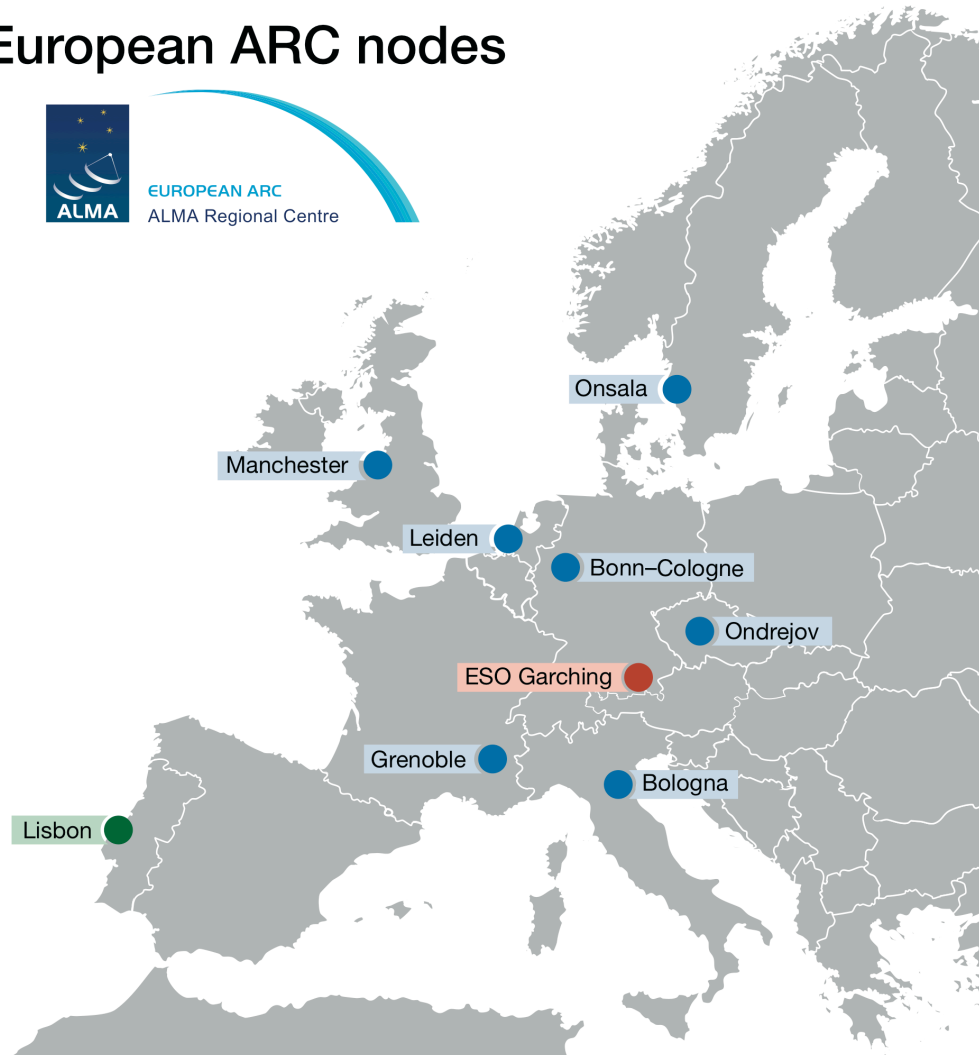# ALMA Regional Centre
Italian node

Beyond user support: our less visible activities

Jan Brand

INAF – Istituto di Radioastronomia
ALMA Regional Centre italiano

What does the ARC do? Not just active around a Call for Proposals!

European ARC nodes

EUROPEAN ARC
ALMA Regional Centre

Onsala

Manchester

Leiden

Bonn–Cologne

Ondrejov

ESO Garching

Grenoble

Bologna

Lisbon

We are part of a network:

ESO + 7 nodes [+ 1 COE]

Network has just been reviewed by external committee (14-15 Jan.)

http://www.alma.inaf.it

Italian ARC-node/Bologna

present structure

Host institute: INAF – Istituto di Radioastronomia (IRA), Bologna, Italy

ARC-node: 2 staff, 5 postdocs (1 Co-Fin with Dept. Astron. & Physics, UniBo)

+ Dedicated computer cluster, high-speed links

ARC node representative: Jan Brand (staff IRA; 0.25 FTE; planning, formation)

Name	Status	FTE	Expertise/task
Marcella Massardi	Staff IRA	1.0	User support; formation
Viviana Casasola (until 31 Jan. 2015)	Post-doc	0.5	User support; formation
Arturo Mignano	Post-doc	0.5	User support; QA2; software; formation
Rosita Paladino	Post-doc (Co-fin)	0.5	User support; QA2; polarimetry; formation
Elisabetta Liuzzo	Post-doc	0.5	User support; QA2; mm-vlbi
Nuria Marcelino	Post-doc	0.5	Data reduction; EOC expert (Long Baseline; calibrator database)
Kazi Rygl (from 1 Feb. 2015, iALMA)	Post-doc	0.5	mm-vlbi

ARC node Expertise:

Polarimetry; (mm-)VLBI

Star formation (gal & extra-gal); astrochemistry; AGN; high-z universe

FUNDING

➢ Directly by INAF, on year-to-year basis; amount variable

Additional and external funding:

➢ Node participates in merit ('premiale') project "iALMA" (2014-2015 +?)
  [1 postdoc, 1 PhD]

➢ 1 postdoc co-financed by Dept. Physics & Astronomy, Univ. Bologna

➢ 2010-2013: post-doc on the ESO ALMA COFUND Fellowship program

What does the ARC do…

To help and inform the community?

➢ Organize Community Days / Proposal Preparation Days. (dal 2007)
  Different formats & contents (lectures on ALMA, on science; interferometric techniques;
  OT, simulator, tutorials; more focused on upcoming Cycle. At IRA, or via Videocon, or visiting institutes).

➢ Tutorials (CASA, OT. Stand-alone or as part of a School, e.g. ERIS)

➢ Seminars at institutes/observatories in Italy (scientific results + capacities new
  Cycle + opportunity for f2f help). [SISSA, Padova, Brera, Torino, Bologna, Roma, Napoli, Catania]
  Colloquia, pre-Early Science (Bologna, Firenze, Catania, Trieste)

➢ Workshops: Italian mm (2012, 2015)

➢ Face-to-face support + via Helpdesk, phone, e-mail.
    for proposal preparation, data reduction, archive mining

➢ A bi-monthly Newsletter

➢ An up-to-date web page: http://www.alma.inaf.it

What does the ARC do…

To train the community and the next generation?

➢ International Training School (Astrochemistry with ALMA, 2011; Lucchin, 2015)

➢ Supervise tesi di laurea (at ARC or in collaboration); tesi di dottorato

➢ Lectures on radioastronomy and interferometry (Univ. Bologna, Catania)
   Lectures on (sub)mm astronomy and ALMA (SISSA, Trieste)
   Astrophysics Laboratory on interferometry, hands-on reduction ALMA data
   (Univ. Bologna, corso di Marano) from academic year 2013-14 onwards.

Courses

Contents [hide]

1 Radio-Astronomy course - UNI Bologna 2013/2014
2 (sub)mm-Astronomy with ALMA - SISSA 2014
3 Radio-Astronomy course - UNI Catania 2014
4 Lectures on mm astrophysics for PhD students - Bologna 2009
5 Scuola Nazionale "Oggetti compatti e pulsar - Scienza con ALMA" - Maracalagonis (CA) 2007

➢ Support post-doc fellowships

➢ Co-proposers accepted premiale project *iALMA* (see session on Day2).
   Includes WP 'ARC node development' (mm-VLBI => postdoc: Rygl) and
   WP 'Advanced Training' (=> 3 PhD's: Bologna [Galluzzi], Firenze [Bianchi], Catania
   [Urso])

i ALMA (P.I. Testi)

i ALMA objectives over 4 years:

To construct a solid infrastructure at INAF to support Italian involvement in ALMA. This includes:

☑ Develop receivers for ALMA Band 2-3 to study complex and pre-biotic molecules in disks and probe the high-z universe;

☑ Strengthen the ALMA science activities in Italy combining observations and innovative laboratory experiments on ices;

☑ Train a new generation of researchers in Italy [6 PhD positions];

☑ Support and expand the ARC node in Bologna;

☑ Develop outreach activities for ALMA at INAF;

☑ Investigate in Italy the possibility of 'green energy' production for ALMA

What does the ARC do…

To learn and improve ourselves AND help the ALMA project?

➢ Monthly EU ARC telecons; yearly f2f meeting ACC; yearly "All Hands" meeting with all EU ARC personnel: 2014 Grenoble (Bologna organized in 2012)

➢ Writing/editing documentation on network and network activities

➢ Writing/editing technical Handbook/Manuals for OT

➢ Contact Scientist duties

➢ QA2 (Quality Assessment; after receiving special training)

➢ Software testing (new versions of CASA, OT)

➢ Development of software tools

➢ SV (Science Verification) data reduction; participation in specialist groups (e.g., imaging)

What does the ARC do…

To learn and improve ourselves AND help the ALMA project?

(continued)

➢ Participating in CSV/EOC [Commissioning & Science Verification]:
  -- polarimetry (calibrator database: source list, data reduction, integration reduction script in pipeline,
     writing CASAguide)
  -- long baseline campaign

➢ Organize specialist workshops for ALMA & ARC(-nodes) community:
   polarimetry with ALMA (2013)
   mm-VLBI with ALMA (2015; also partly open to outside-ARC)
   These initiatives also serve to get in on ground floor with these projects

➢ Participants in ALMA Upgrade proposal ESO-GMVA (Ros et al.) on inclusion
   of phased array ALMA in global VLBI network.
   Involved in WP2.4 (disk logistics, correlation, archiving) and WP2.6 (user support)

➢ Exchange programs (between nodes, between nodes and JAO)

EUROPEAN ARC
ALMA Regional Centre

- Contribution to EOC polarization activities continued thereafter at the Italian node

    (Marcelino, Paladino, Mignano, Massardi.

      A PhD position to work on polarization was assigned on iALMA project funding)

- we contributed with a **source list of candidate polarisation calibrators** based on the AT20G survey

- we are **reducing test datasets**

      - calibrator observations in the framework of the ALMA calibrator campaigns

      - 24hr runs on selected sources in Band 3, 6, 7

- we are integrating the polarimetric reduction scripts within the existing **data reduction pipelines**

- we wrote the **CASAguide for polarimetric observations of 3C286**

- Contribution to EOC polarization activities continued thereafter at the Italian node

   (Marcelino, Paladino, Mignano, Massardi.

   A PhD position to work on polarization was assigned on iALMA project funding)

- we contributed with a **source**

- we are **reducing test datas**

   - calibrator obser

   - 24hr runs on se

- we are integrating the polari

- we wrote the **CASAguide fo**

Marcelino, Liuzzo, Mignano

ALMA long baseline progress

- ALMA Long Baseline Campaign Sep 5 – Nov 30, 2014
- Tested up to 15 km baselines, mostly B3, B6, B7
- Infrastructure (pads, engineering etc.) going well
- Improved technical performance as needed
   - More accurate position determination incl. pressure term
   - Delay server calculations and efficiency improved
- Fringes, phase closure, image quality shows ALMA works consistently as expected (or better!)
   - WVR crucial, allows ~minute-scale cycle times
   - Develop/document optimised techniques for observing
- Need phase reference source within few degrees
   - Weak calibrator survey (QSO, stars, asteroids...)
   - Self-calibration often possible

What does the ARC do…

**To learn and improve ourselves AND help the ALMA project?**

(continued)

➢ Participating in CSV/EOC [Commissioning & Science Verification]:
  -- polarimetry (calibrator database: source list, data reduction, reduction script
  integration in pipeline, writing CASAguide)
  -- long baseline campaign

➢ Organize specialist workshops for ALMA & ARC(-nodes) community:
  -- polarimetry with ALMA (2013)
  -- mm-VLBI with ALMA (2015; also partly open to outside-ARC)
  These initiatives also serve to get in on ground floor with these projects

➢ Participants in ALMA Upgrade proposal ESO-GMVA (Ros et al.) on inclusion
  of phased array ALMA in global VLBI network.
  Involved in WP2.4 (disk logistics, correlation, archiving) and WP2.6 (user support)

➢ Exchange programs (between nodes, between nodes and JAO)

What does the ARC do…

For the public? Outreach.

➢ Contribute to Radioastronomy Visitors Centre, Medicina

➢ Participated in "Origins 2013" for the European Researchers night (live stream)

➢ Collaborate with INAF media (interviews, news items)

➢ Articles in popular press; talks

In Search of Our Cosmic Origins
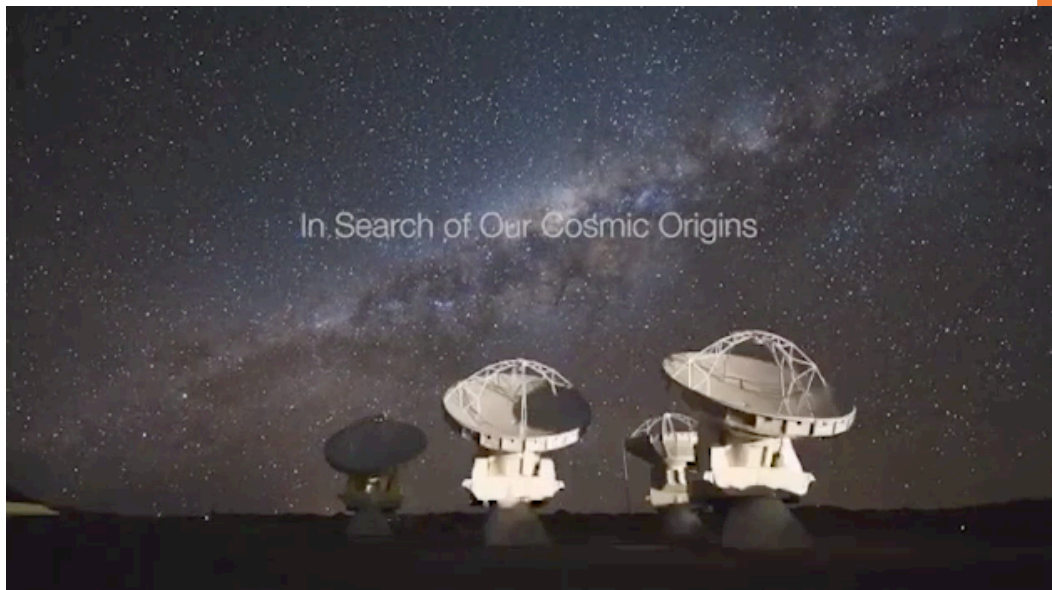
ALMA

L'*Atacama Large Millimeter Array* (ALMA) è un interferometro costituito da 66 antenne paraboliche. Si trova sull'altopiano cileno di Chajnantor a 5 km di altitudine.
Opera a lunghezze d'onda tra 0.1 mm e 10 cm. Le antenne possono essere disposte a distanze fino a 16 km una dall'altra, raggiungendo risoluzioni che permetterebbero di distinguere una moneta da un euro a 500 km di distanza. Il grande numero di antenne, la loro efficienza e l'aridità del deserto permettono di raggiungere una sensibilità tale da poter osservare oggetti molto più deboli e lontani rispetto ad altri telescopi di questo tipo.

cornice digitale

Il progetto ALMA è una collaborazione internazionale. Onori e oneri del suo funzionamento sono condivisi, col contributo del Governo Cileno, da tre partner sovranazionali: Nord America, Europa e Asia. L'attività è organizzata in tre centri regionali (*ALMA Regional Centres*, ARCs) che fanno da interfaccia tra ALMA e le comunità scientifiche. L'ARC europeo è una rete di 7 nodi distribuiti sul territorio e coordinati dal nodo centrale dell'ESO (*European Southern Observatory*).
Il nodo italiano è ospitato dall'Istituto di Radioastronomia di Bologna.
Alcuni dei suoi compiti fondamentali sono: fornire supporto sui progetti osservativi; contribuire alla formazione sull'astronomia millimetrica e su ALMA con seminari e corsi; collaborare allo sviluppo degli strumenti software per la gestione dei dati e di nuove componenti hardware per i futuri sviluppi dello strumento.
La comunità italiana ha contribuito alla costruzione di ALMA, e partecipa numerosa ai progetti osservativi e alle attività di ricerca.

ALMA (ESO/NRAO/NRAO)/J. Guarda (ALMA)

Osservazioni ALMA (arancione-giallo) e osservazioni HST (blu) delle due galassie a spirale interagenti "Antenne"
Radio: ALMA (ESO/NRAO/NRAO)
Ottico: NASA/ESA Hubble Space Telescope

The Atacama Large Millimeter Array (ALMA) is located on the Chilean Chajnantor plateau at an altitude of 5 km. It is an interferometer comprising 66 antennas observing between 0.1 and 10 mm with a maximum resolution enough to resolve a Euro coin at a distance of 500 km, and with unprecedented sensitivity. The ALMA project is a partnership between Europe, North America and Asia.
The Istituto di Radioastronomia hosts the Italian node of the European ALMA Regional Centre network, designed to be an interface between ALMA and the scientific community. It provides support for scientific projects, educates and trains astronomers, and collaborates on software and hardware development.

Early Science Cycles 0 – 2. Some statistics I

ARC researchers:

➢ are involved as PI or Co-I on 94 ALMA proposals, of which 18 are accepted (19%)

➢ are (co-) authors on 7 refereed ALMA papers

➢ supported ca. 150 proposals (est. 5 hrs average /proposal, 0.5 – 16 hrs range)

➢ reached a few 100 astronomers (seminars, tutorials, f2f)

➢ had 18 f2f visits at the ARC (15 proposal preparation, 3 data reduction)

Please visit our web pages: http://www.alma.inaf.it

Early Science Cycles 0 – 2. Some statistics II

Italian researchers:

Over 3 Cycles:

➢ Submitted 119 proposal with Italian PI
    total submitted: 3435 (3.5%)
    EU-submitted: 1448 (8.2%)

➢ Accepted: 17 proposals with Italian PI (14.3% of those submitted)
    total accepted: 961 (1.8%)
    EU-accepted: 312 (5.4%)

Early Science Cycles 0 – 2. Some statistics III

Italian researchers:

➤ Cycle 0
919 submitted (EU: 399; Italy: 36 PIs)

161 accepted (highest prio + fillers; EU: 49)
Unique Italian PI's : 3+1 [2.5% of all accepted; 8.2% of EU accepted props]
Unique Italian Col's: 17

➤ Cycle 1
1133 submitted (EU: 487; Italy: 36 PIs (30 unique PIs))

288 accepted (highest prio + fillers; EU: 87)
Unique Italian PI's: 2+0 [0.7% of all; 2.3% of EU accepted props]
Unique Italian Col's: 31

➤ Cycle 2
1383 submitted (EU: 562; Italy: 47 PIs (43 unique PIs))

512 accepted (highest prio + fillers; EU: 176)
Unique Italian PI's: 5+6 [2.2% of all; 6.3% of EU accepted props]
Unique Italian Col's: 67

Next appointment: proposal preparation day for Cycle 3
9 April 2015

http://www.alma.inaf.it/index.php/ALMA_proposal_preparation_day_2015

Preliminary Program

10:00 - 12:30 Morning session

- ALMA Cycle 3 capabilities
- ALMA OT (with interactive sessions)
- FAQs in the proposal preparation
- Other ALMA tools (OST, CASA simulators)

13:30 - 18:00 Afternoon session

- F2F support to participants

We would appreciate getting feedback from the community

Please speak up now, contact one of us during the meeting, or send us a mail later.

Please visit our web pages: http://www.alma.inaf.it