# SOCR Tools

**Distributions**
This set of Java applets provides one of the most diverse set of continuous and discrete interactive distribution calculators. Users first choose a distribution of interest and the corresponding parameters and then compute probabilities or critical values for any distributions using mouse of keyboard controls.

**Experiments**
A number of interactive experiments used to demonstrate fundamental concepts in probability and statistics. These applets are frequently employed to motivate the introduction of new statistical concepts and methodologies.

**Analyses**
A suite of web-based graphical user interfaces to basic statistical analysis methods.

**Games**
A collection of dynamic computer games demonstrating a variety of situations where chance and variation and unavoidable.

**Modeler**
A data sampling and simulation tool, using the distributions provided as part of the SOCR Distributions library, that includes a complex data model fitting functionality.

**Charts**
SOCR Charts provide a diverse collection of tools for data plotting, charting, visualization and EDA.

**Additional Resources**
A number of external tools for statistical computing data visualization and analysis are linked to from within the SOCR Additional resource archive.

The goals of the SOCR Resource are to design, validate and freely disseminate knowledge. SOCR specifically provides portable online aids for probability and statistics education, technology based instruction and statistical computing.


Statistics Online Computational Resource

8125 Mathematical Sciences Building
Los Angeles, CA 90095-1554
Tel: (310) 825-8430 Fax: (310) 206-5658
**www.SOCR.ucla.edu**
**www.StatisticsResource.org**


# SOCR Personnel

Principal Investigator: Ivo D. Dinov, PhD

Co-PI Nicolas Christou, PhD

Robert Gould, PhD

Annie Chu, PhD

Jenny Cui, MS

Rahul Gidwani, MS

Jameel Al-Aziz

Beryl Lou

# SOCR Courses

Stats 10 - Introduction to Statistical Reasoning

Stats 13 - Statistical Methods for the Health and Life Sciences

Stats 100A - Probability Theory

Stats 100B - Mathematical Statistics

Stats 100C - Regression Analysis

Stats 136 - Probability & Statistics Data Modeling

Stats 105 - Applied Probability & Statistics for Engineers

Stats 130D - Statistical Computing

Stat 251 - Statistical Methods for Life Sciences

Neuroscience 272 - Brain Mapping & Neuroimaging

Statistics Online Computational Resource
UCLA

Funded by NSF DUE 0716055
&
NIH U54-RR21813

SOCR = ∫ Statistical Computing
Technology-based Instruction
Open-Source Project

http://www.SOCR.ucla.edu

http://wiki.stat.ucla.edu/socr

# Statistics Online Computational Resource

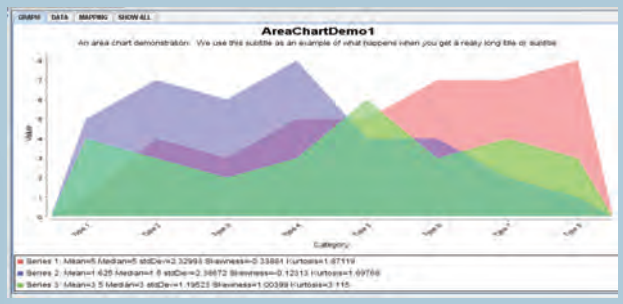
The need for hands-on computer laboratory experience in undergraduate and graduate statistics education has been firmly established in the past decade. Typical probability and statistics courses are presently either taught with enough rigor, using classical probability theory, or entirely based on empirical observations. In both cases, there are pedagogically valuable reasons for these choices. However, some motivational, descriptive and practical aspects may be significantly downplayed by solely theoretical or entirely empirical instructional approaches.

The Statistics Online Computational Resource (SOCR) was established in 2001 to design, implement, validate and freely disseminate new methods and approaches for integration of technology in the educational curriculum.

When Properly Integrated, IT and Blended Instruction May Significantly Enhance Undergradate and Graduate Education.

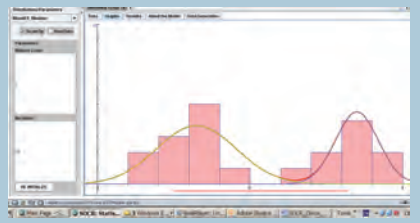
## SOCR Charts

**Charts** This new SOCR package consists of a large number of frequently used tools for Exploratory Data Analysis.



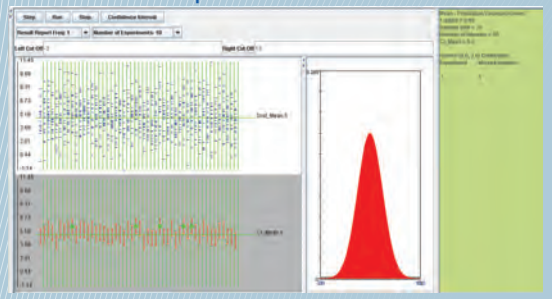

## SOCR Modeler

**Modeler** allows simulation, resampling and model-fitting. The example below illustrates fitting a mixture of two Gaussians to user selected data. It uses the EM algorithm to automatically estimate parameters.



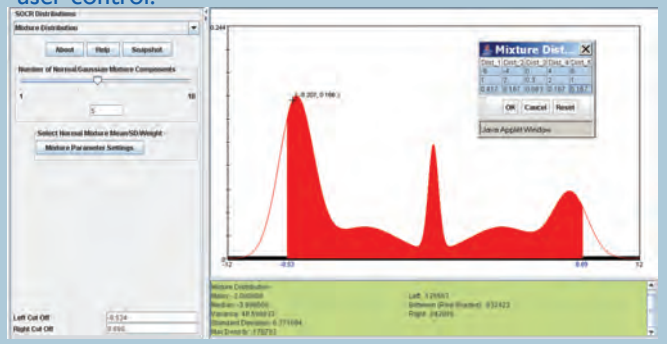
## SOCR Experiments

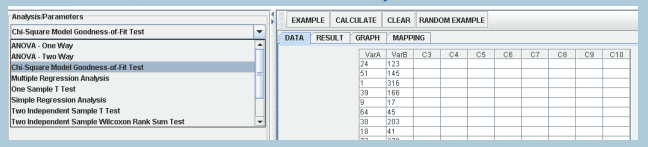
**Experiments** provide a plug-in framework for interactive simulations, which are useful in concept definitions, probability modeling and for student motivation. The figure below depicts one of the SOCR experiments, which illustrates the consistency of the confidence intervals definition and the relations between size of the intervals, -values and sample sizes.



## SOCR Distributions

**Distributions** The SOCR Distribution Modeling Toolbox allows computing of the probability values and the critical scores for a large number of distributions. This example shows the superposition of two (standard) Beta distributions, their parameters and shapes. Interactive manipulations using the mouse or keyboard allow easy user control.



## SOCR Analyses

**Analyses** contain the most commonly used methods for statistical data analyses.