

REPORT ON THE RADIONET3 NETWORKING ACTIVITY

**TITLE: THE MANY FACETS OF EXTRAGALACTIC RADIO SURVEYS: TOWARDS
NEW SCIENTIFIC CHALLENGES**

DATE: *20-23 OCTOBER 2015* **TIME:** WHOLE DAY

LOCATION: *BOLOGNA, ITALY*

MEETING WEBPAGE <http://www.ira.inaf.it/meetings/survey2015/>

HOST INSTITUTE: *INAF*

PARTICIPANTS NO: *112*

MAIN LEADER: *INAF*

REPORT:

1. Agenda of the meeting

20 OCTOBER 2015

08:30 – 09:15 - REGISTRATION

09:15 - 09:30 - WELCOME

CHAIR: L. FERETTI

09:30 – SESSION I: SETTING THE SCENE

09:30 - 10:00 CARLA FANTI [INVITED] - ONCE UPON A TIME: FROM THE EARLY SURVEYS TO THE EPOCH OF THE NORTHERN CROSS

10:00 - 10:20 HUUB ROTTGERING - EXTRAGALACTIC SCIENCE WITH LOFAR

10:20 - 10:40 CAROLE JACKSON - MWA GLEAM: LOW FREQUENCY INSIGHTS TO EXTRA-GALACTIC RADIO SOURCES

10:40 - 11:10 JIM CONDON [INVITED] – RADIO CONTINUUM SURVEYS: LESSONS LEARNED

CHAIR: M. GARRETT

11:40 - 12:00 RAY NORRIS - THE EMU SURVEY

12:00 - 12:20 ERIC MURPHY - THE VLA SKY SURVEY (VLASS)

12:20 - 12:40 MATT JARVIS - THE NEW DEEP RADIO SURVEYS: V-DECS AND MIGHTEE

12:40 - 13:00 KYLE WILLETT – RADIO GALAXY ZOO: HOST GALAXIES AND RADIO MORPHOLOGIES FOR LARGE SURVEYS FROM VISUAL INSPECTION

CHAIR: E. MURPHY

14:00 - SESSION II: STAR FORMATION

14:00 - 14:30 GEORGE HELOU [INVITED] – STAR FORMATION ASTROPHYSICS IN THE CONTEXT OF RADIO CONTINUUM OBSERVATIONS: THEORETICAL FRAMEWORK AND OPEN QUESTIONS

14:30 - 15:00 GEORGE HEALD [INVITED] – MAGNETIC FIELDS ON A WIDE RANGE OF SCALES IN STAR-FORMING GALAXIES

15:00 - 15:20 ANNA WILLIAMS - A SEARCH FOR MAGNETIC FIELDS IN DISK-LIKE GALAXIES AT $z \sim 0.5$

15:20 - 15:50 ROB BESWICK [INVITED] – STAR FORMATION ASTROPHYSICS: THE ROLE OF HIGH RESOLUTION RADIO CONTINUUM SURVEYS

15:50 - 16:10 FATEMEH TABATABAEI - UNVEILING THE PHYSICS OF STAR FORMATION AND FEEDBACK IN NEARBY GALAXIES

CHAIR: M. PEREZ-TORRES

16:40 - SESSION III: THE TRANSIENT UNIVERSE

16:40 - 17:10 JEAN-PIERRE MACQUART [INVITED] – CHARTING THE TRANSIENT UNIVERSE USING CONTINUUM RADIO SURVEYS

17:10 - 17:30 GIANCARLO GHIRLANDA – ORPHAN AFTERGLOWS: THE OFF-AXIS VIEW OF GAMMA RAY BURSTS

17:30 - 17:50 TRACY CLARKE – THE VLA LOW BAND IONOSPHERIC AND TRANSIENT EXPERIMENT: A COMMENSAL SKY SURVEY

17:50 - 18:30 PARALLEL SELF-ORGANIZED DISCUSSIONS

21 OCTOBER 2015

CHAIR: R. NORRIS

09:00 – SESSION IV: GALAXY EVOLUTION I

09:00 - 09:30 VERNESA SMOLCIC [INVITED] – RADIO CONTINUUM SURVEYS AND GALAXY EVOLUTION: THE AGN VIEW

09:30 - 09:50 DARIA GUIDETTI – ULTRA-DEEP SUB-ARCSEC JVLA OBSERVATIONS OF GOODS-N: THE NATURE OF THE RADIO EMISSION IN THE FAINT RADIO SOURCE POPULATION

09:50 - 10:10 JACK RADCLIFFE – NOWHERE TO HIDE – WIDE-FIELD VLBI OF THE HUBBLE DEEP FIELD-NORTH AGN

10:10 - 10:30 WENDY WILLIAMS - FEEDING THE MONSTERS AT LOW FREQUENCIES: LOFAR & THE EVOLUTION OF RADIO-LOUD AGN

10:30 - 10:50 IMOGEN WHITTAM - EXPLORING THE FAINT SOURCE POPULATION AT 15.7 GHz

CHAIR: M. JARVIS

11:20 - 11:40 MATTIA VACCARI – HELP-ING RADIO CONTINUUM SURVEYS : THE HERSCHEL EXTRAGALACTIC LEGACY PROJECT

11:40 - SESSION V: COSMOLOGY

11:40 - 12:10 MARIO SANTOS [INVITED] - THE ROLE OF HI & CONTINUUM RADIO SURVEYS IN COSMOLOGY

12:10 - 12:40 PRINA PATEL [INVITED] – WEAK LENSING WITH RADIO CONTINUUM SURVEYS

12:40 - 13:00 EMMA STORM – PREDICTIONS FOR DARK MATTER IN GALAXY CLUSTERS WITH NEW RADIO SURVEYS

CHAIR: R. LAING

14:00 - 14:30 POSTER SESSION I

[2 MIN/TALK, SEE SPEAKERS' LIST AT THE END]

14:30 - SESSION VI: EXPLOITING SYNERGIES

14:30 - 15:00 ROBERT BRAUN [INVITED] – SKA STATUS AND RADIO CONTINUUM SURVEYS

15:00 - 15:30 TOM OOSTERLOO [INVITED] – HI AND CONTINUUM SURVEYS WORKING TOGETHER

15:30 - 16:00 FEDERICA GOVONI [INVITED] – MAGNETISM AND CONTINUUM SURVEYS WORKING TOGETHER

CHAIRS: R. BRAUN, M. JARVIS, R. NORRIS, I. PRANDONI, S. TINGAY

16:30 - 18:00 DISCUSSION SESSION ON SYNERGY

22 OCTOBER 2015

CHAIR: A. BONAFEDE

09:00 – SESSION VII: GALAXY CLUSTERS

09:00 - 09:30 ROSSELLA CASSANO [INVITED] – NON THERMAL PHENOMENA IN GALAXY CLUSTERS: OPEN QUESTIONS & FUTURE PERSPECTIVES

09:30 - 10:00 REINOUT VAN WEEREN [INVITED] – DIFFUSE CONTINUUM RADIO EMISSION IN CLUSTERS: OBSERVATIONAL EVIDENCES

10:00 - 10:20 TIZIANA VENTURI - 10 YEARS OF GMRT RADIO HALO SURVEY AND BEYOND

10:20 - 10:40 VIRGINIA CUCITI – RADIO HALOS IN GALAXY CLUSTERS: INSIGHT FROM A MASS-SELECTED SAMPLE

10:40 - 11:00 GIANNI BERNARDI – KAT7 OBSERVATIONS OF AN UNBIASED SAMPLE OF MASS-SELECTED GALAXY CLUSTERS

CHAIR: T. VENTURI

11:30 - 11:50 RUTA KALE – RADIO SOURCES IN THE MADCOWS (MASSIVE AND DISTANT CLUSTERS FROM THE WISE SURVEY)

11:50 - 12:10 MYRIAM GITTI – DO RADIO MINI-HALOS AND AGN HEATING IN COOL-CORE CLUSTERS HAVE A COMMON ORIGIN?

12:10 - 12:30 LAKSHMI SARIPALLI - GIANT PROBES OF LARGE-SCALE STRUCTURE

12:30 - 12:50 ANDREW O'BRIEN - THE ATLAS-SPT RADIO SURVEY OF CLUSTER GALAXIES

CHAIR: R. BESWICK

14:00 SESSION VIII: GALAXY EVOLUTION - II

14:00 - 14:30 ADRIANNE SLYZ [INVITED] - RADIO CONTINUUM SURVEYS AND GALAXY EVOLUTION: MODELLING AND SIMULATIONS

14:30 - 14:50 THOMAS FRANZEN – USING GLEAM TO UNRAVEL THE NATURE OF THE LOW-FREQUENCY RADIO SOURCE POPULATION

14:50 - 15:10 CLAUDIAMANCUSO – TIES BETWEEN STAR FORMATION AND AGN ACTIVITY IN SOURCES DETECTED BY SUB-MJY RADIO SURVEYS

15:10 - 15:30 NIKOLA BARAN – STAR FORMING GALAXIES VERSUS LOW- AND HIGH-EXCITATION RADIO AGN IN VLA-COSMOS 3 GHz LARGE PROJECT

15:30 – 15:50 MANUELA MAGLIOCCHETTI – IS THERE ANY FEEDBACK BETWEEN AGN AND STAR-FORMING ACTIVITY IN RADIO-SELECTED AGN?

CHAIR: G. BRUNETTI

16:00 - 16:30 POSTER SESSION II

[2 MIN/TALK, SEE SPEAKERS' LIST AT THE END]

16:30 SESSION IX: COSMIC MAGNETISM

16:30 - 16:50 ANNALISA BONAFEDE – CONSTRAINING MAGNETIC FIELDS AND PARTICLE ACCELERATION PROCESSES IN GALAXY CLUSTERS: A JOINT VLA/LOFAR VIEW ON COMA AND SKA PERSPECTIVES

16:50 - 17:10 FRANCO VAZZA – ON THE DETECTABILITY OF THE RADIO COSMIC WEB WITH EXISTING AND FUTURE SURVEYS

17:10 - 17:25 SURAJIT PAUL (SHORT=10 +5 MIN) – PROBING THE UNIQUENESS OF GALAXY GROUPS IN THE STRUCTURAL HIERARCHY FROM ITS RADIO SIGNATURE

17:25 - 18:10 PARALLEL SELF-ORGANIZED DISCUSSIONS

23 OCTOBER 2015

09:00 – SESSION X: AGN PHYSICS

CHAIR: R. MORGANTI

09:00 - 09:30 ROBERT LAING [INVITED] - RADIO GALAXIES: PHYSICS AND SURVEYS

09:30 - 09:50 LEITH GODFREY – STATISTICAL STUDIES OF REMNANT RADIO GALAXIES AND IMPLICATIONS FOR THE DYNAMICAL EVOLUTION OF RADIO GALAXIES

09:50 - 10:10 MARISA BRIENZA - DYING AND RESTARTED RADIO GALAXIES IN THE LOFAR SKY

10:10 - 10:30 JEREMY HARWOOD - THE SYSTEMATIC SPECTRAL ANALYSIS OF RADIO SURVEYS

10:30 - 10:50 LEAH MORABITO – LOFAR SURVEY OF SPATIALLY RESOLVED ULTRA STEEP SPECTRUM SOURCES

CHAIR: G. GIOVANNINI

11:20 - 11:50 IVAN AGUDO [INVITED] – JET MORPHOLOGY AND POLARIZATION: THE ROLE OF HIGH RESOLUTION RADIO SURVEYS

11:50 - 12:10 YURI KOVALEV – RADIOASTRON SURVEY OF AGN CORES WITH EXTREME ANGULAR RESOLUTION

12:10 – 12:30 MARCELLO GIROLETTI – THE THIRD FERMI CATALOGUES OF GAMMA-RAY SOURCES AND ACTIVE GALACTIC NUCLEI

12:30 - 13:00 MIKE GARRETT [INVITED] - CONCLUDING REMARKS

14:30 END OF CONFERENCE

2. Scientific Summary

Radio continuum surveys are a powerful tool to detect large number of objects over a wide range of redshifts and obtain information on the intensity, polarization and distribution properties of radio sources across the sky. They are essential to answer to fundamental questions of modern astrophysics.

Radio astronomy is in the midst of a transformation. Developments in high-speed digital signal processing and broadband optical fibre links between antennas have enabled significant upgrades of the existing radio facilities (e-MERLIN, JVLA, ATCA-CABB, eEVN, APERTIF), and are leading to next-generation radio telescopes (LOFAR, MWA, ASKAP, MeerKAT). All these efforts will ultimately lead to the realization of the Square Kilometre Array (SKA), which, owing to advances in sensitivity, field-of-view, frequency range and spectral resolution, will yield transformational science in many astrophysical research fields.

The organization of this conference has been inspired by the recent celebration of the 50th anniversary of the Northern Cross Radio Telescope in Medicina (BO), whose pioneering B2 and B3 surveys provided a significant contribution to radio astronomical studies for many decades afterwards.

The purpose of this meeting is to explore new scientific perspectives offered by modern radio surveys, focusing on synergies allowed by multi-frequency, multi-resolution observations. We will bring together researchers working on wide aspects of the physics and evolution of extra-galactic radio sources, from star-forming galaxies to AGNs and clusters of galaxies, including their role as cosmological probes.

The conference was organized in 10 sessions: the first session was used to introduce the main available or upcoming radio surveys, from the LOFAR and MWA-GLEAM low frequency surveys to the EMU, VLASS and MIGHTEE GHz frequency surveys; the other nine sessions covered all the most important science topics relevant to present and future radio continuum surveys.

Specifically, we had:

- Session I: Setting the scene**
- Session II: Star formation**
- Session III: The Transient Universe**
- Session IV: Galaxy Evolution I**
- Session V: Cosmology**
- Session VI: Exploiting Synergies**
- Session VII: Galaxy Clusters**
- Session VIII: Galaxy Evolution II**
- Session IX: Cosmic Magnetism**
- Session X: AGN Physics**

Each Session was characterized by at least a couple of invited talks, which had the main aim to set the scene, and by a number of contributed talks (see the Conference Program for more details).

Some statistics:

- total number of participants : 112
- women: 51 (~46% of the total)
- most of the attendants were from European Countries, while ~1/3 of attendants were from extra-EU countries, specifically: 11 from South Africa, 8 from USA, 8 from Australia, 4 from India and 1 from Russia.

3. LIST OF PARTICIPANTS

Agudo	Ivan	Instituto de Astrofisica de Andalucia-CSIC	Spain
Baran	Nikola	University of Zagreb	Croatia
Bardelli	Sandro	INAF-Oabologna	Italy
Bernardi	Gianni	SKA SA & Rhodes University	South Africa
Berton	Marco	Università degli Studi di Padova	Italy
Beswick	Rob	JBCA/e-MERLIN	United Kingdom
Bonafede	Annalisa	Hamburg University	Germany
Bondi	Marco	INAF-IRA	Italy
Botteon	Andrea	IRA	Italy
Braun	Robert	SKA Organisation	United Kingdom
Bravi	Luca	INAF-IRA	Italy
Brienza	Marisa	ASTRON	Netherlands
Brunetti	Gianfranco	IRA	Italy
Capetti	Alessandro	INAF - OATo	Italy
Casoni	Anastasia	INAF - ORA	Italy
Cassano	Rossella	INAF - ORA	Italy
Cassaro	Pietro	ORA INAF	Italy
Chandra	Ishwara	NCRA-TIFR	India
Cilieggi	Paolo	INAF- OABO	Italy
Clarke	Tracy	Naval Research Laboratory	United States of America
Condon	Jim	NRAO	United States of America
Cuciti	Virginia	INAF-IRA	Italy
De Lucia	Gabriella	INAF - Astronomical Observatory of Trieste	Italy
Dumba	Cosmos	Thüringer Landessternwarte Tautenburg	Germany
Fanti	Carla	IRA-INAF Bologna	Italy
Fanti	Roberto	IRA-INAF Bologna	Italy
Feretti	Luigina	INAF - ORA	Italy
Ferrari	Chiara	Lagrange Laboratory, OCA	France
Franzen	Tom	Curtin Institute of Radio Astronomy	Australia
Galluzzi	Vincenzo	Dip. Fisica e Astronomia (Univ. di Bologna); INAF-IRA (Bologna)	Italy
Garrett	Michael	ASTRON/Leiden University	Netherlands
Gelszinnis	Jakob	Thueringer Landessternwarte Tautenburg	Germany
Ghirlanda	Giancarlo	INAF-OABrera	Italy
Giovannini	Gabriele	DIFA, Bologna Univ. and IRA/INAF	Italy
Giroletti	Marcello	INAF IRA	Italy
Gitti	Myriam	University of Bologna - DIFA	Italy
Godfrey	Leith	ASTRON	Netherlands
Govoni	Federica	INAF - Cagliari	Italy
Gregorini	Loretta	Istituto di Radioastronomia - INAF	Italy
Guidetti	Daria	INAF - ORA	Italy
Harwood	Jeremy	ASTRON	Netherlands
Heald	George	ASTRON	Netherlands
Helou	George	Caltech	United States of America
Jackson	Carole	ICRAR-Curtin University	Australia
Jagannathan	Preshanth	National Radio Astronomy Observatory	United States of America

Jarvis	Matt	Oxford / UWC	United Kingdom
Kale	Ruta	NCRA-TIFR	India
Kimball	Amy	CSIRO Astronomy & Space Science	Australia
Kovalev	Yuri	Lebedev Physical Institute	Russia
Laing	Robert	ESO	Germany
Lapi	Andrea	SISSA	Italy
Lico	Rocco	INAF - ORA	Italy
Liuzzo	Elisabetta	INAF - IRA	Italy
Macquart	Jean-Pierre	ICRAR/Curtin University	Australia
Madhanpall	Nikhita	University of the Western Cape	South Africa
Magliocchetti	Manuela	IAPS-INAF	Italy
Mancuso	Claudia	SISSA-ISAS	Italy
Mao	Minnie	JIVE	Netherlands
Marubini	Takalani Enos	University of the Western Cape	South Africa
Massardi	Marcella	INAF-IRA/ Italian ARC	Italy
Mimica	Petar	University of Valencia	Spain
Morabito	Leah	Leiden Observatory	Netherlands
Morgan	John	ICRAR/Curtin	Australia
Morganti	Raffaella	ASTRON/Kapteyn Institute Groningen	Netherlands
Murgia	Matteo	INAF-Cagliari	Italy
Murphy	Eric	Caltech/IPAC	United States of America
Muxlow	Tom	JBCA	United Kingdom
Norris	Ray	CSIRO	Australia
O'Brien	Andrew	University of Western Sydney	Australia
Ocran	Emmanuel	University of the Western Cape	South Africa
Oosterloo	Tom	Astron	Netherlands
Orru	Emanuela	Astron	Netherlands
Paladino	Rosita	INAF IRA	Italy
Panessa	Francesca	IAPS-INAF	Italy
Parma	Paola	IRA - BOLOGNA	Italy
Patel	Prina	UWC	South Africa
Paul	Surajit	University of Pune, Department of Physics	India
Perez-Torres	Miguel	IAA-CSIC	Spain
Prandoni	Isabella	INAF - ORA	Italy
Radcliffe	Jack	University of Manchester & Groningen	United Kingdom
Randriamampandry	Solohery	University of KwaZulu-Natal	South Africa
Ricci	Roberto	INAF - ORA	Italy
Righini	Simona	INAF-IRA	Italy
Ritacco	Alessia	Laboratoire de Physique Subatomique et Cosmologie (Grenoble)	France
Rivi	Marzia	UCL - Department of Physics and Astronomy	United Kingdom
Rottgering	Huub	Leiden Observatory	Netherlands
Santos	Mario	UWC	South Africa
Saripalli	Lakshmi	Raman Research Institute	India
Setti	Giancarlo	Inaf - IRA	Italy
Slyz	Adrienne	Dept. Physics - Univ. Oxford	United Kingdom
Smolicic	Vernesa	Physics Dept - Univ. Zagreb	Croatia
Stagni	Matteo	INAF - ORA	Italy
Storm	Emma	University of Amsterdam	Netherlands

Tabatabaei	Fatemeh	IAC	Spain
Terni de Gregory	Beatrice	ORA	Italy
Tingay	Steven	Curtin University/INAF	Australia
Trasatti	Monica	Difa, Bologna Univ./ IRA-INAF	Italy
Umana	Grazia	INAF-OACT	Italy
Vaccari	Mattia	UWC	South Africa
Van Weeren	Reinout	Harvard-Smithsonian Center for Astrophysics	United States of America
Vazza	Franco	Hamburg University	Germany
Venturi	Tiziana	INAF - ORA	Italy
Whittam	Imogen	University of the Western Cape	South Africa
Willett	Kyle	University of Minnesota	United States of America
Williams	Anna	University of Wisconsin-Madison	United States of America
Williams	Wendy	University of Hertfordshire	United Kingdom
Wilson	Susan	University of Kwa-Zulu Natal	South Africa
Xie	Lizhi	INAF-Astronomical Observatory of Trieste	Italy
Zamorani	Giovanni	INAF - Bologna Astronomical Observatory	Italy
Zanichelli	Alessandra	Istituto di Radioastronomia - INAF	Italy
Zoldan	Anna	Università degli Studi di Trieste - INAF-OATS	Italy
Zwart	Jonathan	UWC/UCT	South Africa

To Whom It May Concern:

I can confirm that the above list contains the names, affiliations and country of the people attending the conference.

Bologna, 24 November 2015

Rossella Cassano
(LOC -- co-Chair)

3. FINANCIAL REPORT / RADIO NET3 CONTRIBUTION

RadioNet3 provided a total contribution to the event of 5033 €. The funding was used to support

the waived conference fees for 11 participants with 2750 € total:

- 1) Anna Williams, University of Wisconsin-Madison, USA
- 2) Paul Surajit, University of Pune, Department of Physics, India
- 3) Kyle Willett, University of Minnesota, USA
- 4) Pietro Cassaro, ORA-Noto, Italy
- 5) Marisa Brienza, ASTRON, Nederland
- 6) Claudia Mancuso, SISSA-ISAS, Italy

- 7) Ishwara Chandra, NCRA-TIFR, India
- 8) Takalani Enos Marubini, University of the Western Cape, South Africa
- 9) Cosmos Dumba, Thüringer Landessternwarte Tautenburg, Germany
- 10) Petar Mimica, University of Valencia, Spain
- 11) Imogen Whittam, University of the Western Cape, South Africa

-the hotel accommodation for 7 participants with 2283 € total:

- 1) Anna Williams, University of Wisconsin-Madison, USA
- 2) Paul Surajit, University of Pune, Department of Physics, India
- 3) Kyle Willett, University of Minnesota, USA
- 4) Imogen Whittam, University of the Western Cape, South Africa
- 5) Ocran Emmanuel, University of the Western Cape, South Africa
- 6) Madhanpall Nikhita, University of the Western Cape, South Africa
- 7) Randriamampandry Solohery, University of KwaZulu-Natal, South Africa

3. CONFERENCE PROCEEDINGS AND WEB PAGE

The Conference proceedings will be published in Proceedings of Science (<http://pos.sissa.it>), the open access online journal managed by SISSA, the International School for Advanced Studies based in Trieste.

The Conference presentations are available on-line at the conference web page <http://www.ira.inaf.it/meetings/survey2015/presentations.php>