

WINNER OF THE 2016 IAA OUTSTANDING PUBLICATION AWARD,  
INTERNATIONAL ASTROSTATISTICS ASSOCIATION

*Statistics, Data Mining, and Machine Learning in Astronomy* is the essential introduction to the statistical methods needed to analyze complex data sets from astronomical surveys such as the Panoramic Survey Telescope and Rapid Response System, the Dark Energy Survey, and the Large Synoptic Survey Telescope. Now fully updated, it presents a wealth of practical analysis problems, evaluates the techniques for solving them, and explains how to use various approaches for different types and sizes of data sets. Python code and sample data sets are provided for all applications described in the book. The supporting data sets have been carefully selected from contemporary astronomical surveys and are easy to download and use. The accompanying Python code is publicly available, well documented, and follows uniform coding standards. Together, the data sets and code enable readers to reproduce all the figures and examples, engage with the different methods, and adapt them to their own fields of interest.

An accessible textbook for students and an indispensable reference for researchers, this updated edition features new sections on deep learning methods, hierarchical Bayes modeling, and approximate Bayesian computation. The chapters have been revised throughout and the astroML code has been brought completely up to date.

- Fully revised and expanded
- Describes the most useful statistical and data-mining methods for extracting knowledge from huge and complex astronomical data sets
- Features real-world data sets from astronomical surveys
- Uses a freely available Python codebase throughout
- Ideal for graduate students, advanced undergraduates, and working astronomers

#### PRAISE FOR THE PREVIOUS EDITION:

“A comprehensive, accessible, well-thought-out introduction to the new and burgeoning field of astrostatistics.”

#### —CHOICE

“A substantial work that can be of value to students and scientists interested in mining the vast amount of astronomical data collected to date. . . . If data mining and machine learning fall within your interest area, this text deserves a place on your shelf.”

#### —PLANETARIAN

“This comprehensive book is surely going to be regarded as one of the foremost texts in the new discipline of astrostatistics.”

#### —JOSEPH M. HILBE, PRESIDENT OF THE INTERNATIONAL ASTROSTATISTICS ASSOCIATION

**ŽELJKO IVEZIĆ** is professor of astronomy at the University of Washington.

**ANDREW J. CONNOLLY** is professor of astronomy at the University of Washington.


**JACOB T. VANDERPLAS** is a software engineer at Google.

**ALEXANDER GRAY** is vice president of AI science at IBM.

Princeton Series in Modern Observational Astronomy

David N. Spergel, Series Editor

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