Name of the Center: Millennium Institute Center for Genome Regulation	
Type (Institute or Nucleus)	Institute
Acronym	MI CGR
Reported period	1 July 2022 to December 31, 2022
Starting date of the Center	1 July 2022
Web Page	www.institutocrg.cl
Host Institution(s)	Universidad de Chile Pontificia Universidad Católica de Chile Universidad Andrés Bello Pontificia Universidad Católica de Valparaíso
Address	Av. Vicuña Mackenna 4860, Macul, Santiago
Stage	**New**
End date of the Center	23 June 2032
Total amount	USD $ 10,500,000 for 10 years
Total amount for the reported period	USD $ 364,912.00

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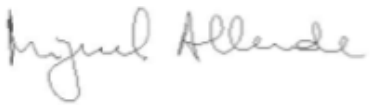
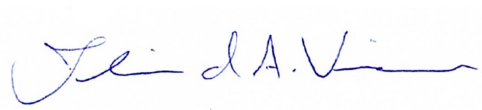
Declaración de Singapur
Por este medio declaro que la información entregada en esta memoria anual es fidedigna, y que adhiero a la Declaración de Singapur, contenida en la Resolución Exenta Nº 157 del 24 de enero de 2013 de Conicyt, como guía global para una conducta responsable en la investigación.

Institute Director Name	*Institute Alternate Director Name*
Miguel L. Allende Connelly	*Juliana De Abreu Vianna*
Director´s Signature	*Alternate Director's Signature*
	

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1. Executive Summary

The main objective of the MI CGR is to generate scientific knowledge in the fields of genomics, functional genomics, interaction gene networks, and omic sciences applied to sustainable food production. This is the MI CGR's first year of operation, having begun in late June of 2022. Our scientific team is made up of nine Associate Researchers, 10 Adjunct Researchers, 20 postdoctoral researchers, over 60 students, as well as technicians and administrative personnel and other collaborators, belonging to four host universities, three adjunct universities, along with other research institutes and academic institutions both in Chile and abroad. Below we summarize the scientific activity the MI CGR has carried out in our three main research lines:

RL1: Functional genomics of adaptation and convergent evolution

With this research line we aim to understand the molecular and evolutionary basis that govern animal-plant-microbiome-abiotic interactions in extreme environments by analyzing existing whole-genome sequence data to identify genes involved in tolerance to extreme conditions. We will use comparative genomics to assess convergent evolution in extreme environments. We will carry out exhaustive sampling to collect bacterial populations to address the role of specific bacterial groups in promoting plant growth in nutrient poor, arid environments. We will also study microbial local adaptation in Atacama to infer evolutionary history, and unveil genetic novelty and new phenotypes, which appear through adaptation over gradients.

RL2: Interaction networks that govern genome structure in communities of organisms

Sophisticated data analysis, mathematical modeling and systems biology have allowed us to make descriptions of unique ecological niches. By adding functional and causal elements, we aim to understand how networks of organisms are influenced by environmental change. We will take advantage of our unique data collections in environmental gradients combining metagenomics and abiotic factors in a heterogeneous manner to find quantitative relationships between the distributions of organisms, their metabolic and gene regulatory functions.

RL3: Genomics for conservation, ecosystem health and sustainable food production

Conservation action plans are often considered at the species-level. Through genomics, we can provide a more accurate estimation of biodiversity and detect SNPs involved in local adaptation to specific environmental conditions, which can be incorporated into species distribution models under scenarios of climate change. Genomic tools can also help to understand the mechanisms that control commercially important characteristics of fruit crops by integrating omics and phenotyping data. In aquaculture, we aim to understand the physiological and molecular aspects of *Piscirickettsia salmonis*, a disease with high impact in the salmonid aquaculture in Chile, which may drive pathogenicity. Similarly in agriculture, we aim to improve the stability of molecules such exopolysaccharides, toxins, osmoregulators, and antivirals from cyanobacteria which have potential biotechnological applications in the food, pharmaceutical, bioenergy and other industries, and search for the associated genes.

Productivity: During the reported period (1 July to 31 December 2022), we published 40 research articles in peer-reviewed journals, of which 26 (63%) were in Q1 journals and 11 (27%) were in Q2. Our Associate Researchers published 24 of these research articles, while other researchers (Adjuncts and Postdocs) published 16 articles. Among the 26 articles published by our Associate Researchers, seven (18%) were collaborative works with other MI CGR researchers, four publications (10%) were co-authored by students, and two of those publications were led by students of the MI CGR.

Education, Training and Capacity Building. During the reporting period, the MI CGR hosted 63 students: 40 doctoral students, seven master's students, and 16 undergraduate students, as well as 20 postdoctoral researchers. Two students successfully completed their PhD theses and have gone on to continue work in academic research either as postdocs or technicians within the MI CGR.

Networking and outreach. From July to December 2022, the MI CGR strengthened its collaborative networks, both in Chile and abroad. We are a part of five formal collaborative networks and two additional networks with which we seek to collaborate in joint research projects, data analysis, publications, as well as outreach and science communication. We also launched the MI CGRs new website and hosted two "Interactomics" seminars with international speakers. These seminars are open to the public and by using a hybrid format (i.e. attendees can come in person or attend via videoconference), we can reach a wide and diverse audience both within Chile and internationally. Our researchers also participated in interviews, wrote articles for non-academic publications, and strengthened collaborative links with the private sector and industry. Our RL3 lends itself particularly well for collaborations with the agriculture and aquiculture sectors.

Administration and Financial Status. During our first six months of operations, the MI CGR nominated its board of Directors and obtained official legal status as a non-profit organization. The MI CGR received its first financial contribution from the MSI in late June 2022 ($840,000,000 CLP, approx. $1,050,000 USD). The total amount spent for the reported period between 1 July and 31 December 2022 the MI CGR is $ 268,732,656 CLP or 35% (approx. $245,948 USD). We also received funding support through FONDECYT projects carried out by our Associate Researchers and their postdocs, as well as from additional national and international sources.

2. Resumen Ejecutivo

El objetivo principal del MI CGR es generar conocimiento científico sobre genómica, genómica funcional, redes de interacción de genes y las ciencias "ómicas" aplicadas a la producción sustentable de alimentos. Este es el primer año de funcionamiento del MI CGR, habiendo comenzado operaciones a finales de junio de 2022. Nuestro equipo científico está compuesto por nueve Investigadores Asociados, 10 Investigadores Adjuntos, 20 investigadores postdoctorales, más de 60 estudiantes, además de técnicos, personal administrativo y otros colaboradores, pertenecientes a cuatro universidades anfitrionas, tres universidades adjuntas, además de otros institutos de investigación e instituciones académicas tanto en Chile como en el extranjero. A continuación resumimos la actividad científica que el MI CGR ha desarrollado en nuestras tres principales líneas de investigación:

RL1: Genómica funcional de la adaptación y evolución convergente

Con esta línea de investigación planteamos entender las bases moleculares y evolutivas que gobiernan las interacciones entre los animales-plantas-microbioma y los factores abióticos en ambientes extremos mediante el análisis de los datos existentes de secuencias de genoma completo para identificar genes implicados en la tolerancia a condiciones extremas. Utilizaremos la genómica comparativa para evaluar la evolución convergente en ambientes extremos. Llevaremos a cabo un muestreo exhaustivo para descubrir nuevas poblaciones bacterianas con el fin de entender el rol de los grupos bacterianos específicos en el crecimiento de las plantas en ambientes áridos y pobres en nutrientes. También estudiaremos la adaptación local microbiana en Atacama para inferir su historia evolutiva, y descubrir novedades genéticas y nuevos fenotipos, que aparecen a través de la adaptación en gradientes.

RL2: Redes de interacción que gobiernan la estructura del genoma en comunidades de organismos

El análisis sofisticado de datos, el modelamiento matemático y la biología de sistemas nos han permitido hacer descripciones de nichos ecológicos únicos. Añadiendo elementos funcionales y causales, el objetivo es comprender cómo las redes de organismos se ven influenciadas por el cambio climático. Aprovecharemos nuestras colecciones de datos únicas en gradientes ambientales

combinando metagenómica y factores abióticos de forma heterogénea para encontrar relaciones cuantitativas entre las distribuciones de organismos, sus funciones metabólicas y de regulación génica.

RL3: Genómica para la conservación, la salud de los ecosistemas y la producción sostenible de alimentos

Los planes de acción para la conservación suelen plantearse a nivel de especie. A través de la genómica, podemos proporcionar una estimación más precisa de la biodiversidad y detectar SNP implicados en la adaptación local a condiciones ambientales específicas, que pueden incorporarse a modelos de distribución de especies en distintos escenarios de cambio climático. Las herramientas genómicas también pueden ayudar a comprender los mecanismos que controlan características comercialmente importantes de los cultivos frutales mediante la integración de datos ómicos y de fenotipo. En la acuicultura, nuestro objetivo principal es comprender los aspectos fisiológicos y moleculares de *Piscirickettsia salmonis* (una enfermedad de gran impacto en la acuicultura de salmónidos en Chile) que pueden impulsar la patogenicidad. Del mismo modo, en agricultura, pretendemos mejorar la estabilidad de moléculas como exopolisacáridos, toxinas, osmorreguladores y antivirales de cianobacterias que tienen potenciales aplicaciones biotecnológicas en las industrias alimentaria, farmacéutica, bioenergética y otras, y buscar los genes asociados.

Productividad: Durante el período reportado (1 de julio a 31 de diciembre de 2022), publicamos 40 artículos de investigación en revistas indexadas, de los cuales 26 (63%) fueron en revistas Q1 y 11 (27%) en Q2. Nuestros Investigadores Asociados publicaron 24 artículos, mientras que otros investigadores (Adjuntos y Posdoctorales) publicaron 16 artículos. Entre los 26 artículos publicados por nuestros Investigadores Asociados, siete (18%) fueron trabajos en colaboración con otros investigadores del MI CGR, cuatro publicaciones (10%) fueron en coautoría con estudiantes, y dos de esas publicaciones fueron dirigidas por estudiantes del MI CGR.

Educación, formación y capacitación. Durante el periodo del reporte, el MI CGR acogió a 63 estudiantes: 40 estudiantes de doctorado, siete de máster y 16 de pregrado, así como 20 investigadores postdoctorales. Dos estudiantes completaron con éxito sus tesis doctorales y han pasado a continuar trabajando en la investigación académica, ya sea como postdoctorales o como técnicos dentro del MI CGR.

Redes de colaboración y divulgación. Entre julio y diciembre de 2022, el MI CGR fortaleció sus redes de colaboración, tanto en Chile como en el extranjero. Somos parte de cinco redes colaborativas formales y dos redes adicionales con las que buscamos colaborar en proyectos conjuntos de investigación, análisis de datos, publicaciones, así como divulgación y comunicación científica. También lanzamos la nueva página web del MI CGR y organizamos dos seminarios de "Interactómics" con expositores internacionales. Estos seminarios están abiertos al público y el formato híbrido (es decir, que los asistentes pueden estar en persona o asistir a través de videoconferencia), nos permite llegar a un público amplio y diverso, tanto dentro de Chile como a nivel internacional. Nuestros investigadores también participaron en entrevistas, escribieron artículos para publicaciones no académicas y estrecharon lazos de colaboración con el sector privado y la industria. Nuestra RL3 se presta particularmente bien para colaboraciones con los sectores agrícola y acuícola.

Administración y situación financiera. Durante nuestros primeros seis meses de operaciones, el MI CGR consolidó su junta directiva y obtuvo su personería jurídica como organización sin fines de lucro. El MI CGR recibió su primera contribución financiera a fines de junio de 2022 ($840.000.000 CLP, aprox. $1.050.000 USD). El monto total para el período reportado entre el 1 de julio y el 31 de diciembre de 2022 la MI CGR es de $ 268.732.656 CLP o el 35% (aprox. $ 245.948 USD). También recibimos apoyo financiero a través de proyectos FONDECYT realizados por nuestros Investigadores Asociados y sus postdoctorantes, así como de otras fuentes nacionales e internacionales.

3. Outstanding Achievements

There are a number of outstanding achievements that we would like to highlight, mainly:

a) The creation of collaborative networks among the center's researchers to carry out specific and interdisciplinary research projects. These collaborative networks originated during the first scientific meeting of the MI CGR researchers in Quintay in November 2022. During this two-day meeting we had a semi-structured workshop that allowed researchers the opportunity to explore ideas, fill knowledge gaps, and get together with colleagues interested in collaborating.

b) We are also very proud of the many students we are mentoring - 63 in total among undergraduate, Masters and PhD students - who are carrying out research projects in all three of our research lines. Mentoring students gives our researchers the opportunity to develop and share the talent, skill, and expertise that they have acquired throughout their professional careers.

c) Our researchers have published 40 research articles in peer-reviewed journals. As a research center we understand the importance of publishing our results and disseminating our findings to other researchers beyond our immediate circle of academic colleagues. In section 1.c below ("Outstanding Publications") we highlight our most notable publications.

d) We hosted two Interactomics Seminars, which are open to both academics and the general public and have allowed international researchers to strengthen their collaborations in Chile. Because our Seminars are presented in "hybrid format", that is attendees can come in person or attend via videoconference, we can reach a wide and diverse audience.

4. Introduction

a) Description of the Institute:

The main objective of the IM-CGR is to reveal the mechanisms used by organisms to adapt in response to environmental factors and biological interactions. These adaptations are reflected in genome structure and can be revealed by examining metabolic and regulatory pathways, by comparative genomics, by functional analysis, by searches for co-occurrence patterns, or more ambitiously, by exploring quantitative relationships between biological signals and abiotic patterns. In addition, these discoveries can have a significant impact in highlighting issues of local and planetary importance, including climate change and biodiversity loss. We will focus on exploring the richness present in the massive data sets we have already obtained to identify the mechanisms that explain the emergence of adaptive traits, from the organism level, to the community and ecosystem level. Thus, our research is intrinsically interdisciplinary, with experts from disciplines that range from ecology to molecular biology, with important contributions to systems biology and mathematics.

b) Research Lines:

The MI CGR has three main research lines which are highly interdisciplinary and bring together researchers from different areas of expertise. These areas include experts from disciplines such as genomics, microbiology, evolution, zoology, plant science, agronomy, as well as aquaculture and sustainable food production.

1. Functional genomics of adaptation and convergent evolution

a. To understand the molecular and evolutionary basis that govern plant-abiotic interactions in arid environments, our main goal is to analyze existing whole-genome sequence data to

identify genes and genome features involved in tolerance to extreme conditions, exploring the molecular mechanisms involved in adaptation and development.

b. Use comparative genomics to further look into convergent evolution in extreme environments and associate an organism's phenotype and local environmental variables with the genotype and genomic regulation using transcriptomics.

c. We have sequenced 114 metagenome-assembled genomes (MAGs) and a collection of 112 isolated bacteria from the Atacama Desert. We need more exhaustive sampling to collect additional bacterial populations to address the role of specific bacterial groups in promoting plant growth in nutrient poor, arid environments.

d. We will also study microbial local adaptation in Atacama to infer evolutionary history, and unveil genetic novelty and new phenotypes, which appear through adaptation over gradients.

2. Interaction networks that govern genome structure in communities of organisms

a. Sophisticated data analysis, mathematical modeling and systems biology have allowed us to make descriptions of unique ecological niches. By adding functional and causal elements, we aim to understand how networks of organisms are influenced by environmental change. We will take advantage of our unique data collections in environmental gradients combining metagenomics and abiotic factors in a heterogeneous manner to find quantitative relationships between the distributions of organisms, their metabolic and gene regulatory functions.

b. Using genomic co-occurrence and phage-bacteria infection networks, we will define taxonomic, functional and environmental interactions in Atacama biotopes and in Antarctic marine ecosystems. We will determine microbial/viral beta-diversity/biogeographic patterns consistent with distance-decay relationships, community turnover, and genetic and taxonomic niche-partitioning.

3. Genomics for conservation, ecosystem health and sustainable food production

a. Conservation action plans and assessments are often considered at the species-level. Through genomics, we can provide a more accurate estimation of biodiversity and detect SNPs involved in local adaptation to specific environmental conditions, which can be incorporated into models for species distribution range under scenarios of climate change.

b. Genetic and genomic tools can elucidate the mechanisms that control commercially important characteristics of fruit crops by integrating omics and phenotyping data. We will further integrate the phenotype and the information gathered at different omic levels under controlled conditions for crops and plants grown in extreme environments to understand the metabolic pathways involved and their regulatory networks.

c. We also aim to understand the physiological and molecular aspects of *Piscirickettsia salmonis*, the etiological agent of Piscirickettsiosis, a disease with high impact in the salmonid aquaculture in Chile, which may drive pathogenicity.

d. We aim to improve the stability of molecules such as pigments, exopolysaccharides, toxins, osmoregulators, antibiotics, antivirals from cyanobacteria which have potential biotechnological applications in the food, pharmaceutical, bioenergy and other industries, to search for genes associated with novel biologically active compounds and to modulate exopolysaccharides syntheses to produce bioethanol by fermentation in extremophile cyanobacteria.

c) Organization of research teams:

We have three research groups, represented by our research lines, mainly, genetics, conservation, and sustainable food production. Our researchers participate in and belong to a wide variety of

research initiatives, including other Millennium Institutes and Research Centers. And although we strive to encourage collaborative work within and among research groups, we can nonetheless identify team leaders in each topic. The "**functional genomics of adaptation and convergent evolution**" research group is led by our Director, Miguell L Allende Connelly. This research group includes two additional Associate Researchers, our Deputy Director, Juliana de Abreu Vianna and Rodrigo Gutiérrez Ilabaca, as well as three Adjunct Researchers and several postdocs. Miguel Allende is the founder of 1000 Genomes for Chile, a research initiative created with the aim to sequence 1000 Chileans and 1000 Chilean plant and animal species. Juliana Vianna and Rodrigo Gutiérrez work in close collaboration with the Millennium Institute Biodiversity of Antarctic and Subantarctic Ecosystems (MI-BASE) and the Millennium Institute for Integrative Biology (MI-iBio), respectively. Our "**interaction networks that govern genome structure in communities of organisms**" research team is led by Alejandro Maass Sepúlveda? and includes 2 additional Associate Researchers, Beatriz Díez Moreno and Mauricio González Canales, as well as three Adjunct Researchers and their postdocs. Alejandro Maass also works in the Center for Mathematical Modelling (CMM), Beatriz Díez collaborates with the Anillo Antártico Project: Long-range transport of xenobiotics and microorganisms, and Mauricio González works at the Institute of Food Nutrition and Technology of the University of Chile. Finally, the "**genomics for conservation, ecosystem health and sustainable food production**" team is led by Ariel Orellana López, who is the current Director of the Center for Plant Biotechnology at Universidad Nacional Andrés Bello (UNAB), and includes 2 additional Associate Researchers, Romina Pedreschi Plasencia and Verónica Cambiazo Ayala, as well as four Adjunct Researchers and several postdocs.

5. Scientific and technological research:

a) Current status of research lines:

1. Functional genomics of adaptation and convergent evolution

This line of research focuses on discovering the molecular and evolutionary basis of plant-abiotic interactions in arid environments. With this research line, the MI CGR seeks to identify genes and genome features involved in the tolerance to extreme conditions by analyzing existing whole-genome sequence data, as well as understand convergent evolution in extreme environments. In addition, we also aim to study microbial adaptation in Atacama to infer evolutionary history, unveil genetic novelty and new phenotypes.

Studies developed within this research line include: "Cell surface receptor kinase FERONIA linked to nutrient sensor TORC signaling controls root hair growth at low temperature linked to low nitrate in *Arabidopsis thaliana*". Here, using genetics to understand the roles of the cell surface receptor kinase FERONIA (FER) and the nutrient sensing TOR Complex 1 (TORC) in root hair (RH) growth, our researchers uncovered a molecular mechanism by which a central hub composed by FER-ROP2-TORC is involved in the control of RH elongation under low temperature and nitrogen deficiency. Another study developed in this research line is the "Phylogenomics of the world's otters", a collaborative effort that involved many international researchers, who used comparative whole-genome analyses to resolve the phylogenetic relationships of otters. The results showed that although demographic history varied, common patterns seem related to paleoclimatic cycles. In addition, results showed that the Chilean species of otters are the least genetically diverse, which should be considered when developing long term species conservation plans. Thirdly, our studies on evolutionary genomics of fish encompass a set of diverse projects including: i) evolutionary history of the *Orestias* genus, pupfish that live in the salt pans of the Atacama Desert; ii) genome structure in Annual killifish, animals that survive a dry season by

undergoing diapause during embryogenesis and iii) Evolution and development of the antero-posterior body axis in teleosts, where we approach these questions using CRISPR-Cas9 mutagenesis of key developmental genes.

2. Interaction networks that govern genome structure in communities of organisms

This line of research aims to understand how networks of organisms are influenced by environmental change. By adding functional and causal elements to sophisticated data analysis, mathematical models, and systems biology, we can describe unique ecological niches. Data on environmental gradients, combined with metagenomics and abiotic factors in a heterogeneous manner, can uncover quantitative relationships between the distributions of organisms, their metabolic and gene regulatory functions in extreme environments such as the Atacama biotopes and Antarctic marine ecosystems. With this research line we also aim to determine microbial/viral beta-diversity, and biogeographic patterns consistent with distance-decay relationships, community turnover, and genetic and taxonomic niche-partitioning.

Studies developed under this research line include: "A general theory for temperature dependence in biology", where our Associate Researcher Beatriz Díez is a co-author. Because temperature is one of the most fundamental physical constraints on living systems, our researchers developed a simple, mechanistic theory that predicts the response to temperature across all scales theory based on the fundamental chemical kinetics and statistical physics governing the biochemical reactions needed to support life. The mathematical framework developed has multiple potential applications including predicting responses to global warming, yields of industrial processes, and epidemic outbreaks.

3. Genomics for conservation, ecosystem health and sustainable food production

Because of the nature of sustainable food production research, this research line is perhaps the most productive of the MI CGR and continues to grow. Studies in this line of research include: "A multiomics integrative analysis of color de-synchronization with softening of 'Hass' avocado fruit: A first insight into a complex physiological disorder". Researchers integrated omics (transcriptomics, proteomics and metabolomics) datasets and network analysis and discovered eight transcription factors associated with differentially regulated genes between regular air (RA) and controlled atmosphere (CA) and twelve transcription factors related to avocado fruit color de-synchronization control in ready-to-eat stage. Higher contents of flavonoids, abscisic acid and brassinosteroids were associated with synchronized fruit, whereas de-synchronized fruit revealed increases of jasmonic acid, salicylic acid and auxin levels. These results represent an important discovery in this complex disorder in a crop of high economic value for Chile.

Work in this line of research also yielded the study "Metabolomic and biochemical analysis of mesocarp tissues from table grape berries with contrasting firmness reveals cell wall modifications associated with harvest and cold storage". Because a firm texture is highly valued by consumers of table grapes (*Vitis vinifera* L.), this study looks into the firmness of the mesocarp tissue. They found that changes in galacturonic acid content in both soft and firm phenotypes were due mainly to a differential carbohydrate metabolism, providing new evidence on the role of cell wall polysaccharides -mainly pectins- and calcium in grape berry tissue firmness.

b) Productivity:

The MI CGR researchers have published 40 research articles in peer-reviewed journals, of which 26 (63%) were in Q1 journals and 11 (27%) were in Q2. Our Associate Researchers published 24

research articles, while other researchers (Adjuncts and Postdocs) published 16 articles. Among the 26 articles published by our Associate Researchers, there are seven (18%) that were collaborative works either with other Associate Researchers or with Adjunct Researchers, meaning that the majority of the publications had only one MI CGR researcher (33; 82%). This result is likely due to the fact that we are a newly created Millenium Institute, and our researchers are only now starting to form collaborative networks with each other, and are only recently finding similarities among their research. Collaborative works with several of our researchers as co-authors will likely grow as we create and strengthen collaborations within the MI CGR. Our students also participated in four publications (10%), and two of those publications were led by students of the MI CGR. While this percentage might seem low, as is the case with the collaborative publications among MI CGR researchers, the publications where students participate will only improve with time.

The articles published by our researchers are associated directly with our research lines, with most publications (45%) originating from our L3, followed by L2 (32%) and L1 (23%). The total number of publications per research line are presented below:

RL1: Functional genomics of adaptation and convergent evolution: 9
RL2: Interaction networks that govern genome structure in communities of organisms: 13
RL3: Genomics for conservation, ecosystem health and sustainable food production 18

Several of our researchers also work collaboratively with the agricultural industry. Our third research line "Genomics for conservation, ecosystem health and sustainable food production" allows us to work closely with the food production, food safety, and agricultural industry. Our Associate Researcher Verónica Cambiazo wrote an article for the Salmon Expert magazine in their section Section I+D+i. This publication is aimed at the salmon feed and handling industry, and Dr. Cambizo's article focused on the study of Piscirickettsia salmonis, specifically "using primary zebrafish cultures as an alternative model for the study of *Piscirickettsia salmonis*". *Piscirickettsia salmonis* is gram positive bacteria that Piscirickettsiosis (SRS) in salmon and has caused hundreds of thousands of dollars' worth of damage in the industry. Dr. Cambiazo proposes using the zebrafish genome to study the parasite as an alternative to traditional methods using salmon. Similarly, Dr. Cambiazo also wrote an article in InduAlimentos, a magazine intended for the food and agriculture industry, titled "Genetically modified foods". In the article she addresses the new techniques to modify food and the legislation that regulates these techniques.

At MI CGR we firmly believe that scientific information needs to be made accessible and available to a wide audience. To that end we strive to publish in journals that are either Open Access or opt to publish articles that are Open Access within traditionally non-open access journals. To that effect, we have published 32 of our articles in 12 fully Open Access journals, with an additional 9 articles published in open access format in other journals.

c) Outstanding publications:

Our researchers have many outstanding publications in the timeframe between 1 July and 31 December 2022. In particular, the article "A general theory for temperature dependence in biology" in Proceedings of the National Academy of Sciences (PNAS) deserves special attention since it presents a general theory to explain temperature dependence in biology, based on a unified mathematical framework that integrates different biological processes. The proposed theory suggests that temperature dependence can be explained by the variation of activation energy and the ability of the cell to regulate its internal temperature and may have important implications for

understanding the effects of climate change on ecosystems and human health. In particular, this theory may be useful for predicting how different organisms and biological systems will respond to changes in environmental temperature.

In addition, our Associate Researcher and Deputy Director, Juliana Vianna, was part of a large international collaborative effort that helped to reconstruct the evolutionary and demographic history of all otters of the world using their genomes in the publication titled "Phylogenomics of the world's otters". The results, published in Current Biology, showed that although demographic history varied, common patterns between species seem related to paleoclimatic cycles. In addition, the study found that the lowest genomic diversity of all otter species was for the two species found in Chile, the southern river otter (*Lontra provocax*) and the marine otter (*Lontra felina)*. Their results highlight the potential of genomic data for conservation assessment and provide a framework for further in-depth comparative genomic studies in these species.

Another publication worthy of note is the "Global phylogenomic novelty of the Cas1 gene from hot spring microbial communities". This publication in which our Associate Researchers Beatriz Díez is a co-author, describes the discovery of new Cas1 variants in hot spring microbial communities - (42–80°C, pH 6–9) from three continents - and their importance in understanding the evolution of the CRISPR-Cas system (bacterial defense system) and its adaptation in the environment. The study also highlights the importance of exploring previously unstudied microbial communities, such as those present in hot springs, to discover interesting new variants with biotechnological potential. Furthermore, the results show that circumneutral hot springs are environments harboring high microbial diversity and novelty related to adaptive immunity systems.

Summary table

Category of Publication	**MSI Center Members**	**Number of Publications co-authored by students**	**Total Number of Publications**
ISI/WOS Publications or Similar to ISI/WOS Standard	Principal Researchers **23**	3	23
	Other Researchers **14**	1	14
SCOPUS Publications or Similar to SCOPUS Standard	Principal Researchers **2**	0	2
	Other Researchers **1**	0	1
SCIELO Publications or Similar to SCIELO Standard	Principal Researchers 0	0	0
	Other Researchers 0	0	0
Scientific Books and chapters	Principal Researchers 0	0	0
	Other Researchers 0	0	0
Other Scientific Publications	Principal Researchers 3	0	3
	Other Researchers 0	0	0
Total of Publications		**4**	**43**

d) Congress Presentations:

From 1 July to 31 December 2022, our researchers presented their research at 68 scientific events including annual meetings, congresses, conferences, seminars, and workshops, both at the national

and international level. Out of the 68 events, 49 (72%) were oral presentations, and 19 (28%) were posters. Our students presented seven talks (10%), and 21 presentations (31%) were collaborative works that included two or more of our researchers. For their presentations our researchers and students traveled to Portugal, France, Switzerland, Czech Republic, Brazil, Peru, Uruguay, Argentina, the US, and to many different regions within Chile. The audience included other academics interested in the MI CGR's research lines, as well as graduate and undergraduate students, members of industry, the private and public sector. Our researchers gave 13 invited talks - five at international events and eight at national conferences. Our students presented at 7 conferences and seminars, two of which were for a wide international audience.

Among the presentations we would like to highlight is the **Luis Izquierdo Fernández** Plenary Lecture given by our Director, Miguel Allende, during the *XXXIV Annual Meeting of the Chilean Society for Cell Biology (SBCCH)* in Puerto Varas, Chile. The annual meeting of the SBCCH is the main forum in Chile to learn about and promote research and education in cell biology and biomedical sciences. The conference is named after the late Dr. Luis Izquierdo Fernández, a Chilean researcher who conducted pioneer work in embryonic cell research. This year, the "Luis Izquierdo Fernández" Conference honoured Dr. Allende's prominent research career and accomplishments. The title of Dr. Allende's presentation "A career peppered with fins and fish heads" lightheartedly referred to his many years working with zebrafish (*Danio rerio*) as a model organism for cellular research. Widely used in biological research the worldover, this small fish species has been at the center of Dr. Allende's career.

Martin Montecino's invited Plenary Talk at the **Osvaldo Cori Conference** during the *Annual Meeting of the Chilean Society for Biochemistry and Molecular Biology 2022* titled "Epigenetic control of gene transcription during cell lineage commitment" is also worthy of note. The Osvaldo Cori Conference is held in honor of Osvaldo Cori Moully (1921-1987), founder of the Biochemistry program at the University of Chile in 1957 and it is considered a great honor to be invited as a speaker. Dr. Montecino's talk focused the results of recent research that show that neural engagement involves epigenetic silencing of non-neural programs, specifically the differentiation of pluripotent stem cells (PSCs) to pro-neural progenitors (NPCs) requires silencing of the RUNX2 gene. These results are important as PSCs and NPCs then differentiate into neurons and glial cells, the main components of our central nervous system and key to understanding neurodegenerative diseases.

Additionally, our Associate Researcher Beatriz Díez was an Invited Speaker at the *18th International Symposium on Microbial Ecology (ISME18)* in Lausanne, Switzerland. Held every two years, the ISME is the most relevant forum in the discipline of environmental microbial ecology. Dr. Díez was invited to chair one of the sessions and as well an invited oral lecture. This invitation allowed the work the MI CGR carries out in this discipline to be highly visualized in front of an international audience and experts in the field. Dr. Díez presented the talk "Taxonomic, functional and environmental interactions in hot springs microbial mats", which summarized years of work in this area.

Summary Table

Type of presentation	Type of presentation	National Events [Number]	International Events [Number]
Principal Researchers	Conferences, oral communications, poster communications, others (specify)	16	12
	Invited presentations (not included in the above row)	3	7
Other researchers (Adjunct, Senior, Young, Postdoctoral Researchers)	Conferences, oral communications, poster communications, others (specify)	11	10
	Invited presentations (not included in the above row)	1	1
Students	Conferences, oral communications, poster communications, others (specify)	5	2
	Invited presentations (not included in the above row)	0	0

e) Other achievements:

- **Patents:** Nothing to report during the period between 1 July to 31 December 2022.

- **Intellectual property:** Nothing to report during the period between 1 July to 31 December 2022.

- **Organization of Scientific Events:**
  The MI CGR organized five scientific events during our first six months of operation - two symposia, one workshop and two seminars:

  - **Symposia**

  1. **From molecules to ecosystems: mechanisms of adaptation to extreme environments**

  Symposium titled "From Molecules to Ecosystems: Mechanisms of Adaptation to Extreme Environments" presented at the joint Conference of the Genetic Society of Chile (SOCHIGEN) and the Chilean Society of Evolution. Punta Arenas, Chile in December 2022. It is the most relevant national conference for research into genetics and evolution. This symposium was organized by our Director, Miguel Allende Connelly, and included talks by four of our Associate Researchers: Miguel Allende, Juliana Vianna, Rodrigo Gutiérrez and Beatriz Díez. As such, the symposium was related to two of our research lines - RL1: the "functional genomics of adaptation and convergent evolution" and RL2: "Interaction networks that govern genome structure in communities of organisms" research lines. The purpose of the Symposia was to showcase the genomic work developed by the MI CGR to an audience that was likely among the most receptive to the achievements obtained by our researchers within this research area.

2. International Symposium on Genetics in Aquaculture (ISGA 2022)

Our Adjunct Researcher Liane Basssini was on the Organization Board for this international Symposium, "Genomics for conservation, ecosystem health and sustainable food production", from 27 November to 2 December 2022 in Puerto Varas, Chile. This Symposium is one of the main triennial meetings on genetics worldwide and is generally attended by specialists in the field, researchers from academic institutions and companies related to genomic research in aquaculture. The main goal was to promote communication between international researchers and industry on the relevance of genomics in aquaculture, as well as an opportunity to foster collaborations and exchange of ideas between industry and academia.

- **Workshop**

1. School: "Combinatorial and Geometric Approaches on Dynamics"

This workshop was organized by our Associate Researcher Alejandro Maass, it was a workshop for researchers, including postdoctoral and selected PhD and MSc students, to present relevant developments in dynamical systems and ergodic theory. The communities that will benefit from this workshop include symbolic and topological dynamics of general group actions, symbolic dynamics of systems of low complexity, and Teichmüller dynamics, among others.

- **Seminars**

At the MI CGR we have maintained the tradition stemming from the years as a FONDAP Project and have aimed to organize monthly seminars to highlight research in genomics. These seminars are called "Interactomics", a word play on the "omics" of our research. These seminars allow national and international researchers to strengthen their collaborations in Chile and since they are presented in a "hybrid" modality, that is a mix of in-person and digitally (via platforms such as Zoom™) it allows for the participation of a large audience, including international attendees. We organized two "Interactomics" seminars with invited speakers during 2022:

1. ***Interactomics Seminar:*** **"DeRGA: an introduction to the German biodiversity genomics initiative"**

Our first Interactomics Seminar was organized by our Director, Miguel Allende Connelly. For this seminar he invited Dr. Phillip Schiffer from the German Reference Genome Atlas (Deutscher ReferenzGenom Atlas) to talk about the German biodiversity genomics initiative. Dr. Schiffer's team traveled to the Atacama Desert in the north of Chile to assess the genetic diversity of nematodes in desert soils. The collaboration between Dr. Allende and Dr. Schiffer at DeRGA has yielded possible future research collaborations as well as outreach and educational activities that we will be developing during 2023 and beyond.

2. ***Interactomics Seminar*****: "Combining real time transcription phenotyping to omics: the key to mine biodiversity for water use efficiency"**

This seminar was organized by our Associate Researcher Romina Pedreschi. Dr. Sebastien Carpentier from the KU Leuven University, Belgium, is a long-time collaborator of Dr. Pedreschi. Because water deficit is one of the world's major constraints in agriculture, Dr. Carpentier's talk focused on the banana (*Musa* spp.) an important crop that requires vast amounts of water for optimal production. In the long-term, Dr. Carpentier's team aims to evaluate the potential of the banana for climate smart agricultural usage.

- **Scientific Editorial Boards:**
  Three of our Associate Researchers participate on the editorial boards of five scientific journals, all of which are ISI/WOS o Similar a ISI/WOS standard, and are Q1:

  a. Alejandro Maass has been on the Scientific Editorial Board of *Discrete and Continuous Dynamical Systems* since 2019. This journal publishes peer-reviewed original papers on the theory, methods and applications of analysis, differential equations, and dynamical systems, and is committed to recording important new methods and results in its field.
  b. Rodrigo Gutiérrez is on the editorial board of three scientific journals: *The Plant Cell* (since 2018), *Molecular Plant* (since 2017), and *Journal of Experimental Botany* (since 2010). The *Plant Cell* and *Molecular Plant* publish novel research of special significance in plant biology, especially in the areas of cellular biology, molecular biology, physiology, biochemistry, genetics, and plant-microbe interaction. In contrast the *Journal of Experimental Botany* publishes advances in plant biology, focusing on fundamental processes underpinning the improvement of plants for the sustainable production of food, fuel and renewable materials.
  c. Romina Pedreschi has been on the editorial board *Postharvest Biology and Technology* since 2016. This journal is devoted to the publication of original papers, review articles and frontiers articles on biological and technological postharvest research of horticultural crops including fruit, vegetables, grapes, flowers, tea and nuts, but excluding grains.

- **Awards:** Nothing to report during the period between 1 July to 31 December 2022.

6. Education and Capacity Building

a) Education, Training and Capacity Building:

Perhaps our most enduring legacy as a research institute is the mentoring of young researchers. During our first six months of operation, the MI CGR hosted 63 students - 40 doctoral students, seven master's students, and 16 undergraduate students (*for detailed information see Annex 5*). One third of our doctoral students are enrolled in the Biological Sciences with a specialization in Molecular Biology PhD program, while the remaining students are enrolled almost equally in Biotechnology, Molecular and Neurosciences, or Nutrition and Agricultural doctoral programs. Meanwhile, our master's students' programs range from Nutrition and Agri-Food Sciences to Environmental Sciences and Natural Resources, Biotechnology and even Applied Mathematics. Finally, 38% of our undergraduate students are enrolled in the Biological Sciences program, while the remaining students are studying Marine Biology, Forestry Engineering, Biotechnology, and Veterinary Medicine. The wide variety of careers and study areas are a testament to the transversality of genomics and our research lines.

In addition, the CGR also hosted 20 postdoctoral researchers who also contributed to the MI CGR's goals with their research. We are proud of the fact that we have more female postdoctoral researchers than males (*See Annex 1.1*). We understand the challenges faced by female researchers in our field, and we strive to promote gender equality in all our endeavors. The average age of our postdoctoral researchers is under 36 years old, meaning many of them have only recently finished their doctoral studies and have been trained in the latest and most advanced techniques and methodologies. The relatively high number of students and postdoctoral researchers hosted by the

MI CGR reflects the importance of a center like ours as a place for young researchers to achieve their academic and professional goals.

With regards to funding and scholarships, seven of the doctoral students (18%), one master's student and one undergraduate student were fully financed by the MI CGR, while three doctoral students and two master's students were jointly financed with funds from the MI CGR and another funder. The remaining 49 students were financed through external sources of funding.

b) Achievements and results:

During the second half of 2022, two of our doctoral students completed their program of studies and went on to graduate successfully from their respective universities. Pablo Vergara completed his doctoral thesis in December 2022 under the tutelage of our Associate Researcher Beatriz Díez. For his thesis titled "Effect of temperature on the transcriptional activity and energy metabolism of the thermal cyanobacterium *Fischerella thermalis*" Dr. Vergara used both molecular and bioinformatic tools to determine the molecular mechanisms that allow *F. thermalis* to sustain its photosynthetic activity in temperatures near 60°C and its potential connection with auxiliary metabolic pathways such as carbohydrate metabolism. Our second graduate, Alexis Gaete - a doctoral student supervised by our Associate Researcher Mauricio González - finished his doctoral thesis in August 2022. He graduated from the Agroforestry and Veterinary doctoral program of the Universidad de Chile with the thesis titled "Functional characterization of soil bacteria isolated from extreme environments as potential plant growth promoters".

We would like to mention that our researchers are committed to helping students on the path to a career as a research scientist. Their support includes not only sharing knowledge, but also hands-on teaching regarding scientific methods and the use of sophisticated equipment. In addition, our researchers also offer career counseling, discussing with students their potential prospects, and putting them in touch with other researchers both in Chile and overseas. We hope that all of our students will become independent researchers in the future, whether that path leads them to academia or industry.

c) Destination of students:

Since his graduation in August 2022, Alexis Gaete has begun his career as a postdoctoral researcher with Mauricio González and the Institute of Nutrition and Food Technology (INTA) at the Universidad de Chile. Similarly, Pablo Vergara continues to work for Beatriz Díez's lab carrying out research on metagenomics and microbiology. Dr. Vergara will likely be included as a postdoctoral researcher of the MI CGR once we are formally operating as an independent institute in July 2023.

7. Networking and other collaborative work

a) Formal collaborative networks:

We are part of five formal collaborative networks that allow room for mutual contributions, shared goals, and complimentary lines of research:

- **1000 Genomes Project Chile**
  The objective of this program is to sequence the genome of 1,000 people and 1,000 species to create a large genetic library in Chile. The project is a collaborative effort between the Centers of Excellence that carry out frontier research in biomedicine, genomics, and processing of

large volumes of genomic data. Through this collaborative effort they aim to face a major scientific challenge that is relevant for Chile's development. Complementing our experience in various disciplines, the project has initiated an ambitious plan to discover the genome sequence of Chilean organisms, including animals, plants, microorganisms as well as that of the country's human inhabitants. In the next few years, the goal is to obtain the genomes of 1000 Chileans and of an important number of endemic species of Chile.

- **Genome sequencing consortium for the SARS-CoV-2 virus**
  This initiative, led by prominent researchers and centers of excellence, brings together the greatest number and diversity of virus sequences from all regions of Chile. This program of genomic surveillance of the SARS-CoV-2 pandemic will allow us to assess the evolution of the virus as it is transmitted in the population and its possible mutations. Under the supervision of the Ministry of Science and composed of researchers from various Chilean universities working in genomics and bioinformatics, this initiative developed a computer platform for processing and storing sequences obtained from the SARS-COV-2 virus in different regions of Chile. Once the genomes have been sequenced, the information is processed by bioinformatic engineers at the National High Performance Computing Center (NLHPC), where the sequences are stored and made available to the entire scientific community. The general characteristics of the viral genomes and the phylogenetic (parentage) relationships between the different variants found can be viewed on the Consortium's website (www.cov2.cl).

- **Earth Biogenome Project**
  Launched in 2018, the Earth BioGenome Project (EBP) aims to sequence, catalog and characterize the genomes of all of Earth's eukaryotic biodiversity over a period of ten years. The project is divided into three large phases of approximately 3 years each. In Phase I one of the most important goals is to create annotated chromosome-scale reference assemblies for at least one representative species of each of the ~9,000 eukaryotic taxonomic families. Our Director, Miguel Allende, is a member of the EBP and through him both the IM-CGR and the 1000 Genomes Project Chile are included as members/partners of the initiative.

- **Mission Microbiomes**
  The Foundation TARA Océan is developing an innovative open science initiative which will enable better planning for the impact of climate change. The schooner *Tara* is a floating laboratory that has already covered more than 570 000 km since 2003, stopping in more than 60 countries. Tara Océan has launched seven "Expeditions", one of which is **Mission Microbiomes** in four key stages: Chile, the Amazon, Antarctica, and Africa. It aims to understand the invisible life of the ocean to answer three key questions:
    - ➢ How does climate change disrupt ocean currents and the distribution of the marine microbiome?
    - ➢ What impact does pollution and particularly microplastics have on the marine microbiome?
    - ➢ How does the land fertilise the ocean?

- **SymbioDiversity - Associated team France-Chile**
  An initiative led by the French National Institute for Research in Digital Science and Technology (INRIA), the associated SymBioDiversity team works with massive data on microbial biodiversity. The project coordinators are Anne Siegel of the DYLISS project team

at the Inria Center of the Université de Rennes, and the MI CGR Associate Researcher Alejandro Maass. The SymBioDiversity - Symbolic and Data Mining and Exploration of Functional Biodiversity began in 2020 for a duration of four years. Through a combination of data mining, reasoning and mathematical modeling, this team aims to develop approaches for the analysis of microbial diversity in extreme environments, as well as to characterize the functional landscape of these ecosystems.

b) Other Collaborative Networks:

The MI CGR has developed partnerships and collaborations with other research organizations and institutions listed below:

- **The Center for Mathematical Modeling (CMM)** based at the University of Chile is a national leading scientific center for research and applications of mathematics. It aims to create new mathematics and use it to solve problems coming from other sciences, the industry, and public policies. Created in 2000 with the support of FONDAP, the CMM has contributed to the innovation and solution of public and industrial problems in areas where mathematical modeling has shown to be essential. Our Associate Researcher Alejandro Maass is an active member of the CMM, through which Dr. Maass has carried out not only pioneering research and complex data analyses, but also outreach activities such as workshops and seminars (*see section* **Organization of Scientific Events** *above*).

- **Millennium Institute Biodiversity of Antarctic and Subantarctic Ecosystems (MI BASE)** is a Millenium Institute established in 2021 which seeks to strengthen scientific research excellence in biodiversity, conservation, and international law in Antarctic and Subantarctic territories. Our Associate Researcher and Deputy Director, Juliana Vianna, is also a researcher at the MI BASE. Because our two research institutes have complementary research lines, collaborations between our researchers, and students have occurred naturally. We share information, resources, results, and co-fund young researchers in both genomics and phylogenomics, as well as in conservation of Antarctic and Subantarctic species such as penguins and foxes.

8. Outreach and connections with other sectors

a) Outreach:

We had few opportunities to develop outreach activities during our first six months of operation. Nonetheless, our researchers communicated part of the work we do at the MI CGR to non-academic audiences through interviews, round tables, and other fora.

During the TXPLUS Rockstars program our Director, Miguel Allende was interviewed by renowned science communicator Gabriel León regarding paleogenomics, and the outstanding achievements by 2022 Nobel Prize Winner Dr. Svante Pääbo. Among his accomplishments, Dr. Pääbo and his team completed the first draft of the Neanderthal genome, shedding light on the recent evolutionary history of modern humans. He also helped to uncover an unknown hominid using DNA analysis and he published a draft of the Neanderthal genome sequence. The interview highlighted the importance of DNA research and cutting-edge techniques. Similarly, Dr. Allende was interviewed by CNN Chile during their CNN Prime Futuro 360 program. This program boasts an international viewing audience and was a prominent platform to convey the importance of

genomic research and its potential to help resolve the evolutionary history of both humans and other species. To this effect Dr. Allende published an opinion piece in the journal Palabra Pública, published by the Universidad de Chile, highlighting our constant search for the origins of humanity.

In september 2022, our Associate Researcher Beatriz Díez, along with two of her doctoral students were interviewed by (CR)2 (https://www.cr2.cl) for their article: "Unveiling the identity and diversity of marine viruses in the waters of Chilean Patagonia". In the article Dr. Díez highlights how our relationship with viruses has changed over the years, but despite a general negative connotation, viruses are fundamental biological agents of biodiversity, which help to maintain the balance of any ecosystem and, therefore, we must study and protect them. In marine ecosystems, viruses are the most abundant and diverse microorganisms, with average concentrations of 10 million viral particles per milliliter of seawater. However, despite the relevance of viruses in the oceans, and the urgency of studying them in the ecosystems most vulnerable to the effects of climate change, to date there are no published studies on the viruses that inhabit the waters of Chilean Patagonia.

Alejandro Maass also highlighted the importance of the study of microbiology in his article "DNA of Antarctic microorganisms" in the Chilean national newspaper La Tercera, in the section "Qué Pasa". The article was on the comprehensive sampling of the genetic material of microorganisms inhabiting the sea carried out by **Mission Microbiomes** (*see section 3 above*). Dr. Maass stressed the importance of collaborative research both nationally and internationally, to tackle the world's biggest challenges.

Our Deputy Director, Juliana Vianna, participated in a round table Titled Gender and Science during the Joint Annual Meeting of the Genetic Society of Chile (SOCHIGEN) and the Chilean Society of Evolution. The round table discussion led by Ziomara Gerdtzen, Deputy Director of the Department of Chemical Engineering, Biotechnology and Materials at the Universidad de Chile, focused on the challenges women face in science and technology fields, which have traditionally been male dominated careers.

b) Connections with other sectors:
The Annual FruitTrade held in Santiago brings together the best of the Chilean fruit and vegetable industry and research. Fruittrade is an international business conference, fair and convention specializing in Chilean fruit and vegetables for export. It is organized by the Federation of Fruit Producers of Chile (FEDEFRUTA) and is supported by the Chilean government through the Ministry of Agriculture and the Ministry of Foreign Affairs through its export promotion agency ProChile. Our Associate Researcher Ariel Orellana participated in the round table discussion where he and other experts proposed novel solutions to the new challenges posed by climate change in the Chilean fruit sector.

c) Other achievements: Nothing to report in the period from 1 July to 31 December 2022.

9. Administration and Financial Status

a) Organization and administration: During our first six months of operations, the MI CGR consolidated its board of Directors and obtained official legal status as a non-profit organization. Our organizational chart is presented below:

Category	Female	Male	TOTAL
Assistant & Technicians	18	18	36
Administrative Staff	1	2	3
TOTAL	19	20	39

b) Financial Status:

The MI CGR received its first financial contribution from the MSI in late June 2022 ($840,000,000 CLP, approx. $1,050,000 USD). The total amount for the reported period between 1 July and 31 December 2022 the MI CGR is $ 268,732,656 CLP (approx. $245,948 USD).

The MI CGR received additional funding support through FONDECYT for 17 research projects carried out by our Associate Researchers and their postdocs. The total yearly amounts per project were adjusted for the reported period, yielding a total of $433,472,583 CLP, of which approximately 18.2% was used to support MI CGR research activities (See Appendix 9).

The outflow structure for the reported period shows that most of the MI CGR budget was spent on researchers', students', and research assistants' salaries, partial support for publications, and contributions for attending scientific events (included in Operational Costs), among other activities.

	Description	Year 1	Monthly	Qty.	Total for period
Researchers	Director	$ 19,200,000	$ 1,600,000	1	$ 4,800,000
	Deputy Director	$ 15,600,000	$ 1,300,000	1	$ 3,900,000
	Principal Researchers	$ 12,000,000	$ 1,000,000	7	$ 21,000,000
	Adjunct Researchers	$ 4,200,000	$ 350,000	11	$ 11,550,000
	Postdocs	$ 20,400,000	$ 1,700,000	2	$ 10,200,000
	PhD Scholarships	$ 5,400,000	$ 600,000	2	$ 2,700,000
Administrative Personnel	Executive Director	$ 24,000,000	$ 2,000,000	1	$ 6,000,000
	Administrator	$ 18,000,000	$ 1,200,000	1	$ 4,500,000
	Finance & Procurement	$ 7,200,000	$ 600,000	1	$ 1,800,000
	Communications Director	$ 22,800,000	$ 1,900,000	1	$ 5,700,000
	Total Personnel				**$ 72,150,000**
Other Costs	**Equipment (from year 2 onwards)**				$ 14,000,000
	Infrastructure (from year 2 onwards)				$ -
	General Operational Costs				$ 10,000,000
	Administrative Costs (e.g. events, legal fees)				$ 10,000,000
	Individual Operational Costs				$ 172,962,500
	Overhead				$ 3,359,158
	TOTAL				**$ 268,732,656**

10. **<u>Annexes</u>**: (see below)

Annex 1.- Institute / Nucleus Researchers

1.

1.1 Researcher Summary Table

Category of researcher	Quantity	Average age	Nationality		Distribution Gender		
			National	International	Male	Female	Not stated
Director	1	60	1	0	1	0	-
Alternate Director	1	43	0	1	0	1	-
Principal Researcher	9	54.3	6	3	5	4	-
Senior Researcher	4	59.75	0	4	2	2	-
Young Researcher	0	0	0	0	0	0	-
Postdoctoral	20	36.6	19	1	9	11	-

1.2 Principal Researchers

Name	Research Line	Nationality	Gender	Date of birth dd/mm/yy	Profession	Academic Degree	Affiliation	Current Position	Relation with Center
Miguel L Allende	Functional genomics of adaptation and convergent evolution	Chilean	M	08/10/1962	Molecular Biologist	D	U de Chile	Professor	2
Juliana Vianna	Functional genomics of adaptation and convergent evolution	Brazilian	F	09/04/1979	Biologist	D	PUC	Professor	2
Rodrigo A Gutiérrez	Functional genomics of adaptation and convergent evolution	Chilean	M	30/12/1971	Biochemist	D	PUC	Professor	2
Beatriz E Díez	Interaction networks that govern genome structure in communities of organisms	Spanish	F	22/02/1972	Biologist	D	PUC	Professor	2

Name	Research Line	Nationality	Gender	Date of birth dd/mm/yy	Profession	Academic Degree	Affiliation	Current Position	Relation with Center
Mauricio González	Interaction networks that govern genome structure in communities of organisms	Chilean	M	04/12/1962	Molecular Biologist	D	U de Chile	Professor	2
Alejandro Maass	Interaction networks that govern genome structure in communities of organisms	Chilean	M	11/11/1965	Mathmatician	D	U de Chile	Professor	2
Verónica Cambiazo	Genomics for conservation, ecosystem health and sustainable food production	Chilean	F	06/01/1961	Molecular Biologist	D	U de Chile	Assoc. Professor	2
Ariel Orellana	Genomics for conservation, ecosystem health and sustainable food production	Chilean	M	01/12/1961	Molecular Biologist	D	UNAB	Professor	2
Romina Pedreschi	Genomics for conservation, ecosystem health and sustainable food production	Italian	F	17/08/1978	Agronomist	D	PUCV	Assoc. Professor	2

1.3 Senior Researchers

Name	Research Line	Nationality	Gender	Date of birth dd/mm/yy	Profession	Academic Degree	Affiliation	Current Position	Relation with Center
Rasmus Nielsen Jensen	Functional genomics of adaptation and convergent evolution	North American	M	27/01/1970	Biologist	D	University of California	Professor	2
Gloria Coruzzi	Interaction networks that govern genome structure in communities of organisms	North American	F	28/06/1954	Biologist	D	NYU	Professor	2
Marie France Sagot	Interaction networks that govern genome structure in communities of organisms	French	F	21/04/1956	Computer Science	D	INRIA, Université Lyon	Professor	2
Colomban de Vargas	Functional genomics of adaptation and convergent evolution	French	M	25/08/1971	Biologist	D	CNRS-Sorbonne Université	Professor	2

NOMENCLATURE:	**[Academic Degree]**	**[Relation with Center]**
[Gender] [M] Male [F] Female [ND] Does not Declare	[U] Undergraduate [M] Master [D] Doctoral	[1] Full time [2] Part time

Annex 2.- Research Lines

Nº	Research Line	Research Line Objectives	Description of Research Line	Researcher	Research Discipline	Starting Date [dd/mm/yy]	Ending Date [dd/mm/yy]	Status
RL1	Functional genomics of adaptation and convergent evolution	Use a genomic approach to determine the independent evolution of similar traits in different lineages	Convergent evolution generally involves the same genes, and with this line of research we seek to understand the genetic basis of the evolution of similar traits in different lineages to determine which mutations, either in a gene or in the genetic sequence, are responsible for modifying a particular trait.	Martín Motecino Leonard. Miguel Allende Connelly. Rodrigo Gutiérrez Ilabaca. Eleodoro Riveras Hernandez. Álvaro Glavic Maurer. Alexandra Galetovic Carabantes. Juliana De Abreu Vianna. Colomban de Vargas. Grace Isabel Armijo. Tomás Moyano Yugovic. Pamela Morales. Carola Cañón. Fabiola León. Grace Armijo. Francisca Díaz. David González. Felipe Gajardo. Rasmus Nielsen Jensen.	Molecular biology. Microbiology. Mathematical Sciences. Cell biology. Genetics and evolution. Botany. Zoology. Ecology and environmental sciences.	01/07/2022		
RL2	Interaction networks that govern genome structure in communities of organisms	Study how gene regulatory networks interact in the genome of microbiological communities	A gene regulatory network interacts to control a specific cellular function. Gene regulatory networks are important in development, differentiation and response to environmental signals.	Mauricio Latorre Mora. Claudio Latorre Hidalgo. Jacquelinne Acuña Sobarzo. Beatriz Diez Moreno. Pablo Vergara Barros. Natalia Eugenia Jiménez Tapia.	Cell biology. Molecular biology. Population biology. Ecology and environmental sciences. Genetics and evolution.	01/07/2022		

Nº	Research Line	Research Line Objectives	Description of Research Line	Researcher	Research Discipline	Starting Date [dd/mm/yy]	Ending Date [dd/mm/yy]	Status
				Fernanda Fredericksen. Victor Aliaga. Joaquín Rilling. Alejandro Maass Sepúlveda. Gloria Coruzzi. Marie France Sagot. Mauricio González Canales.	Microbiology. Analysis. Mathematical sciences. Biogeography. Paleontology. Fisheries and fish farming. Immunology. Parasitology.			
RL3	Genomics for conservation, ecosystem health and sustainable food production	Analyze genomes and their interaction networks to generate hypotheses related to the impact of climate change on endangered species, and propose solutions for biodiversity conservation, sustainable agriculture and aquaculture	Conservation genetics is the application of genetics to understand and reduce the risk of extinction of populations and species. From our analysis of genomes, genes and networks, we can generate, and test hypotheses related to the impacts of climate change and environmental degradation, and propose biotechnological solutions for biodiversity conservation and sustainable production in agriculture and aquaculture.	Aurora Gaxiola Alcantar. Claudio Meneses Araya. Romina Pedreschi Plasencia. Ariel Orellana López. Liane Bassini Ney. Gerardo Núñez Lillo. Ignacia Hernández Figueroa. Alexis Ignacio Gaete Silva. Angélica Reyes Jara. Verónica Cambiazo Ayala. Alejandra Goity Falconi. Erika Araus Caramori. Karin Rothkegel Agurto. Alejandra Goity.	Molecular biology. Ecology and environmental sciences. Agronomy and forestry and livestock specialties. Food processing and technology. Other biology specialties. Genetic engineering Veterinary sciences. Agricultural economics and production systems. Fisheries and fish farming Biogeography. Basic nutrition. Biochemistry.	01/07/2022		

Annex 3.- Publications (Total or partially financed by MSI)

3.1.- ISI/WOS Publications or Similar to ISI/WOS Standard:

3.1.1 ***Principal Researchers****:*

N°	Title	Quartile	Authors	PI Associated with the Publication	Source	DOI	Lines of Research	N° principal researchers of the center	Number of researchers of the center another category	N° students	Date of publication
1	Impact of cold storage followed by drying of mashua tuber (Tropaeolum tuberosum) on the glucosinolate content and their transformation products	Q2	Ana Aguilar-Galvez,Diego García-Ríos,Johana Lindo,Daniel Ramírez-Guzmán,Rosana Chirinos,Romina Pedreschi,David Campos	Romina Pedreschi	International Journal of Food Science & Technology	10.1111/ijfs.16088	Genomics for conservation, ecosystem health and sustainable food production	1	0	0	20/11/22
2	Antioxidant, antihypertensive and antidiabetic properties of peptidic fractions obtained from tarwi (Lupinus mutabilis) protein hydrolysate and identification of promising multifunctional bioactive properties	Q2	Chirinos, R; Villasante-Bravo, N; Aguilar-Gálvez, A; Figueroa-Merma, A; Carpentier, S; Pedreschi, R; Campos, D;	Romina Pedreschi	International Journal of Food Science & Technology	10.1111/ijfs.16100	Genomics for conservation, ecosystem health and sustainable food production	1	0	0	22/09/22

N°	Title	Quartile	Authors	PI Associated with the Publication	Source	DOI	Lines of Research	N° principal researchers of the center	Number of researchers of the center another category	N° students	Date of publication
3	Phylogenomics of the world's otters	Q1	Vera de Ferran, Henrique Vieira Figueiro, Fernanda de Jesus Trindade, Oliver Smith, Mikkel-Holger S. Sinding, Cristine S. Trinca, Gabriele Zenato Lazzari, Geraldine Veron, Juliana A. Vianna, Filippo Barbanera, Sergei Kliver, Natalia Serdyukova, Tatiana Bulyonkova, Oliver A. Ryder, M. Thomas P. Gilbert, Klaus-Peter Koepfli, and Eduardo Eizirik	Juliana Vianna	Current Biology	10.1016/j.cub.2022.06.036	Functional genomics of adaptation and convergent evolution	1	0	0	22/08/22
4	The systematics of Tachymenini (Serpentes, Dipsadidae): An updated classification based on molecular and morphological evidence	Q1	Vivian C. Trevine, Felipe G. Grazziotin, Alejandro Giraudo, Nicole Sallaberry-Pinchera, Juliana A. Vianna, Hussam Zaher	Juliana Vianna	Zoologica Scripta	10.1111/zsc.12565	Functional genomics of adaptation and convergent evolution	1	0	0	6/09/22
5	An exploration of microbial response to stressors with Prof. Claudio C. Vásquez Guzmán	Q2	M Seeger, RJ Turner, M González	Mauricio González	Biological Research	10.1186/s40659-022-00393-3	Interaction networks that govern genome structure in communities of organisms.	1	0	0	6/08/22

N°	Title	Quartile	Authors	PI Associated with the Publication	Source	DOI	Lines of Research	N° principal researchers of the center	Number of researchers of the center another category	N° students	Date of publication
6	On the automorphism group of minimal -adic subshifts of finite alphabet rank	Q1	B Espinoza, A Maass	Alejandro Maass	Ergodic Theory and Dynamical Systems	10.1017/etds.2021.64		1	0	0	30/06/22
7	Color desynchronization with softening of 'Hass' avocado: Targeted pigment, hormone and gene expression analysis	Q1	Camila Arancibia-Guerra, Gerardo Núñez-Lillo, Alejandro Cáceres-Mella, Esther Carrera, Claudio Meneses, Nathalie Kuhn, RominaPedreschi	Romina Pedreschi	Postharvest Biology and Technology	https://doi.org/10.1016/j.postharvbio.2022.112067	Genomics for conservation, ecosystem health and sustainable food production	1	1	0	1/12/22
8	A general theory for temperature dependence in biology	Q1	José Ignacio Arroyo, Beatriz Diez, Christopher P. Kempes, Geoffrey B. West, and Pablo A. Marquet	Beatriz Díez	Proceedings of the National Academy of Sciences	doi.org/10.1073/pnas.2119872119	Interaction networks that govern genome structure in communities of organisms.	1	0	0	18/07/22
9	Characterization and genomic analysis of two novel psychrotolerant Acidithiobacillus ferrooxidans strains from polar and subpolar environments	Q1	Muñoz-Villagrán C, Grossolli-Gálvez J, Acevedo-Arbunic J, Valenzuela X, Ferrer A, Díez B and Levicán G	Beatriz Díez	Frontiers in Microbiology	10.3389/fmicb.2022.960324	Interaction networks that govern genome structure in communities of organisms.	1	0	0	24/08/22

N°	Title	Quartile	Authors	PI Associated with the Publication	Source	DOI	Lines of Research	N° principal researchers of the center	Number of researchers of the center another category	N° students	Date of publication
10	Fractionation and separation of peptides with antioxidant and angiotensin-i converting enzyme inhibitory activities from a quinoa (Chenopodium quinoa Willd.) protein hydrolysate	Q3	M Cisneros-Yupanqui, R Pedreschi, A Aguilar-Galvez, R Chirinos, D Campos	Romina Pedreschi	Journal of Microbiology, Biotechnology and Food Sciences	10.55251/jmbfs.2686	Genomics for conservation, ecosystem health and sustainable food production	1	0	0	1/08/22
11	Effect of Prolonged Cold Storage on the Dynamics of the Enzymatic and Non-Enzymatic Antioxidant System in the Mesocarp of Avocado (Persea americana) cv. Hass: Relationship with Oxidative Processes	Q1	R Chirinos, K Ramon, M Mendoza, A Figueroa-Merma, A Pacheco-Ávalos, D Campos, R Pedreschi	Romina Pedreschi	Horticulturae	https://doi.org/10.3390/horticulturae8100880	Genomics for conservation, ecosystem health and sustainable food production	1	0	0	26/09/22
12	Prolonged on-tree maturation vs. cold storage of Hass avocado fruit: Changes in metabolites of bioactive interest at edible ripeness	Q1	I Serrano-García, E Hurtado-Fernández, JJ Gonzalez-Fernandez, JI Hormaza, R Pedreschi, P Reboredo-Rodríguez, M Figueiredo-González, L Olmo-García, A Carrasco-Pancorbo	Romina Pedreschi	Food Chemistry	10.1016/j.foodchem.2022.133447	Genomics for conservation, ecosystem health and sustainable food production	1	0	0	15/11/22

N°	Title	Quartile	Authors	PI Associated with the Publication	Source	DOI	Lines of Research	N° principal researchers of the center	Number of researchers of the center another category	N° students	Date of publication
13	Current state of knowledge on freshwater planarians (Platyhelminthes, Tricladida, Dugesiidae) from Chile	Q3	Constanza Vásquez-Doorman, Javiera Escobedo, Miguel L. Allende	Miguel Allende	Neotropical Biology and Conservation	10.3897/neotropical.17.e82779	Functional genomics of adaptation and convergent evolution	1	0	0	5/08/22
14	Associations between bacterial communities and microplastics from surface seawater of the Northern Patagonian area of Chile	Q1	P Aguila-Torres, M González, JE Maldonado, R Miranda, L Zhang, R González-Stegmaier, L A Rojas, A Gaete	Mauricio González	Environmental Pollution	10.1016/j.envpol.2022.119313	Interaction networks that govern genome structure in communities of organisms.	1	0	1	1/08/22
15	Directional mean dimension and continuum-wise expansive $\mathbb{Z}^{\mathbb{k}}$-actions	Q1	S Donoso, L Jin, A Maass, Y Qiao	Alejandro Maass	PROCEEDINGS OF THE AMERICAN MATHEMATICAL SOCIETY	10.1090/proc/16027		1	0	0	29/07/22
16	Metabolomic and biochemical analysis of mesocarp tissues from table grape berries with contrasting firmness reveals cell wall modifications associated to harvest and cold storage	Q1	I Balic, P Olmedo, B Zepeda, B Rojas, T Ejsmentewicz, M Barros, D Aguayo, AA Moreno, R Pedreschi, C Meneses, R Campos-Vargas	Romina Pedreschi	Food Chemistry	10.1016/j.foodchem.2022.133052	Genomics for conservation, ecosystem health and sustainable food production	1	1	0	30/09/22

N°	Title	Quartile	Authors	PI Associated with the Publication	Source	DOI	Lines of Research	N° principal researchers of the center	Number of researchers of the center another category	N° students	Date of publication
17	Reduced neutralization against Delta, Gamma, Mu, and Omicron BA.1 variants of SARS-CoV-2 from previous non-Omicron infection	Q1	Paola Pidal, Jorge Fernández, Constanza Airola, Miguel Araujo, Ana María Menjiba, Héctor San Martín, Nicole Bruneau, Monserrat Balanda, Coral Elgueta, Rodrigo Fasce, María Teresa Valenzuela, Ariel Orellana, Eugenio Ramírez	Ariel Orellana	Medical Microbiology and Immunology	10.1007/s00430-022-00753-6	Genomics for conservation, ecosystem health and sustainable food production	1	0	0	12/11/22
18	Patched-Related Is Required for Proper Development of Embryonic Drosophila Nervous System	Q2	C Bolatto, S Nieves, A Reyes, S Olivera-Bravo, V Cambiazo	Verónica Cambiazo	Frontiers in Neuroscience	10.3389/fnins.2022.920670	Genomics for conservation, ecosystem health and sustainable food production	1	0	0	23/08/22
19	First finds in North and South America of Pentacoelum kazukolinda (Platyhelminthes: Tricladida), a worldwide invasive flatworm	Q2	Vásquez-Doorman C, Brusa F, Reyes J, Sluys R, Vila-Farré M, Rink JC, Allende ML	Miguel Allende	Bioinvasions Records - REABIC	10.3391/bir.2022.11.4.25	Functional genomics of adaptation and convergent evolution	1	0	0	14/10/22

N°	Title	Quartile	Authors	PI Associated with the Publication	Source	DOI	Lines of Research	N° principal researchers of the center	Number of researchers of the center another category	N° students	Date of publication
20	Aloe vera reduces gut inflammation induced by soybean meal in Atlantic salmon	Q1	Fehrmann-Cartes K, Vega M, Vera F, Enríquez R, Feijóo CG, Allende ML, Hernández AJ and Romero A	Miguel Allende	Frontiers in Animal Science	10.3389/fanim.2022.1028318	Genomics for conservation, ecosystem health and sustainable food production	1	0	0	19/10/22
21	Proteomics analysis reveals new insights into surface pitting of sweet cherry cultivars displaying contrasting susceptibility	Q2	Nunez-Lillo, G; Ponce, E; Alvaro, JE; Campos, D; Meneses, C; Campos-Vargas, R; Carpentier, S; Fuentealba, C; Pedreschi, R	Romina Pedreschi	JOURNAL OF HORTICULTURAL SCIENCE & BIOTECHNOLOGY	10.1016/j.foodchem.2022.133052	Genomics for conservation, ecosystem health and sustainable food production	1	1	0	3/09/22
22	Global phylogenomic novelty of the Cas1 gene from hot spring microbial communities	Q1	Salgado O, Guajardo-Leiva S, Moya-Beltrán A, Barbosa C, Ridley C, Tamayo-Leiva J, Quatrini R, Mojica FJM and Díez B	Beatriz Díez	Frontiers in Microbiology	10.3389/fmicb.2022.1069452	Interaction networks that govern genome structure in communities of organisms.	1	0	1	2/12/22
23	Compensatory Transcriptional Response of Fischerella thermalis to Thermal Damage of the Photosynthetic Electron Transfer Chain	Q1	Vergara-Barros, P.; Alcorta, J.; Casanova-Katny, A.; Nürnberg, D.J.; Díez, B	Beatriz Díez	Molecules	10.3390/molecules27238515	Interaction networks that govern genome structure in communities of organisms.	1	1	0	3/12/22

3.2.- SCOPUS Publications or Similar to SCOPUS Standard:

3.2.1 ***Principal Researchers****:*

N°	Title	Quartile	Authors	Researcher Principal associated with the publication	Source (Name of the Journal)	DOI	Lines of Research	N° principal researchers of the center	Number of researchers of the center another category	N° students	Date of publication
1	Transcriptome and gene regulatory network analyses reveal new transcription factors in mature fruit associated with harvest date in Prunus persica	Q1	Núñez-Lillo, G., Pérez-Reyes, W., Riveros, A., Lillo-Carmona, V., Rothkegel, K., Alvarez, J.M., Blanco-Herrera, F., Pedreschi, R., Campos-Vargas, R., Meneses, C.	Romina Pedreschi	Plants	10.3390/plants11243473	Genomics for conservation, ecosystem health and sustainable food production	1	1	0	12/12/22
2	Response Mechanisms of “Hass” Avocado to Sequential 1–methylcyclopropene Applications at Different Maturity Stages during Cold Storage	Q1	D Olivares, M García-Rojas, PA Ulloa, A Riveros, R Pedreschi, R Campos-Vargas, C Meneses, B G Defilippi	Romina Pedreschi	Plants	10.3390/plants11131781	Genomics for conservation, ecosystem health and sustainable food production	1	1	0	5/07/22

3.3.- SCIELO Publications or Similar to SCIELO Standard

3.3.1 ***Principal Researchers****:*

N°	Title	Quartile	Authors	Researcher Principal associated with the Publication	Source (Name of the Journal)	DOI	Lines of Research	N° principal researchers of the center	Number of researchers of the center other category	N° students	Date of publication
1	**N/A**										

3.4.- Scientific Books and Chapters
3.4.1 Principals Researchers:

N°	Title	Quartile	Principal Researcher	Source (Name of the Journal)	Volume	Number	Initial page	ISBN	Lines of Research	N° principal researchers of the center	Number of researchers of the center another category	N° students	Date of publication
1	**N/A**												

3.5.- Other Publications

3.5.1 Principals Researchers:

N°	Title	Publication Category	Other Category	Quartile	Authors	Source (Name of the Journal)	Principal Researcher	Lines of Research	N° principal researchers of the center	Number of researchers of the center another category	N° students	Date of publication
1	Svante Pääbo, explorador del pasado	Other	Magazine	Q5	Miguel Allende	Palabra Pública	Miguel Allende	Functional genomics of adaptation and convergent evolution	1	0	0	19-dec-2022
2	Using primary zebrafish cultures as an alternative model for the study of *Piscirickettsia salmonis*	Other	Industry	Q5	Ortiz-Severin J, Tandberg J, Winther-Larsen H, Cambiazo V	Salmon Expert	Verónica Cambiazo	Genomics for conservation, ecosystem health and sustainable food production	1	0	0	15-nov-2022
3	Genetically modified foods	Other	Industry	Q5	Sebastián Roque, Pamela Aravena, Verónica Cambiazo	InduAlimentos	Verónica Cambiazo	Genomics for conservation, ecosystem health and sustainable food production	1	0	1	14-dec-2022

3.6.- "ISI/WOS Publications or Similar to ISI/WOS Standard", "SCOPUS Publications or Similar to SCOPUS Standard" "SCIELO Publications or Similar to SCIELO Standard", "Books and chapters in books" y "Other Publications [Other Researchers]":

3.6.1 Other researchers:

N°	Publication Category	Other Category	Quartile	Authors	Title	Source	Volume	Number	Initial Page	DOI	ISSN	Lines of Research	N° principal researchers of the center	N° students	Date of publication
1	ISI/WOS o Similar a ISI/WOS standard		Q1	Campos, M; Acuna, JJ; Rilling, JI, ; Gonzalez-Gonzalez, S; Pena-Cortes, F; Jaisi, DP ; Hollenback, A; Ogram, A; Bai, JH; Zhang, L; Xiao, R; Jorquera, MA	Spatiotemporal distributions and relationships of phosphorus content, phosphomonoesterase activity, and bacterial phosphomonoesterase genes in sediments from a eutrophic brackish water lake in Chile	Journal of Environmental Management	320			10.1016/j.jenvman.2022.115906	0301-4797	Interaction networks that govern genome structure in communities of organisms.	0	0	15/10/22
2	ISI/WOS o Similar a ISI/WOS standard		Q1	Narvaez, G; Munoz-Espinoza, C; Soto, E; Rothkegel, K; Bastias, M; Gutierrez, J; Bravo, S; Hasbun, R; Meneses, C; Almeida, AM	Global Methylation Analysis Using MSAP Reveals Differences in Chilling-Associated DNA Methylation Changes during Dormancy Release in Contrasting Sweet Cherry Varieties	Horticulturae	8	10	962	10.3390/horticulturae8100962	2311-7524	Genomics for conservation, ecosystem health and sustainable food production	0	1	10/10/22
3	ISI/WOS o Similar a ISI/WOS standard		Q1	Manning, JE; Chea, S; Parker, DM; Bohl, JA; Lay, S; Mateja, A; Man, S; Nhek, S; Ponce, A; Sreng, S; Kong, D; Kimsan, S; Meneses, C; Fay, MP; Suon, S; Huy, R; Lon, C; Leang, R; Oliveira, F	Development of Inapparent Dengue Associated With Increased Antibody Levels to Aedes aegypti Salivary Proteins: A Longitudinal Dengue Cohort in Cambodia	JOURNAL OF INFECTIOUS DISEASES	226	8	1327	10.1093/infdis/jiab541	0022-1899	Genomics for conservation, ecosystem health and sustainable food production	0	0	17/10/22
4	ISI/WOS o Similar a ISI/WOS standard		Q2	Houston, J; Latorre, C	The role of the non-stationary Andean Dry Diagonal in paleoclimate reconstructions	Hydrological Processes	36	10	e14723	10.1002/hyp.14723	0885-6087	Interaction networks that govern genome structure in communities of organisms.	0	0	23/10/22

N°	Publication Category	Other Category	Quartile	Authors	Title	Source	Volume	Number	Initial Page	DOI	ISSN	Lines of Research	N° principal researchers of the center	N° students	Date of publication
5	ISI/WOS o Similar a ISI/WOS standard		Q2	McRostie, V; Babot, P; Calas, E; Gayo, E; Gallardo, F ; Godoy-Aguirre, C; Labarca, R; Latorre, C; Nunez, L; Ojeda, K; Santoro, CM; Valenzuela, D	Silvopastoralism and the shaping of forest patches in the Atacama Desert during the Formative Period (ca. 3000-1500 years BP)	Holocene	32	12	1492	10.1177/09596836221122636	0959-6836	Interaction networks that govern genome structure in communities of organisms.	0	0	17/09/22
6	ISI/WOS o Similar a ISI/WOS standard		Q4	Brigitte van Zundert, Martin Montecino	Epigenetic Changes and Chromatin Reorganization in Brain Function: Lessons from Fear Memory Ensemble and Alzheimer's Disease	International Journal of Molecular Sciences	23	20	12081	10.3390/ijms232012081	1661-6596	Functional genomics of adaptation and convergent evolution	0	0	11/10/22
7	ISI/WOS o Similar a ISI/WOS standard		Q2	Beatriz Andrea Otálora-Otálora, Cristian González Prieto, Lucia Guerrero, Camila Bernal-Forigua, Martin Montecino, Alejandra Cañas, Liliana López-Kleine, Adriana Rojas	Identification of the Transcriptional Regulatory Role of RUNX2 by Network Analysis in Lung Cancer Cells	Biomedicines	10	12	3122	10.3390/biomedicines10123122	2227-9059	Functional genomics of adaptation and convergent evolution	0	0	22/11/22
8	ISI/WOS o Similar a ISI/WOS standard		Q1	Claudia Molina-Pelayo, Patricio Olguin, Marek Mlodzik, Alvaro Glavic	The conserved Pelado/ZSWIM8 protein regulates actin dynamics by promoting linear actin filament polymerization	Life Science Alliance	5	12		10.26508/lsa.202201484	2575-1077	Functional genomics of adaptation and convergent evolution	0	0	12/12/22
9	ISI/WOS o Similar a ISI/WOS standard		Q2	Vilo, C; Dong, QF; Galetovic, A; Gomez-Silva, B	Metagenome-Assembled Genome of Cyanocohniella sp. LLY from the Cyanosphere of Llayta, an Edible Andean Cyanobacterial Macrocolony	Microorganisms	10	8	1517	10.3390/microorganisms10081517	2076-2607	Functional genomics of adaptation and convergent evolution	0	0	3/09/22
10	ISI/WOS o Similar a ISI/WOS standard		Q1	Zhang, L; Bai, JH; Wang, C; Wei, ZQ; Wang, YQ; Zhang, KG; Xiao, R; Jorquera, MA; Acuna, JJ; Campos, M	Fate and ecological risks of antibiotics in water-sediment systems with cultivated and wild Phragmites australis in a typical Chinese shallow lake	Chemosphere	305			10.1016/j.chemosphere.2022.135370	0045-6535	Interaction networks that govern genome structure in communities of organisms.	0	0	25/07/22

N°	Publication Category	Other Category	Quartile	Authors	Title	Source	Volume	Number	Initial Page	DOI	ISSN	Lines of Research	N° principal researchers of the center	N° students	Date of publication
11	ISI/WOS o Similar a ISI/WOS standard		Q1	Karmakar, S; Volpedo, G; Zhang, WW; Lypaczewski, P; Ismail, N; Oliveira, F; Oristian, J; Meneses, C; Gannavaram, S; Kamhawi, S; Hamano, S; Valenzuela, JG; Matlashewski, G; Satoskar, AR; Dey, R; Nakhasi, HL	Centrin-deficient Leishmania mexicana confers protection against Old World visceral leishmaniasis	NPJ VACCINES	7	1	157	10.1038/s41541-022-00574-x	2059-0105	Genomics for conservation, ecosystem health and sustainable food production	0	0	3/12/22
12	ISI/WOS o Similar a ISI/WOS standard		Q2	Guajardo-Correa, E; Silva-Aguero, JF; Calle, X; Chiong, M; Henriquez, M; Garcia-Rivas, G; Latorre, M; Parra, V	Estrogen signaling as a bridge between the nucleus and mitochondria in cardiovascular diseases	Frontiers In Cell And Developmental Biology	10		968373	10.3389/fcell.2022.968373	2296-634X	Interaction networks that govern genome structure in communities of organisms.	0	0	10/09/22
13	ISI/WOS o Similar a ISI/WOS standard		Q1	Toro, M; Weller, D; Ramos, R; Diaz, L; Alvarez, FP; Reyes-Jara, A; Moreno-Switt, AI; Meng, JH; Adell, AD	Environmental and anthropogenic factors associated with the likelihood of detecting Salmonella in agricultural watersheds	Environmental Pollution	306		r119298	10.1016/j.envpol.2022.119298	: 0269-7491	Genomics for conservation, ecosystem health and sustainable food production	0	0	1/08/22
14	ISI/WOS o Similar a ISI/WOS standard		Q1	Solis, D; Toro, M; Navarrete, P; Faundez, P; Reyes-Jara, A	Microbiological Quality and Presence of Foodborne Pathogens in Raw and Extruded Canine Diets and Canine Fecal Samples	FRONTIERS IN VETERINARY SCIENCE	9		799710	10.3389/fvets.2022.799710	2297-1769	Genomics for conservation, ecosystem health and sustainable food production	0	0	8/08/22
15	Scopus		Q1	Beatriz Andrea Otálora-Otálora, Daniel Alejandro Osuna-Garzón, Michael Steven Carvajal-Parra, Alejandra Cañas, Martín Montecino, Liliana López-Kleine, Adriana Rojas 6	Identifying General Tumor and Specific Lung Cancer Biomarkers by Transcriptomic Analysis	Biology	11	7	1082	10.3390/biology11071082	2079-7737	Functional genomics of adaptation and convergent evolution	0	0	20/07/22

3.5.- Collaborative publications:

Category of Publication	1 researcher		2 researchers		3 researchers		4 or more researchers	
	Nº	%	Nº	%	Nº	%	Nº	%
ISI/WOS Publications or Similar to ISI/WOS Standard	34	83%	7	17%	0	0	0	0
SCOPUS Publications or Similar to SCOPUS Standard	3	7%	0	0	0	0	0	0
SCIELO Publications or Similar to SCIELO Standard	N/A	-	-	-	-	-	-	-
Books and chapters	N/A	-	-	-	-	-	-	-
Other Publications	1	2%	0	0	0	0	0	0
Total of publications	41	93%	7	17%	-	-	-	-

Annex 4.- Organization of Scientific Events

Scope	Title	Type of Event	City	Country	Responsible Researcher	URL
International	School: “Combinatorial and Geometric Approaches on Dynamics”	Conference	Santiago	Chile	Alejandro Maass Sepúlveda	-
International	Make Health Latam - Chile	Conference	Valparaíso	Chile	Alejandro Maass Sepúlveda	-
International	From molecules to ecosystems: mechamisms of adaptation to extreme environments	Symposium	Punta Arenas	Chile	Miguel Allende Connelly	-
International	Interactomics Seminar: "DeRGA: an introduction to the German biodiversity genomics initiative"	Seminar	Santiago	Chile	Miguel Allende Connelly	-
International	Interactomics: Seminar Combining real time transcription phenotyping to omics: the key to mine biodiversity for water use efficiency	Seminar	Quillota, V Region	Chile	Romina Pedreschi Plasencia	-

Annex 5.- Education and capacity building

5.1 Capacity Building inside MSI Centers

MSI RESEARCHER	NUMBER									TOTAL NUMBER PER MSI RESEARCHER
	Undergraduate students			Graduate students						
				Masters			Doctoral			
	F	M	ND	F	M	ND	F	M	ND	TOTAL
Miguel Allende	0	0	0	0	0	0	2	2	0	**4**
Juliana Vianna	8	3	0	1	1	0	3	1	0	**17**
Rodrigo Gutiérrez	0	0	0	0	0	0	7	5	0	**12**
Alejandro Maass	0	0	0	0	1	0	0	0	0	**1**
Beatriz Díez	1	3	0	0	1	0	2	5	0	**12**
Romina Pedreschi	0	0	0	1	0	0	0	1	0	**2**
Ariel Orellana	0	0	0	0	0	0	0	0	0	**0**
Mauricio González	0	0	0	1	0	0	1	1	0	**3**
Verónica Cambiazo	0	1	0	0	0	0	0	1	0	**2**
Alvaro Glavic	0	0	0	0	0	0	0	0	0	**0**
Alexandra Galetovic	0	0	0	0	0	0	0	0	0	**0**
Angélica Reyes	0	0	0	0	0	0	0	0	0	**0**
Jacquelinne Acuña	0	0	0	0	0	0	0	0	0	**0**
Liane Bassini	0	0	0	0	0	0	0	0	0	**0**
Claudio Meneses	0	1	0	1	0	0	2	1	0	**5**
Cluadio Latorre	0	0	0	0	0	0	0	0	0	**0**
Mauricio Latorre	0	0	0	0	0	0	1	4	0	**5**
Martín Montecino	0	0	0	0	0	0	0	0	0	**0**
TOTAL	**9**	**8**		**4**	**3**		**18**	**21**	**0**	**63**

Annex 5.2. - Short-term Traineeships of MSI students

Traineeships

Student name	Institution	Country	Advisor	Project Description	Starting Date [dd/mm/yy]	Ending Date [dd/mm/yy]
N/A						

Exernal Internships and Traineeships

Intern Type	Intern Name	Academic Degree	Home Institution	Destination Institution	Country	Project Description	Starting Date [dd/mm/yy]	Ending Date [dd/mm/yy]
Investigador	Sebastien Carpentier	D	Bioversity International & SyBioMa, KU Leuven	Pontificia Universidad Católica de Valparaíso	Belgium	Within the framework of the Fondecyt project N°1200260, "Study of cytokininin applications in early stages of berry development on changes in cell wall metabolism and its effect on the grape firmness in Vitis vinifera", Dr. Carpentier conducted two seminars related to flux analysis and phenotyping combined with omics to study biodiversity potential. In addition, discussions were held on omics data integration and publications in preparation	28/11/2022	4/12/2022

Annex 6.- Networking and other collaborative work

6.1 Formal Collaboration Networks

Network Name	Network Scope	Researchers				Institutions
		From the Center		External		
		Researchers	Postdocs/ Students	Researchers	Postdocs/ Students	
Proyecto 1000 genomas Chile	N	4	1	10		Centro de Gerociencia, Salud y Metabolismo; el Centro Avanzado de Enfermedades Crónicas; el Instituto Milenio de Biología Integrativa y el Centro de Modelamiento Matemático
Consorcio de secuenciación del genoma del SARS-CoV-2	N	6	N/A	100+		Ministerio de Ciencias, Universidad de Chile, Pontificia Universidad Católica, Universidad Mayor, Universidad Andrés Bello, Universidad de Valparaíso, Centro de Modelamiento Matemático, Instituto Milenio IBio, Proyecto 1000 Genomas, Universidad Austral de Chile-sede Puerto Montt; Faculty of Renewable Natural Resources, Arturo Prat University, Iquique and Universidad de Antofagasta, Antofagasta
Earth Biogenome Project	I	1	2	100+		Universidad de Chile; Dalhousie University; Revive & Restore; University of Sydney; Spacetime Ventures; Australian Museum; Universidad Nacional Autonoma de Mexico; University of Oslo; Center for Translational Biodiversity Genomics

Network Name	Network Scope	Researchers				Institutions
		From the Center		External		
		Researchers	Postdocs/ Students	Researchers	Postdocs/ Students	
Mission Microbiome	I	2	3	70		CEODOS Chile, Universidad de Concepción y los Centros de Investigación de Excelencia COPAS Sur-Austral e INCAR, Centro de Modelamiento Matemático
BioSymbioDiversity - Associated team France-Chile	I	2	2	5		Universidad de Chile, INRIA-Francia, PUC-Chile

NOMENCLATURE:
[Network Scope]
[N] National [I] International [LA] Latin American

Annex 6.2.- Other Collaboration Networks

Activity Name	Objective	Description	Co-Participants Institutions	Number of Research from the Center	Number of Postdocs/ Students from the Center	Number of External Research	Number of External Postdocs/ Students	Product	Name of the Center Principals Researchers Participating in the activity
CRG-MI BASE	Share information and experiences to complement the research lines of both centers.	This collaboration stems from the participation of our Deputy Director in the IM BASE and IM CRG. The activities we carry out (e.g. research, dissemination) complement each other as we answer scientific questions from different research areas.	Millennium Institute Biodiversity of Antarctic and Subantarctic Ecosystems	1	2	0	0	Research articles, connection with other sectors, science communication	Juliana Vianna
CRG - (CMM)	Collaborate on data analysis using biological information, genomics and mathematical modeling.	The CMM and NLHPC have resources for analyzing large amounts of data that MI CGR researchers have used individually. Now, the goal is to work together to carry out collaborative work.	The Center for Mathematical Modeling	4	8	100	16	scientific articles, data analysis, dissemination activities, among others.	Alejandro Maass Miguel Allende Beatriz Díez Mauricio Latorre

Annex 7. - Outreach

7.1. - Outreach activities throughout the period

Event Title	Type of Event	Scope	Target Audience	Date	Region	N° of Student from the Center	N° of Attendees	Duration in days	Participating Researchers	Responsible for the activity
Soluciones para el Sector Frutícola, Fruit Trade 2022	Forum	I	Private sector Public sector Industry Professionals from the center's research area Professionals from other areas	12/10/2022	RM	0	47	1	1	Ariel Orellana López
Talk CIENCIA & SOCIEDAD OMG!!! GMOs!!!	Seminar	N	General Public	7/10/2022	De los Lagos	0	50	1	1	Miguel Allende Connelly
LabTalks Facultad de Ciencias Biológicas	Conference	N	University teachers Undergraduate university students Graduate students	27/10/2022	RM	0	47	1	1	Beatriz Díez Moreno

7.2.- Articles and Interviews

Type of media and scope	Local/Regional		National		International		
	N° Interviews	N° Articles	N° Interviews	N° Articles	N° Interviews	N° Articles	TOTAL
Written	0	1	0	1	0	0	**2**
Internet	0	0	0	0	2	0	**2**
Audiovisual	0	0	0	0	1	0	**1**
TOTAL		**1**		**1**	**3**		**5**

Annex 8. - Connections with other sectors:

Activity	Type of Connection [Number]	Type of Activity [Number]	Institution Country	Agent Type [Number]	Economic Sector
N/A					

NOMENCLATURE:
[Type of Connection] [1] Services Contract [2] Cooperation Agreement
[Type of Activity] [1] Development of Studies [2] Project Implementation [3] Training [4] Prospective Activity [5] Scientific Training [6] Installation of Scientists [7] Others (specify at the table foot other types of activity)
[Agent Type] [1] Industry and Services [2] Organizations and Public Services [3] Educational Sector

Annex 9.- Total Funding:

Funds	2022 Sources of Funding	
	Amount [$]	Percentage of resources used by the Center [%]
MSI	840,000,000	34.8%
FONDECYT*	433,472,583	18.2%
TOTAL	**1,706,945,167**	**365,948,162**

**Pro-rata of Associate Reserachers' FONDECYT projects for the period between 1 July & 31 December 2022.*

Annex 10.- Other Outstading Activities

Name of the activity relevant in your discipline	Type of activity relevant in your discipline carried out	Description of the relevant activity in your discipline	Importance in your discipline of the activity	Possibility to maintain or replicate this activity
N/A				

Annex 12.- Negative or positive aspects that you would like to address in order to understand the context in which the center developed its work during the reported period.

Relevant Positive and Negative Aspects
N/A