

Astro-Engineering Centre at PUC L. Infante



Vision and Mission

VISION: Make Chile an internationally recognized leader in (Astronomical) Instrumentation and (Astronomical) Technology.

MISSION: To serve as channel to carry out research, innovation and transfer and to generate new technological and computational opportunities in the area of astronomy and engineering in Chile.

AIUC is { **Center of technological development and innovation**
School of high level scientists and engineers







CENTRO DE INNOVACION UC
ANACLETO ANGELINI

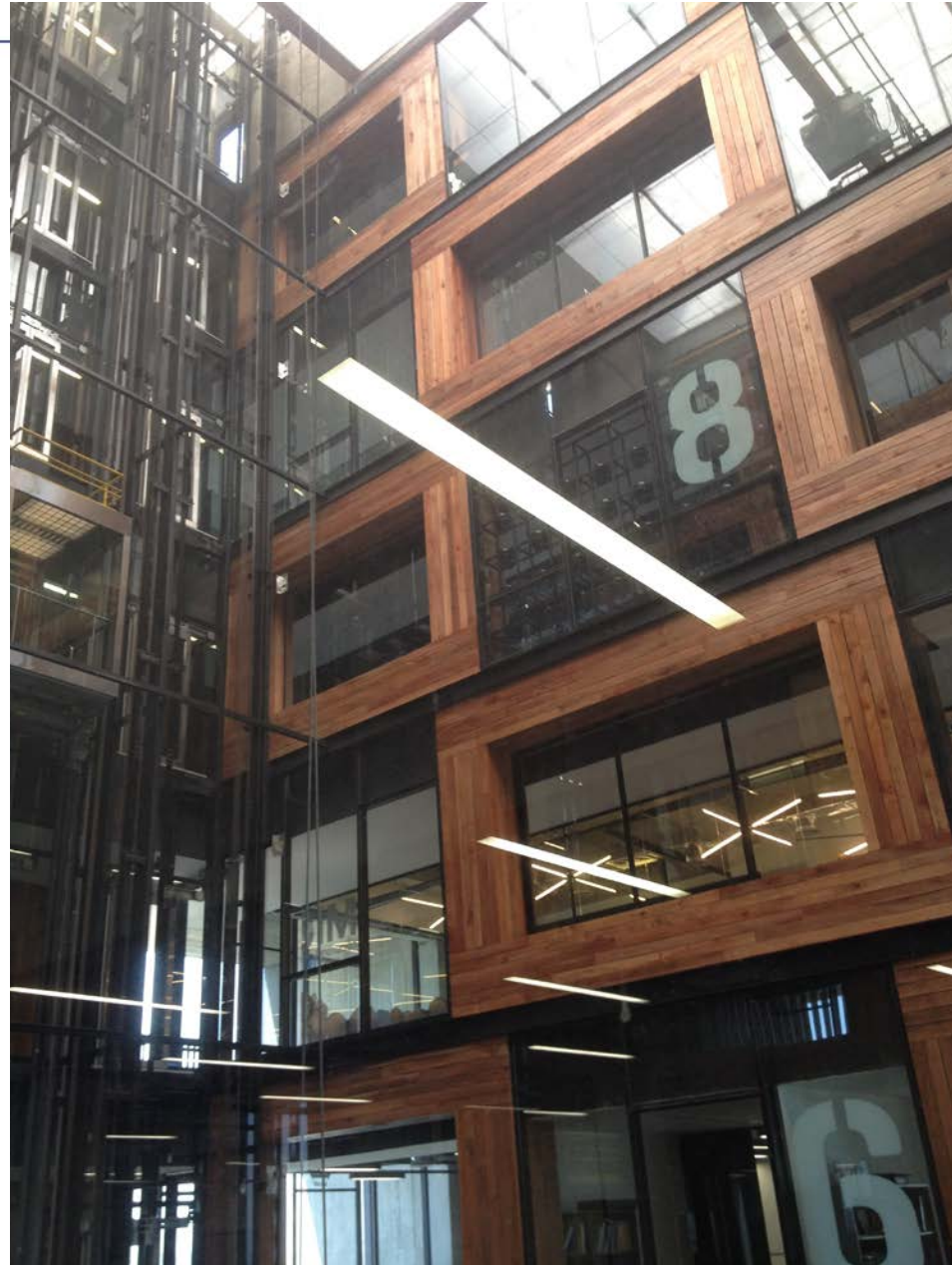
- **Located at the PUC San Joaquín Campus in Santiago, a full university and research environment.**
- **The AIUC has one floor, ~600 mt², in this building**



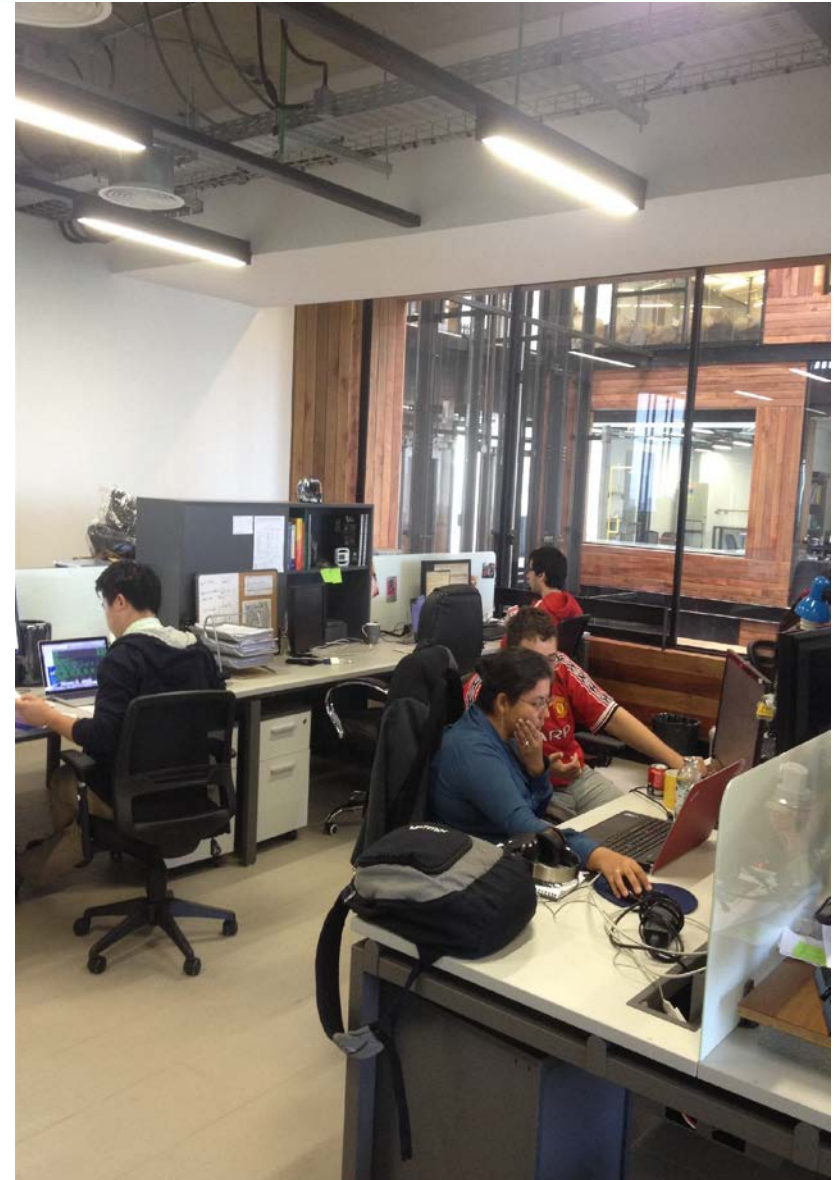


CENTRO DE INNOVACION UC
ANACLETO ANGELINI









Virtuous Cycle

Technological Development,
Innovation and Transfer

Cutting edge
Science

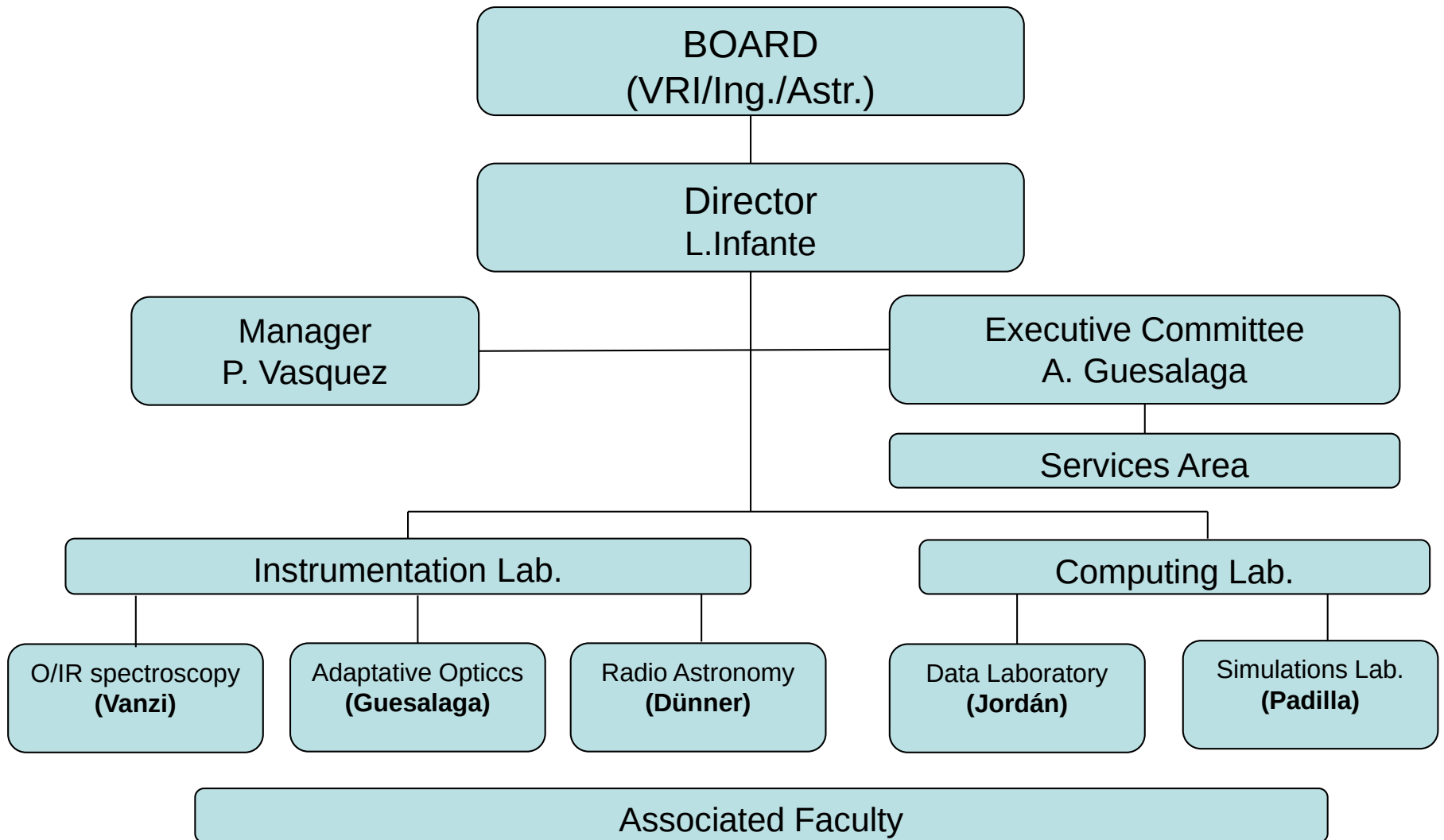


Training of
Human Resources

Public
Enlightenment



Organization



Instrumentation



- **Spectrographs** (see Vanzi, Rukdee's talks and Zapata's poster)
 - **PUCHEROS (0.5mt),**
 - **FIDEOS (1mt),**
 - **TARDYS@TAO (6.5 mt)**
 - **G-CLEF@GMT (25 mt)**
 - **MOONS@VLT (8.2 mt)**
 - **HIRES@E-ELT (39 mt)**
- **Telescope Projects**
 - **ACT, CLASS, POLARBEAR**
- **VALTEC telescope control system**
- **BOMBOLO@SOAR (4mt.)**



AIUC IR – Lab

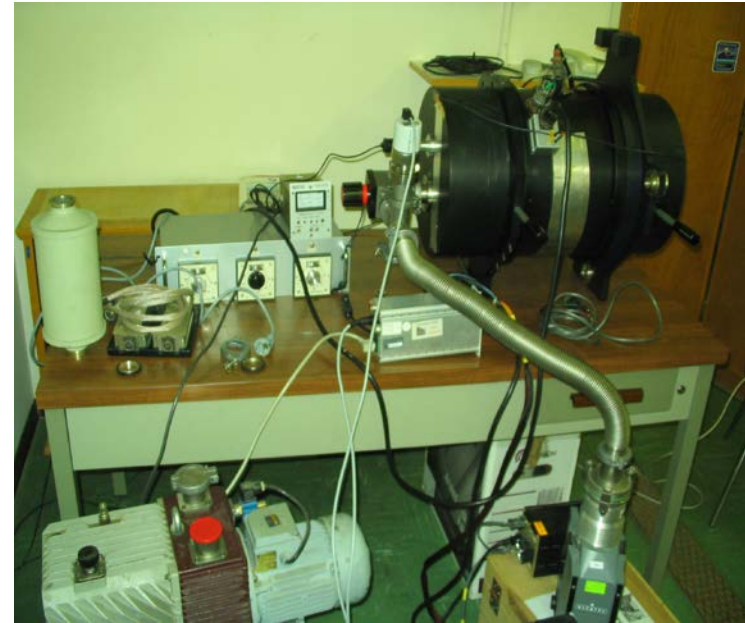
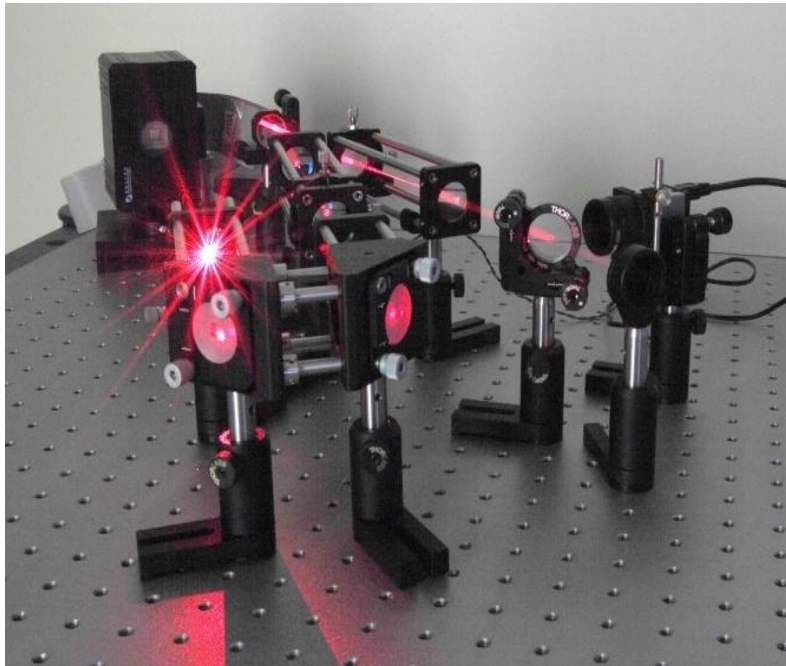
Team:

Ingenieria Electrica PUC

Astronomia y Astrof. PUC

Observatorio Arcetri – ITALY

TAO – Japan



AIUC AO – Lab

Team:

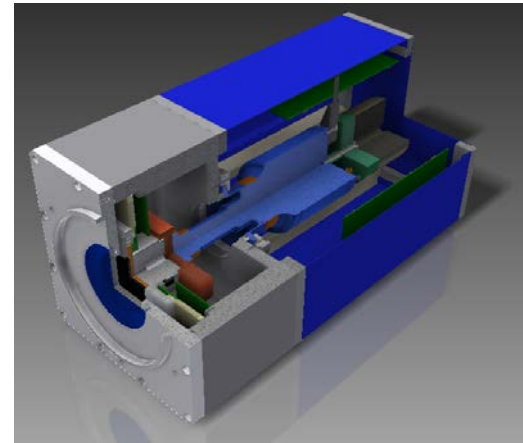
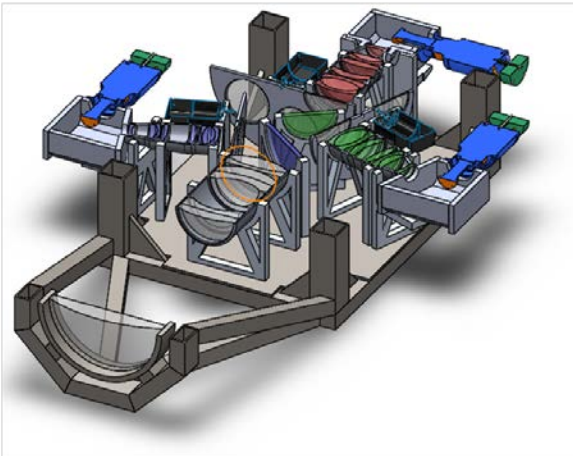
Astronomia y Astrof. PUC

Ingenieria Electrica PUC

Durham – UK



- **Multi-band imaging (Guzman, Puzia):**
 - We are developing the **BOMBOLO** instrument,
 - 7x7 arcminutes, 3-channels and simultaneous optical imager for SOAR Telescope.
- **STATUS**
 - optics sent for fabrication
 - science cameras designed and in fabrication



Integration: second semester 2016



GMT CFA Large Earth Finder: **A** optical fiber fed echelle

Large Focal Plane Arrays ^{spectrograph} simulation and integration (Jordan & Guzman):

- collaborating with Harvard-Smithsonian Center for Astrophysics in **G-Clef**, a selected first-light instrument for the GMT.
- The group at PUC is in charge of the cryogenic thermal and electronic detector design of the two science cameras.

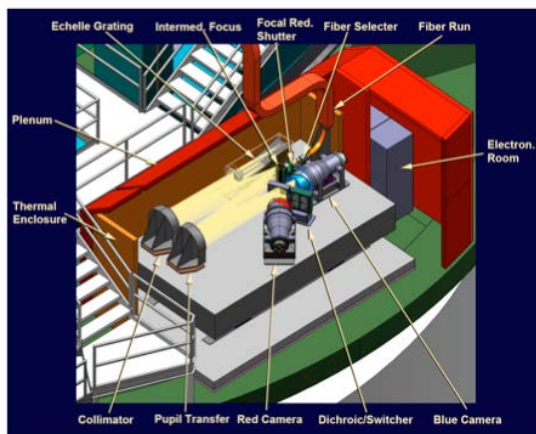


Figure 2: G-CLEF Baseline design

Optical spectrograph for the 24 meter GMT.
The spectrograph has been designed to allow extremely high precision radial velocity measurements ($\sim 0.1\text{m/s}$)

Main purpose of discovering earth-mass planets orbiting solar-type stars in the habitable zone, i.e., where liquid water may exist.



- **Wide-field adaptive optics (Guesalaga, Guzman):**
 - long-term research program in Multi-Object Adaptive Optics (MOAO)
 - Develop reconstruction algorithms that will enable the operation of a MOAO instrument on an ELT.
- **Turbulence monitoring (Guesalaga):**
 - Collaboration with GeMS team
 - Aim: retrieve the turbulent profile from GeMS LGS WFS data
 - Various other areas related to AO control.



- **Telescope Characterization (Dünner):**
 - Measured and characterized the optics of the Atacama Cosmology Telescope (ACT) using photogrammetrical measurements of the reflective optics
 - then simulate the effects of the observed miss-alignments. This work is being used to understand the beams and pointing model of the ACTPol experiment



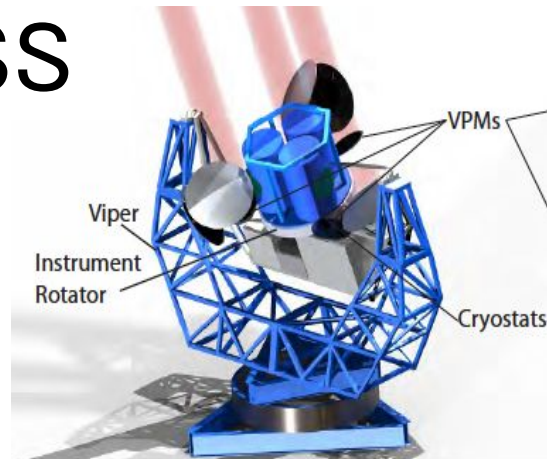
ACT



Polarbear



CLASS



COMPUTATIONAL LABORATORY



The AIUC hosts an HPC cluster (>1300 cores).

- **Instrument operation data analysis software (Padilla, Jordan):**
 - The AIUC hosts an HPC cluster (2 X 512 processors). We produce instrument software, run simulations and process big data. G-Clef and MOONS are two of our software programs.
- **Cosmological Simulations (Padilla)**
 - Geryon (super computer 512 + 512 proc.)
- **Data Processing (Zoccali, Infante, Barrientos)**
 - VVV, IR survey of the MW plane and bulge.
 - U-band VST/ATLAS (UVAS), 5000 deg² ugriz, available to the Chilean Community



SERVICES



- MPIA-PUC, operation 2.2mt La Silla
- HAT-South, robotic Telescopes
- Instrument Support
- Graduate studies in Astro-Engineering
- Science projects administration
- Promote Inventions (meteorite tracing, solar panel tracking ...)
- Industry and Telecommunications



**Innovation and Astro-Engineering
are a reality at PUC
Collaborations are welcome**

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Thank you

- **PUC:** www.uc.cl
- **IA:** www.astro.puc.cl
- **Astro-Engineering:** <http://aiuc.puc.cl/>
- **My e-mail:** linfante@astro.puc.cl

