The SKA Science Working Group on The Transient Universe aims to explore what variable and one-off astrophysical signals can teach us about topics ranging from stellar evolution and relativistic astrophysics to cosmology. Transient radio signals point to the sites of the most extreme phenomena in our Universe: e.g. supernovae, merging neutron stars, and the ultra-relativistic jets from accreting black holes. They give us unique insight into fundamental physics and through propagation effects in the radio signal they allow us to probe the interesting ionized and magnetized material that would otherwise be invisible to us. To name just a few examples of the astrophysical transients that the SKA will study...

**Fast radio bursts**
- Discovered only a decade ago, fast radio bursts (FRBs) are a fascinating astrophysical puzzle. We have good reason to believe they originate in distant galaxies, but we have still not identified their physical origins. Dozens of theories have been proposed to explain these short but stupendously luminous flashes of radio light. Are the FRBs that are seen to repeat created by exceptionally young, ultra-magnetized neutron stars? Some FRBs appear to be one-off events, whose apparent lack of repetition suggests that they are created in cataclysmic explosions.

**Gravitational wave events**
- With the discovery of the first gravitational wave sources, LIGO/Virgo has opened a new window on the Universe. We can use these gravitational waves to directly detect the mergers of neutron stars and black holes, and then infer their properties. Electromagnetic observations of these events are critical for understanding the resulting explosion and its aftermath. In particular, radio observations probe the relativistic outflows that are created.

**Long gamma-ray bursts & superluminous supernovae**
- After exhausting their nuclear fuel, massive stars end their lives in supernovae and leave behind a neutron star or black hole. Long gamma-ray bursts and superluminous supernovae may be associated with even more extravagant progenitor stars and explosions. Their relativistic jets and afterglows are well studied in radio, which can trace e.g. the evolution of the outflow and its magnetization.

**The SKA as a transients discovery and follow-up machine**
- The SKA will provide unprecedented sensitivity for detecting radio transients. Such observations will be triggered by the global suite of all-sky monitors spanning the electromagnetic spectrum, as well as multi-messenger alerts from, e.g., LIGO/Virgo and neutrino telescopes like IceCube. At the same time, the SKA will discover its own transients via the planned imaging and beam-formed (high-time-resolution) surveys. Critical to success is the ability to search for transients in parallel with other scientific use cases. A low latency for data access and a trigger of follow-up observations will also be key for delivering the science harvest. The SKA is poised to answer fundamental questions related to the origins and physics of known source classes like the examples above, and perhaps most excitingly: the SKA will discover astrophysical radio transients unlike any we have seen before, or perhaps even imagined.