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Introduction for S.I. AofA14

Mireille Bousquet-Mélou[1] · **Robert Sedgewick**[2] ·
Michèle Soria[3]

1 Introduction

We are delighted to present this special issue of *Algorithmica* on probabilistic, combinatorial, and asymptotic methods for the analysis of algorithms.

Methods that enable precise mathematical analysis of the combinatorial properties of computer programs and data structures have been a focus of a large group of researchers meeting at least annually since the early 1990s. The 2014 meeting in Paris was a special one, marking the occasion of the first Flajolet Lecture, which was delivered by Don Knuth, thus honoring two of the field's pioneers.

This issue consists of seven papers that were selected for this issue by the conference program committee.

The first two articles, by Drmota and Jin on "An Asymptotic Analysis of Labeled and Unlabeled k-Trees," and by Krenn and Wagner on "Compositions into Powers of b: Asymptotic Enumeration and Parameters," continue to expand the frontier of combinatorial structures that can be studied with analytic-combinatoric techniques. The next three articles address classic problems in the analysis of algorithms. In "Analysis of Pivot Sampling in Dual-Pivot Quicksort," Wild finally develops convincing explanation for the success of Yaroslavskiy's algorithm in practice; in "On the Cost of Fixed Partial Match Queries in K-d Trees," Duch, Lau, and Martinez develop a deeper

✉ Michèle Soria
  Michele.Soria@lip6.fr

1   Laboratoire Bordelais de Recherche en Informatique, UMR 5800, CNRS,
    Université de Bordeaux, 351 Cours de la Libération, 33405 Talence Cedex, France

2   Department of Computer Science, Princeton University, 35 Olden Street, Princeton, NJ 08540,
    USA

3   Laboratoire d'Informatique de Paris 6, UMR 7606, Université Pierre and Marie Curie,
    4 Place Jussieu, 75005 Paris, France

understanding of the nature of partial match queries; and in "A Unified Approach to Linear Probing Hashing with Buckets," Janson and Viola give the first unified presentation of the analysis of linear probing hashing with buckets based on analytic combinatorics. In "Asymptotic Lattice Path Enumeration Using Diagonals," Melczer and Mishna develop new results on a fundamental class of problems using multivariate analytic combinatorics; and in "Complexity of Anticipated Rejection Algorithms and the Darling-Mandelbrot Distribution," Bacher and Sportiello develop a fundamental result about random sampling.

The guest editors believe the papers appearing in this issue are representative of current research frontiers in the field. Several of them address classical problems with modern analytic tools, so they should appeal both to experts in the field and to those interested in current research trends in probabilistic, combinatorial and asymptotic methods for the analysis of algorithms.

We hope you enjoy this special issue and take some inspiration from it for your own future research.

Mireille Bousquet-Mélou, Robert Sedgewick, and Michèle Soria, April 2016