

Table of Contents

Preface: Star clusters as basic galactic building blocks	xv
Scientific Organising Committee	xvii

Part 1: Review, invited and contributed talks

Introductory review

The nature and nurture of star clusters	3
<i>B. G. Elmegreen</i>	

Session I. Physics and modes of star cluster formation

Chair: Ata Sarajedini

Embedded and open star clusters: basic questions	17
<i>H. Zinnecker</i>	

The origin of mass segregation in NGC 3603	24
<i>X. Pang, E. K. Grebel & M. Altmann</i>	

Physics and modes of star cluster formation	29
<i>M. R. Bate</i>	

The VLT-FLAMES Tarantula Survey	35
<i>C. J. Evans, N. Bastian, Y. Beletsky, I. Brott, M. Cantiello, J. S. Clark, P. A. Crowther, A. de Koter, S. E. de Mink, P. L. Dufton, P. Dunstall, M. Gieles, G. Gräfener, V. Hénault-Brunet, A. Herrero, I. D. Howarth, N. Langer, D. J. Lennon, J. Maíz Apellániz, N. Markova, F. Najarro, J. Puls, H. Sana, S. Simón-Díaz, S. J. Smartt, V. E. Stroud, W. D. Taylor, C. Trundle, J. Th. van Loon, J. S. Vink & N. R. Walborn</i>	

Stellar feedback and triggered star formation	41
<i>J. Palouš, R. Wünsch, J. E. Dale, V. Sidorin & A. Whitworth</i>	

Session II. Massive star clusters: formation, evolution, feedback and destruction

Chairs: Bruce Elmegreen and Carl Grillmair

Young massive star clusters: achievements and challenges	49
<i>R. de Grijs</i>	

Nuclear star clusters	58
<i>T. Böker</i>	

Colliding galaxies and the rapid assembly of clouds into proto-super star clusters	64
<i>G. Tenorio-Tagle, E. Pérez, C. Muñoz-Tuñón, S. Silich & J. Palouš</i>	

Star cluster disruption	69
<i>M. Gieles</i>	

On the temporal evolution of the stellar mass function of Galactic clusters	81
<i>G. De Marchi, F. Paresce & S. Portegies Zwart</i>	

Early dynamical evolution of star cluster systems.....	87
<i>G. Parmentier</i>	
Session III. Star cluster systems	
<i>Chair: Brad Whitmore</i>	
The distance and space distribution of bulge globular clusters	97
<i>S. Ortolani, B. Barbuy & E. Bica</i>	
The range of validity of cluster masses and ages derived from broad-band photometry	100
<i>J. Maíz Apellániz</i>	
Observational properties of the open cluster system of the Milky Way and what they tell us about our Galaxy	106
<i>A. Moitinho</i>	
A new era for the globular cluster system in M31.....	117
<i>M. G. Lee, S. C. Kim, H. S. Hwang, H. S. Park, D. Geisler, A. Sarajedini & W. E. Harris</i>	
Proper-motion studies of Milky Way starburst clusters – a new definition of starburst cluster templates.....	123
<i>A. Stolte & W. Brandner</i>	
Session IV. Globular cluster chemical evolution	
<i>Chair: Giampaolo Piotto</i>	
Globular cluster abundances: the imprint of first-generation massive stars	131
<i>C. Charbonnel</i>	
The lithium history of NGC 6397	143
<i>F. Primas, K. Lind, C. Charbonnel, F. Grundahl & M. Asplund</i>	
Globular cluster abundances and what they can tell us about galaxy formation	149
<i>J. G. Cohen</i>	
Chemical abundances in tidally disrupted globular clusters.....	157
<i>D. Yong, J. Meléndez, K. Cunha, A. I. Karakas, J. E. Norris & V. V. Smith</i>	
Globular cluster abundances: the role of asymptotic giant branch stars.....	161
<i>A. I. Karakas</i>	
Massive binaries and the enrichment of the interstellar medium in globular clusters	169
<i>S. E. de Mink, O. R. Pols, N. Langer & R. G. Izzard</i>	
Session V. Multiwavelength observations	
<i>Chair: Dulilia de Mello</i>	
Insights into star cluster formation from $\lambda \gtrsim 1 \mu\text{m}$	177
<i>R. Indebetouw, R. Chen, C. Brogan, B. Whitney, T. Robitaille, L. Looney & the SAGE team</i>	
An optical/near-infrared survey of GCs in early-type galaxies.....	184
<i>A. L. Chies-Santos, S. S. Larsen, E. M. Wehner, H. Kuntschner, J. Strader, J. P. Brodie & J. F. C. Santos Jr.</i>	

X-rays from young star clusters: a complement to optical and infrared views	190
<i>F. Damiani</i>	
Infrared surveys of Galactic star clusters.....	203
<i>V. D. Ivanov, M. Messineo, Q. Zhu, D. Figer, J. Borissova, R. Kurtev & G. R. Ivanov</i>	
Session VI. Cluster dynamics	
<i>Chair: Simon Goodwin</i>	
Stellar-mass black holes in star clusters: implications for gravitational-wave radiation	213
<i>S. Banerjee, H. Baumgardt & P. Kroupa</i>	
Star cluster dynamics in galaxies	219
<i>K. Bekki</i>	
HST's hunt for intermediate-mass black holes in star clusters	231
<i>J. Chanamé, J. Bruursem, R. Chandar, J. Anderson, R. van der Marel & H. Ford</i>	
The internal dynamics of stellar clusters	238
<i>C. M. Boily</i>	
On the origin of globular cluster bimodality	250
<i>O. Y. Gnedin</i>	
The progeny of stellar dynamics and stellar evolution within an <i>N</i> -body model of NGC 188	258
<i>A. M. Geller, J. R. Hurley & R. D. Mathieu</i>	
The formation of brown dwarfs.....	264
<i>A. Whitworth, D. Stamatellos, S. Walch, M. Kaplan, S. Goodwin, D. Hubber & R. Parker</i>	
On the origin of the hypervelocity runaway star HD 271791	272
<i>V. V. Gvaramadze</i>	
Session VII. Star clusters as laboratories for stellar evolution	
<i>Chairs: Léo Girardi and Licai Deng</i>	
Globular clusters as laboratories for stellar evolution	281
<i>M. Catelan, A. A. R. Valcarce & A. V. Sweigart</i>	
Close pairs: keys to comprehension of star cluster evolution	293
<i>D. Vanbeveren</i>	
Star clusters and single stellar populations	304
<i>L. Deng & Y. Xin</i>	
A new method to measure stellar mass-loss rates	312
<i>J. S. Kalirai</i>	
The dynamical effect of white dwarf kicks in star clusters	318
<i>H. B. Richer</i>	

Star clusters with dual red clumps	320
<i>L. Girardi, S. Rubele & L. Kerber</i>	
The multipopulation phenomenon in Galactic globular clusters: M4 and M22	326
<i>S. Villanova, G. Piotto, A. F. Marino, A. P. Milone, A. Bellini, L. R. Bedin, Y. Momany & A. Renzini</i>	
Primordial binary evolution and blue stragglers	333
<i>X. Chen & Z. Han</i>	
Symposium summary	
IAU Symposium 266: Summary	341
<i>G. Carraro</i>	
Part 2: Posters	
Further developments in star cluster spectral libraries	347
<i>A. V. Ahumada, J. J. Clariá, E. Bica, A. E. Piatti, J. F. C. Santos Jr., M. L. Talavera, T. Palma, D. B. Pavani, M. C. Parisi, M. C. Torres & C. M. Dutra</i>	
Measuring the GC luminosity function up to $z \sim 0.2$	351
<i>K. A. Alamo-Martínez, R. A. González-Lópezlira & J. Blakeslee</i>	
Determination of astrophysical parameters of open clusters using classical and semi-automated isochrone-fitting methods	352
<i>V. M. Alves, E. Bica & D. B. Pavani</i>	
Star clusters as building blocks for dSph galaxy formation	353
<i>P. Assmann, M. Fellhauer & M. I. Wilkinson</i>	
The globular cluster NGC 6642: evidence for a depleted mass function	357
<i>E. Balbinot, B. X. Santiago, E. Bica & C. Bonatto</i>	
Multicolor CCD photometry of the open cluster NGC 752	361
<i>S. Bartašiūtė, R. Janusz, R. P. Boyle, A. G. Davis Philip & V. Deveikis</i>	
Limits on the dark matter content of globular clusters	365
<i>H. Baumgardt, P. Côté, M. Hilker, M. Rejkuba, S. Mieske, S. G. Djorgovski & P. Stetson</i>	
Hidden infrared star clusters in our Galaxy: follow-up observations	366
<i>J. Borissova, R. Kurtev, M. M. Hanson, L. Georgiev, V. Ivanov & S. Ortolani</i>	
<i>UBVRI</i> CCD photometric study of southern open star clusters observed at Pico dos Dias Observatory (LNA/Brazil)	367
<i>T. C. Caetano & W. S. Dias</i>	
Lithium survey of evolved stars observed in the SACY project	368
<i>B. L. Canto Martins, S. Vieira, C. A. O. Torres, G. R. Quast, L. da Silva, R. de la Reza, C. H. F. Melo & J. R. de Medeiros</i>	
Building stable stellar systems with ρ as the only datum	369
<i>D. D. Carpintero</i>	

Membership probability via control-field colour-magnitude decontamination	370
<i>W. J. B. Corradi, F. F. S. Maia & J. F. C. Santos Jr.</i>	
An overview of the rotational behavior of metal-poor stars	374
<i>C. Cortés, J. R. P. Silva, A. Recio-Blanco, M. Catelan, J. D. Do Nascimento Jr. & J. R. De Medeiros</i>	
The fragmentation of expanding shells – limitations of the thin-shell model	375
<i>J. Dale, R. Wünsch, J. Palouš, A. Whitworth & R. Smith</i>	
Clusters of PMS stars in the Magellanic Clouds: the case of LH 95	376
<i>N. Da Rio</i>	
Hierarchical stellar clusters in molecular clouds	377
<i>S. Datta</i>	
No relation between the vertical velocity component and the absolute magnitude among globular clusters	380
<i>E. A. De Souza-Rossetto & H. J. Rocha-Pinto</i>	
An unusual abundance of T Tauri stars? NIR study of the southern high-mass star-forming region RCW 34	384
<i>H. M. de Villiers & D. J. van der Walt</i>	
Open clusters: a program to analyse the color-magnitude diagram with the help of stellar kinematic data	385
<i>W. S. Dias & T. C. Caetano</i>	
The dynamics of an extremely young cluster probed for the first time	386
<i>C. Ducourant, S. Bontemps, D. Despois, P. André, R. Teixeira, E. Moraux, J. Bouvier, A. Krone-Martins & D. Sinachopoulos</i>	
The globular cluster M69: color-magnitude diagram and variable stars	390
<i>M. E. Escobar, M. Catelan, M. Zoccali, H. A. Smith, B. J. Pritzl, A. Layden, J. Gregorok, D. L. Welch & T. Webb</i>	
A deep dive into NGC 604 with Gemini/NIRI imaging	391
<i>C. Fariña, G. L. Bosch & R. R. Barbá</i>	
Determination of kinematic distances of pre-main-sequence stars in star-forming regions	395
<i>P. A. B. Galli, R. Teixeira, C. Ducourant & C. Bertout</i>	
Gas trapping in extremely massive clusters in NGC 1365	399
<i>E. Galliano & D. Alloin</i>	
Search for cluster candidates in the UKIDSS database	400
<i>M. Gennaro, W. Brandner, T. Henning & A. Stolte</i>	
Nuclear clusters in dwarf irregular galaxies and their connection to massive galactic clusters	401
<i>I. Y. Georgiev, M. Hilker, T. H. Puzia, P. Goudfrooij & H. Baumgardt</i>	
Investigation of star clusters found in the 2MASS catalog	402
<i>E. Glushkova, R. Yadav & S. Koposov</i>	
Star clusters: age, metallicity and extinction from integrated spectra	403
<i>R. M. González Delgado & R. Cid Fernandes</i>	

Lithium abundances of main-sequence and subgiant stars in the globular cluster NGC 6397	407
<i>J. I. González Hernández, P. Bonifacio, E. Caffau, M. Steffen, H.-G. Ludwig, N. Behara, L. Sbordone, R. Cayrel & S. Zaggia</i>	
Looking for building blocks of the Galactic halo: variable stars in the Fornax, Bootes I, Canes Venatici II dwarfs and in NGC 2419	411
<i>C. Greco, G. Clementini, E. V. Held, E. Poretti, M. Catelan, L. Federici, M. Maio, M. Gullieuszik, V. Ripepi, M. Dall’Ora, L. Di Fabrizio, K. Kinemuchi, M. Di Crescienzo, M. Marconi, I. Musella, B. Pritzl, A. Rest, N. De Lee & H. Smith</i>	
Distribution of very young stellar clusters in grand-design spirals	412
<i>P. Grosbøl & H. Dottori</i>	
High-velocity runaway stars from three-body encounters	413
<i>V. V. Gvaramadze, A. Gualandris & S. Portegies Zwart</i>	
Galactic consequences of clustered star formation	417
<i>M. R. Haas & P. Anders</i>	
A high-spectral-resolution study of abundances and isotopic composition of BHB stars in NGC 6397 and NGC 6752	421
<i>S. Hubrig, F. Castelli, G. De Silva, J. F. González, Y. Momany, M. Netopil & S. Moehler</i>	
Proper-motion measurements in the Quintuplet cluster	422
<i>B. Hußmann, A. Stolte & W. Brandner</i>	
Tracing star cluster formation in the interacting galaxy M51	423
<i>N. Hwang & M. G. Lee</i>	
The field of Lacerta OB1	427
<i>N. T. Kaltcheva</i>	
First results of the Southern Open Cluster Study	429
<i>K. Kinemuchi, A. Sarajedini, D. Geisler, F. Mauro, G. Carraro, S. Kafka & E. Jeffery</i>	
Constraining star cluster disruption mechanisms	433
<i>I. S. Konstantopoulos, N. Bastian, M. Gieles & H. J. G. L. M. Lamers</i>	
The origin of very wide binary systems	438
<i>M. B. N. Kouwenhoven, S. P. Goodwin, R. J. Parker, M. B. Davies, D. Malmborg & P. Kroupa</i>	
Kinematic parameters and membership lists of open clusters in the Bordeaux Carte du Ciel zone	442
<i>A. Krone-Martins, C. Soubiran, R. Teixeira & C. Ducourant</i>	
Metallicities of intermediate-age and old star clusters in the Large Magellanic Cloud	446
<i>A. Kučinskas, V. Dobrovolskas, A. Černiauskas, R. Lazauskaitė & T. Tanabé</i>	
Super star clusters in HII galaxies	447
<i>P. Lagos, E. Telles & E. R. Carrasco</i>	

W UMa-type systems in globular clusters	451
<i>L. Li, F. Zhang & Z. Han</i>	
Star clusters in the starburst galaxy M82	454
<i>S. Lim, N. Hwang & M. G. Lee</i>	
Open cluster characterization via cross-correlation with a spectral library	458
<i>F. F. S. Maia, J. F. C. Santos Jr., W. J. B. Corradi & A. E. Piatti</i>	
Analysis of the B and Be-star populations of the double cluster η and χ Persei .	462
<i>A. N. Marsh, M. V. McSwain & T. Currie</i>	
Young open clusters in the Milky Way and Small Magellanic Cloud	466
<i>C. Martayan</i>	
Evolution and appearance of Be stars in SMC clusters	470
<i>C. Martayan, D. Baade, Y. Frémat & J. Zorec</i>	
Chemical abundances of the LMC cluster Hodge 11 and its surrounding field	474
<i>R. Mateluna, D. Geisler & S. Villanova</i>	
Fundamental stellar properties from eclipsing-binary analyses	477
<i>E. F. Milone, R. Stagg, P. Guhathakurta, D. A. VandenBerg & J. Kallrath</i>	
A global optimization technique for the fitting of color-magnitude diagrams	478
<i>H. Monteiro, W. S. Dias & T. C. Caetano</i>	
Probing the structure of the Galactic disk through open clusters	482
<i>X. Pang & C. Shu</i>	
Metallicity analysis of an SMC cluster sample using CaII-triplet spectroscopy	483
<i>M. C. Parisi, A. Grocholski, D. Geisler, A. Sarajedini & J. J. Clariá</i>	
Open cluster remnants in low-density Galactic fields	487
<i>D. B. Pavani, L. O. Kerber, E. Bica & W. J. Maciel</i>	
Intermediate-mass black holes in Galactic globular clusters	491
<i>C. Pepe & L. J. Pellizza</i>	
Abundances of seven red giants in the open cluster NGC 3114	495
<i>C. B. Pereira & C. Quireza</i>	
Local starbursts seen when the Universe was 2–4 Gyr old	499
<i>S. M. Petty, D. F. de Mello, J. P. Gardner & J. S. Gallagher</i>	
Washington photometry of five star clusters in the Large Magellanic Cloud	500
<i>A. E. Piatti, D. Geisler, A. Sarajedini & C. Gallart</i>	
NGC 2587: a sparse open cluster projected onto a populous star field	504
<i>A. E. Piatti, J. J. Clariá & A. V. Ahumada</i>	
H α imaging of X-ray sources in selected globular clusters with SOAR	508
<i>P. Pietrukowicz</i>	
The population of young stars in Orion A: X-rays and IR properties	509
<i>I. Pillitteri, S. J. Wolk, L. Allen, S. T. Megeath, R. A. Gutermuth & the SOXS collaboration</i>	

Clusters and stellar angular-momentum evolution	510
<i>M. H. Pinsonneault, D. M. Terndrup & P. Denisenkov</i>	
MASSCLEAN (MASSive CLuster Evolution and ANalysis Package): description, tests, and results.....	511
<i>B. Popescu & M. M. Hanson</i>	
The molecular cloud and embedded young stellar population associated with IRAS 18236–1205	516
<i>R. Retes, A. Luna, D. Mayya & L. Carrasco</i>	
Internal dynamics of the NGC 3603 young cluster	517
<i>B. Rochau, W. Brandner, A. Stolte, M. Gennaro & T. Henning</i>	
Nonradial pulsations in the open cluster NGC 3766	518
<i>R. M. Roettenbacher, E. C. Amouzou & M. V. McSwain</i>	
Extragalactic star-forming regions and open clusters in the Milky Way	522
<i>F. Sakhibov, A. S. Gusev, N. V. Kharchenko & A. E. Piskunov</i>	
Extreme-mass-ratio solar-type binaries and their implications for cluster environs	523
<i>R. G. Samec, C. M. Labadorf, E. R. Figg, T. S. Loflin, G. R. Behn, N. A. Hawkins, H. A. Chamberlain, D. R. Faulkner & W. Van Hamme</i>	
The spatial distribution of stars in open clusters	524
<i>N. Sánchez & E. J. Alfaro</i>	
Astrometry and photometry of stars and star clusters in M33.....	528
<i>I. San Roman, A. Sarajedini, C. Gallart & A. Aparicio</i>	
Study of the young and old compact stellar cluster population in M81	532
<i>M. Santiago-Cortés, Y. D. Mayya & D. Rosa-González</i>	
Astrophysical properties of binary star clusters in the Small Magellanic Cloud..	533
<i>J. F. C. Santos Jr., A. A. Schmidt & E. Bica</i>	
Sulfur in the globular clusters 47 Tuc and NGC 6752.....	537
<i>L. Sbordone, A. Chieffi, M. Limongi, E. Caffau, H.-G. Ludwig & P. Bonifacio</i>	
Hierarchical clustering in the Local Group dwarf galaxy NGC 6822.....	538
<i>S. Schmeja, D. A. Gouliermis, R. S. Klessen, W. J. G. de Blok & F. Walter</i>	
Refining the true parameters of the open cluster NGC 4852	539
<i>G. Solivella, E. Giorgi, R. Vázquez & G. Carraro</i>	
Membership status of TWA22AB.....	540
<i>R. Teixeira, C. Ducourant, G. Chauvin, A. G. O. Krone-Martins, M. Bonnefoy & I. Song</i>	
SACY: open clusters connected to young nearby associations.....	544
<i>C. A. O. Torres, G. R. Quast, C. H. F. Melo, M. Sterzik, R. de la Reza & L. da Silva</i>	
Pre-main-sequence stars in the stellar association N 11 in the Large Magellanic Cloud: clustering properties.....	545
<i>A. Vallenari, R. Sordo & E. Chiosi</i>	

Bridging galactic star formation from intermediate to local epochs	549
<i>E. N. Voyer, D. F. de Mello, J. P. Gardner, B. Siana & H. Teplitz</i>	
Probing star formation at intermediate z	550
<i>E. N. Voyer, D. F. de Mello, C. Quirk, B. Siana, J. P. Gardner & H. Teplitz</i>	
The massive star-forming region Cygnus OB2.....	551
<i>N. J. Wright & J. J. Drake</i>	
Super star clusters and their emission lines.....	555
<i>R. Wünsch, J. Palouš, G. Tenorio-Tagle, S. Silich & C. Muñoz-Tuñón</i>	
Blue stragglers in star clusters and the conventional SSP models	556
<i>Y. Xin, R. de Grijs, L. Deng & P. Kroupa</i>	
IC 361, a distant intermediate-age cluster in Camelopardalis	557
<i>J. Zdanavičius, R. P. Boyle, F. J. Vrba, K. Zdanavičius & S. Bartašiūtė</i>	
The globular cluster NGC 5286: color–magnitude diagram and variable stars...	561
<i>M. Zorotovic, M. Catelan, M. Zoccali, H. A. Smith & B. J. Pritzl</i>	
Author index	563
Object index.....	567
Subject index	573