Report from the event supported by RadioNet

TITLE:	The Labyrinth of the Unexpected: Unforeseen Treasures in Impossible Regions of Phase Space.
DATE:	23 MAY – 3 JUNE 2017
LOCATION:	KERASTARI, TRIPOLIS, GREECE
MEETING WEBPAGE:	https://www.atnf.csiro.au/research/conferences/2017/Labyrinth/
HOST INSTITUTE:	CSIRO Astronomy & Space Science (CASS)
RADIONET BENEFICIARY / NO:	TO BE FILLED BY MANAGEMENT

RadioNet has received funding from the EU's Horizon 2020 research and innovation programme under the grant agreement No 730562

Report:

1. SCIENTIFIC SUMMARY

About every 5 years, Dr. Anastasios Tzioumis aka “Tasso”, Assistant Director of CSIRO Astronomy & Space Science (CASS), organises a meeting in the village of Kerastari in the ancient region of Arcadia in Greece, that attracts experts in radio astronomy from all around the world to discuss their latest scientific discoveries and astronomical techniques. Kerastari is the village where Tasso grew up, and its people and the tranquil surroundings make a great setting for a scientific meeting.

On 29 May – 3 June 2017, the 4th of these meetings took place with the goal of explore how flexible data processing environments associated with radio telescopes are opening up new windows on the Universe, resulting in exciting new discoveries (e.g. Fast Radio Bursts, FRBs) and potentially transforming other related fields of study (e.g. SETI, the Search for Extraterrestrial Intelligence). In general, the meeting included a lot of time for discussion, including a final session outside under the orchid, next to the village church.

There were many highlights during the meeting. Several talks focused on serendipity and what we could learn from the nature of past discoveries (e.g. Pulsars, FRBs etc) – notable talks included those from Jocelyn Bell-Burnell (discoverer of Pulsars) and Jill Tarter (one of the first astronomers to dedicate her research career to SETI). Ken Kellerman gave a very interesting talk on the “Gold effect” (named after Tommy Gold), considering how an idea can evolve towards being an accepted scientific fact (via the social processes of conferences, committees, consensus building etc.) despite not being supported by *conclusive* evidence. The impact of the Breakthrough Listen progamme was clearly to be seen in several SETI presentations, including an overall summary given by Andrew Siemion. The prospect of systematic surveys of various targets (1 million nearby stars, the galactic plane, 100 local galaxies) is very exciting, building on the rapid progress that has been made in time-domain radio astronomy over the past 10 years. Another hot topic was the recent localisation of a repeating FRB with an distant (z=0.2) dwarf galaxy presented by Zsolt Paragi and Benito Marcotte – clearly the ability to precisely locate these bursts with VLBI will be important to the overall interpretation of the physical nature of these systems and their surrounding environment. The use of machine learning in the era of the SKA, raised some questions about whether the astronomy community was prepared for serendipity or would users be blinded by focused campaigns to extract data from huge, faceless catalogues of cosmic radio sources.

These topics are all very relevant to the research conducted by the RadioNet community. In particular, the VLBI results presented by Paragi & Marcotte exclusively use the European VLBI Network (EVN) and e-MERLIN. FRB research benefits greatly from broadband receiver systems, technical research projects such as the RadioNet BRAND JRA are very interesting from this perspective, and there was a good deal of discussion during the meeting about this and related topics. In this sense, the meeting was an excellent platform to show the Transient and SETI communities the capabilities of these RadioNet telescopes and technical research activities. Much of the pulsar developments also drew from observations made by European and RadioNet facilities e.g. the Jodrell Bank Lovell Telescope and the European Pulsar Timing Array (EPTA). The EPTA is significant for another line of research also discussed at the meeting – Gravitational Wave events.

The meeting attracted many participants from outside of Europe. The location in Greece was also an opportunity to enlarge the RadioNet family to include European researchers that are somewhat on the periphery of the RadioNet community. This, together with the high visibility of European telescopes, technologies and human expertise presented at the meeting, ensures that this event had a very positive impact on RadioNet, its community and its standing in the global context. RadioNet support for the meeting directly increased the participation and influence of European astronomers in the event, and was highly appreciated by all participants, and indeed the organisers themselves.

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2. AGENDA OF THE EVENT

See Appendix 2.

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3. PARTICIPANTS

66 people attended the conference. Most participants were from Europe but also 9 from Australia, 7 from the USA, 3 from China, and 1 each from Israel, Thailand and South Africa. 41 Scientific presentations were made, and one poster talk was presented (also orally). Women formed about 10% of the conference participants and there was a good range of different ages present. A list of participants can be found in appendix 1.

Figure 1: Conference photograph

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4. RADIONET FINANCIAL CONTRIBUTION

A total of 1000EUR was contributed by the RadioNet project.

These funds were used to contribute to the total cost (1500EUR) of hiring of audio-visual equipment for the duration of the conference.

5. PUBLICATIONS

Formal publications from the meeting are not envisaged. However, all the presentations are available online at:

https://www.atnf.csiro.au/research/conferences/2017/Labyrinth/

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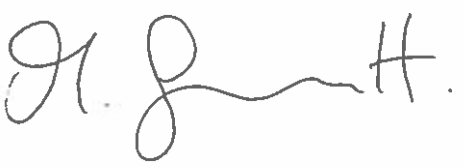
APPENDIX 1 – LIST OF PARTICIPANTS:
THE LABYRINTH OF THE UNEXPECTED - UNFORESEEN TREASURES IN IMPOSSIBLE REGIONS OF PHASE SPACE.

PETROS ALEXAKIS
OLGA ANDRIANAKOU
NICOLÒ ANTONIETTI
RICHARD ARMSTRONG
MATTHEW BAILES
KEITH BANNISTER
JOCELYN BELL BURNELL
GEORGIA BROUSALI
GIUSEPPE CIMO
TIM CORNWELL
DIMITRIS DIMOPOULOS
JAMIE DREW
MARIA FASOULAKI
GRIFFIN FOSTER
VINCENZO GALLUZZI
MICHAEL GARRETT
MARISA GEYER
NECTARIA GIZANI
DIMITRIOS HASOULAS
GREGORY HELLBOURG
ASSAF HORESH
PHRUDTH JAROENJITTICHAI
DAVID JAUNCEY
SIMON JOHNSTON
ARIS KARASTERGIOU
KENNETH KELLERMANN
SOTIRIS KOSTOUROS
PANAGIOTA KOUSKOULI
BUSABA KRAMER
SHI-YU LI
MICHAEL LINDQVIST
CLAUDIO MACCONE
JEAN-PIERRE MACQUART
EUGENIA MANTZOURANI
BENITO MARCOTE
(WILLIAM) BRUCE MCADAM
JANICE MCADAM
REBECCA MCFADDEN
MITCHELL MICKALIGER
ANTONIOS MITROPOULOS
IASON MITSIOS
SAMAYA NISSANKE
RAY NORRIS
MONIKA OBROCKA
VASILEIOS PAPANASTASIOU
ZSOLT PARAGI
BO PENG
EMILY PETROFF
VASILIKI POLYCHNIATOU
VIKRAM RAVI
SOTIRIS SANIDAS
SPYROS SEIMENIS
JOHN SEIRADAKIS
ANDREW SIEMION
JILL TARTER
PANAGIOTA THEODOROPOULOU
NIKOLAOS TSIPAS
PANAGIOTA TZIOUMI
TASSO TZIOUMIS
LIDIA VAN DRIEL
WIM VAN DRIEL
IOANNIS VLACHOS
ANTONIS VLASOPOULOS
DAN WERTHIMER
ZACHARIAS ZACHAROPOULOS
TONG-JIE ZHANG



APPENDIX 2 – WORKSHOP PROGRAMME

Kerastari Talks - Final
2-June-2017

	Name	time	title	chair
MONDAY PM	**29-May-17**			
18:30	**Reception**	**3h**	**Reception at Mainalon hotel 18:30-21:00. Drinks + light food.**	

**** NOTE1: Bus pickup to Kerastari at 8:15am every morning, near the small church at the square next to Mainalon. ****
**** NOTE2: The return bus to Tripoli will depart at 17:30-18:00, at the end of each day's presentations.**

**** NOTE3: The duration of the talks INCLUDES question time. Please allow at least 5 mins for questions. ****

TUESDAY AM	**30-May-17**		**Introduction to the Workshop. Setting themes**	***Chair Tasso***
10:00	Bishop Alexandros		open workshop	
	Vice-Governor		opening speeches	
	Tripolis mayor		opening speech	
	Village representatives		Opening speeches	
	Yota Krili		Welcome from the village	
10:45	Ένωση Ελλήνων Φυσικών		Greek Physicists - Aristotle award to Tasso Tzioumis	**Chair - Seiradakis**
	Tasso Tzioumis		Reply & short presentation of work (15 mins)	
11:15	**Coffee break**	**30**		
11:45	Tzioumis, Tasso	10	Introduction to the Workshop	
11:55	Drew, Jamie	40	Public talk - Breakthrough Listen Intro and short movie.	
12:35	Kellerman, Ken	25	The Gold Effect aka The Buffalo Syndrome	
13:00	**Lunch**	**60**		
TUESDAY PM			**SETI**	***Chair - Emily***
14:10	Tarter, Jill	25	Clarke's Third Law: Indistinguishable From Magic; Indistinguishable From Nature; or Indistinguishable From Paperclips?	
14:35	Siemion, Andrew	25	Breakthrough Listen	
15:00	Garret, Michael	25	All-sky Radio SETI	
15:25	Werthimer, Dan	25	When Will Earthlings Find ET?: Future SETI and Radio Astronomy Instrumentation	
15:50	**Coffee break**	**30**		
16:20	Maccone, Claudio	25	Lifetime Gap among ET Civilizations quantified by Evo-SETI	
16:45	Hellbourg, Greg	25	SETI & RFI	
17:10			Open discussion	
8:30	**Snacks/coffee**	**30**		
WEDNESDAY AM	**31-May-17**		**FRBs**	***Chair - Aris***
9:15	Bailes, Matthew	25	Serendipity and Fast Radio Bursts	
9:40	Johnston, Simon	25	Fast Radio Bursts, Perytons and the High Time Resolution Universe Survey	
10:05	Petroff, Emily	25	FRBs, Perytons, and the hunts for their origins	
10:30	Foster, Griffin	25	ALFABURST: A Commensal FRB Search with ALFA	
10:55	**Coffee break**	**30**		
11:25	Bannister, Keith	25	Fast Radio Bursts detections with ASKAP	
11:50	Macquart, Jean-Pierre	25	FRBs as cosmic weigh stations	
12:15	Ravi, Vikram	25	The brightest FRBs: a class distinct from the repeater(s)?	
12:40	Obrocka, Monika	25	Cognitive computing for the MeerKAT Integrated RFI Management System	
13:05	**Lunch**	**55**		
WEDNESDAY PM				***Chair - Nectaria***
14:00	Paragi, Zsolt	25	Localizing fast transients with the e-EVN	
14:25	Marcote, Benito	25	Localizing a Fast Radio Burst on milliarcsecond angular scales	
14:50		25	Open discussion	
15:15	**Coffee break**	**30**	**Machine learning**	
15:45	Norris, Ray	25	Building Machine Astronomers to Discover the Unexpected in Astronomical Surveys	
16:10	McFadden, Rebecca	5	Poster sparkler (Machine Learning for Radio Transient Detection)	
16:15	Antonietti, Nicolo	25	KLT for transient signal analysis	
16:40	Maccone, Claudio	25	Relativistic eigenfunctions for uniformly-accelerated spaceflight	
17:05			Open discussion	
18:00		**60**	**Winery visit (stopover by return bus)**	
8:30	**Snacks/coffee**	**30**		
THURSDAY AM	**1-Jun-17**		**Pulsars & Fast transients**	***Chair - Bailes***
9:15	Bell Burnell, Jocelyn	25	Reflections on the discovery of pulsars and lessons for today	
9:40	Seiradakis, John	25	Early Pulsar searches	
10:05	Geyer, Marisa	25	Anomalous pulsar scattering at LOFAR frequencies	
10:30	**Coffee break**	**30**		
11:00	Karastergiou, Aris	25	The pulsar population, and MeerKAT PSR/FRB searches	
11:25	Sanidas, Sotiris	25	Searching for pulsars and fast transients with LOFAR	
11:50	Mickaliger, Mitchell	25	Pulsar and Fast Transient Search with the SKA	

Kerastari Talks - Final
2-June-2017

	12:15		15	Open discussion
	12:30	**Lunch**	**60**	
THURSDAY PM			5h	**Excursion 13:30-18:30 - Ancient Messini**
THURSDAY PM		Vespers	1h	**6:30-7:30 pm Special Vespers**
THURSDAY Evening			4-5h	**Conference dinner & entertainement in Kerastari**
				Return bus ~11:30pm
	8:30	**Snacks/coffee**	**30**	
FRIDAY AM		**2-Jun-17**		**Multi-wavelength** ***Chair - Keith***
	9:10	Bailes, Matthew	5	Gravitational wave #3 - announcement
	9:15	Nissanke, Samaya	30	Strong gravity - slides presented by Assaf
	9:45	Horesh Assaf	30	Lessons from the last decade of time-domain astronomy
	10:15	Cimo, Giuseppe	30	Supporting multi-wavelength and multi-messenger astronomy with ASTERICS
	10:45	**Coffee break**	**30**	
	11:15	Jauncey, David	30	Inter-Stellar Scintillation; 50 Years from Discovery to Acceptance
	11:45	Peng, Bo	30	Unexpected outcome of the first RFI measurements for the SKA
	12:15	Galluzzi, Vincenzo	30	Multi-frequency polarimetry of a complete sample of faint PACO sources
	12:45	**Lunch**	**90**	
FRIDAY PM				***Chair - Monica***
	14:00	Jaroenjittichai, Phrudth	25	Radio Astronomy Network and Geodesy for Development (RANGD) Project
	14:25	Lindqvist Michael	25	Present status and future directions of the EVN
	14:50	Cimo, Giuseppe	25	Radio Astronomy and Space Science: VLBI observations of orbiters and landers
	15:15	Cornwell, Tim	25	The labyrinth of SKA processing
	15:40	**Coffee break**	**30**	
	16:10		30	Open discussion - under the plane tree
	16:40	Garrett, Micahael	20	Workshop summary
	17:00		5	**Workshop Close**
SATURDAY		**3-Jun-17**		**9am-7pm Full-day excursion to Mistras and Deiros caves.**
SATURDAY EVENING				**Party hosted by Tasso Tzioumis (8pm - 3am)**
				Return bus by ~12am
		Posters		
		McFadden, Rebecca		Machine Learning for Radio Transient Detection