2013 CfA Summer Colloquium Series

The Summer Colloquium series provides a broad introduction to the research going on at the CfA. Summer interns and other junior staff are particularly encouraged to attend but all are welcome. Talks are in Phillips Auditorium at 4 pm preceded by refreshments at 3:30 pm.

June 20: X-ray and Multiwavelength Extragalactic Surveys

Dr. Francesca Civano
Dartmouth College & Smithsonian Astrophysical Observatory

Two currently active X-ray missions, NASA's Chandra X-Ray Observatory and ESA's XMM Newton, are performing some of the deepest and widest serendipitous X-ray surveys ever undertaken. Multiwavelength photometric and spectroscopic follow-up of serendipitously detected X-ray sources is crucial to understand the properties of the objects observed, resulting in large imaging campaigns from radio to UV. I will present a broad overview of these surveys, focusing on the COSMOS survey and on the results achieved by sampling a large sample of Active Galactic Nuclei at high redshift with uniform observed properties.

June 27: Massive Star Formation and Astrochemistry

Dr. Claudia Cyganowski
Harvard-Smithsonian Center for Astrophysics

Massive stars dominate our view of galaxies: they heat and ionize their surroundings, drive powerful outflows and winds, and finally explode as supernova, injecting heavy elements into the interstellar medium. As a result, "How do massive stars form?" is a fundamental question, with implications for areas of astrophysics from planet formation to galaxy evolution. The dense clouds of gas and dust where massive stars form are best studied at (sub)millimeter wavelengths, and interferometers have opened a new era in our understanding of massive star formation. I will discuss recent Submillimeter Array (SMA) studies of massive star formation and astrochemistry, and the outlook in the era of ALMA.

July 11: Gravitationally Lensed Sub-mm Galaxies Discovered by Herschel

Dr. Shane Bussmann
Harvard-Smithsonian Center for Astrophysics

Strong gravitational lensing by massive galaxies provides one of the most striking visual confirmations of Einstein's theory of General Relativity. Moreover, strong lensing plays an important and unique role in current research efforts because we can use it to "weigh" the lensing galaxy and because the lens acts as a "cosmic telescope", permitting studies of the morphological structure of the source in far greater detail than otherwise possible. Surveys conducted in the past few years by the Herschel Space Observatory have discovered a new population of submillimeter galaxies (SMGs) at $z > 2$ that are gravitationally lensed by an intervening galaxy or group of galaxies along the line of sight. I will present lens models based on Submillimeter Array (SMA) imaging of lensed SMGs discovered by Herschel and summarize what we have learned about the nature of galaxy evolution based on these studies.

July 18: Cosmology with the Cosmic Microwave Background

Prof. John Kovac
Harvard-Smithsonian Center for Astrophysics

Since its discovery in 1965, the Cosmic Microwave Background (CMB), a relic of the hot Big Bang, has been among our most powerful tools for establishing and refining the standard model of cosmology. I will briefly review the basics and history of CMB measurement, discuss current measurements from ground based telescopes and the WMAP and Planck satellites which provide precise constraints on the parameters of the standard model, and discuss how CMB polarization measurements in the coming decade will be used to probe new physics of inflation, dark energy, and neutrinos.

August 1: The Search for Habitable Planets

Courtney Dressing
Harvard-Smithsonian Center for Astrophysics

As evidenced by science fiction, the search for life elsewhere in the galaxy has long captivated our imaginations. Now the quest for life on other planets is becoming a reality. Astronomers have discovered that the galaxy is teeming with planets and that small planets like the Earth are common. Recently, astronomers have detected the first planets that might be suitable for life. I will explain how astronomers detect planets orbiting other stars and discuss how we can use current and future instruments to search for signs of life on other worlds.

August 8: Cosmic Superheroes: Extragalactic X-ray Jets

Dr. Giulia Migliori
Harvard-Smithsonian Center for Astrophysics

In this talk I will show how the main traits of extragalactic jets, associated with an actively accreting supermassive Black Hole, undoubtedly qualify them as cosmic superheroes: an exceptional and partly obscure origin, a secret identity and, above all, extraordinary powers, such as their relativistic speed and ability to produce X-ray and gamma-ray radiation. I will also discuss how to identify and observe jets in action, focusing on the observatories that allow them to reveal their most energetic manifestation.