How to Win Graduate School

Joe Ayoob, PhD
Josh Kangas, PhD
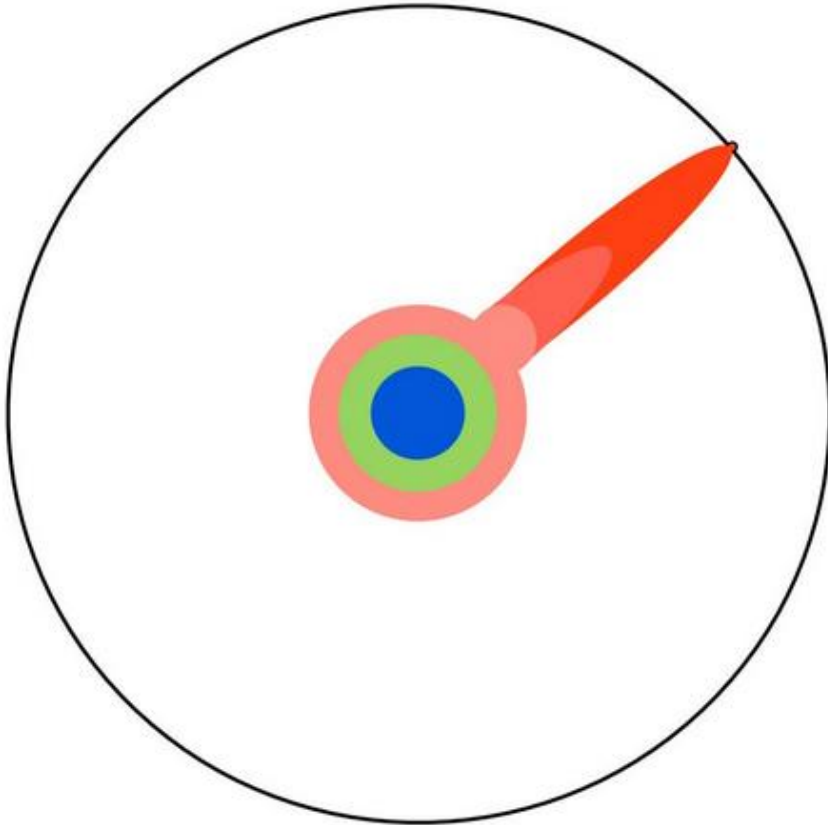
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Grad School – why are you here?

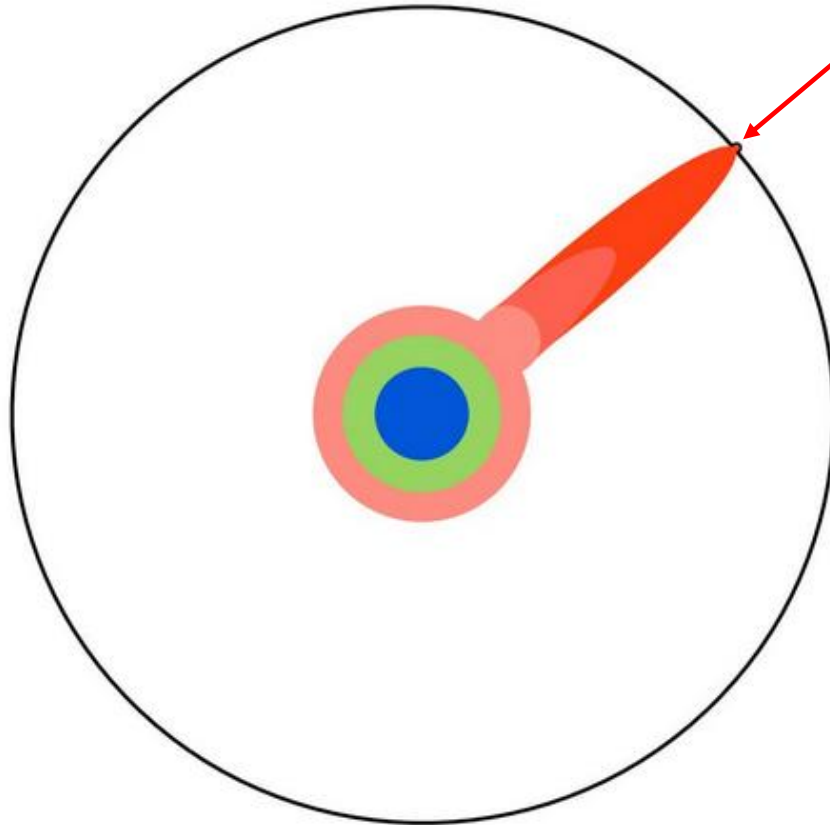The Illustrated Guide to a Ph.D.

To Obtain & Contribute to our

KNOWLDEGE

Matt Might

Grad School – how do you get there?

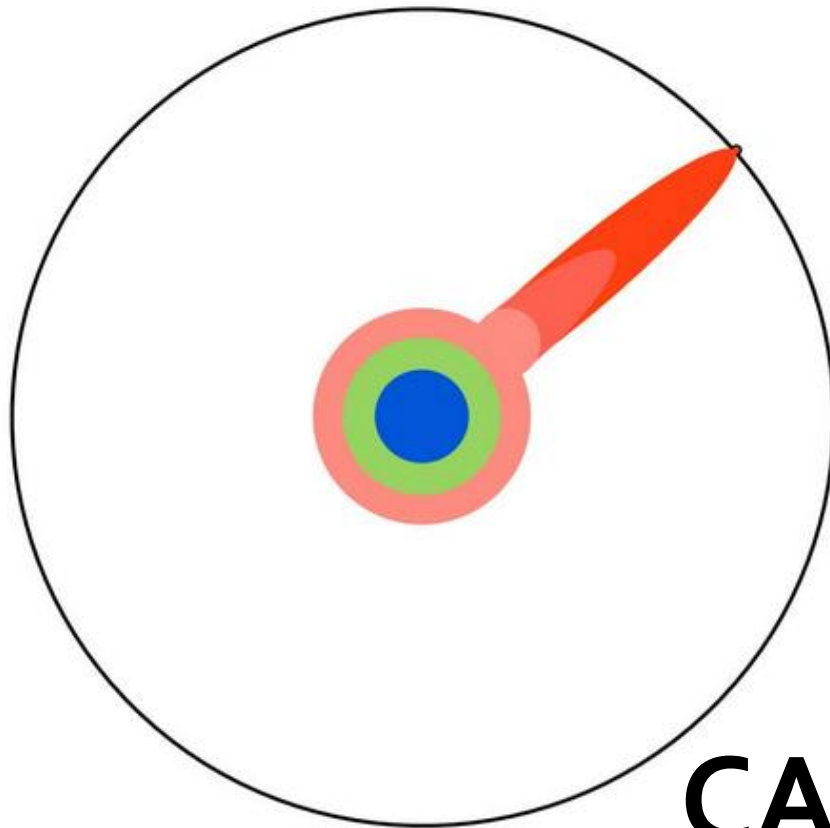The Illustrated Guide to a Ph.D.

**study, search, and research
hard work and publish
plan and prepare
fail and persevere
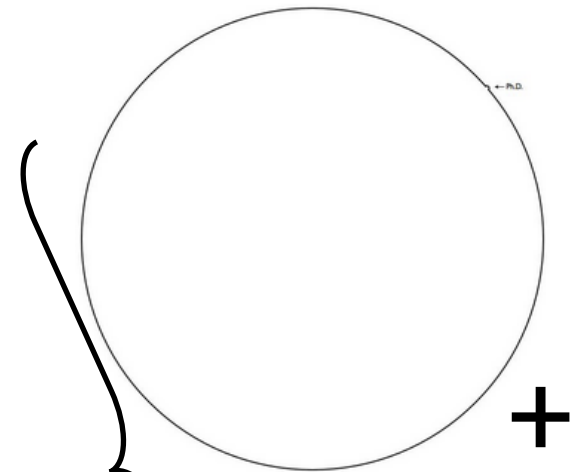seek out mentors**

Matt Might

Grad School – it doesn't just stop 'there'

The Illustrated Guide to a Ph.D.

CAREER

+

skills
abilities
creativity
communication

Matt Might

Grad School – why are you here?

The Illustrated Guide to a Ph.D.
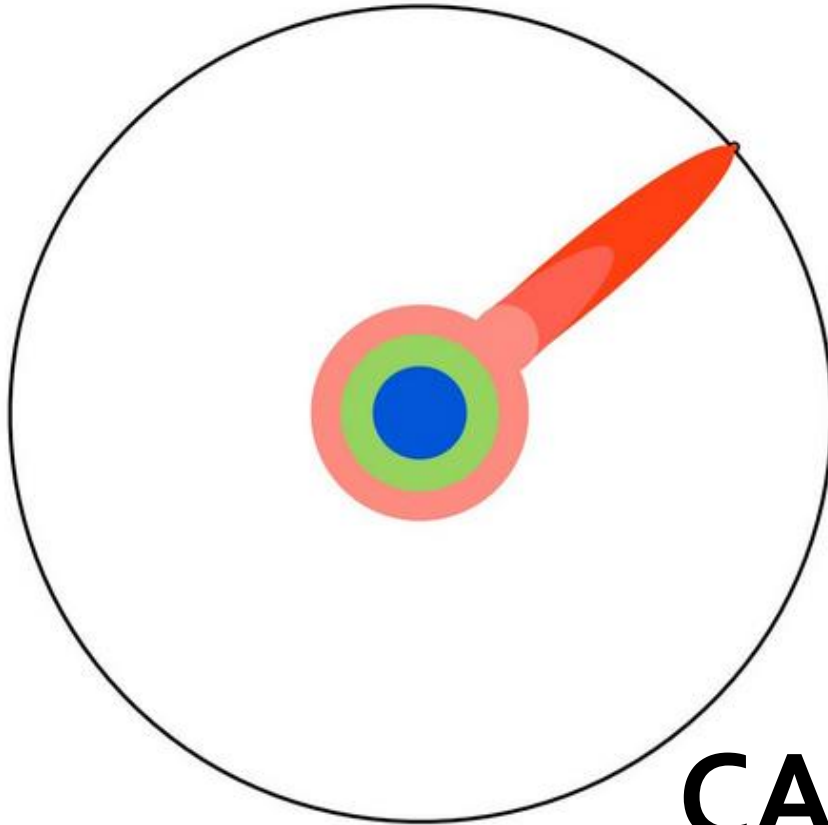
To Obtain & Contribute to our

KNOWLDEGE

…and to prepare for your…

CAREER

Matt Might

Savage Chickens by Doug Savage

IT'S NOT LIKE IT'S BRAIN SURGERY

IT'S NOT LIKE IT'S ROCKET SCIENCE

…3 …2 …1

Please visit Matt Might's full Illustrated Guide to a Ph.D. at http://matt.might.net/articles/phd-school-in-pictures/

CPCB Professional Development
aka the MetaSchool

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Just-in-time professional development

YEAR 1: Summer Writing Course → proposal/$
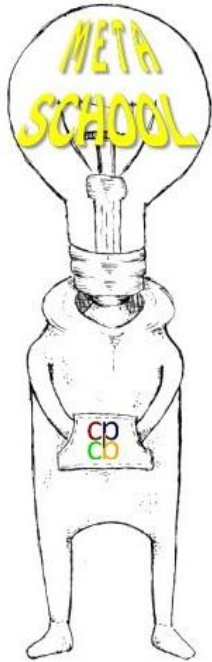
YEAR 2: Presentation Course → confs, etc.

YEAR 3/4: Jobs Workshop → more $

ALL YEARS: CPCB Alumni Seminars

Support from us

Grad School – why are YOU here?

Who are YOU?

Grad School – why are YOU here?

Who are YOU?

1. Form small groups 2-3
2. Set a timer for 10 minutes (to complete step 4)
3. Share info about yourself
   a. name and former school
   b. 1 word describes yourself, special skill, hobby, instrument, or other info
   c. what are you excited about?
   d. what are you nervous or concerned about?
4. Prepare an introduction of another from group (3.a-3.c)
5. Deliver your introduction
6. Offer your own responses to 3.d. when introduced

I like big BUTS… and I cannot lie
(*a disclaimer on this session*)

Advice is here and everywhere, BUT you have to define your own path/process
define mutual goals and expectations with your advisor(s)

Peers can be a good guide, BUT they shouldn't be your measuring stick
e.g., introverts and extroverts process, think, and work differently

All have different advice and experiences, BUT some advice is universal
don't be a $#!& (insert your favorite 3-4 letter word)

Your job search starts now
(at least thinking about what you want to be when you grow up)

Science *Careers*

AAAS

How Do You Find the Right Career?

Be Proactive and Creative

- Research your options — see 1-page guide for links / talk to people and network

- Take self-assessments

- Make a career plan — myIDP @ sciencecareers.org

- Build new skills — keep track of what you've done / catalog accomplishments

- Get involved

- Start job searching — ...or start thinking about: potential postdoc mentors / potential internships, etc.

Career Options and Job Resources
Tianna Hicklin, Ph.D.

CPCB 1-page guide to grad school

CPCB 1 page guide to graduate school

Work hard... duh ...and seek advice of others.

Strive to become an expert in something.

10 Simple Rules for Reproducible Computational Research

Other 10 Simple Rules from PLoS Comp Bio

Perspectives from previous/senior graduate students:

http://pgbovine.net/PhD-memoir.htm

http://www.cs.unc.edu/~azuma/hitch4.html

http://www.myscizzle.com/blog/how-to-survive-your-phd/

An oldie, but a goodie: The Final Exam – Don Coffey

some basic advice

Be an active member of the science community and start networking (it's not a dirty word).

Go to seminars/events (in the program/your department & elsewhere) and meet with visiting speakers.

Actively listen at talks (stay off your phone and computer, unless you're taking notes).

Present your work locally and at regional/national conferences – can get additional perspectives on your work.

Get involved with Grad Student Association and/or CPCB Government.

Create a LinkedIn profile, connect to people, and join groups – they are a great source of info (jobs, etc.).

Look for mentors who will help guide you along your career path.

Look for opportunities to get teaching experience and to be a mentor for a nascent scientist.

Summer undergrad and high school programs have opportunities for both (great to build your CV).

Be an active TA – do more than just the minimum.

networking & getting involved

What do you want to be when you grow up?

Consider job prospects and paths early in your career (some useful blogs/websites/info below)

Highlight and keep track of all of your accomplishments and academic activities in an updated CV.

Be active in your professional development – keep up to date on career options, fields, and trends.

Consult the following links for job postings, info on career paths, and career development advice:

http://blogs.nature.com/naturejobs/   http://biocareers.com/bio-careers-blog

http://versatilephd.com/   http://www.academic360.com/

http://www.biospace.com/   http://serialmentor.com/

http://jobs.newscientist.com/   http://www.hercjobs.org/

http://whatareallthephds.tumblr.com/   http://www.pathwaysreport.org/

http://www.sciencemag.org/content/337/6099/1149.full   http://myidp.sciencecareers.org/

career planning

Show me the Money!

Establish a track record of funding early – money begets money in science.

Seek grad student fellowships (NIH F31, NSF GFRP), internal university awards, conference travel awards, etc.

funding

Put your best words forward.

Become an effective communicator – this is incredibly important in science today!

Seek out assistance in writing and presenting.

Writing Centers: CMU – http://www.cmu.edu/gcc/   Pitt – http://www.writingcenter.pitt.edu/

Prepare and practice for all talks you will give

You never know who is going to show up.

Talks/presentations are a great opportunity to make a good (or bad) impression.

Useful Links: Gopen and Swan on Science Writing   Zuckerman on writing

Zhang on writing   Erren and Bourne on poster presentations

Bourne on oral presentations   JCA Presentations Pointers

Give credit where it's due. Prior work, plus acknowledge any assistance, ideas, materials, & guidance received.

ka myoo nah kay shun

Don't be afraid of the F-word – Failure is an important part of success.

http://www.forbes.com/sites/ekaterinawalter/2013/12/30/30-powerful-quotes-on-failure/

Get a life!

Seek a work-life balance.

Make sure you have an outlet(s) and have fun!

What do you want to be when you grow up?
(with or without a doing a postdoc)

Tenure-track faculty

    research + teaching + service + mentoring + granting + managing...

Teaching- or Research-track faculty

Biotech/Industry

NIH/National Lab scientist

Scientific/technical writer

Journal editor

Grant/academic administrator

Consulting

    Finance (Boston CG, McKinsey)

    Government (Booz Allen Hamilton)

Public policy (Rand/NIH/NSF/Capitol Hill)

Patent law

Technical sales

Medical Science Liaison

No matter which path you choose, you need to put the most into your graduate school studies and work

What else will you learn during your PhD?
(some answers to what exactly gets <u>P</u>iled <u>h</u>igher and <u>D</u>eeper)

- Independent and team-based research

- Proposing, planning, executing, and managing (multiple) projects

- Problem solving and the scientific method

- Critical thinking

- Data analysis and management

- Communication (oral, written, interpersonal)

- Preparing and delivering public presentations

- All your quantitative and computational skills

- Working knowledge of your field

- Mentoring and teaching experience

- Being detail orientated and able to translate work to bigger picture

- Ability to meet deadlines

- Budgetary skills

- etc...

Who are you?

(your CV is your academic passport – keep it up to date)

Curriculum Vitae = Course of your Life = Catalog of your academic career

Education	Teaching
Research	Service
Publications	Mentoring
Presentations	Professional Memberships
Honors/awards	Other relevant experience(s)

Lots of formats – make sure yours is organized and consistent throughout.
Keep it up to date (when you do something noteworthy, put it on your CV).

WhoRU?

(Resumes are succinct and tailored)

Will likely only get a **10 sec**. review

Most relevant (to them) skills/experiences/accomplishments (quantified)

Different for every job posting (use their key words)

Speak actively and carry a big stock (of words)

- Administered
- Analyzed
- Assessed
- Collaborated
- Collected
- Created
- Demonstrated
- Designed
- Determined
- Developed

- Devised
- Discovered
- Encouraged
- Evaluated
- Fabricated
- Facilitated
- Formulated
- Implemented
- Innovated
- Led

- Mentored
- Moderated
- Obtained
- Performed
- Presented
- Published
- Reviewed
- Taught
- Trained
- Wrote

Highlight your accomplishments, not merely your tasks/what you did.

A CPCB Grad's Resume…

Relevant contact info
(email, phone, web,
github, LinkedIn)

Expertise
What can be offered

Most recent experience

Active words

Quantified

@msn.com · phone · .com
github.com/ · linkedin.com/in/

SUMMARY
- PhD in Computational Biology with specialization on analysis of dynamical and evolutionary properties of proteins using incomplete and ambiguous experimental structure datasets.
- Solid background in data analysis, software engineering, and computational modeling, and excellent machine learning skills.
- Passionate about learning new technologies, building data analysis and visualization tools and pipelines to solve real world problems.

EXPERIENCE

Fellow at *Insight Data Science*, Mountain View, CA   Jan, 2014 - present
- Created *EURoute.me* app that suggests vacation routes in Europe to maximize traveler experience
- Consolidated data from Wikivoyage and EuroRail to build a graph of cities using NetworkX
- Recommended routes based on traveler interests along with factoids calculated for each city
- Designed an interactive front end using Flask, jQuery, Google Maps API and deployed on AWS

Research Associate at *University of Pittsburgh*, Pittsburgh, PA   2010 - 2013
- Created *ProDy* API and software suite in *Python/C/TCL* for protein structure and sequence analysis, that received $1.1M grant support from NIH-NIGMS for further development
  Homepage: http://prody.csb.pitt.edu   GitHub: https://github.com/prody/ProDy
  - Handles missing structure data and ambiguities in sequence alignments (*pandas for proteins*)
  - 4 to 80x faster parsers and 10x more memory efficient classes compared to other Python APIs
  - Implemented *SQL-like selections* for atoms, e.g. "*same chain as name CA and within 5 of water*"
  - Implemented C modules for *information theoretical calculations* on sequence alignments
  - 1000+ users from 300 institutions worldwide and over 182K+ downloads
- Studied protein-drug interactions using molecular dynamics simulations on CPU/GPU clusters
- Discovered inhibitors of cytochrome *c* peroxidase function as potential anti-radiation drugs
- Designed and initiated development of a web platform using Django and PostgreSQL for management and analysis of data from drug testing on human-on-a-chip models (http://mps.csb.pitt.edu)
- Lectured on *Drug Discovery, Bioinformatics* and *Software Engineering Best Practices for Scientists*

Graduate Intern at *GlaxoSmithKline*   Summer 2009
- Developed Python based tools for simulating and analyzing drug target proteins

Graduate Researcher at *Carnegie Mellon - University of Pittsburgh*   2005- 2009
- Performed first of a kind analysis of large experimental structure datasets with missing atoms and segments to gain insights on the dynamical properties of proteins
- Performed simulations and modeling to elucidate molecular mechanism of action of a compound in zebrafish and human cells
- Implemented tree augmented naïve Bayes in MATLAB with feature selection for fMRI data

EDUCATION

Carnegie Mellon – University of Pittsburgh, Pittsburgh, PA   2009
Joint PhD Program in Computational Biology
Relevant Graduate Coursework: Machine Learning (CMU), Linear Algebra (Pitt)

Koç University, Istanbul, Turkey   2005
BSc in Chemistry
Relevant Coursework: Algorithms & Data Structures, Programming with C, Computational Science

SKILLS

Languages: Python, JavaScript, C, SQL, BASH, TCL, MATLAB*, Java* (* prior experience)
Analysis & Modeling: NumPy, SciPy, Scikit-Learn, Matplotlib, NetworkX, Pandas, IPython
Web & Visualization: D3, jQuery, Reveal.js, Flask, Django, Sphinx, BeautifulSoup

Don't forget about the Government BS...

(The NIH BioSketch, that is)

http://grants.nih.gov/grants/funding/2590/biosketchsample.pdf

OMB No. 0925-0001 and 0925-0002 (Rev. 09/17 Approved Through 03/31/2020)

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: |

eRA COMMONS USER NAME (credential, e.g., agency login):

POSITION TITLE:

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY

A. **Personal Statement**   *Tailored to each grant; justify why you are right person for this award*

B. **Positions and Honors**

C. **Contributions to Science**   *Can organize into groups/themes: undergrad, grad, postdoc scientific areas*

D. **Additional Information: Research Support and/or Scholastic Performance**

Networking
(It's not a dirty word)

www.tcd.ie/wiser/build-profile/networking/tips/

Networking
(It's not a dirty word)

Networking strategies

1. Don't just look for ways that you can benefit
2. Be helpful and collaborative
3. Understand the interests/needs of others
4. Become an expert in something

Don't be afraid of the F word

Failure …all the cool kids are doing it.

"I have not failed. I've just found 10,000 ways that won't work." - Thomas A. Edison
different perspective

"The only real mistake is the one from which we learn nothing." - Henry Ford
learn something from them

"When we give ourselves permission to fail, we, at the same time, give ourselves permission to excel." - Eloise Ristad
open yourself up to great things

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Having <u>Fun</u> …all the cool kids are doing it.

finding a balance is essential (it's not a sprint)

Get involved and learn by doing…

Why?

…in the program

- make your program & experience better
- get strong recommendations
- acquire 'soft' skills
- learn from others' experiences
- share your expertise

…outside of the program

- pursue other scientific interests
- get to know your field
- networking opportunities
- discern your next step
- get $$$ / establish a track record

How?

- actively participate in seminars/class/ MetaSchool, CPCB government, recruiting events
- be a kick-ass TA
- ask for help when/before you need it
- look to help others, EQ (emot. intell.)

- attend other seminars
- meet with speakers
- BGSA involvement
- attend conferences – posters
- apply for pre-doctoral fellowships, travel awards, STIR, etc.

Other Resources

@CMUPittCompBio

CMU Eberly Center

Pitt Center for Teaching and Learning

Office of Academic Career Development

CMU Counseling & Psychological Services (CaPS)

Pitt Counseling Center

ASCB Article on Mental Health in Grad School