# AMS SHORT COURSE

## Aspects of Statistical Learning

**January 4-5, 2008**
**San Diego, California**

Organizers:

Dorothy Buck
Department of Mathematics
and Centre for Bioinformatics
Imperial College London

Erica Flapan
Department of Mathematics
Pomona College

Over the past twenty years, knot theory has rekindled its historic ties with biology, chemistry, and physics. While the original motivation for understanding and classifying knots came from chemistry, knot theory remained a primarily pure field of mathematics until the 1980s, when chemists, biologists, and physicists began searching for more sophisticated descriptions of entanglements of natural phenomena—from strings to small organic compounds to DNA.

This AMS Short Course will introduce knot theory, and some of its recent applications in molecular biology, chemistry, and physics. No prior knowledge of knot theory, biology, chemistry, or physics is assumed— there will be introductory talks on the first day. Speakers will survey their own work in these areas, as well as describing new avenues for interested researchers (and their students) to explore.

The Short Course will conclude with a panel discussion of the putative trajectories of these applications of knot theory, and summarize the major open problems and challenges. References will be available in advance and lecture notes published afterwards.

List of speakers:

Colin Adams (Williams College)
Dorothy Buck (Imperial College London)
Erica Flapan (Pomona College)
Lou Kauffman (University of Illinois at Chicago)
Ned Seeman (New York University)
Jon Simon (University of Iowa)

**Advance registration fees:**

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| **member/nonmember** | **$90/120** |
| **Student/unemployed/emeritus** | **$40** |

**On-site registration fees:**

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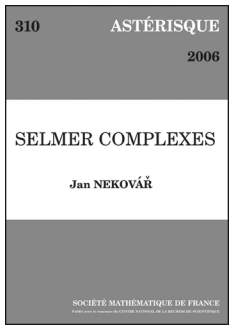
| **member/nonmember** | **$120/151** |
| **student/unemployed/emeritus** | **$60** |

# Number Theory




## Selmer Complexes

**Jan Nekovář**, *Université Pierre et Marie Curie, Paris, France*

This book builds new foundations of Iwasawa theory, based on a systematic study of cohomological invariants of big Galois representations in the framework of derived categories. A new duality formalism is developed, which leads to generalized Cassels–Tate pairings and generalized $p$-adic height pairings. One of the applications is a parity result for Selmer groups associated to Hilbert modular forms.

A publication of the Société Mathématique de France, Marseilles (SMF), distributed by the AMS in the U.S., Canada, and Mexico. Orders from other countries should be sent to the SMF. Members of the SMF receive a 30% discount from list.

**Contents:** Introduction; Homological algebra: Products and signs; Local duality; Continuous cohomology; Continuous cohomology of pro-finite groups; Duality theorems for Galois cohomology revisited; Selmer complexes; Unramified cohomology; Iwasawa theory; Classical Iwasawa theory; Generalized Cassels–Tate pairings; $R$-valued height pairings; Parity of ranks of Selmer groups; Errata; List of symbols; Bibliography.

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