

講題: **Topological Data Mining for Analyzing and Visualizing Complexities**

時間: 2009 年 12 月 10 日 星期四 10:30am-12:00pm

地點: 工五館 C 棟 1 樓會議室

主辦單位: 數據分析方法研究中心 校內分機 34951

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**ABSTRACT.** Topological representation of scientific data has become one of the primary visualization techniques in the last decade. In this talk, I will present how such topological approaches allow us to extract the meaningful structures inherent in the complicated data, together with the associated advancements of scientific visualization. Our main tool here is the contour tree, which delineates the topological evolution of isosurfaces of a single-valued function. We show that, especially for volume visualization, the use of contour trees effectively facilitates the automatic design of transfer functions, spatial analysis of inner structures in volumes, optimal viewpoints search, and so forth. Furthermore, we applied a conventional nonlinear dimensionality reduction to extract the contour tree even from higher-dimensional data. Several visualization results are also exhibited in this presentation so that we can visually confirm the feasibility of our topological approaches.

**REFERENCE.** Shigeo Takahashi, Issei Fujishiro, and Masato Okada: "Applying Manifold Learning to Plotting Approximate Contour Trees," *IEEE Transactions on Visualization and Computer Graphics (Proceedings of IEEE Visualization / Information Visualization 2009)*, Vol. 15, No. 6, pp. 1185-1192, 2009.

**SHIGEO TAKAHASHI** is an associate professor in the Graduate School of Frontier Sciences at the University of Tokyo, Japan. He received his B.S., M.S., and Ph.D. in computer science from the University of Tokyo in 1992, 1994, and 1997, respectively. His research interests include computer visualization, visual perception modeling, geometric modeling, and geographical information systems. He received the Most Cited Paper Award for Graphical Models (2004-2006) from Elsevier in 2007.