

# ASA resident's Invited Address

## 2007

### A Brief Look at Grace Wahba

Prior to joining the University of Wisconsin-Madison, Grace Wahba was a member of the technical staff at Operations Research Incorporated, and then at IBM. She also held a postdoctoral position at Stanford. She is a Fellow of the Institute of Mathematical Statistics, American Statistical Association, and American Association for the Advancement of Science and a member of the National Academy of Sciences and American Academy of Arts and Sciences.

Since the early 1970s, beginning with smoothing splines, Wahba has been interested in regularization methods for nonparametric statistical model-building, which involve a trade-off between fit to the data and complexity of the model. Early work involved optimization problems in Reproducing Kernel Hilbert Spaces (RKHS). These spaces attracted relatively modest interest until about 1996, when it was discovered that the popular Support Vector Machine for classification could be obtained as the solution for an optimization problem in RKHS.

Wahba's recent research has involved analysis of datasets where only noisy, incomplete, dissimilarity information is available between members of the set; problems looking for important patterns or clusters of interacting variables; and various issues involving large, complex datasets and model structures with noisy, indirect, and incomplete information. She has graduated 29 PhD students, and, according to the Mathematical Genealogy Project, has 88 descendants.



Grace Wahba

*Monday, July 30, 2007, 4 p.m.*

**Salt Palace Convention Center, Ballrooms E-J**

*“Regularization Methods in Statistical  
Model-Building: Statisticians, Computer Scientists,  
Classification, and Machine Learning”*

**Grace Wahba  
University of Wisconsin-Madison**

Wahba will survey members of a broad class of statistical model-building tools that are popular in nonparametric regression and classification. These tools have the common feature that they involve an optimization problem with an explicit trade-off between fit to the data and complexity of the model. She will examine relationships between Bayes estimates, penalized likelihood nonparametric regression methods, and the classification method known as a Support Vector Machine in the context they share as regularization methods. Cross-validation-based methods for choosing the trade-off (tuning) parameters will be examined, along with problems in selecting important variables and variable clusters. Interplay between statisticians and computer scientists in extending this rich class of methods will be shown to be valuable to both.