Fundamentals of Nonparametric Bayesian Inference Subhashis Ghosal Aad van der Vaart

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# Fundamentals of Nonparametric Bayesian Inference (Cambridge Series in Statistical and Probabilistic Mathematics)

By Subhashis Ghosal, Aad van der Vaart



**Fundamentals of Nonparametric Bayesian Inference (Cambridge Series in Statistical and Probabilistic Mathematics)** By Subhashis Ghosal, Aad van der Vaart

Explosive growth in computing power has made Bayesian methods for infinitedimensional models - Bayesian nonparametrics - a nearly universal framework for inference, finding practical use in numerous subject areas. Written by leading researchers, this authoritative text draws on theoretical advances of the past twenty years to synthesize all aspects of Bayesian nonparametrics, from prior construction to computation and large sample behavior of posteriors. Because understanding the behavior of posteriors is critical to selecting priors that work, the large sample theory is developed systematically, illustrated by various examples of model and prior combinations. Precise sufficient conditions are given, with complete proofs, that ensure desirable posterior properties and behavior. Each chapter ends with historical notes and numerous exercises to deepen and consolidate the reader's understanding, making the book valuable for both graduate students and researchers in statistics and machine learning, as well as in application areas such as econometrics and biostatistics.

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- Rank: #198832 in Books
- Published on: 2017-06-26
- Original language: English
- Dimensions: 9.96" h x 1.57" w x 6.97" l,
- Binding: Hardcover
- 656 pages

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#### **Editorial Review**

#### Review

Advance praise: 'Probabilistic inference of massive and complex data has received much attention in statistics and machine learning, and Bayesian nonparametrics is one of the core tools. Fundamentals of Nonparametric Bayesian Inference is the first book to comprehensively cover models, methods, and theories of Bayesian nonparametrics. Readers can learn basic ideas and intuitions as well as rigorous treatments of underlying theories and computations from this wonderful book.' Yongdai Kim, Seoul National University

Advance praise: 'Bayesian nonparametrics has seen amazing theoretical, methodological, and computational developments in recent years. This timely book gives an authoritative account of the current state of the art by two leading scholars in the field. They masterfully cover all major aspects of the discipline, with an emphasis on asymptotics, and achieve the rare feat of being simultaneously broad and deep, while preserving the utmost mathematical rigor. This book is, without doubt, a must-read for Ph.D. students and researchers in statistics and probability.' Igor Prünster, Universit... Commerciale Luigi Bocconi, Milan

Advance praise: 'Worth waiting for, this book gives a both global and precise overview on the fundamentals of Bayesian nonparametrics. It will be extremely valuable as a textbook for Masters and Ph.D. students, along with more experienced researchers, as the authors have managed to gather, link together, and present with great clarity a large part of the major advances in Bayesian nonparametric modeling and theory.' Judith Rousseau, Université Paris-Dauphine

#### About the Author

Subhashis Ghosal is Professor of Statistics at North Carolina State University. His primary research interest is in the theory, methodology and various applications of Bayesian nonparametrics. He has edited one book, written nearly one hundred papers, and serves on the editorial boards of the Annals of Statistics, Bernoulli, and the Electronic Journal of Statistics. He is an elected fellow of the Institute of Mathematical Statistics, the American Statistical Association and the International Society for Bayesian Analysis.

Aad van der Vaart is Professor of Stochastics at Universiteit Leiden. He is the author of several books and lecture notes in topics ranging from asymptotic statistics to genetics and finance, and many research papers in statistics and its applications. He is a member of the Royal Netherlands Academy of Arts and Sciences, former president of Netherlands Statistical Society, and a recipient of the Spinoza Prize of the Netherlands Organisation of Scientific Research.

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