

2-27-2015

# What's Grad School All About?

Michele C. Weigle

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**OLD DOMINION**  
UNIVERSITY

# What's Grad School All About?

**Michele C. Weigle**

Associate Professor

Graduate Program Director

Department of Computer Science

Old Dominion University

Norfolk, VA

Capital Region Celebration of Women in Computing (CAPWIC) 2015

February 27, 2015



@weiglemc

<http://www.cs.odu.edu/~mweigle/>

# Outline

- **Introduction / My Background**
- Grad School
- Academia
- Final Tips

# Who Am I?



- Michele Weigle
- Associate Professor of Computer Science
- Old Dominion University in Norfolk, VA
- Graduate Program Director - MS Program
- Research interests: web science, digital preservation, information visualization, wireless networking
- Wife and mom of 2 boys



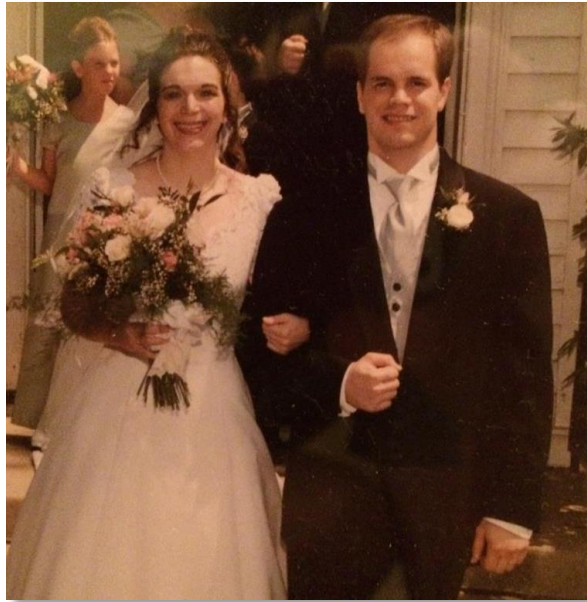
# My Successes

- Students
  - Graduated 4 MS Thesis students
    - 2 are PhD students (one at ODU, one at NC State)
  - Graduated 4 PhD students
    - 2 are assistant profs at universities in Indiana
  - Currently advising 5 PhD students
- Teaching
  - Taught 11 different courses
  - Developed new courses in vehicular networking and information visualization
  - ODU College of Sciences Distinguished Teaching Award – 2013-2014

# My Research Successes

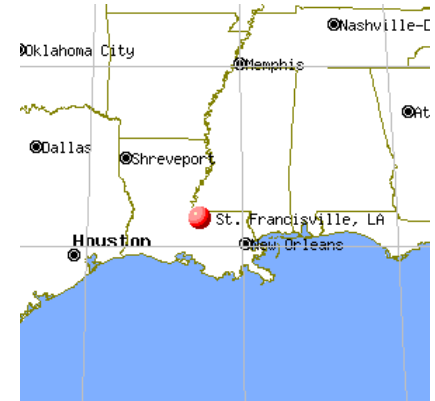
- ~75 peer-reviewed publications (conferences and journals)
  - 5 best paper (and best student paper) awards
- 4 book chapters
- 1 edited book
- > \$2M in grant funding
  - National Science Foundation, National Endowment for the Humanities, Andrew Mellon Foundation

# My Personal Successes



# Who Was I?

- Small-town Louisiana gal



- Computer Science undergrad in Louisiana
- Computer Science MS and PhD at UNC-Chapel Hill





# NLU

Internet Archive Wayback Machine

web.archive.org/web/19970226195019/http://www.nlu.edu/

347 captures  
26 Feb 97 - 12 May 13

JAN FEB JUN  
1996 1997 1998

Close X  
Help ?

## Northeast Louisiana University

welcome campus info academics publications enrollment alumni athletics lagniappe

Welcome to the Northeast Louisiana University home page. Click on the graphic above, or the following links for more information.  
[Welcome to NLU](#), [academics](#), [enrollment](#), [athletics](#), [campus info](#), [publications](#), [alumni](#), [lagniappe](#), [publishing on NLU's web](#).

- [Greater NLU Annual Fund](#) - Realize the Vision
- 1997 "[Best Practices](#)" Institute - The Challenge of Educating Special Children
- An [Email Search](#) and the [NLU Gopher Server](#) are located under the *campus info* link.
- Click here for [NLU's Web Page Policy](#)

Welcome to Northeast Louisiana University. Email Search Now Available. Email Search can be found at the Campus Info Link.

# Undergrad Experience



- Went to relatively small CS dept in my home state, no graduate program
  - allowed me to stand out and get good recommendation letters for grad school
- Advisor (and later department chair) was female
  - helped to hear her experiences and encouragement



# Thought about changing majors my first year

- Algorithms was confusing
- Then senior friend told me that he'd asked prof who was best student in Programming II. She mentioned me.
- *I. had. no. clue.*

# What is the Imposter Syndrome?

- Do you have the *imposter syndrome*? From my discussions with friends and colleagues, it's very common among women in computing and technology. (I've heard that there a few men who suffer from this, too!)
- Here's the list:
  - Do you secretly worry that others will find out that you're not as bright/capable as they think you are?
  - Do you attribute your success to being a fluke or "no big deal"?
  - Do you hate making a mistake, being less than fully prepared, or not doing things perfectly?
  - Do you believe that others are smarter and more capable than you are?

[Borrowed from Tracy Camp]

# Stats on Women in Academia

## CS degrees awarded to women

- 14% of BS degrees
- 21% of MS degrees
- 17% of PhD degrees

## Female faculty

- 26% of Assistant Professors
- 19% of Associate Professors
- 13% of Full Professors

Source: 2013 Taulbee survey

*Women's participation != women's interest*

	1970s
Law school	5%
Business school	4%
Medical school	8%
High school sports	4%

[Borrowed from Tracy Camp]

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# UNC-CS

Department of Computer Science, UNC-Chapel Hill


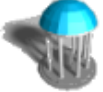
web.archive.org/web/19970628133751/http://www.cs.unc.edu/

INTERNET ARCHIVE  
WayBack Machine

1,132 captures  
29 Jan 97 - 23 Oct 13

JAN JUN AUG  
1996 1997 1998

Close X  
Help ?

 The University of North Carolina at Chapel Hill  
College of Arts and Sciences 

## Department of Computer Science

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**People** Department Administration, Department Committees, Faculty, Staff, Graduate Students, Undergraduate Students, Visiting Researchers, Alumni, Friends, Phone and Photo directories

**Academic Affairs** Academic Programs, Course Descriptions, Schedules and Home Pages, Exams, Department Committees, Forms

**Research** Research Projects and Faculty Research Interests, Research Results and Products, Ph.D. Dissertations, Technical Reports, Research Laboratories, Research Support (Grants, Contracts, Gifts, and Awards), Research Resources

**News, Events, & Organizations** Current News and Events, Colloquia, Conferences, Distinguished Lecturer Series, Special Events, Computer Science Students Association, Research Groups, and Research Meetings

**Publications** Admissions Brochure, Alumni Newsletter (News & Notes), Department History, Ph.D. Dissertations, M.S. Theses, Technical Reports

**General** Descriptions of our Department, UNC Campus, Chapel Hill, and the Research Triangle Area, Directions to the Department, Floor Plans for

# How did I get there?

- NSF Graduate Research Fellowship
  - support for 3 years of grad school
  - opened lots of doors
- I'd always loved the state of North Carolina
- Fell in love with the department on my visit
  - also visited and applied to Alabama and NC State
  - plus, UNC had the best basketball team



# How should *you* pick a grad school?

- Do your research
  - faculty interests, course offerings (don't just look at the catalog), program requirements
  - for PhD: identify potential advisors, read their papers, send them an email
- Look at program rankings
  - <http://www.phds.org/rankings/computer-science>
  - but be aware of the dates of the data
- Visit, if possible
  - Scholars Day
- Stakes are higher if you're pursuing PhD vs. MS
  - you'll spend many more years there working on a PhD

# My CS Homepage - 1997

Internet Archive  
Wayback Machine

160 captures  
28 Jun 97 - 3 Oct 13

http://www.cs.unc.edu/~clark/ Go

MAY JUN 28 1997 JAN 1998

Close X Help ?

## Michele Clark

CB# 3175 Sitterson Hall

University of North Carolina  
Chapel Hill, NC 27599-3175

### A bit about me:

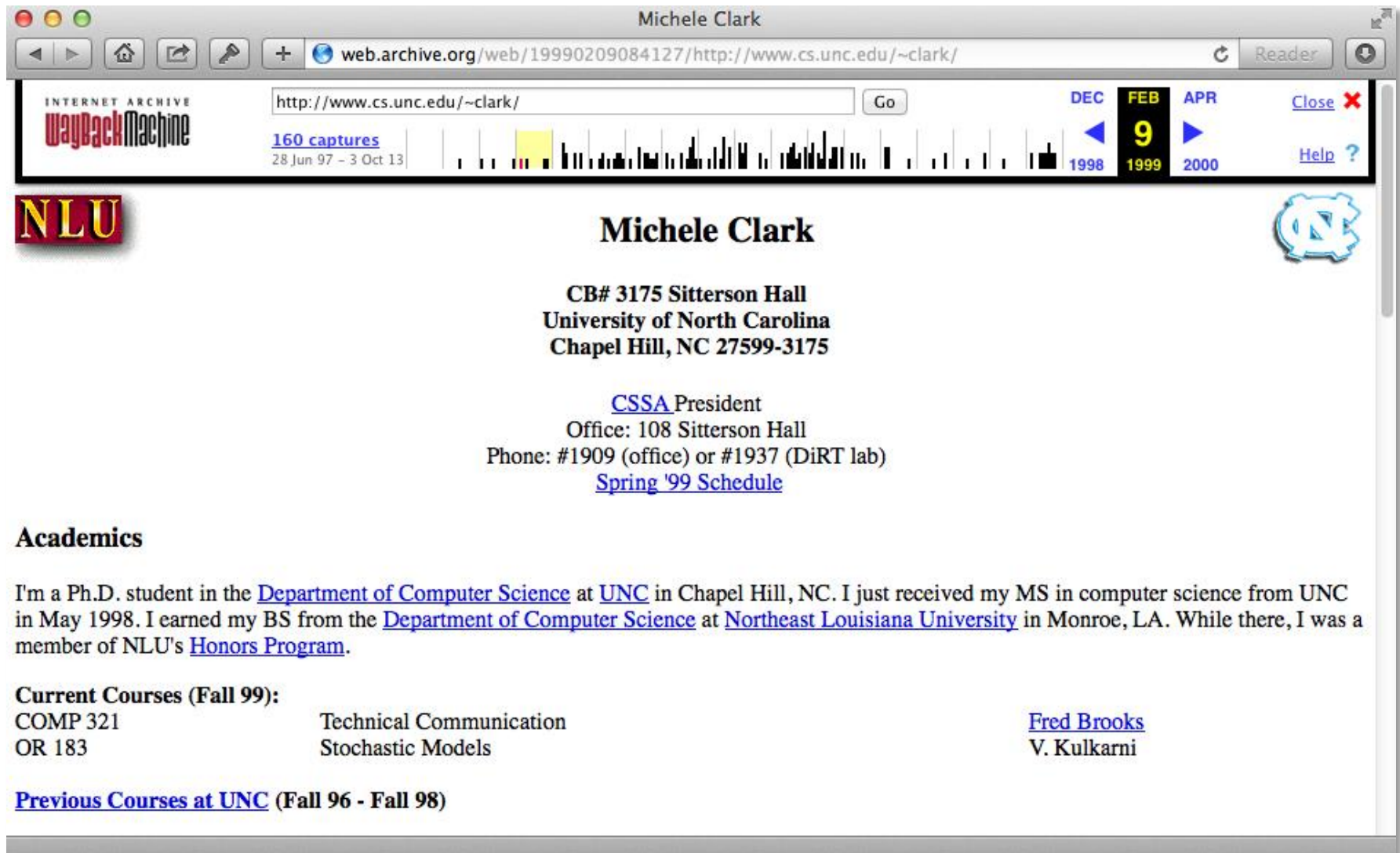
I'm a MS/Ph.D. student in the [Department of Computer Science](#) at [UNC](#) in Chapel Hill.  
These are the research groups I'm involved in at UNC:

- [DiRT Group \(Distributed and Real-Time Systems\)](#)
- [nanoManipulator Project](#) (NEW this summer!)
- [Collaboration Group](#)
- [Collaboration Bus Project](#)

**NLU** I earned my BS in [computer science](#) at [Northeast Louisiana University](#) in Monroe, LA.

My hometown is St. Francisville, Louisiana, a beautiful small town on the banks of the mighty Mississippi, known for its antebellum plantation homes and centuries-old live oak trees.

# CS Student Assoc Pres - 1999



The screenshot shows a web browser window titled "Michele Clark" with the address bar displaying "web.archive.org/web/19990209084127/http://www.cs.unc.edu/~clark/". The browser interface includes navigation buttons, a search bar, and a calendar for February 1999. The website content features the NLU logo, a title "Michele Clark", and contact information for the University of North Carolina. It also lists his academic background, current courses, and previous courses at UNC.

Internet Archive Wayback Machine  
160 captures  
28 Jun 97 - 3 Oct 13

DEC FEB APR  
1998 1999 2000  
9

Close X  
Help ?

**NLU**

**Michele Clark**

CB# 3175 Sitterson Hall  
University of North Carolina  
Chapel Hill, NC 27599-3175

[CSSA](#) President  
Office: 108 Sitterson Hall  
Phone: #1909 (office) or #1937 (DiRT lab)  
[Spring '99 Schedule](#)

**Academics**

I'm a Ph.D. student in the [Department of Computer Science](#) at [UNC](#) in Chapel Hill, NC. I just received my MS in computer science from UNC in May 1998. I earned my BS from the [Department of Computer Science](#) at [Northeast Louisiana University](#) in Monroe, LA. While there, I was a member of NLU's [Honors Program](#).

**Current Courses (Fall 99):**

COMP 321	Technical Communication	<a href="#">Fred Brooks</a>
OR 183	Stochastic Models	V. Kulkarni

[Previous Courses at UNC](#) (Fall 96 - Fall 98)

# Teaching - 2000

COMP 14

web.archive.org/web/20000817013041/http://www.cs.unc.edu/~clark/comp14/

INTERNET ARCHIVE  
Wayback Machine

49 captures  
19 Jun 00 - 19 Jun 10

JUN 1999 AUG 2000 OCT 2001

Close X  
Help ?

## COMP 14-090: Introduction to Programming

### Summer I 2000

**Monday - Friday 9:45 - 11:15 am Sitterson 014**

**Instructor:** Michele Clark  
**Email:** [clark@cs.unc.edu](mailto:clark@cs.unc.edu)  
**Web Page:** <http://www.cs.unc.edu/~clark>  
**Office:** Sitterson 143  
**Phone:** 962-1909

**Office Hours:** Monday 1-2pm  
Tuesday 2-3pm  
Wednesday 3-4 (in Davis Lab)  
Thursday 1-2pm  
Friday 2-3pm

**Lab Assistants** Jay, Sandy, Lily, Ian

### Announcements (updated 6/16)

- added - final grades



# My Friends

- Fellow female CS students help me get through and boosted my confidence



# Grad School

- I loved grad school
  - and I love it even more now that I can look back fondly on it
- No "real-life" responsibilities
  - single, no kids, no house
- Developed life-long friendships
- Met people from all over the world
- Worked with really smart people
- Worked on interesting projects
- Got to code!
- Attended interesting (sometimes!) classes
- Got to travel (for free) - Italy, Sweden, Lake Tahoe, Norfolk

# MS vs PhD - Jobs

- A masters degree equips you to do high level, complex design and potentially lead software engineering teams.
- A PhD degree equips you to do original research and potentially lead R&D teams.

<http://www.quora.com/What-are-the-main-differences-between-a-Masters-and-a-PhD-in-computer-science>  
Vijay Chidambaram, computer science grad student

# MS vs. PhD - Requirements

- MS
  - 30 hours of coursework (10 courses)
  - final project, comprehensive exam, or thesis
  - usually 2 years
- PhD
  - 72 credit hours
  - 24 hours of dissertation credits
  - 48 hours of coursework (16 courses)
    - MS courses usually count towards this
  - variable (often 3-4 years after MS)

*Numbers here are typical, but may vary by department.*



# MS vs. PhD

- "a PhD teaches you how to ask the right questions"

<http://blog.skanev.org/2013/03/why-not-do-phd-in-computer-science.html>

- Your PhD advisor's job is to ask questions about your work
  - why does the output/graph/result look like this?
  - what would happen if you ran the experiment/analysis another way instead?

# MS vs. PhD

Ron Azuma's classic article

**“So long, and thanks for the Ph.D.!”**

a.k.a.

**“Everything I wanted to know about C.S. graduate school at the beginning but didn’t learn until later.”**

**The 4th guide in the Hitchhiker’s guide trilogy (and if that doesn’t make sense, you obviously have not read Douglas Adams)**

**by Ronald T. Azuma**

**v. 1.10**

**Original version 1997, last revised December 2014**

William Lipscomb, a Nobel Prize winner in chemistry, said,  
“With a Ph.D. you will have a better chance of spending  
the rest of your life doing what you want to do, instead of  
what someone else wants you to do.”

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

# Surviving the PhD

- Read Ron Azuma's guide
- Perseverance
  - it can be slow, it can get boring, some days you just have to get through it
- Initiative
  - your advisor will rarely bug you each day to make sure you're working, must set your own goals
- Curiosity
  - PhD students are usually ready to graduate once they start asking their own questions about their data and research
- Coffee
  - *my PhD students told me to add this one*

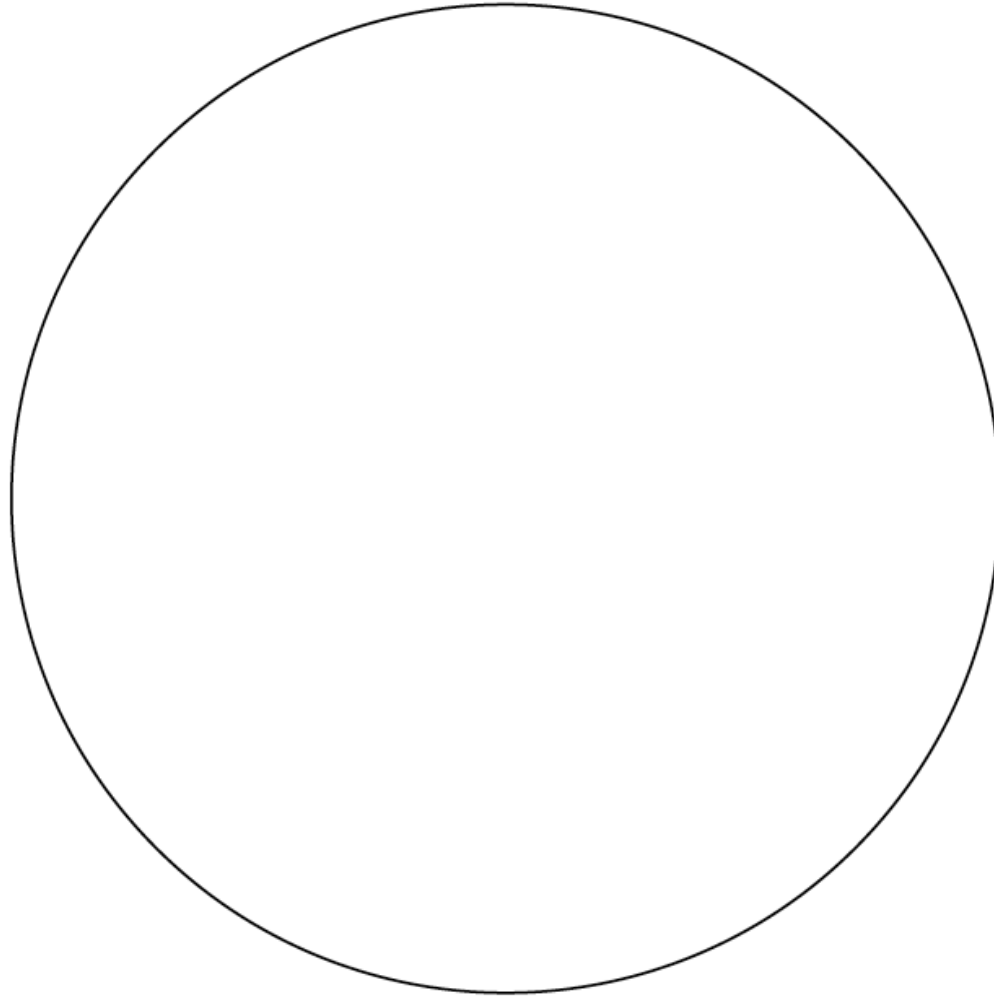
# What is Research?

Matt Might (<http://matt.might.net/>), a professor in Computer Science at the University of Utah, created "The Illustrated Guide to a Ph.D." to explain what a Ph.D. is to new and aspiring graduate students.

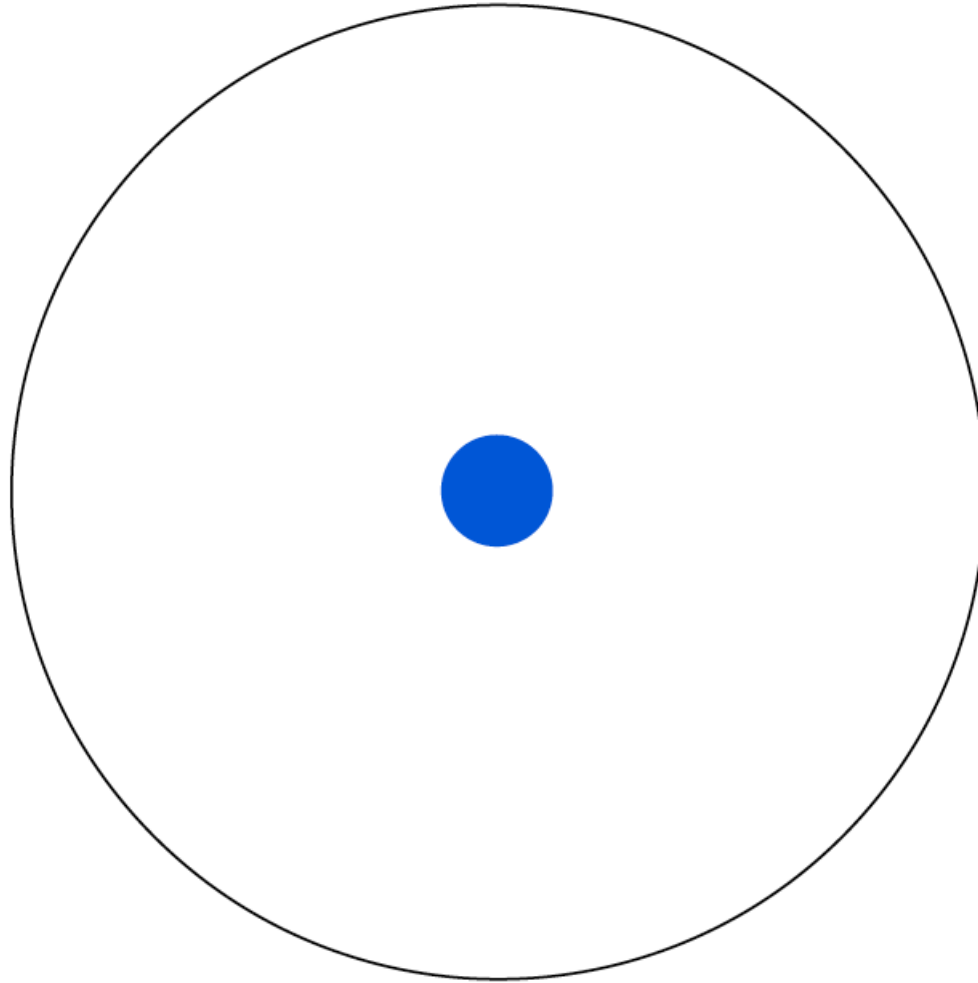
[Matt has licensed the guide for sharing with special terms under the Creative Commons license.]

<http://matt.might.net/articles/phd-school-in-pictures/>

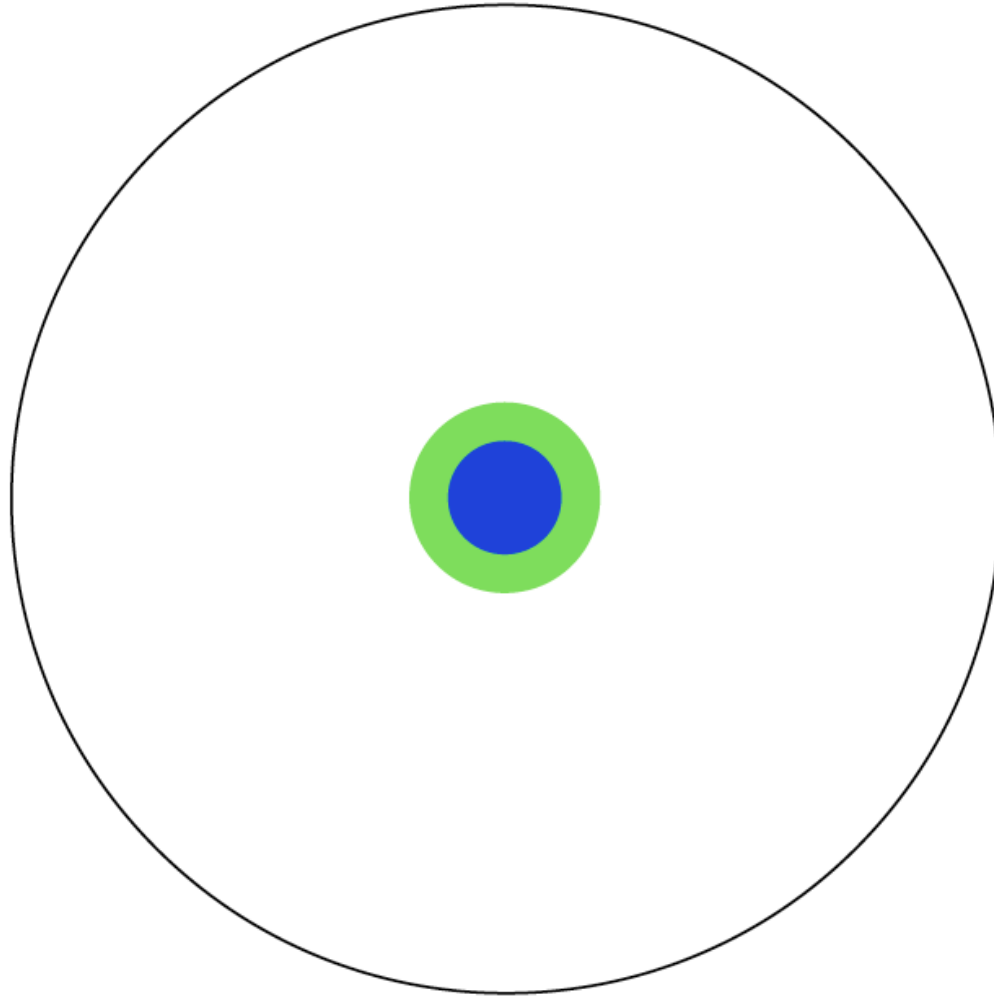
# Imagine a circle that contains all human knowledge



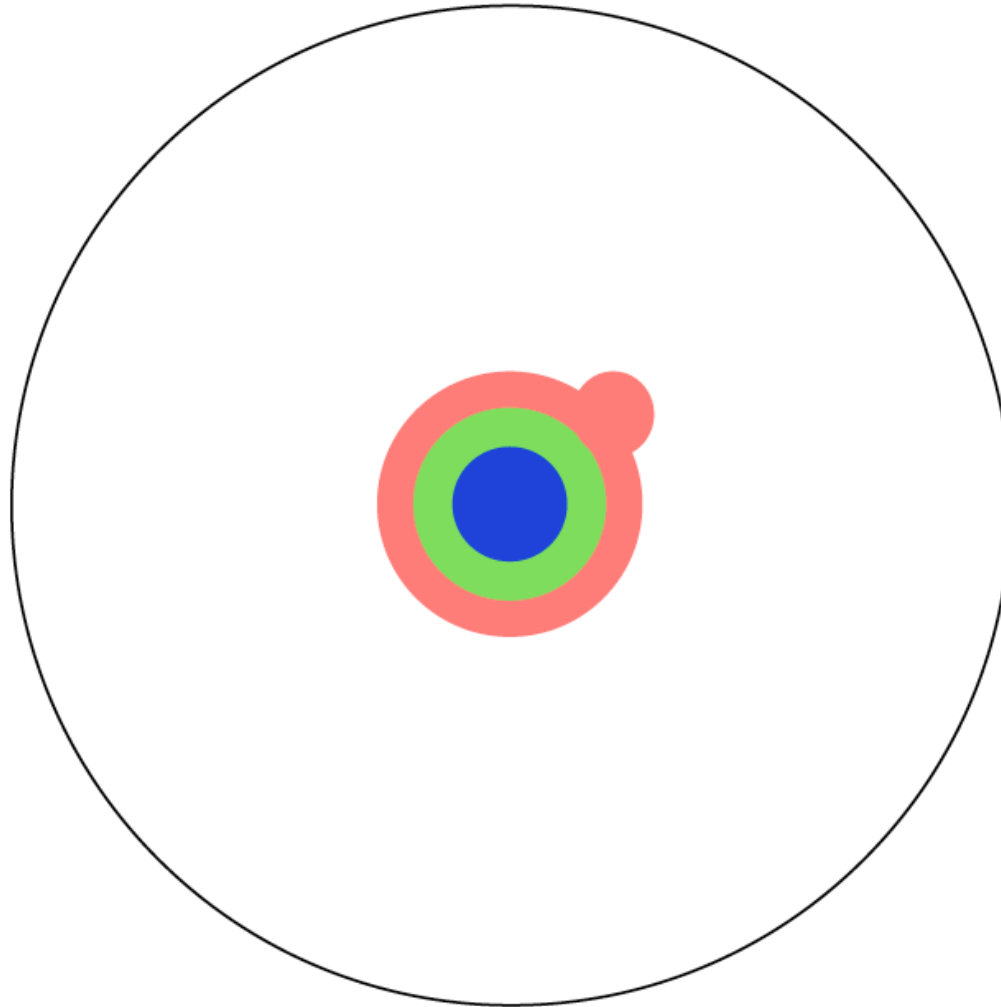
# By the time you finish elementary school, you know a little



# By the time you finish high school, you know a bit more



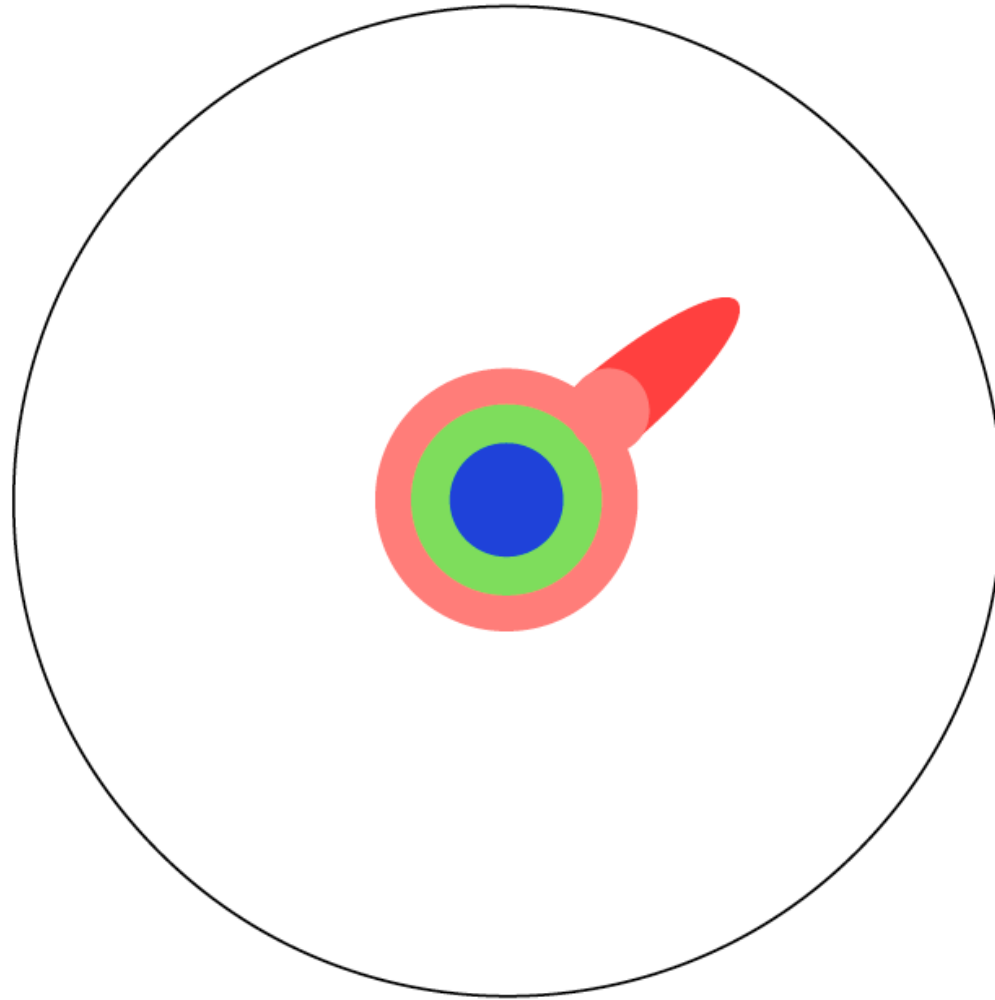
# With a bachelor's degree, you gain a specialty



<http://matt.might.net/articles/phd-school-in-pictures/>

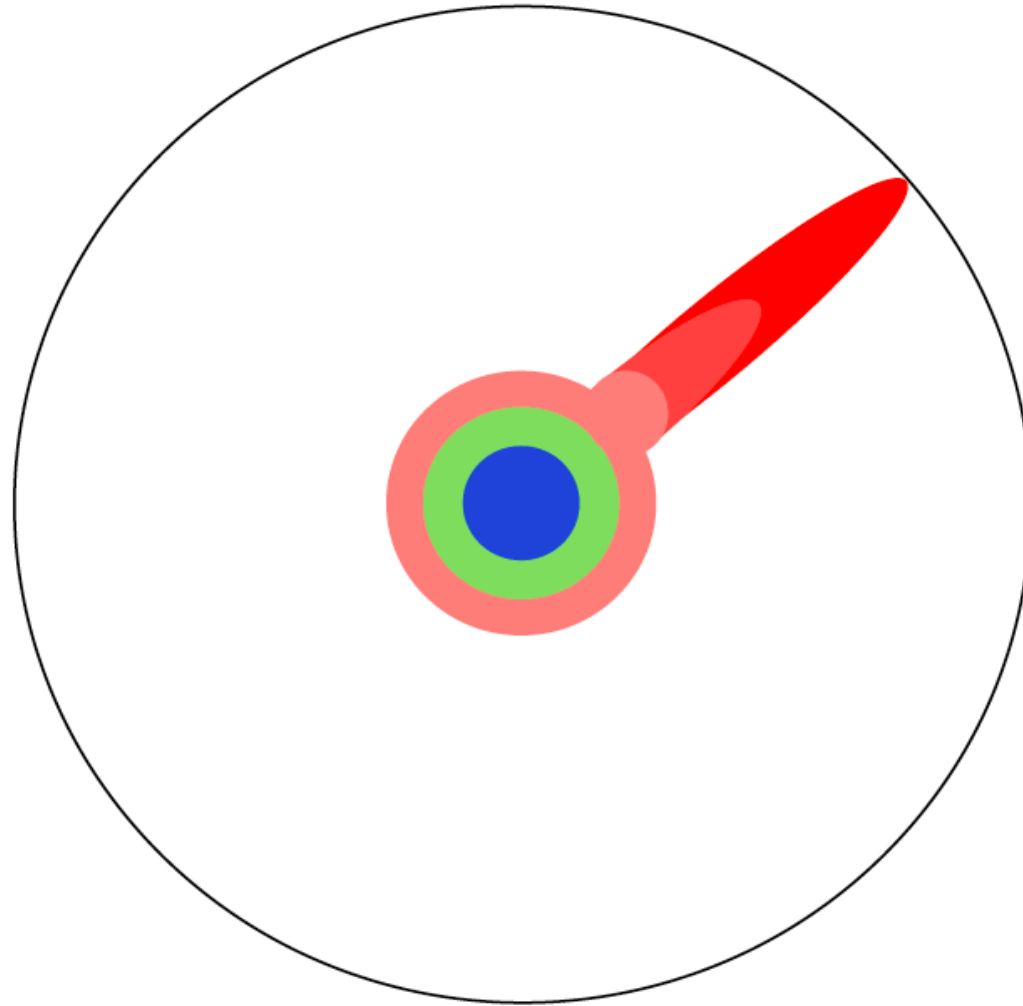


# A master's degree deepens that specialty



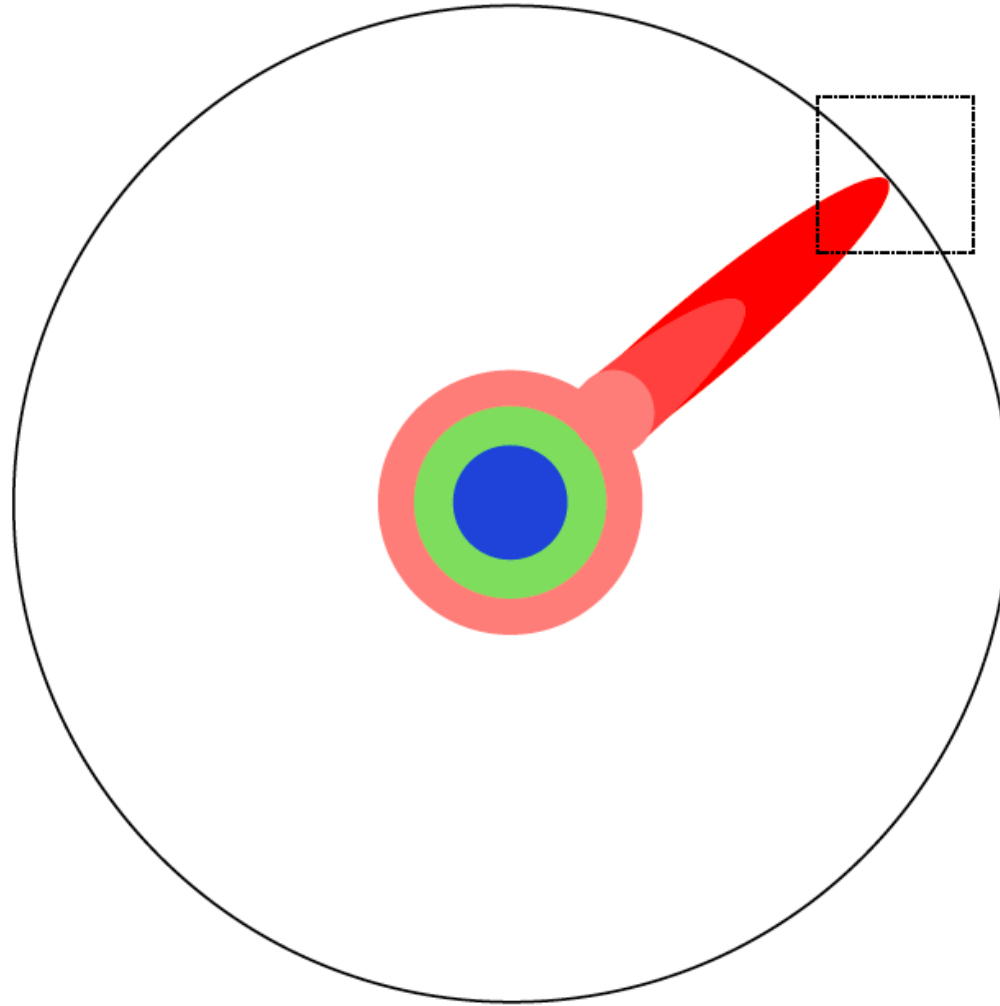
<http://matt.might.net/articles/phd-school-in-pictures/>

# Reading research papers takes you to the edge of human knowledge

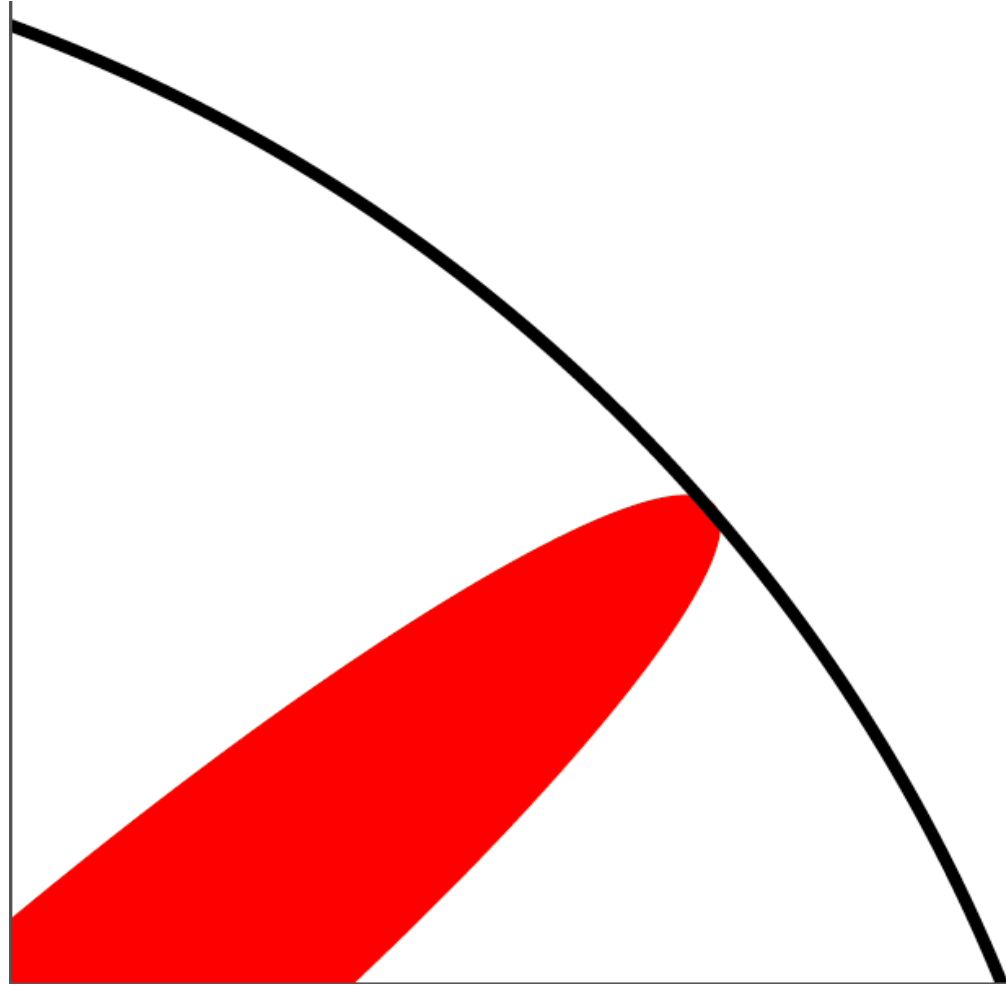


<http://matt.might.net/articles/phd-school-in-pictures/>

# Once you're at the boundary, you focus

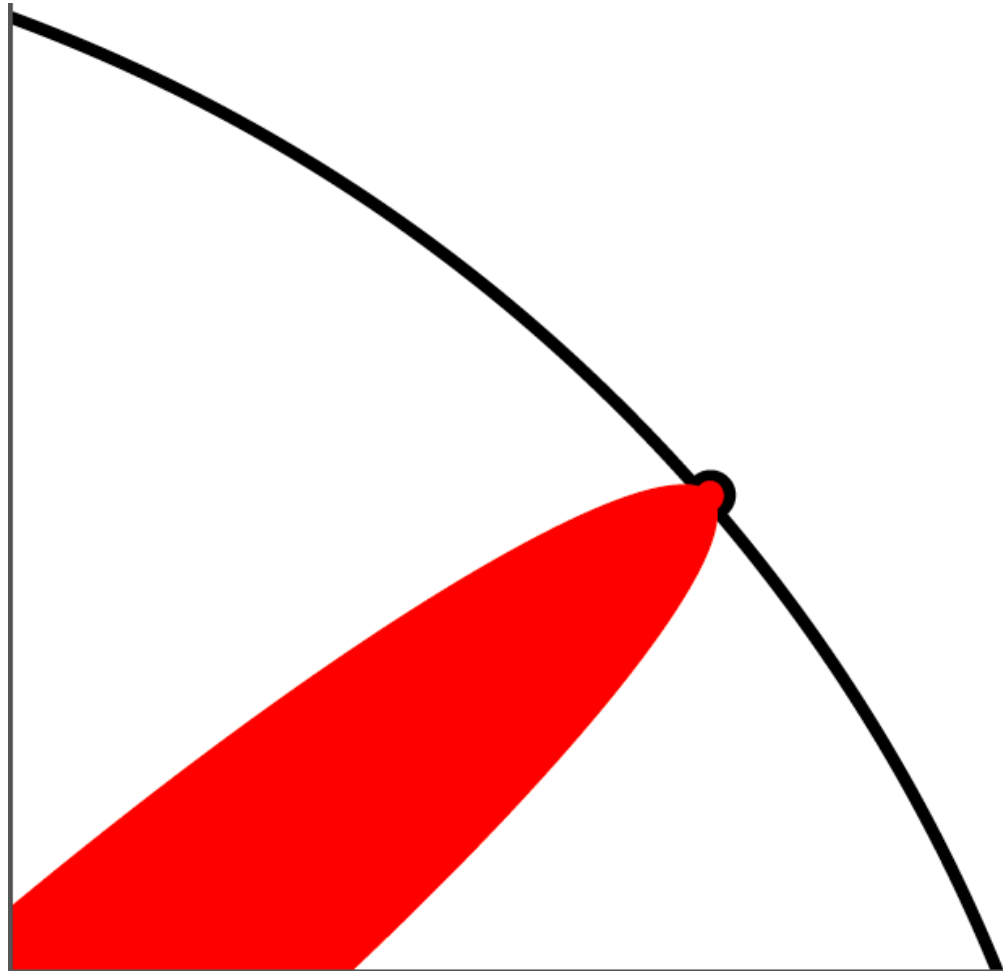


# You push at the boundary for a few years



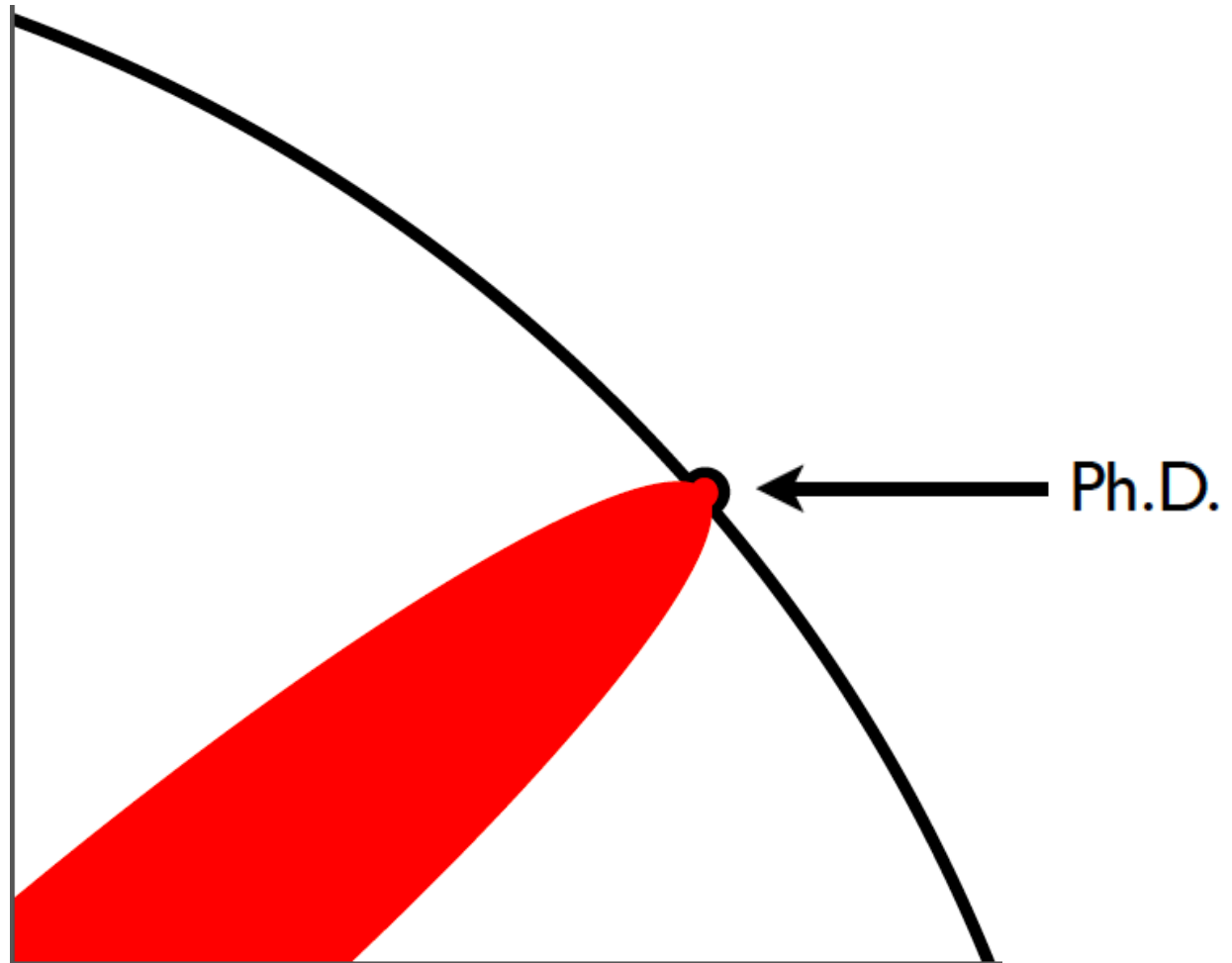
<http://matt.might.net/articles/phd-school-in-pictures/>

# Until one day, the boundary gives way

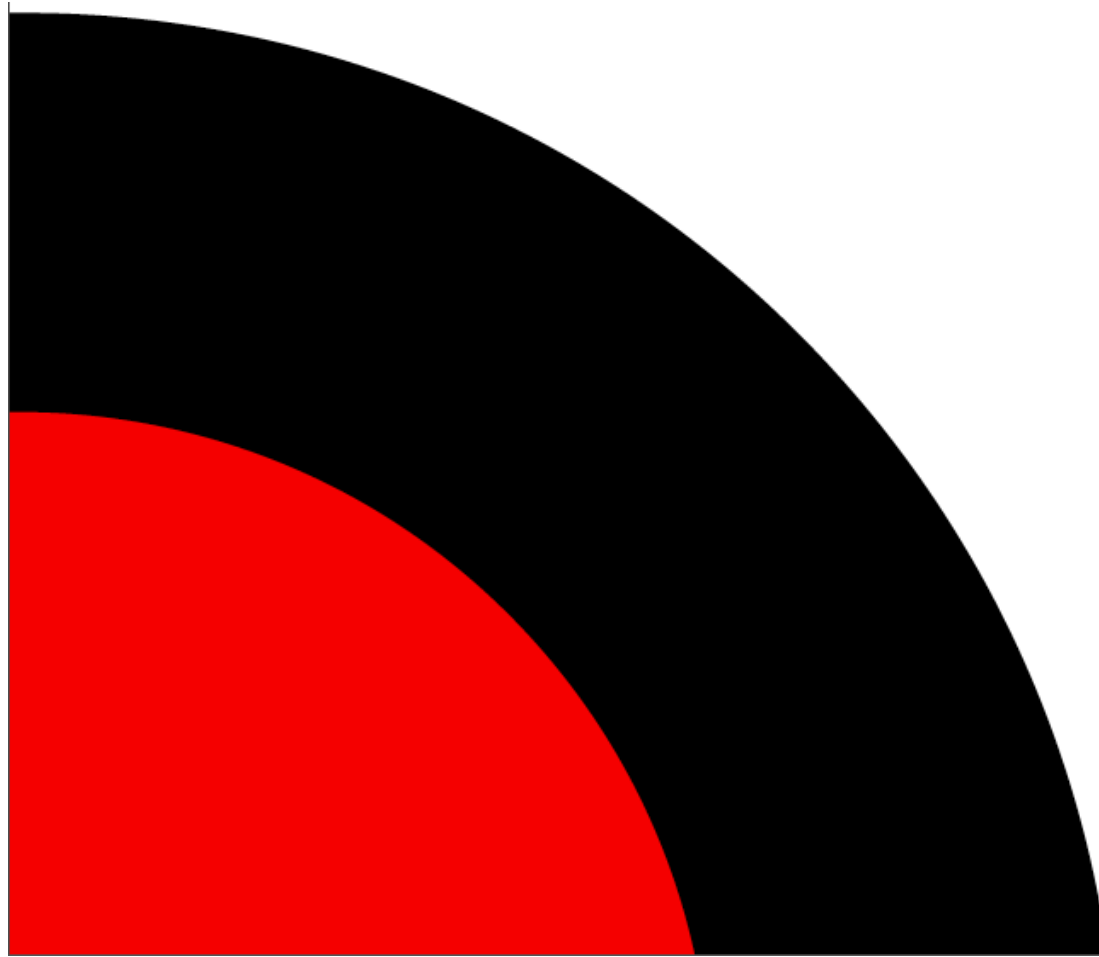


<http://matt.might.net/articles/phd-school-in-pictures/>

# And, that dent you've made is called a Ph.D.

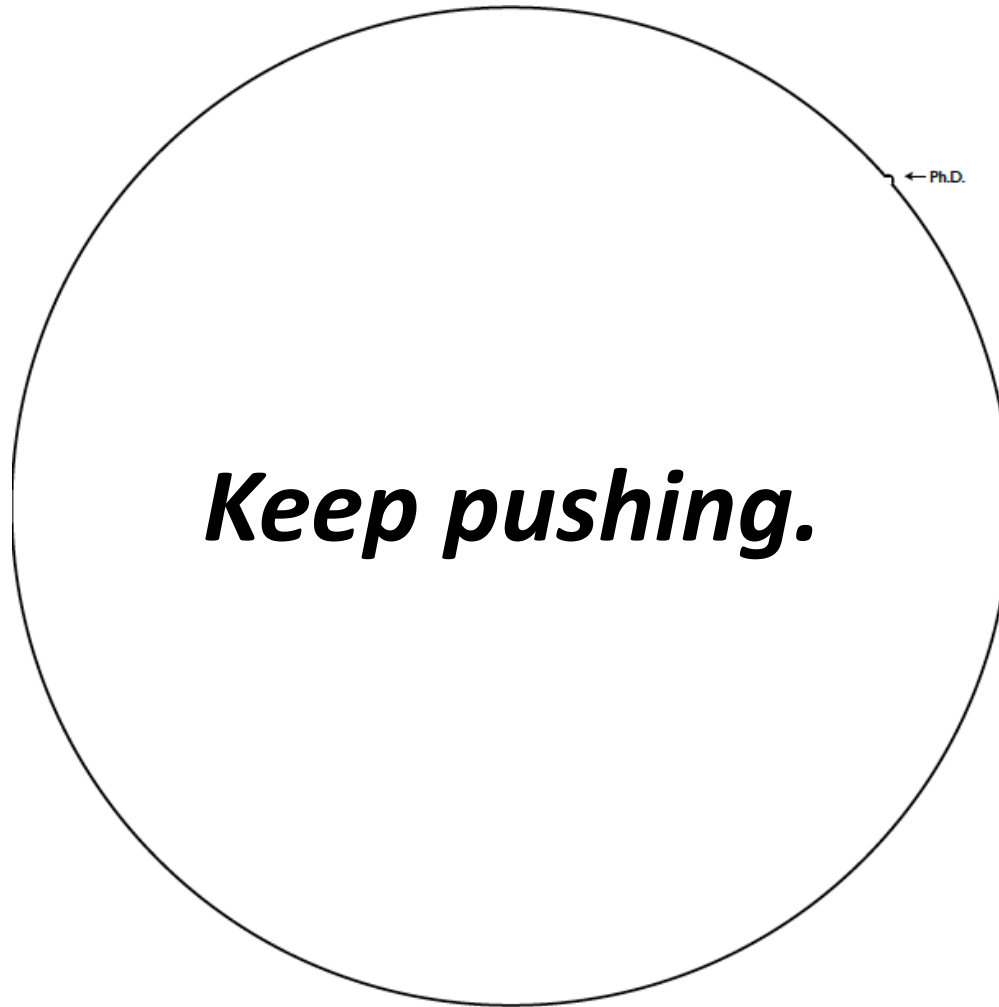


# Of course, the world looks different to you now



<http://matt.might.net/articles/phd-school-in-pictures/>

# So, don't forget the bigger picture





# Skills Gained Through PhD

- **Ability to work independently**
- **Critical thought**
  - A PhD candidate learns to critically examine the thoughts of others and pick out the pros and cons.
- **Perseverance**
- **Ability to work with poorly defined goals**
  - One of the bigger hurdles of the PhD is that there is no clear cut goal.
  - No one can exactly say these are the things you need to do every day.
  - Research as such involves going back and forth, exploring blind alleys and so forth.
- **Effective communication**

<http://www.quora.com/What-are-the-main-differences-between-a-Masters-and-a-PhD-in-computer-science>  
Vijay Chidambaram, computer science grad student

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# Why did I want to become a professor?

- Inspired by mentors and undergraduate/graduate faculty



- Liked teaching
  - really enjoy learning something new, organizing the information, and figuring out the best way to present it
- Flexibility
  - can choose own research topics (to some extent)
  - my advisor coached his son's soccer team
- I loved being a graduate student, didn't want to leave academia

# Clemson

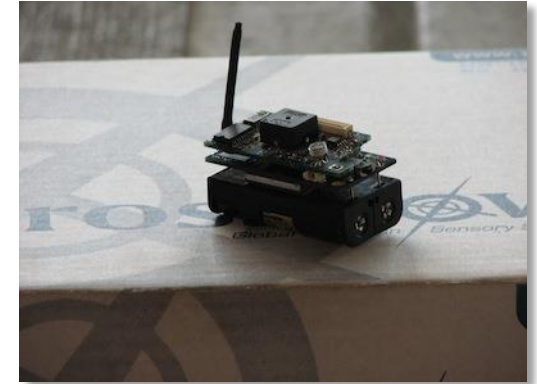


- Assistant Professor - 2004-2006
- Students investigated high-speed TCP protocols and Internet traffic generation for simulations
  - 2 MS thesis
- Started investigation of vehicular networks
  - using PocketPC and Bluetooth GPS devices
- Teaching networking courses
  - ugrad - network programming
  - grad - network protocols



- 2006 - Joined as assistant professor
- 2012 - Tenure, associate professor
- 2013 – Graduate Program Director
- Vehicular networks, sensor networks, web science, digital preservation, information visualization

# Vehicular Networks - NOTICE Project



An Architecture for the Notification of Traffic Incidents and Congestion (NOTICE), National Science Foundation, 2007-2001, \$400,000



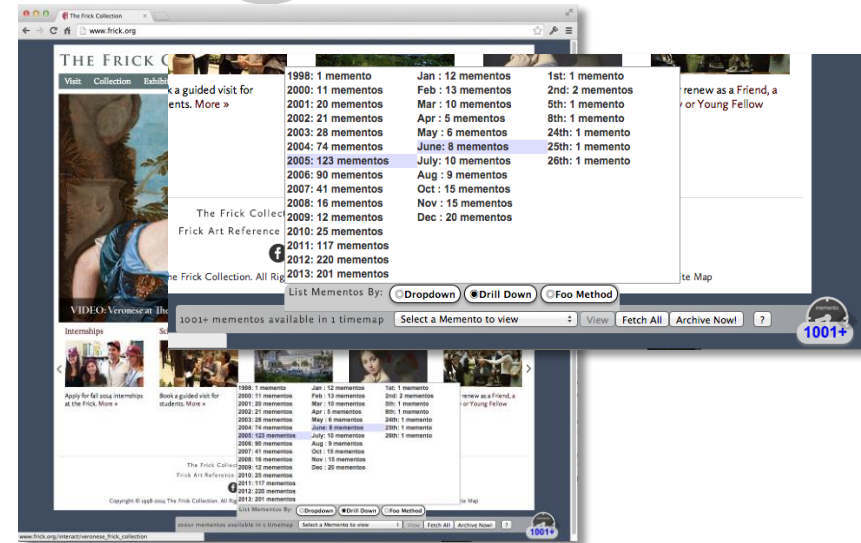
# Web Science and Digital Libraries



WARCreate



Mink

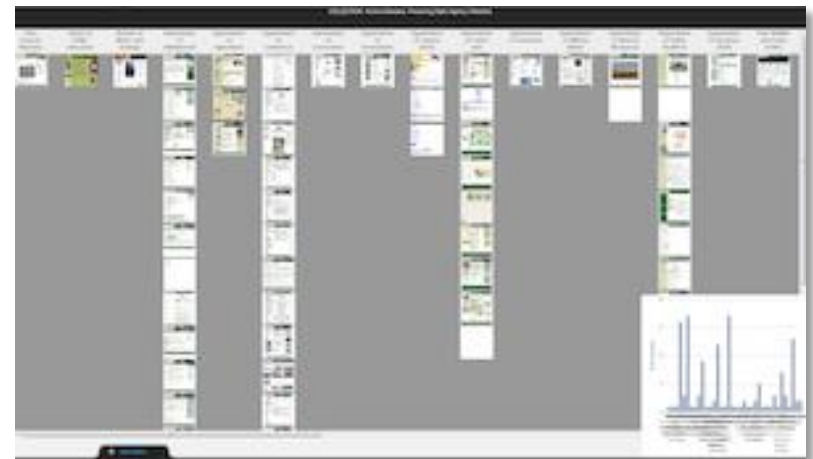
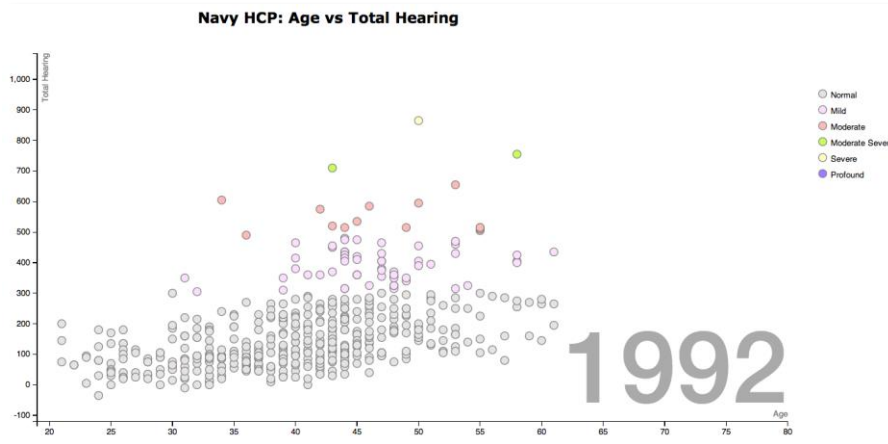
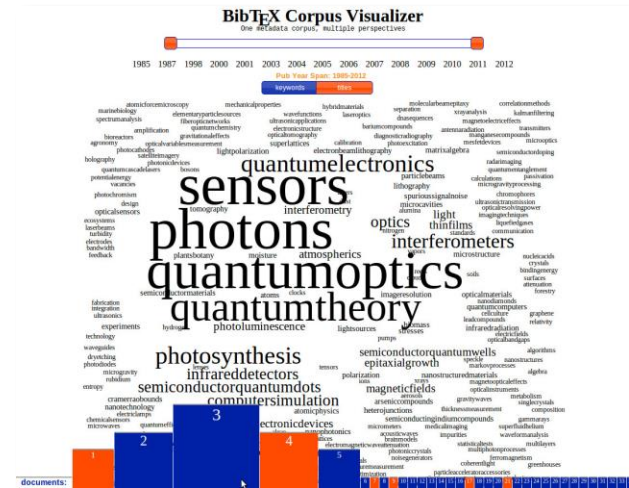
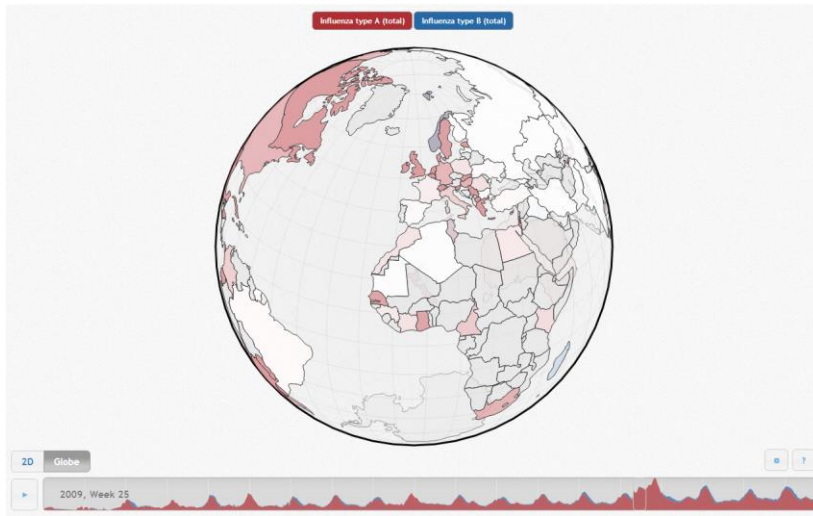


THE CHRONICLE  
of Higher Education



Archive What I See Now: Bringing Institutional Web Archiving Tools to the Individual Researcher, Digital Humanities Implementation Grant, 2014-2017, \$325,000

# Information Visualization





# Perks of Academia

- Work with really smart people
  - faculty colleagues
  - students
- Always learning new stuff
  - teaching courses
  - research
- Control your own destiny
  - no one's looking over your shoulder to see if you're in your office 9am-5pm
  - change research projects and focus

# What You Don't Learn in Grad School

- Programming is fun
  - and depending on what you end up doing, you may not get to do it much again!
- Managing people
  - how to get the best work out of your students (both in class and in research)
- Much of what you'll do is reading, editing, writing, and talking
  - reading and editing students' papers
  - writing proposals
  - meeting with students, giving talks

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# Time Management

- Work-life balance
  - or as Tracy Camp calls it “work-life integration”
- Still working on figuring it out
- Generally hate to be idle, always something on my to do list I feel like I should be doing
- Helps to have an equal partner
  - my husband has a PhD, too
  - and he cooks, grocery shops, shares parenting responsibilities

# Importance of Mentors

- Undergraduate
  - My advisor and dept chair – Dr. Krissten Cooper
- Graduate
  - My advisor – Dr. Kevin Jeffay, UNC
  - Fellow grad students
- Professional
  - Dr. Tracy Camp, Colorado School of Mines
  - Dr. Gail Dodge, physics at ODU
  - Dr. Michael L. Nelson, colleague at ODU



# Networking at Conferences

- At meals, sit with people you don't know
- Introduce yourself
- Ask questions about others
- If you're sitting with a group from your school, be polite and open to newcomers



**OLD DOMINION**  
UNIVERSITY

# What's Grad School All About?

**Michele C. Weigle**

Associate Professor

Graduate Program Director

Department of Computer Science

Old Dominion University

Norfolk, VA

Capital Region Celebration of Women in Computing (CAPWIC) 2015

February 27, 2015



@weiglemc

<http://www.cs.odu.edu/~mweigle/>