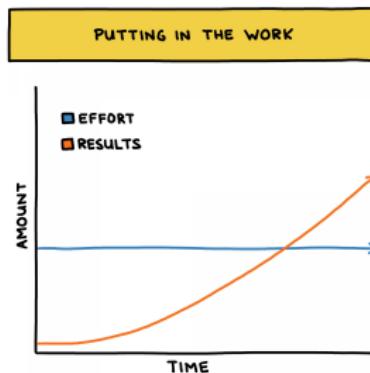


I H \heartsuit TE Grad School, and You Can Too!

Tales and Advice from an Interdisciplinary Graduate Student

Shelby Scott

Department of Ecology and Evolutionary Biology
University of Tennessee, Knoxville



1 April 2021

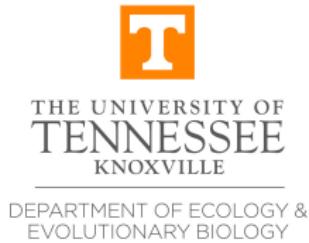
Preliminaries

shelbymscott.github.io

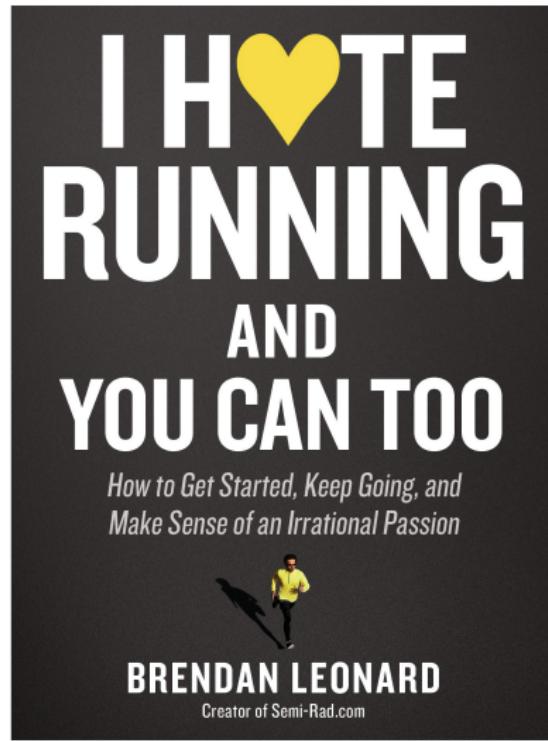


Acknowledgments

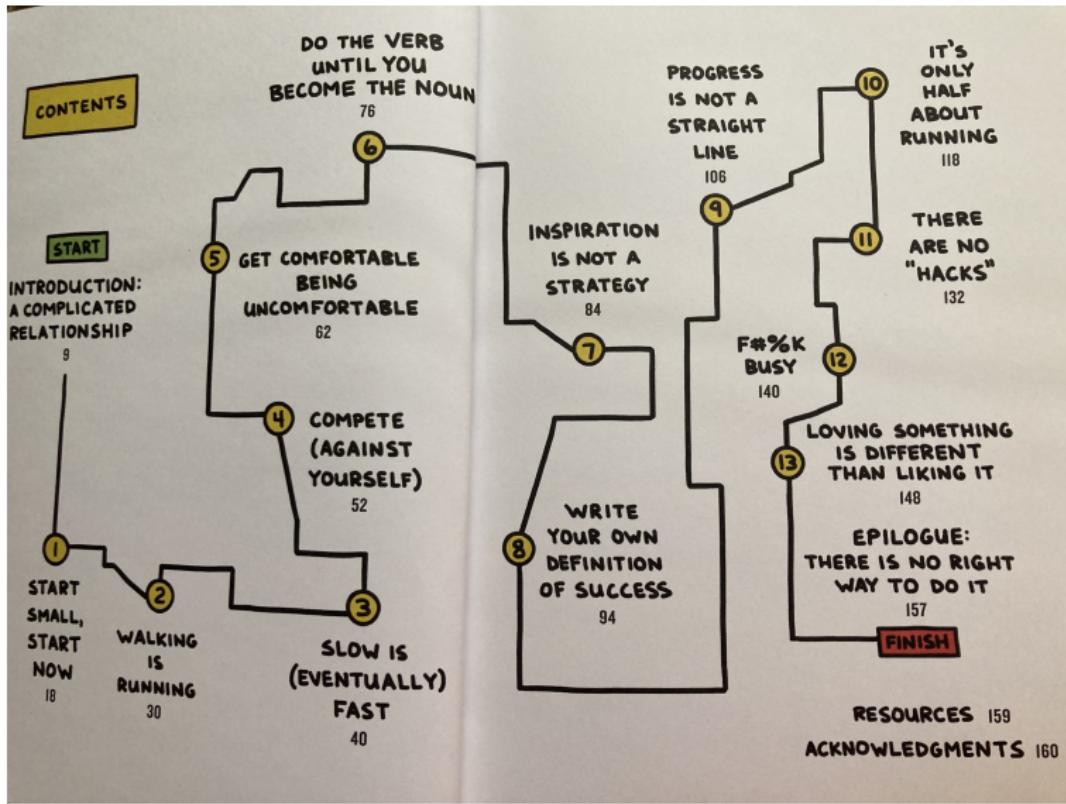
- SMB Education Subgroup
- UTK Department of Ecology and Evolutionary Biology
- Dr. Louis J. Gross*, Dr. Nina Fefferman, Dr. Sergey Gavrilets, Dr. Suzanne Lenhart
- Funding: ASEE NDSEG Fellowship, NIH/NIGMS - IMSD #R25GM086761



For Context



Overview



Overview

- 1 Introduction: A Complicated Relationship
- 2 Start Small, Start Now
- 3 Reading is Research
- 4 Slow is (Eventually) Fast
- 5 Compete (Against Yourself)
- 6 Get Comfortable Being Uncomfortable
- 7 Do the Verb Until You Become the Noun
- 8 Inspiration is Not a Strategy
- 9 Write Your Own Definition of Success
- 10 Progress is Not a Straight Line
- 11 It's Only Half About Running
- 12 There Are No "Hacks"
- 13 Screw Busy
- 14 Loving Something is Different from Liking It
- 15 Epilogue: There is No Right Way to Do It

Introduction

- May 2015: B.S. Rhodes College - Biomathematics
- Senior thesis: *An Agent-Based Model of Golden Eagle Predation on the Santa Cruz Island Fox*
- August 2015: Started in the Ecology and Evolutionary Biology Department at UTK
- Concurrently pursuing a Masters in Statistics via the IGSP
- Masters project: *Analyzing Covariates of Diabetes Using Bayesian Linear Regression and Model Selection*
- Dissertation: *Spatio-Temporal Modeling of Gun Crime in Chicago, Illinois*

Introduction: A Complicated Relationship with Science

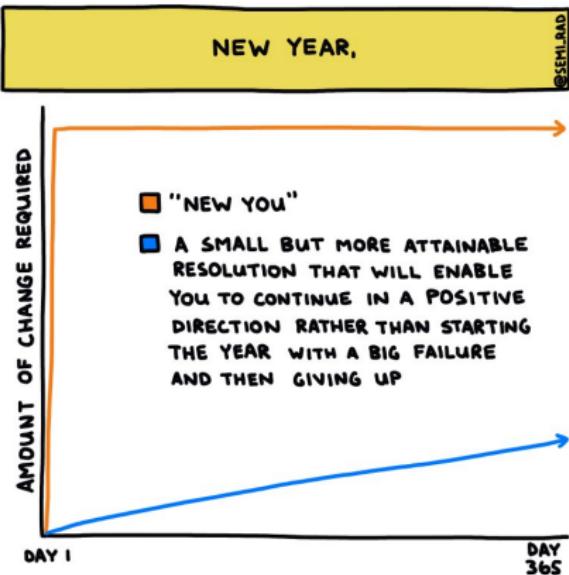
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- Service and Extracurriculars: SMB Education Subgroup, SMB Writing Group, Criminology Writing Group, EKEE Co-Founder and Past President

Start Small, Start Now - Lessons from Undergrad

- Get involved with research:
 - Summer REU Programs
 - Internships and externships
 - Informal experiences
- Attend conferences
- Develop valuable skills:
 - LaTeX
 - Effective Oral and Poster Presentation
 - Coding
 - Teamwork
- Publish (if possible)
- Enroll in classes outside of your major



Start Small, Start Now - Wishes from Undergrad



- Course wishes:

- Linear Algebra
- Proofs course
- More computer science
- More interesting classes

- Experiences

- Networking with more diverse groups
- Grad school application process
- More reading
- Gap year

Reading IS Research

- Read, and then read some more
- Google Alerts
- Literature organization

mathematical modeling November 27, 2017 2 days ago

NEWS

Researchers Using Math to Boost Wheat Straw Use for Ethanol

U.S. News & World Report

Researchers Using Math to Boost Wheat Straw Use for Ethanol. Researchers in Kansas and China are using mathematical modeling to improve the process of converting wheat straw into pellets for the production of ethanol. Nov. 26, 2017, at 11:36 a.m. Researchers Using Math to Boost Wheat Straw ...

WEB

Computational psychiatry : mathematical modeling of mental illness

Stanford Newsworks - Stanford University

Computational psychiatry : mathematical modeling of mental illness. Responsibility: edited by Alan Anticevic, John D. Murray. Imprint: London : Academic Press, c2018. Physical description: online resource (xx, 300 pages) : color illustrations, charts ...

| Existing Crime Models Paper Breakdown | | | | | | | |
|---------------------------------------|---|---|--|------|---|---|--|
| A1 | Paper Title | Authors | Journal | Year | Question Asked | Method Used | |
| 1 | Novel evaluation metrics for sparse spatio-temporal point process hidden predictors – a crime case study | Monsuwe, Adejaji, Gabriel Rossen, Tao Cheng | International Journal of Geographical Information Science | 2018 | Develop a practical toolkit of evaluation metrics for spatio-temporal point process predictors | Spatio-temporal point process | |
| 2 | An Exploratory Analysis of Guns and Violent Crime in a Cross-National Sample of Cities | Ingrid Altheimer | Southwest Journal of Criminal Justice | 2013 | Examine the relationship between gun availability and crime in a cross-national sample of cities | Logistic regression maximum likelihood estimation | |
| 3 | A Recurrent Spatial Analysis of Gun Violence near School: A Public Health Approach | Gia Barbaza | Journal of Urban Health | 2018 | Quantify the concentration of shootings near schools to elucidate the place-based dynamics of gun violence around schools for violence prevention; assess the spatial dependence of shooting at individual schools | Spatial statistics for point pattern data, distance matrix and k function methodology | |
| 4 | Neighborhood Co-Offending Networks: Structural Embeddedness, and Violent Crime in Chicago | Sara Bestromski, Noli Bratil, Andrew Papachristos | Social Networks | 2017 | Clarify the role of neighborhood-level criminal networks in shaping the distribution of violent crime throughout cities. Investigate how a focal neighborhood's violent crime is influenced by its structural embeddedness within the larger community-wide criminal network. | Network models | |
| 5 | Robberies in Chicago: A Block-Level Analysis of the Influence of Crime Generators, Crime Attractors, and Offender Anchors | Wim Bernasco, Richard Block | Journal of Research in Crime and Justice | 2013 | Clarify the effects of crime generators, online attractors, and offender anchor points on the distribution of violent crime across the 25,000 census blocks of Chicago | Negative binomial model | |
| 6 | Integrating the Literature on Lethal Violence: A Comparison of Mass Murder, Homicide, and Homicide-Suicide | EE Frindel - Homicide Studies, 2021 | ... Tips on citation download. Download Citation. Download article citation data for Integrating the Literature on Lethal Violence: A Comparison of Mass Murder, Homicide, and Homicide-Suicide. Emma E. Frindel: Homicide Studies 0 ... | | | | Blocks that host crime attractors and generators not only have elevated rates of robbery but also have higher rates of their elevated crime risk to adjacent blocks. Modeling effects of the physical environment in situations where the social units of analysis are |

Integrating the Literature on Lethal Violence: A Comparison of Mass Murder, Homicide, and Homicide-Suicide

EE Frindel - Homicide Studies, 2021

... Tips on citation download. Download Citation. Download article citation data for Integrating the Literature on Lethal Violence: A Comparison of Mass Murder, Homicide, and Homicide-Suicide. Emma E. Frindel: Homicide Studies 0 ...

☆ ☀️ 🌟 🎉

@Shelby_M_Scott (UTK)

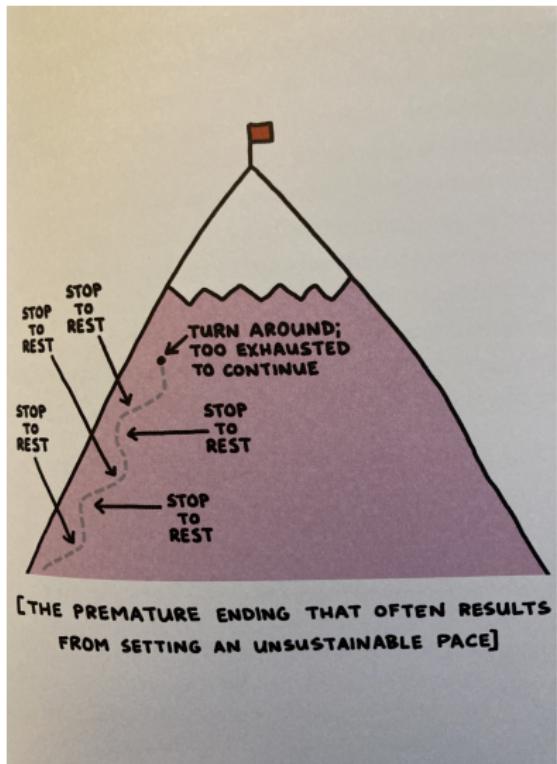
IH ❤️ TE Grad School, and You Can Too!

SMB Education Satellite Meeting

11 / 30

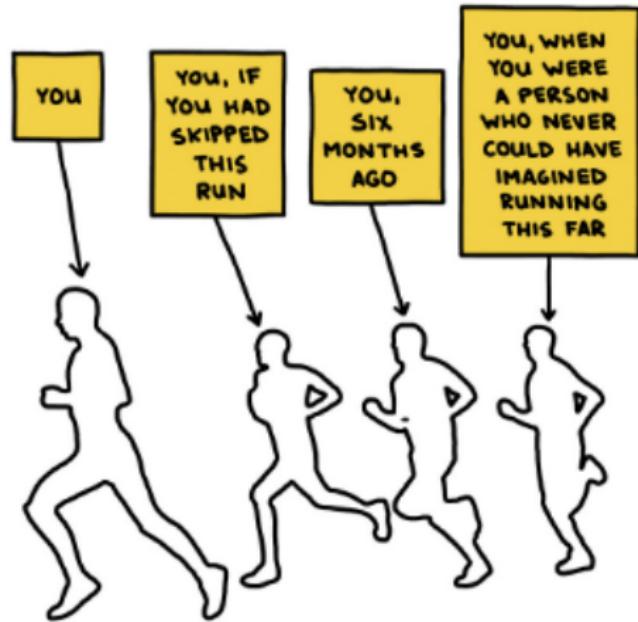
Slow is (Eventually) Fast

- 1. Undergrad vs. Grad: Tasks take less time now and are less intimidating
- 2. If you, “go out too fast,” you’ll burn out.



Compete (Against Yourself)

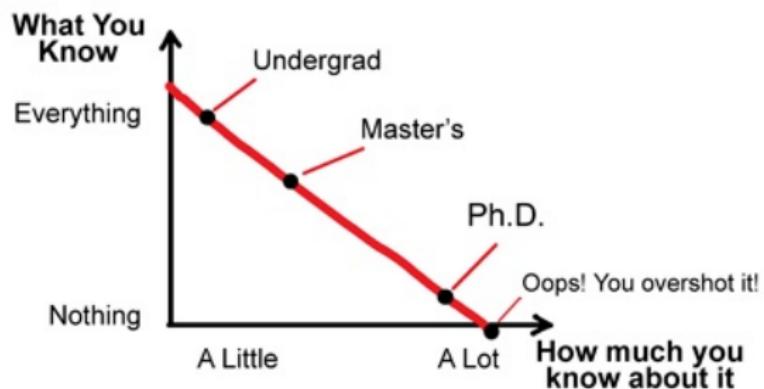
- Your PhD is an individual event
- Grad school is a team sport
- Imposter Syndrome is the worst



Get Comfortable Being Uncomfortable

- Interdisciplinary work means interacting with and establishing new contacts
- This means new conferences and new collaborations
- You'll quickly learn: you know nothing

What You Know vs How much you know about it



JORGE CHAM © 2008

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Do the Verb Until You Become the Noun

How to become an Applied Mathematician

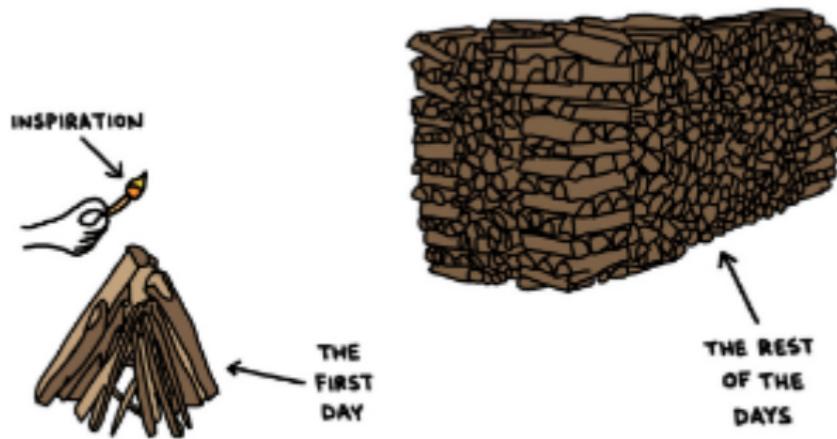
$$\text{Applied Mathematician} = \int_0^n n(\text{Apply Math}), \quad (1)$$

where n is the number of times you apply math.

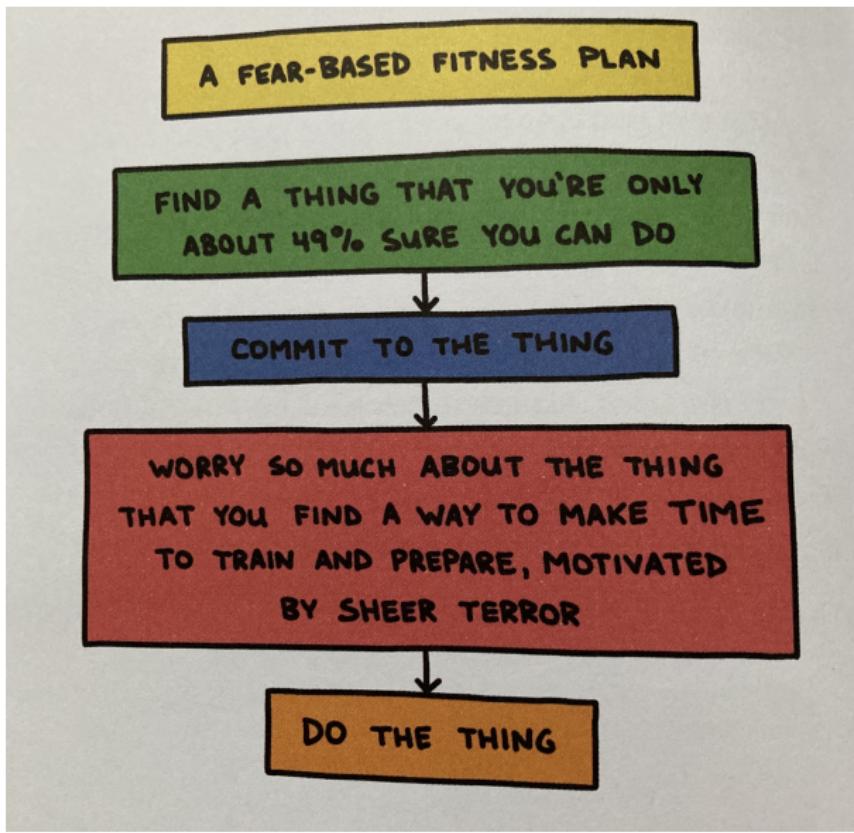
- If you do something often enough, it starts to become your academic identity
- This can be hard and soft skills – choose wisely
- Practice doesn't necessarily make perfect, but practice does make permanent

Inspiration is (Unfortunately) Not a Strategy

- Inspiration isn't enough
- Find your fuel
- Planning is important



A Fear-Based PhD Plan



Write Your Own Definition of Success

What makes a successful PhD Candidate?

- Papers published
- Conferences attended
- Courses taken
- Dissertation quality/length
- Service

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- Focus and self-control
- Perspective
- Communication
- Making Connections
- Critical Thinking
- Taking on Challenges
- Self-Directed, Engaged Learning

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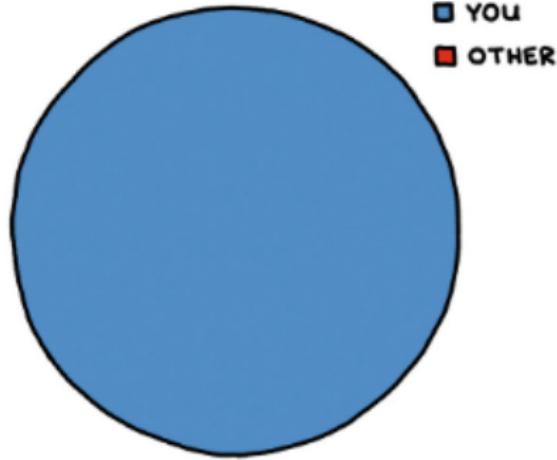
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Write Your Own Definition of Success

- What do you want to do after a PhD?
- Who do you want to be after a PhD?

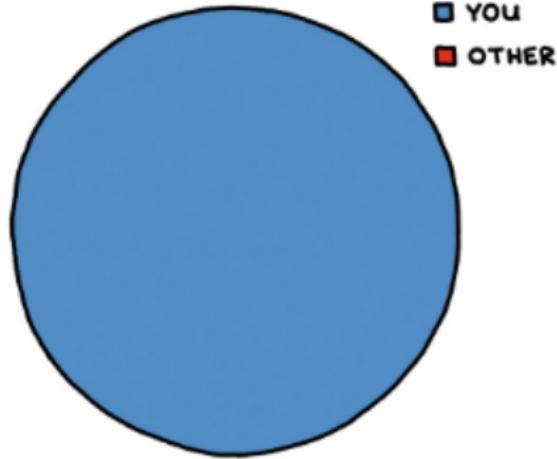
PEOPLE WHO GET TO DECIDE WHAT
THE POINT OF ALL YOUR RUNNING IS:



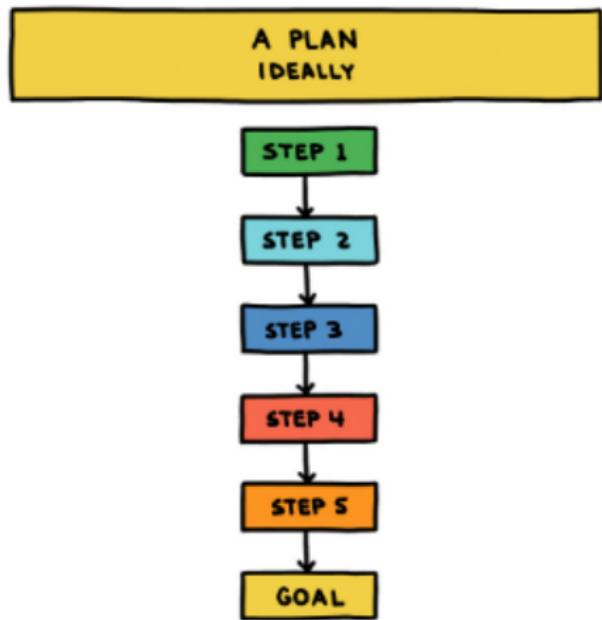
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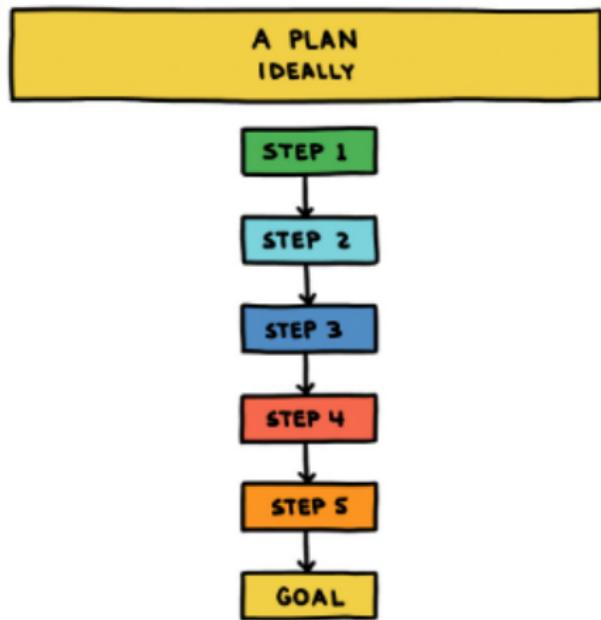


Progress is Not a Straight Line



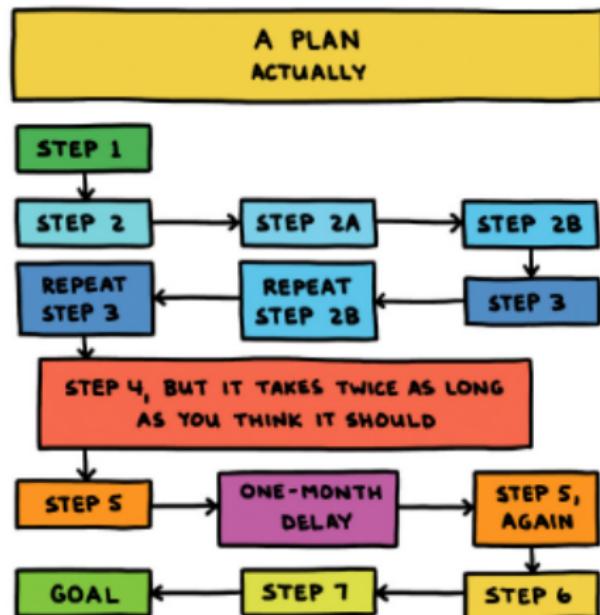
- Step 1: Get into PhD program
- Step 2: Pass qualifying exam
- Step 3: Pass comprehensive exam
- Step 4: Defend dissertation
- Step 5: Graduate, get dream job.

Progress is Not a Straight Line



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Progress is Not a Straight Line



It's Only Half About Science - The Science

An Agent-Based Model of Santa Cruz Island Foxes (*Urocyon littoralis santacruzae*) which Exhibits an Allee Effect

Shelby M. Scott, Erin N. Bodine & Anne Yust

An Agent-Based Model of the Spatial Distribution and Density of the Santa Cruz Island Fox

Shelby M. Scott^{*}, Casey E. Middleton[†] and Erin N. Bodine^{1,†}

Technology as a tool in teaching quantitative biology at the secondary and undergraduate levels: a review

Miranda M. Chen, S. M. Scott & Jessica D. Stevens

A Report from the NIMBioS/DySoC Investigative Workshop on the Mathematics of Gun Violence

Shelby Scott

COVID-19 and crime: Analysis of crime dynamics amidst social distancing protocols

Shelby M. Scott^{*1#‡a}, Louis J. Gross^{1,2&}

It's Only Half About Science - The Not-Science



It's Only Half About Science - The Not-Science



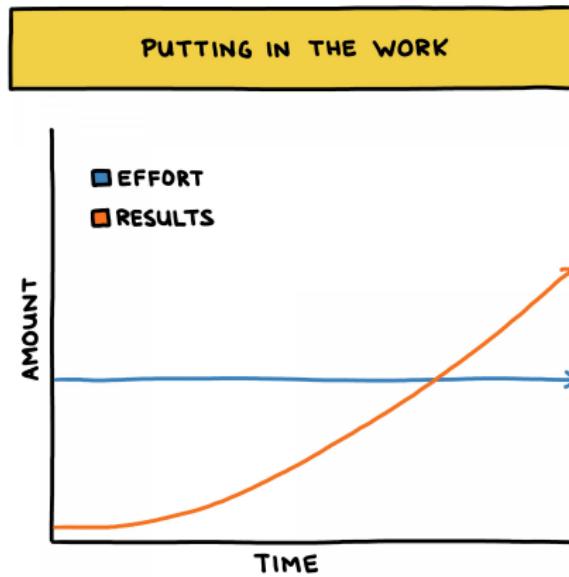
It's Only Half About Science - The Not-Science



There Are No “Hacks”

At some point, you just have to:

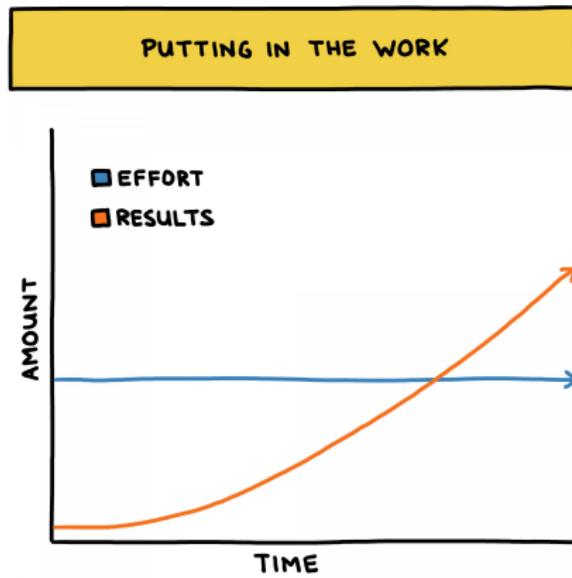
- Read the textbook
- Learn the coding language
- Write the manuscript
- Ask for help



There Are No “Hacks”

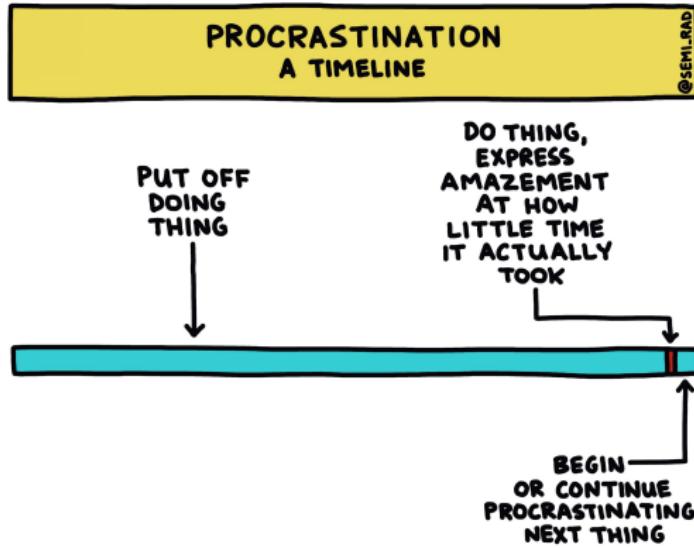
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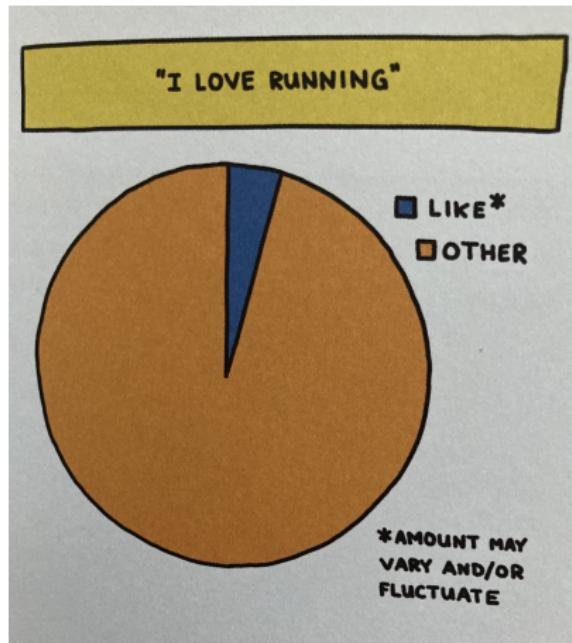
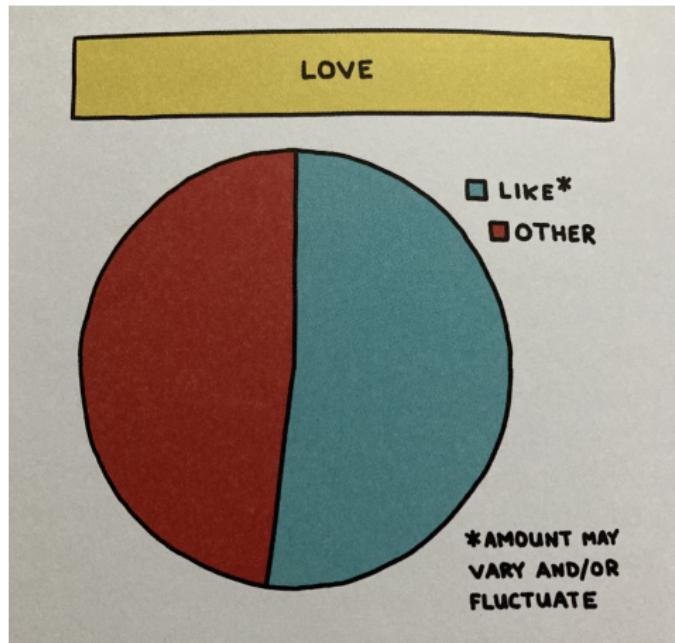
Screw Busy

- Graduate school is a master class in time management
- You can be as busy as you want to be*



* This will differ based on your non-grad school responsibilities. Parents – how are you doing?

Loving Something is Different from Liking It



Epilogue: There is No Right Way to Do It

Questions?

