

2009-10 Princeton Global Scholar

Yasushi Suto. Dr. Yasushi Suto, Professor of University of Tokyo, and the Council of Astronomical Society of Japan is a leading theoretical astrophysicist in Japan.

His work covers a wide range of topics from cosmology to extra-solar planets. Based on the state-of-art Cosmological Computer Simulations developed by him and his colleagues, he succeeded to constrain cosmological parameters by comparing the physical predictions with the observed statistical properties of the galaxies. He is a leader of the field of Cosmology not only in Japan but also in the world. Dr. Suto also works in the field of Extrasolar Planets and has made important achievements in this field. For him, Cosmology does not only mean studying distant galaxies and universe but also the important study the origins of our physical world.

He is an international scientist working with many excellent colleagues over the world, including Princeton University. While he is a theorist, he is also making important roles in the previous and the future large observational projects such as Sloan Digital Sky Surveys and the future very deep wide-area survey using the Japanese 8.2m Subaru Telescope being promoted in collaboration with Princeton University. Dr. Yasushi Suto is an expert of very important fields and still always opens his mind to the new exciting questions in the nature.

Professor Suto has a remarkable record of theoretical work in a variety of areas of astrophysics and cosmology, a partial list includes: pioneering work on non-linear perturbation theory of cosmological fluctuations, detailed numerical simulations of the dynamics and structures of cosmic objects such as galaxies and galaxy clusters, seminal studies on galaxy clusters as a cosmological probe, extensive studies of the galaxy bias (the relation of the distribution of galaxies relative to the underlying mass distribution), and most recently, innovative studies of the radial velocities of extra-solar planets. His work is often so creative that it is ahead of his time, and the topic of his research has become a popular subject after several years. One notable example is a series of his work on galaxy clusters and the clustering of galaxies; he foresaw both promises and limitations of using them as cosmological probes more than a decade ago, when the other researchers focused only on the promises and ignored limitations. Many of the effects he pointed out back then are appreciated now in the context of the next generation of experiments for constraining the nature of Dark Energy. For this work he was awarded Hayashi Chushiro Prize, the most prestigious award of the Astronomical Society of Japan, in 2005.

Dr. Suto is best known for his work on numerical cosmology, which dates back to his collaborations with Professor Jeremiah Ostriker and others at Princeton in the early 1990s. At that stage, understanding the ‘cold’ nature of the galaxy distribution (low random peculiar velocities) was a major issue in cosmology (eventually resolved in part by the adoption of the now standard low-density model), and Suto wrote a number of influential papers on the ‘cosmic Mach number’. He was energetic in winning resources to build up supercomputing power at Tokyo, and carried out a number of calculations in the late 1990s that were at the leading edge of simulation size for the time. Probably the most impressive results of this research were the papers on properties of dark-matter haloes with Y. P. Jing in 2000 & 2002. These went beyond

the resolution available in the simulations that established the ‘universal’ NFW density profile, and showed that it was not exactly universal.

As a Japanese member of the WFMOS project, a multi-object spectrograph built in collaboration between the Gemini consortium and the Subaru Japanese national telescope, Dr. Suto was essential in raising the profile of the project inside Japan and has been appointed the lead scientist for the project. He also successfully bid to the JSPS for a ‘core- to-core’ program on Dark Energy, which sponsors visits and meetings involving a number of major institutions in Japan and Internationally (including Princeton and Edinburgh). As these close connections between the Japanese community (especially the Subaru telescope) and the world-wide community of cosmology researchers continue to grow, Yasushi Suto will be one of the scientists at the heart of these developments.

Professor Suto has taught numerous courses and is a very popular instructor at the University of Tokyo. He is in demand as an invited lecturer. He has written several popular books and textbooks (in Japanese), reaching out to a broader audience for science education. Most notable of his achievements in teaching is the number of high-quality PhDs he has advised. Over the last 15 years, Prof. Suto supervised 17 PhD dissertations. Four of these have obtained faculty positions, and many more recent graduates are currently postdoctoral fellows at good institutions, including overseas institutions such as Stanford University and Princeton University.