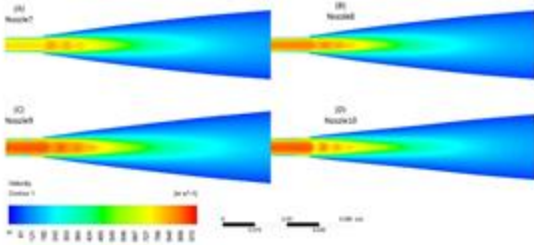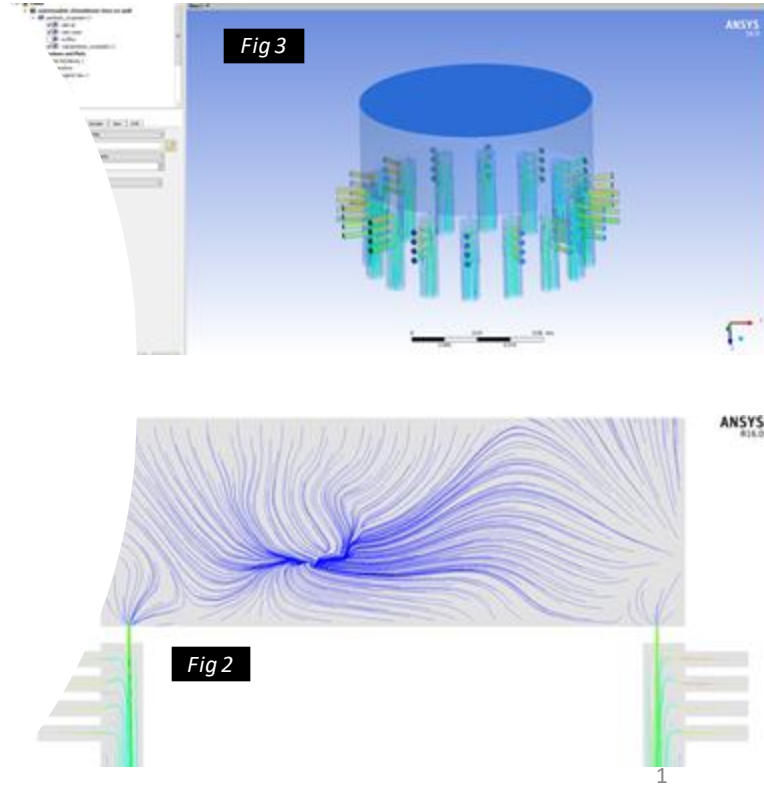# CFD

High speed compressible flow modeling

Figure 5: Gas velocity contours (X-Y plane, clipped >200m/s) at nozzle exit indicating the operating modes of the nozzle from perfectly expanded to overexpanded regimes (A to D)

Varadaraajan, V., & Mohanty, P. (2017). Design and optimization of rectangular cold spray nozzle: radial injection angle, expansion ratio and traverse speed. *Surface and Coatings Technology*, *316*, 246-254.

Fig 3

Fig 2

1

Combined air + water simulation for thermal applications

FEA and CFD

Conjugate heat transfer analysis rotating mesh

Fig 4

Fig 1

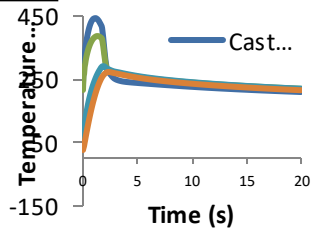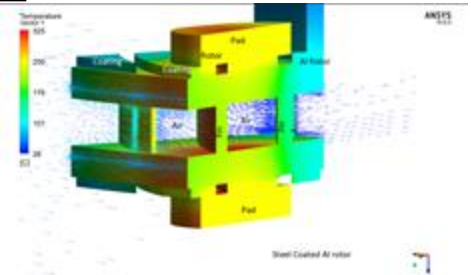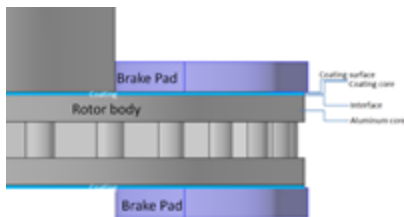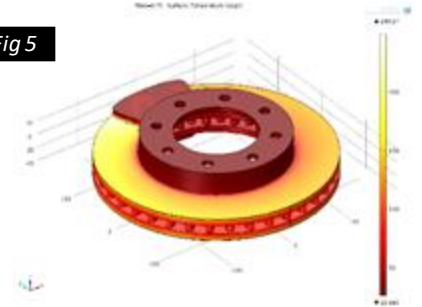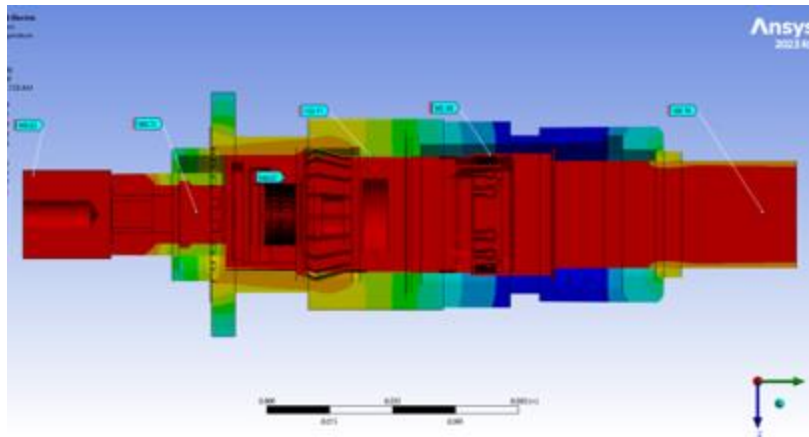Fig 3

Fig 2

Fig 5

Connection systems design

This coupled structural - thermoelectric simulates the connector and current flow in assembled state

LFA development

During Covid, I volunteered for the bio-medical team at U of M to determine fluid/drug diffusion through test strips (lateral flow asays) done using Comsol (richardson darcy flow)