



## **Commission Triennial Report**

### **Commission J**

This is a brief summary of the activities of Commission J and the developments in radio astronomy during this triennium. This report covers four years due to the COVID-19 worldwide pandemic that forced the postponement of URSI GASS 2020 until 2021. All officers agreed to serve an additional year of their terms.

## **1 Officers of Commission J for this triennium**

Chair:	Richard F. Bradley, NRAO, United States
Vice-Chair:	Douglas Bock, CSIRO, Australia
Past-Chair:	Willem Baan, ASTRON, The Netherlands
ECR:	Stefan Wijnholds, ASTRON, The Netherlands Jacki Gilmore, Stellenbosch U, South Africa

## **2 Terms of Reference for Commission J**

The activities of the Commission include:

- Observation and interpretation of cosmic radio emissions from the early universe to the present epoch and
- Radio reflections from solar system bodies

Emphasis is placed on:

- The promotion of science-driven techniques for making radio-astronomical observations and data analysis,
- Support of activities to protect radio-astronomical observations from harmful interference.

## **3 Finances**

The budget for Commission J has been used to support travel for officials and for support of a few workshops/meetings to provide YS participation (budget 24,185 euros, expenditures 17,632 euros). Surplus is 6953 euros.

## **4 Support of meetings and workshops**

The following meetings and workshops were provided with technical and/or financial support.

<b>Meeting</b>	<b>Country</b>	<b>Date</b>	<b>Support for YS</b>
History of SKA from 1980s to 2012, Jodrell Bank	UK	April 3-5, 2021	1,000 euros
RFI 2019 Workshop	France	September 23-26, 2019	2,000 euros
e-Workshop at Stellenbosch and Eindhoven	South Africa and Netherlands	Planned but delayed due to COVID-19	Technical support



## 5 Vice-chair and Early Career Representative nominees

Nominations for Vice Chair of Commission J:

- Yuri Kovalev (Russian Federation)
- Stefan Wijnholds (The Netherlands)

Nominations for ECR of Commission J:

- Ruan Duan (China)
- Jin Fan (China)
- Danielle Fenech (UK)
- Lucy Oswald (UK)

## 6 AT-RASC 2018 at Gran Canaria, Spain

There were 12 sessions with 80 papers presented in regular and special sessions. A workshop was also held. A summary of the sessions and papers per session are given in the following table:

Session	Session Topic	Papers
J1	Software Enabled Radio Astronomy	15
J2	Large N Aperture Arrays	13
J3	Pattern Recognition Applications in Radio Astronomy	6
J4	Novel Instrument Concepts and Observational Challenges	6
J5	Detecting Hydrogen Near and Far	10
J6	Instruments for Education	4
J8	Radio Telescopes	7
J9	Radio Astronomy	6
S-JB	Polarimetry of Advanced Antenna Systems in Radio Astronomy	8
S-J	Photonics in Radio Astronomy	5
S-EACFJ	Spectrum Management and Utilization	workshop

Commission J attendance was satisfactory and increased over that of AT-RASC 2015. The atmosphere of the venue made it very easy/pleasant for participants to discuss and collaborate. While travel to Gran Canaria is not so easy for some participants from the Atlantic region, the organization needs to make it easier (more transparent) the next time for those participants. The format of the AT-RASC meetings should remain flexible and should allow holding URIS-related workshops in connection with the meetings.

## 7 AP-RASC in New Delhi, India

From March 9 through March 14, 2019, the Asia-Pacific Radio Science Conference (AP-RASC) was held in the India Habitat Centre in New Delhi, India.

Commission J had 91 oral presentations in 16 session and 34 posters. The Commission J keynote lecture was delivered by Ron Ekers on the topic of “Paths to discovery in radio astronomy – the role of technical innovation and serendipity”. Young scientists could apply for a Young Scientist Award (YSA) or take part in the Student Paper Competition (SPC). There were three applications for a YSA and two submissions for the SPC from the Commission J community. Unfortunately, none of them were successful.



Session	Session Topic	Papers
J01	Evolution / latest results from the uGMRT, in honour of Govind Swarup	5
J02, J03	Updates from exiting radio astronomy facilities	11
E02, E03	RFI mitigation in radio astronomy (with Commission E)	12
J04	VLBI: current status and future prospects	6
H04	Radio science for space weather (with Commission H)	6
J09, J10	Recent scientific results on solar, solar wind and space weather observations	10
J05	Recent scientific results on Galactic, extra-Galactic star formation and transients	6
J06	The Early Universe (EoR experiments and related results)	5
J07	Future radio astronomy facilities (including SKA)	6
J11, J12	Radio astronomy instrumentation & techniques – I. Receiver systems: analog/digital/optical fibre	12
J08, J13	Radio astronomy instrumentation & techniques – II. Data processing: Imaging, Big Data	12

## 8 Rome, Italy URSI GASS 2021 Scientific Sessions (planned)

Session	Session Topic	Papers
J01	New Telescopes on the Frontier	9
J02	Recent and Future Space Missions	12
J03	Single-Dish Instruments	9
J04	Very Long Baseline Interferometry	15
J05	Millimeter and Sub-Millimeter Arrays	6
J06	Antennas and Receivers: Simulation, Design and Calibration	9
J07	Digital Signal Processing: Algorithms and Platforms	6
J08	Short Duration Transients, FRBs and Pulsars: observations, techniques and instr.	15
J09	The Impact of Radio Astronomy on Technology and Society	6
J10	Latest News and Observatory Reports	6
J11	Big Data: Algorithms and Platforms	18
J12	Open Session	6
J13	Calibration Techniques and Instrumentation for Observational Cosmology	9
J-IAU	Next Generation Radio Astronomy Science and Technologies	9
JG1	Mutual Benefit between Radio Astronomy and Ionospheric Science	6



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There are 141 oral talks and approximately 60 posters (FIPs) planned. A workshop and tutorial are also organized. Note that the Student Paper Competition (SPC) was held virtually in 2020. Two students are participating in the 2021 SPC from Commission J. The unique, inter-union session (J-IAU) will bring together the International Astronomical Union (IAU) and URSI at the GASS.

## 9 Communication and Membership

Discussions continued about the ‘average youth’ of the URSI membership and the role for URSI in the life and career of the radio scientists. It is clear that URSI can be attractive for radio scientists as an organization providing places for discussions, presentations, and for meeting colleagues. While there may be some overlap in covering the certain radio science research fields with other organizations, URSI covers the broad radio science fields like no other. Still it is important to make URSI more a part of the ‘daily life of the radio scientists.’ In addition, the new generation of radio scientists needs to be attracted to URSI. The answers to such issues are complex but the leadership of Comm J has been discussing these issues and considering changes that may be made within URSI.

In an attempt to improve communications and raise awareness of URSI, a Commission J Newsletter was introduced and distributed to the membership on a monthly basis. The format included the latest news, announcements / information on upcoming meetings, a short article highlighting research or other activities by members, and a “Photo from the Field” showing an activity or instrument. The Newsletter received very positive feedback. It was monthly over the first 2.5 years but became more sporadic thereafter due to the lack of input from the membership.

Commission J participated in the discussions regarding the UTC leap second, and assisted in drafting the URSI Resolution on the need for continuous reference time scale.

Dr. Richard Bradley agreed to serve as the Associate Editor Comm. J of the Radio Science Bulletin.