

# UC DAVIS Chile

## LIFE SCIENCES INNOVATION CENTER



**Javier Ramirez, M.Sc.**  
Chief Business Development Officer

### MANAGING A MINI ECOSYSTEM TO SUPPORT (BIO)TECHNOLOGICAL ENTREPRENEURSHIP

### Creating a platform for entrepreneurship based on science

The mission of UC Davis Chile is to provide the market with technological solutions based on science with the intention of generating economic impact and social development in Chile and the world. Both on our campus in California and also the national ecosystem one of the most successful ways to achieve such an impact is through the creation of science-based start-ups. These are responsible for taking technologies in their initial stage of maturity and bringing them up to a level of development that increases their chances of being adopted by the market.

Understanding this reality, Dushyant Pathak, Associate Vice Chancellor for Technology Management and Corporate Relations created 'Venture Catalyst' in 2013. This program provides an ecosystem which supports grassroots start-ups with a (bio)technological base, providing for them from small funds for prototypes up to laboratories dedicated exclusively to the venture and even more

important, a space for creative interaction in order to exchange ideas and experience amongst the start-ups themselves, together with an extensive support network which creates a 'substrate' conducive to support this kind of venture.

Despite the different proportions, Chile has been facing similar challenges. On one hand we have vast results from excellent research, but their level of development does not allow them to be transferred directly to the market and to society. On the other hand, in Chile we have diverse business generators and accelerators, but most of them have a traditional business focus with needs and ways of working which are not necessarily suited for the world of science-based entrepreneurship. The Chilean entrepreneurs had taken this first step to solve this lack of 'substrate' by creating Santiago LabSpace. On the platform developed by this team and using the experience and work methodology of

Venture Catalyst, we generated R2B Catalyst (Research to Business Catalyst).

This company is responsible for implementing the entrepreneurship program developed at UC Davis, and adapting it to the Chilean reality. It provides a mini ecosystem to support science-based entrepreneurship, thus increasing both the knowledge and skills of the start-ups and consequently their chances of success in Chile and in the world.

In the same way as in California, collaborative work is essential for the success of this initiative. The entrepreneurship program would not be possible without the collaboration of various strategic partners, who concur, each one in his area of expertise, in order to complete this challenge successfully.

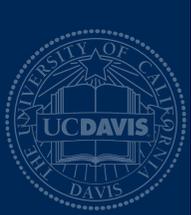


■ **R2B CATALYST:**  
THE FIRST SCIENTIFIC CENTER FOR BUSINESS DEVELOPMENT OPENS IN CHILE

■ **FOCUSED ACTION:**  
GENETICALLY IDENTIFYING CLONES OF THE WINE INDUSTRY'S MOST RELEVANT STRAINS

■ **NEW DIRECTIVE OF CHILEAN STUDENTS' ASSOCIATION AT UC DAVIS**  
■ **CHILEANS IN UC DAVIS**  
■ **HIGHLIGHTS:**  
- UC DAVIS SPECIALISTS LEAD AN IRRIGATION WORKSHOP  
- PARTICIPATION IN THE AGRO PLANTTRADE 2016

■ **GETTING TO KNOW A UC DAVIS ALUMNI: AIKO ADELL FORGING A WAY BETWEEN TEACHING AND RESEARCH**  
■ **HIGHLIGHTS:**  
- WE LEAD THE SOUTHERN VITICULTURE & ENOLOGY EXTENSION CENTER!  
- FOOD ENGINEER FROM UC DAVIS MEETS INDUSTRY REPRESENTATIVES



# R2B CATALYST THE FIRST SCIENTIFIC CENTER FOR BUSINESS DEVELOPMENT OPENS IN CHILE

Research to Business Catalyst (R2B Catalyst) is the first scientific HUB for business development. It offers Programs for Entrepreneurs inspired by UC Davis' Venture Catalyst model to science-based start-ups; LabSpaces or cutting-edge laboratories for co-work and a series of Services for Entrepreneurs which range from marketing and communications to accounting.



OCTOBER 2016 - Research to Business Catalyst (R2B Catalyst), the first scientific HUB for business development in Chile was inaugurated in the heart of Providencia. The event was attended by Dushyant Pathak, Associate Vice Chancellor of Technology Management and Corporate Relations of UC Davis; Ignacio Brescia, CEO of R2B Catalyst; Alan Bennett, Executive Director of UC Davis Chile and Marcela Angulo, Manager of Technological Capabilities of Corfo.

R2B Catalyst arose from the union of UC Davis Chile; Labspace SpA and MGMS Consulting. The "headquarters" of this Company, a space over 320m<sup>2</sup> on the same floor as UC Davis Chile, received an investment of approximately USD \$700,000, amongst contributions from Corfo and donations from the private sector.

The mission of R2B Catalyst is to support the development of business ventures with a scientific basis. For this purpose, the Company offers three groups of services to the start-ups. Program for Entrepreneurs inspired by the model of Venture Catalyst of UC Davis -created by Dr. Pathak- which provides assessment on business models, raising public and private capital as well as legal services

and strategy for intellectual property; LabSpaces or collaborative laboratory areas and Services for Entrepreneurs such as mentoring, in-house services, marketing, communications, industrial and graphic design and legal assessment.

With regard to its infrastructure, R2B Catalyst has three laboratories for co-work -Plant Biology, Biochemistry and Molecular Biology and Microbiology- with the highest standards of technology and equipment together with a Workshop for Prototyping with 3D printers. Moreover the scientific start-ups which form part of this hub have access to co-work and meeting areas.

Specifically, R2B Catalyst is looking for the synergy between researchers, entrepreneurs, mentors and investors in order to generate a "mini-ecosystem" ideal for scientific start-ups. This has the aim of leveraging national and international scientific talent and thus converting the scientific research into applications that generate a positive impact on people and into companies that create jobs.

## PROGRAMS OF R2B CATALYST

Projects wishing to form part of R2B Catalyst should have a scientific base, either in nanotechnology, chemistry and life sciences. For its part, R2B Catalyst offers two types of programs:

**JUNIOR:** This program is aimed at the start-ups or entrepreneurship in their earlier stages and lasts three months, during which time programs of scientific research and business planning are developed in order to generate a solid working model. During this period it will have the back-up and support of the range of professionals who belong to R2B Catalyst and who will lead the projects in this initial phase.

**SENIOR:** This program is the "heart of R2B Catalyst", lasts 15 months and includes services such as: Senior Scientific Advisory for the optimal development of research (3 hours of monthly assessment) and the UC Davis Chile Seal of Approval for the projects complying with these high standards. Whilst LabSpace DRIVE allows the use of laboratories and scientific installations of R2B Catalyst in Santiago, Legal Net provides legal support from prestigious law firms in corporative, labor, tax and intellectual property issues and Inventor Advantage gives assessment from UC Davis in the development of intellectual property (3 hours per month).



*"We have noted with satisfaction how the ecosystem of science, technology, innovation and entrepreneurship has consolidated in Chile and is beginning to improve the connection of the skills offered by the R&D centers with the requirements of companies and entrepreneurs in order to generate more sophisticated products and services. Corfo is giving ample support to these efforts."*  
**Marcela Angulo, Manager of Technological Capabilities of Corfo indicated**



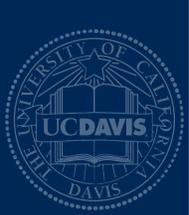
*"In general, the ten UC campuses encourage start-up formation because, in addition to helping commercialize cutting-edge innovation for the benefit of society, they can have a transformative impact on the economy of California through supporting the creation of high quality net new jobs."*  
**Dushyant Pathak, Associate Vice Chancellor of UC Davis and member of UC Davis Chile Board of Directors**



*"We are very happy to inaugurate this laboratory, the first of its kind in Santiago. LabSpace Central aims to crown many months of hard work and without a doubt it is our entrance into the major leagues, which places us on a higher level with respect to what we have been doing."*  
**Ignacio Brescia, CEO of R2B Catalyst**



*"The aim of UC Davis Chile is to make a positive impact on the Chilean ecosystem by leveraging the strengths of UC Davis in research and technological transfers. In that sense, it seemed natural to us to form an alliance with STGO LabSpace in the creation of R2B Catalyst."*  
**Alan Bennett, Executive Director of UC Davis Chile**



# GENETICALLY IDENTIFYING CLONES OF THE WINE INDUSTRY'S MOST RELEVANT STRAINS

Distinguishing clones within a strain is by no means an easy job. To the traditional ampelographers, professionals who identify and classify the vines, increasing economical sequencing techniques have appeared on the scene. The aim of this line that is coordinated by UC Davis Chile -in which VSPT Wine Group, Concha & Toro and researchers from UNAB and UC Davis are involved- is to genetically identify 29 clones of Cabernet Sauvignon, Sauvignon Blanc, Chardonnay, Merlot and Pinot Noir in order to maintain their identity reliably.



If we add the strains Cabernet Sauvignon, Sauvignon Blanc, Chardonnay, Merlot and Pinot Noir, these represent around 80% of the national wine production and the majority of the planted hectares. For this reason the project coordinated by UC Davis Chile seeks to genetically identify selections of clones of these strains so that they may reliably maintain their identities.

Participating in this line of research called "Whole Genome Analytics: Genetic Identification of Clones for Grapevine", are the VSPT Wine Group, Concha & Toro and the teams led by the researchers Claudio Meneses from Universidad Andrés Bello and Darío Cantu from UC Davis.

How does a producer know that a clone X of Sauvignon Blanc is indeed that and not clone Y which does not adapt well to the vineyard's soil conditions or does not resist a certain common parasite in that zone? It is not an easy task, since generally two clones are similar and if physical (phenotypic) differences do arise, it is usually following several months of growth and after having spent resources for their care (water, fertilizers, pesticides, etc.) and perhaps for their acquisition. It is so complex to identify and classify the vines, that for centuries highly trained professionals have been hired to perform this task, the ampelographers.

However, more modern techniques have been added to this traditional one: with the reduced costs of massive DNA sequencing, it is now possible to identify the "genetic footprint" of the strains of vines. In fact, one of the pioneers in the application of this technique was Dr. Carole Meredith, professor emeritus of UC Davis.

Furthermore, the Davis team in this line of research is developing genetic libraries for building "reference genomes". At the beginning of this project, the only reference genome available was Pinot Noir, and this initiative will generate four more.

The innovative aspect of this part of the project is its state-of-the-art technology, PacBio. Only a few research centers, including UC Davis, has access to this service that allows real-time sequencing of a single DNA molecule, SMRT (Single Molecule Real Time Sequencing). This delivers the highest level of precision and accuracy in the assignment of each of the bases, the most uniform coverage and the most extensive average of readings than any other currently available sequencing technology. To make an analogy, a reference genome developed with PacBio allows us to have a clear picture of a puzzle of large pieces, which will serve as a guide for the other part of the project.

The two vines involved in the project defined the clones that were relevant to each variety, reaching 29 clones in total. This gives rise to the work being carried out by the UNAB team: the development of specific markers for each of them. "It is not the same to take markers for the same clones from France, Australia or California than from Chile, because there is always the possibility that they will not work," explains Alvaro Castro, Program Coordinator of Molecular Genetics / Genomics at UC Davis Chile, on the relevance of performing this work in Chile.

A genetic marker is an area of the genome, which can range from a nucleotide to DNA fragments, that enables us to discriminate statistically between a population of individuals. On a global level, researchers have not found it easy to define genetic markers for clones. Vines are reproduced by stakes, asexually, so clones are expected to be identical; however they are not. "The question is which of these differences account for a clone being called X and not Y," says Castro.

The group led by Dr. Meneses has chosen to look for structural variants of more than 10 nucleotides. For that purpose they are sequencing around three individuals from each of the 29 clones. They employ a fast and relatively inexpensive technology, Illumina, which gives them a 'photograph' with a resolution level of 30-40X. The PacBio reference genome, which will have a resolution of 100X, will serve to complement the information.

Since they already had the reference genome of Pinot Noir, Dr. Meneses' team began with this strain. Preliminarily, it defined ... 16 thousand structural variants! That information has been refined and should reach a reduced pool. Subsequently this information must be validated in the field, which will imply new challenges that we will proceed to relate in this newsletter.

"We should end up with a set of markers available for the specific identification of each of the 29 clones. We will try to make a link between the development of pathogen markers of the wood vine (line N°1 of research) with these markers of clones, in order to establish a system of assurance of the quality of the plants in the future, in terms of identity and phytosanitary status, for their multiplication," concludes Dr. Castro.



## RESEARCHERS IN THE GENETIC IDENTIFICATION OF CLONES FOR GRAPEVINE



Alvaro Castro, Ph.D.  
Program Coordinator Molecular Genetic / Genomic



Catalina Pavez, M.Sc.  
Grape Genotyping Research Assistant



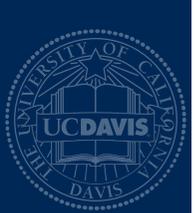
Darío Cantu, Ph.D.  
Principal Investigator (PI)



Claudio Meneses, Ph.D  
Principal Investigator (PI)



Claudio Urro  
Ph.D. student



## HIGHLIGHTS



### NEW DIRECTIVE OF CHILEAN STUDENTS' ASSOCIATION AT UC DAVIS

Valerie Weinborn, Cristobal Heitmann, Italo Cuneo and Diego Montecino (from left to right in the picture) have worked actively to fulfill the mission of the organization: "To generate public opinion about scientific interest and subjects of national interest, as well as to provide spaces for workshops and symposiums which will conclude in consolidating the brand name of UC Davis and their alumni in Chile." We wish them every success!

### CHILEANS IN UC DAVIS

**NAME:** Juan Pablo Toro Labbé, Civil Engineer of Industries of the PUC, master and student for doctorate in the Department of Civil and Environmental Engineering at UC Davis.

**PROFESSIONAL EXPERIENCE:** "In TECHO I was the National Coordinator for the Program of Productive Development where we provided training and small loans to inhabitants of shantytowns. Next I worked as a hydraulic group engineer in ENDESA, studying and assessing a large number of projects and also as part-time professor at the University of the Andes."

**Why did you choose UC Davis?:** "For the great quality of the civil engineering program, the excellent quality and variety of professors who investigate problems related to water and for the outstanding environment where my children could grow. Davis is a very civic city, with an exceptional public education, a wide network of cycle paths, many green areas and moreover it is very close to attractive places such as San Francisco, Sonoma, Lake Tahoe and Yosemite."

**Area of research:** "Characterization of turbulent water flows which interact with hydraulic works, for example the flow over pillars of landfill bridges or hydraulic dams or below a floodgate. I have developed flow simulations in steep slope canals with steps (phased landfills). This is one of the first investigations which demonstrates the viability of simulating phased landfills as pressure flows and evidences the evolution of vorticity from the steps in order to have a better understanding of the entrance of the air to the water flow."

**What would you like to do when you come back to Chile?:** "I am lucky to have been involved in applied industry and in a more fundamental research and I like both. I intend to continue and extend my research even more and contribute to resolve problems applied in Chile which involve the presence of water."



### UC DAVIS SPECIALISTS LEAD AN IRRIGATION WORKSHOP



Doctors Richard Snyder, biometeorology specialist and Daniele Zaccaria, specialist in water management for agriculture, both members of the Extension System of the University of California and researchers in the line "Agro-climate Technologies" of UC Davis Chile, lead the workshop "Surface Renewal: an advanced micrometeorological method for measuring field scale evapotranspiration" in Chillan.

The workshop was an advanced training, organized by UC Davis Chile in collaboration with the Center of Water Resources for Agriculture and Mining (CRHIAM) of the University of Concepcion (UdeC).

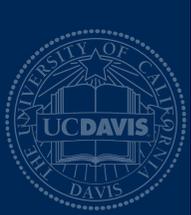
Surface Renewal is a micrometeorological method increasingly used to determine the main components of the surface energy balance, especially in terms of evapotranspiration. In this course, the participants learned the principal requirements to install and to calibrate a Surface Renewal station on a field scale, the pros and cons of this technology, how to get and analyze data, and the correct interpretation of the results.

### PARTICIPATION IN THE AGRO PLANTRADE 2016



Pablo Zamora, Chief Science Officer of UC Davis Chile, participated last October 5 in the Agro Plantrade 2016 with the talk "Impacting precision agriculture: metagenomics tools for the design of bio-products."

The Agro Plantrade -event organized by Viveros de Chile-, brings together important leaders of the agricultural industry, nurseries, producers of fruit, vegetables, ornamental plants and wines, suppliers of seeds, inputs and services, technologies, national and foreign investors, financial bodies, consultants and academics.



## GETTING TO KNOW A UC DAVIS ALUMNI

### AIKO ADELL: FORGING A WAY BETWEEN TEACHING AND RESEARCH

Less than three years ago this veterinarian and epidemiologist returned to Chile after having completed a master's and doctor's degree at UC Davis. During this time, she was able to position herself as an academic at the University Andres Bello and as a researcher was adjudicated recently a National Fund of Initiation for Scientific and Technological Development or "Fondecyt".

Within a few months after becoming a veterinarian of the University Mayor in 2006, Aiko Adell Nakashima left for UC Davis. Thanks to a presidential scholarship, she completed her Masters in Preventive Veterinary Medicine (MPVM) and became the Assistant Professor of Biostatistics.

"UC Davis is the best veterinary university in the world. I could not have been in a better place. The infrastructure and the professors are amazing. The university is like a city within itself," she comments.

For this reason she decided to continue her studies in this campus of the University of California by taking a doctorate in Comparative Pathology. Her supervisor was Doctor Patricia Conrad, specialist in global health and protozoology. Aiko thus learned how to perform clinical studies and laboratory techniques for the detection of pathogens, specifically protozoa (unicellular parasites) and bacteria, in environmental samples, feces and bivalve mollusks.

Whilst she was working on her doctoral thesis, her first daughter was born from her marriage to

Roberto Carrasco, also an MPVM from UC Davis. "Davis is really family friendly", she recalls.

Having completed her doctorate and after living more than six years in California, Aiko returned to Chile. In March 2014 she joined the team of professors of the School of Veterinary Medicine of the University Andres Bello (UNAB) where she is holding a series of pre- and postgraduate courses.

This year has been particularly intense for Aiko; in May her second child was born and in October she was adjudicated a "Fondecyt" of Initiation in Investigation 2016 (from Conicyt, the main public funding agency for science and technology). She relates enthusiastically that in summer she will begin taking samples from the rivers Maule and Maipo. "I needed rivers which were being used a lot for irrigation, zones defined for urban and agricultural use," she explains.

Moreover, as part of the organizing team "First International Symposium on Food Safety (ISFS): New Tools to Detect and Prevent Foodborne Outbreaks from Farm to Fork", which will be held from December 5 to 7 at the 'Casona' campus of the UNAB. Attending the event will be prestigious guests such as UC Davis professor Woutrina Smith, molecular epidemiologist with whom Aiko has worked and published.



## HIGHLIGHTS

### WE LEAD THE SOUTHERN VITICULTURE & ENOLOGY EXTENSION CENTER!

Together with the INIA Quilamapu and the Faculty of Agronomy of the University of Concepcion, UC Davis Chile will lead the Southern Viticulture & Enology Technological Extension Center. This initiative - financed by the Corfo (an agency of the Ministry of Economy) - could be transformed into a pilot plan that recovers the best practices of the extension system in California. For example, by bringing together and making the different components of the system interact, as universities and institutes (national and international), extension agents, institutions and public policies.

All of this to fill the technological, commercial and organizational gaps of the small and medium farmers of the valleys of Tutuven, Itata, Biobio and Malleco (South of Chile) in order to be able to improve the quality and competitiveness of their wine.



### FOOD ENGINEER FROM UC DAVIS MEETS INDUSTRY REPRESENTATIVES

The traditional approach is that functional foods -those which contain biologically active components- offer health benefits and reduce the risk of disease. However, international research indicates that 70% of the population is skeptical about functional foods.

"This generates a great opportunity to expand research and development of the foods and also to communicate this to the consumers," commented Gail Bornhorst when she visited Chile. This academic from UC Davis has a different approach in the area; she is studying the behavior of food following its consumption. Together with her colleagues she is investigating the relationship between the processing of the foods, its decomposition during digestion and the absorption of nutrients in order to optimize the functional properties of the foods. In UC Davis Chile, Doctor Bornhorst had meetings with representatives from leading national companies in the food sector and professionals from universities and research centers.



/UCDavisChile



UCDavisChile



/company/uc-davis-chile

Av. Andrés Bello 2299, Of. 1102, Providencia, Santiago de Chile  
Phone: +569 4475 4718  
eangel@ucdavischile.org

www.ucdavischile.org



Proyecto apoyado por

