

IAU Symposium

359

2-6 March 2020

Bento Gonçalves, Brazil

Proceedings of the International Astronomical Union

Galaxy Evolution and Feedback across Different Environments

Edited by

Thaisa Storchi Bergmann

William Forman

Roderik Overzier

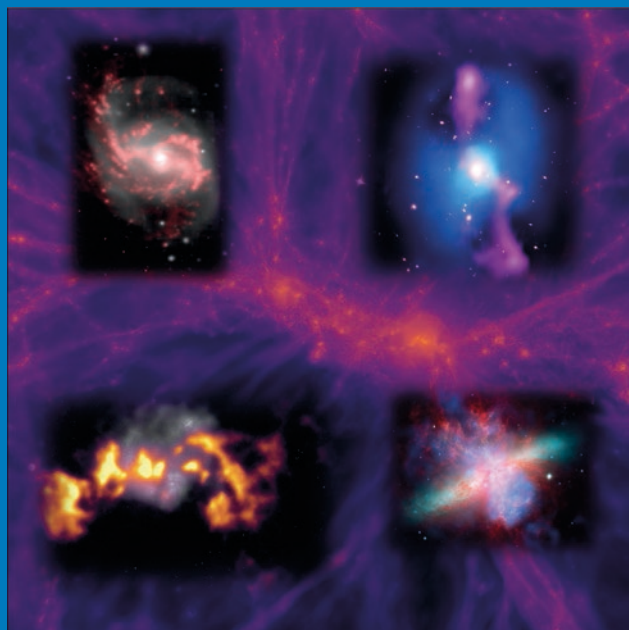
Rogério Riffel

ISSN 1743-9213

International Astronomical Union



CAMBRIDGE
UNIVERSITY PRESS



GALAXY EVOLUTION AND FEEDBACK ACROSS
DIFFERENT ENVIRONMENTS

IAU SYMPOSIUM 359

COVER ILLUSTRATION:

Background: Gas column density in the cosmic web, $z = 2$, comoving 15 Mpc side (credit: Rainer Weinberger, IllustrisTNG Collaboration). From this cosmic web, galaxies and clusters have been formed, as shown with the foreground images, revealing different forms of feedback.

Top left: Jellyfish galaxy JO201 (credit: GASP collaboration, 2019) suffering feedback within a galaxy cluster.

Top right: Composite image of galaxy cluster MS0735.6+7421 showing feedback effects in the X-ray gas (Credit: X-ray: NASA/CXC/Univ. Waterloo/B.McNamara; Optical: NASA/ESA/STScI/Univ. Waterloo/B.McNamara; Radio: NRAO/Ohio Univ./L.Birzan et al., 2006, revised 2018).

Bottom left: HST [OIII] narrow-band image of the QSO J135251+654113 showing the ionized gas extending by 30 kpc (orange) overlaid on a continuum-band image of the host galaxy (grey) (Credit: Storchi-Bergmann et al. 2018, ApJ 868, 14; figure by Fausto Barbosa), revealing Supermassive Black Hole feedback beyond the host galaxy.

Bottom right: Composite image of the Starburst galaxy M82 showing feedback from star formation (Credit: X-ray: NASA/CXC/JHU/D. Strickland; Optical: NASA/ESA/STScI/AURA/The Hubble Heritage Team; Infrared: NASA/JPL-Caltech/Univ. of Arizona/C. Engelbracht).

IAU SYMPOSIUM PROCEEDINGS SERIES

Chief Editor

MARIA TERESA LAGO, IAU General Secretariat

IAU-UAI Secretariat

98-bis Blvd Arago

F-75014 Paris

France

mtlago@astro.up.pt

Editor

JOSÉ MIGUEL RODRÍGUEZ ESPINOSA, IAU Assistant General Secretary

IAU-UAI Secretariat

98-bis Blvd Arago

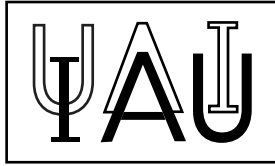
F-75014 Paris

France

IAU_AGS@iap.fr

INTERNATIONAL ASTRONOMICAL UNION
UNION ASTRONOMIQUE INTERNATIONALE

International Astronomical Union



GALAXY EVOLUTION AND FEEDBACK ACROSS DIFFERENT ENVIRONMENTS

PROCEEDINGS OF THE 359th SYMPOSIUM OF
THE INTERNATIONAL ASTRONOMICAL UNION
HELD IN BENTO GONÇALVES, BRAZIL
2–6 MARCH, 2020

Edited by

THAISA STORCHI-BERGMANN

Departamento de Astronomia, Instituto de Física, UFRGS, Brazil

WILLIAM FORMAN

Harvard-Smithsonian Center for Astrophysics, USA

RODERIK OVERZIER

Observatório Nacional, Brazil

and

ROGÉRIO RIFFEL

Departamento de Astronomia, Instituto de Física, UFRGS, Brazil



CAMBRIDGE UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, United Kingdom
1 Liberty Plaza, Floor 20, New York, NY 10006, USA
10 Stamford Road, Oakleigh, Melbourne 3166, Australia

© International Astronomical Union 2021

This book is in copyright. Subject to statutory exception
and to the provisions of relevant collective licensing agreements,
no reproduction of any part may take place without
the written permission of the International Astronomical Union.

First published 2021

Printed in the UK by Bell & Bain, Glasgow, UK

Typeset in System L^AT_EX 2 ϵ

*A catalogue record for this book is available from the British Library Library of Congress
Cataloguing in Publication data*

This journal issue has been printed on FSCTM-certified paper and cover board. FSC is an
independent, non-governmental, not-for-profit organization established to promote the
responsible management of the world's forests. Please see www.fsc.org for information.

ISBN 9781108490689 hardback
ISSN 1743-9213

Table of Contents

Preface	xv
Dedication	xvii
The Organising Committee	xviii
Acknowledgements	xx
Conference Photo	xxiv
List of Participants	xxv

Session 1: Formation and early growth of galaxies and SMBHs

Recent insights into massive galaxy formation from observing structural evolution (Review)	3
<i>Andrew B. Newman</i>	
Models for galaxy and massive black hole formation and early evolution	11
<i>Rainer Weinberger</i>	
Tracing young SMBHs in the dusty distant universe – a Chandra view of DOGs	17
<i>Karín Menéndez-Delmestre, Laurie Riguccini and Ezequiel Treister</i>	
High-redshift starbursts as progenitors of massive galaxies	22
<i>Carlos Gómez-Guijarro</i>	
Variable radio AGN at high redshift identified in the VLA Sky Survey	27
<i>Kristina Nyland, Dillon Dong, Pallavi Patil, Mark Lacy, Amy Kimball, Gregg Hallinan, Sumit Sarbadhicary, Emil Polisensky, Namir Kassim, Wendy Peters, Tracy Clarke, Dipanjan Mukherjee, Sjoert van Velzen and Vivienne Baldassare</i>	
The evolution of star formation in QSOs according to WISE	33
<i>K. A. Cutiva-Alvarez, R. Coziol, J. P. Torres-Papaqui, H. Andernach and A. C. Robleto-Orús</i>	
Feedback from central massive black holes in galaxies using cosmological simulations	35
<i>Paramita Barai</i>	
Substructure in black hole scaling diagrams and implications for the coevolution of black holes and galaxies	37
<i>Benjamin L. Davis, Nandini Sahu and Alister W. Graham</i>	
Classification and photometric redshift estimation of quasars in photometric surveys	40
<i>L. M. Izuti Nakazono, C. Mendes de Oliveira, N. S. T. Hirata, S. Jeram, A. Gonzalez, S. Eikenberry, C. Queiroz, R. Abramo and R. Overzier</i>	

Dark matter content of ETGs and its relation to the local density of galaxies	42
<i>A. Nigoche-Netro, G. Ramos-Larios, R. Díaz, E. de la Fuente, P. Lagos, A. Ruelas-Mayorga, J. Mendez-Abreu and S. N. Kemp</i>	
Cosmological forecasts from photometric measurements of the angular correlation function for the Legacy Survey of Space and Time	46
<i>Diogo H. F. de Souza and Basílio X. Santiago</i>	
Session 2: Cosmic noon	
The role of AGN feedback in the baryon cycle at $z \sim 2$	51
<i>Vincenzo Mainieri</i>	
Quasar black hole masses and accretion rates across cosmic time	57
<i>Michael Brotherton, Jaya Maithil, Adam Myers, Ohad Shemmer, Brandon Matthews, Cooper Dix, Pu Du and Jian-Min Wang</i>	
The merger-driven evolution of massive early-type galaxies	62
<i>Carlo Cannarozzo, Carlo Nipoti, Alessandro Sonnenfeld, Alexie Leauthaud, Song Huang, Benedikt Diemer and Grecco Oyarzún</i>	
GOODS-ALMA: AGNs and the slow downfall of massive star-forming galaxies at $z > 2$	67
<i>Maximilien Franco</i>	
The physics of galaxy evolution with SPICA observations	72
<i>Luigi Spinoglio, Juan A. Fernández-Ontiveros and Sabrina Mordini</i>	
Distant quasar host galaxies and their environments with multi-wavelength 3D spectroscopy	78
<i>Andrey Vayner</i>	
No evidence for quenching in quasars	82
<i>Clare Wethers, Nischal Acharya, Roberto De Propriis, Jari Kotilainen, Malte Schramm and Andreas Schulze</i>	
Session 3: Evolution of galaxies and AGN in high-density environments from high to low redshifts	
High density galaxy environments — the radio view	91
<i>Martin J. Hardcastle</i>	
The effects of outbursts from Supermassive Black Holes: A close look at M87	99
<i>C. Jones and W. Forman</i>	
The role of environment on quenching, star formation and AGN activity	108
<i>Bianca M. Poggianti, Callum Bellhouse, Tirna Deb, Andrea Franchetto, Jacopo Fritz, Koshy George, Marco Gullieuszik, Yara Jaffé, Alessia Moretti, Ancla Mueller, Mario Radovich, Mpati Ramatsoku, Benedetta Vulcani and the rest of the GASP team</i>	

The gas-loss evolution in dwarf spheroidal galaxies: Supernova feedback and environment effects in the case of the local group galaxy Ursa Minor	117
<i>Anderson Caproni and Gustavo Amaral Lanfranchi</i>	
Supermassive Black Hole feedback in early type galaxies	119
<i>W. Forman, C. Jones, A. Bogdan, R. Kraft, E. Churazov, S. Randall, M. Sun, E. O'Sullivan, J. Vrtilek and P. Nulsen</i>	
The light side of proto-cluster galaxies at $z \sim 4$	126
<i>Kei Ito</i>	
Mass outflow of the X-ray emission line gas in NGC 4151	131
<i>S. B. Kraemer, T. J. Turner, D. M. Crenshaw, H. R. Schmitt, M. Revalki and T. C. Fischer</i>	
Cold gas studies of a $z = 2.5$ protocluster	136
<i>Minju M. Lee, Ichi Tanaka and Rohei Kawabe</i>	
The recurrent nuclear activity of Fornax A and its interaction with the cold gas	141
<i>F. M. Maccagni, P. Serra, M. Murgia, F. Govoni, K. Morokuma-Matsui and D. Kleiner</i>	
Diving deeper into jellyfish: The rich population of jellyfish galaxies in Abell 901/2	147
<i>Fernanda Roman de Oliveira, Ana L. Chies-Santos, Fabrício Ferrari and Geferson Lucatelli</i>	
The intriguing case of Was 49b	153
<i>Henrique R. Schmitt, Nathan J. Secrest, Laura Blecha, Barry Rothberg and Jacqueline Fischer</i>	
H_2 content of galaxies inside and around intermediate redshift clusters	158
<i>Damien Spérone-Longin</i>	
Effects of AGN feedback on galaxy downsizing in different environments	163
<i>Amirnezam Amiri, Kastytis Zubovas, Alessandro Marconi, Saeed Tavasoli and Habib G. Khosroshahi</i>	
A systematic search for galaxy proto-cluster cores at $z \sim 2$	166
<i>Makoto Ando, Kazuhiro Shimasaku and Rieko Momose</i>	
Isolated groups of extremely blue dwarf galaxies	168
<i>Vitor Bootz, Marina Trevisan, Trinh Thuan, Yuri Izotov, Angela Krabbe and Oli Dors Jr.</i>	
The environmental effect on galaxy evolution: Cl J1449 + 0856 at $z = 1.99$	170
<i>Rosemary T. Coogan, E. Daddi, R. Gobat, M. T. Sargent et al.</i>	
The co-responsibility of mass and environment in the formation of lenticular galaxies	173
<i>A. Cortesi, L. Coccato, M. L. Buzzo, K. Menéndez-Delmestre, T. Goncalves, C. Mendes de Oliveira, M. Merrifield and M. Arnaboldi</i>	

Cosmic magnetism evolution using cosmological simulations	175
<i>Stela Adduci Faria, Elisabete M. de Gouveia Dal Pino and Paramita Barai</i>	
Propagation of cosmic rays and their secondaries in the intracluster medium	178
<i>Saqib Hussain, Rafael Alves Batista, Elisabete Maria de Gouveia Dal Pino and Klaus Dolag</i>	
AGN feedback and galaxy evolution in nearby galaxy groups using CLoGS	180
<i>Konstantinos Kolokythas and CLoGS team</i>	
Ubiquitous cold and massive filaments in brightest cluster galaxies	182
<i>Valeria Olivares and Philippe Salomé</i>	
Excitation mechanism in the intracluster filaments surrounding the Brightest Cluster Galaxies	185
<i>Fiorella L. Polles</i>	
Investigating the properties of a galaxy group at $z = 0.6$	188
<i>Daniela Hiromi Okido, Cristina Furlanetto, Marina Trevisan and Mônica Tergolina</i>	
Post-starburst galaxies in different environments	190
<i>Rodolfo Spindler, Marina Trevisan and Allan Schnorr-Müller</i>	
Testing the link between mergers and AGN in the Arp 245 system	192
<i>Elismar Löscher and Daniel Ruschel-Dutra</i>	
Nuclear Star Clusters in Coma confirmation of an unusually high nucleation fraction	195
<i>Emilio Zanatta, Ruben Sanchez-Janssen and Ana L. Chies-Santos</i>	
Session 4: Secular evolution and internal processes: Mass quenching, stellar and AGN feedback over different z's	
Establishing the impact of powerful AGN on their host galaxies	203
<i>C. M. Harrison, S. J. Molyneux, J. Scholtz and M. E. Jarvis</i>	
The physical properties and impact of AGN outflows from high to low redshift	212
<i>Giacomo Venturi and Alessandro Marconi</i>	
Kiloparsec-scale jet-driven feedback in AGN probed by highly ionized gas: A MUSE/VLT perspective	221
<i>A. Rodríguez-Ardila and M. A. Fonseca-Faria</i>	
Ionized outflows in local luminous AGN: Density and outflow rate	226
<i>R. Davies, D. Baron, T. Shimizu and H. Netzer</i>	
Outflows & Feedback from Extremely Red Quasars	232
<i>Fred Hamann, Serena Perrotta and Nadia Zakamska</i>	
Feeding and feedback from little monsters: AGN in dwarf galaxies	238
<i>Mar Mezcua</i>	

Taking snapshots of the jet-ISM interplay with ALMA	243
<i>Raffaella Morganti, Tom Oosterloo and Clive N. Tadhunter</i>	
Nuclear ionised outflows in a sample of 30 local galaxies	249
<i>D. Ruschel-Dutra, T. Storchi-Bergmann and A. Schnorr-Müller</i>	
Stellar population synthesis of jellyfish galaxies	255
<i>Gabriel M. Azevedo, Ana L. Chies-Santos, Rogério Riffel, Augusto Lassen, Marina Trevisan, Nicolás Mallmann, Fernanda Oliveira and Jean Gomes</i>	
Searching for Ultra-diffuse galaxies in the low-density environment around NGC 3115	257
<i>Marco Canossa-Gosteinski, Ana L. Chies-Santos, Cristina Furlanetto, Rodrigo F. Freitas and William Schoenell</i>	
Constraining general relativity at $z \sim 0.299$ MUSE Kinematics of SDP.81	260
<i>Carlos R. M. Carneiro, Cristina Furlanetto and Ana L. Chies-Santos</i>	
Ionized gas outflows in the interacting radio galaxy 4C +29.30	262
<i>Guilherme S. Couto, Thaisa Storchi-Bergmann, Aneta Siemiginowska and Rogemar A. Riffel</i>	
Gauging the effect of feedback from QSOs on their host galaxies	265
<i>Bruno Dall’Agnol de Oliveira and Thaisa Storchi-Bergmann</i>	
Feedback from ionised gas outflows in the central kpc of nearby active galaxies	267
<i>Edwin David and Thaisa Storchi-Bergmann</i>	
HST observations of [O III] emission in nearby QSO2s: Physical properties of the outflows	269
<i>Anna Trindade Falcao, S. B. Kraemer, T. C. Fischer, D. M. Crenshaw, M. Revalski and H. R. Schmitt</i>	
The two-phase gas outflow in the Circinus Galaxy	272
<i>M. A. Fonseca-Faria and A. Rodríguez-Ardila</i>	
Outflow signatures in Gemini GMOS-IFU observations of 5 nearby Seyfert 2 galaxies	274
<i>Izabel C. Freitas, Rogemar A. Riffel and Thaisa Storchi-Bergmann</i>	
The role of internal feedback in the evolution of the dwarf spheroidal galaxy Leo II	277
<i>Roberto Hazenfratz, Gustavo A. Lanfranchi and Anderson Caproni</i>	
Effects of supernovae feedback and black hole outflows in the evolution of Dwarf Spheroidal Galaxies	280
<i>Gustavo Amaral Lanfranchi, Anderson Caproni, Jennifer F. Soares and Larissa S. de Oliveira</i>	
On the path toward a universal outflow mechanism in light of NGC 4151 and NGC 1068	283
<i>D. May, J. E. Steiner and R. B. Menezes</i>	

Identifying the extent of AGN outflows using spatially resolved gas kinematics	285
<i>Beena Meena, D. M. Crenshaw, T. C. Fischer, Henrique R. Schmitt, M. Revalski and G. E. Polack</i>	
Mapping the inner kpc of the interacting Seyfert galaxy NGC 2992: Stellar populations and gas kinematics	288
<i>Muryel Guolo-Pereira and Daniel Ruschel-Dutra</i>	
A MUSE study of NGC 7469: Spatially resolved star-formation and AGN-driven outflows	291
<i>A. C. Robleto-Orús, J. P. Torres-Papaqui, A. L. Longinotti, R. A. Ortega-Minakata, S. F. Sánchez, Y. Ascasibar, E. Bellocchi, L. Galbany, M. Chow-Martínez, J. J. Trejo-Alonso, A. Morales-Vargas, F. J. Romero-Cruz, K. A. Cutiva-Alvarez and R. Coziol</i>	
Session 5: Secular evolution and internal processes: Mechanisms for fueling star formation and AGN	
Nature of inflows and outflows in AGNs	297
<i>Keiichi Wada, Yuki Kudoh, Naomichi Yutani and Nozomu Kawakatu</i>	
Feeding and feedback in nuclei of galaxies	307
<i>Anelise Audibert, Françoise Combes, Santiago García-Burillo and Kalliopi Dasyra</i>	
Circum-nuclear molecular disks: Role in AGN fueling and feedback	312
<i>Francoise Combes</i>	
Observations of AGN feeding and feedback on Nuclear, Galactic, and Extragalactic Scales	318
<i>D. Michael Crenshaw, C. L. Gnlika, T. C. Fischer, M. Revalski, B. Meena, F. Martinez, G. E. Polack, C. Machuca, D. Dashtamirova, S. B. Kraemer, H. R. Schmitt, R. A. Riffel and T. Storchi-Bergmann</i>	
Interstellar medium properties and feedback in local AGN with the MAGNUM survey	323
<i>M. Mingozzi, G. Cresci, G. Venturi, A. Marconi and F. Mannucci</i>	
The first AI simulation of a black hole	329
<i>Rodrigo Nemmen, Roberta Duarte and João P. Navarro</i>	
Gas flows in a changing-look AGN	334
<i>Sandra I. Raimundo</i>	
The relation between the environment and nuclear activity in nearby QSOs: Defining a control sample	339
<i>Bruna L. C. Araujo, Thaisa Storchi-Bergmann and Sandro B. Rembold</i>	
The relation between dust amount and galaxy mass across the cosmic time	342
<i>J. H. Barbosa-Santos and G. B. Lima Neto</i>	
Kinematics of the parsec-scale jet of the blazar AO 0235+164	345
<i>Flávio Benevenuto da Silva Junior and Anderson Caproni</i>	

Multiwavelength analysis of OH Megamaser galaxies: The case of IRAS11506-3851	347
<i>Carpes P. Hekatelyne and Thaisa Storchi-Bergmann</i>	
Galactic nuclear off-centerings: the innermost accretion mechanism?	350
<i>Gaia Gaspar, Rubén Díaz, Damían Mast and María P. Agüero</i>	
Modelling the silicate emission features in type 1 AGNs: Dusty torus and disk+outflow models	352
<i>M. Martínez-Paredes and I. Aretxaga</i>	
NIR–IFU observations of the merger remnant NGC 34	355
<i>Juliana C. Motter, Rogério Riffel, Tiago V. Ricci, Natacha Z. Dametto, Luis G. Dahmer-Hahn, Marlon R. Diniz, Rogemar A. Riffel, Miriani G. Pastoriza, Alberto Rodríguez-Ardila, Thaisa Storchi-Bergmann and Daniel Ruschel-Dutra</i>	
Optical properties of CSS/GPS sources	357
<i>Raquel S. Nascimento, Alberto Rodríguez-Ardila, Marcos F. Faria, Murilo Marinello and Luis G. Dahmer-Hahn</i>	
The excitation mechanisms of X-ray oxygen emission-lines	360
<i>Victoria Reynaldi, Matteo Guainazzi, Stefano Bianchi, Ileana Andruchow, Federico García, Iván López and Nicolás Salerno</i>	
The birth of an AGN: NGC 4111	362
<i>Gabriel R. H. Roier and Thaisa Storchi-Bergmann</i>	
Feeding and feedback in the nucleus of NGC 613	364
<i>Patrícia da Silva, J. E. Steiner and R. B. Menezes</i>	
Molecular and ionised gas kinematics in a sample of nearby active galaxies	366
<i>Marina Bianchin, Rogemar A. Riffel, Thaisa Storchi-Bergmann, Rogério Riffel and Astor J. Schonell</i>	
Session 6: The present-day Universe: Spatially resolved studies of stellar and gas content, excitation and metallicity	
The importance of the diffuse ionized gas for interpreting galaxy spectra	371
<i>Natalia Vale Asari and Grażyna Stasińska</i>	
Reconstructing the mass accretion histories of nearby red nuggets with their globular cluster systems	381
<i>Michael A. Beasley, Ryan Leaman, Ignacio Trujillo, Mireia Montes, Alejandro Vazdekis, Núria Salvador Rusiñol, Elham Eftekhari, Anna Ferré-Mateu and Ignacio Martín-Navarro</i>	
Recovering the star formation history of galaxies through spectral fitting: Current challenges	386
<i>Lucimara P. Martins</i>	
From global to local scales in galaxies	391
<i>Sebastian F. Sánchez and Carlos Lopez Cobá</i>	

Radio galaxies with and without emission lines	396
<i>Grażyna Stasińska, Natalia Vale Asari and Dorota Koziel-Wierzbowska</i>	
The DIVING ^{3D} Survey - Deep IFS View of Nuclei of Galaxies	402
<i>J. E. Steiner, R. B. Menezes, T. V. Ricci and DIVING^{3D} team</i>	
Surface Brightness Fluctuations for constraining the chemical enrichment of massive galaxies	407
<i>A. Vazdekis, P. Rodríguez-Beltrán, M. Cerviño, M. Montes, I. Martín-Navarro and M. B. Beasley</i>	
Ionized gas kinematics and luminosity profiles of Low-z Lyman Alpha Blobs . . .	413
<i>María P. Agüero, Rubén Díaz and Mischa Schirmer</i>	
Alternative classification diagrams for AGN-starburst galaxies	415
<i>Catarina P. Aydar, J. E. Steiner and Oli Dors Jr.</i>	
Unveiling the nuclear region of NGC 6868: Mapping the stellar population and ionized gas	418
<i>João P. V. Benedetti, Rogério Riffel, Tiago V. Ricci, João E. Steiner, Rogemar A. Riffel, Miriani G. Pastoriza, Daniel Ruschel-Dutra and Juliana C. Motter</i>	
Recovering the origin of the lenticular galaxy NGC3115 using multi-band photometry	421
<i>Maria Luísa Buzzo, Arianna Cortesi, Ariel Werle and Claudia Mendes de Oliveira</i>	
Direct measures of chemical abundances from stacked spectra of star-forming galaxies: Implications for the mass–metallicity–star formation rate relation . . .	424
<i>Katia Slodkowski Clerici and Natalia Vale Asari</i>	
A panchromatic spatially resolved study of the inner 500 pc of NGC 1052	427
<i>Luis G. Dahmer-Hahn, Rogério Riffel, Tiago V. Ricci, João E. Steiner, Thaisa Storchi-Bergmann, Rogemar A. Riffel, Roberto B. Menezes, Natacha Z. Dametto, Marlon R. Diniz, Juliana C. Motter and Daniel Ruschel-Dutra</i>	
H α plumes or arms associated with the nucleus of NGC 7020	429
<i>H. Dottori, R. Díaz, G. Gimeno, A. Bianchi and G. Gaspar</i>	
Structure and morphology of relic galaxies in the Local Universe	431
<i>Rodrigo F. Freitas, Ana L. Chies-Santos, Cristina Furlanetto and Fabricio Ferrari</i>	
Selection and characterisation of Red Geysers in the MaNGA survey	433
<i>Gabriele S. Ilha, Rogemar Riffel, Sandro B. Rembold and Jáderson S. Schimóia</i>	
Circumnuclear multi-phase gas around nearby AGNs investigated by ALMA	436
<i>Takuma Izumi</i>	

An Extended Emission Line Region around Mrk 1172	438
<i>Augusto Lassen, Rogério Riffel, Ana L. Chies-Santos, Evelyn Johnston, Boris Haeussler, Daniel R. Dutra and Gabriel M. Azevedo</i>	
The Quest for Relics: Massive compact galaxies in the local Universe	441
<i>F. S. Lohmann, A. Schnorr-Müller, M. Trevisan, R. Riffel, N. Mallmann, A. L. Chies-Santos and C. Furlanetto</i>	
Curvature of galaxy brightness profiles	444
<i>Geferson Lucatelli, Fabricio Ferrari, Arianna Cortesi, Ana L. Chies-Santos, Fernanda Roman de Oliveira, Claudia Mendes de Oliveira and Lilianne M. Izuti Nakazono</i>	
Dark matter bar evolution in triaxial spinning haloes	446
<i>Daniel A. Marostica and Rubens E. G. Machado</i>	
The gas distribution and kinematics in the central region of the Seyfert 2 galaxy NGC 1125	448
<i>Johan M. Marques, Rogemar A. Riffel, Thaisa Storchi-Bergmann, Rogério Riffel and Marlon R. Diniz</i>	
First results of the DIVING ^{3D} survey of bright galaxies in the local universe: The mini-DIVING ^{3D} sample	450
<i>R. B. Menezes, J. E. Steiner, T. V. Ricci, Patrícia da Silva and D. M. Nicolazzi</i>	
Gas kinematics and stellar archaeology of the Seyfert galaxy NGC 5643	452
<i>P. H. Cezar, J. E. Steiner and R. B. Menezes</i>	
The DIVING ^{3D} Project: Analysis of the nuclear region of Early-type Galaxies	454
<i>T. V. Ricci, J. E. Steiner and R. B. Menezes</i>	
The radial acceleration relation and its emergent nature	457
<i>Davi C. Rodrigues and Valerio Marra</i>	
Properties of AGN in NIR within the context of the Eigenvector 1	460
<i>D. Dias dos Santos, A. Rodríguez-Ardila and M. Marinello</i>	
Characterizing circumnuclear starbursts in the local universe with the VLA	462
<i>Yiqing Song, Sean T. Linden, Aaron S. Evans, Loreto Barcos-Muñoz and Eric J. Murphy</i>	
Turbulence/outflows perpendicular to low-power jets in Seyfert galaxies	464
<i>Giacomo Venturi, Alessandro Marconi, Matilde Mingozzi, Giovanni Cresci, Stefano Carniani and Filippo Mannucci</i>	
Unveiling the afterlife of galaxies with ultraviolet data	467
<i>Ariel Werle</i>	
Stellar populations and ionised gas in central spheroidal galaxies	469
<i>Vanessa Lorenzoni and Sandro B. Rembold</i>	

Session 7: Discussion - questions and answers

Discussion Session	473
Author Index	491

Preface

The history of IAU Symposium 359 – Galaxy Evolution and Feedback across Different Environments, GALFEED for short, began with a meeting, by the end of 2014, between two of us at the Harvard/Smithsonian CfA: William and Thaisa, who was visiting the CfA. Due to our common interest in Active Galactic Nuclei (AGN) feedback, at that opportunity, we decided to create the IAU Commission X1 – Supermassive Black Holes, Feedback and Galaxy Evolution. And shortly afterwards, we began to discuss the promotion of an IAU Symposium on this topic in the south of Brazil. But these Symposia are very competitive, and the first proposal, focusing on feedback from AGN, did not succeed. There had been too many recent Symposia on this topic. Discussing this fact with our young colleagues from the astronomy group at the Instituto de Física, UFRGS (Universidade Federal do Rio Grande do Sul), Porto Alegre, Brazil, and with their support, we changed the proposal to include the broader topic of galaxy evolution and a strong community outreach component, that led to its selection by the IAU.

Our goal with this Symposium was, thus, to bring together the AGN and galaxy evolution science communities, that usually propose separate Symposia. However, we now know that AGN is a phase occurring in most galaxies that critically influences their evolution. Thus it is important to study the two processes together and to enable researchers, in both topics, to learn from each other. Key questions we have discussed during the Symposium include: How do galaxies acquire their gas and how efficiently is it transformed into stars? How is the SMBH in the galaxy center fuelled to become an AGN? What is the main physical mechanism that quenches star formation? How powerful are the stellar and AGN feedback processes in regulating galaxy evolution? What is the role of the environment on galaxy evolution and AGN triggering?

During our Symposium, the above questions have been discussed in 118 scientific contributions, grouped in six sessions:

(1) The first session addresses the formation and early evolution of galaxies and supermassive black holes via models, simulations and observations, targeting massive galaxies, starburst galaxies and QSOs;

(2) The second session focuses on the epoch of Cosmic Noon, addressing black hole masses, galaxy mergers, star-forming galaxies, distant quasar host galaxies, including the claim that there is no quenching of star formation in quasars;

(3) In the third session we discuss high density environments, from protoclusters, through the effect of black hole outbursts on galaxy clusters, to the effect of the environment on starburst and AGN activity;

(4) The fourth session addresses feedback associated with secular evolution, including the effect of AGN jets and outflows on galaxies, via models and observations, and a discussion of the important role of the adopted gas density on the calculation of outflow power from ionised gas kinematics;

(5) The fifth session concentrates on the fueling of star formation and nuclear activity, including the observation of gas flows with ALMA down to the inner few parsecs around the supermassive black hole and models of the flows in the innermost parsec;

(6) In the sixth session, the primary topic is the state of the present day Universe, via the study of resolved stellar populations of galaxies to derive their star formation history and the investigation of resolved excitation and kinematics of the gas in individual nearby active and non-active galaxies.

The seventh and last session comprises a compilation of 25 specific questions proposed by the participants and discussed on the last day of the Symposium together with the proposed answers given both at the conference or afterwards by the participants.

It was a pleasure to receive the approximately 200 colleagues and students who came to the Symposium in Bento Gonçalves during the week of March 2 to 6 of 2020, making the meeting a success, just before the cancellation of all similar meetings due to the COVID-19 pandemic. We were pleased, in particular, by the enthusiastic participation of Brazilian students and post-docs who helped with the reception of our foreign colleagues as well as with the outreach activities that engaged about 2000 people during the 5 days of the Symposium.



The SOC, from left to right: William Forman, Françoise Combes, Thaisa Storchi-Bergmann, Richard Davies, Roderik Overzier and Keiichi Wada. Missing from the picture: Raffaella Morganti and Sebastian Sanchez.



Welcome address by the Chair.



The audience of the Symposium.

Thaisa Storchi-Bergmann, *Editor and Chair of the SOC*
William Forman, *Co-editor and Co-chair*
Roderik Overzier, *Co-editor and Co-chair*
Rogério Riffel, *Co-editor and Chair of the LOC*

Dedication

We dedicate this volume to the memory of Dr. João Evangelista Steiner, who prematurely passed away on September 10, 2020, by the time we were finishing these Proceedings. As co-chair Roderik Overzier posed, “the great oak of Brazilian Astronomy has fallen, and we will be lost without its shadow”.



Left: João Steiner. **Right - From left to right:** Daniel May, Roberto Menezes, Patricia da Silva, João Steiner, Tiago Ricci, Catarina Aydar, Pedro H. Cezar

João was a Professor of Astrophysics at IAG-USP (Instituto de Astronomia, Geofísica e Ciências Atmosféricas - Universidade de São Paulo) and a member of the Brazilian Academy of Sciences. He was an active astrophysicist who made important scientific contributions in the area of compact stars (in particular cataclysmic variables) and Active Galactic Nuclei. A 1983 paper by him and Jules Halpern, written when both were at the Harvard/Smithsonian Center for Astrophysics, Cambridge, US, is an important reference to this date on the nature of LINER galactic nuclei.

Besides being a productive researcher, and having advised more than 20 students and post-docs, João was restless to promote scientific research not only in astrophysics but also in other areas of knowledge, having been secretary general of the Brazilian Society for the Progress of Science (SBPC), Secretary for the Coordination of Research Units of the Ministry of Science, Technology and Innovation (MCTI), directed the Institute for Advanced Studies of University of São Paulo (IES/USP) and was also director of INPE (Instituto Nacional de Pesquisas Espaciais). João was particularly concerned that Brazilian astrophysics had the necessary infrastructure to be at the forefront of astrophysical research. He coordinated the efforts of modernization of the Pico dos Dias Observatory, the establishment of the National Astrophysics Laboratory (LNA) and played a fundamental role in the Brazilian participation in the Gemini and SOAR observatories consortia. More recently, he had been the lead scientist coordinating the Brazilian participation in the GMT (Giant Magellan Telescope).

João came with his 6 students and post-docs (see figure above) to participate in the Symposium, happily reporting on the results of their recent survey of nearby southern galaxies with the Gemini Multi-Object Integral Field Spectrograph called “Diving 3D”, described along 9 contributions to the present volume. His contributions, guidance and leadership will be missed.

Thaís Storchi-Bergmann, William Forman, Roderik Overzier and Rogério Riffel
The Editors

Editors

Thaisa Storchi-Bergmann
Departamento de Astronomia, Instituto de Física, UFRGS, Brazil

William Forman
Harvard-Smithsonian Center for Astrophysics, USA

Roderik Overzier
Observatório Nacional, Brazil

Rogério Riffel
Departamento de Astronomia, Instituto de Física, UFRGS, Brazil

Organizing Committee

Scientific Organizing Committee

Thaisa Storchi-Bergmann (Chair)	Instituto de Física, UFRGS, Porto Alegre, Brazil
Roderik Overzier (Co-Chair)	Observatório Nacional, Rio de Janeiro, Brazil
William Forman (Co-Chair)	Harvard-Smithsonian CfA, Cambridge, US
Raffaella Morganti (Co-Chair)	ASTRON, Dwingeloo, Netherlands
Francesco Massaro	University of Turin, Italy
Maria Victoria Alonso	IATE, Cordoba, Argentina
Francoise Combes	Paris Observatory, Paris, France
Luis Colina Robledo	Centro de Astrobiología, Madrid, Spain
Richard Davies	MPE, Garching, Germany
Luis Ho	KIAA, Peking University, China
Stefanie Komossa	Max Planck Inst. Radio Ast., Bonn, Germany
Paulina Lira	University of Chile, Santiago, Chile
Alessandro Marconi	University of Florence, Italy
Nicole Nesvadba	Inst. d'Astroph. Spatiale, Orsay, France
Sebastian Sanchez	UNAM, Ciudad de Mexico, Mexico
Keiichi Wada	Kagoshima University, Japan

Local Organizing Committee

Rogério Riffel (Chair)	Instituto de Física, UFRGS, Porto Alegre, Brazil
Ana L. Chies-Santos (Co-Chair)	Instituto de Física, UFRGS, Porto Alegre, Brazil
Cristina Furlanetto (Co-Chair)	Instituto de Física, UFRGS, Porto Alegre, Brazil
Allan Schnorr-Müller (Co-Chair)	Instituto de Física, UFRGS, Porto Alegre, Brazil
Marina Trevisan (Co-Chair)	Instituto de Física, UFRGS, Porto Alegre, Brazil
Carpes Hekatelyne	Instituto de Física, UFRGS, Porto Alegre, Brazil
Juliana Motter	Instituto de Física, UFRGS, Porto Alegre, Brazil
Rogemar Riffel	Universidade Federal de Santa Maria, Brasil
Tiago Ricci	Universidade Federal da Fronteira Sul, Cerro Largo, Brazil
Jaderson Schimoia	Universidade Federal de Santa Maria, Brazil



Members of the LOC - from left to right Rodrigo Flores, Tiago Ricci, Hekatelyne Carpes, Cristina Furlanetto, Juliana Motter, Ana L. Chies-Santos, Eduardo Brock, Marina Trevisan and Jaderson Schimoia (not in the picture: Allan Schnorr-Müller, Rogério Riffel and Rogemar Riffel).

Acknowledgements

IAU 359 was a very special and successful meeting because of the remarkable efforts of many people. First, it gathered a superb cast of scientists from around the world for a superb set of talks. Second, it provided a showcase for South American postdocs and students to present their exciting work. The posters and the flash talks were dramatic and interesting – too many to absorb in too short a time – but the symposium proceedings are now before you! Read, enjoy, and reflect. Third, our public outreach event was the highlight of the season for the young and old of Bento Gonçalves and surrounding towns that packed the lecture hall until it overflowed and waited for over an hour after the public lecture in order to ask questions and have their photos taken with the speakers. It was inspiring to experience the enthusiasm of this audience for astrophysics!

We would like to thank the support from the IAU, SAB (Sociedade Astronômica Brasileira), Instituto Serrapilheira and FAPERGS (RS foundation for research support). We thank also the SOC for the guidance; the LOC for the logistic support, the creation of the “Universe at your feet” sandals, bags and notebooks; the astronomy students from our Physics Institute of Universidade Federal do Rio Grande do Sul (IF-UFRGS) and from other institutes for the support during the sessions and outreach activities; our University UFRGS for its support and the provost of research Rafael Roisler, for his speech in the opening ceremony; our partner Universities Universidade Federal da Fronteira Sul and Universidade Federal de Santa Maria for their support and the town of Bento Gonçalves, represented in the opening ceremony by the Secretary of Tourism, Rodrigo Parisotto, who welcomed the participants.



Thanks to the students, for their support throughout all activities.

The partnership with the town administration allowed us to use the space Casa das Artes, adjacent to the hotel, to develop our many educational and outreach activities, under the leadership of the director of the UFRGS Planetarium Daniela Pavani. We thank

her and her team for the promoted activities for young school students during the days, and for the general public and high school students during the nights.



Kids waiting for the Planetarium session.



Audience of the nighttime outreach talks.



About 2,000 people attended these activities that included shows in an inflatable Planetarium, nighttime observations and talks by renowned international participants of the Symposium.

A word from Henrique Roberto Schmitt, Thaisa's first PhD student

In the name of Thaisa's students, I would like to point out that this symposium also marks a major point in Dr. Thaisa Storchi-Bergmann's career. After a long tenure as a professor at the Astronomy Department at UFRGS, Thaisa is retiring from teaching and administrative duties, which will allow her to dedicate more time to research and other interests. We would like to congratulate her on this major achievement, as well as on her highly accomplished professional career, spanning more than three decades, with seminal contributions to several areas of extragalactic astrophysics. Furthermore, her current and

former students and post-docs would like to thank her for the guidance, friendship and encouragement that she provided through the different stages of their careers. Thanks to her energetic and gregarious nature, they were brought into a vibrant group, pursuing leading edge research in her many areas of interest. By incorporating these students into the daily activities of the group, not only were they taught the basics of the field, and guided on how to navigate the arduous and sometimes convoluted process of obtaining a degree, they were also encouraged to pursue their own interests and explore their own ideas. This independence was essential, not only for the professional development of the students and their future careers, but also for the overall success of the group, keeping it in the forefront of the field, with collaborations throughout the globe.



Special thanks to (from left to right): Daniela Pavani for coordinating the outreach activities; Grazyna Stasinska, Christopher Harrison and Christine Jones, for giving the nighttime talks.



Thaisa's present and former students and post-docs. **Left:** top, from left to right, Bruna Arajo, Natalie Schreiber, Henrique Schmitt, Jaderson Shimoia, [Thaisa], Gabriel Roier, Cristina Furlanetto, Julio Cesar, Hekatelyne Carpes, Daniel Ruschel Dutra, Oli Dors Jr.. Bottom: Edwin David, Bruno Dall'Agnol de Oliveira, Guilherme Couto. **Right:** Thaisa with former student Rodrigo Nemmen

A word from the Chair

Being in a phase of my career when I am retiring from teaching and administrative duties at the University, I would like to use this opportunity to thank all the participants and in particular my students, post-docs, my PhD advisor, Miriani Pastoriza, my colleagues

and collaborators, from whom I learned so much during the years we worked together. Special thanks go to my former students Henrique Schmitt and Rodrigo Nemmen for their kind words during the Symposium. I also use this opportunity to pay tribute to Astronomy and the Universe with the following poem. My cousin Roberto Niederauer has composed a melody to go with it and played it at the Symposium. The song is available on Youtube:

<https://www.youtube.com/watch?v=I-5j6Nb-3mg>.

The Universe Song

*When you look far, you see our Universe's past
Took shape at the Big Bang,
Then the first atoms began to circulate, away
And where they stayed, galaxies they created
Inside all galaxies, stars took form and Black Holes were born
Inside the stars, new heavier elements were forged
Then Supernovae and Black Holes
Spread the elements around the Universe
And where they stayed, new stars they created
And from star dust, this rich star dust, planets formed around
And in one planet, a little blue planet we were born,
We were finally born.*



Roberto Niederauer and Thaisa: the authors of the Universe song

Thaisa Storchi-Bergmann
Chair of the SOC

CONFERENCE PHOTOGRAPH



List of Participants

Name & Organization	Email
Adam Thomas , Australian National University, Australia	adam.thomas@anu.edu.au
Aitor Carlos Robleto Orús , Universidad de Guanajuato, Mexico	arobleto@astro.ugto.mx
Alberto Nigoche-Netro , Universidad de Guadalajara, Mexico	anigoche@gmail.com
Alberto Rodríguez-Ardila , Laboratório Nacional de Astrofísica, Brazil	aardila@lna.br
Alessandro Marconi , Physics & Astronomy Dept., University of Florence, Italy	alessandro.marconi@unifi.it
Alexandre Vazdekis , Instituto de Astrofísica de Canarias, Spain	vazdekis@iac.es
Allan Schnorr Müller , Universidade Federal do Rio Grande do Sul, Brazil	allanschnorr@gmail.com
Amirnezam Amiri , University of Florence (UniFi) & Institute for research in fundamental (IPM), Italy and IRAN	amirnezamamiri@gmail.com
Ana Carolina Pichel , IAFE, Argentina	ana.pichel@gmail.com
Ana L. Chies-Santos , Universidade Federal do Rio Grande do Sul, Brazil	ana.chies@ufrgs.br
Anderson Caproni , NAT - Universidade Cidade de São Paulo, Brazil	anderson.caproni@cruzeirosul.edu.br
André Luiz de Amorim , UFSC, Brazil	andre@astro.ufsc.br
Andrew Newman , Carnegie Observatories, USA	anewman@carnegiescience.edu
Andrey Vayner , Johns Hopkins University, USA	avayner1@jhu.edu
Anelise Audibert , National Observatory of Athens, Greece	anelise.audibert@obspm.fr
Anna D. Kapinska , NRAO, USA	akapinska@nrao.edu
Anna Luiza Trindade Falcao , The Catholic University of America, USA	anna.trindade04@gmail.com
Annagrazia Puglisi , CEA Saclay, Durham University, United Kingdom	anna.gp27@gmail.com
Ariane Trudeau , University of Victoria, Canada	ariane.trudeau@videotron.ca
Arianna Cortesi , Observatorio do Valongo, Brazil	aricorte@gmail.com
Ariel Werle , IAG - USP, Brazil	ariel.werle@gmail.com
Artemi Camps Fariña , Instituto de Astronomía, UNAM, Mexico	acamps@astro.unam.mx
Augusto Lassen , Universidade Federal do Rio Grande do Sul - UFRGS, Brazil	augusto.lassen@gmail.com
Beena Meena , Georgia State University, USA	bmeena@astro.gsu.edu
Benjamin Lee Davis , Swinburne University of Technology, Australia	benjamindavis@swin.edu.au
Bianca Poggianti , INAF-OAPd, Italy	bianca.poggianti@inaf.it
Bruna Lorrany de Castro Araujo , Universidade Federal do Piauí, Brazil	araujo.brunalc@gmail.com
Bruno Dall'Agnol de Oliveira , Universidade Federal do Rio Grande do Sul, Brazil	bruno.ddeo@gmail.com
Bruno Rodríguez Del Pino , Centro de Astrobiología, CSIC-INTA, Spain	brodriguez@cab.inta-csic.es
Carlo Cannarozzo , Alma Mater Studiorum Università di Bologna - Dipartimento di Fisica e Astronomia, Italy	carlo.cannarozzo3@unibo.it
Carlos Gomez-Guijarro , CEA Saclay, France	carlos.gomezguijarro@cea.fr
Carlos López-Cobá , Instituto de Astronomía - Universidad Nacional Autónoma de México, Mexico	clopez@astro.unam.mx
Carlos Roberto de Melo Carneiro , Universidade Federal do Rio Grande do Sul, Brazil	carlos.melo@ufrgs.br

Name & Organization	Email
Carolina Queiroz de Abreu Silva , Instituto de Física, Universidade de São Paulo, Brazil	cqueiroz@if.usp.br
Catarina Pasta Aydar , Universidade de São Paulo, Brazil	catarina.aydar@gmail.com
César Augusto Caretta , Universidad de Guanajuato, Mexico	caretta@astro.ugto.mx
Chris Harrison , Newcastle University, United Kingdom	c.m.harrison@mail.com
Christine Jones , Harvard-Smithsonian Center for Astrophysics, USA	cjones@cfa.harvard.edu
Clare Wethers , University of Turku (FINCA), Finland	clare.wethers@utu.fi
Cody Carr , University of Minnesota, USA	CodyCarr24@gmail.com
Cristina Furlanetto , Universidade Federal do Rio Grande do Sul, Brazil	cristina.furlanetto@ufrgs.br
Cristina Ramos Almeida , Instituto de Astrofísica de Canarias, Spain	cra@iac.es
Damien Spérone-Longin , LASTRO - EPFL, Switzerland	damien.sperone-longin@epfl.ch
Daniel Alberto Marostica , Universidade Tecnológica Federal do Paraná, Brazil	danielmarostica@live.com
Daniel May Nicolazzi , IAG-USP, Brazil	dmay.astro@gmail.com
Daniel Michael Crenshaw , Georgia State University, USA	crenshaw@astro.gsu.edu
Daniel Ruschel Dutra , Universidade Federal de Santa Catarina, Brazil	daniel@astro.ufsc.br
Daniela Borges Pavani , Universidade Federal do Rio Grande do Sul, Brazil	dpavani@if.ufrgs.br
Daniela Hiromi Okido , Universidade Federal do Rio Grande do Sul, Brazil	dhiromiokido@gmail.com
Darshan Kakkad , European Southern Observatory, Chile	dkakkad@eso.org
Davi Cabral Rodrigues , Universidade Federal do Espírito Santo, Brazil	davi.rodrigues@cosmo-ufes.org
David Williamson , University of Southampton, United Kingdom	d.j.williamson@soton.ac.uk
Denimara Dias dos Santos , National Institute for Space Research (INPE), Brazil	denimaradds@id.uff.br
Diogo Henrique Francis de Souza , Universidade Federal do Rio Grande do Sul, Brazil	diogo.henrique@ufrgs.br
Dominika Wylezalek , ESO, Germany	dwylezal@eso.org
Eduardo Alberto Duarte Lacerda , Instituto de Astronomía - Universidad Nacional Autónoma de México, México	lacerda@astro.unam.mx
Eduardo Telles , Observatorio Nacional, Brazil	etelles@on.br
Edwin Gouveia David , Universidade Federal do Rio Grande do Sul, Brazil	edwin.godavid@gmail.com
Elismar Lösch , Universidade Federal de Santa Catarina, Brazil	elismar@astro.ufsc.br
Emilio Zanatta , Universidade Federal do Rio Grande do Sul, Brazil	emiliojbanatta@gmail.com
Fabio Cafardo , IAG - USP, Brazil	fabio.cafardo@usp.br
Felícia Palacios , Universidade Federal do Rio Grande do Sul, Brazil	felicia.palacios@gmail.com
Felipe Schmidt Lohmann , Universidade Federal do Rio Grande do Sul, Brazil	felipeslohmman@gmail.com
Fernanda Roman Oliveira , Universidade Federal do Rio Grande do Sul, Brazil	fernanda.oliveira@ufrgs.br
Filippo Maccagni , INAF - OAC, Italy	filippo.maccagni@inaf.it
Fiorella Lucia Polles , Observatoire de Paris, France	fiorella.polles@obspm.fr
Flávio Benevenuto da Silva Junior , NAT-UNICSUL, Brazil	flavio.ben@outlook.com

Name & Organization	Email
Francoise Combes , Observatoire de Paris, France	francoise.combes@obspm.fr
Frederick Hamann , University of California, USA	fhamann@ucr.edu
Gabriel Maciel Azevedo , Universidade Federal do Rio Grande do Sul, Brazil	gabriel.maciell.azevedo@gmail.com
Gabriel Roberto Hauschild Roier , Universidade Federal do Rio Grande do Sul, Brazil	gabrielrroier@gmail.com
Gabriele Ilha , Universidade Federal de Santa Maria, Brazil	gabrieleilha1994@gmail.com
Gaia Gaspar , Observatorio Astronomico de Cordoba, Argentina	gaiagaspar@gmail.com
Giacomo Venturi , Pontificia Universidad Católica de Chile, Instituto de Astrofísica, Chile	gventuri@astro.puc.cl
Grazyna Stasinska , Observatoire de Paris, France	grazyna.stasinska@obspm.fr
Guilherme Couto , Universidad de Antofagasta, Chile	guilherme.couto@uamail.cl
Gustavo A. Lanfranchi , NAT - Universidade Cidade de São Paulo/Universidade Cruzeiro do Sul, Brazil	gustavo.lanfranchi@cruzeirosul.edu.br
Gustavo Soares , IAG-USP, Brazil	gustavo.9891@gmail.com
Carpes Hekatelyste , Universidade Federal do Rio Grande do Sul, Brazil	hekatelyste.carpes@gmail.com
Henrique Schmitt , Naval Research Laboratory, USA	henrique.schmitt@nrl.navy.mil
Horacio Dottori , Universidade Federal do Rio Grande do Sul, Brazil	hdottori@gmail.com
Ilaria Pagotto , Leibniz-Institut für Astrophysik Potsdam, Germany	ilaria.pagotto@gmail.com
Itziar Aretxaga , INAOE, Mexico	itziar@inaoep.mx
Ivan Almeida , IAG-USP, Brazil	ivan.almeida@usp.br
Izabel Cristina Freitas dos Santos , Universidade Federal de Santa Maria, Brazil	izabelfisica@gmail.com
Jaderson da Silva Schimoia , Universidade Federal de Santa Maria, Brazil	jaderfisico@gmail.com
Jari Kotilainen , University of Turku, Finland	jarkot@utu.fi
Jason K. Chu , Gemini Observatory, USA	jchu@gemini.edu
João Evangelista Steiner , Universidade de São Paulo, Brazil	joao.steiner@iag.usp.br
João Pedro Verardo Benedetti , Universidade Federal do Rio Grande do Sul, Brazil	jpvbene@gmail.com
Johan Matheus Marques , Universidade Federal de Santa Maria, Brazil	johanmatheusmarques@gmail.com
Jonathan Cohn , Texas A&M University, USA	joncohn@tamu.edu
Jorge Moreno , Pomona College & Harvard CfA, USA	jorge.moreno@pomona.edu
Juliana Cristina Motter , Universidade Federal do Rio Grande do Sul, Brazil	jujuemotter@gmail.com
Júlio César Matte Figueiró , Universidade Federal do Rio Grande do Sul, Brazil	jcmf1998@outlook.com
Jullian Henrique Barbosa dos Santos , Universidade de São Paulo, Brazil	jullian.santos@usp.br
Karin Menendez-Delmestre , Valongo Observatory, Federal University of Rio de Janeiro, Brazil	kmd@astro.ufrj.br
Karla Alejandra Cutiva Alvarez , Universidad de Guanajuato, Mexico	kacutivaa@unal.edu.co
Katia Slodkowski Clerici , Universidade Federal de Santa Catarina, Brazil	clericikatia@gmail.com
Kei Ito , NAOJ/SOKENDAI, Japan	kei.ito@nao.ac.jp
Keiichi Wada , Kagoshima University, Japan	wada@astrophysics.jp
Kelen Tonet , Universidade Federal do Rio Grande do Sul, Brazil	kelenkaty@gmail.com
Kirsty May Butler , Sterrewacht Leiden, Netherlands	butler@strw.leidenuniv.nl
Konrad Tristram , European Southern Observatory, Chile	konrad.tristram@eso.org

Name & Organization	Email
Konstantinos Kolokythas , Centre for Space Research, North-West University, South Africa	K.Kolok@nwu.ac.za
Kristina Nyland , NRC fellow, resident at NRL, United States	knyland@nrao.edu
Kshama Sara Kurian , European Southern Observatory, Germany	kshama.sara@gmail.com
Lilianne Mariko Izuti Nakazono , Universidade de São Paulo, Brazil	lilianne.nakazono@usp.br
Lucimara Pires Martins , Universidade Cruzeiro do Sul, Brazil	lucimara.martins@cruzeirosul.edu.br
Luidhy Santana da Silva , Federal University of Rio de Janeiro/Valongo, Brazil	luidhy@astro.ufrj.br
Luigi Spinoglio , Instituto di Astrofisica e Planetologia Spaziali - INAF, Italy	luigi.spinoglio@inaf.it
Luis Gabriel Dahmer Hahn , Laboratório Nacional de Astrofísica, Brazil	luisgdh@gmail.com
Lyndsay Old , European Space Agency (ESA), France	lyndsay.old@esa.int
Makoto Ando , The University of Tokyo, Japan	mando@astron.s.u-tokyo.ac.jp
Mar Mezcua , Institute of Space Sciences, Spain	marmezcua.astro@gmail.com
Marcela Yasmín González Paillalef , Universidad de Concepción, Chile	marcegonzalezp@udec.cl
Marco Antonio Canossa Gosteinski , Universidade Federal do Rio Grande do Sul, Brazil	canossa.marco@gmail.com
Marcos Fonseca Faria , Instituto Nacional de Pesquisas Espaciais, Brazil	marcos.faria@inpe.br
Maria Luisa Gomes Buzzo , Universidade de São Paulo, Brazil	luisa.buzzo@gmail.com
Maria Paz Agüero , Cordoba Observatory, Argentina	mpaguero@unc.edu.ar
Mariela Martinez Paredes , Korea Astronomy and Space Science Institute, South Korea	mariellauriga@gmail.com
Marina Bianchin , Universidade Federal de Santa Maria, Brazil	marinabianchin17@gmail.com
Marina Dal Ponte , Universidade Federal do Rio Grande do Sul, Brazil	mari.dalponete@gmail.com
Marina Trevisan , Universidade Federal do Rio Grande do Sul, Brazil	marina.trevisan@gmail.com
Martin Hardcastle , University of Hertfordshire, United Kingdom	m.j.hardcastle@herts.ac.uk
Marzena Sniegowska , Nicolaus Copernicus Astronomical Center Polish Academy of Sciences, Poland	msniegowska@camk.edu.pl
Matilde Mingozi , Astronomical Observatory of Padova, Italy	matilde.mingozi@inaf.it
Maximilien Franco , University of Hertfordshire, United Kingdom	m.franco@herts.ac.uk
Michael Beasley , Instituto de Astrofísica de Canarias, Spain	beasley@iac.es
Michael Brotherton , University of Wyoming, USA	mbrother@uwyo.edu
Minju Lee , Max Planck Institute for Extraterrestrial Physics, Germany	minju@mpe.mpg.de
Miriani G. Pastoriza , Universidade Federal do Rio Grande do Sul, Brazil	miriani.pastoriza@gmail.com
Mônica Tergolina , Universidade Federal do Rio Grande do Sul, Brazil	monica.tergolina@ufrgs.br
Montserrat Villar Martin , Centro de Astrobiología, Spain	villarmm@cab.inta-csic.es
Muryel Guolo Pereira , University of Santa Catarina, Brazil	muryel@astro.ufsc.br

Name & Organization	Email
Natacha Zanon Dametto , Universidad de Antofagasta, Chile	natacha.dametto@uamail.cl
Natalia Vale Asari , Universidade Federal de Santa Catarina, Brazil	natalia@astro.ufsc.br
Natalie Nicole Schreiber Bensley , Universidade Federal do Rio Grande do Sul, Brazil	nataliemaggori@gmail.com
Nicolás Dullius Mallmann , Universidade Federal do Rio Grande do Sul, Brazil	nicolas.mallmann@ufrgs.br
Nicolas Peschken , University Nicolaus Copernicus, Poland	npeschken@umk.pl
Oli Luiz Dors Junior , Universidadada do Vale do Paraiba, Brazil	olidors@univap.br
Pablo G. Pérez-González , Centro de Astrobiología (CAB/CSICINTA), Spain	pgperez@cab.inta-csic.es
Paramita Barai , Universidade Cruzeiro do Sul, Brazil	paramita.barai@iag.usp.br
Patrícia da Silva , Universidade de São Paulo, Brazil	p.silva2201@gmail.com
Pedro Henrique Cezar Remião de Macedo , Universidade de São Paulo, Brazil	pedrocezar@usp.br
Peter Laursen , Institute of theoretical astrophysics, University of Oslo, Norway	pela@astro.uio.no
Rafael S. de Souza , Shanghai Astronomical Observatory, China	drsouza@ad.unc.edu
Raffaella Morganti , ASTRON/Kapteyn Institute, The Netherlands	morganti@astron.nl
Rainer Simon Weinberger , Center for Astrophysics — Harvard & Smithsonian, USA	rainerweinberger@googlemail.com
Raniere de Menezes , Universidade de São Paulo, Brazil	raniere.m.menezes@gmail.com
Raquel Santiago Nascimento , Laboratório Nacional de Astrofísica, Brazil	rnascimento@lna.br
Richard Bower , Durham University, United Kingdom	r.g.bower@durham.ac.uk
Richard Davies , MPE, Germany	davies@mpe.mpg.de
Roberto Bertoldo Menezes , Instituto Mauá de Tecnologia, Brazil	lindeterob@gmail.com
Roberto Hazenfratz Marks , Universidade de São Paulo, Brazil	robertohm@usp.br
Roderik Overzier , Observatório Nacional, Brazil	roderikoverzier@gmail.com
Rodolfo Brumel Cardoso Spindler , Universidade Federal do Rio Grande do Sul, Brazil	rodolfo.spindler@ufrgs.br
Rodrigo Flores de Freitas , Universidade Federal do Rio Grande do Sul, Brazil	rodrigofloresdefreitas@gmail.com
Rodrigo Nemmen , Universidade de São Paulo, Brazil	rodrigo.nemmen@iag.usp.br
Rogemar A. Riffel , Universidade Federal de Santa Maria, Brazil	rogemar@ufsm.br
Rogério Riffel , Universidade Federal do Rio Grande do Sul, Brazil	riffel@ufrgs.br
Rosemary Coogan , Max Planck Institute for Extraterrestrial Physics, Germany	rcoogan@mpe.mpg.de
Sandra Isabel Raimundo , DARK, Niels Bohr Institute, University of Copenhagen, Denmark	sandra.raimundo@nbi.ku.dk
Santiago GARCIABURILLO , OAN-IGN, Spain	s.gburillo@oan.es
Saqib Hussain , Universidade de São Paulo, Brazil	s.hussain2907@gmail.com
Satish Shripati Sonkamble , NCRA-TIFR, India	ssonkamble@ncra.tifr.res.in
Sebastián Francisco Sanchez , IA-UNAM, México	sfsanchez@astro.unam.mx
Sedona Price , Max-Planck-Institut für extraterrestrische Physik (MPE), Germany	sedona@mpe.mpg.de
Stela Adduci Faria , Instituto de Astronomia, Geofísica e Ciências Atmosféricas, Brazil	stela.faria@usp.br

Name & Organization	Email
Steve Kraemer , Catholic University of America, USA	kraemer@cua.edu
Takuma Izumi , NAOJ, Japan	takuma.izumi@nao.ac.jp
Taro Shimizu , MPE, Germany	shimizu@mpe.mpg.de
Thaísa Storchi Bergmann , Universidade Federal do Rio Grande do Sul, Brazil	thaisa@ufrgs.br
Tiago Vecchi Ricci , UFFS - Campus Cerro Largo, Brazil	tiago.ricci@uffs.edu.br
Timothy Rawle , ESA/STScI, USA	tim.rawle@esa.int
Travis Fischer , United States Naval Observatory/Space Telescope Science Institute, USA	fischertc13@gmail.com
Valeria Olivares , Observatoire de Paris, France	valeria.olivares@obspm.fr
Vanessa Lorenzoni , Universidade Federal de Santa Maria, Brazil	vanessalorenzonii@gmail.com
Venkatessh Ramakrishnan , Universidad de Concepcion, Chile	vramakrishnan@udec.cl
Victoria Reynaldi , Facultad de Ciencias Astronómicas y Geofísicas - UNLP, Argentina	victoria.reynaldi@gmail.com
Vincenzo Mainieri , ESO, Germany	vmainier@eso.org
Vitor Eduardo Buss Bootz , Universidade Federal do Rio Grande do Sul, Brazil	vitorbootz@gmail.com
William Forman , CfA/SAO, USA	wforman@cfa.harvard.edu
Yiqing Song , University of Virginia, USA	ys7jf@virginia.edu