

A visualization of the cosmic web, showing a complex network of blue filaments and nodes with numerous bright orange and yellow galaxies scattered throughout. The background is dark, making the glowing structures stand out.

# Galaxy Evolution in Groups and Clusters at 'low' Redshift:

## Theory and Observations

Schloss Ringberg, 11-15, December 2017









Elad Zinger, Postdoc

MPI fur Astronomy (MPIA)

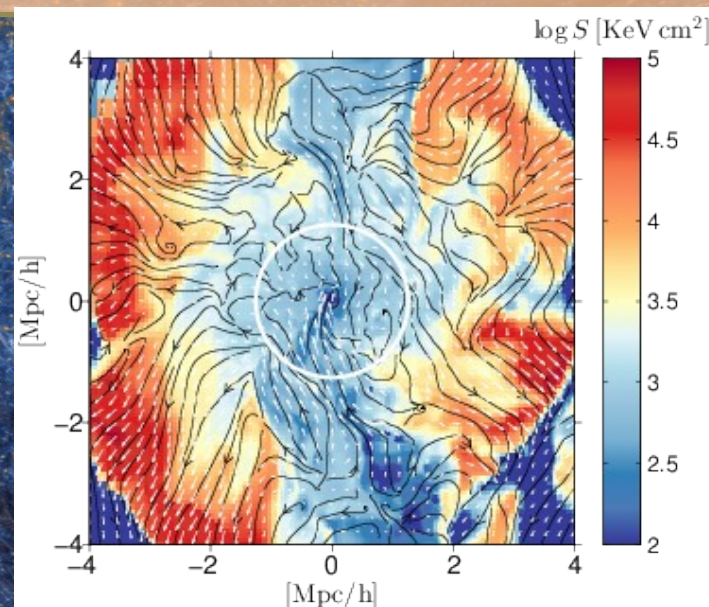
zinger@mpia.de

Talk 1: Quenching in Cluster Outskirts

Talk 2: Thermodynamics of Quenching and Quenched Galaxies  
in IllustrisTNG

Scientific Focus and Methods:

- Galaxy evolution in clusters
- Structures and properties of ICM
- IllustrisTNG
- Hydrodynamic Simulations





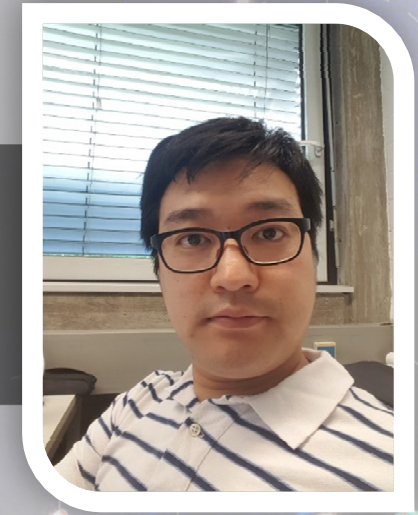
# Kiyun Yun

2<sup>nd</sup> year PhD Student

Max-Planck-Institute for Astronomy (MPIA)

Supervisor : Annalisa Pillepich

yun@mpia.de



Talk Title

## Jellyfish galaxies in the IllustrisTNG simulations

Research interest

- The **evolution** of galaxies falling into the massive galaxies
  - Role of **host hot halo environments** in the evolution of satellite galaxies
  - **Jellyfish**-shape galaxies that show extended gas distributions
- Moving mesh hydrodynamic simulation code developing
- Fundamental properties of gravity and dark matter
- Non-inertia effect in galaxy cluster
- Visualization





Sukyoung K. Yi, Professor

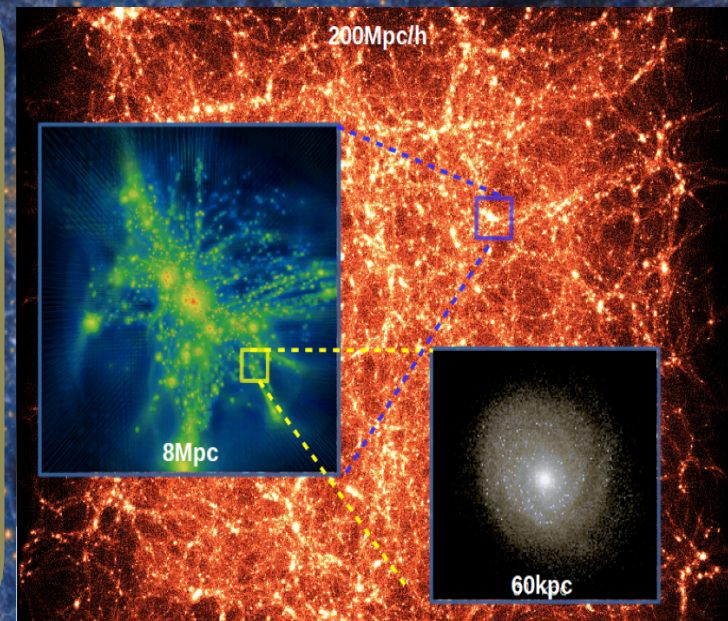
Yonsei University, Seoul, Korea

yi@yonsei.ac.kr

Talk Title: **Yonsei Zoom-In Cluster Simulation**

Scientific Focus and Methods:

- Galaxy spin evolution
- Phase-space diagram application
- Star formation quenching of cluster galaxies





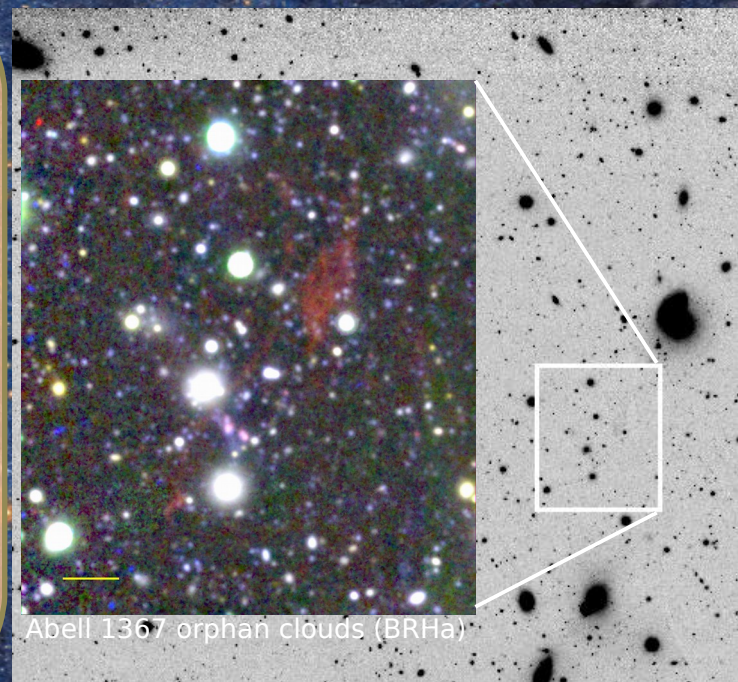


Masafumi Yagi, Assistant Professor  
National Astronomical Observatory of Japan  
YAGI.Masafumi@nao.ac.jp

Talk Title: **Several intergalactic ionized gas in clusters**

Scientific Focus and Methods:

- Galaxies in nearby clusters, and post-starburst galaxies.
- Optical photometry (esp. H $\alpha$  imaging)
- CCD data reduction and calibration;  
(currently absorbed in optical ghosts)



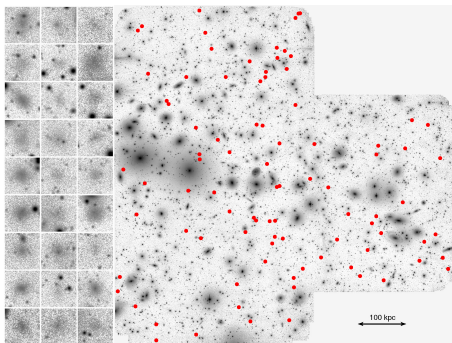




- PhD student (IMPRS-HD)
- Zentrum für Astronomie der Universität Heidelberg (ZAH)

## Research interests:

- Low-mass populations in nearby galaxy clusters
  - Including the most compact and most diffuse stellar systems
- ⇒ Signs of environmental influences?



**Talk:** Were the most compact and most diffuse stellar systems in galaxy clusters both formed by tidal stripping?





Gillian Wilson, Professor

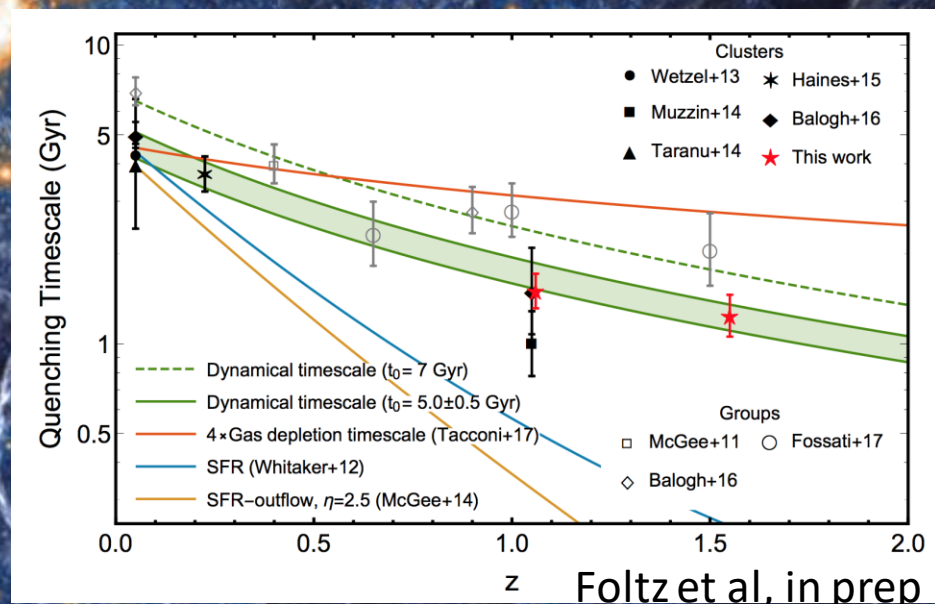
University of California Riverside (UCR)

[gillianw@ucr.edu](mailto:gillianw@ucr.edu)

**Talk Title: Galaxy Quenching in Clusters and Growth of BCGs**

Scientific Focus and Methods:

- Observations of Clusters/Groups (SpARCS, GCLASS, GOGREEN)
- Causes of Environmental Quenching
- Growth of Massive Galaxies



2018 UCR postdoc opening – see AAS job register



# BENEDETTA VULCANI

Univ. of Melbourne - INAF OAPD

- The influence of the environment on galaxy properties
- Galaxy evolution from  $z=1$
- Spatially resolved vs integrated galaxy properties
- Systematic comparisons between observations and simulations

HUNTING DOWN THOSE  
RESPONSIBLE FOR THE OBSERVED  
SPATIAL DISTRIBUTION OF GAS IN  
GALAXIES AT  $Z=0.-0.5$



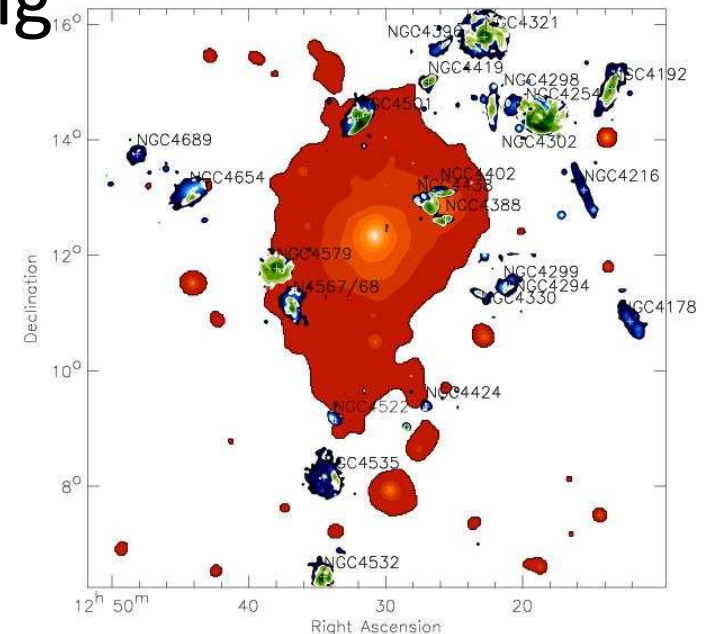


Bernd Vollmer, staff astronomer  
CDS, Observatoire astronomique de Strasbourg  
Bernd.Vollmer@astro.unistra.fr

## Talk Title: Galaxy evolution in the Virgo cluster

Scientific focus and methods:

- Analytical/dynamical modelling
- HI/CO/radio continuum observations
- Galaxy interactions - ISM
- Gas tori around AGN





# Stephanie Tonnesen

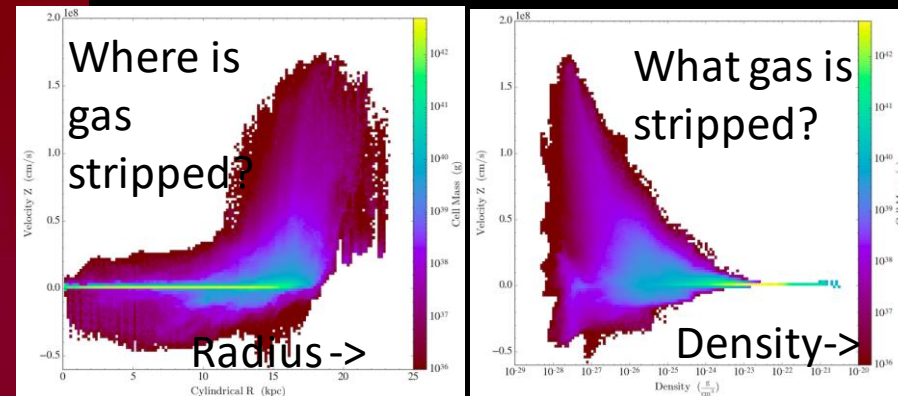
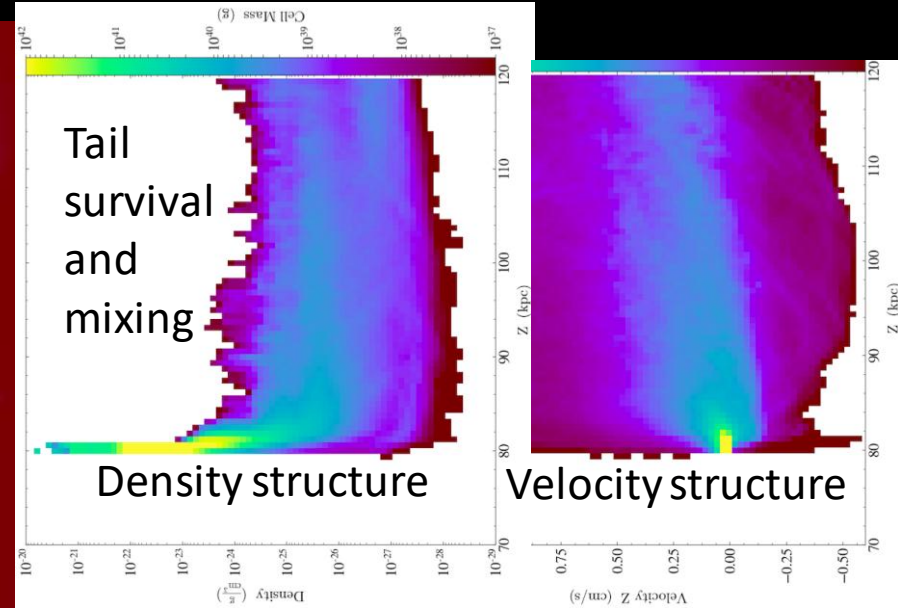
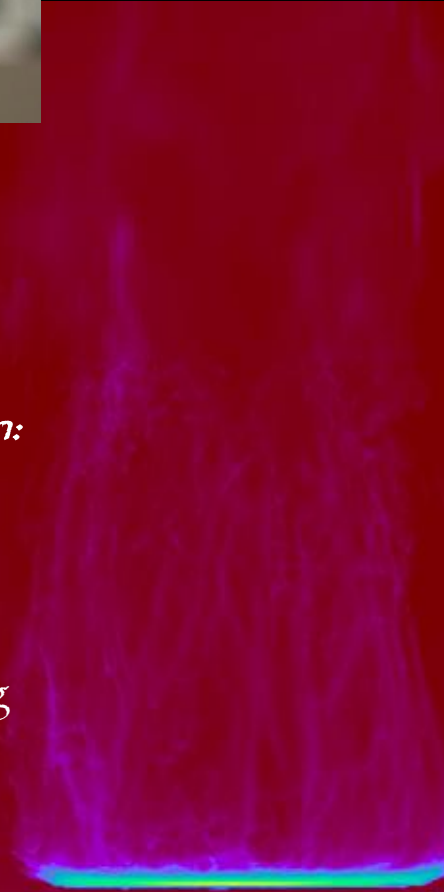
Flatiron Institute, CCA  
stonnes@gmail.com



I use Hydro/MHD simulations:  
Enzo, Athena,  
Analysis-yt, python

*Main Science Question:*  
How is galaxy evolution  
influenced by  
environment?

- Ram Pressure Stripping  
(can RPS be used to probe the environment?)
- Does the large-scale environment matter (on the  $\geq 20$  Mpc scale)?







## Elisa Toloba

Assistant Professor  
University of the Pacific  
(California)



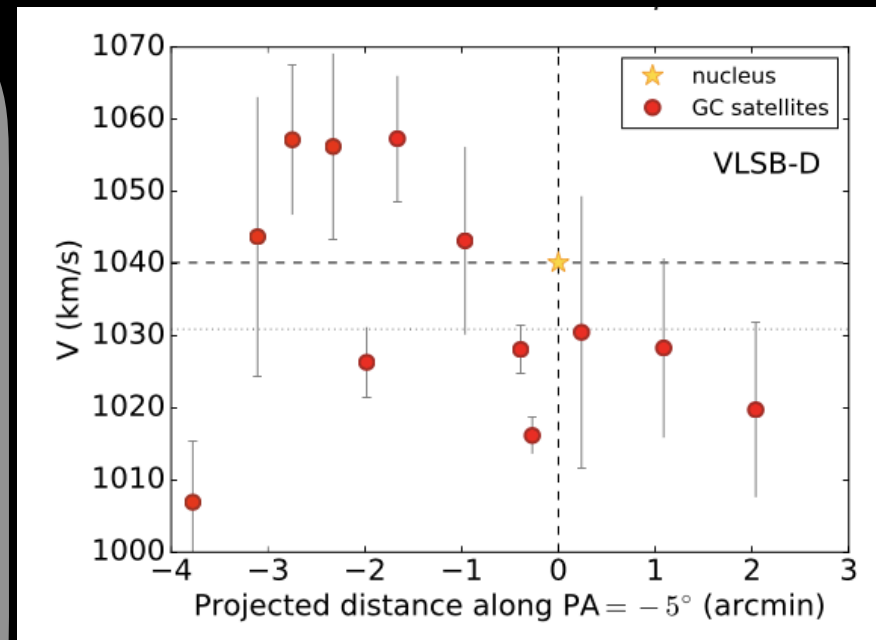
Talk title: Ultra-diffuse galaxies: nature vs. nurture

### Main Research Topic:

✱ Quenched galaxies (kinematics, dark matter, stellar populations, globular clusters, environmental effects on all these properties)

### Specific objects I'm currently working on:

- ✱ Dwarf early-types
- ✱ Dwarf spheroidals
- ✱ Ultra-diffuse galaxies



Rotation curve of an ultra-diffuse galaxy  
Toloba et al. (ApJL, submitted)



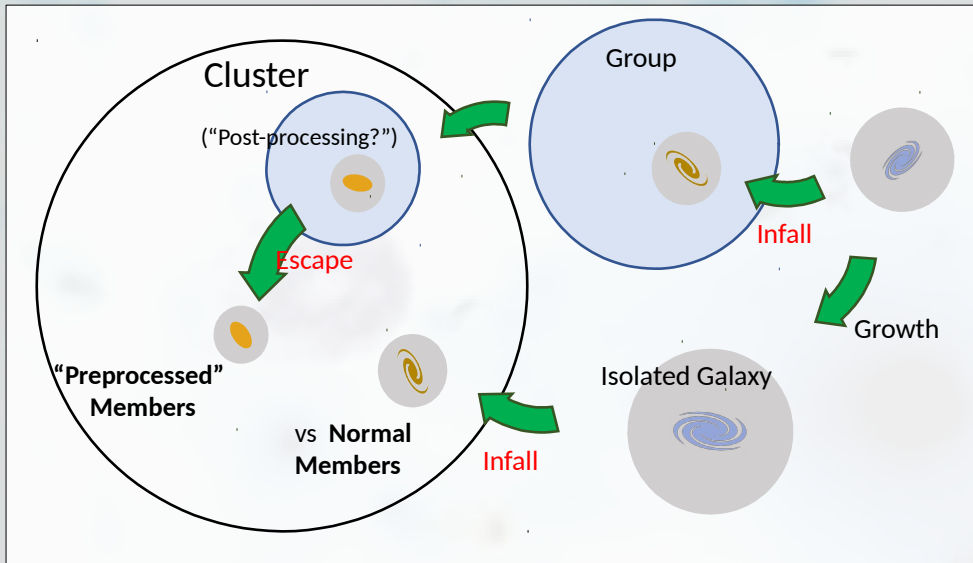


# Rory Smith, Staff Scientist

Korea Astronomy & Space Science Institute (KASI)  
rorysmith@kasi.re.kr



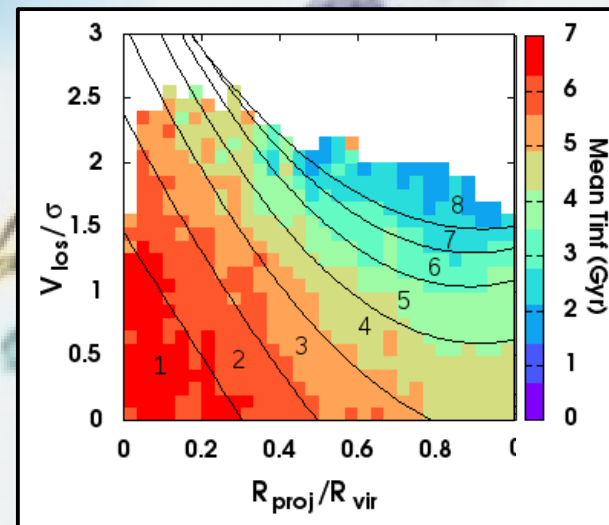
## Talk 1) Preprocessing



- Roughly half of cluster galaxies previously in a host
- Use cluster zoomed cosmological simulations
- Investigate significance for tidal mass loss of cluster population

## Talk 2) Phase-space Diagrams

- Use cluster zoomed cosmological simulations
- Maximise knowledge gained from applying phase-space diagrams
- Applied to clusters and groups







# Paolo Serra

INAF - Osservatorio Astronomico di Cagliari

*Talk: Tidal effects in groups and the Fornax cluster*



Image credit: ESO. Acknowledgement: Aniello Grado and Luca Limatola.

## My research on galaxies

HI mass, morphology, dynamics in early-type galaxies (Atlas<sup>3D</sup>)

Accretion and removal of gas

Study of individual groups and clusters (nearby groups, Coma, Fornax)

Large HI surveys with SKA and its precursors (WALLABY)

Comparison with simulations (EAGLE)





RSJANSSEN@GMAIL.COM

# RUBÉN SÁNCHEZ-JANSSEN

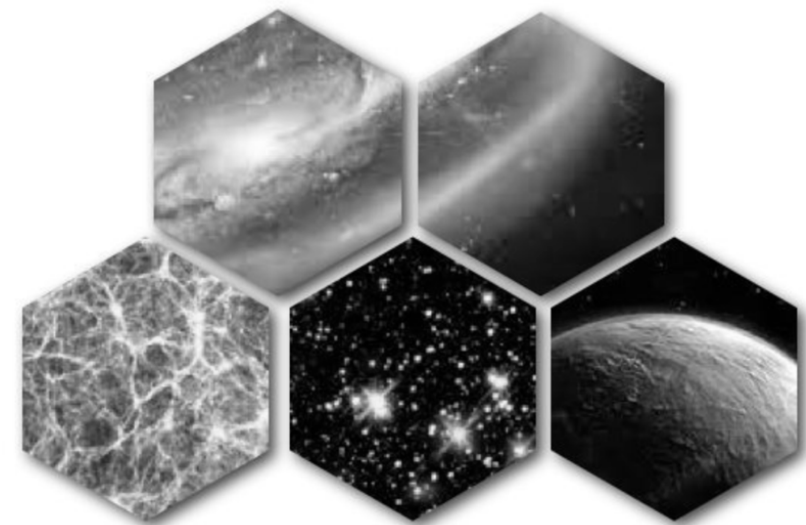
ASTRONOMER / INSTRUMENT SCIENTIST  
UK ASTRONOMY TECHNOLOGY CENTRE  
ROYAL OBSERVATORY EDINBURGH

FUTURE INSTRUMENTATION FOR LARGE TELESCOPES (ESPECIALLY MOS)

PROPERTIES OF LOW-MASS STELLAR SYSTEMS IN HIGH-DENSITY ENVIRONMENTS:

DWARF GALAXIES, NSCS, UCDS, GCS

**TALK:** *CLUSTER DWARFS, THEIR STAR CLUSTERS, AND WHAT IT ALL MEANS*



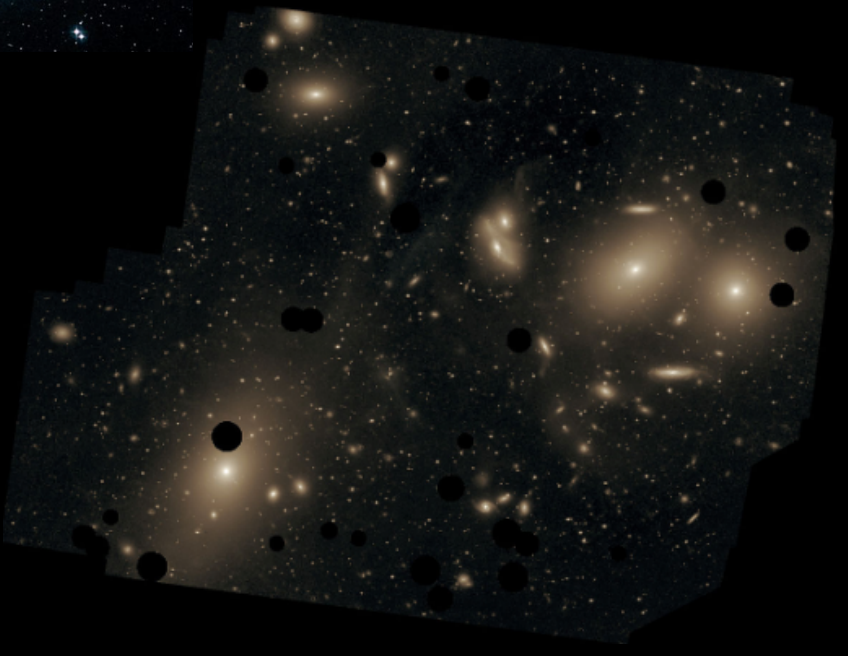
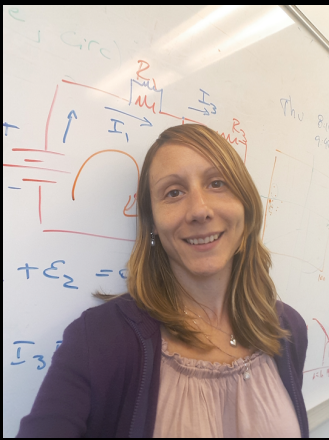
## MOSAIC



# Laura V. Sales

Assist. Prof. UC Riverside (it's 28 C there right now!)

Title:  
Modeling globular clusters on cosmological simulations of Virgo-like objects





Teymoor Saifollahi  
[saifollahi@astro.rug.nl](mailto:saifollahi@astro.rug.nl)

PhD Student - SUNDIAL  
Kapteyn Astronomical Institute  
University of Groningen, Netherlands

## RESEARCH INTEREST

Environmental Effects in Galaxy Evolution  
Multi-wavelength Astronomy  
Small scale clumps of dark matter  
Observational Techniques

## CURRENT ACTIVITIES

Near-Infrared view of Fornax cluster  
Stellar populations of Fornax dwarf galaxies

## FUTURE WORK

Formation History of dwarf galaxies  
Galaxy formation and evolution with  
novel machine learning techniques



university of  
 groningen

faculty of science  
and engineering

kapteyn astronomical  
institute





# Elke Roediger, Lecturer

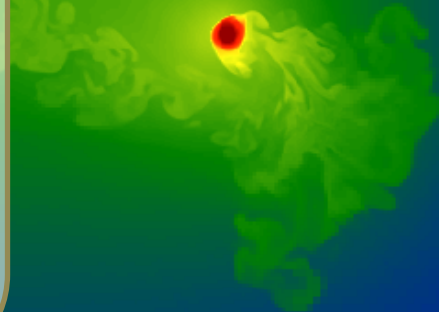
E.A. Milne Centre for Astrophysics,  
University of Hull, UK,

[e.roediger@hull.ac.uk](mailto:e.roediger@hull.ac.uk)

**Talk Title: ICM flow patterns associated with ram pressure stripping - or lessons from non-quasi-steady-state stripping**

## Scientific Focus and Methods:

- Simulate objects (galaxies, sub-clusters) falling into galaxy clusters → ram pressure stripping, gas sloshing, mixing, star formation enhancement, ...
- Compare with observations to figure out dynamic history and ICM physics



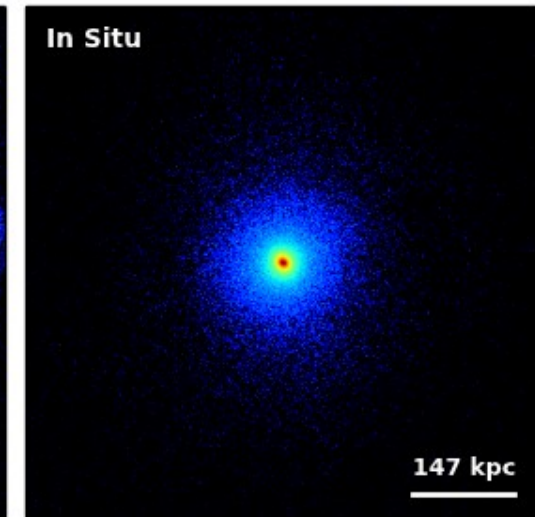
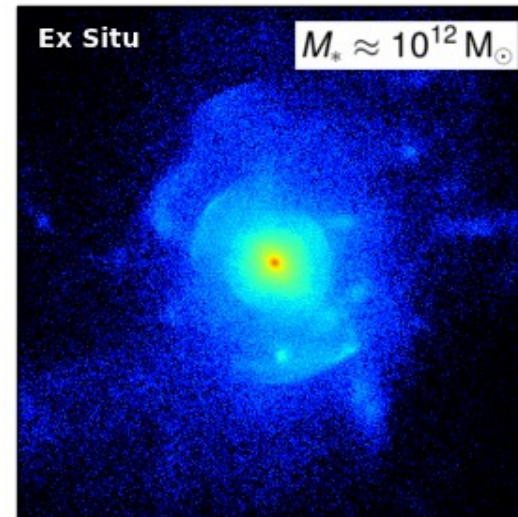
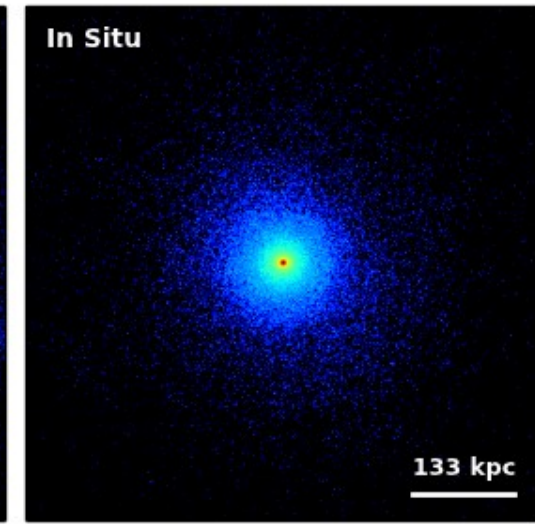
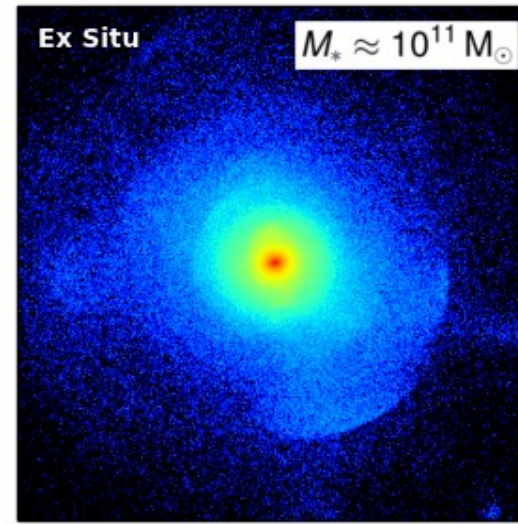


# Vicente Rodriguez-Gomez

Postdoc, Johns Hopkins University  
vrg@jhu.edu



- **Talk title:**  
Galaxy mergers in different environments
- **Scientific focus:**  
Merger rates, *ex situ* stellar mass fractions, galaxy morphologies
- **Methods:**  
Cosmological hydrodynamic simulations, merger trees







Marina Rejkuba

ESO

Talk Title:

Observations of extended low surface brightness halos around massive galaxies in the nearby universe





Marc Postman, Astronomer

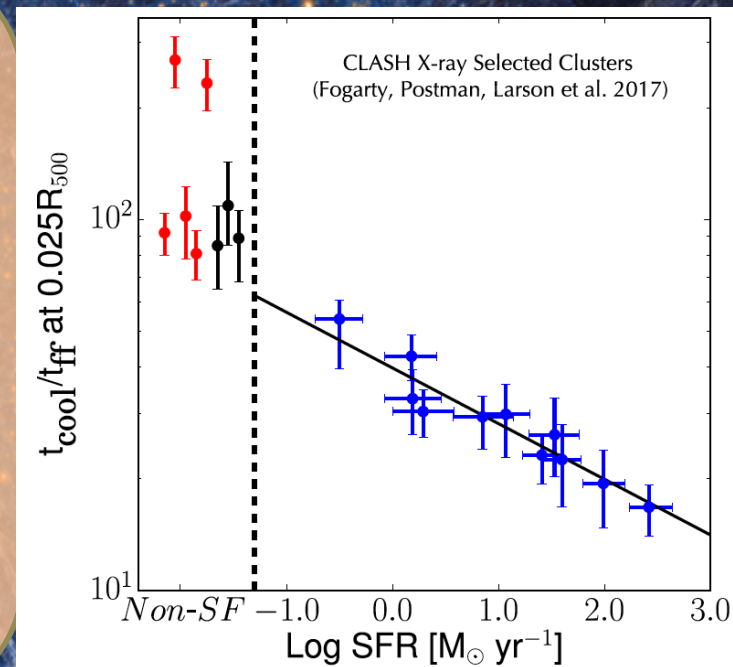
Space Telescope Science Institute (STScI)

postman@stsci.edu

Talk Title: BCGs & Their Relation to the Cluster Environment

Scientific Focus and Methods:

- Observational studies of
  - Galaxy Clusters
  - Brightest Cluster Galaxies (BCG)
- Evolution of Galaxy Cluster Properties
- Constraints on Cluster Dark Matter
- Relationship Between BCG SF & ICM





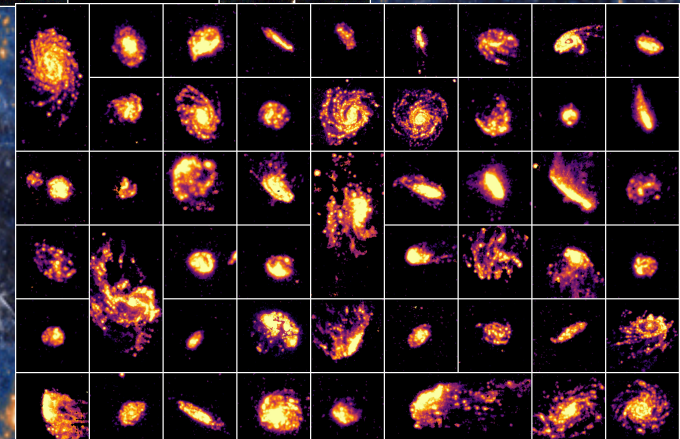
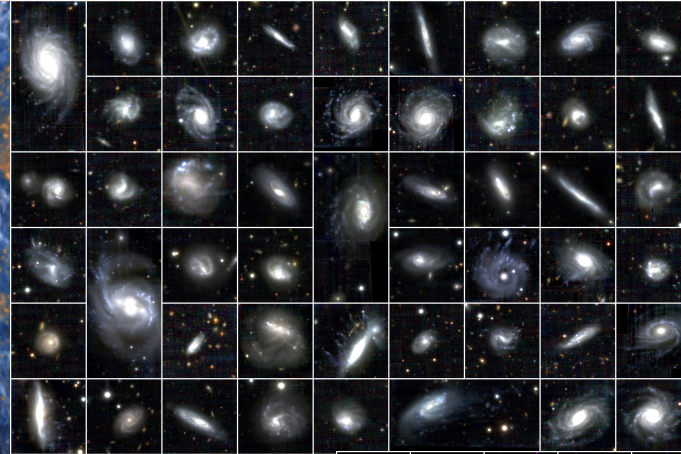


Bianca Poggianti, Staff  
INAF-Osservatorio Astronomico di  
Padova  
bianca.poggianti@oapd.inaf.it



Talk title: **Gas stripping phenomena with MUSE integral field spectroscopy**

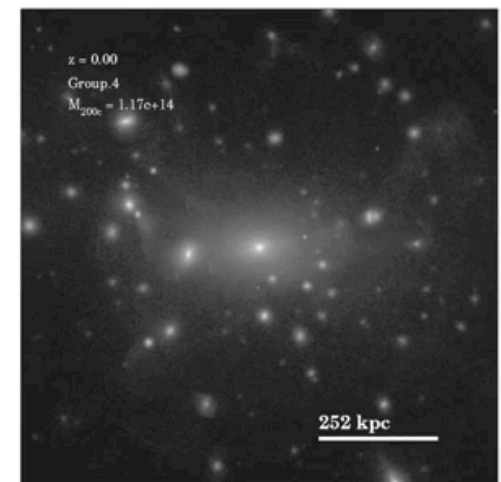
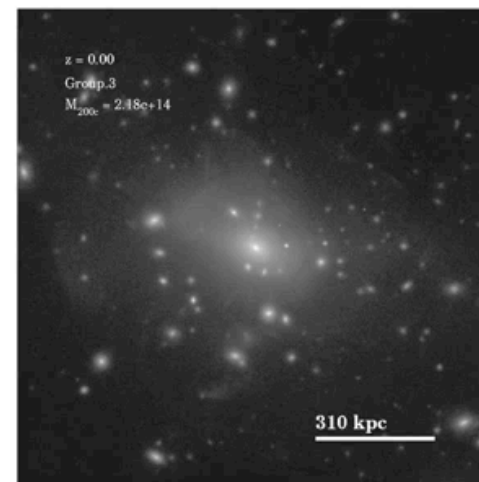
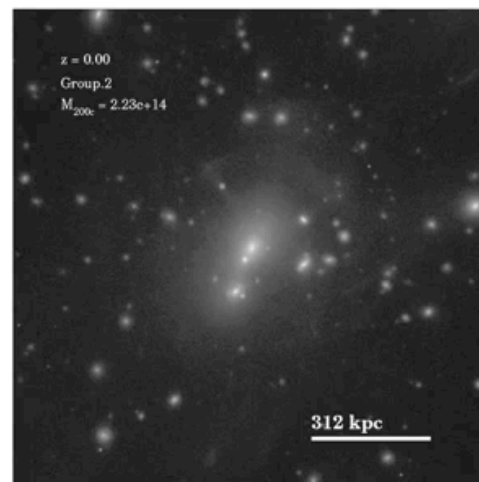
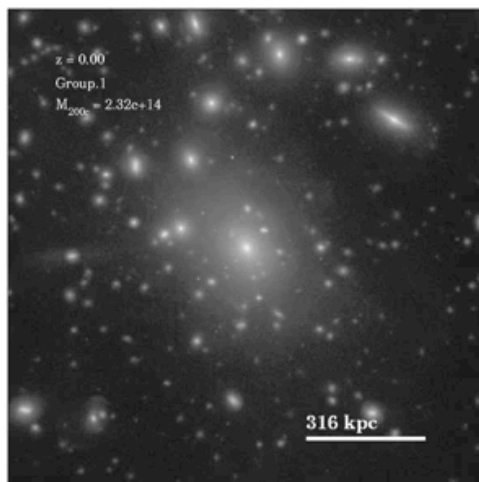
- Gas and galaxy evolution
- Star formation activity and history
- Formation and evolution of galaxies in clusters, groups, filaments and field
- Integral-field spectroscopy







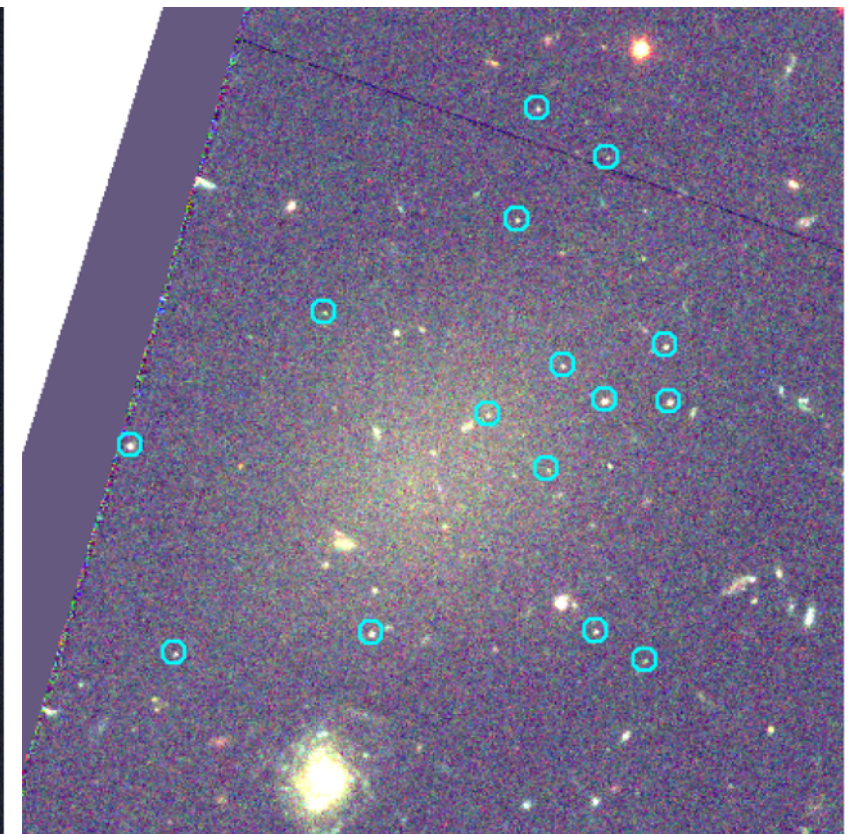
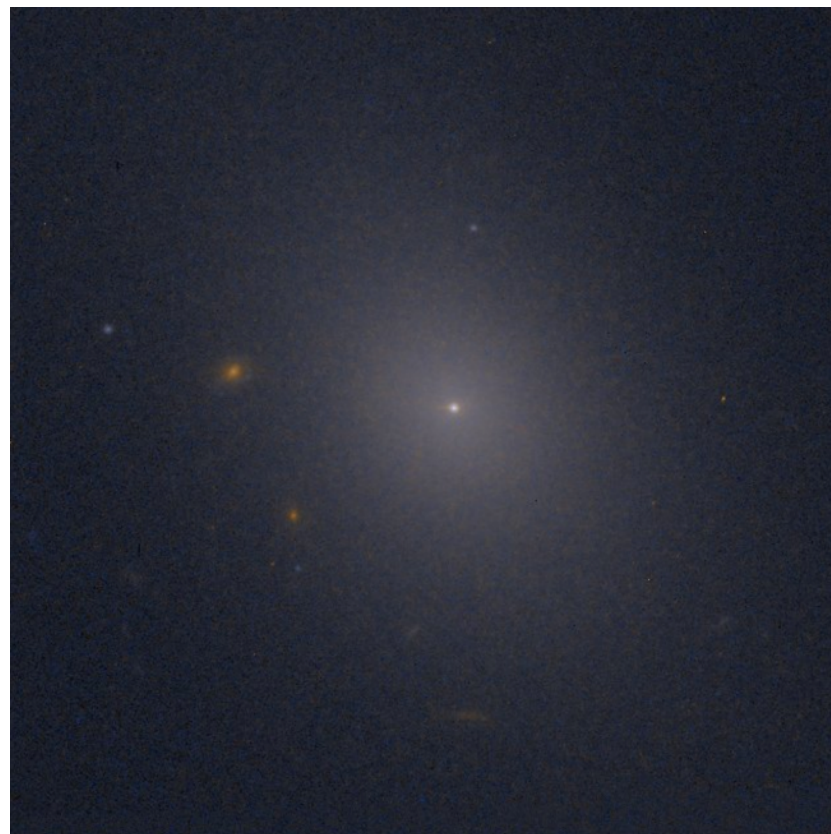
- Current Position: Independent Research Group Leader, MPIA Heidelberg
- Talk: “The stellar mass content of groups and clusters with the TNG simulations” (on Thursday)
- Current Scientific Focus/Methods:
  - Development of Large-scale gravity+MHD Simulations of Gravity: **IllustrisTNG ([www.tng-project.org](http://www.tng-project.org))**
  - Galaxy evolution, stellar haloes and intracluster light, cluster assembly and cluster cosmology, interaction DM-baryonic processes...





# Eric Peng

- Associate Professor, Peking University  
Department of Astronomy and the Kavli Institute for Astronomy and Astrophysics (KIAA)
- Interests:
  - Globular cluster systems: what do they tell us about their host galaxies?
  - Compact stellar systems (UCDs, GCs)
  - Galaxy dynamics, chemical abundances
  - Nearby galaxy groups and clusters (Virgo, Fornax, Coma et al.)
- Talk: “Globular clusters in low mass galaxies as probes of quenching”







# Reynier Peletier, Professor

Kapteyn Institute, Groningen

peletier@astro.rug.nl

## Talk Title:

The Fornax Deep Survey', a Modern study of Dwarf Galaxies in Fornax.

## Scientific Interests:

- The Evolution of dwarf galaxies
- The Fornax Cluster (PI of FDS Survey)
- Stellar Population analysis
- Ultra Diffuse Galaxies
- Developing novel data-science methods for astronomy (PI of the SUNDIAL EU ITN)







Dylan Nelson

Postdoctoral Fellow (MPA)

[dnelson@mpa-garching.mpg.de](mailto:dnelson@mpa-garching.mpg.de)

talk: Review on [theoretical] models

Scientific focus and methods:

- Cosmological magneto-hydrodynamical sims.
- Gas accretion, circumgalactic medium (OVI, VII, VIII)
- Galactic feedback, baryon cycle, inflows & outflows
- Galaxy evolution: the color bimodality, quenching
- Illustris, IllustrisTNG, ...



**Josefina Michea,  
PhD student**

Astronomisches Rechen-Institut,  
Zentrum für Astronomie der Universität  
Heidelberg (ZAH)



IMPRS fellow, DAAD scholarship holder

Supervisor: Dr. Thorsten Lisker

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**Talk title: “Searching for substructure in Fornax Deep Survey (FDS) dwarf galaxies”**

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Scientific interests: dwarf galaxies and their relation to environment



Brian McNamara

University of Waterloo in Ontario Canada, about an hour outside of Toronto

I study galaxies and clusters across the electromagnetic spectrum

I will discuss atmospheric gas cooling and feedback from supermassive black holes

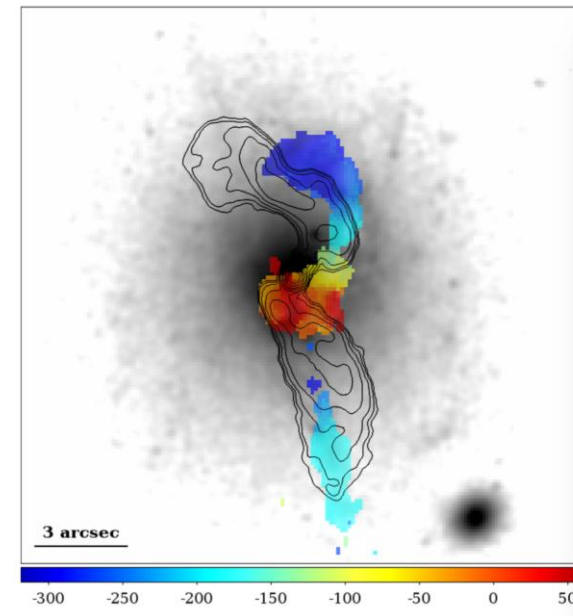
My talks will focus on ALMA CO & X-ray observations of clusters and galaxies

I will conjecture that warm gas uplifted behind buoyant cavities governs radio-mode feedback

I work with an outstanding team of young researchers including, Helen Russell, Iurii Babyk, Mike Hogan, Adrian Vantyghem, Pratamesh Tamhane, and others.

I have collaborated closely with Paul Nulsen for 20 years.

ALMA image of molecular gas being lifted out of the central galaxy in Abell 1795 by radio jets – Russell + 17







Sean McGee, Lecturer

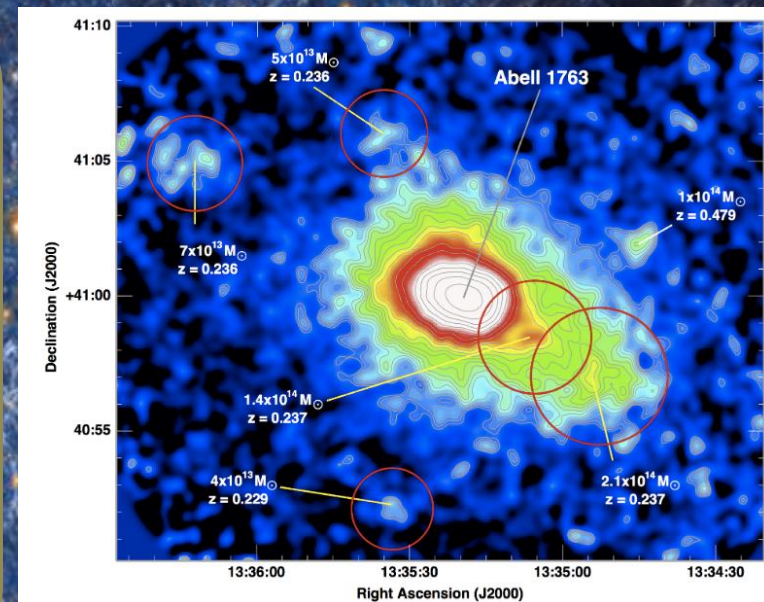
University of Birmingham

smcgee@star.sr.bham.ac.uk

Talk Title: Pre-processing in galaxy groups falling into massive galaxy clusters

Scientific Focus and Methods:

- Quenching of star formation in groups and clusters
- Models of environmental effects
- Low surface brightness features







# Thorsten Lisker, Lecturer

Zentrum für Astronomie  
der Universität Heidelberg (ZAH)

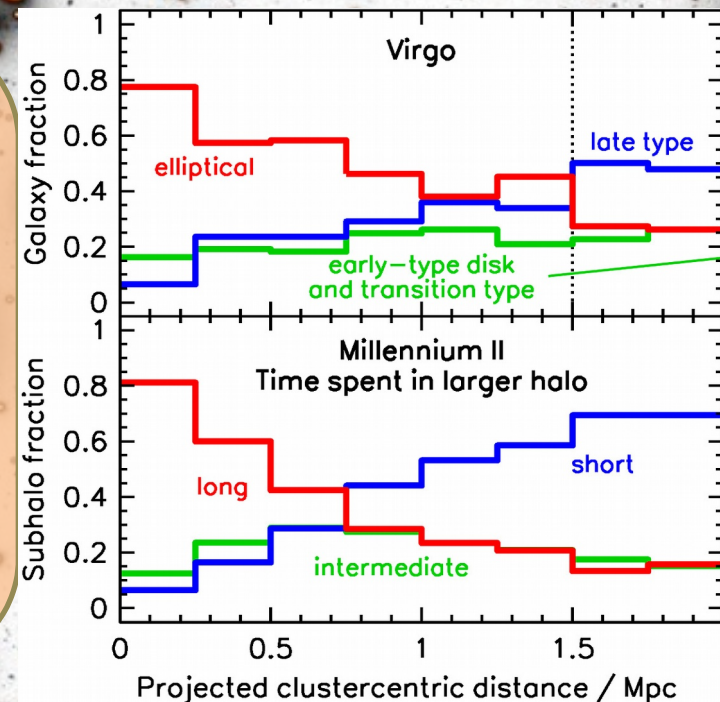
[www.dwarfgalaxies.net](http://www.dwarfgalaxies.net)

*„How to discriminate between cluster galaxy properties imprinted at birth and resulting from environmental transformation“*

*Talk on Tuesday 5:15 pm*

## Scientific Focus and Methods:

- The structure, stel.pops, dynamics of today's cluster dwarf galaxies have been shaped....in that same cluster? Elsewhere? When? How? Why?
- Compare observations to sims/models
- Focus: better with chocolate
- Method: eat it quickly!





# *Yen-Ting Lin* 林彥廷



- associate research fellow at Institute of Astronomy & Astrophysics, Academia Sinica (ASIAA) in Taipei, Taiwan
- interested in
  - BCG+ICL
  - cluster galaxy evolution
  - radio galaxies
  - galaxy-halo connection (assembly bias, SHAM, etc)
  - application of machine learning
- will talk about cluster galaxy evolution from Subaru Hyper Suprime-Cam (HSC) survey







# Ryan Leaman, Postdoc

Max-Planck-Institut für Astronomie (MPIA)

[leaman@mpia.de](mailto:leaman@mpia.de)

**Talk Title: The Survival of a Relic Galaxy in the Centre of Perseus**

## Scientific Interests:

- GC-host galaxy co-evolution
- Galaxy accretion histories
- Dwarf galaxy chemodynamical evolution
- Local Group + SAMs







Claudia Lagos

ICRAR

Talk Title:

The connection between mass, environment and slow rotation  
in simulated galaxies

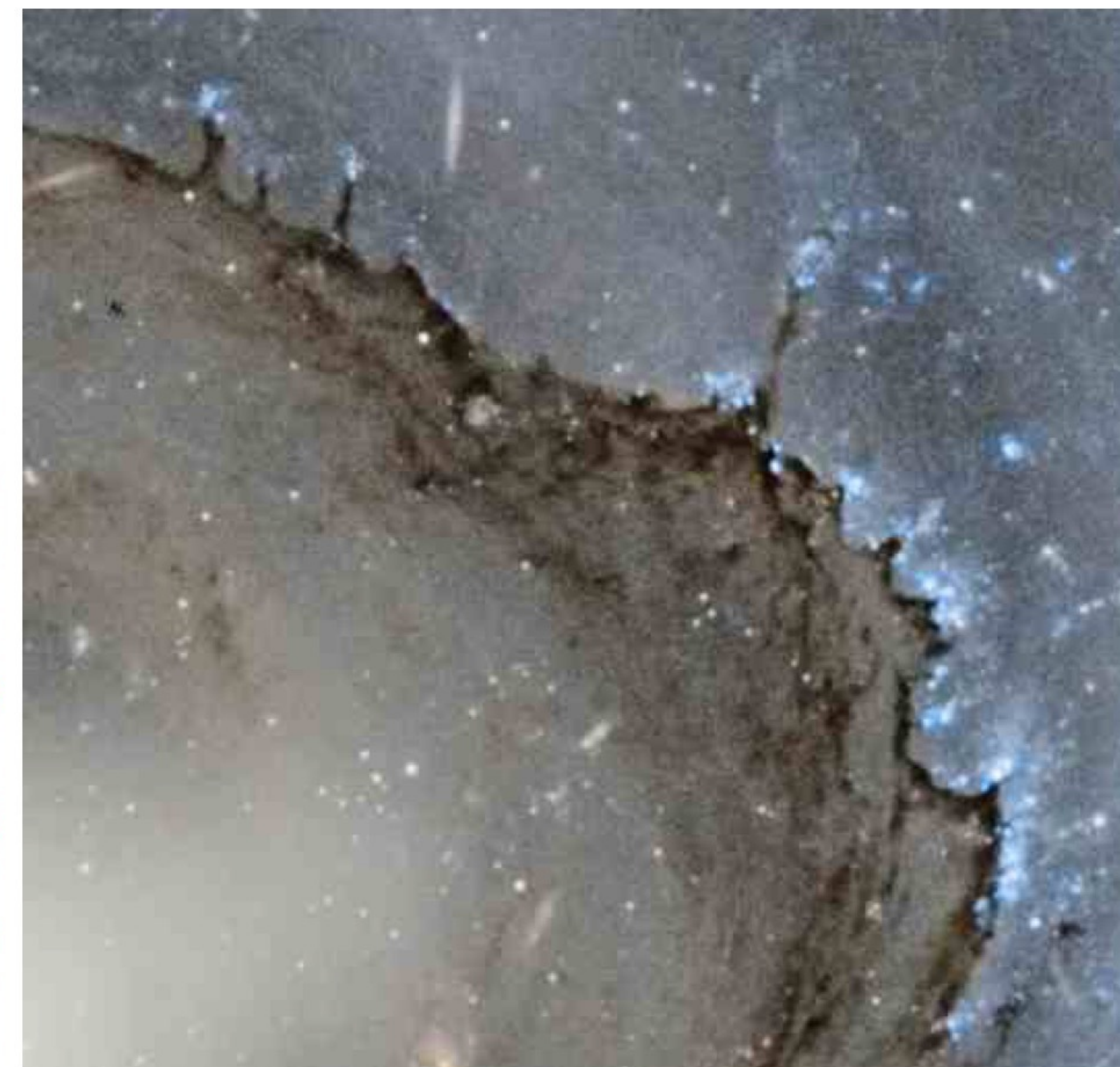
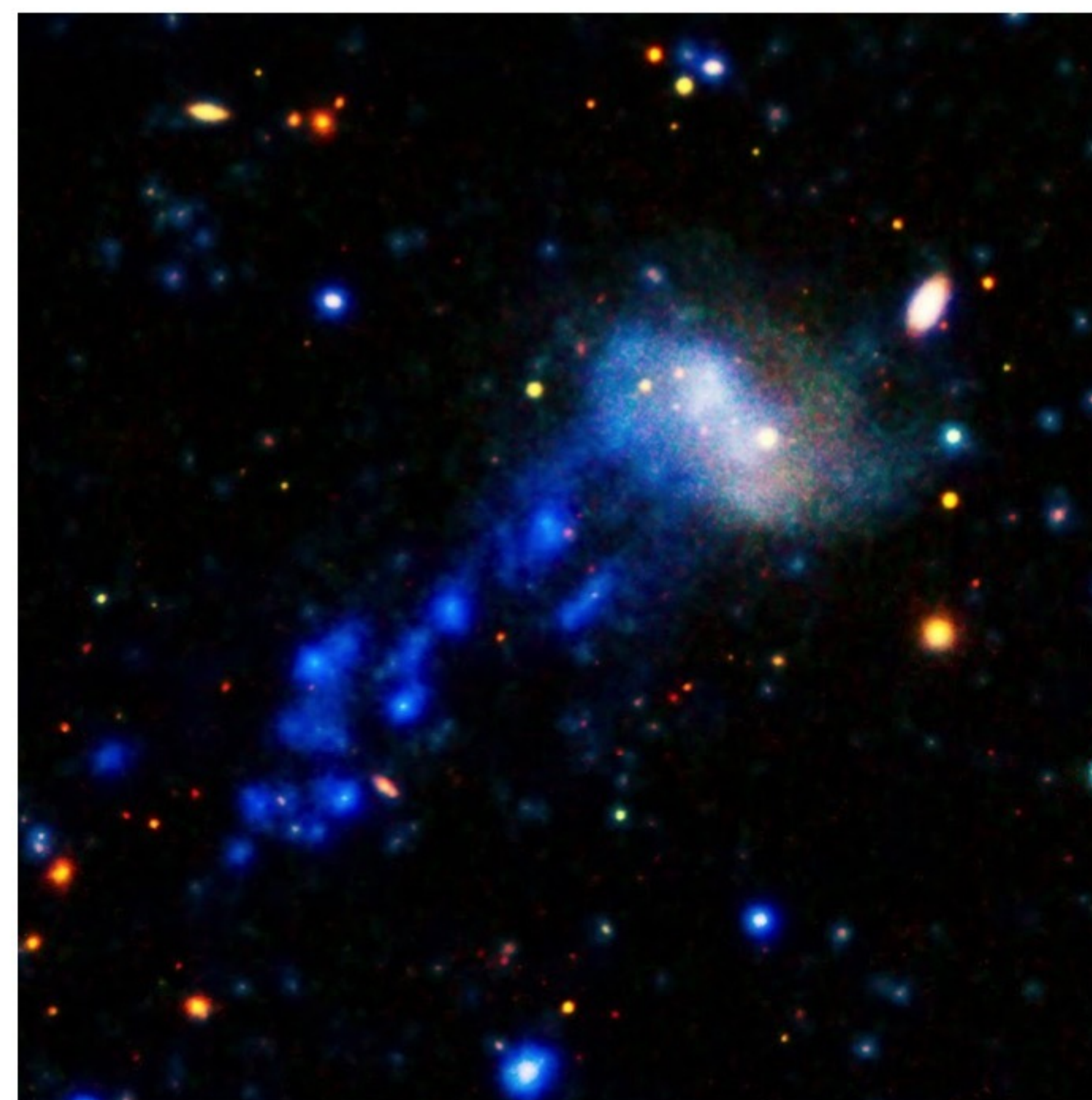
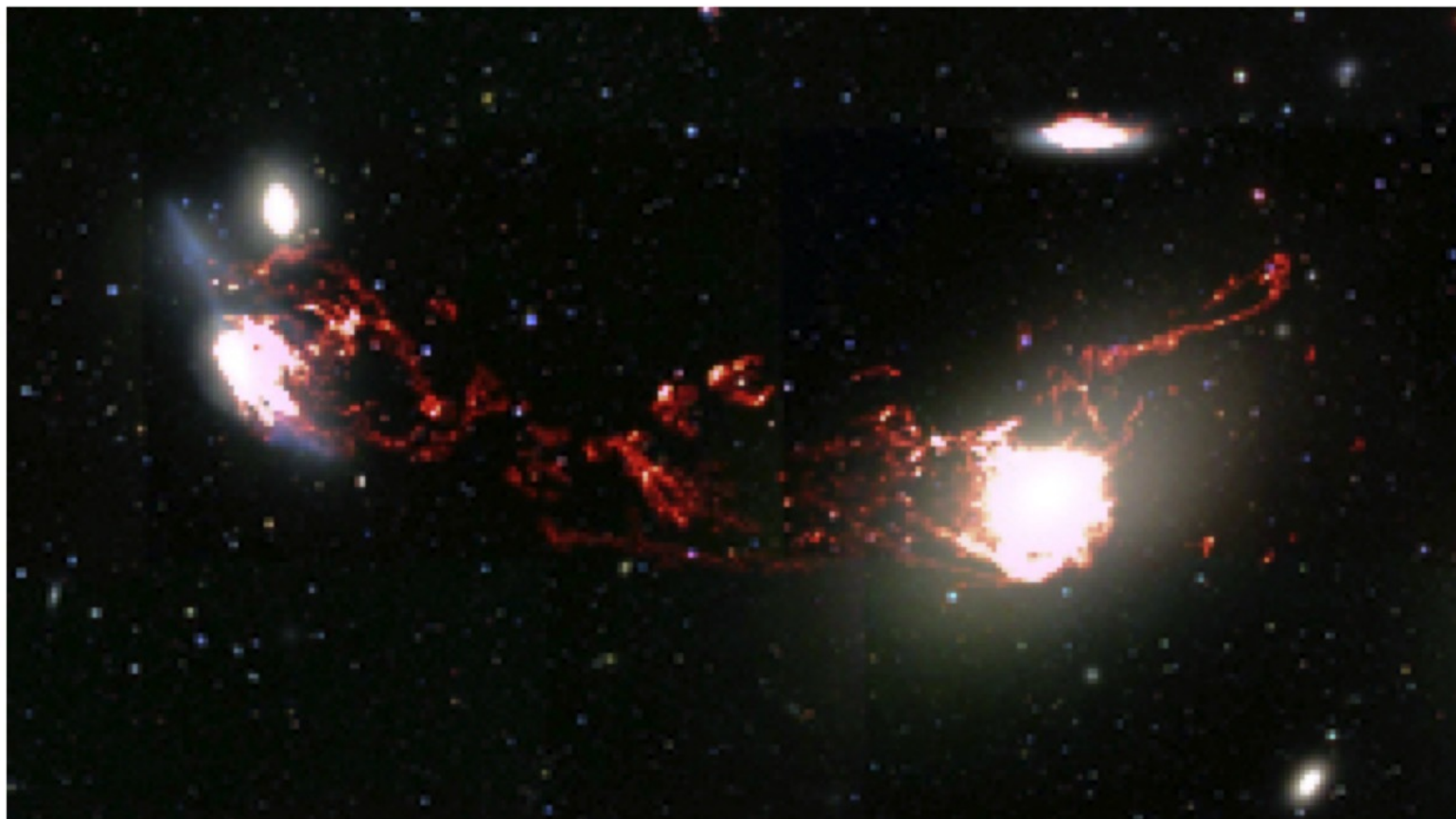


# Prof. Jeff Kenney Yale University USA

Galaxies: Radio & Optical observer



Environmental effects on cluster galaxies  
Structure & evolution of nearby galaxies  
Gas in galaxy centers – starbursts & black holes







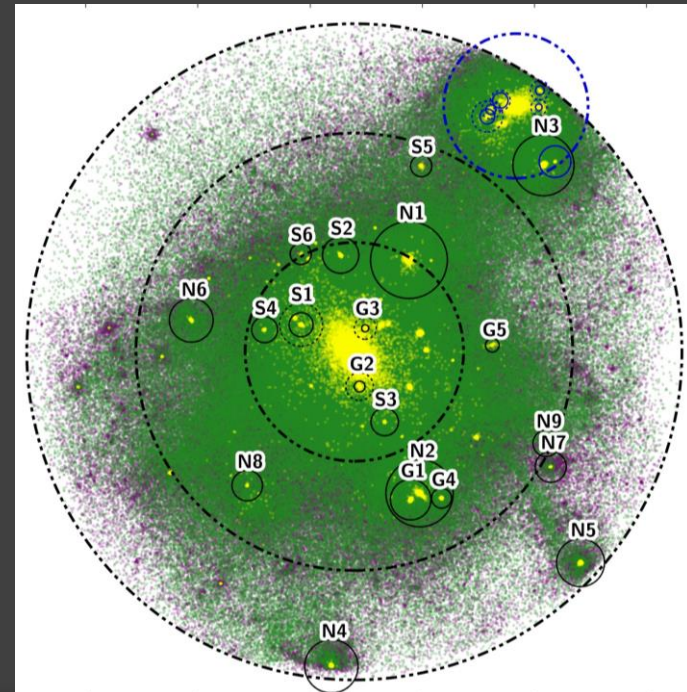
Gandhali Joshi

Postdoc, Max Planck Institute for Astronomy (MPIA)  
joshi@mpia-hd.mpg.de

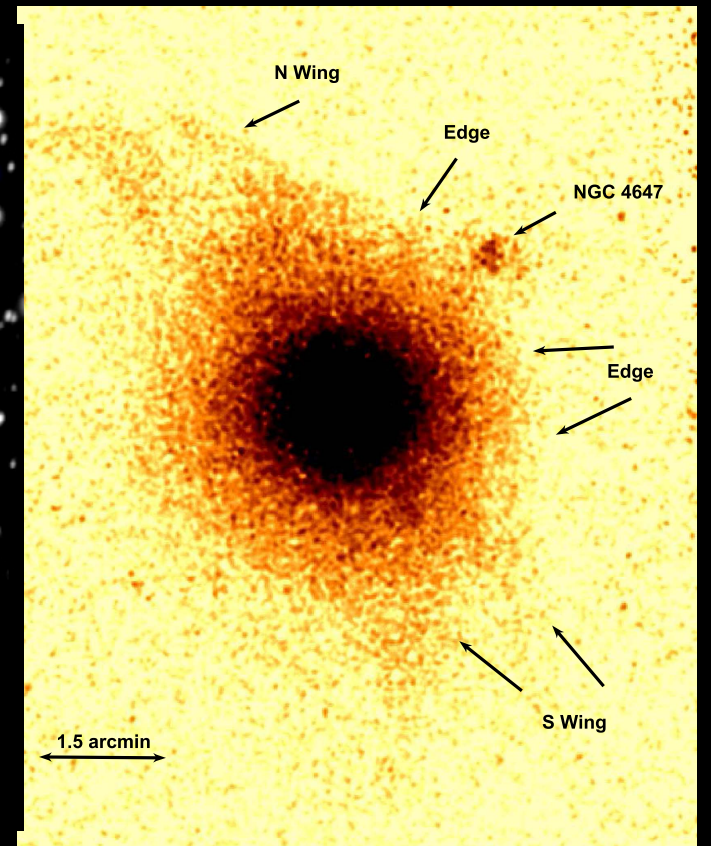
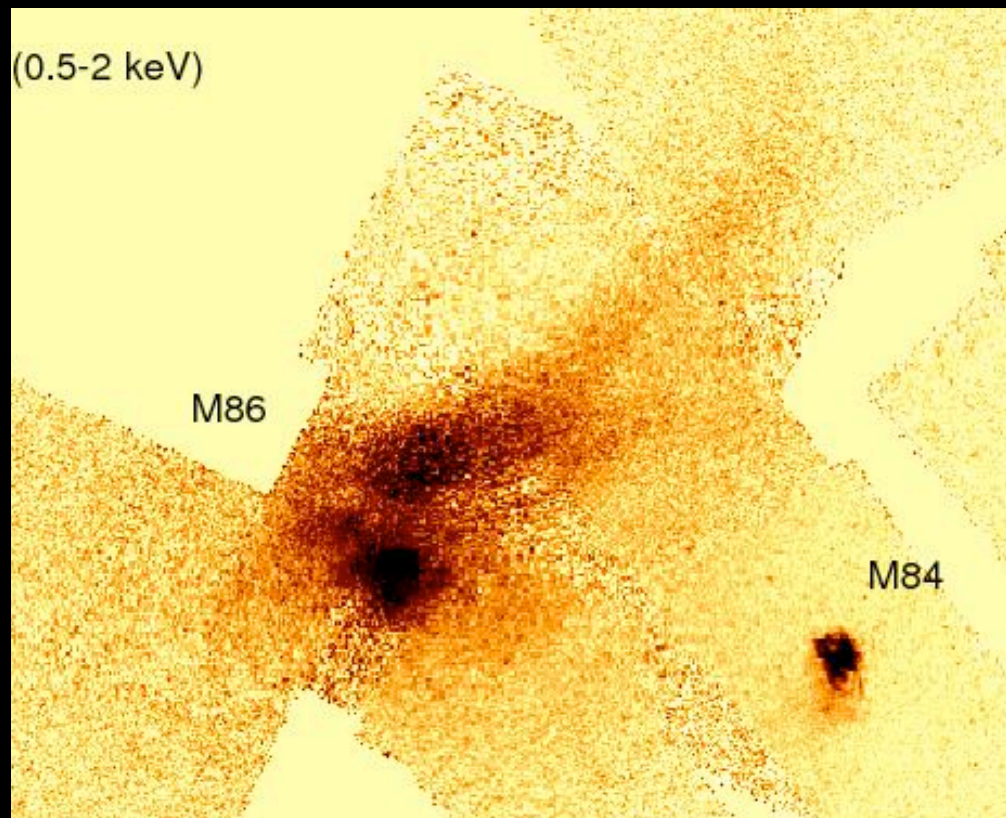
## Talk title: Mass Loss and Preprocessing of Group Galaxies

### Research interests and methods:

- Galaxy evolution in groups and clusters
- The role of preprocessing in determining mass loss and final galaxy properties
- Zoom-in simulation of galaxy group







# The infall of galaxies into clusters - the formation of long and short hot gas tails

Christine Jones , William Forman, Eugene Churazov,  
Yuanyuan Su, Ralph Kraft, Ming Sun, Scott Randall, Paul  
Nulsen, John Zuhone, Elke Roediger

**Christine Jones**  
**Senior Astrophysicist, Smithsonian Astrophysical Observatory, CfA**  
**President, American Astronomical Society**







# Pavel Jáchym

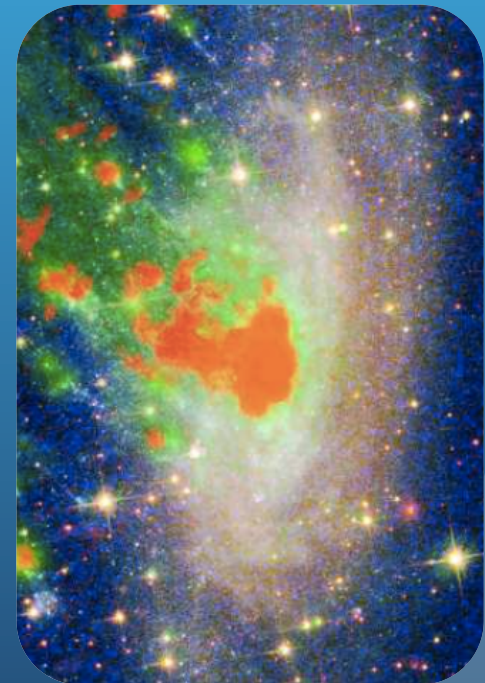
Czech Academy of Sciences (CAS), Prague

[jachym@ig.cas.cz](mailto:jachym@ig.cas.cz)

## Talk: Molecular Gas in Ram Pressure Stripped Tails

### Scientific focus and methods:

- Ram pressure stripping and evolution of galaxies in clusters
- Optically dark clouds in clusters
- Effects of AGN feedback on star formation
- Millimeter observations
- Numerical simulations
- EU ARC – Czech node







Bruno Henriques

ETH Zurich

Talk Title:

The link between AGN and environmental quenching





# Oleg Gnedin

Associate Professor  
University of Michigan, USA

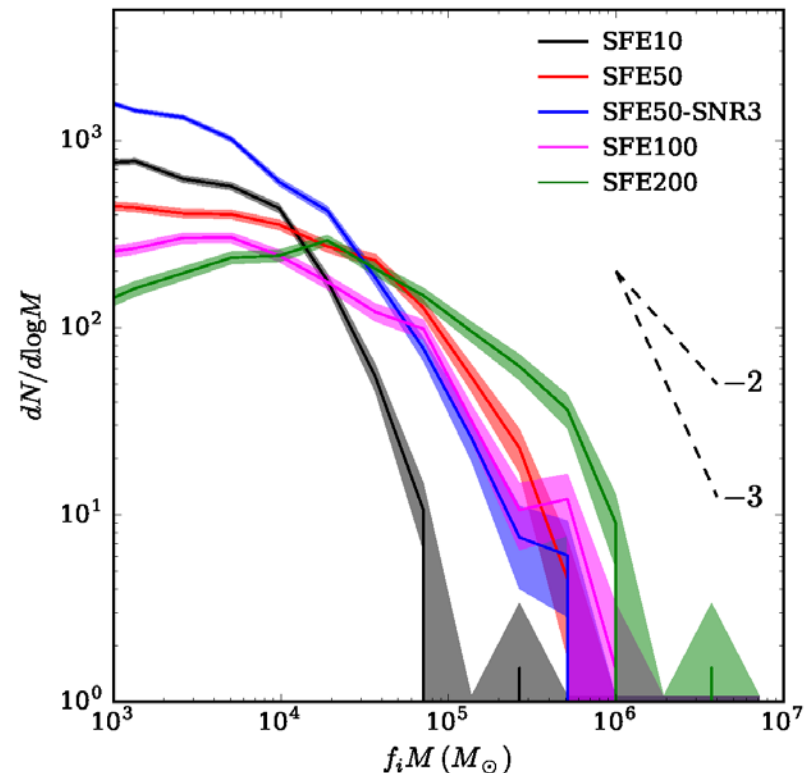
Talk title:

On the origin of the correlation between halo mass  
and its globular cluster system mass

Research interests:

Simulations of galaxy formation  
Formation of massive star clusters  
Origin of globular clusters

Plot: direct modeling of star clusters in  
cosmological simulations allows new tests of  
the implementation of star formation







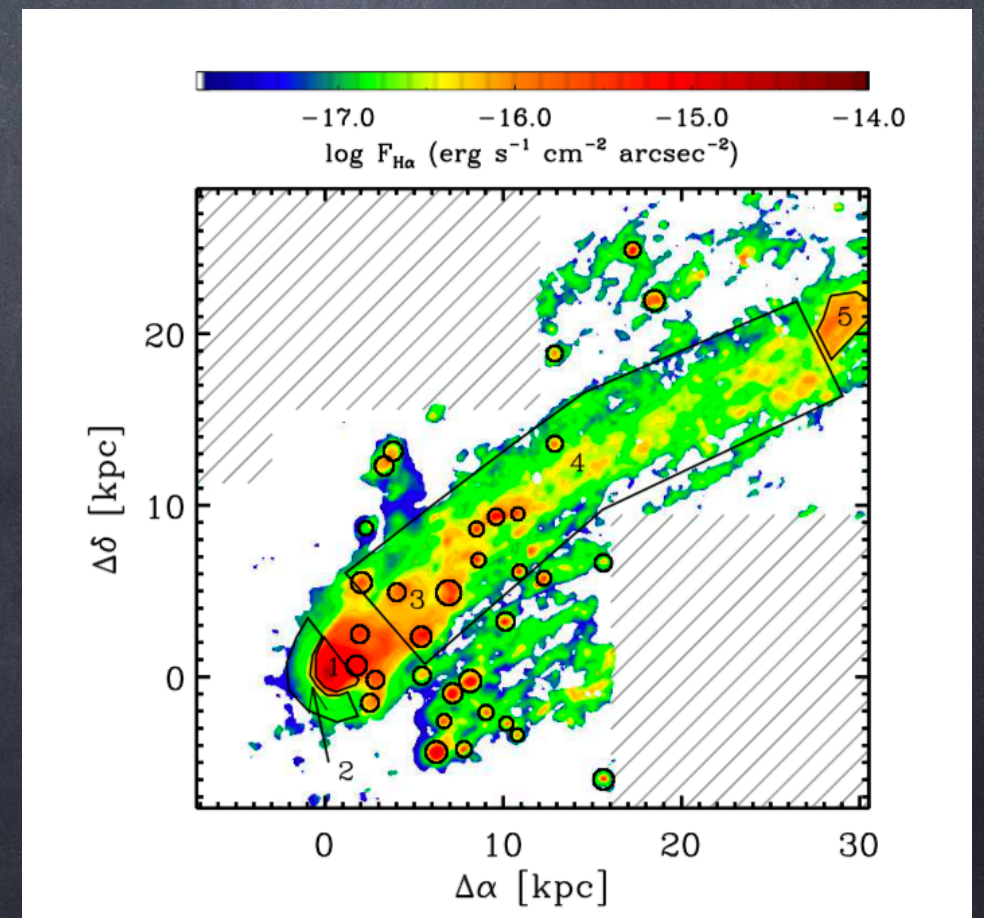
Matteo Fossati, Postdoc  
Max Planck Institut für  
Extraterrestrische Physik (MPE)  
mfossati@mpe.mpg.de

Talk Title: A spatially resolved view of gas stripping processes  
in nearby clusters

Scientific focus and methods:

Gas kinematics and ionization conditions  
Stellar populations in dense environments  
Environmental quenching

3D spectroscopy  
Statistical studies of high- $z$  samples







**Bill Forman**

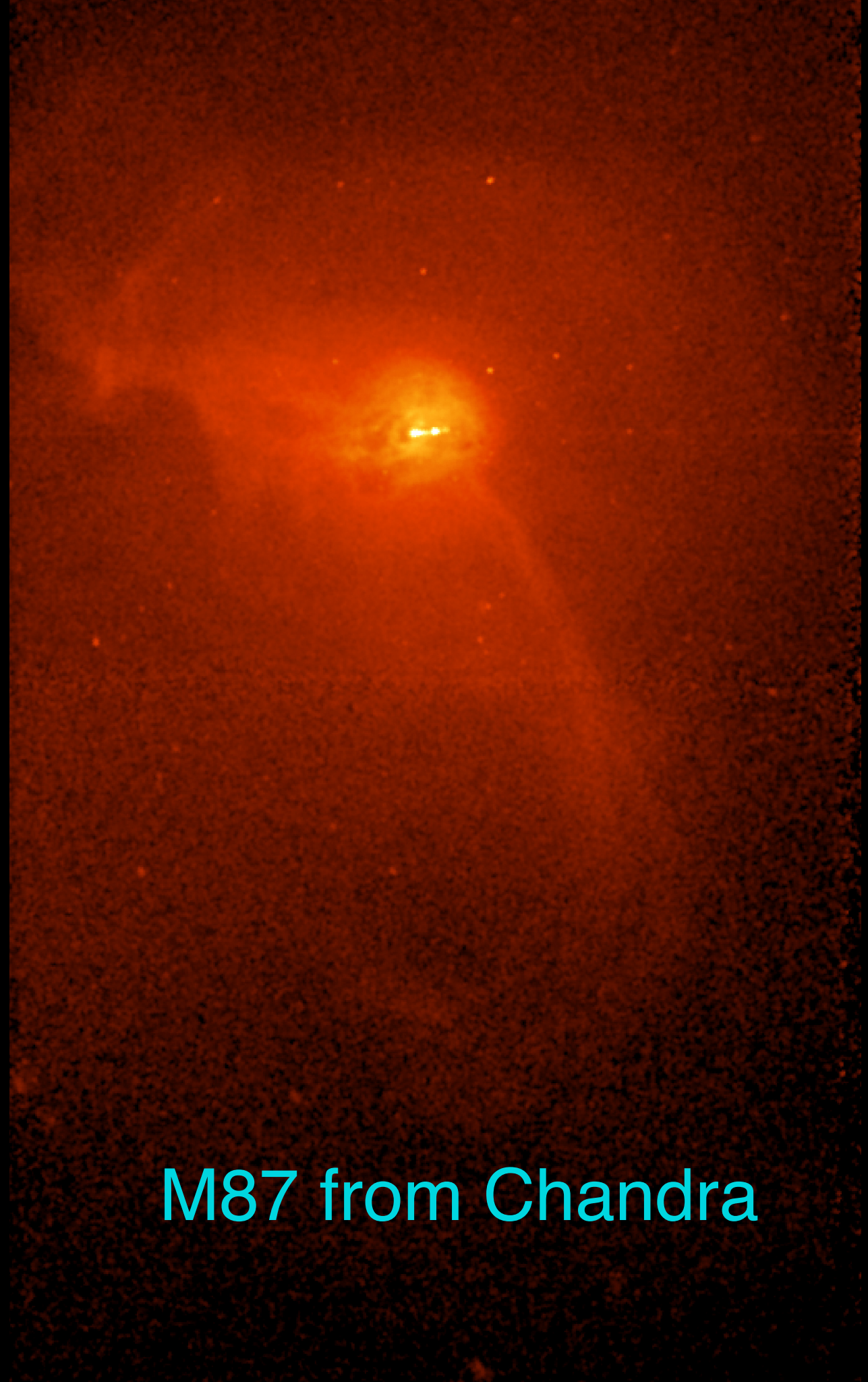
**Director**

**High Energy Astrophysics Division**

**Senior Astrophysicist**

**Smithsonian Astrophysical Observatory**

**CfA Cambridge, MA**



**M87 from Chandra**





Christoph Engler, Research Assistant

Astronomisches Rechen-Zentrum, Zentrum für  
Astronomie der Universität Heidelberg (ARI/ZAH)

christoph@dwarfgalaxies.net

Talk Title: **Intrinsic Scatter of the Mass-Metallicity  
Relation in Illustris Dwarfs**

Scientific Focus and Methods:

- Dwarf galaxies in clusters
- Analysis of low-mass galaxies in the Illustris simulation
- Linking a cluster's assembly history to galaxy properties





# Eric Emsellem, Faculty

European Southern Observatory (ESO)  
& CRAL – Obs Lyon

[eric.emsellem@eso.org](mailto:eric.emsellem@eso.org)

**Talk Title:** Is prolateness the (dominant) rule for BCGs?

## Scientific Focus and Methods

- Analytic models and hydro simulations
- Mostly IFU (e.g., MUSE, MaNGA) obs
- From dwarf to massive galaxies
- Star formation vs dynamics
- Stellar clusters and nuclei







Martina Donnari, Postdoc

Max Planck Institute for Astronomy

donnari@mpia-hd.mpg.de

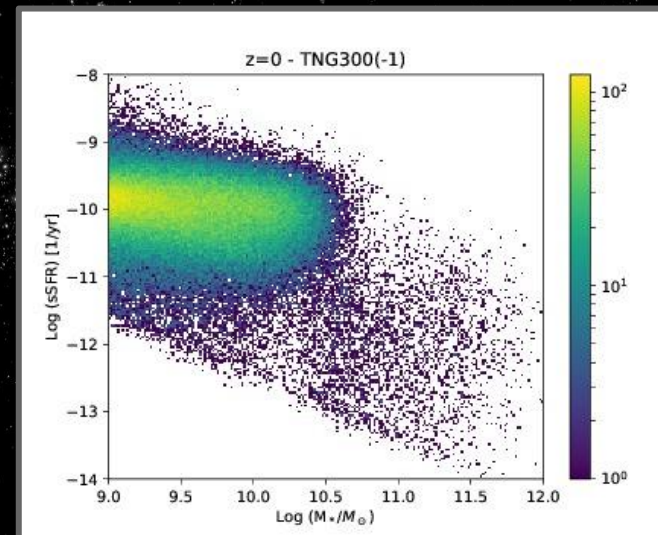
Talk title (flash talk): *The effects of environment on the star formation activity of galaxies with the IllustrisTNG simulation*

### Scientific focus

- ★ Star formation rate in different environments

### Method

- ★ Cosmological simulation: IllustrisTNG







## Luca Cortese, Staff

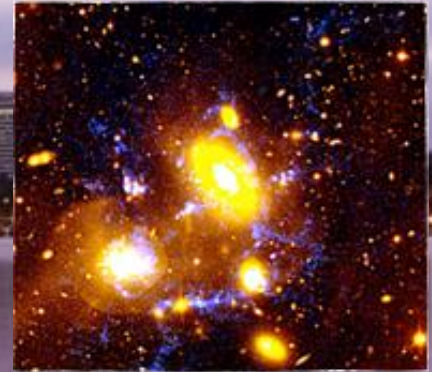
International Centre for Radio Astronomy Research  
University of Western Australia

luca.cortese@uwa.edu.au

Talk Title: **Cold gas stripping in galaxy groups**

### Scientific Focus and Methods:

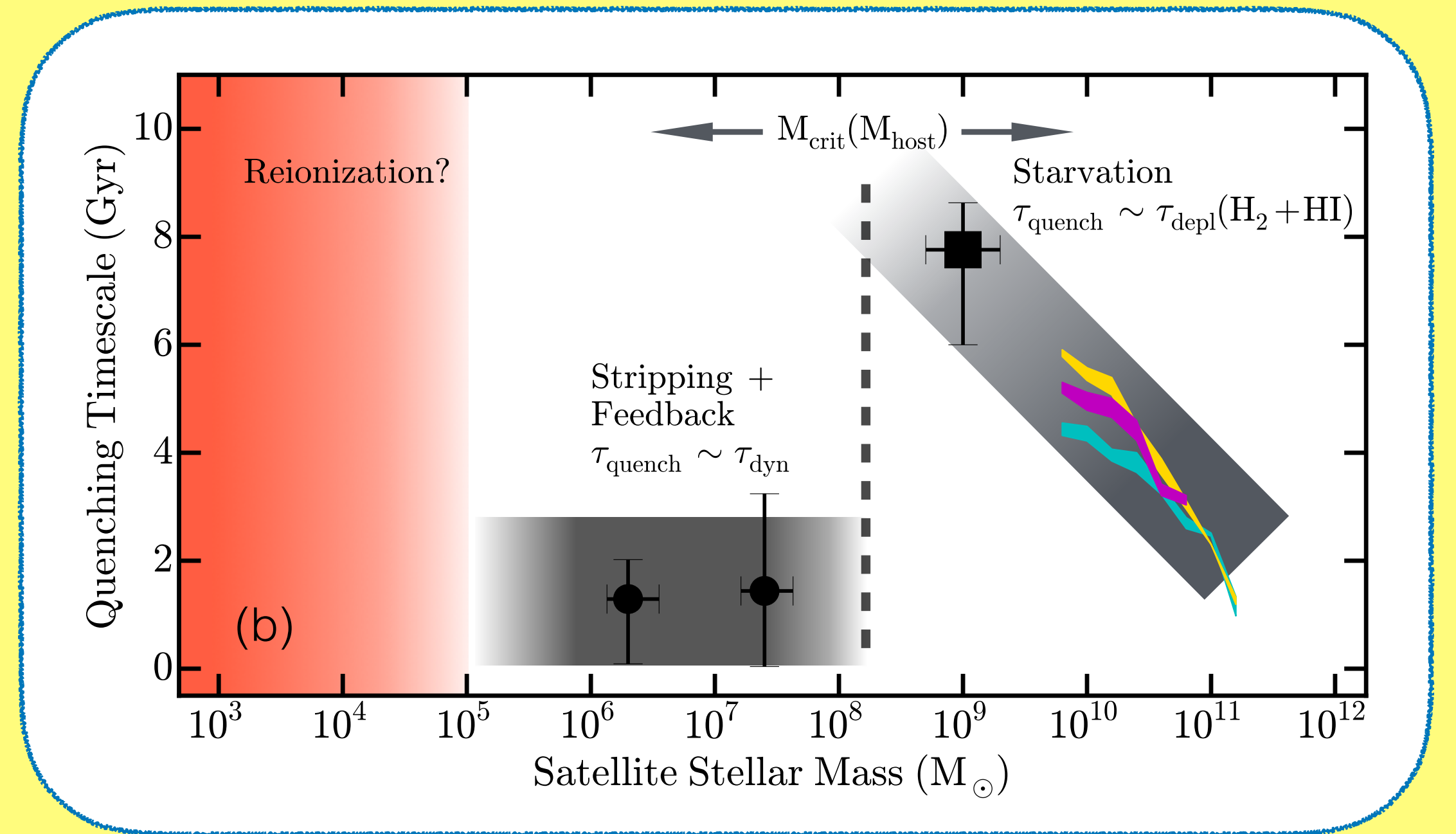
- Gas/Star-formation cycle
- Quenching time-scales and stripping
- Morphological transformation
- Integral Field Spectroscopy (SAMI)
- HI and H<sub>2</sub> surveys (xGASS, ALFALFA)
- Panchromatic view of galaxies







**Mike Cooper**  
**Faculty @ UC Irvine**



**Talk Title — Project Purple Rain ♀: When Doves Cry, Satellites Quench**



**Some Scientific Foci:**

- galaxy evolution  $z < 3$
- the Local Volume
- the GOGREEN Survey
- PHIBSS2 Survey





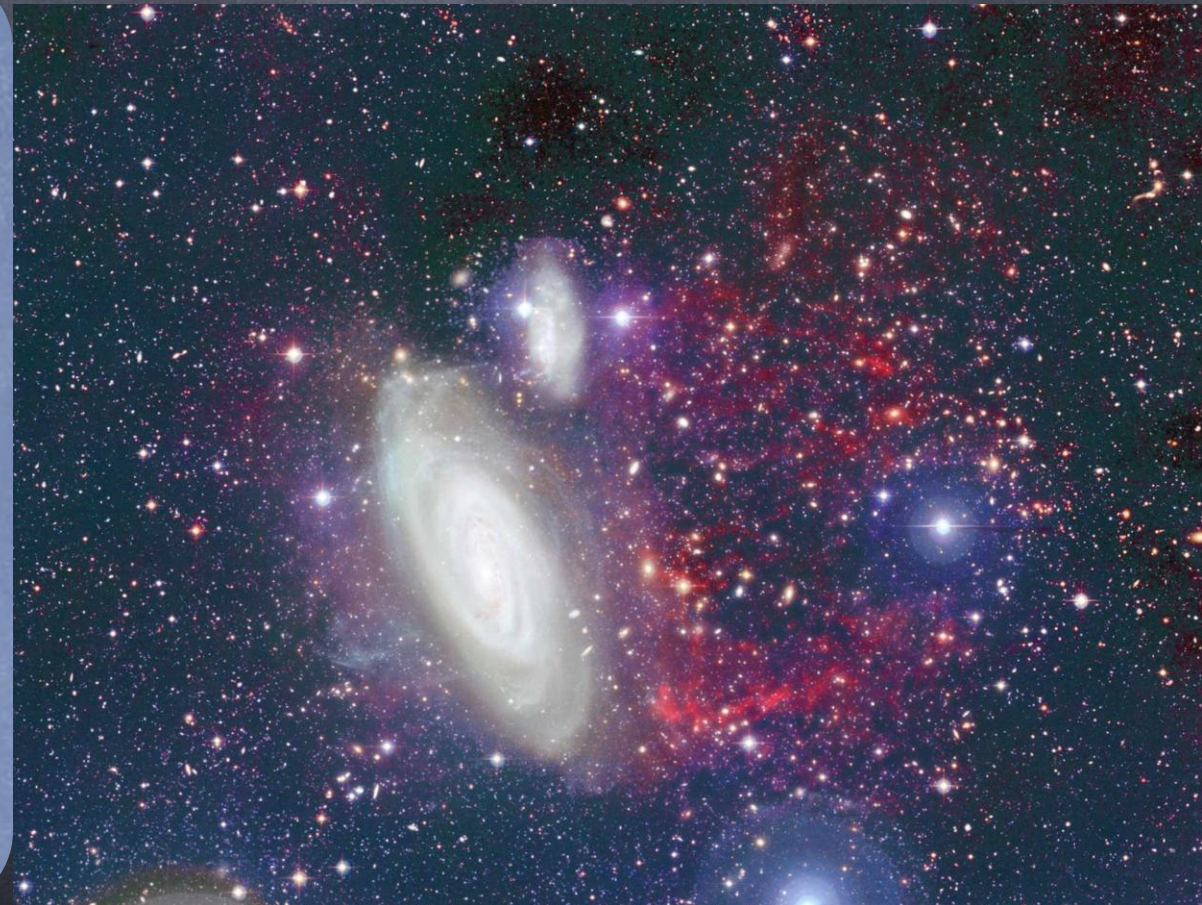
Alessandro Boselli  
Laboratoire d'Astrophysique de Marseille  
alessandro.boselli@lam.fr

Talk Title: VESTIGE: A Virgo Environmental Survey Tracing Ionised Gas Emission

Scientific focus and methods:

Ionised gas emission in Virgo cluster galaxies as a tracer of ongoing perturbations

Multifrequency analysis of Virgo cluster galaxies





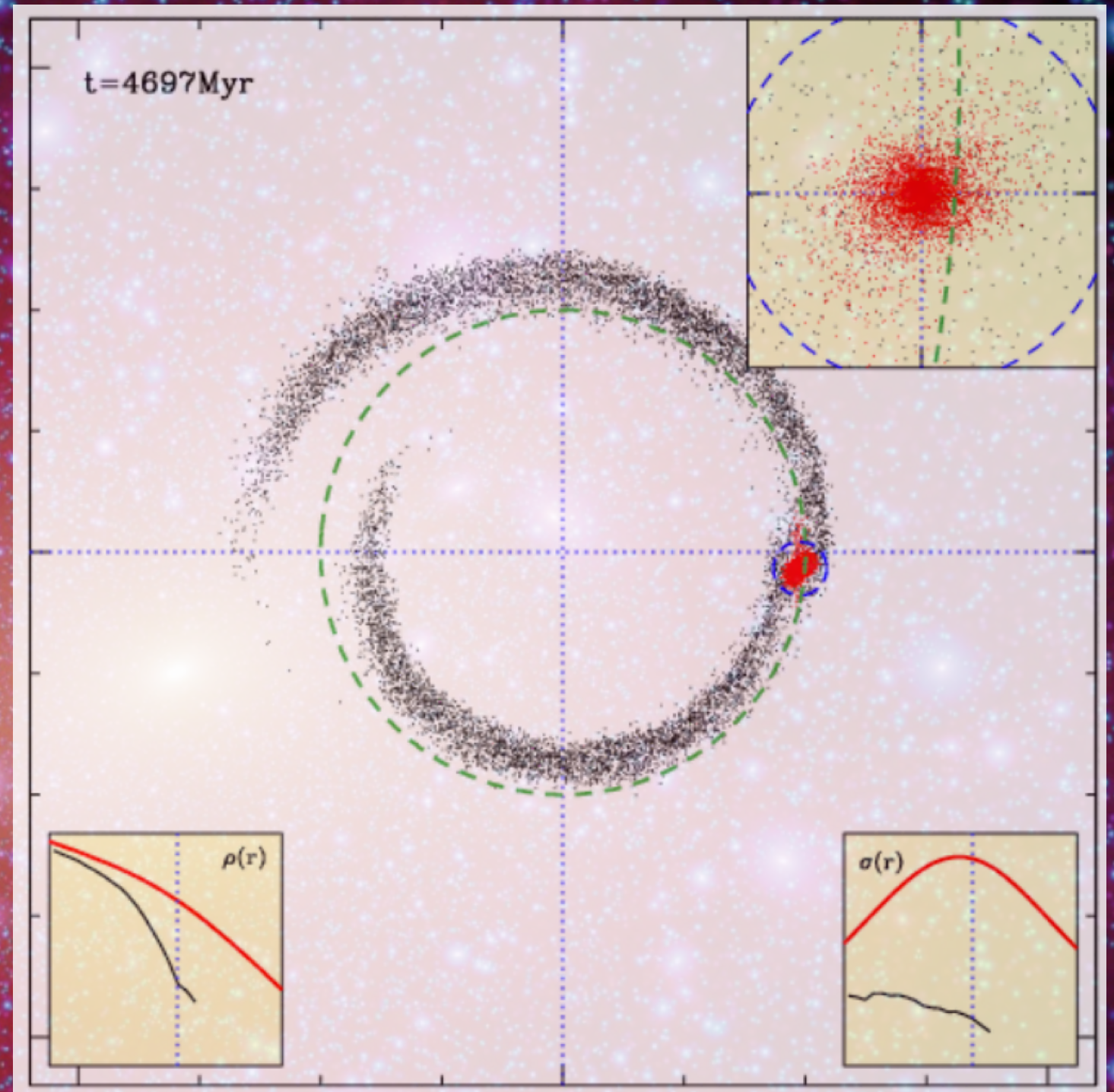
**FRANK VAN DEN BOSCH**  
ASSOCIATE PROFESSOR  
YALE UNIVERSITY



Talk:  
**The Tidal Evolution  
of Substructure**

Research Focus:

- **Galaxy-Halo Connection**
- **Satellite Kinematics**
- **Galaxy Quenching**
- **Dark Matter Substructure**







**Bahar Bidaran**  
**Zentrum für Astronomie der Universität Heidelberg**  
**(ZAH)**

*Bahar@dwarfgalaxies.net*

***Talk Title: Dwarf progenitors- what we can learn  
from circular velocity profiles?***

***Scientific Focus and Methods:***

**Environmental effects on dwarf and late type galaxies.  
Big data processing**





Yannick Bahé, Postdoc



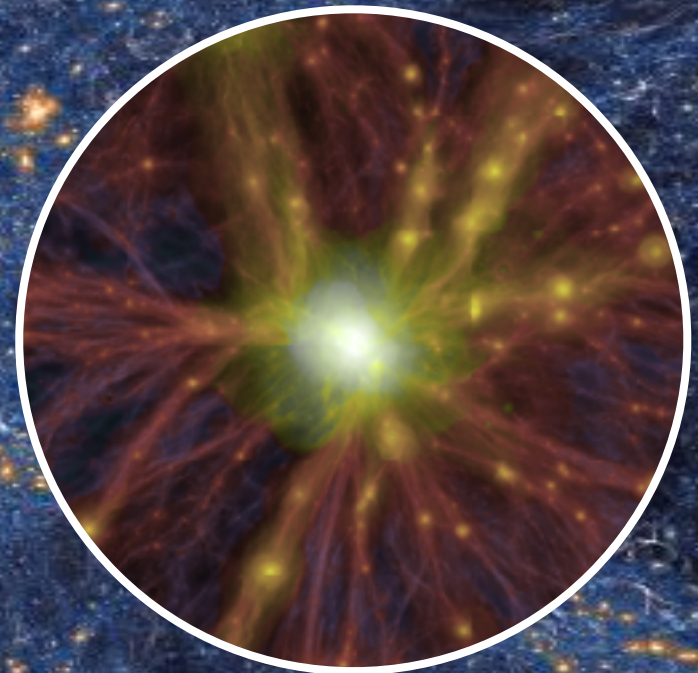
Sterrewacht Leiden (The Netherlands)

bahe@strw.leidenuniv.nl

Talk Title (Friday): **Metallicity, quenching, and stellar mass fractions in cluster galaxies: the EAGLE view**

Scientific Focus and Methods:

- Formation of **galaxies** in/around groups and clusters
- Cosmological hydro **simulations**
- **Comparison** to observations and qualitative **understanding** of what's going on





**Mike Anderson**  
postdoctoral fellow  
MPA Garching

[michevan@mpa-garching.mpg.de](mailto:michevan@mpa-garching.mpg.de)



**“Multiphase gas in a sightline towards a filament in M87”**

## **Research interests:**

- Galaxy formation; circumgalactic medium; AGN and stellar feedback
- Intracluster medium; cooling flows; filaments in galaxy clusters
- Missing baryons; metal enrichment history of the Universe



# Let the Party\* Begin!

\*Party = Talks, reviews, splinter sessions, discussion panels, etc\*\*.

\*\*etc=Food, Wine and Beer!