themselves in Cerenkov Telescope Array collaboration, a massive international effort to map the sources of the most energetic processes in the Universe. While the consistency of the group's scientific productivity has been remarkable, they have actually been able to grow the enterprise in every area. This is exemplified by the high speed computing and simulations group, which has grown from one researcher to 8. Over the years, I have reviewed many of the groups supported with Basal funds. While these groups generally work at a very high level and produce exciting science and technology, the CATA collaboration operates at a scientific level that is a quantum leap above the rest. They are high impact in every sense.

2) Pathways of students that have been part of the Center.

Give your insight on the pathways of students that have been part of the Center but that are not engaged to it anymore because they migrated to other working sources or to continue their training.

Reviewing the data on student outcomes for CATA during the subject performance period, this reviewer is quite impressed. The students who continue along a pure research track seem to go on to PhD study and postdocs at some of the most prestigious international research centers. While cross-pollination in the international community is desirable, a "brain-drain" would not be a positive outcome for CATA, CONICYT or Chile. It is gratifying to see that many junior researchers continue their professional development at many of the prestigious Chilean Universities. A number of students apparently enter the commercial world, and at least one is exploiting his training as an astronomer in the field of finance at Bain & Co. (a company that is well known in Massachusetts too). Some student choose national service at CONICYT and museums. These professional trajectories are diverse, and would seem to be a superb return on national investment in curiosity-driven research.

II. MAIN ACHIEVEMENTS IN KNOWLEDGE AND TECHNOLOGY TRANSFER

(APPLICATION OF THE RESEARCH RESULTS INTO ACTIONS THAT CONTRIBUTE TO INCREMENT THE COMPETITIVENESS OF CHILEAN ECONOMY (INDUSTRY, CIVIL SOCIETY AND PUBLIC BODIES OR POLICY MAKERS))

Please evaluate in this section whether the Center is taking the appropriate steps in developing applicable research results, managing their intellectual and industrial property, approaching to the adequate public and/or private entities that may use or be interested in using these results and in general doing it in the correct way. Is there an impact expected from the developments and initiatives?

While it is not unexpected that the CATA team has a strong astronomical instrumentation component, I have been continuously surprised by their ability to look beyond engineering for astrophysical purposes and explore the potentialities to contribute to the marketplace. I have watched the progress on the RadioVision and DryWood project with some amazement. When I heard the first presentation by the CAT team, I suspect that these projects were simply designed to satisfy the requirements of the Basal program to have a pragmatic component. However, there has been good, steady progress on these projects, which are imaginative and useful applications of technologies that have parallel uses in astronomical instrumentation. The group is to be commended for "thinking outside the box" and exploiting technology in an innovative way. This is true of their other "real world" enterprises. This is an extremely positive outcome for the Basal funding program.

III. OUTREACH RESULTS AND IMPACT

In this section evaluate the efforts of the Center to disseminate its activities /results to the society in general. Do you think it has succeeded in giving relevance to its scientific outcomes? Was it able to transmit the importance of science in the life of the common individual? Have they been able to focus in their strengths to obtain the best of the outreach units and activities?

The results and impact of the CATA research effort is somewhat difficult to judge. The group seems to be active in all the "modern" media outlets, including social media, Twitter, etc. They maintain a nice-looking, informative webpage. I am, however, of an older generation that is not necessarily the most avid consumer of things like Facebook.

20 public talk a year is a respectable number, and I gather they will be present in the Elqui Valley to organize an event for the solar eclipse. The outreach effort looks well-rounded and at a level to be expected of research group of this size.

IV. PARTICIPATION OF COUNTERPART FUNDS

The Center has completed a Financial Statement of the sources that have allowed it to perform its activities over this period.

Please give your opinion whether you think the balance between public and private funds is appropriate. In particular take a look at the Counterpart Funding and indicate if the progress in funds obtained in the period are reasonable for the progress of the activities planned and the intrinsic requirements of the funding.

Until the commercial projects CATA is involved with come to market, it is hard to imagine the consortium deriving much funding from private sources. Curiosity-driven research is almost entirely funded by governments, with very few exceptions in countries with some tradition of philanthropy-support science. The consortium has been a strong advocate for their community receiving support from foreign entities that deploy telescopes in Chile. The amount of funding that is derived this way is not small, and the CATA team deserves recognition for their efforts in this area.
