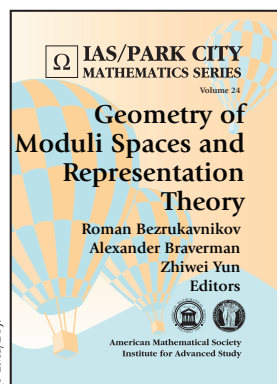


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Since the 1990s, the Park City Math Institute (PCMI) has held a three-week long residential program centered around a cutting-edge mathematical theme. Research leaders in the subject, college and university faculty, undergraduate and graduate students, and K–12 educators participate in intensive parallel workshops and activities that are centered around the program's theme. The program is set up to allow members of each group to dive deeply with peers into subject matter, while allowing time to mingle with others and think holistically about research and education.

For graduate students just beginning to specialize, the program can be described as a game-changer. Budding researchers have the chance to attend lecture series by world experts, work on problem sets guided by the coming generation of leaders in the subject, and work together with peers from other institutions, building friendships and professional networks that will last their lifetimes. The *IAS/Park City Mathematics Series* (PCMS) (<https://bookstore.ams.org/PCMS>) publishes compendia of notes from the graduate lectures, arranged and prefaced by editors from the scientific committee. These volumes serve as a valuable snapshot of a moment in the evolution of a subject, and as a valuable resource for undergraduates, graduate students, and researchers beyond those attending the program.

To illustrate the kinds of treasures that can be found in this series, we describe two recent examples.



IAS/Park City Mathematics Series, Volume 24, 2017, 436 pp. (PCMS/24).

### *Geometry of Moduli Spaces and Representation Theory*

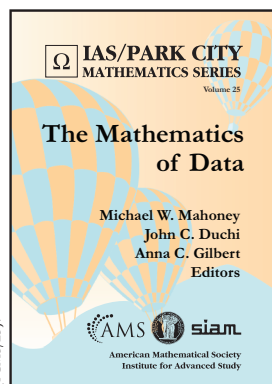
edited by Roman Bezrukavnikov, Alexander Braverman, and Zhiwei Yun

Geometric representation theory is a fast-developing area that pulls together topics in algebraic geometry, topology of algebraic varieties, and representation theory. The field is relatively young, growing out of a famous conjecture by Kazhdan and Lusztig from the 1970s on characters

of highest weight modules over a complex semisimple Lie algebra. Its proof by Beilinson-Bernstein and Brylinski-Kashiwara spurred powerful generalizations by revealing a deep interplay between the topology of singular “geometric spaces” (in their case, flag varieties and their subvarieties) and its ability to encode intricate algebraic geometric data. The lectures in this volume focus on two highly active research directions that have been invigorated by this circle of ideas. One is the geometric Langlands program, and the second is enumerative algebraic geometry. Although the two branches are quite distinct in motivation, they have deep, philosophical similarities, and strong technical connections, which help to unify the narrative of the volume.

The material in this volume assumes some familiarity with advanced notions in algebraic geometry and representation theory and would be useful for an advanced graduate topics course or for self-study.

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IAS/Park City Mathematics Series, Volume 25, 2018, 325 pp. (PCMS/25).

### *The Mathematics of Data*

edited by Michael W. Mahoney, John C. Duchi, and Anna C. Gilbert

Interest in “machine learning” and “data science” has exploded in recent years. The purpose of this volume is to present the myriad role that mathematics plays in the subject, both by supplying techniques and theorems and by providing an abstract and

cohesive framework. The volume conveys the wide range of topics that are used in data analysis, ranging from probabilistic methods in linear algebra and stochastic optimization algorithms to homological algebra, and is written by leading experts in various fields within mathematics, computer science, and statistics. Each lecture is self-contained and can be read independently. The program organizers have ensured that the chapters together give a sense of the diverse and complementary ways that the topics work together, making the volume as a whole useful as a textbook or supplementary text for advanced undergraduates and graduate students.

The AMS Bookshelf is prepared bimonthly by AMS Book Acquisitions Consultant Eriko Hironaka. Her email address is [ehironaka@amsbooks.org](mailto:ehironaka@amsbooks.org).