

WELCOME TO THE METAL FORMING RESEARCH LAB



University
of Windsor

The Metal Forming Research Lab at the University of Windsor:

- **Conducts equipment and experimental testing with the following equipment:**
 - 240-ton double action hydraulic press for blanking, piercing, formability testing (Nakazima, Marciniak, Erichsen, bending, hole expansion, hydraulic bulge test), cyclic shear, hot stamping
 - Tension/compression split Hopkinson bar apparatus for high strain rate characterization of work hardening behaviour of metals
 - Flat rolling mill for pre-straining up to large deformations
 - Instron Charpy impact tester for fracture toughness
 - Metallurgical lab, optical microscope, scanning electron microscope
 - FMTI optical strain measurement; high-resolution stereo-cameras with ARAMIS digital image correlation software; high-speed Photron cameras with digital image correlation software
- **Performs Numerical simulations including** finite element simulations of various metal forming processes (stamping, drawing, springback prediction, hydroforming, piercing, trimming, electrohydraulic forming etc.) using LS-Dyna or ABAQUS.
 - Development of user-defined material subroutines for ABAQUS allows advanced constitutive models and damage models to be used that are not commercially available.
- **Engages in constitutive and damage modeling** such as the development of advanced anisotropic, rate-dependent constitutive models and ductile damage models for use in finite element simulations and for prediction of forming behaviour, of the onset of plastic instability and fracture.
- **Carries out micromechanical modeling:** development of micro- and mesoscale mechanical models (RVE – representative volume element, CA – cellular automata) for prediction of deformation and fracture of multi-phase steel sheets.

To learn more about how you can get involved with the Metal Forming Research Lab, contact Dr. Daniel Green of the Department of Mechanical Automotive & Materials Engineering by email at dgreen@uwindsor.ca or call 519.253.3000 ext. 3887.