DESIGNING OPTIMAL SPECTRAL FILTERS AND LOW-RANK MATRICES FOR INVERSE PROBLEMS

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3:00 p.m.
Chauvenet Hall, room 143

Inverse problems arise in scientific applications such as biomedical imaging, computational biology, and bioinformatics, and computing accurate solutions to inverse problems can be both mathematically and computationally challenging. In this talk, a new framework for solving inverse problems is developed by incorporating training data to compute an optimal regularized inverse matrix. This matrix is obtained by incorporating probabilistic information and solving a Bayes risk minimization problem. We present theoretical results for the Bayes problem and discuss efficient approaches for solving associated empirical Bayes risk minimization problems. Once computed, the optimal regularized inverse matrix can be used to solve inverse problems very efficiently.

This is joint work with Julianne Chung (Virginia Tech) and Dianne O'Leary (University of Maryland, College Park).

Matthias Chung received his PhD in Computational Mathematics from the University of Lübeck (Germany) in 2006 and is currently assistant professor in the Department of Mathematics at Virginia Tech. His research focuses on computational methods for inverse problems, which includes research areas such as parameter estimation for dynamical systems, optimization techniques, and regularization methods. Applications of his research include, but are not limited to, medicine, biology, and imaging.

Please join us for refreshments at 2:45 p.m.