SAMSI Program 2013 - 2014

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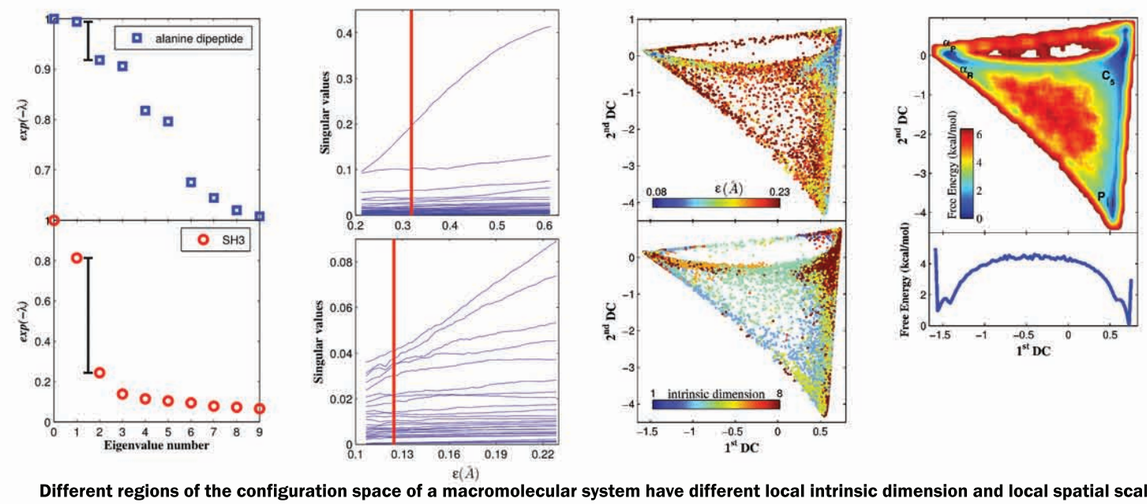
Low-Dimensional Structure in High-Dimensional Systems

Opportunities to Participate

- Visits to SAMSI for researchers
- Postdoctoral Fellowships
- New Researcher Fellowships
- Graduate Students stay at SAMSI
- Working Groups meeting weekly
- Workshops

The program on Low-Dimensional Structure in High-Dimensional Systems (LDHD) is devoted to the development of methodological, theoretical, and computational treatment of high-dimensional mathematical and statistical models. Possibly limited amounts of available data pose added challenges in high dimensions. The program will address these challenges by focusing on low-dimensional structures that approximate or encapsulate given high-dimensional data. Cutting edge methods of dimension reduction will be brought together from probability and statistics, geometry, topology, and computer science. These techniques include variable selection, graphical modeling, classification, dimension reduction in matrix estimation, empirical processes, and manifold learning. Working groups during the program will include theoretical discussions of these tools as well as applications to image and signal analysis, graphs and networks, genetics and genomics, dynamical systems, and machine learning.



Different regions of the configuration space of a macromolecular system have different local intrinsic dimension and local spatial scale. Locally scaled diffusion maps yield global reaction coordinates for the system as well as for associated low-dimensional nonlinear projections of the configuration space, to describe the slowest motions. This low-dimensional representation of the system on long timescales accurately reproduces certain statistics of the dynamics, such as reaction rates between semistable configurations.

Go to www.samsi.info for more info.

Program Leaders: Florentina Bunea (Cornell), Peter Hoff (U Washington), Chris Holmes (Oxford), Peter Kim (U Guelph), Vladimir Koltchinski (Georgia Tech), John Lafferty (U Chicago), Gilad Lerman (U Minnesota), Sara van de Geer (ETH Zürich), Marten Wegkamp (Cornell), Bin Yu (UC Berkeley)
Directorate Liaison: Ezra Miller (Duke)
Local Scientific Coordinators: Andrew Nobel (UNC), Rebecca Willett (Duke), Helen Zhang (NCSU)
National Advisory Committee Liaison: Jianqing Fan (Princeton)

Statistical and Applied Mathematical Sciences Institute (SAMSI), 19 T.W. Alexander Drive, RTP, NC 27709