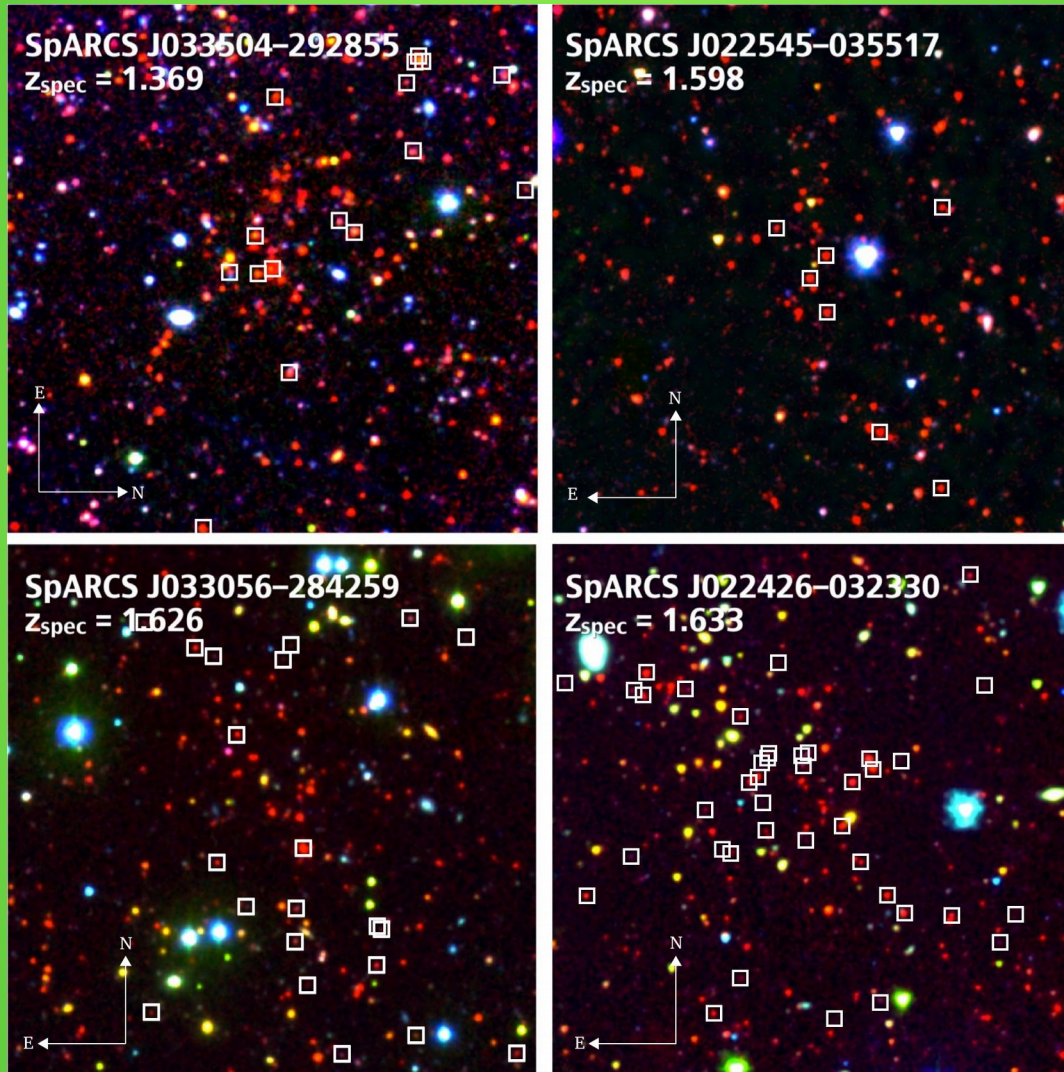


Stellar Mass Functions and Reduced Environmental Quenching Efficiency at $z \sim 1.5$



Nantais et al.
2016, A&A, 592,
A161

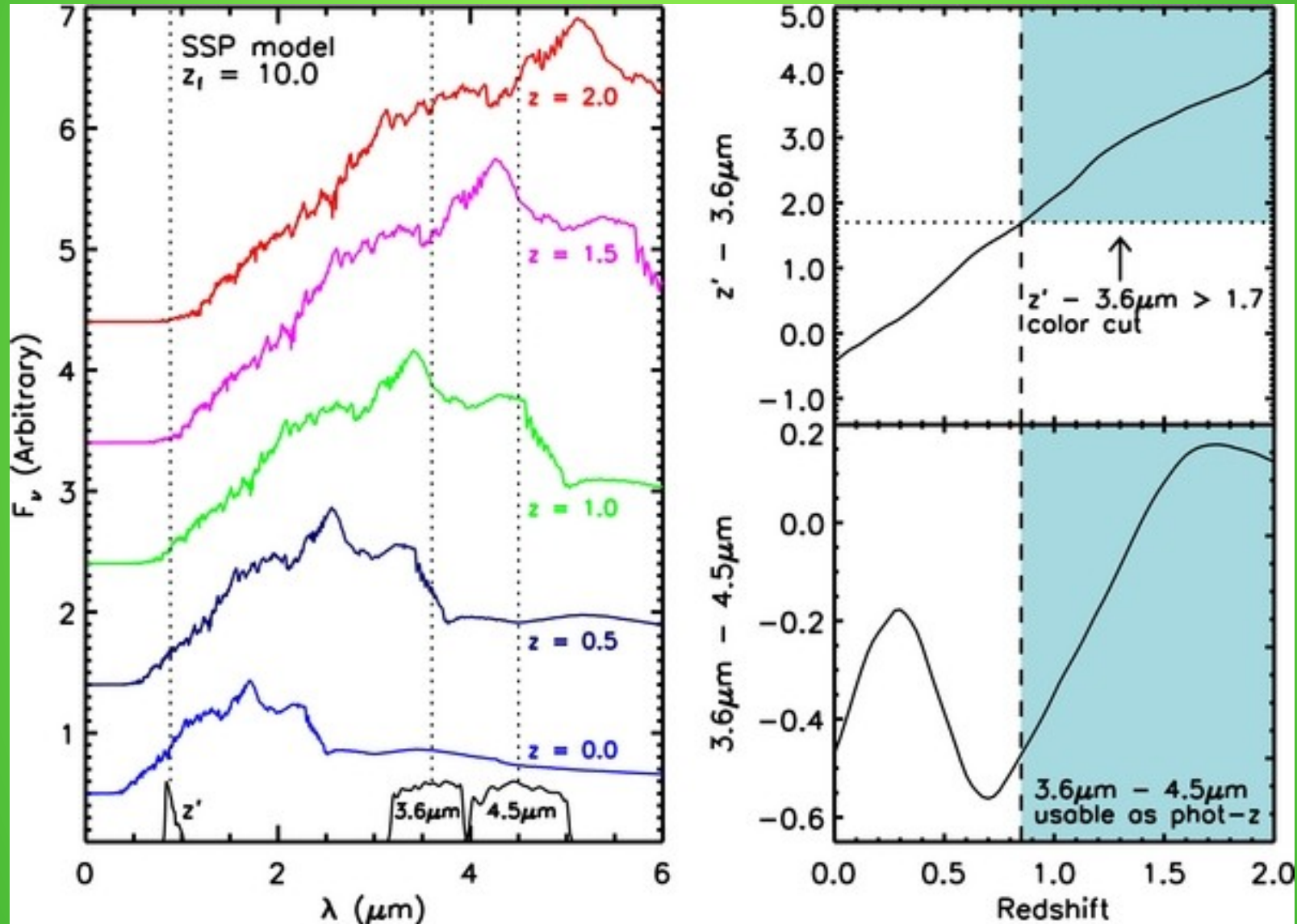
Julie B. Nantais (Universidad Andrés Bello) and the SpARCS Collaboration
20 Sep 2016
Hobart, Tasmania

Adolescent Galaxies and Peer (ram?) Pressure



Source: scienceleadership.org

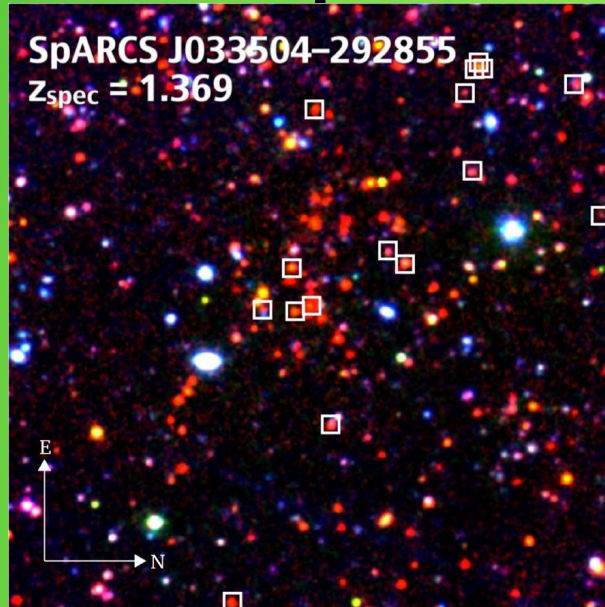
SpARCS: Finding Galaxy Clusters with IR Colors



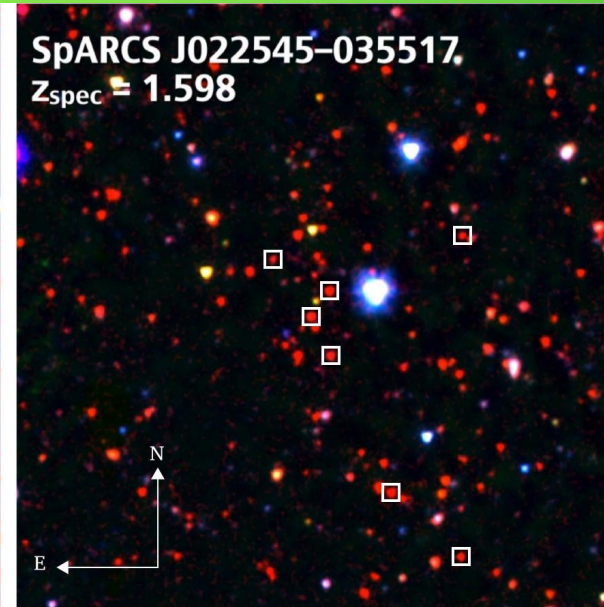
Source: Muzzin et al. 2013

Meet the SpARCS Stellar Bump Sequence Clusters

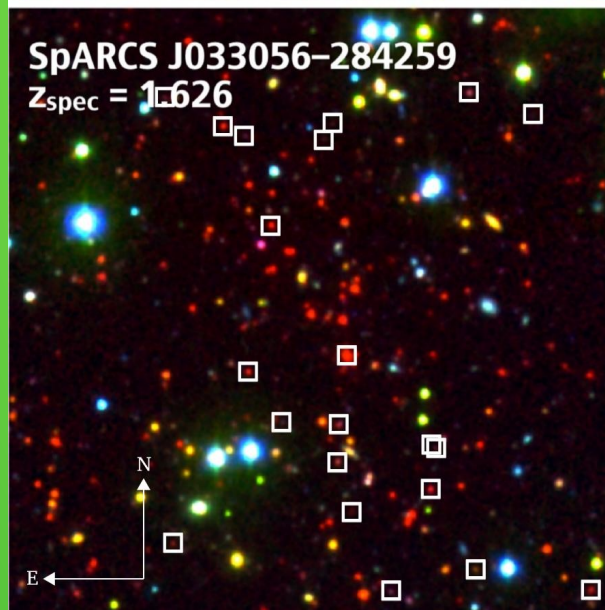
22 members
(2 AGN)
Never before
published



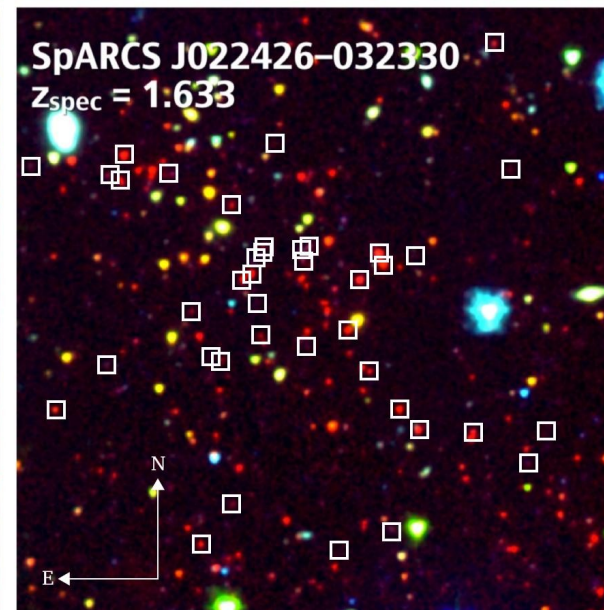
8 members
(+2 not
visible in Ks)
Never before
published



38 members
BCG in
Lidman et
al.~(2012)



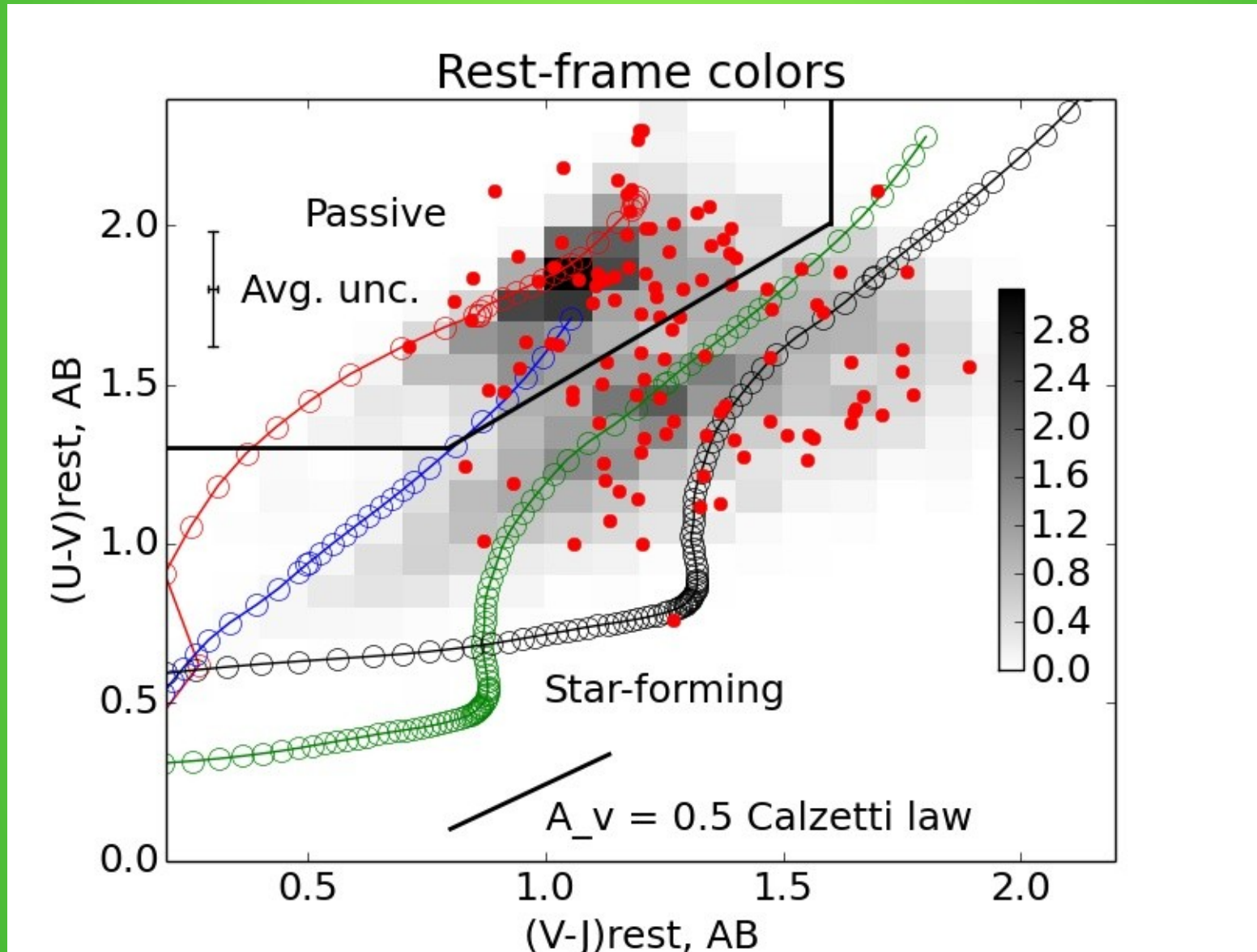
45 members
(first 12 in
Muzzin et al.
2013a)



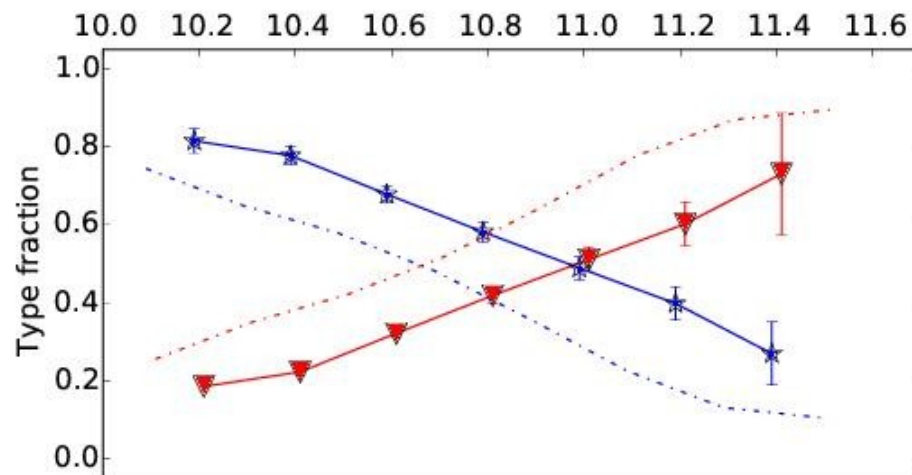
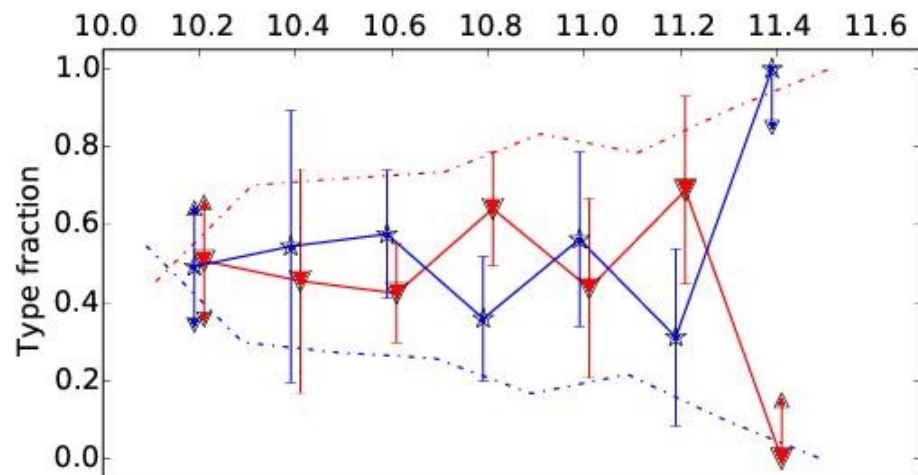
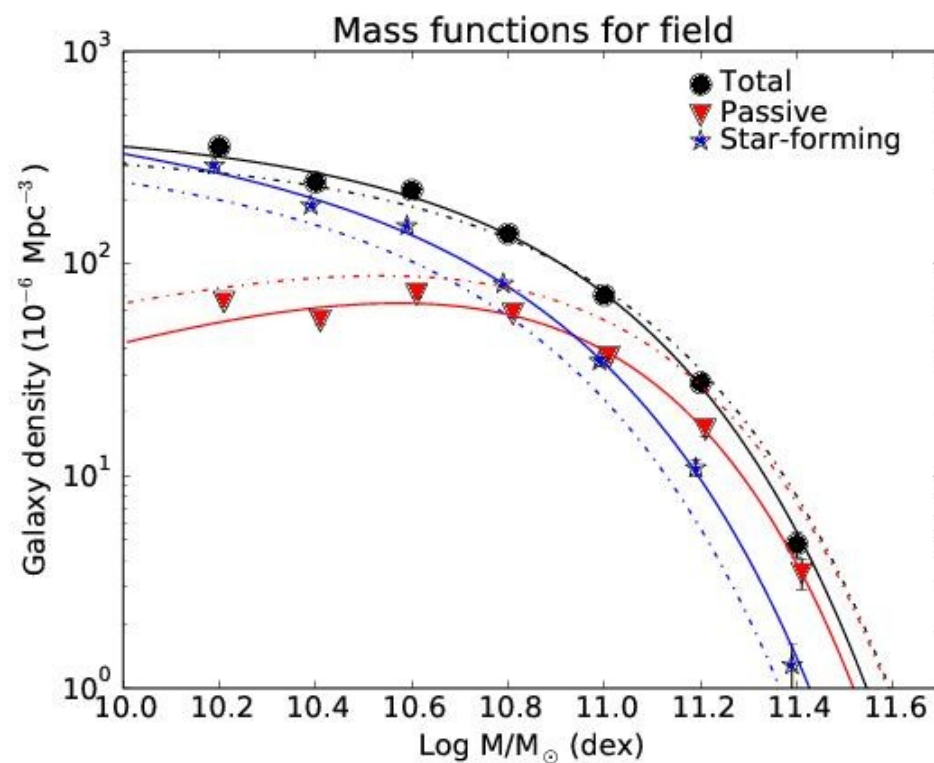
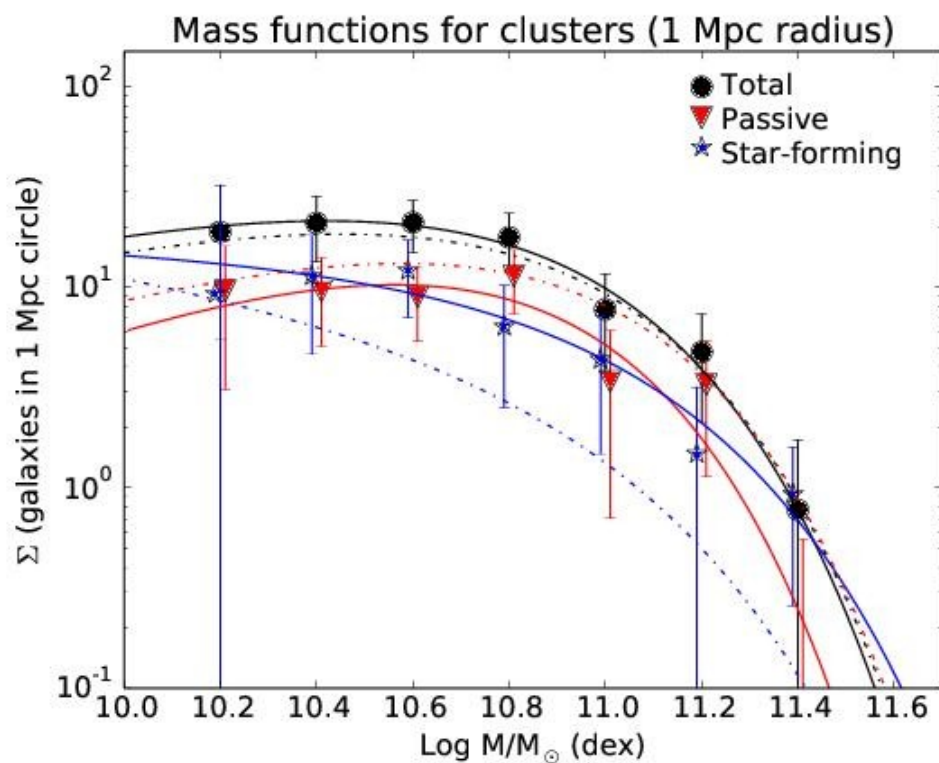
Data and Analysis

- 4 clusters, $1.37 < z < 1.63$, found with Stellar Bump Sequence & confirmed with FORS & MOSFIRE spectroscopy. 113 spectroscopic members.
- 10-12 bands spanning optical to Spitzer 8.0 micron, EAZY photo-zs with scatter = 0.04.
- EAZY Rest-frame colors and FAST stellar masses + spec → Ks-selected photometric catalogs
- Field Comparison: UltraVISTA survey (Muzzin et al. 2013b).
- Analysis: UVJ diagrams → passive vs. star-forming; stellar mass functions for photo-z-selected + spectroscopic members $> 10^{10.1} M_{\text{sun}}$; environmental quenching efficiency calculated for mass function sample

Passive and Star-Forming Populations



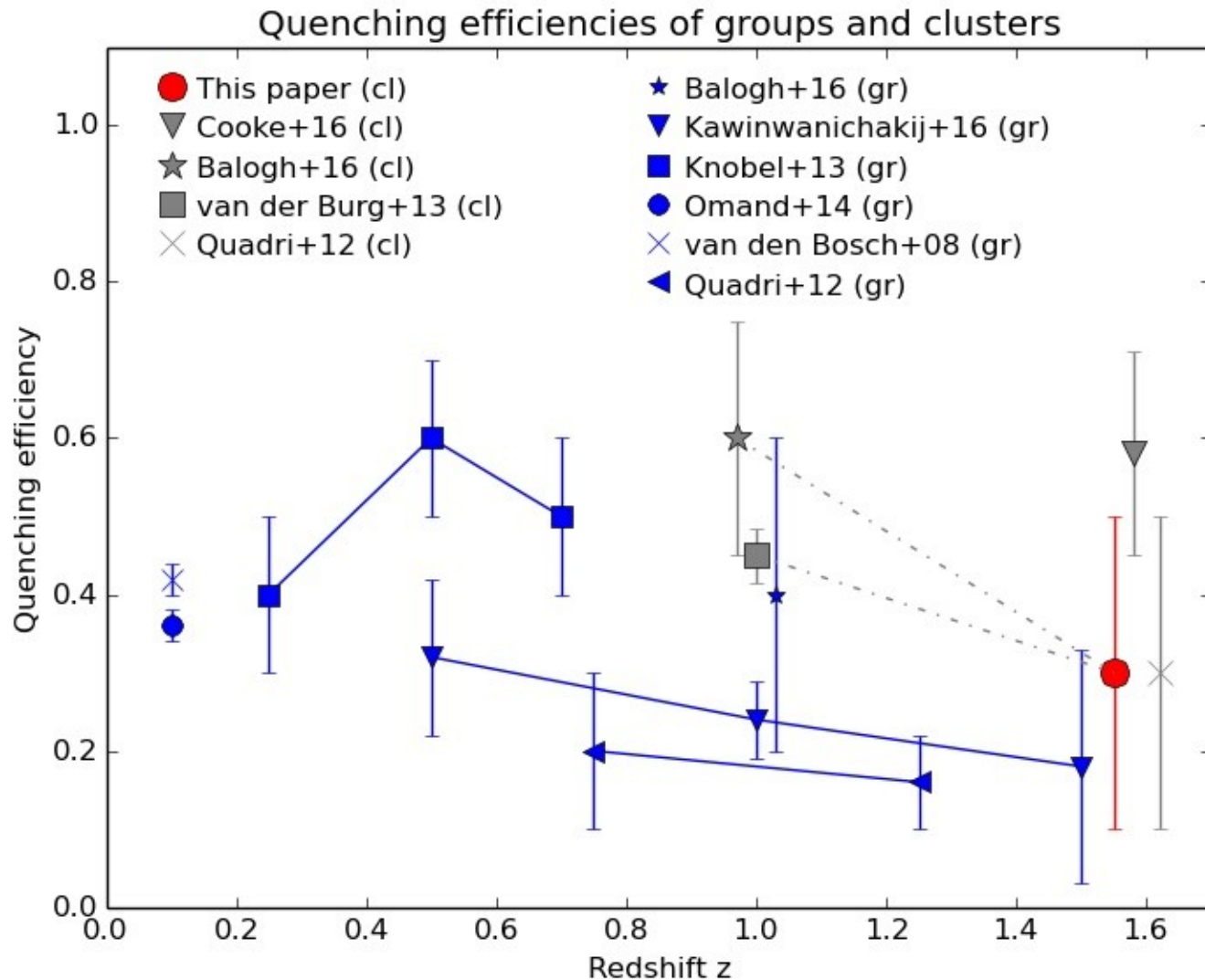
Stellar Mass Functions



Important Points

- Similar total stellar mass functions between cluster and field and between $z \sim 1$ and $z \sim 1.5$
- No clear dominance of star-forming galaxies at low stellar masses in $z \sim 1.5$ clusters, unlike field: some lightweights are being quenched!
- On the other hand, a lot less quenching in clusters (vs. slightly less in field) than at $z \sim 1$.
- Quenching efficiency (cluster passive fraction – field passive fraction)/(field star-forming fraction) 30%, robust under various tests.

Quenching Efficiency: Comparison with Literature



Conclusions

- Stellar mass functions of SpARCS SBS clusters similar to field, but show some signs of quenching
- Quenching efficiency of 30 (+/- 20%) for our 4 clusters, robust under various tests.
- Quenching efficiencies of clusters in literature tend to be higher than those of groups at the same redshift, but lower at higher redshifts.
- We continue to work on this stuff (submitted paper under revision) to try to better pinpoint effects at $z > 1.5$ vs. the rest, with more homogeneous samples and methodology. In the future, we need statistically impressive samples...and we're starting to get there.

Thanks

- To the SpARCS collaboration, especially co-authors (R. van der Burg, C. Lidman, R. Demarco, A. Noble, G. Wilson, A. Muzzin, R. Foltz, A. DeGroot, M. Cooper)
- To the organizers and guests of the conference
- To the people who couldn't make it, without whom I would not be standing here today.