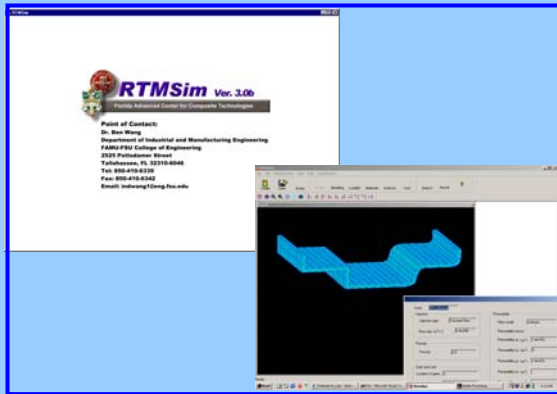
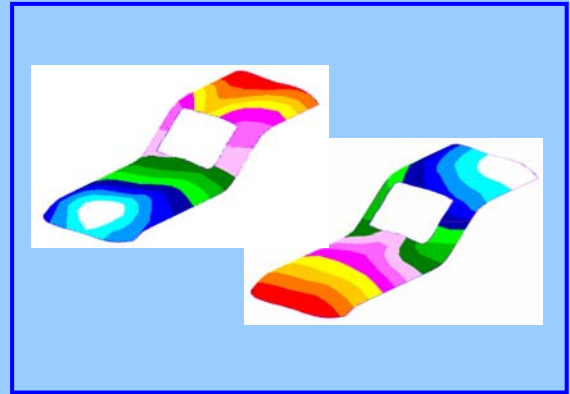


# Synopsis:

## 3D RTM/VARTM Manufacturability Simulator



GUI for the RTM manufacturability simulator



Simulation of alternative tooling designs

### Background

Resin transfer molding (RTM) and vacuum-aided RTM (VARTM) are promising manufacturing processes for developing high-performance composite materials. Traditionally, RTM/VARTM process designs have been expensive, time-consuming trial-and-error procedures, hindering its wide application base. Process modeling and simulation provides an effective tool for optimum RTM/VARTM process designs. This project aims at developing a high-fidelity, three-dimensional RTM/VARTM manufacturability simulator. This simulation tool can be used to predict part quality problems (such as dry spots) and control flow pattern in mold filling.

### Goals

- Develop a high-fidelity, three-dimensional RTM/VARTM manufacturability simulator
- Validate simulation models with closed-form solutions and experiments
- Provide technical solutions for computational efficiency for producing large, complex geometric parts
- Develop and test simulation-based RTM/VARTM process optimization approach

### Projects/Research Highlights

- Develop simulation code
- Validate simulation code with closed-form solutions and experiments
- Apply simulation tool for industrial cases
- Simplify computational models for VARTM processes

### Benefits to Industry

- Reduced product and process design and testing lead time
- Reduced development costs
- Ensured part quality