

## **Welding Science as an Engineering Expertise**

Mahyar Asadi, Majid Tanbakuei Kashani, Mathew Smith

**Applus<sup>+</sup> Canada, SKC Engineering**

Welding engineering is among one of the complex fields that has historically relied on the past experience of welding engineers. In the modern age, high power computing platforms for simulation and weld modeling enables welding engineers to explore complex welding and weld design parameters when presented with different scenarios on how to proceed with a given welding problem. The main theme of this talk presents industrial projects where these services helped clients to define an optimal design envelope with a clear understanding of the correlation between large numbers of design parameters. An example will be presented for an interactive welding design of a large structure for optimal fixture, tack weld, strong back, and sequence design where extremely tight dimensional tolerances were required. Another example shows how the capability of modeling and simulation helped weld engineers for critical assessment of a series of cracked welds. A third example will be on the assessment of retrofit options, for a welded structure containing cracks that developed after initial welding. These cases will present how weld engineers can be enabled to develop creative options when developing a solution to welding problems using computational welding models.