ALMA Cycle 7: Selection Statistics

Proposal Review Process

A total of 1773 proposals were submitted in response to the ALMA Cycle 7 Call for Proposals. The proposals were reviewed during a meeting in Atlanta (USA) on 17-21 June 2019. The review committee consisted of 158 Science Assessors grouped into 25 ALMA Review Panels (ARP) that were distributed across five scientific categories:

1. Cosmology and the high redshift universe (6 panels)
2. Galaxies and galactic nuclei (6 panels)
3. ISM, star formation and astrochemistry (6 panels)
4. Circumstellar disks, exoplanets and the solar system (5 panels)
5. Stellar evolution and the Sun (2 panels).

Most review panels contained 6 members each. Two panels in Category 4 and both panels in Category 5 contained eight Science Assessors. Science Assessors were selected on the basis of scientific specialization while having a regional affiliation that closely matched the nominal ALMA regional shares of observing time. The full list of Science Assessors is provided in the Appendix.

Eighteen of the 25 Panel Chairs served on the ALMA Proposal Review Committee (APRC) together with the APRC Chair, Masao Saito. The Review Panels conducted the initial scientific reviews and recommended which Large Proposals should be further discussed by the APRC. The APRC conducted the final review to recommend which Large Programs should be scheduled.

The Joint ALMA Observatory (JAO) created an observing queue and assigned a priority grade to each proposal after considering the scientific rank determined from the review process, the share of observing time for each region, and proposal pressure for the various configurations and right ascension. Priority Grade A was assigned to the top ranked proposals up to a cumulative sum of 1418 h of requested 12-m Array observing time. Grade B was assigned to high ranked proposals to fill the remaining time. Grade C was assigned to proposals that oversubscribed the time in a configuration by approximately 50%.

Proposal statistics

Of the 1773 proposals submitted, 128 received the highest priority of Grade A, 270 received Grade B, and 236 received Grade C. The Grade A and B proposals requested an estimated 4033 h of execution time on the 12-m Array. Together with the estimated 270 h of Cycle 6 Grade A proposals that will be carried forward to Cycle 7, this constitutes the 4300 h of 12-m Array time expected to be available for successful executions in Cycle 7.

The titles, investigators, and abstracts of the Grade A and B projects are available from the ALMA Science Portal. Tables 1 and 2 list the number and requested time for proposals grouped by region and science category, respectively. Table 3 lists the number of Grade A and B projects for different proposal types. Various metrics of the proposal data are presented in the figures.

Fourteen Large Proposals were submitted in Cycle 7. As recommended by the APRC, the following four Large Programs have been scheduled :

1. *ALMAGAL: ALMA Evolutionary study of High Mass Protocluster Formation in the Galaxy* (2019.1.00195.L)
   PI: Sergio Molinari (EU); coPIs: Paul Ho (EA), Peter Schilke (EU), and Cara Battersby (NA)

2. *Early Planet Formation in Embedded Disks* (2019.1.00261.L)
   PI: Nagayoshi Ohashi (EA); co-PIs: John Tobin (NA) and Jes Jorgensen (EU)

3. *VERTICO: The Virgo Environment Traced in CO* (2019.1.00763.L)
   PI: Toby Brown (NA); coPIs: Christine Wilson (NA), Aeree Chung (EA), and Alessandro Boselli (EU)

4. *REBELS: An ALMA Large Program to Discover the Most Luminous [CII]+[OIII] Galaxies in the Epoch of Reionization* (2019.1.01634.L)
   PI: Rychard Bouwens (EU); co-PI: Valentino Gonzalez (CL), Dan Stark (NA), and Hanae Inami (EA)

Collectively these four Large Programs were assigned 280 h on the 12-m Array and 182 hours on the 7-m Array.

Table 1. Distribution of proposals by region

	Chile (CL)	East Asia (EA)	Europe (EU)	North America (NA)	Open Skies	Total
Submitted Proposals						
Number of proposals	90	377	727	504	75	1773
12-m Array time (hours)	1041	3983	8300	5201	623	19148
7-m Array time (hours)	550	2154	3214	2756	176	8850
Total Power Array time (hours)	377	1674	2345	2383	159	6937
Subscription rate						
12-m Array (4300 h offered)	2.4	4.1	5.7	3.6	N/A	4.5
7-m Array time (3000 h offered)	1.8	3.2	3.2	2.7	N/A	3
Total Power Array (3000 h offered)	1.3	2.5	2.3	2.4	N/A	2.3
Grade A & B projects						
Number of proposals	38	96	124	133	7	398
12-m Array time (hours)	399	904	1331	1355	43	4033
7-m Array time (hours)	173	835	532	664	2	2206
Total Power Array time (hours)	99	445	388	488	5	1424
Grade C projects						
Number of proposals	16	40	100	72	8	236
12-m Array time (hours)	196	504	1060	688	80	2528
7-m Array time (hours)	0	0	0	0	0	0
Total Power Array time (hours)	0	0	0	0	0	0

Table 2. Distribution of proposals by scientific category

	Category 1	Category 2	Category 3	Category 4	Category 5	Total
Submitted Proposals						
Number of proposals	420	382	444	373	154	1773
12-m Array time (hours)	5878	4253	3949	3944	1124	19148
7-m Array time (hours)	1257	2488	4103	565	437	8850
Total Power Array time (hours)	0	1639	5043	88	167	6937
Grade A & B projects						
Number of proposals	103	88	103	73	31	398
12-m Array time (hours)	1306	829	931	753	214	4032
7-m Array time (hours)	418	743	843	56	146	2206
Total Power Array time (hours)	0	393	956	10	65	1424
Grade C projects						
Number of proposals	55	49	57	55	20	236
12-m Array time (hours)	731	520	546	585	147	2528
7-m Array time (hours)	0	0	0	0	0	0
Total Power Array time (hours)	0	0	0	0	0	0

Table 3. Number of proposals and Grade A & B projects by proposal type

Proposal Tye	Number Submitted	Number Grade A & B	Acceptance Rate (%)
All	1773	398	22
ACA	332	81	24
ACA Standalone	80	36	45
Large Programs	14	4	29
Polarization	122	32	26
Solar	21	5	24
Solar System	41	9	22
Target of Opportunity	28	20	71
VLBI	17	6	35

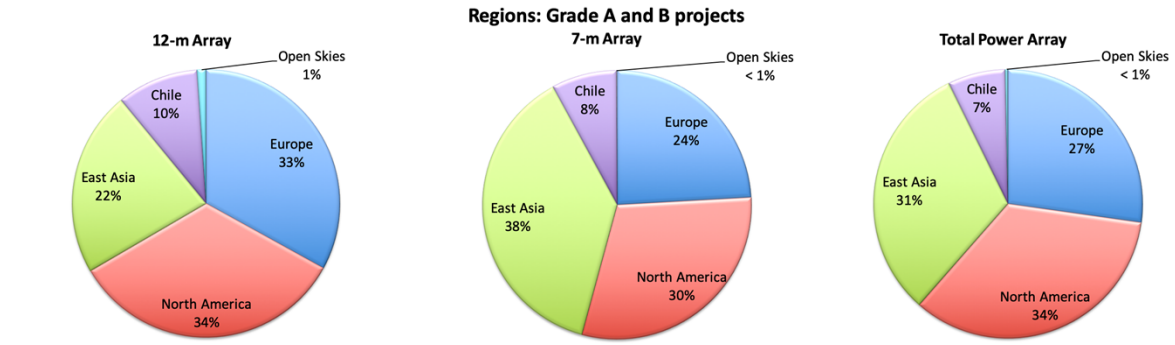

Figure 1. Distribution of the estimated execution time for Grade A and B projects by region for the 12-m (left), 7-m (center), and Total Power (right) arrays. The results for the 7-m and Total Power arrays include both ACA standalone proposals and proposals requesting the 12-m Array + ACA.

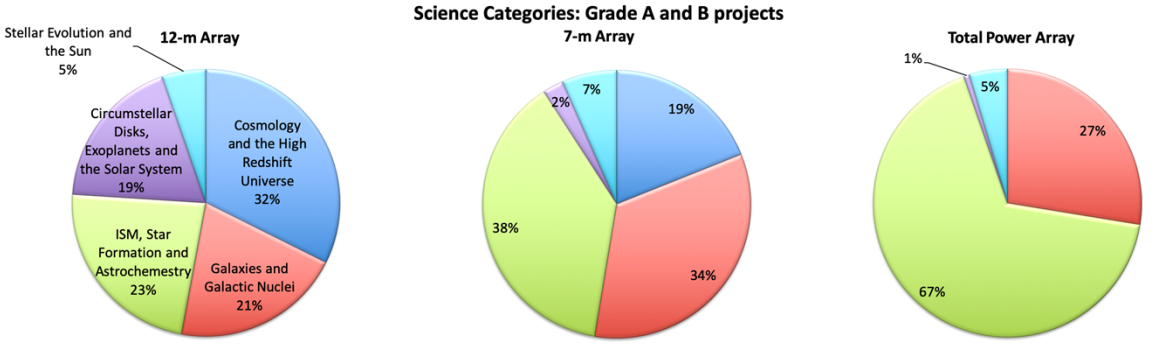

Figure 2. Distribution of the estimated execution time for Grade A and B projects by science category for the 12-m (left), 7-m (center), and Total Power (right) arrays. The results for the 7-m and Total Power arrays include both ACA standalone proposals and proposals requesting the 12-m Array + ACA.

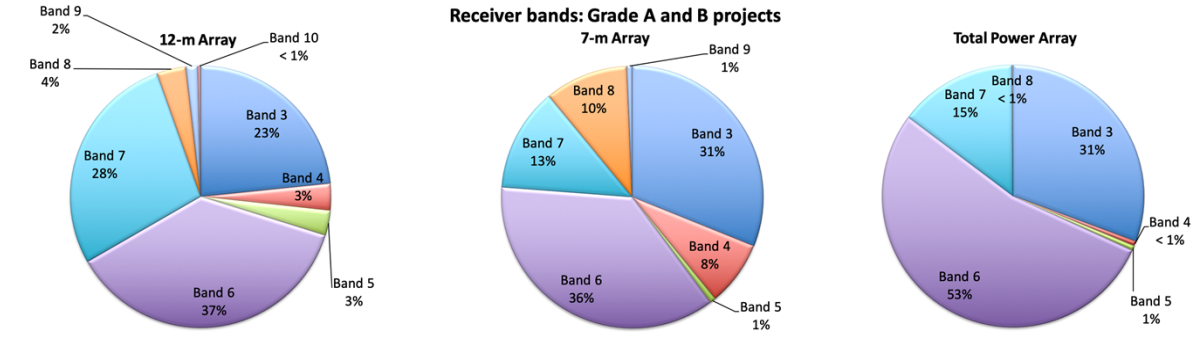

Figure 3. Distribution of the scheduled execution time for Grade A and B projects by receiver band for the 12-m (left), 7-m Array (center), and Total Power (right) arrays. The results for the 7-m and Total Power arrays include both ACA standalone proposals and proposals requesting the 12-m Array + ACA.

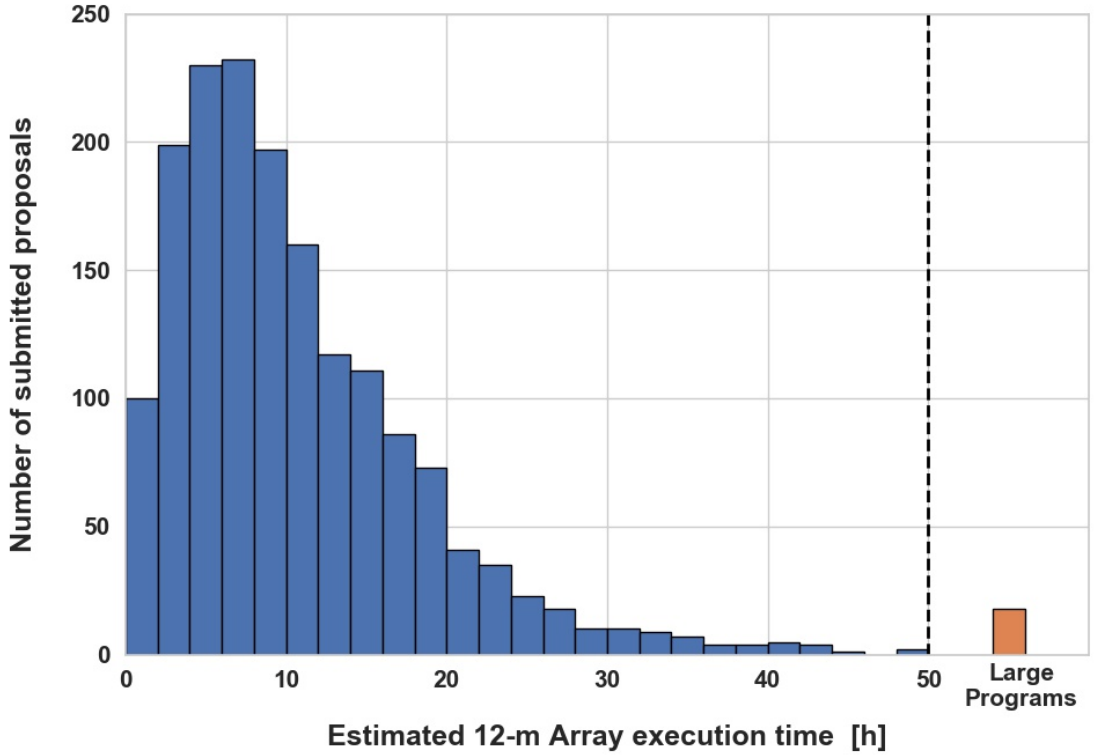

Figure 4. Number of proposals submitted as a function of the estimated 12-m Array execution time.

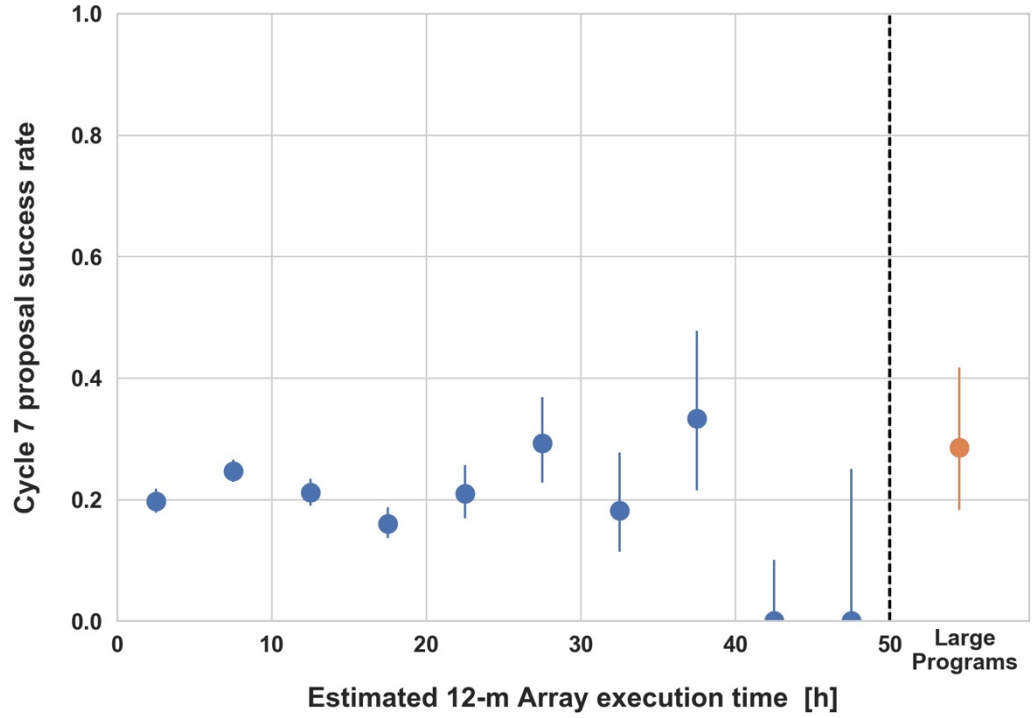

Figure 5. The fraction of proposals (with 1σ confidence intervals) that are assigned priority Grade A and B as a function of the estimated 12-m Array execution time.

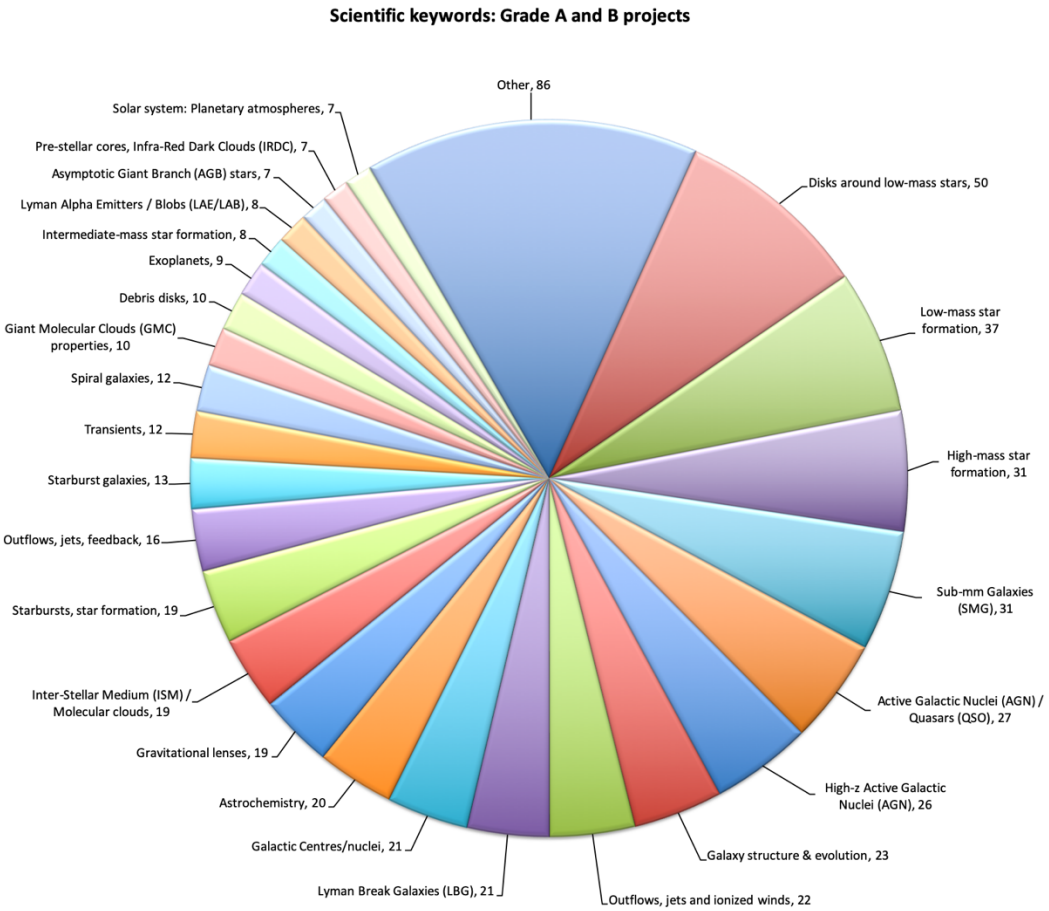

Figure 6. Breakdown of the Grade A and B projects by scientific keyword, across all ALMA scientific categories. For each science keyword, the number of proposals in which it is selected is indicated.

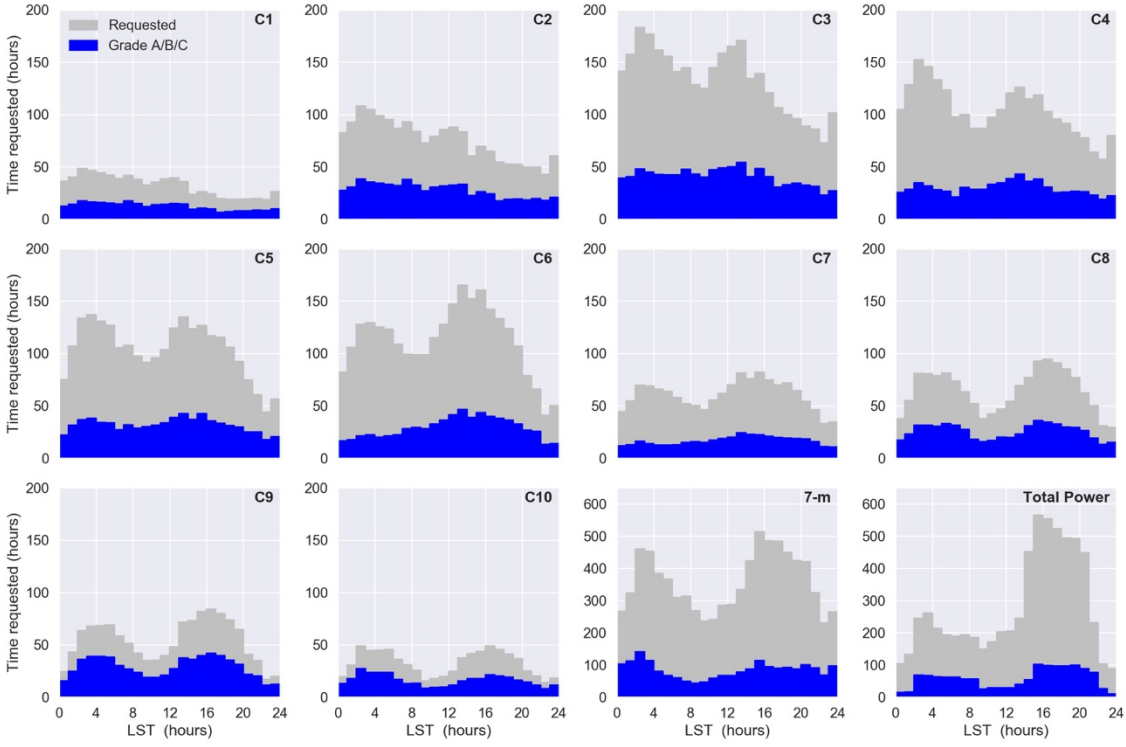

Figure 7. Distribution of estimated execution time for all submitted Cycle 7 proposals (gray) and proposals assigned Grade A, B, or C (blue).

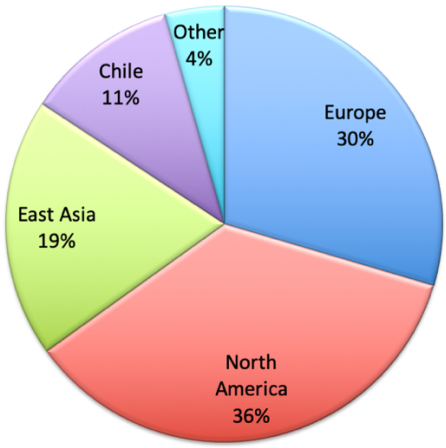

Figure 8. Regional distribution of the Cycle 7 APRC and ARP members

Appendix: Cycle 7 APRC and ARP members

APRC chair:

Masao Saito	National Astronomical Observatory of Japan (Japan)

APRC and ARP members:

Masayuki Akiyama	Tohoku University (Japan)
Megan Ansdell	University of California, Berkeley (USA)
Itziar Aretxaga	Instituto Nacional de Astrofísica (Mexico)
Nobuo Arimoto	National Astronomical Observatory of Japan (USA)
Dana Balser	National Radio Astronomy Observatory (USA)
Amy Barger	University of Wisconsin at Madison (USA)
Cara Battersby	University of Connecticut (USA)
Sara Beck	Tel Aviv University (Israel)
Milena Benedettini	INAF (Italy)
Myriam Benisty	University of Chile (Chile)
Edwin Bergin	University of Michigan at Ann Arbor (USA)
Tilman Birnstiel	University of Munich (Germany)
Geoffrey Blake	California Institute of Technology (USA)
Yann Boehler	Institut de Planetologie et d'Astrophysique de Grenoble (France)
Médéric Boquien	University of Antofagasta (Chile)
Brendan Bowler	University of Texas at Austin (USA)
Martha Boyer	Space Telescope Science Institute (USA)
Drew Brisbin	Universidad Diego Portales (Chile)
Gemma Busquet	Institute of Space Sciences (CSIC)/IEEC (Spain)
Claudio Caceres	University of Andres Bello (Chile)
Gianna Cauzzi	National Solar Observatory (USA)
Laurent Chemin	University of Antofagasta (Chile)
Christine Chen	Space Telescope Science Institute (USA)
Ilse Cleeves	University of Virginia (USA)
Claudio Codella	INAF (Italy)
Luis Colina	Centro de astrobiología (INTA-CSIC) (Spain)

James Condon	National Radio Astronomy Observatory (USA)
Kristen Coppin	University of Hertfordshire (United Kingdom)
Martin Cordiner	National Aeronautics and Space Administration (USA)
Tanio Diaz-Santos	Universidad Diego Portales (Chile)
Anne Dutrey	Bordeaux Observatory (France)
Rolando Dünner Planella	Catolica of Chile, Pontifical University (Chile)
Fumi Egusa	The University of Tokyo (Japan)
Catherine Espaillat	Boston University (USA)
Cristobal Espinoza	Universidad de Santiago de Chile (Chile)
Stefano Facchini	European Southern Observatory (Germany)
Edith Falgarone	Paris Observatory (France)
Gregory Fleishman	New Jersey Institute of Technology (USA)
Francesco Fontani	INAF (Italy)
Jan Forbrich	University of Hertfordshire (United Kingdom)
David Frayer	Green Bank Observatory (USA)
Decker French	Carnegie Institution of Washington (USA)
Rachel Friesen	National Radio Astronomy Observatory (USA)
Kenji Furuya	University of Tsukuba (Japan)
Roberto Galvan-Madrid	National Autonomous University of Mexico (Mexico)
Santiago Garcia-Burillo	Observatorio Astronómico Nacional (Spain)
Adam Ginsburg	National Radio Astronomy Observatory (USA)
Raphael Gobat	Catolica of Valparaiso, Pontificia University (Chile)
Ciriaco Goddi	Radboud University Nijmegen (Netherlands)
Uma Gorti	National Aeronautics and Space Administration (USA)
Jenny Greene	Princeton University (USA)
Pin-Gao Gu	Academia Sinica (Taiwan)
Tetsuo Hasegawa	National Astronomical Observatory of Japan (Japan)
Jennifer Hatchell	University of Exeter (United Kingdom)
Bunyo Hatsukade	The University of Tokyo (Japan)
Saeko Hayashi	National Astronomical Observatory of Japan (Japan)
Christian Henkel	Max-Planck-Institute for Radio Astronomy (Germany)
Rodrigo Herrera-Camus	University of Concepcion (Chile)
Mark Heyer	University of Massachusetts at Amherst (USA)
James Higdon	Georgia Southern University (USA)
Aya Higuchi	RIKEN (Japan)
Hugh Hudson	University of California, Berkeley (USA)
Nuria Huelamo	Centro de astrobiología (INTA-CSIC) (Spain)
Hiroshi Imai	Kagoshima University (Japan)
Nick Indriolo	National Astronomical Observatory of Japan (Japan)
Shigeki Inoue	University of Tsukuba (Japan)
Andrea Isella	Rice University (USA)
Eric Jensen	Swarthmore College (USA)
Doug Johnstone	National Research Council of Canada (Canada)
Paul Kalas	University of California, Berkeley (USA)
Nissim Kanekar	Tata Institute of Fundamental Research (India)

Jihyun Kang	Korea Astronomy and Space Science Institute (South Korea)
Akimasa Kataoka	National Astronomical Observatory of Japan (Japan)
Adam Kobelski	West Virginia University (USA)
Jin Koda	State University of New York at Stony Brook (USA)
Kotaro Kohno	The University of Tokyo (Japan)
Yi-Jehng Kuan	National Taiwan Normal University (Taiwan)
Therese Kucera	National Aeronautics and Space Administration (USA)
Jeong-Eun Lee	Kyung Hee University (South Korea)
Maria Loukitcheva	Bay Area Environmental Research Institute (USA)
Fabien Louvet	University of Chile (Chile)
Hiroyuki Maezawa	Osaka Prefecture University (Japan)
Carlo Felice Manara	ESO (Germany)
Ivan Marti-Vidal	University of Valencia (Spain)
Satoki Matsushita	Academia Sinica (Taiwan)
Mikako Matsuura	Cardiff University (United Kingdom)
Brenda Matthews	National Research Council of Canada (Canada)
Anaelle Maury	CEA Saclay (France)
Walter Max-Moerbeck	University of Chile (Chile)
David Meier	New Mexico Tech (USA)
Francois Menard	Institut de Planetologie et d'Astrophysique de Grenoble (France)
James Miller-Jones	International Centre for Radio Astronomy Research (Australia)
Ivelina Momcheva	Space Telescope Science Institute (USA)
Kana Morokuma	The University of Tokyo (Japan)
Neil Nagar	University of Concepcion (Chile)
Marcel Neeleman	Max-Planck-Institute for Astronomy (Germany)
Nicole Nesvadba	Paris-Sud University (France)
Robert Nikutta	National Optical Astronomy Observatory (USA)
Kristina Nyland	National Radio Astronomy Observatory (USA)
Joana Oliveira	Keele University (United Kingdom)
Johan Olofsson	University of Valparaiso (Chile)
Alain Omont	Astrophysical Institute Paris (France)
Yoko Oya	University of Tokyo (Japan)
Debora Pelliccia	University of California, Davis (USA)
Laura Pentericci	INAF (Italy)
Sebastian Perez	Universidad de Santiago de Chile (Chile)
Celine Peroux	ESO (Germany)
Thushara Pillai	Boston University (USA)
Rene Plume	University of Calgary (Canada)
Linda Podio	INAF (Italy)
Bettina Posselt	Pennsylvania State University (USA)
George Privon	University of Florida (USA)
Miriam Rengel	Max-Planck-Institute for Solar System Research (Germany)
Aki Roberge	National Aeronautics and Space Administration (USA)
Giulia Rodighiero	University of Padova (Italy)

Huub Rottgering	Leiden University (Netherlands)
Monica Rubio	University of Chile (Chile)
Wiphu Rujopakarn	Chulalongkorn University (Thailand)
Amelie Saintonge	University of London (United Kingdom)
Philippe Salome	Paris Observatory (France)
Karin Sandstrom	University of California at San Diego (USA)
Hidetoshi Sano	Nagoya University (Japan)
Anne Sansom	University of Central Lancashire (United Kingdom)
Marc Schartmann	LMU Munich (Germany)
Matthias Schreiber	University of Valparaiso (Chile)
Douglas Scott	University of British Columbia (Canada)
Takashi Shimonishi	Tohoku University (Japan)
John Silverman	The University of Tokyo (Japan)
Renske Smit	University of Cambridge (United Kingdom)
Kazuo Sorai	Hokkaido University (Japan)
Justin Spilker	University of Texas at Austin (USA)
Ian Stephens	Harvard-Smithsonian Center for Astrophysics (USA)
Thaisa Storchi-Bergmann	Federal University of Rio Grande do Sul (Brazil)
Tomoko Suzuki	Tohoku University (Japan)
Carmen Sánchez Contreras	Centro de astrobiología (INTA-CSIC) (Spain)
Kengo Tachihara	Nagoya University (Japan)
Mario Tafalla	National Astronomical Observatory (Spain)
Daniel Tafoya	Chalmers University of Technology (Sweden)
Marco Tazzari	University of Cambridge (United Kingdom)
Grant Tremblay	Harvard Smithsonian Astrophysical Observatory (USA)
Sascha Trippe	Seoul National University (South Korea)
Konrad Tristram	European Southern Observatory (Chile)
Jean Turner	University of California at Los Angeles (USA)
Junko Ueda	National Astronomical Observatory of Japan (Japan)
Francesco Valentino	University of Copenhagen (Denmark)
Bram Venemans	Max-Planck-Institute for Astronomy (Germany)
Aprajita Verma	Oxford University (United Kingdom)
Matias Vidal	University of Chile (Chile)
Joaquin Vieira	University of Illinois at Urbana-Champaign (USA)
Keiichi Wada	Kagoshima University (Japan)
Jeff Wagg	Square Kilometre Array Organisation (United Kingdom)
Tracy Webb	McGill University (Canada)
Stephen White	US Air Force Research Laboratory (USA)
Tommy Wiklind	Catholic University of America (USA)
Jong-Hak Woo	Seoul National University (South Korea)
Mark Wyatt	University of Cambridge (United Kingdom)
Ke Zhang	University of Michigan at Ann Arbor (USA)
Qizhou Zhang	Harvard-Smithsonian Center for Astrophysics (USA)