



<http://kicp-workshops.uchicago.edu/cosmicweb2013/>

## WORKSHOP PROGRAM

The Kavli Institute for Cosmological Physics (KICP) at the University of Chicago will host "Galaxies within the Cosmic Web" workshop on June 17-21, 2013. The workshop will be held in the lecture hall 120 in the Kersten Physics Teaching Center (KPTC) on the University of Chicago campus.

During the last thirty years, studies of structure formation have played a key role in establishing the Cold Dark Matter (CDM) paradigm of structure formation in an expanding universe. In the CDM model the initial Gaussian density perturbations are shaped by gravity into a cosmic web of voids and filaments, at the intersection of which galaxies and galaxy clusters are mainly thought to form. Although the model has been a tremendous success in explaining the observed large-scale structure of the universe, many key aspects of how galaxies form and evolve within this cosmic web of dark matter and diffuse gas are still not understood. The gaps in our understanding not only hamper interpretation of the wealth of observational data on galaxy evolution, but also represent a major systematic uncertainty for cosmological probes of the accelerated expansion of the universe, the nature of gravity, and forecasts and interpretation of direct and indirect dark matter searches.

This workshop will assemble both observers and theorists (target size ~60-80 people) who work on all key aspects of galaxy formation to assess recent progress and, most importantly, to germinate new ideas for how to improve our understanding of galaxy formation, the relation between the baryonic mass of galaxies and their parent halos, the effects of galaxy assembly and associated feedback on the spatial distribution of dark matter, and the interpretation of galaxy clustering and bias from large surveys to constrain the evolution of dark energy. The focus of the meeting will be on the most rapidly developing and interesting topics of research, and the format will include ample time for discussion and unstructured interaction.

### Scientific Organizing Committee

**Charlie Conroy**  
University of California, Santa Cruz

**Nickolay Gnedin**  
Fermilab

**Andrey Kravtsov**  
The University of Chicago

**Francisco Prada**  
Instituto de Fisica Teorica UAM, CSIC

**Risa Wechsler**  
Stanford University

**WORKSHOP PROGRAM**

June 17-21, 2013 @ University of Chicago

**Monday - June 17, 2013****INTRO. COSMOLOGICAL CONTEXT.***Chair: Andrey Kravtsov*

9:00 AM - 9:40 AM

**David H. Weinberg**, Ohio State University  
*Overview*

9:40 AM - 10:00 AM

*DISCUSSION*

10:00 AM - 10:30 AM

*COFFEE BREAK*

10:30 AM - 10:50 AM

**Nikhil Padmanabhan**, Yale University  
*Constraints from the Baryonic Acoustic Oscillations*

10:55 AM - 11:15 AM

**Francisco Prada**, Instituto de Fisica Teorica UAM, CSIC  
*Cosmology from Al-Andalus to BOSS*

11:20 AM - 11:40 AM

**Anatoly Klypin**, NMSU  
*LSS simulations for cosmology*

11:45 AM - 12:05 PM

**Gustavo Yepes**, U. Autonoma, Madrid  
*JUBILEE: a suite of large LSS simulations*

12:10 PM - 12:30 PM

*DISCUSSION*

12:30 PM - 2:00 PM

*LUNCH***COSMIC WEB OF GALAXIES: GALAXY CLUSTERING AND ENVIRONMENT***Chair: David Weinberg*

2:00 PM - 2:20 PM

**Idit Zehavi**, Case Western Reserve University  
*Galaxy Clustering in the Sloan Digital Sky Survey*

2:25 PM - 2:45 PM

**Aaron D Bray**, Harvard University  
*The Luminosity and Color Dependence of Galaxy Clustering since  $z \sim 1$  in PRIMUS*

2:50 PM - 3:10 PM

**Mehmet Alpaslan**, University of St Andrews, University of Western Australia  
*Filaments and large scale structure in the Galaxy and Mass Assembly survey*

3:15 PM - 3:30 PM

*DISCUSSION*

3:30 PM - 4:00 PM

*COFFEE BREAK*

4:00 PM - 4:20 PM

**Manodeep Sinha**, Vanderbilt University  
*Towards an Accurate Relation between Galaxies and their host Dark Matter Halos*

4:25 PM - 4:45 PM

**Ramin A Skibba**, University of California, San Diego  
*Quantifying the Cosmic Web: Measures of Galaxy Environment*

4:50 PM - 5:10 PM

**Noam I Libeskind**, Leibniz Institute for Astrophysics  
*Cosmic vorticity and the origin halo spins*

5:15 PM - 5:30 PM

*DISCUSSION*

5:30 PM - 6:30 PM

*INFORMAL INTERACTION*

**Tuesday - June 18, 2013****HALOS WITHIN THE COSMIC WEB: GALAXY-HALO CONNECTION.***Chair: Charlie Conroy*

- 9:00 AM - 9:20 AM **Martha Haynes**, Cornell University  
*The ALFALFA Census of Gas-Bearing Galaxies at  $z=0$*
- 9:25 AM - 9:45 AM **Benjamin P Moster**, MPA, Garching  
*Connecting galaxies and dark matter haloes: star formation and gas accretion*
- 9:50 AM - 10:10 AM **Peter Behroozi**, Stanford University  
*Star formation in individual galaxies*
- 10:15 AM - 10:30 AM *DISCUSSION*
- 10:30 AM - 11:00 AM *COFFEE BREAK*
- 11:00 AM - 11:20 AM **Pieter van Dokkum**, Yale  
*The growth of Milky Way-like galaxies since  $z\sim 2.5$*
- 11:25 AM - 11:45 AM **Douglas F Watson**, KICP/U. of Chicago  
*The strikingly similar relation between satellite and central galaxies and their dark matter halos since  $z=2$*
- 11:50 AM - 12:10 PM **Surhud More**, Kavli IPMU  
*Pseudo-evolution of the halo mass-stellar mass relation*
- 12:15 PM - 12:30 PM *DISCUSSION*
- 12:30 PM - 2:00 PM *LUNCH*
- HALO-GALAXY CONNECTION (CONT.)**  
*Chair: Andreas Berlind*
- 2:00 PM - 2:20 PM **Charlie Conroy**, University of California, Santa Cruz  
*Satellite Galaxies in Hierarchical Universe*
- 2:25 PM - 2:45 PM **Andrew Hearin**, Fermilab  
*The Dark Side of Galaxy Color*
- 2:50 PM - 3:10 PM **Tomer Tal**, UC Santa Cruz  
*The non-evolving galaxy distributions in groups since  $z=1.6$*
- 3:15 PM - 3:35 PM **Guillermo Barro**, University of California Santa Cruz  
*The progenitors of compact quiescent galaxies at  $z\sim 2$*
- 3:40 PM - 3:55 PM *DISCUSSION*
- 3:55 PM - 4:20 PM *COFFEE BREAK*
- 4:20 PM - 5:30 PM *PANEL DISCUSSION: COSMIC WEB - HISTORICAL PERSPECTIVES*  
*Chair and moderator: Sergei Shandarin*
- 5:30 PM - 6:30 PM *INFORMAL INTERACTION*

**Wednesday - June 19, 2013****GALAXY-HALO CONNECTION: BACKREACTION OF BARYONS ON HALOS***Chair: Marla Geha*

- 9:00 AM - 9:20 AM **Emmanouil Papastergis**, Cornell University  
*Testing the LambdaCDM halo mass function with the ALFALFA 21cm survey*
- 9:25 AM - 9:45 AM **Oleg Gnedin**, University of Michigan  
*How baryons shape dark matter*
- 9:50 AM - 10:10 AM **Reina Reyes**, KICP  
*Is LambdaCDM consistent with the Tully-Fisher Relation?*
- 10:15 AM - 10:30 AM *DISCUSSION*
- 10:30 AM - 11:00 AM *COFFEE BREAK*
- 11:00 AM - 11:20 AM **Monica Valluri**, University of Michigan  
*The effect of baryons on the orbital properties and shapes of dark matter halos*
- 11:25 AM - 11:45 AM **Marco Velliscig**, Leiden Observatory  
*What shapes the halo mass function? The effects of baryonic physics on the total mass and mass profile of haloes*
- 11:50 AM - 12:10 PM **Stefan Gottloeber**, Leibniz-Institute for Astrophysics (AIP)  
*Constrained Simulations of the Local Universe*
- 12:15 PM - 12:30 PM *DISCUSSION*
- 12:40 PM *LUNCH*
- LOCAL GROUP WITHIN THE COSMIC WEB: NEAR-FIELD COSMOLOGY**  
*Chair: Piero Madau*
- 2:00 PM - 2:20 PM **Michael Boylan-Kolchin**, UC Irvine  
*Dark matter in the Milky Way and its satellites*
- 2:25 PM - 2:45 PM **Matthew Walker**, CfA, Harvard  
*Galactic Dynamics as a Test of Cold Dark Matter*
- 2:50 PM - 3:10 PM **Amina Helmi**, Kapteyn Institute, Groningen  
*Dynamical models of dSph in the Local Group*
- 3:15 PM - 3:30 PM *DISCUSSION*
- 3:30 PM - 4:00 PM *COFFEE BREAK*
- 4:00 PM - 4:20 PM **Marla Geha**, Yale  
*The Stellar Content of Milky Way Ultra-Faint Dwarf Galaxies*
- 4:25 PM - 4:45 PM **Alyson Brooks**, U Wisconsin, Madison  
*The Influence of Baryons in Interpreting our Cosmological Model*
- 4:50 PM - 5:10 PM **Kenza Arraki**, NMSU  
*Effects of baryon removal on the structure of dwarf spheroidal galaxies*
- 5:15 PM - 5:30 PM *DISCUSSION*
- 6:30 PM *PINK MARTINI CONCERT IN THE MILLENIUM PARK*

**Thursday - June 20, 2013****UNDERSTANDING CO-EVOLUTION OF GALAXIES AND HALOS WITHIN COSMIC WEB***Chair: Matthias Steinmetz*

9:00 AM - 9:20 AM	<b>Piero Madau</b> , UC Santa Cruz <i>The baryon cycle of dwarf galaxies</i>
9:25 AM - 9:45 AM	<b>Aleks Diamond-Stanic</b> , UC San Diego <i>Probing Gas Flows in the Cosmic Web with Background Galaxies</i>
9:50 AM - 10:10 AM	<b>Daniel Ceverino</b> , Universidad Autonoma Madrid <i>Early formation of galaxies in cosmological simulations</i>
10:15 AM - 10:30 AM	DISCUSSION
10:30 AM - 11:00 AM	COFFEE BREAK
11:00 AM - 11:20 AM	<b>Fabio Governato</b> , University of Washington <i>Shining Light on the Properties of Dark Matter: Coupling Baryon and Dark Matter Physics in Galaxy Formation Models</i>
11:25 AM - 11:45 AM	<b>Oscar Agertz</b> , KICP <i>Towards realistic model of stellar feedback</i>
11:50 AM - 12:10 PM	<b>Sebastian Trujillo-Gomez</b> , NMSU <i>Stellar mass assembly in galaxies with realistic star formation and feedback</i>
12:15 PM - 12:30 PM	DISCUSSION
12:30 PM - 2:00 PM	LUNCH
	<b>UNDERSTANDING CO-EVOLUTION OF GALAXIES AND HALOS WITHIN COSMIC WEB (CONT.)</b>
	<i>Chair: Fabio Governato</i>
2:00 PM - 2:20 PM	<b>Andrey Doroshkevich</b> , ASC FIAN <i>Formation of the first galaxies and reionisation of the Universe</i>
2:25 PM - 2:45 PM	<b>Craig M Booth</b> , University of Chicago <i>Cosmic rays in a cosmological context: the physics of galactic superwinds</i>
2:50 PM - 3:10 PM	<b>Joel R Primack</b> , UCSC <i>Assembling Galaxies of Resolved Anatomy (AGORA) Simulation Comparison Project</i>
3:15 PM - 3:30 PM	DISCUSSION OF FEEDBACK/WIND IMPLEMENTATIONS
3:30 PM - 4:00 PM	COFFEE BREAK
	<b>MILKY WAY WITHIN THE COSMIC WEB</b>
	<i>Chair: Fabio Governato</i>
4:00 PM - 4:20 PM	<b>Matthias Steinmetz</b> , Leibniz Institute for Astrophysics Potsdam (AIP) <i>The Wobbly Galaxy: kinematics north and south with RAVE</i>
4:25 PM - 4:45 PM	<b>Alis Deason</b> , UC Santa Cruz <i>The Cold and Broken Milky Way Stellar Halo</i>
4:50 PM - 5:10 PM	<b>Jo Bovy</b> , Institute for Advanced Study <i>New measurements of the structure and dynamics of the Milky Way's disk</i>
5:15 PM - 5:45 PM	CONCLUDING DISCUSSION
6:00 PM - 9:00 PM	RECEPTION/CONFERENCE DINNER ON CAMPUS
9:00 PM - 9:00 PM	CONCLUSION OF THE WORKSHOP