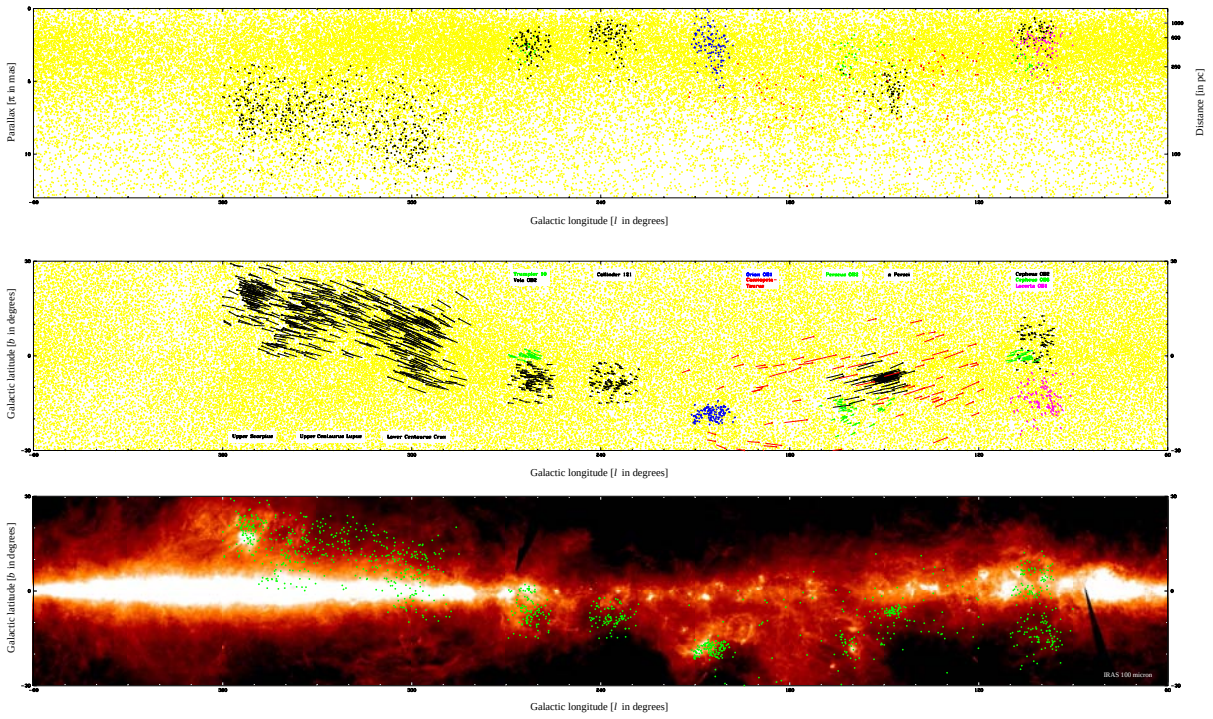

Kinematic selection of nearby OB associations using Hipparcos positions, parallaxes, and proper motions (de Zeeuw et al., 1999, AJ, 117, 354): (upper panel) parallaxes of the OB-association members, superimposed on all stars observed by Hipparcos in the range $-30^\circ < b < 30^\circ$; (middle panel) positions and proper motions of the members in Galactic coordinates; (lower panel) positions of the members superimposed on the IRAS 100-μm background.

The most conspicuous component of the Milky-Way galaxy is its flat disc which contains nearly 10^{11} stars of all spectral types and ages orbiting the Galactic centre. The Sun is located at about 8.5 kpc from the Galactic centre. The disc displays spiral structure, and also contains interstellar material, predominantly atomic and molecular hydrogen, and a significant amount of dust. The disc of the Milky Way contains, besides numerous open clusters and associated super-clusters/moving groups, various manifestations of recent star formation events, including OB associations and the large-scale Gould Belt (see figure above). The inner kilo-parsec of the disc also contains the bulge, which is less flattened, may contain a bar, and consists mostly of moderately-aged stars. At its centre lies a supermassive black hole of $\sim 4 \times 10^6$ $M_\odot$. The disc and bulge are surrounded by a halo of about 10^9 old and metal-poor stars, as well as $\sim$160 globular clusters and a small number of satellite dwarf galaxies. This entire system is embedded in a massive halo of dark material of unknown composition and poorly known spatial distribution.

The distributions of stars in the Galaxy over position and velocities are linked through gravitational forces, and through the star formation rate as a function of position and time. The initial distributions are modified, perhaps substantially, by small- and large-scale dynamical processes. These processes include instabilities which transport angular momentum (for instance bars and warps) and mergers with other galaxies.

Understanding our Galaxy requires measurement of distances and space motions for large and unbiased samples of stars of different mass, age, metallicity, and evolutionary stage. Gaia's global survey of the entire sky down to 20-th magnitude is the ideal – and only – approach to define and measure such samples. The huge number of stars, the impressive astrometric accuracy, and the faint limiting magnitude of Gaia will quantify our understanding of the structure and motions of stars within the bulge, the spiral arms, the disc, and the outer halo, and will revolutionise dynamical studies of our Galaxy.