Open Questions from the SOC

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The processes of massive star and star cluster formation are fundamental for the formation and evolution of galaxies. In particular, star clusters appear to be the basic building blocks of galactic stellar populations. Massive stars, along with most other stars, tend to form in star clusters. These massive stars regulate the heating and cooling of the interstellar medium, dominate metal production, and may regulate global and local rates of star formation. Thus for a more complete understanding of galaxy formation and evolution, as well as the nature of the star-forming environments that create most stellar and planetary systems, this conference aims to cover the fields of massive star formation, star cluster formation, feedback, and star formation in extreme environments (including near supermassive black holes and at the highest redshifts).

Some open questions and topics to be addressed include:

What are the initial conditions, including potential triggers, of massive star and star cluster formation from the large scale interstellar medium?

How does massive star formation differ from low-mass star formation?

What are the clustering properties of (massive) star formation?

What sets binary and higher order multiplicity properties of massive stars?

What sets the stellar initial mass function (IMF), including potential truncation at the highest masses, and does the IMF vary with environment?

What sets the timescale and star formation efficiency of star cluster formation?

What memory of the formation process do massive stars carry with them, e.g., in their spin, magnetization, clustering and stellar evolution?

How does massive star and star cluster formation activity vary with properties of the galactic environment, such as gas content, pressure, orbital shear, metallicity, strength of spiral density waves?

How does massive star and star cluster formation differ in the Galactic center and near other supermassive black holes?

How did star formation differ in the Population III era?