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# KITP Conference: Quantifying and Understanding the Galaxy—Halo Connection

(May 15-19, 2017)

**Coordinators: Andrey Kravtsov, Alexie Leauthaud, Risa Wechsler, and Andrew Zentner**  
**Scientific Advisors: Carlos Frenk, Marla Geha, Romain Teyssier, and Martin White**

## Monday, May 15, 2017

**Session: Theoretical and Observational Reviews, Chair: Andrew Zentner (U Pittsburgh)**

8:50am	Lars Bildsten (KITP)	Welcome
9:00am	Andrew Hearin (Yale/ANL)	Theory Overview
9:45am	Rachel Mandelbaum (CMU)	Observational Overview
10:30am		<b>Morning Break</b>
11:00am	Mark Vogelsberger (MIT)	Illustris, IllustrisTNG, and Beyond: the co-evolution of CDM and Galaxies
11:30am	Rachel Somerville (Rutgers)	The Connection Between Halos and Galaxy Structural Properties

### **Lightning talks (~3 minutes each) from conference participants**

12:00pm	Participants	Lightning talks
12:00pm	1: Idit Zehavi	The evolution of the HOD
12:00pm	2: Ben Moster	The stellar-to-halo mass relation of red and blue galaxies
12:00pm	3: Philip Busch	Assembly bias and splashback in galaxy clusters
12:00pm	4: Victor Calderon	Small-scale galactic conformity in SDSS DR7
12:00pm	5: Simon Birrer	Strong lensing and the galaxy-halo connection
12:00pm	6: Jesse Golden-Marx	Parameterizing the stellar mass-halo mass relation: incorporating the magnitude gap
12:00pm	7: Rita Tojeiro	Assembly bias on the cosmic web
12:00pm	8: Hanwool Koo	Observational evidence for spin alignments in isolated galaxy pairs
12:00pm	9: Alex Krolewski	Measuring alignments between galaxies and filaments using galaxy spins from the MaNGA IFU Survey
12:30pm		<b>Lunch Break</b>

### **Session: Recent Results**

2:00pm	Guinevere Kauffmann (MPA Garching)	The Gaseous Structure of Galaxy Halos
2:30pm	Song Huang (UCSC)	New Insights from the HSC survey on the Stellar Halos of Massive Galaxies
3:00pm	Surhud More (U Tokyo IPMU)	Assembly Bias and Splashback Radius on Cluster Scales: Observational Status
3:30pm		<b>Afternoon Break</b>

**Session: Results/Moderated Panel Discussion of Important Issues**

4:00pm Priya Natarajan (Yale)	New Insights on the Galaxy-halo Connection from Cluster Lensing
4:30pm Frank van den Bosch Risa Wechsler Andrew Hearin Rachel Mandelbaum	Moderated Group Discussion of Important Issues in the Galaxy-Halo Connection
5:30pm	<b>SHUTTLE TO BWSCI</b>

**Tuesday, May 16, 2017****Session: Halos and Simulations, Chair: Andrey Kravtsov (U Chicago)**

9:00am Benedikt Diemer (Harvard U)	Cold Dark Matter Halo Theory/Splashback Review
9:45am Joop Schaye (Leiden U)	Hydro Simulations Review
10:30am	<b>Morning Break</b>
11:00am Andrew Benson (Caltech)	Semi-Analytic Models Overview/TBD
	<b>Lightning talks (~3 minutes) from conference participants</b>
11:45am Participants	Lightning talks
11:45am 1: August Evrard	The galaxy-hot gas connection in massive halos
11:45am 2: Bhuvnesh Jain	The boundaries and shapes of cluster halos
11:45am 3: Cristobal Sifon	The galaxy-subhalo connection in massive clusters from weak lensing
11:45am 4: Johannes Ulf-Lange	Brightest galaxies as tracers of the halo core
11:45am 5: Hung-Jin Huang	Galaxy alignment in redMaPPer clusters
11:45am 6: Pierre Guillard	The discovery of a massive, extended molecular gas reservoir in the halo of the spider-web proto-cluster.
11:45am 7: Hong Guo	Galaxy assembly bias from HI-selected galaxies
11:45am 8: Elena Massara	Designing a cosmology emulator with on demand simulations
11:45am 9: Ben Wibking	Emulating galaxy-galaxy lensing observables in the deeply nonlinear regime
11:45am 10: Pascal Elahi	SURFS: Synthetic UniveRses For Surveys
11:45am 11: Haojie Xu	Global modelling of color and luminosity dependent galaxy clustering
11:45am 12: Hao-Yi Wu	Constraining the galaxy-halo connection using the anisotropy of the cosmic FIR background
11:45am 13: Kareem El-Badry	When do low-mass galaxies form disks
11:45am 14: Harry Desmond	Dynamical constraints on the galaxy-halo connection
12:30pm	<b>Lunch Break</b>

**Session Chair: Rita Tojeiro (U St. Andrews)**

2:00pm Dylan Nelson (MPA Garching)	IllustrisTNG: Galaxy Color Bimodality and Clustering
2:30pm Zheng Zheng (U Utah)	z-Space Galaxy Clustering: Modeling, Velocity Bias, and Assembly Bias
3:00pm Andrey Kravtsov (U Chicago)	The Size-Virial Relationships of Galaxies
3:30pm	<b>Afternoon Break</b>
4:00pm Mike Fall (STScI)	The Sizes and Angular Momenta of Galaxies and Their Halos

4:30pm Marla Geha  
Guinevere Kauffmann  
Andrey Kravtsov  
Joop Schaye  
Bhuvnesh Jain

Moderated Group Discussion Panel

5:30pm **RECEPTION**

6:00pm **SPECIAL EVENTS DINNER**

8:00pm **SHUTTLE TO BWSCI**

### **Wednesday, May 17, 2017**

**Session: Recent Results, Chair: Benedikt Diemer (Harvard)**

9:00am Peter Behroozi (UCB) The Universe Machine  
9:30am Fangzhou Jiang (Hebrew U) New Results (TBD)  
10:00am Joel Primack (UCSC) Structural Evolution in the Galaxy-Halo Connection, and Halo Properties as a Function of Density and Web Environment  
10:30am **Morning Break**

**Session: New Results**

11:00am Yao-Yuan Mao (U Pittsburgh) Beyond Assembly Bias  
11:30am Jeremy Tinker (New York U) What Does Scatter Tell Us?  
12:00pm Andrej Dvornik (Leiden Obs) KiDS Weak Lensing Analysis of Assembly Bias in GAMA Galaxy Groups  
12:30pm **Lunch Break**

2:00pm **FREE AFTERNOON-Shuttle Available to BWSCI**

### **Thursday, May 18, 2017**

**Session: Galaxy-Halo Connection at the Extremes, Chair: Nitya Kallivayalil (U Virginia)**

9:00am Alyson Brooks (Rutgers U) The Abundance of Dwarf Galaxies  
9:30am Shea Garrison-Kimmel (Caltech) Not So Lumpy After All: The Inevitable Depletion of Dark Matter Subhalos by Milky Way-size Galaxies  
10:00am Annalisa Pillepich (MPIA Heidelberg) IllustrisTNG: DM halos, Stellar Halos, and the Galaxies at their Centers  
10:30am **Morning Break**  
11:00am Andrew Wetzel (Caltech) Simulating MW-like Galaxies with Realistic Satellite Populations  
11:30am Marla Geha (Yale U) Satellite Galaxy Populations Around Milky Way Analogs  
12:00pm Carlos Frenk (Durham U) How to Rule Out CDM?  
12:30pm **Lunch Break**

**Session: Galaxy-Halo Connection Developments, Chair: Elisabeth Krause (SLAC)**

2:00pm Myoungwon Jeon (U Arizona) Connecting the First Galaxies with Ultra-Faint Dwarfs in the LG  
2:30pm Yen-Ting Lin (IPMU) Towards Understanding Massive Galaxy Formation: Mass Assembly History, Assembly Bias, and Conformity

3:00pm Alison Coil (UCSD)	Galactic Conformity and Clustering as a Function of sSFR to $z=1$
3:30pm	<b>Afternoon Break</b>
4:00pm Nitya Kallivayalil (U Virginia)	Probing the Dark Halo of the Milky Way
4:30pm Shun Saito (MPA Garching)	The Galaxy-Halo Connection for the BOSS CMASS Sample
5:00pm Alexie Leauthaud (UCSC)	Massive Galaxies: Comparing HSC Results with Hydro Simulations
5:30pm	<b>RECEPTION</b>
6:00pm	<b>SPECIAL EVENTS DINNER</b>
8:00pm	<b>SHUTTLE TO BWSCI</b>

### **Friday, May 19, 2017**

#### **Session: Galaxy-Halo Connection and Cosmology, Chair: Idit Zehavi (Case Western Reserve U)**

9:00am Philip Mansfield (U Chicago)	Halo Splashback Radius
9:30am Simon White (MPA Garching)	Assembly Bias
10:00am Titouan Lazeyras (MPA Garching)	Large-scale Assembly Bias from Separate Universe Simulations
10:30am	<b>Morning Break</b>
11:00am Frank van den Bosch (Yale U)	What Can We Learn from Small-scale Clustering?
11:30am Uros Seljak (UCB)	Modeling Galaxies as a Nonlinear Transformation of the Matter Field
12:00pm Elisabeth Krause (SLAC)	The Galaxy-Halo Connection and Cosmology
12:30pm	<b>Lunch Break</b>

#### **Session: Summary Panel Discussion - Panel Moderator: Risa Wechsler (Stanford University/SLAC)**

2:00pm Alexie Leauthaud Rachel Somerville Andrew Zentner Carlos Frenk Simon White	Final Discussion Panel
3:30pm	<b>CONFERENCE END/SHUTTLE TO BWSCI *Also available to SB Airport and SB Airbus, Goleta location (See Registration Desk to sign up.)</b>