BOOK REVIEW
So You Want to Be a Neuroscientist
By Ashley Juavinett
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No doubt about it, Neuroscience is hot stuff—ever popular with science writers and blog authors, alike. The field is attracting more interest among undergraduates than ever (Pinard-Welyczko et al., 2017). And why not, when its subject matter includes the psychocognitive sciences tackling big questions such as the nature of our emotions as well as how we learn and remember. The latter is very much in the news because of the emergence of studies in artificial intelligence, deep learning, and machine learning, subjects that are on the minds of career-minded and entrepreneurially inclined college undergraduates these days. Neuroscience contends for "big kahuna" of the STEM sciences because who isn't interested in understanding/managing/controlling the one organ that must fire on all cylinders to insure that all of us have high quality of life—you may possess a god-like body, perfect in every feature but if your brain is out of whack neither you, nor those near and dear, will enjoy it. As we approach the quarter-century mark of the third millennium, understanding how human behavior emerges from the soup and sparks of brain activity seems to be a plausibly approachable enterprise, more now than ever before. Hence Neuroscience, broadly and multidisciplinarily conceived, is attractive to not only the best and brightest of today's science students but also attracts equally bright but more pragmatically minded students whose interests lie in managing public health and medicine, including bioengineering, big-pharma, social work, governance, business, and advertising—enterprises that organize how our society runs. So, author Dr. Ashley Juavinett, asks: "what do you have to do to get into Neuroscience and related fields?" In this breezy, well-written but no-nonsense guide to courses and career options in Neuroscience, the author shares her panoramic perspective and experience in navigating a career in Neuroscience, from undergraduate-to-graduate-to-postdoc phases of "training" that captures and annotates the pathway under current practice in colleges and universities. The book initially seems directed at the "serious" neuroscientist student whose goal may be academic or biomedical and who may be majoring initially in biology or psychology, but in later chapters she expands its scope to include fields like industry and consulting which have significant intersection with brain and behavior content. It is definitely a useful guide for anyone, student, parent, or educators whose interests or jobs involve career counseling. There are other books and guides available but few that tackle the myriad options for a career in Neuroscience that are as accessible as this one. Juavinett provides pretty much all an inquiring student might want to know about "what it takes and what's involved" in considering a career in Neuroscience.

The author is a recent Ph.D. (UCSD) and did postdoctoral work at Cold Spring Harbor Lab in Neuroscience research, at the end of which she returned to UCSD as a teaching Assistant Professor and runs the Neuroscience Education Lab. Juavinett certainly knows the ropes for climbing to a neuroscience career. Importantly, she is young and her experience is up-to-date which lends her credibilityfor emerging neuroscientists. Most importantly, this book especially speaks to young women with a STEM leaning and is filled with advice for navigating a once male-dominated field. The author's own life experiences inform her perspective on socially sensitive issues facing women and people of color. Recent shifts in Western culture impacts career choices in more ways than what courses to take, which the author addresses forthrightly.

The book is organized into a brief orientation to what 21st c Neuroscience has become and then switches to undergraduate preparation for graduate school with particular emphasis that the media image of the lone wolf, (or more appropriately, lone lab rat), approach to Neuroscience research is no more. Research is done in teams and collaborative/sharing skills have replaced lone wolves; the ability to communicate collaboratively is valued, especially in graduate school.

The advice on selecting an appropriate graduate program includes a lot of generic, boiler plate details of the application process. A separate chapter provides valuable tips on what to look for in a mentor—this is tricky but important decision that the author deals with directly and sensitively. Similarly, useful tips for selecting a thesis committee are welcome. Uniquely, the author addresses the the important topic or "self-care" that is omitted from other career guides, to the detriment of the trainee—there is life outside the lab and awareness of personal and institutional resources is part of "meta-education" (a.k.a. life-lessons) of graduate students. Here, the role of mentoring reappears and carries over through the postdoc and assistant professor stages, until tenure, at which time one becomes a (hopefully good) mentor. While this seems applicable to academic track neuroscientists, the role of mentors is just as important in Neuroscience-related careers outside academia. Undeniably, though, this book leans

more heavily toward the concerns of Neuroscience trainees aimed toward academic careers.

There are numerous other useful topics for the budding neuroscientist to mull over but I'll focus the rest of my comments on some that could have been emphasized more during all stages of training. The first is that Neuroscience is ever-more quantitative and computational (as all societal institutions, whether baseball or advertising or the stock market). We live in an age of Big Data and Systems Analysis in which computational and statistical competence is must-have training, beginning as an undergraduate. That means math and coding. To her credit, Juavinett makes a strong point about why students should learn to code (through Python, R, or MatLab) which deserves highlighting. It is an encouraging sign that the message about coding has been in high school curricula in recent years due to the perception that this is a strategic skill for tomorrow's job market. At the college level the need for data science courses is becoming more widely acknowledged in fields outside STEM and the social sciences like economics. Hopefully it will become a curricular prerequisite, soon. I would also advise Neuroscience undergraduates to develop their math skills beyond the minimal calculus requirement to include learning linear algebra which is the gateway to the analysis of networks (Hoy, 2021). It would also be desirable to develop their statistics chops to include multivariate statistics and even learn some Bayesian modeling. This is problematic for many biologists and directors of bio and Neuroscience programs who ought to pay more attention to providing computational math teaching in settings or programs outside math departments, which aren't always flexible, let alone sympathetic, to students who are more interested in applications of math. Given that modern Neuroscience has become deeply and densely interdisciplinary where research teams include members from engineering, computer science, physics, as well as statistics, neuro students would greatly benefit if they became more comfortable in linear algebra and computational modeling approaches. In the meantime, at a base minimum, for God's sake, learn to code (Grisham et al., 2021).

Dr. Juavinett concludes her book with a delightful and inspiring chapter, "A cast of neuroscience characters," which is a curated gallery of short biosketches of successful and inspiring young neuroscientists in a range of Neuroscience careers, even outside academia. These brief commentaries leaven all the "check box" nuts and bolts advice on navigating the path to grad school and beyond. These stories can inspire undergraduate and graduate student readers. Equally important, the drawings of headshots make the point that these neuroscientists come from diverse backgrounds—these are folks who look like students who may wonder if there's really a place for someone who looks like them. There is and there are! I wish this chapter led off the book rather than ended it. The biosketches are beautifully written and sketch out the human beings behind the wonderful and revolutionary work that is changing the face of modern Neuroscience.

In conclusion, I recommend this book for the parents, teachers, and career counselors of K-12 students and certainly for aspiring neuroscience undergraduates and graduate students. There are words of advice here that echo those of the best mentors in the field.

REFERENCES

Grisham W, Abrams M, Babiec We, Fairhall AL, Kass RE, Wallisch P, Olivo R (2021) Teaching computation in neuroscience: Notes on the 2019 society for neuroscience professional development workshop on teaching. J Undergrad Neurosci Educ 19(2):A185-A119. Available at https://pubmed.ncbi.nlm.nih.gov/34552436/.

Hoy RR (2021) Quantitative skills in undergraduate neuroscience education in the age of big data. Neurosci Letts 759:136074. doi: 10.1016/j.neulet.2021.136074.

Pinard-Welyczko KM, Garrison ACS, Ramos RL, Carter BS (2017) Characterizing the undergraduate neuroscience program in the U.S.: An examination of course requirements and institution-program associations. J Undergrad Neurosci Educ 16(1):A60-A67. Available at https://pubmed.ncbi.nlm.nih.gov/29371843/.

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