Structural DNA Nanotechnology by Nadrian C. Seeman, Cambridge University Press, Cambridge, 2015, 266 pages, ISBN: 978-0521764483.

Nadrian C. Seeman has been at New York University since 1988, but wrote most of the book while on sabbatical in 2011 in San Francisco. Seeman is the founder of the field of DNA nanotechnology and has been given a number of awards, including the Feynman and Kavli Prizes, in recognition of his groundbreaking work. Seeman comments that he came up with the idea of making nanoscale structures with DNA in a bar in 1980, but he doesn't elaborate. I would have enjoyed the rest of that story.

The book has 14 chapters. The first four cover the origin of the title topic: DNA nanotechnology. The most important statement in chapter 1 is actually in the caption of Figure 1-8: "the central concept of structural DNA nanotechnology: combining branched junctions into larger constructs." This statement captures the crux of the science Seeman describes throughout the whole book. The next two chapters cover the design of sequences to generate branched junctions and motifs by reciprocal exchange. Here a diagrammatical notation is introduced to display complex structures. This notation is further refined in chapter 4, which covers SS DNA topology, starting with knots and nodes and ending with complicated constructs.

Chapter 5 moves from the theoretical to the practical side and describes how to start building and characterizing DNA nanostructures, mostly through FRET and AFM, but occasionally through X-ray crystallography. Chapter 6 looks at robust motifs, essential for building DNA nanostructures. The next two chapters look at making larger structures and mechanical devices from the basic building junctions and motifs, with the latter chapter ending with a discussion on a (very cool) nano-scale bipedal walker.

Chapter 9 covers the topic of origami, things you can make through folding, and bricks, the building blocks of even larger structures. Chapter 10 picks up where chapter 8 left off and combines the concepts of structure and motion to produce a nano-assembly line. This provides a good segue into the next chapter – a discussion about self-replicating systems.

Chapter 12 covers the concept of computing with DNA. Seeman gives the example of a simple traveling salesman problem and describing how to implement basic logic functionality with DNA. Chapter 13 covers the concepts of triplex DNA, G-tetrads, the I motif and RNA constructs. The final chapter looks at how DNA constructs can be used to organize other objects.

The book uses a copious number of figures to explain the various concepts and is very well referenced.

We probably won't be seeing as many reviews from Jeanette here anymore. She has started publishing articles and reviews on a weekly basis on the NYU site scienceline.org. Her review of *The Gene* by Siddhartha Mukherjee, as well an article on the Zika virus, may be found there.

Review by Joseph D. Ferrara, Ph.D.
Chief Science Officer, Rigaku