

Upcoming Workshops

Experiment Design Made Easy

Jan. 28-31, Denver **Sold-out** *
 April 8-11, Minneapolis
 June 3-6, Minneapolis

This workshop covers the practical aspects of Design of Experiments (DOE). Learn about simple but very powerful two-level factorial designs.

Response Surface Methods for Process Optimization

February 25-28, Minneapolis
 June 24-27, Minneapolis

This workshop builds from factorial DOEs into Response Surface Methods (RSM), which produce maps to help you find the optimum and/or robust conditions for your process.

Mixture Design for Optimal Formulations

March 18-21, Minneapolis
 July 15-18, Minneapolis

If you do product formulation, you know standard factorial designs just don't work. You need the mixtures design skills presented here.

Advanced DOE & Robust Design

April 29-May 1, Minneapolis
 December 9-11, Minneapolis

Learn to meet your tightest specifications with minimal variation. Push the envelope with saturated fractional factorials.

*Call for standby seats or to schedule an onsite course.

Attendance is limited to 24. To reserve your place, please call Carol at: **800-801-7191 ext. 18**

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VERSION 5 UNLEASHED

Spend only five minutes with DESIGN-EXPERT® software, Version 5, and you'll *know* you have *power* and *ease-of-use* like never before.

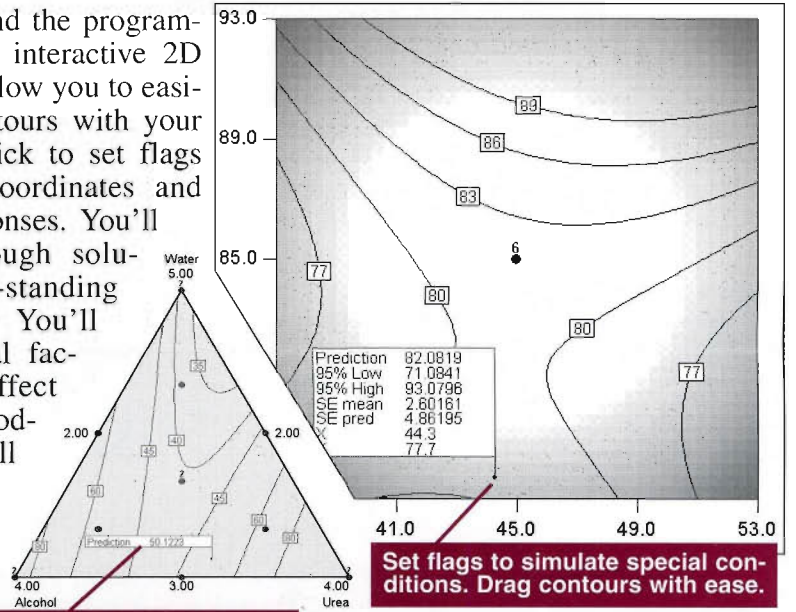
Created by DOE experts, version 5 helps you find the maximum desirability for dozens of responses simultaneously.

The creators and the programmers give you interactive 2D graphics that allow you to easily explore contours with your mouse. Just click to set flags that display coordinates and predicted responses. You'll find breakthrough solutions to long-standing problems. You'll screen for vital factors that affect processes or products. And you'll locate the ideal settings for achieving precise performance.

The mixture design feature finds optimal formulations.

love it! Just 'point and shoot!'" And John Owens III of Sheldahl, Inc., claims the new software to be the "...most user-friendly DOE package on the market."

Try DESIGN-EXPERT 5 **FREE** during your next experiment. Purchase it "on approval" for a convenient 30-day free trial.



Set flags to simulate special conditions. Drag contours with ease.

Dr. Douglas Montgomery, Ph.D., is the author of *Design and Analysis of Experiments* and the coauthor of *Response Surface Methodology*. His preview of DESIGN-EXPERT 5 has led him to state that it is "...far superior to anything else that is on the market." Others agree with him without reservation. Beta tester Peter Runke of Eastman-Kodak says, "I

If you own pre-version 5 DESIGN-EASE® and DESIGN-EXPERT® software, you may upgrade for \$195. Upgrade prices increase for owners of only DESIGN-EXPERT to \$295. DESIGN-EASE-only owners may upgrade for \$695. And first-time purchasers of DESIGN-EXPERT 5 may join the ranks of our 11,000+ users at a cost of \$995.

Welcome to DOE — unleashed!!!

“It wasn't an easy trick...”

THE PROGRAMMERS BEHIND DESIGN-EXPERT 5.

In a mostly quiet room with mostly white walls, four programmers spend their 29th consecutive month writing code for a new version of DESIGN-EXPERT® software.

As they toil, one programmer makes a verbalized cooing sound like a pigeon talking to itself. Another one grins maniacally while pacing about the office. A third has his face so close to the monitor that static charges tug



THE PROGRAMMERS: Left to right are Carl Polnaszek, Tim Gogolin, James Mork, and Tryg Helseth. The four code writers gather two days before 5.0.0 is shipped. **THE STATISTICS:** 150,000 lines of code, 29 months spent writing the program, and a few shouting matches.

his hair forward. The last programmer, like a driven plow-horse, keeps writing code. Endlessly... endlessly writing throughout more than 5,600 hours, 701 days — 29 months.

Despite those quirks, (or maybe because of them), these programming experts have written the most complex and stunning program of their careers. And finally, after five rigorous *beta* cycle reviews lasting another 17 weeks, it is released.



I recently asked the programmers what it's been like writing the code for DESIGN-EXPERT version 5:

HOW MANY LINES OF CODE DID YOU PERSONALLY WRITE?

Tim Gogolin: About 35,000.

James Mork: 80,000-plus.

Carl Polnaszek: All of the numerical stuff.

WHAT PART OF DX5 IS GOING INTO YOUR RESUME?

James Mork: The internal data transfer systems.

Tim Gogolin: 'Draggable' contours is an innovation I've not seen anywhere else.

Tryg Helseth: Response simulation.

WHAT GRAPHIC-RELATED WORK WAS THE BIGGEST CHALLENGE?

Tim Gogolin: Real-time 3D rotation code required a lot of work off some old college books. It's amazing how quickly four-dimensional cosine equations can slip from your mind...

Carl Polnaszek: Getting all the necessary analysis data into the graphics routines.

James Mork: Spreadsheets, reports, and tree-view architecture.

WHAT IS THE PROGRAM'S MOST POWERFUL FEATURE?

James Mork: Numerical Optimization.

Tryg Helseth: The ability to view a single set of data in so many meaningful ways.

Tim Gogolin: The ability to use automatic numerical optimization, which now uses factor requirements, response requirements, user-supplied equations, and propagation-of-error information to find the best possible factor settings. Any subset (or all of these) can be used. Many of these optimization parameters are new in version 5.

Carl Polnaszek: Graphics plus reports for a wide variety of DOE cases.

WHAT STATISTICS-RELATED WORK WAS THE BIGGEST CHALLENGE?

Tim Gogolin: Our goal of internally treating each type of model in the same way, while preserving the different properties of the Factorial, Response Surface, Scheffe, and Taguchi model types.

Carl Polnaszek: The stepwise selection routines with an aliased model with blocks.

Tryg Helseth: Predicting the completion date.

WHAT "TIP" CAN YOU PROVIDE TO A USER OF DESIGN-EXPERT 5?

Tryg Helseth: Design once, analyze often.

Tim Gogolin: If you feel lost while analyzing data and don't know where to go, work your way along the icon tree, from the top down, and then from left to right (just like you're reading a page).

James Mork: If you want to change something, try right-clicking it.

— Rich Burnham
Editor

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- CASE STUDY: "Statistical Software Speeds Process Troubleshooting"** (By Richard Mayes and John Ganjei, Hercules, Inc., Wilmington, DE) Reprinted from CHEMICAL ENGINEERING, 12/95. 1 p. DOE software helps Hercules help a customer. Focus is photoresist adhesion problems during printed circuit board manufacturing. DOE slashes the time required to get answers. Without it, hundreds of experiments, rather than just 16, would be required. **FREE.**
- DOE BOOK: "Experiment Design Made Easy -- Annotated Instructor Notes"** (By the Instructors from Stat-Ease Corp. © 1995.) All the overheads used in the workshop are here, plus notes normally available only to instructors. This book doesn't substitute for the actual workshop, but we believe you'll gain valuable DOE insights. Also included: DESIGN-EASE software on a time-limited disk, answer sheets, case studies, simulations, \$100 coupon to attend an Experiment Design Made Easy workshop! Cost is **\$95** plus shipping if you own any Stat-Ease Corporation product, **\$195** plus shipping if not. Still a great buy. (Shipping costs vary, so please call for a quote.)
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