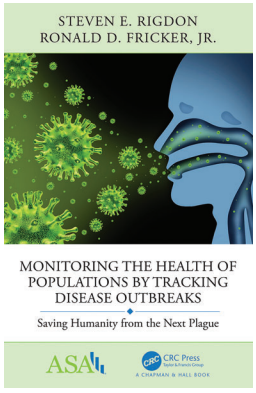
BOOKSHELF

New and Noteworthy Titles on our Bookshelf
March 2022



Cover is courtesy of Taylor and Francis.

Monitoring the Health of Populations by Tracking Disease Outbreaks

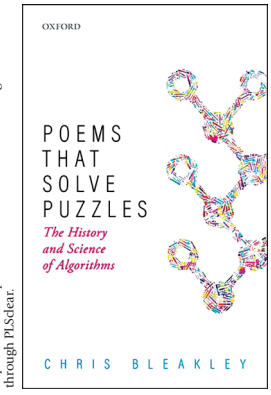
Saving Humanity from the Next Plague

By Steven E. Rigdon and Ronald D. Fricker, Jr.

Given the health concerns surrounding COVID-19 and how our lives were impacted over the last two years (and for many of us, longer), the title of this book alone will likely draw many of us in immediately. Published shortly before COVID-19 was declared a pandemic, this book does not use the coronavirus as a motivating case, but it is easy to see how the models used to track other epidemics and pandemics, such as the Spanish flu, cholera, and bird flu, have been instrumental in battling COVID. This book focuses on how statistics is used to identify contagious diseases and can be applied to determine key factors that influence the development of a disease and can reduce its spread. It has two main parts: The first focuses on methods of monitoring diseases to be able to take action before a disease becomes widespread. The second is about how an epidemiologist works to understand the cause of a disease, presenting seven case studies to illustrate the issues.

When a new statistical concept is introduced, such as the relationship between correlation and causation, the authors include a section that defines the concept and how it is generally used before discussing its particular application to the disease currently being presented. The text also uses many ideas from probability and statistics such as conditional probability, the chi-squared hypothesis test, and experimental design techniques.

This book is an ideal read for anyone with an interest in biostatistics or mathematical models of disease. It is packed with interesting graphs and figures, including a graph demonstrating the SIR (Susceptible-Infected-Recovered) model for the flu and how vaccinations and education campaigns can impact the number of infected individuals. It is a highly engaging and informative read. In the Preface there is a promise of a second edition which will include an analysis of COVID-19. I look forward to reading the second edition!



Poems that Solve Puzzles

The History and Science of Algorithms

By Chris Bleakley

Poems that Solve Puzzles is a thorough investigation into the history of algorithms. Examples of algorithms from as far back as Mesopotamia are given, as well as some algorithms we all use for things such as sorting or deciding how to run our errands most efficiently. Bleakley gives instances, such as weather forecasting, where the algorithmic idea was in place long before the computer technology required to implement it efficiently existed.

Throughout the book, we see how mathematical concepts like simulation, modeling, and networking work together with algorithms. While a good deal of time is spent discussing Turing and his groundbreaking contributions, this book gives ample pages to more modern advances in computer science. Topics such as the birth of the internet, Amazon's personalized recommendations (that are often eerily accurate!), and Google's Page Rank algorithm are discussed. There is even a chapter on IBM's *Jeopardy* playing robot, which in the wake of the passing of Alex Trebek, will surely bring back some fond memories for many readers.

This is an interesting read written for a general audience. Bleakley does not assume any math or computer science background, clearly defining technical terms when they are first used. While you do not have to be a mathematician to enjoy this book, any mathematician will recognize many names mentioned, such as Archimedes, Ada Lovelace, and John Von Neumann, as having made significant contributions to the development of the implementation of algorithms. It is an enjoyable read for anyone curious about how algorithms developed and were implemented throughout history.

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