

## Training Course:

# Modeling and Simulation with LS-DYNA®: INSIGHTS INTO MODELING WITH A GOAL OF PROVIDING CREDIBLE PREDICTIVE SIMULATIONS

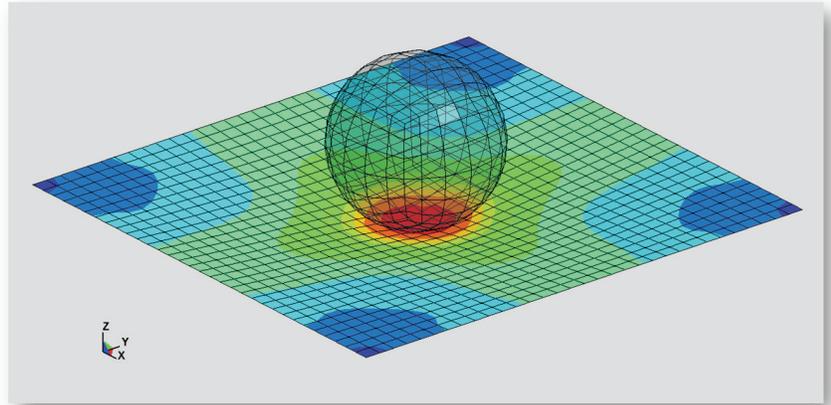
**February 11-12, 2010**  
**West Chicago, Illinois**

The US Department of Transportation funded Transportation Research and Analysis Computing Center (TRACC) at Argonne National Laboratory will hold a training course on modeling and simulation.

Most applications of LS-DYNA are for complex, and often combined, physics where nonlinearities due to large deformations and material response, including failure, are the norm. Often the goal of such simulations are to provide predictions which will ultimately be used to guide product development and safety assessments.

This class focuses on two critical aspects: modeling and simulation. Here modeling is taken to mean the large number of decisions the analyst makes in constructing a model to mimic the response of some physical event. Simulation refers to the results produced to a given analyst's input. The emphasis for simulation is how to assess the credibility, i.e. correctness and accuracy, of predictive simulation results.

Insights into modeling and simulation are illustrated through case studies. An emphasis is placed on modeling techniques, guidelines for which technique(s) to select, which techniques work well and when, and possible pitfalls in modeling choice selections. Simulation credibility is demonstrated through solution of multiple models, with associated multiple solvers, required checks of global and local energies, and mesh refinement strategies. Although the course uses LS-DYNA as a training vehicle, the methods and techniques presented have general value to the computational mechanics analysis community.



### Instructors

The training will be given by Mr. Paul Du Bois (Consultant) and Dr. Len Schwer (Schwer Engineering & Consulting Services). With over 50 years of combined experience in a wide range of commercial and defense applications, they provide insights into many key aspects of modeling and simulation. Their presentation style has often been complemented for being clear, concise, useful, and interesting, and at times hopefully also entertaining

### Location

The training course will be held at the DuPage Airport Flight Center in West Chicago where Argonne's TRACC offices are located. The training sessions will be held on the third floor of the flight center. The training sessions will also be broadcast over the Internet. The link to the Adobe Connect session will be provided to registered participants.

### Registration

Participation in the training course is free, but registration is required. Travel, lodgings, and other expenses are the responsibility of the participant. Please contact us at the number or E-mail address shown below if you would like to attend the training sessions either by Internet or in person.

### Contact Information

Dr. Ronald F. Kulak  
Argonne TRACC  
2700 International Drive, Suite 201  
West Chicago, IL 60185  
630 578 4245  
kulak@anl.gov  
www.tracc.anl.gov

# Modeling & Simulation Training

## Administrative Introductions

- Training on best practices for modeling and simulation presented over two days.
- There will be a 20 minute Break in the mornings and afternoons.
- Audience participation is encouraged to maximize learning.

**Thursday, February 11, 2010**  
**10:00 AM-4:30 PM (CST)**

1. Welcome Remarks by Edward Daniels, Director, Energy Systems Division
2. Introductions and Agenda
3. Opening Remarks
4. Introduction to Modeling & Simulation
5. Constitutive Models – Metals
6. Element Formulations- What is the 'Right' Element for an Analysis
7. Time Integration – Explicit & Implicit
8. Open Discussion

**Friday, February 12, 2010**  
**10:00 AM-4:30 PM (CST)**

1. Contact-Which Type to Use, When, and Why
2. Stress Initialization
3. Introduction to Multi-Material ALE (MM-ALE)
4. Introduction to Meshfree Methods
5. Post-Processing.
6. Open Discussion

### Hotel: Pheasant Run Resort

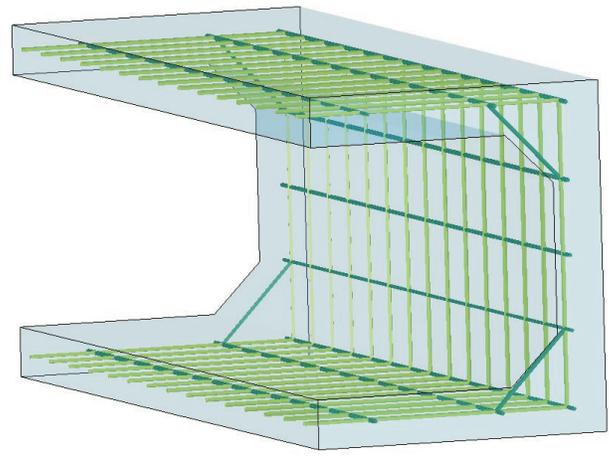
[www.pheasantrun.com](http://www.pheasantrun.com)  
4051 E Main Street, St. Charles, IL 60174  
Reservations: 1-800-474-3272  
Direct Telephone: (630) 524-5042  
Fax: (630) 584-9831  
Email: [jfreeman@pheasantrun.com](mailto:jfreeman@pheasantrun.com)  
Rate: \$106.00/night

### Hotel: Comfort Inn & Suites

[www.comfortinngeneva.com](http://www.comfortinngeneva.com)  
1555 E Fabyan Parkway, Geneva, IL 60134  
Reservations: 1-877-424-6423  
Direct Telephone: (630) 208-8811  
Fax: (630) 208-7844  
Email: [sales@ComfortInnGeneva.com](mailto:sales@ComfortInnGeneva.com)  
Rate: \$72.00/night

### Hotel: Country Inn & Suites

[www.countryinns.com/stcharlesil](http://www.countryinns.com/stcharlesil)  
155 38th Avenue, St. Charles IL 60174  
Reservations: 1-800-596-2375  
Direct Telephone: (630) 587-6564  
Fax: (630) 587-6568  
Email: [cx\\_schl@countryinns.com](mailto:cx_schl@countryinns.com)  
Rate: \$99.95/night



## Location

42 miles from downtown Chicago  
8 miles from Interstate 88 (East/West)  
13 miles from Interstate 90 (East/West)  
14 miles from Interstate 355 (North/South)

## Directions

### From I-88 (Coming from the East or West)

To Farnsworth/Kirk Rd: Going North  
To 38/ Roosevelt Rd: Going East  
To Kautz Rd: Turn Left  
To International Drive: Turn Right

### From I-90/ Northwest Tollway (Coming from either direction)

To Route 59: Going South  
To 64/ North Ave: Going West  
To Kautz Rd: Turn Left  
To International Drive: Turn Left

### From I-355/ North-South Tollway (Coming from the South)

To 38/ Roosevelt Rd: Going West  
To Kautz Rd: Turn Right  
To International Drive: Turn Right

### From I-355/ North-South Tollway (Coming from the North)

To 64/ North Ave: Going West  
To Kautz Rd: Turn Left