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Planetary Nebulae: Multi-Wavelength Probes of Stellar and Galactic Evolution

Edited by

Xiaowei Liu

Letizia Stanghellini

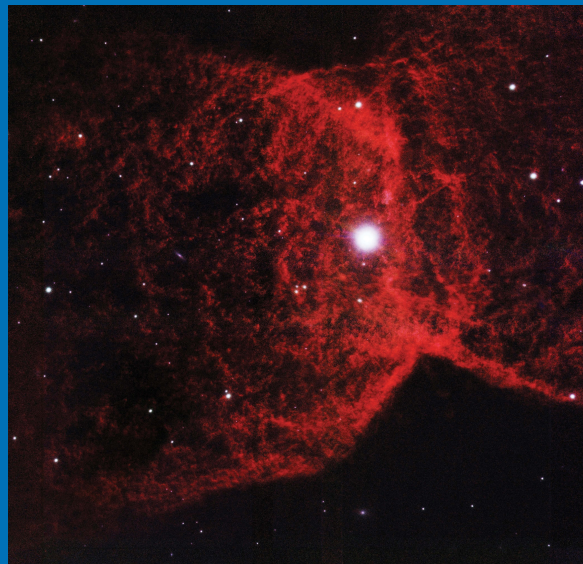
Amanda Karakas

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PLANETARY NEBULAE: MULTI-WAVELENGTH PROBES
OF STELLAR AND GALACTIC EVOLUTION

IAU SYMPOSIUM 323

COVER ILLUSTRATION:

The image of planetary nebula NGC 2346 shows unprecedented resolution of the molecular hydrogen gas. The image is about 1 arc minute on a side: north is up, east is to the left. Image from GeMS/GSAOI Multi-Conjugat Adaptive Optics System, Gemini Observatory/AURA.

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Chief Editor

PIERO BENVENUTI, IAU General Secretary

IAU-UAI Secretariat

98-bis Blvd Arago

F-75014 Paris

France

iau-general.secretary@iap.fr

Editor

MARIA TERESA LAGO, IAU Assistant General Secretary

Universidade do Porto

Centro de Astrofísica

Rua das Estrelas

4150-762 Porto

Portugal

mtlago@astro.up.pt

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**PLANETARY NEBULAE:
MULTI-WAVELENGTH PROBES
OF STELLAR AND GALACTIC
EVOLUTION**

**PROCEEDINGS OF THE 323RD SYMPOSIUM
OF THE INTERNATIONAL ASTRONOMICAL
UNION HELD IN BEIJING, CHINA
OCTOBER 10–14, 2016**

Edited by

XIAOWEI LIU

Peking University Kavli Institute for Astronomy and Astrophysics

LETIZIA STANGHELLINI

National Optical Astronomy Observatory

and

AMANDA KARAKAS

Monash Centre for Astrophysics



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Preface

Planetary nebulae are the spectacular products of low- and intermediate-mass stellar evolution. They are key laboratories for the understanding of atomic, molecular, dust and plasma processes in different astrophysical environments, they probe fundamental physics of single and binary star evolution, including nucleosynthesis, rotation, mass transfer and loss, and magnetic fields, and they trace stellar populations, kinematics and chemistry of galaxies including our own galaxy the Milky Way.

The planetary nebula community, now represented by IAU Commission H3 of Division H, has had a history of very successful IAU symposia, beginning in 1967 with IAU Symp. 34 held in Tatranska Lomnica (Czechoslovakia), followed in 1977 by IAU Symp. 76 in Ithaca, NY (USA), IAU Symp. 103 in London (England) in 1982, IAU Symp. 131 in Mexico City (Mexico) in 1987, IAU Symp. 155 in Innsbruck (Austria) in 1992, IAU Symp. 180 in Groningen (Holland) in 1996, IAU Symp. 209 in Canberra (Australia) in 2001, IAU Symp. 234 in Hawaii (USA) in 2006, and IAU Symp. 283 in Puerto de la Cruz (Spain) in 2011.

Following the endorsement and sponsorship by IAU Divisions and approved by the IAU Executive Committee in April 2015, the latest of this series of IAU Symposia of planetary nebulae, IAU Symposium 323: Planetary nebulae: Multi-wavelength probes of stellar and galactic evolution, was held in Beijing on October 10-14, 2016. This was the first time an IAU symposium on this topic was held in Asia. Over one hundred registered participants from seventeen countries attended the symposium, and interacted and discussed the wide range of topics related to the field. In total 17 invited reviews, 44 contributed talks and 36 posters were presented.

The meeting covers broad themes including new challenges to surveys of planetary nebula, AGB and post-AGB populations in the Milky Way, in the Local Group of galaxies and beyond, planetary nebulae as versatile laboratories for atomic, molecular, dust and plasma physics, stellar nucleosynthesis and chemical enrichment of the interstellar medium, hydrodynamic and radiative modeling of planetary nebulae, single and binary stellar evolution from the asymptotic giant branch to white dwarf stellar phases, magnetic fields, mass loss and mass transfer in binaries and connection to the planetary nebula phenomena, planetary nebulae in nearby galaxies as tracers of galactic dynamics and chemical evolution. In addition, two discussion sessions, each of one hour duration, were held on the topics "Modelling and data" and "Planetary nebulae and forefront instrumentation", moderated by specific SOC members and other scientists who are experts in these areas.

The programme was carefully put together by the Scientific Organizing Committee, consisting of Magda Arnaboldi (Germany), You-Hua Chu (China Taipei), Romano Corradi (Spain), Orsola De Marco (Australia), Adam Frank (U.S.A.), Amanda Karakas (co-chair, Australia), Karen Kwitter (U.S.A.), Sun Kwok (China Nanjing), Xiaowei Liu (co-chair, China Nanjing), Alberto Lopez (Mexico), Arturo Manchado (Spain), Roberto Mendez (U.S.A.), Quentin Parker (Australia), Miriam Pena (Mexico), Letizia Stanghellini (co-chair, U.S.A.), Albert Zijlstra (U.K.). The Committee made an early decision that, in order to help bring in early career speakers, no Committee members were invited to give a review talk. During the symposium, three of the Committee members, Orsola De Marco, Letizia Stanghellini, and Albert Zijlstra volunteered to run a best student poster competition. One first class, two second class and a number of encouragement awards were awarded, with generous prizes provided by the Local Organizing Committee. The activity was well received by all student participants.

The Local Organizing Committee, consisting of Bingqiu Chen, Jianning Fu, Biwei Jiang (co-chair), Stephen Justham (co-chair), Xiaowei Liu (co-chair), Juanjuan Ren, Jieling Yu, Juanjuan Ren and Haibo Yuan provided the local support. The symposium website was built and maintained by Jian Li. Ning Zhang provided indispensable logistic assistance. The symposium was operated by the Overseas Exchange Center of Peking University. The smooth and efficient operation of the symposium was widely and highly praised by the participants. As one of the participants commented afterwards, "Everything was outstanding. From the scientific program to the logistics assistance, the social activities and everything. The meeting was perfect."

Finally, it is a great pleasure to acknowledge the financial support from the International Astronomical Union, National Natural Science Foundation of China, National Astronomical Observatories of Chinese Academy of Sciences, and Peking University. The active involvement of members of the Scientific Organizing Committee, crucial for the success of the meeting, is also acknowledged.

Xiaowei Liu, Letizia Stanghellini, and Amanda Karakas
Co-chairs of Scientific Organizing Committee Beijing,
Rome, and Melbourne, February 2017

The Organizing Committees

Scientific

Magda Arnaboldi (Germany)	You-Hua Chu (China Taipei)
Romano Corradi (Spain)	Orsola De Marco (Australia)
Adam Frank (U.S.A.)	Amanda Karakas (co-chair, Australia)
Karen Kwitter (U.S.A.)	Sun Kwok (China Nanjing)
Xiaowei Liu (co-chair, China Nanjing)	Alberto Lopez (Mexico)
Arturo Manchado (Spain)	Roberto Mendez (U.S.A.)
Quentin Parker (Australia)	Miriam Pena (Mexico)
Letizia Stanghellini (co-chair, U.S.A.)	Albert Zijlstra (U.K.)

Local

Juanjuan Ren	Bingqiu Chen
Jianning Fu	Stephen Justham (co-chair)
Biwei Jiang (co-chair)	Jifeng Liu
Xiaowei Liu (co-chair)	Jieling Yu
Haibo Yuan	

Acknowledgements

The symposium was sponsored and supported by IAU Division H (Interstellar Matter and Local Universe), Division G (Stars and Stellar Physics), Division J (Galaxies and Cosmology), as well as by IAU Commission H3 (Planetary Nebulae).

The Local Organizing Committee operated under the auspices of School of Physics, Peking University.

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National Natural Science Foundation of China,
National Astronomical Observatories of Chinese Academy of Sciences,
Peking University
is gratefully acknowledged.

CONFERENCE PHOTOGRAPH

Part 1. Invited Reviews and Contributed Presentations



1. SOC co-Chair Xiaowei Liu gives the welcome address



2. IAU President, and Planetary Nebula scholar, Silvia Torres-Peimbert delivers a very interesting introductory talk



3. Mike Barlow, SOC Member Arturo Manchado, and others are attentively following an interesting review



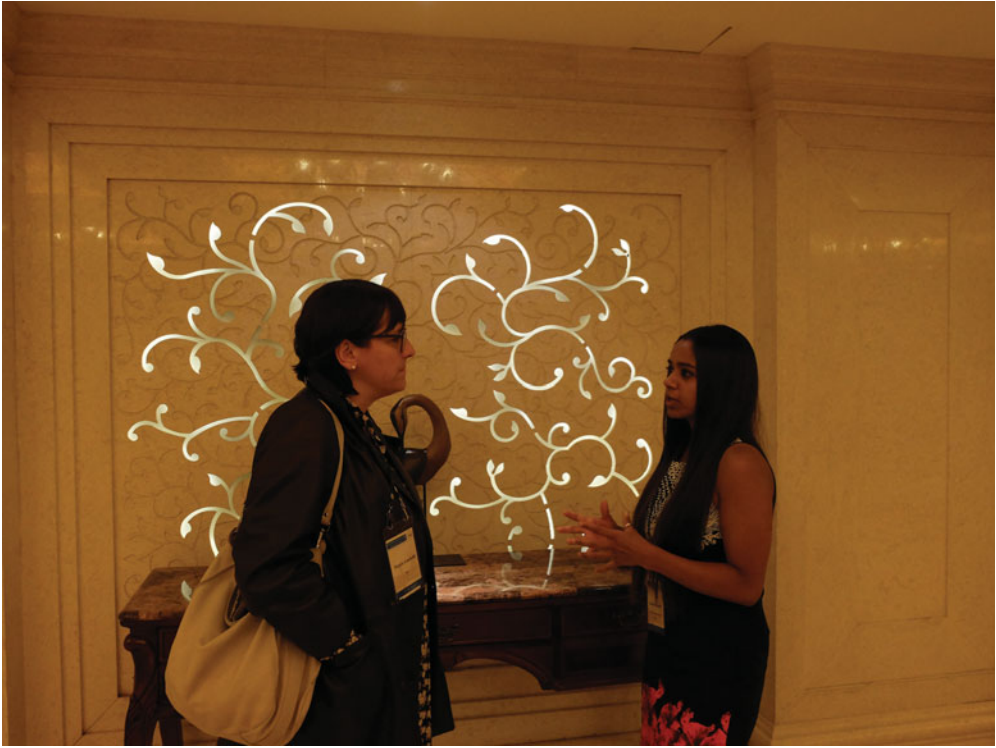
4. Participants discussing science during a break



5. SOC co-Chair Letizia Stanghellini enjoys coffee while discussing science with Invited Speaker Maria Lugaro



6. Astronomers connect with old and new friends and drink coffee

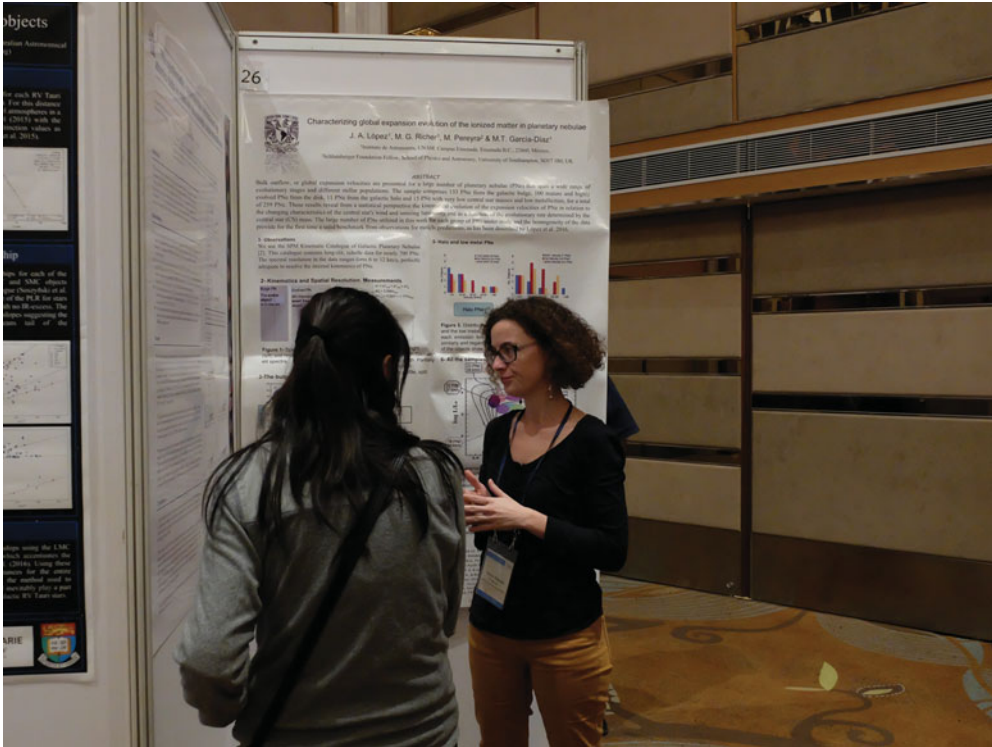


7. SOC Member Magda Arnaboldi and Devika Kamath at the coffee break

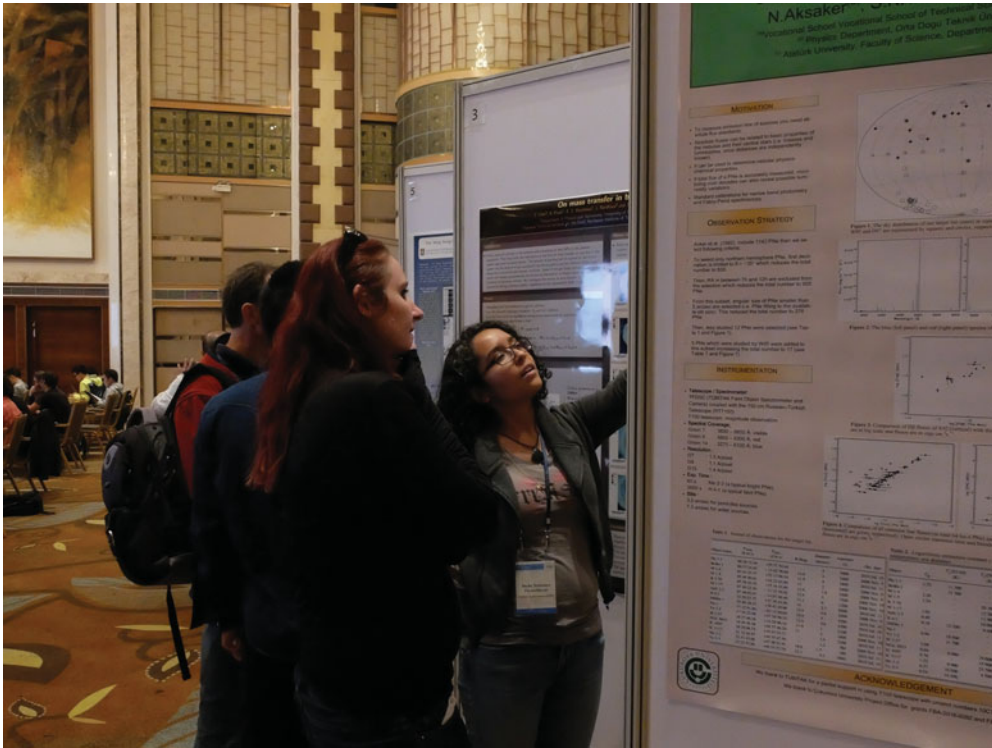


8. Invited speaker Flavia dell'Agli and Jorge Gardia-Rojas enjoying coffee break

Part 2. Poster Presentation



9. Invited speaker Gloria Delgado-Inglada views the posters



10. Poster viewing and science discussion

Participants

First Name	Last Name	Nationality	Gender	Institute	Country	City	Email
Xiaowei Xuan	Liu Fang	China Chinese	M	PKU The University of Hong Kong	China China	Beijing HongKong	x.liu@ pku.edu.cn fangx@ hku.hk
Letizia Orsola	Stanghellini De Marco	Italy Australian	F	NOAO Macquarie University	United States Australia	Tucson Sydney	lstanghellini@ noao.edu orsola.demarco@ mq.edu.au
Quentin	Parker	Australian	M	The University of Hong Kong	China	HongKong	quentinp@ hku.hk
Lizette Nicholas	Guzman Sterling	Mexican USA	F	ESO University of West Georgia	Mexico United States	Salttilo Atlanta	guzmanl@ eso.org nsterlin@ westga.edu
José Jairo	Díaz-Luis	Spanish	M	IAC	Spain	Santa Cruz de Tenerife	jdiaz@ iac.es
Mercedes	Mollá	Spain	F	CIEMAT	Spain	Madrid	mercedes.molla@ ciemat.es
Hans	Van Winckel	Belgian	M	Institute of Astronomy, KU Leuven	Belgium	Leuven	hans.vanwinckel@ ster.kuleuven.be
Mike	Barlow	UK	M	UCL	United Kingdom	London	mjb@ star.ucl.ac.uk
Gloria	Delgado Inglada	Spanish	F	Instituto de Astronomía, UNAM	Mexico	Mexico City	gdelgado@ astro.unam.mx
Jorge	García-Rojas	Spanish	M	Instituto de Astrofísica de Canarias	Spain	La Laguna	astroyorch@ gmail.com
Marcelo	L. Leal Ferreira	Brazilian	M	Leiden Observatory	Netherlands	Leiden	ferreira@ strw.leidenuniv.nl
Nazım	Aksaker	Turkish	M	Çukurova University	Turkey	Adana	naksaker@ cu.edu.tr
Suryashree	Aniyan	Indian	F	Australian National University	Australia	Canberra	suryashree.aniyan@ anu.edu.au
Yong	Zhang	Chinese	M	University of Hong Kong	China	HongKong	zhangy96@ hku.hk
christophe	morisset	french	M	instituto de astronomia - UNAM	Mexico	Mexico City	chris.morisset@ gmail.com
Sun	Kwok	Canada	M	University of Hong Kong	China	Anshan	sunkwok@ hku.hk
Jackeline	Rechy-García	Mexican	F	Instituto de Astronomía UNAM	Mexico	Mexico City	jrechy@ astro.unam.mx
Muthu-mariappan	Chinna-thambi	Indian	M	Indian Institute of Astrophysics	India	Bengaluru	muthu@ iiap.res.in
Sheila Nathanya	Flores Duran	Mexican	F	Instituto de Astronomía UNAM	Mexico	Mexico City	nathanyaster@ gmail.com
Arturo Isabella	Manchado Soeldner-Rembold	Spanish German	M	IAC Max Planck Institute for Extraterrestrial Physics	Spain Germany	Muenchen	amt@ iac.es ism@ mpe.mpg.de
Zhuo	Chen	China	M	University of Rochester	United States	Rochester	zchen25@ ur.rochester.edu
Domingo Anibal	García-Hernandez	Spanish	M	Instituto de Astrofísica de Canarias (IAC)	Spain	Santa Cruz de Tenerife	agarcia@ iac.es
Lodovico Vasiliki Hyosun	Coccatto Fragkou Kim	Italian Greek Korea	M	ESO HKU ASIAA	Germany China Korea, South	Muenchen Anshan Seoul	lcoccatto@ eso.org vfrag@ hku.hk hkim@ asiaa.sinica.edu.tw
Ivan	Bojicic	Serbian	M	The University of Hong Kong	China	HongKong	ibojicic@ hku.hk
Mohammad	Akashi	Israeli	M	Technion, Israel	Israel	Nazareth	akashi@ physics.technion.ac.il

First Name	Last Name	Nationality	Gender	Institute	Country	City	Email
Liliana	Hernández-Martínez	Mexicana	F	ICN-UNAM	Mexico	Mexico City	lilhe.mtz@gmail.com
Helen	Barker	British	F	University of Manchester	United Kingdom	Manchester	helen.barker@postgrad.manchester.ac.uk
Emma Margarita	Pereyra Tamalantes	Mexican	F	University of Southampton	United Kingdom	Southampton	mally@astrosen.unam.mx
Jason	Nordhaus	US	M	Rochester Institute of Technology	United States	Rochester	nordhaus@astro.rit.edu
Laura	Boyle	Irish	F	NUI Galway	Ireland	Galway	l.boyle2@nuigalway.ie
Miriam	Pena Cardenas	chilean	F	Instituto de Astronomia, UNAM	Mexico	Mexico City	miriam@astro.unam.mx
Kyung-Won	Suh	South Korea	M	Chungbuk National University	Korea, South	Seoul	kwsuh@chungbuk.ac.kr
REBECA	GALERA	SPANISH	F	INSTITUTO DE AS-TROFÍSICA DE CANARIAS	Spain	La Laguna	rgr@iac.es
Helge	Todt	German	M	Institute of Physics and Astronomy, University of Potsdam	Germany	Potsdam	htodt@astro.physik.uni-potsdam.de
Flavia	Dell'Agli	Italian	F	INAF - Observatory of Rome	Italy	Rome	flaviadellagli@gmail.com
Romano Luigi Maria	Corradi	italian	M	GRANTECAN	Spain	Santa Cruz de Tenerife	romano.corradi@gtc.iac.es
Magda	Arnaboldi	Italian	F	ESO	Germany	Muenchen	marnabol@eso.org
Carolyn	Doherty	Australian	F		Hungary	Budapest	carolyn.doherty@csfk.mta.hu
Alessia	Longobardi	Italian	F	Max Planck for extraterrestrial Physics (MPE)	Germany	Muenchen	alongobardi@mpe.mpg.de
Nicholas	Walton	Great Britain	M	University of Cambridge	United Kingdom	Cambridge	naw@ast.cam.ac.uk
Johanna Nicole	Hartke Reindl	German	F	ESO	Germany	Muenchen	jhartke@eso.org
Jose Alberto	Lopez	Mexico	M	University of Leicester	United Kingdom	Leicester	nr@le.ac.uk
Bruce	Hrivnak	USA	M	Instituto de Astronomia, UNAM	Mexico	Ensenada	jal@astrosen.unam.mx
Rodolfo	Montez	US	M	Valparaiso University	United States	Chicago	bruce.hrivnak@valpo.edu
Leticia	Juan de Dios	Mexican	F	Smithsonian Astrophysical Observatory	United States	Boston	rmontez@cfa.harvard.edu
Roberto	Mendez	Argentine	M	INAOE	Mexico	Puebla de Zaragoza	leticiajuandedios@gmail.com
Shane	Vickers	Australian	M	Institute for Astronomy	United States	Honolulu	mendez@ifa.hawaii.edu
Albert	Zijlstra	Dutch	M	Macquarie University	Australia	Sydney	shane.vickers@students.mq.edu.au
Masaaki	OTSUKA	JAPAN	M	University of Manchester	United Kingdom	Manchester	a.zijlstra@manchester.ac.uk
Greg	Sloan	USA	M	ASIAA	Japan	Soka	otsuka@asiaa.sinica.edu.tw
Devika	Kamath	Indian	F	Cornell	United States	New York City	sloan@isc.astro.cornell.edu
Marcin	Gladkowski	polish	M	Institute of Astronomy, KU Leuven	Belgium	Leuven	devika@ster.kuleuven.be
Marcelo	Miller Bertolami	Argentine	M	Nicolaus Copernicus Astronomical Center, Polish Academy of Sciences	Poland	Warsaw	seyfert@ncac.torun.pl
Ryszard	Szczerba	Polish	M	CONICET-IALP	Argentina	La Plata	m3b-muadib@hotmail.com
				NCAC	Poland	Torun	szczerba@ncac.torun.pl

First Name	Last Name	Nationality	Gender	Institute	Country	City	Email
Jan	Cami	Belgium	M	The University of Western Ontario / SETI	Canada	London	jcami@uwo.ca
Fabio	Bresolin	Italy	M	University of Hawaii	United States	Honolulu	bresolin@ifa.hawaii.edu
Kentaro	Asano	JAPAN	M	ISAS/JAXA	Japan	Sagamihara	kenasano@ir.isas.jaxa.jp
Diana	Estrella	Mexican	F	UNAM	Mexico	Mexico City	diana.trujillo@correo.nucleares.unam.mx
Bruce	Balick	Balick	M	Univ. Washington	United States	Seattle	balick@uw.edu
Griet	Van de Steene	Belgian	F	Royal Observatory of Belgium	Belgium	Brussels	G.Vandesteene@oma.be
Detlef	Schoenberner	German	M	Leibniz-Institute for Astrophysics Potsdam	Germany	Potsdam	deschoenberner@aip.de
Tim	Gledhill	UK	M	University of Hertfordshire	United Kingdom	Saint Albans	t.gledhill@herts.ac.uk
Martin A Alba	Guerrero Aller	Spain Spanish	M F	IAA Instituto de Física y Astronomía, Universidad de Valparaíso	Spain Chile	Granada Valparaíso	mar@iaa.es alba.aller@ifa.uv.cl
Roger	Wesson	British	M	University College London	United Kingdom	London	rw@nebulousresearch.org
Monica Wendolyn	Blanco Cardenas	Mexican	F	Instituto de Astronomia UNAM	Mexico	Ensenada	mwblanco@astrosen.unam.mx
George	Pagomenos	British	M	The Open University	United Kingdom	Milton Keynes	george.pagomenos@open.ac.uk
YU	WANG	China	M	Fudan University	China	Shanghai	wang_yu@fudan.edu.cn
Vladimir	Escalante	Mexican	M	IRyA	Mexico	Mexico City	v.escalante@crya.unam.mx
Minia	Manteiga Outeiro	Spain	F	Universidad de A Coruna	Spain	A Coruna	minia.manteiga@udc.es
David	Jones	British	M	IAC	Spain	Santa Cruz de Tenerife	djones@iac.es
Harriet	Dinerstein	U.S.A.	F	U. Texas, Austin	United States	Austin	hdinerstein@gmail.com
Paul	Woods	British	M	Nature Astronomy	United Kingdom	London	paul.woods@nature.com
Eva	Villaver	Spanish	F	UAM	Spain	Madrid	villaver.eva@gmail.com
Maria	Lugaro	Italian	F	MTA CSFK	Hungary	Budapest	maria.lugaro@csfk.mta.hu
Jeffrey	Cummings	USA	M	Johns Hopkins University	United States	Baltimore	jcummil9@jhu.edu
Noam	Soker	Israel	M	Technion	Israel	Haifa	soker@physics.technion.ac.il
SILVIA	TORRES-PEIMBERT	MEXICAN	F	IASTRONOMIA, UNIV NACIONAL AUTONOMA MEXICO	Mexico	Mexico City	silvia@astro.unam.mx
Gerardo	Ramos	Mexican	M	Universidad de Guadalajara	Mexico	Guadalajara	gerardo@astro.iam.udg.mx
Yu	Zhang	China	M	Xinjiang Astronomical Observatory	China	Urumqi	zhy@xao.ac.cn
Tao	Chen	Chinese	M	Leiden Observatory	Netherlands	Leiden	chen@strw.leidenuniv.nl
Pedro	Garcia-Lario	Spanish	M	ESA	Spain	Madrid	pedro.garcia.lario@esa.int
Haibo	Yuan	China	M	Beijing Normal University	China	Beijing	yuanhb@bnu.edu.cn
Yang	Huang	China	M	Peking University	China	Beijing	yanghuang@pku.edu.cn
Zhiying	Huo	China	F	NAOC	China	Beijing	zhiyinghuo@bao.ac.cn
Maosheng	Xiang	Chinese	M	NAOC	China	Beijing	msxiang@nao.cas.cn
Lang	Cui	Chinese	M	Xinjiang Astronomical Observatory, CAS	China	Urumqi	cuilang@xao.ac.cn
Hongli	Ma	China	M	Xinjiang Astronomical Observatory, UCAS	China	Urumqi	mahongli@xao.ac.cn
Haifeng	Yang	China	M	Taiyuan University of Science and Technology	China	Taiyuan	hfyang@nao.cas.cn

First Name	Last Name	Nationality	Gender	Institute	Country	City	Email
Zhijia	Tian	Chinese	M	Peking University	China	Beijing	tianzhijia@pku.edu.cn
chun	wang	China	F	Department of Astronomy, Peking University	China	Beijing	wchun@pku.edu.cn
yong	yang	Chinese	M	Beijing Normal University	China	Beijing	yang_yong@mail.bnu.edu.cn
Bingqiu	Chen	Chinese	M	Peking University	China	Beijing	bchen@pku.edu.cn
Huawei	Zhang	Chinese	M	Department of Astronomy, Peking University	China	Beijing	zhanghw@pku.edu.cn
Gaochao	Liu	Chinese	F	Three Gorges university	China	Wuhan	gcliu@nao.cas.cn
Jiawen	Yao	Chinese	M	Beijing Normal University	China	Beijing	201621160012@mail.bnu.edu.cn
David	Frew	Australian	M	HKU	Hongkong	Hongkong	djfrew@hku.hk
Eric	Lagadec	France	M	Observatoire Cote d'Azur	France	Nice	elagadec@oca.eu
Kris On Yan	Chui	Chinese	F	HKU	China	Hongkong	koychui@hku.hk
Meng	Zhang	Chinese	F	Hebei Normal University	China	Shijiazhuang	2479995140@qq.com