

The Early Life of Stellar Clusters: Formation and Dynamics

Program

Day 1

- 08:30 – 09:00 Registration
09:00 – 09:05 Welcome by the Organisers
09:05 – 09:10 Welcome by STARPLAN (Jørgensen)

Session I: Star cluster formation: observations (chair: Dib, Bailey)

- 09:10–09:35 Probing the physical conditions of massive star cluster formation with ALMA (Jonhson)
09:35–10:00 Mini-starburst ridges and instantaneous star formation efficiency (Motte)
10:00–10:25 The ATLASGAL survey: a view on the earliest stages of high-mass star and cluster formation (Csengeri)
10:25–10:50 Revealing the initial condition of star cluster formation: The case of Serpens South (Nakamura)

10:50–11:15 coffee break

11:15–11:40 The star formation history of embedded clusters (Bik)
11:40–12:05 The structure of young stellar clusters (Gouliermis)
12:05–12:30 Massive stars/clusters in the giant molecular cloud G23.3-0.3 (Messineo)

12:30–14:00 lunch break

14:00–14:25 High-mass star formation in the outer Milky Way (Negueruela)
14:25–14:50 Contrasting the gas and stellar distributions in NGC 346: the most active star-forming region in the SMC (Hony)
14:50–15:15 Fragmentation of massive dense cores down to ~ 1000 AU: relation between fragmentation, density structure, and turbulence (Palau)

15:15–15:45 coffee break

Session II: The dynamics of stars in (young) clusters: observations (chair: Haugboelle)

- 15:45–16:15 The dynamics of young clusters from the Gaia-ESO survey (Jeffries)
16:15–16:45 Runaway massive (and less massive) stars (Gvaramadze)
16:45–17:10 Supernova ejection dominates the massive runaway star production of 30 Doradus (Henault-Brunet)
17:10–17:35 Tracing the origins of star clusters through their structure and kinematics (Wright)

17:35–18:00 Discussion session A: *Similarities and differences in the formation of low and high mass clusters, and as a function of the environment.* Chairs: Motte, Jeffries

18:30 – ... Welcome reception

Day 2

Session III: The IMF & binarity (theory, statistics & observations) (chair: Ojha)

- 08:30--09:00** Observations of stellar multiplicity in star-forming regions and young clusters (**Kraus**)
09:00--09:30 Analytical models of the initial mass function (**Hennebelle**)
09:30--09:55 A non universal IMF in Galactic stellar clusters (**Dib**)
09:55--10:20 The low-mass initial mass function and dynamical state of Westerlund 1 (**Andersen**)
10:20--10:35 Poster Presentations-part 1- (**Czanik, Zeidler, Wu, Frimann, Kuffmeier**) 3' each

10:35--11:05 coffee+posters

Session IV: Theoretical and numerical simulations of star formation (Chair: Motte)

- 11:05--11:35** The dependence of star cluster formation on initial conditions (**Bate**)
11:35--12:05 The effect of magnetic fields on fragmentation and the Core Mass Function (**Basu**)
12:05--12:30 Turbulent fragmentation and the IMF (**Haugboelle**)
12:30--14:00 lunch break
14:00--14:25 Understanding the role of small and large scale physics in numerical studies of star formation (**Höçük**)
14:25--14:50 The binary properties of low-mass stars and brown dwarfs (**Stamatellos**)
14:50--15:15 Infall-Driven Protostellar Accretion and the Solution to the Luminosity Problem (**Padoan**)

15:15--15:45 coffee+posters

- 15:45--16:10** Two-stage fragmentation for cluster formation (**Bailey**)
16:10--16:35 Microphysics modeling with Krome (**Grassi**)

16:35--... Discussion B : How much variability is there in the products of the star formation process (IMF, binarity, sub-clustering, ect., Effect of the different physical quantities) **chairs: Basu, Bate**

Day 3

Session V: The dynamical evolution of stellar clusters (chair: Hony)

- 09:00--09:30** Star clusters: nature or nurture? (**Goodwin**)
09:30--09:55 Formation of very young massive clusters: the case of NGC 3603 young cluster (**S. Banerjee**)
09:55--10:20 Making sense of mass segregation in clusters (observed and simulated) (**Parker**)
10:20--10:30 Poster presentations-part 2-(**Maia, Vincke, Fragione**) 3' each
- 10:30-11:05** coffee+posters
- 11:05--11:35** Modelling early cluster evolution with AMUSE (**Pelupessy**)
11:35--12:05 Stellar dynamical remedies to star formation headaches: The triple nucleus of M31 in focus (**Touma**)
- 12:05 --13:35** lunch break

Session VI : The formation of the Solar system, planets, in stellar clusters (chair: Pelupessy)

- 14:35 --14:00** The birth stellar cluster of the Solar System (**Church**)
14:00 --14:30 Close encounters in the birth environments of planetary systems (**Davies**)
14:30 --14:55 Stellar encounters and protoplanetary disc evolution (**Rosotti**)
- 14:55-15:20** coffee+posters
- 15:20 --16:20 Discussion session C:** how well can we constrain the initial conditions of stellar clusters by studying their current stellar populations ? **Chairs: Pfalzner**
- 16:30** departure to Louisiana museum
- 18:00-21:00** conference dinner and visit of the Louisiana museum
- 21:00** return to Copenhagen

Day 4

Session VII: The role of feedback in the evolution and disruption of stellar clusters (chair: Touma)

- 09:00 - 09:30** Triggered star formation in molecular clouds (**Ojha**)
09:30 - 09:55 Evidence of sequential star formation processes involving mid-size embedded clusters. The examples of RCW 121, IRAS 12272-6240 and Trumpler 14-N4. (**Tapia**)
09:55 - 10:25 Disc formation and feedback from YSO (**R. Banerjee**)
10:25 - 10:37 Poster presentations-part 3- (**Frosthom, Castellanos, Estrella, Persi**) 3' each
10:37 - 11:05 coffee+posters
11:05 - 11:35 Feedback from massive stars on molecular cloud scales (**Nordlund**)
11:35 - 12:00 Before the supernovae - effects of ionisation and winds on embedded clusters (**Dale**)
12:00 - 12:25 The dynamics of superbubbles driven by star cluster winds and a supernova explosion (**Rodriguez-Gonzalez**)
12:25 - 14:00 lunch break
14:00 - 14:25 Impact of ionization compression on turbulent molecular clouds, and dating of OB associations (**Tremblin**)
14:25 - 14:55 **Discussion session D:** feedback on clusters scales, signatures, effects, and modelling. **Chair: Nakamura**
14:55 - 15:30 coffee+posters

Session VIII: Star formation, stellar populations, and feedback on galactic scales (chair: S. Banerjee)

- 15:30--16:00** Galactic flows and the formation of stellar clusters (**Bonnell**)
16:00--16:30 The stellar populations of galaxies from their fundamental building blocks (**Kroupa**)
16:30--16:55 Kiloparsec-scale simulations of star formation in disk galaxies: structure and dynamics of filaments and clumps in giant molecular clouds (**Butler**)
16:55--17:20 Formation of massive stellar clusters in galaxy mergers (**Escala**)
17:20-- **Discussion session E:** feedback, from local to galactic scales **Chairs: Bonnell, Ojha**

Day 5

Session IX: Globular clusters (chair Tapia)

09:30--10:00 The turbulent dawn of globular clusters (**Charbonnel**)

10:00--10:30 Observational constraints on globular cluster formation scenarios (**Larsen**)

10:30--11:00 coffee break

11:00--11:25 Dynamical models for the remote halo globular clusters Pal 4 and Pal 14 (**Hasani-Zonoozi**)

11:25--11:50 How does the gas expulsion phase affect the initial conditions of star clusters? (**Haghi**)

11:50--14:00 lunch break

14:00--14:30 Discussion session F: what do globular clusters tell us about the formation of massive clusters and their early evolution ?. **Chair: Kroupa**

14:30-15h30 Discussion: summary of workshop and future outlooks **Chair: Nordlund**

15:30 End of workshop
