THE ROAD AHEAD: MY JOURNEY IN SCIENCE & YOURS

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Division of Training, Workforce Development & Diversity
National Institute of General Medical Sciences
National Institutes of Health*
@KennyGibbsPhD @STEMPhDCareers

*Views are my own, not those of NIH (unless specified)

Disclaimers

- Views of my own journey—not meant to imply endorsement by government

- N = 1

Today's Talk

- Why science? & the next 10 years
- Key career milestones
  - AAAS Science & Technology Policy Fellowships
  - NCI Cancer Prevention Fellowship
- NIGMS: Science, Diversity, Systemic Reform
- Parting advice for the road ahead

Why Science?

Family

Importance of education and service ("To whom much is given, much is required")

Opportunity

THE RESEARCH TRIANGLE PARK

NCSSM
NORTH CAROLINA SCHOOL OF SCIENCE AND MATHEMATICS

Eruditio et Religio

Why Science?

"*If you're a medical doctor, you'll treat at most 10,000 patients in your lifetime. The guy who discovered penicillin has treated billions of people on every continent for the past six decades.*" -speaker at high school science program

Because science is awesome!!!

-and-

Potential to make broad, positive contributions to the human condition

The Next 10 Years

B.S., Biochemistry & Molecular Biology

UMBC

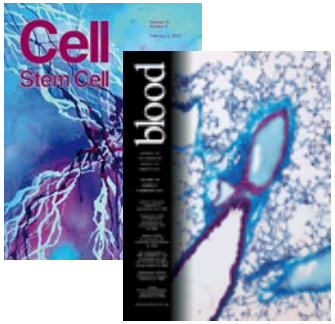
MEYERHOFF SCHOLARS PROGRAM

NATIONAL INSTITUTES OF HEALTH HHMI

Ph.D., Immunology

LELAND STANFORD JUNIOR UNIVERSITY ORGANIZED 1891

NSF Graduate Research Fellowship Program



The further my training progressed, the farther I felt from the reasons I went into science

Advice:

"Stay the course"

"Help when you get tenure"

AAAS S&T Policy Fellowships

Mission: To connect science with policy and foster a network of science and engineering leaders who understand government and policymaking, and are **prepared to develop and execute solutions to address societal challenges**

http://www.aaas.org/program/science-technology-policy-fellowships

My Fellowship Experience

- National Science Foundation, Directorate for Education and Human Resources, Division of Human Resource Development (NSF/EHR/HRD)
- Drafted section for the federal coordinated STEM Education Strategic Plan
  - Learning & synthesizing social science research on STEM career attainment for high level officials (i.e. OSTP)
- Day-to-Day Programmatic Activities
- Conference travel & speaking engagements
- I missed research!!!

Understanding Ph.D. and Postdoc Career Development

What Do I Want to Be with My PhD? The Roles of Personal Values and Structural Dynamics in Shaping the Career Interests of Recent Biomedical Science PhD Graduates

Kenneth D. Gibbs, Jr.,*†‡ and Kimberly A. Griffin†§

RESEARCH ARTICLE

Biomedical Science Ph.D. Career Interest Patterns by Race/Ethnicity and Gender

Kenneth D. Gibbs Jr.[1,2*], John McGready[3], Jessica C. Bennett[4], Kimberly Griffin[4*]

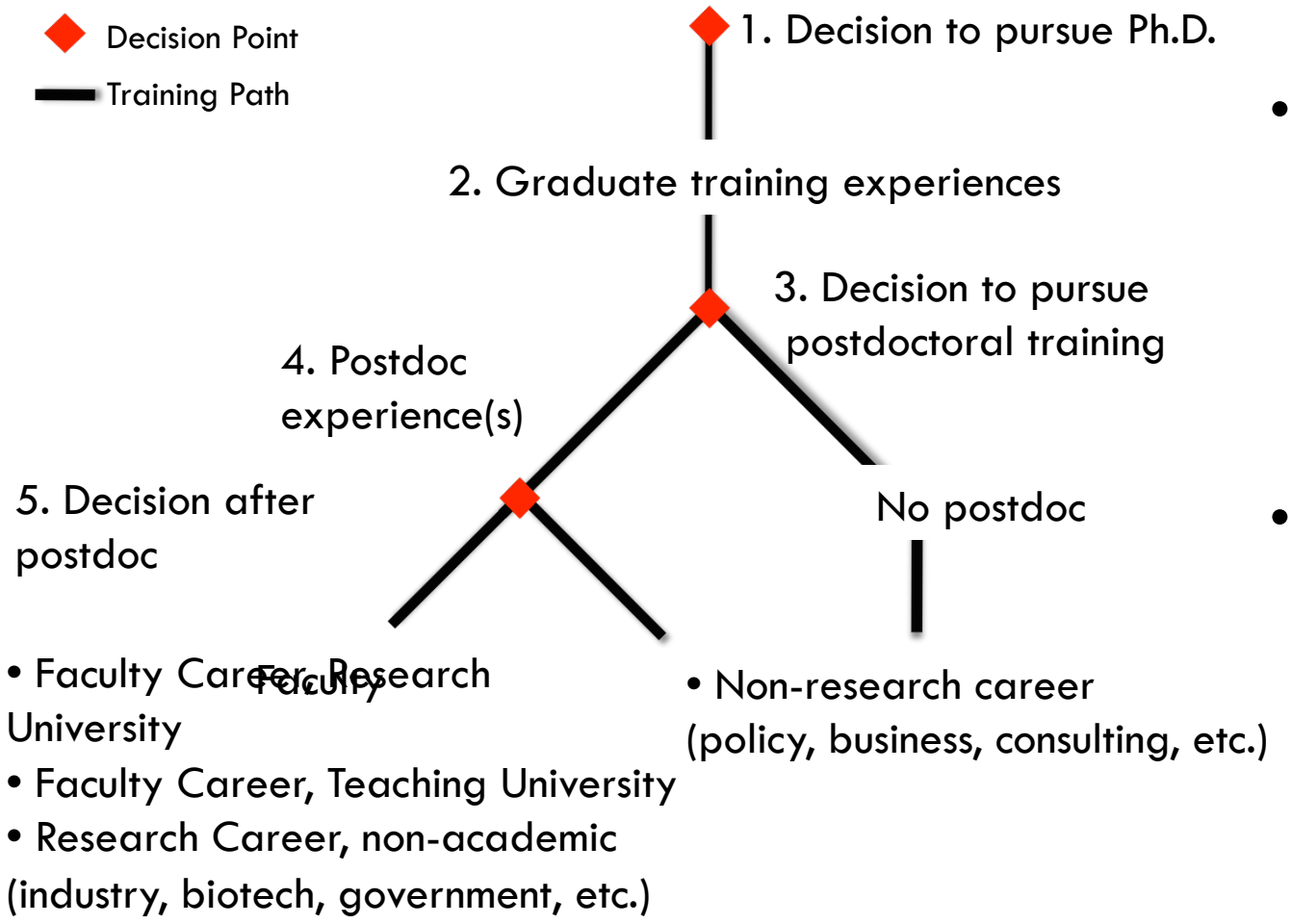
Career Development among American Biomedical Postdocs

Kenneth D. Gibbs, Jr.,*†‡ John McGready,§ and Kimberly Griffin‡‖

- US Citizen and Permanent Resident Ph.Ds. who received Ph.D. between 2006-2012
- National survey (PLOS ONE, 2014; CBE LSE, 2015)
  N=1890 recent STEM Ph.Ds. (n=335 from URM backgrounds)
- Qualitative Data (CBE LSE, 2013, and forthcoming)
  - Focus groups (n=38), and in-depth interviews (n=70)

Kimberly Griffin, Ph.D., Associate Professor of Education, University of Maryland

Career Pathway for Ph.D. Scientists

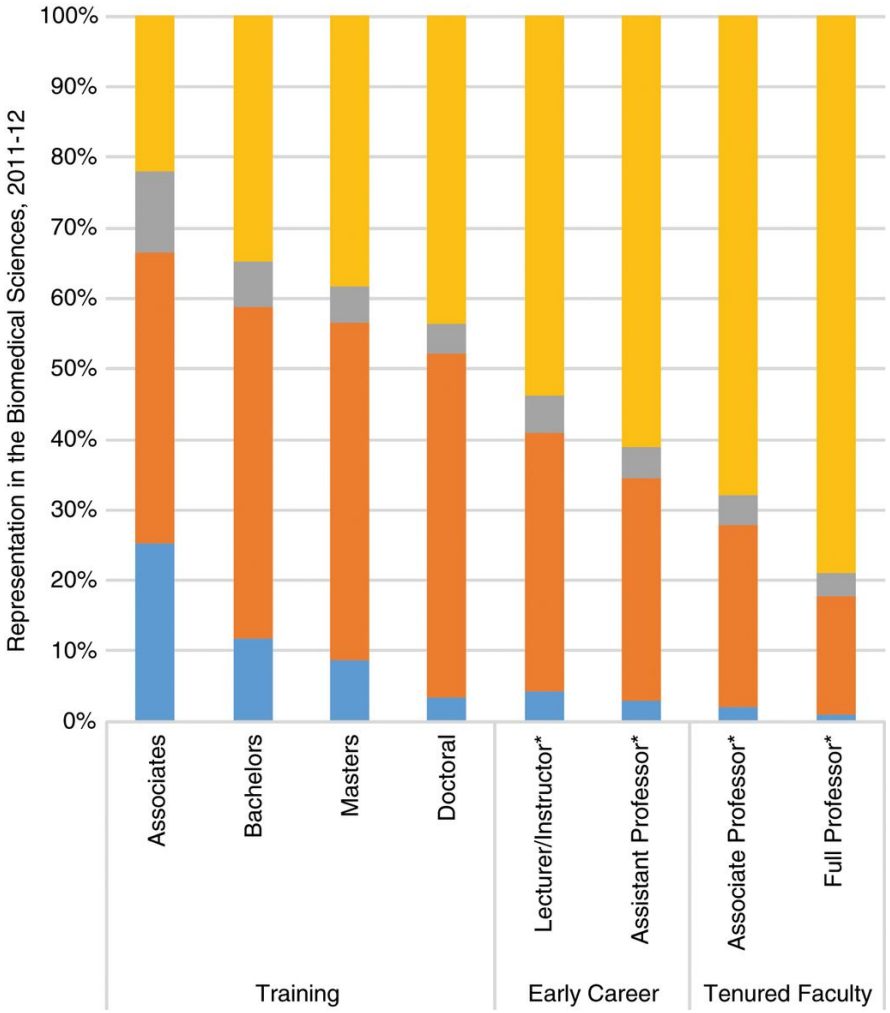


Research Questions

- What is the process of career interest formation for recent biomedical Ph.D. graduates?
- To what extent does this process differ based on social identity (i.e. race/ethnicity, gender, and their intersection)?

Gibbs & Griffin, CBE Life Science Education (2013)

Where are We Now? (Biomedical Snapshot)



Well Represented Groups (WR)

White, Asian, Non-Resident

Underrepresented Minority (URM)

Black, Hispanic/Latin@, American Indian, or Alaska Native

WR Men

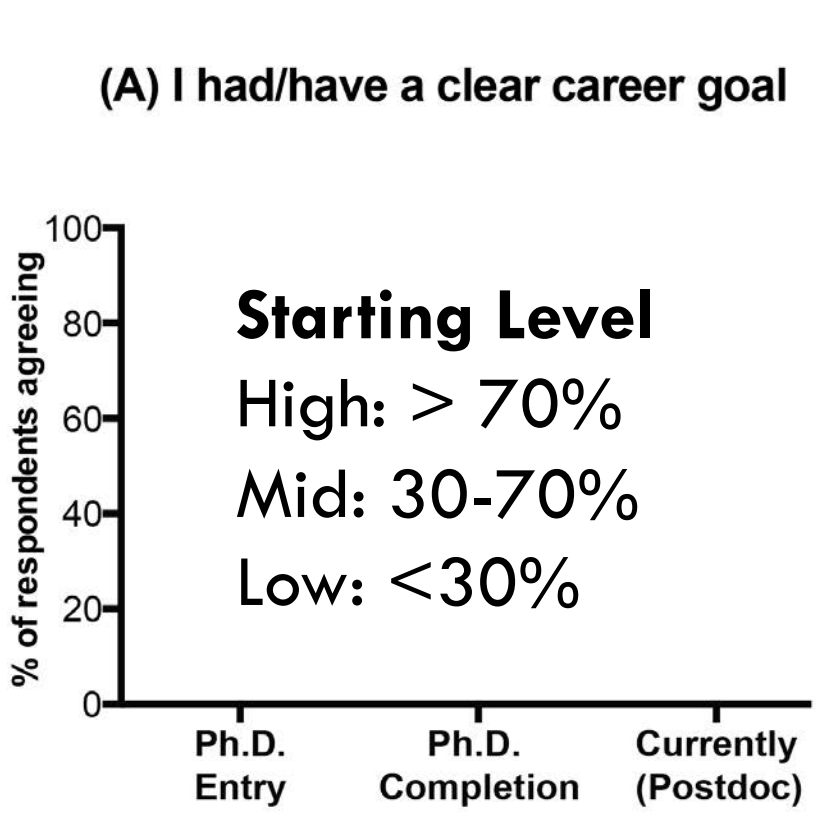
URM Men

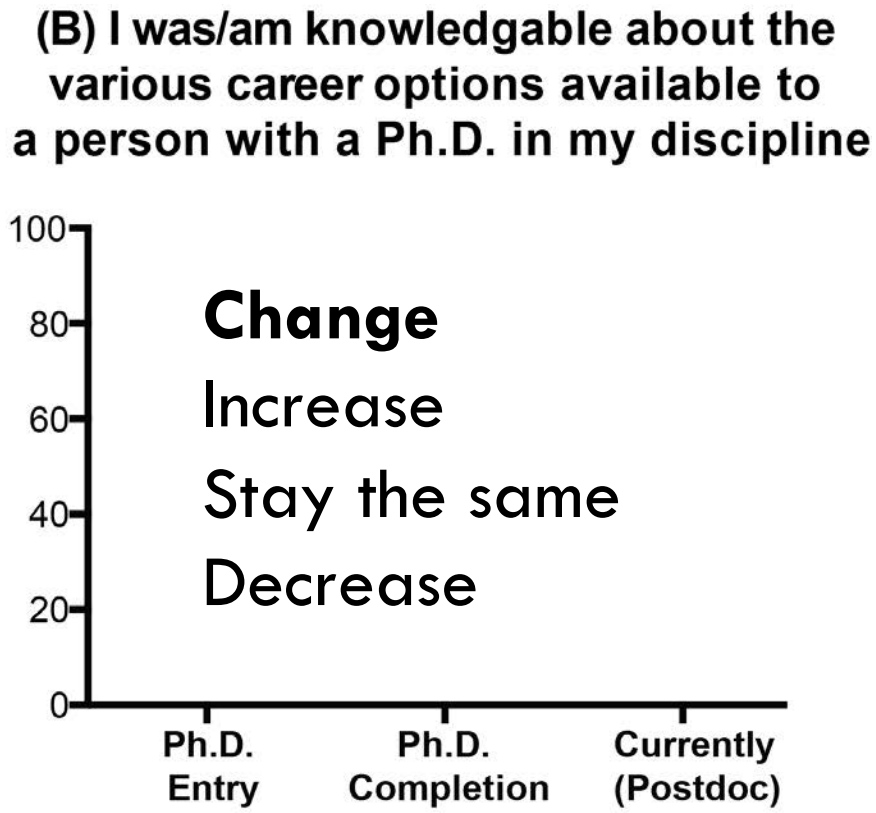
WR Women

URM Women

Valantine, Lund, and Gammie—CBE Life Sciences Education (2016)

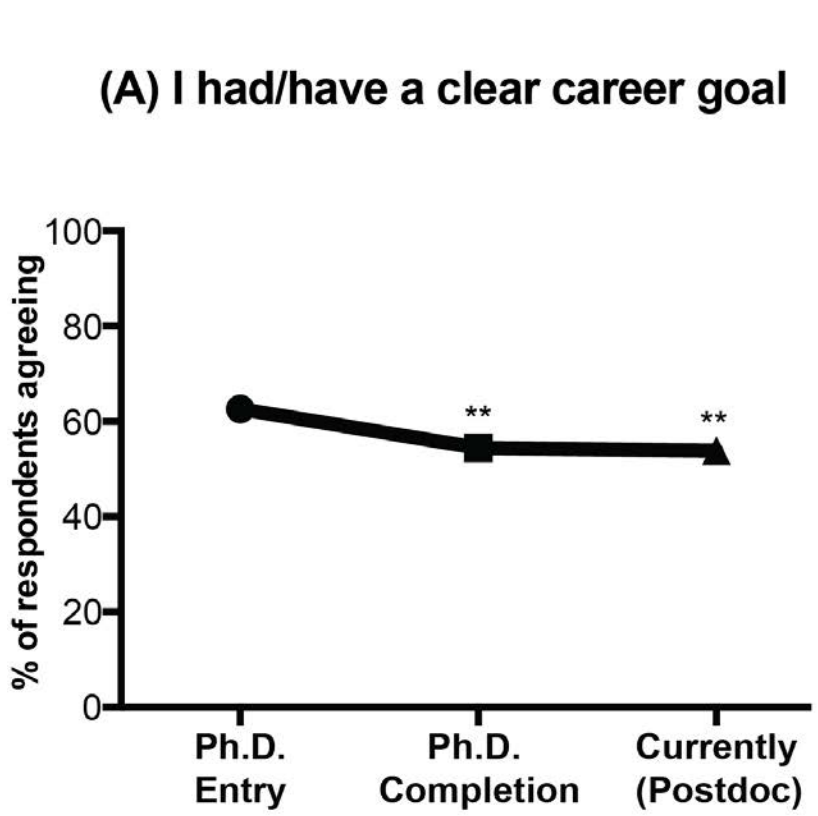
What happens to career goal clarity and career knowledge as training progresses?

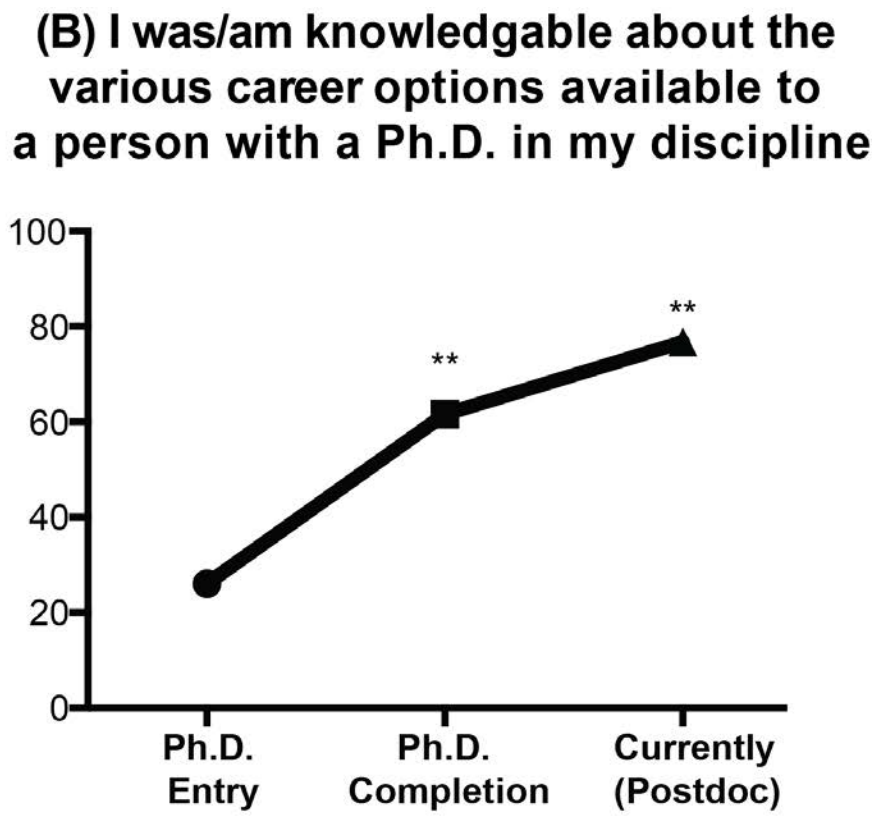




Gibbs et al, CBE Life Sciences Education (2015)

Postdocs Report Greater Knowledge of Career Options & Less Career Goal Clarity Relative to Ph.D. Entry





** p< 0.001 relative to Ph.D. Entry

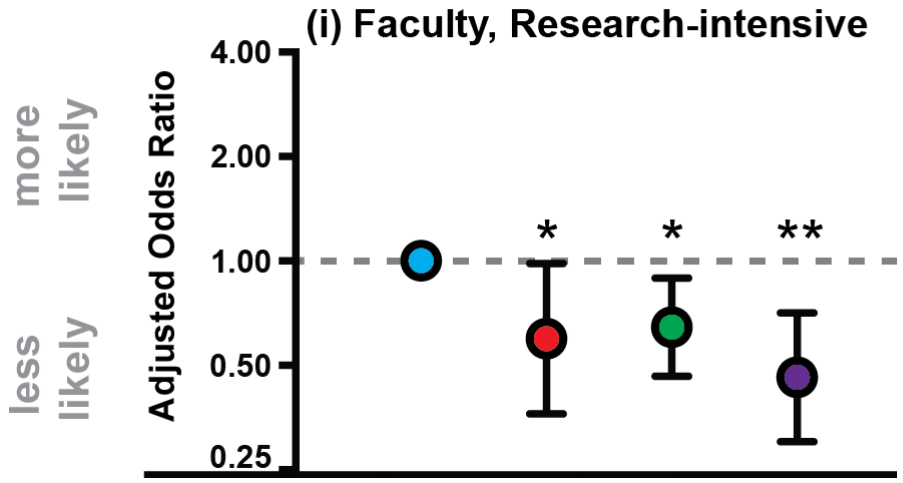
Gibbs et al, CBE Life Sciences Education (2015)

What Explains Career Pathway Interest at Ph.D. Completion?

- Multiple Logistic Regression
  - Outcome: high career pathway interest at Ph.D. completion (i.e. 4 or 5 on the interest scale)
- Covariates:
  - Personal: Interest & intentions at Ph.D. entry, confidence in research ability
  - Objective: first-author publication rate, time-to-degree, h-index, institution type (Top50 yes/no)
  - Graduate training: sense of belonging (intellectually or socially), advisor interactions, and career development measures

Disparate Career Interests at Ph.D. Completion

(A) ***Likelihood of high interest in career path at Ph.D. completion***



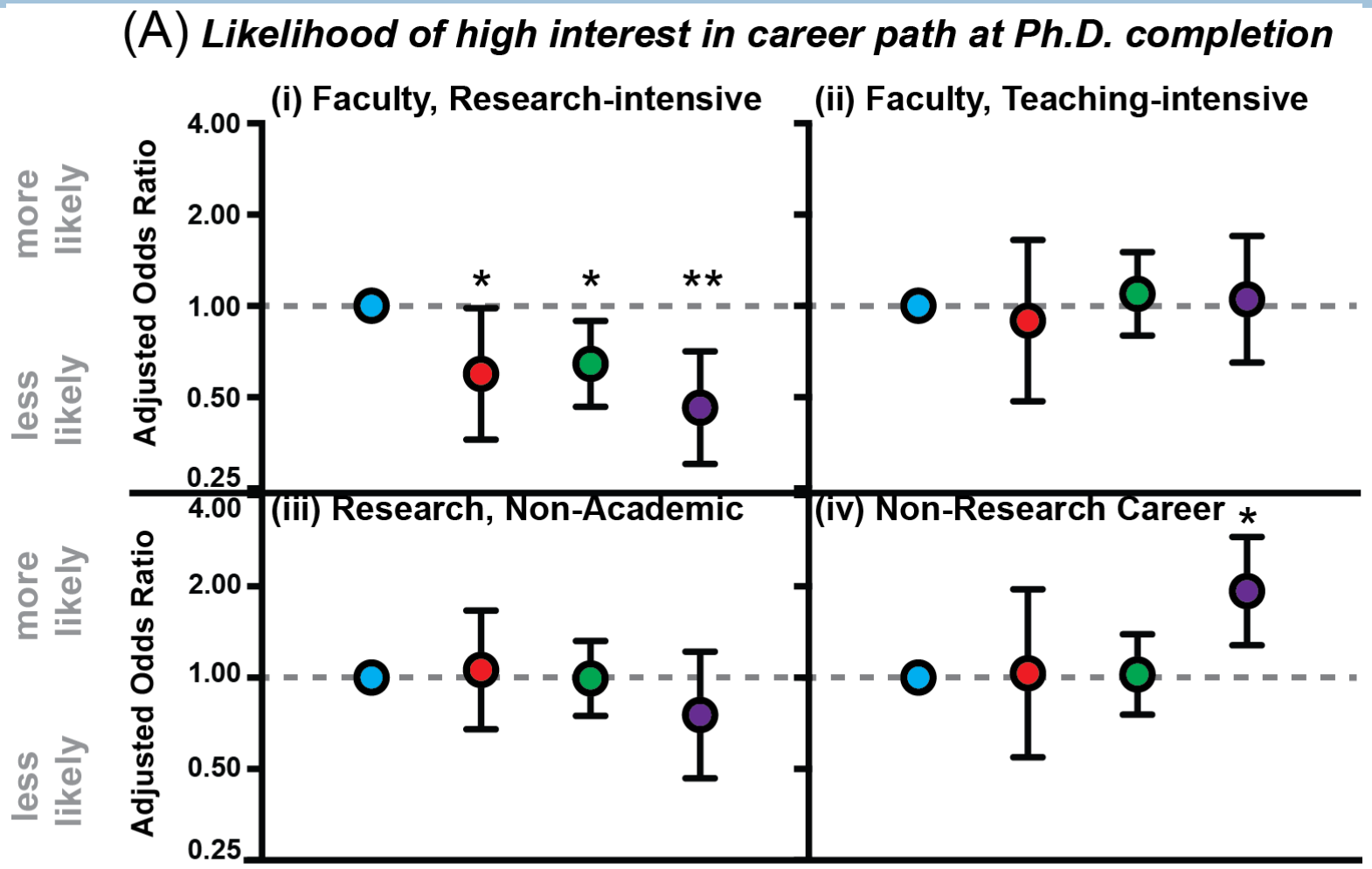
Controls

- Career interests at Ph.D. entry(+)
- Advisor relationship (+)
- Publication record (+)
- Ph.D. at "Top 50" university (-)
- Time-to-degree
- H-index
- Research self-efficacy (+)
- Departmental support for career development (+)
- Sense of belonging

Gibbs et al, *PLOS ONE* (2014)

WR Men (n=375) **URM Men (n=87)**
WR Women (n=808) **URM Women (n=189)**

Disparate Career Interests at Ph.D. Completion



Gibbs et al, *PLOS ONE* (2014)

AAAS Fellowship

- AWESOME!!!
- (For Me) Both research and policy application are necessary to feel fulfilled, and neither is sufficient.
- Is there a way to bridge the two?

NCI Cancer Prevention Fellowship Program

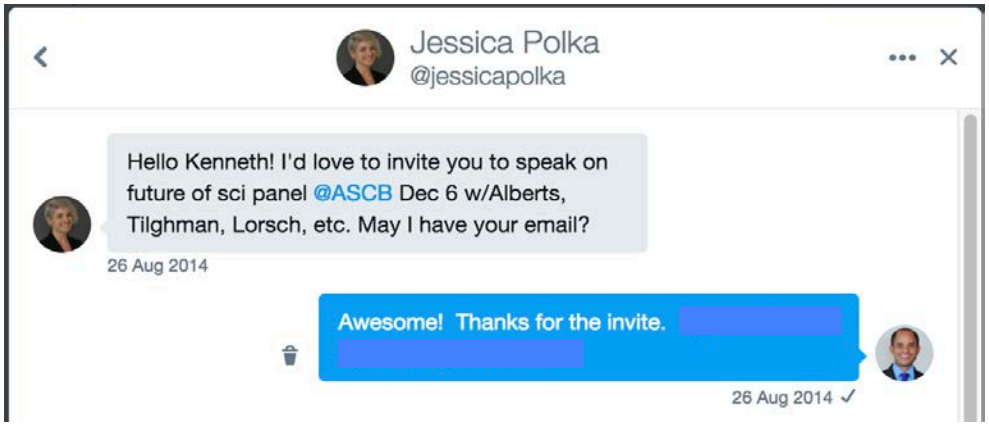
- Post-doctoral Fellowship with 30 year history; for early career scientists
- Multidisciplinary
- Independent, mentored-research in cancer prevention
- 10-15 Fellows selected annually through competitive process; support for 4 years

Career Vision: Policy Scientist

- Macro-scale translational research
  - Science education
  - Science workforce development and diversity
  - Research evaluation
  - Public health
- Physician-scientist: “Bench to bedside”
- Policy scientist: “Bench to society”

The Road to NIGMS

Advisory Council

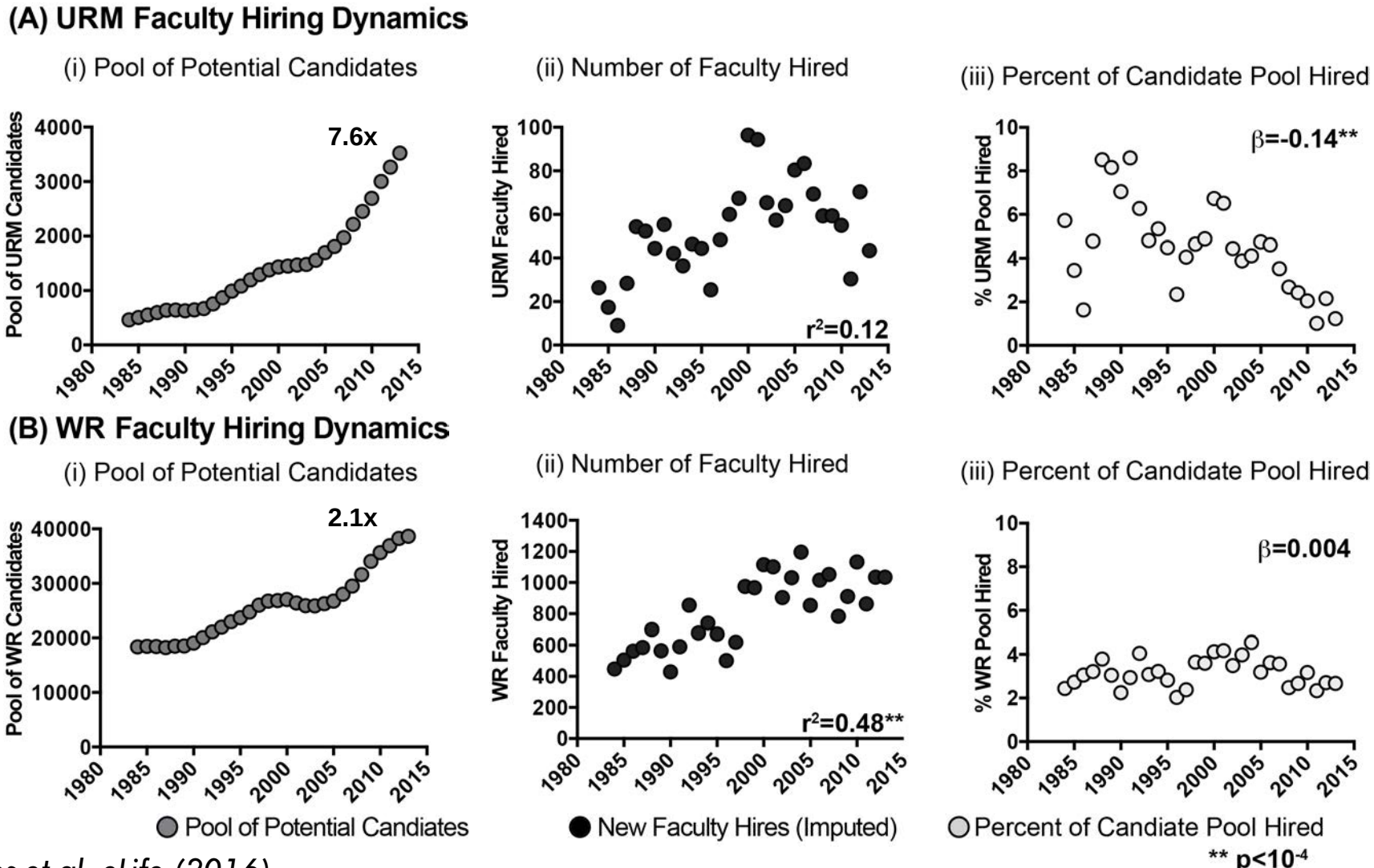


NETWORK, NETWORK, NETWORK

Roles at NIGMS: Science, Diversity, Systemic Reform

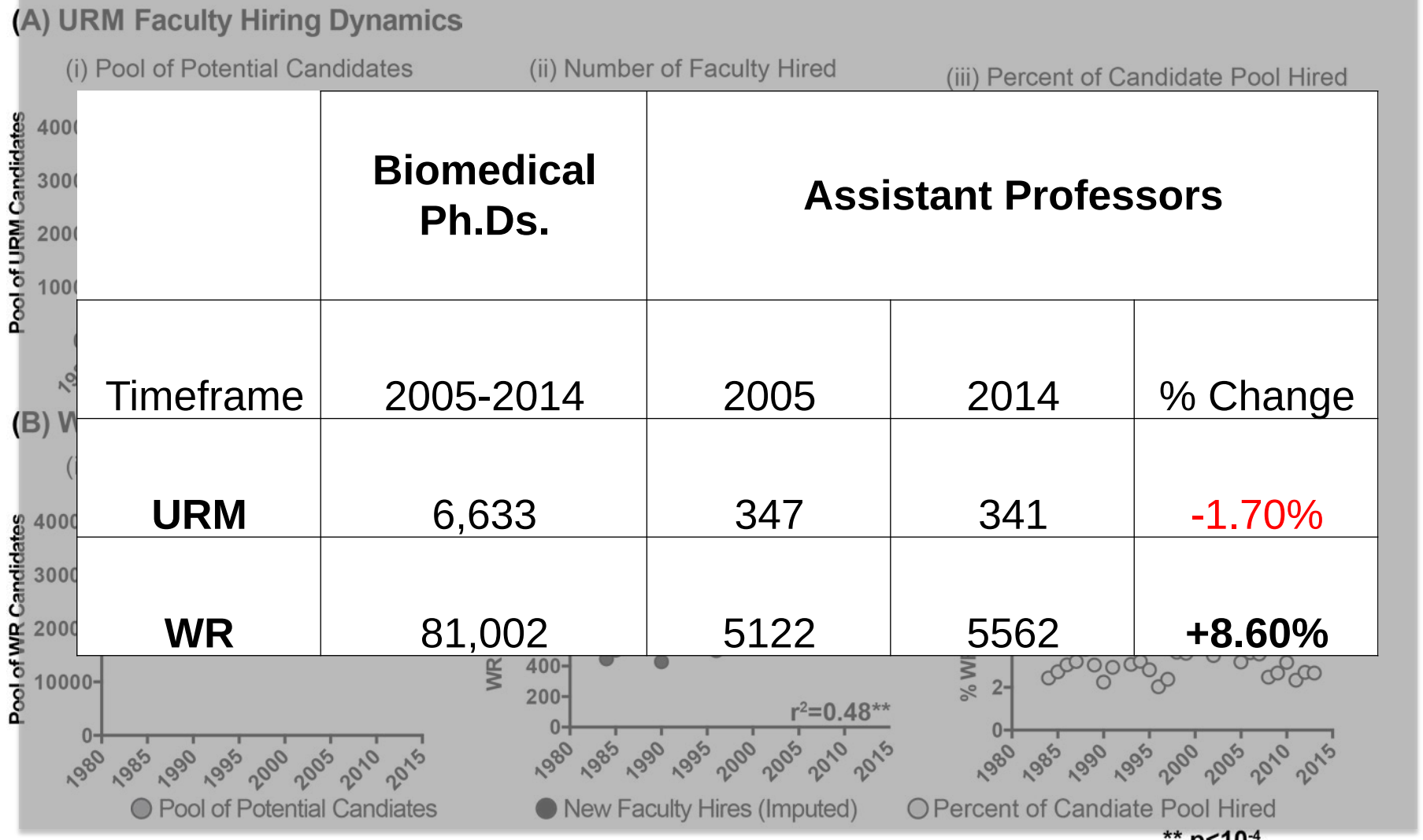
- Program Analyst, Office of Program Planning, Analysis and Evaluation
  - Research on workforce development and diversity
  - Strategic planning for NIGMS training and diversity programs
  - Trans-NIH initiatives (funding disparities for black investigators)
- Program Director, Divisions of Training, Workforce Development and Diversity; Genetics and Developmental Biology

Distinct Faculty Hiring Dynamics for URM and WR Ph.D. Scientists



Gibbs et al, eLife (2016)

Distinct Faculty Hiring Dynamics for URM and WR Ph.D. Scientists



	Biomedical Ph.Ds.	Assistant Professors		
Timeframe	2005-2014	2005	2014	% Change
URM	6,633	347	341	-1.70%
WR	81,002	5122	5562	**+8.60%**

Gibbs et al, eLife (2016)

Impact

Press

The Atlantic

Science's Minority Talent Pool Is Growing—but Draining Away

The number of Ph.D. graduates from underrepresented groups grew by nine times since 1980. The number of assistant professors from those groups grew by just 2.6 times.

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Voices

"There Aren't Qualified Minority Candidates" Is a Myth

The exponential growth in PhD's from underrepresented groups in the last 30 years has not been matched by comparable growth in hiring them

By Viviane Callier on November 22, 2016

Policy

Reforming Graduate Education

Meeting Showcases Innovations in Biomedical Graduate Education


Posted by Dr. Jessica Faupel-Badger and Dr. Kenneth Gibbs on May 2, 2016
Post a Comment | View Comments (4) ↓

Your Perspectives: Catalyzing the Modernization of Biomedical Graduate Education



Posted by Dr. Alison Gammie, Dr. Kenneth Gibbs and Dr. Shiva Singh on November 2, 2016
Post a Comment | No Comments ↓

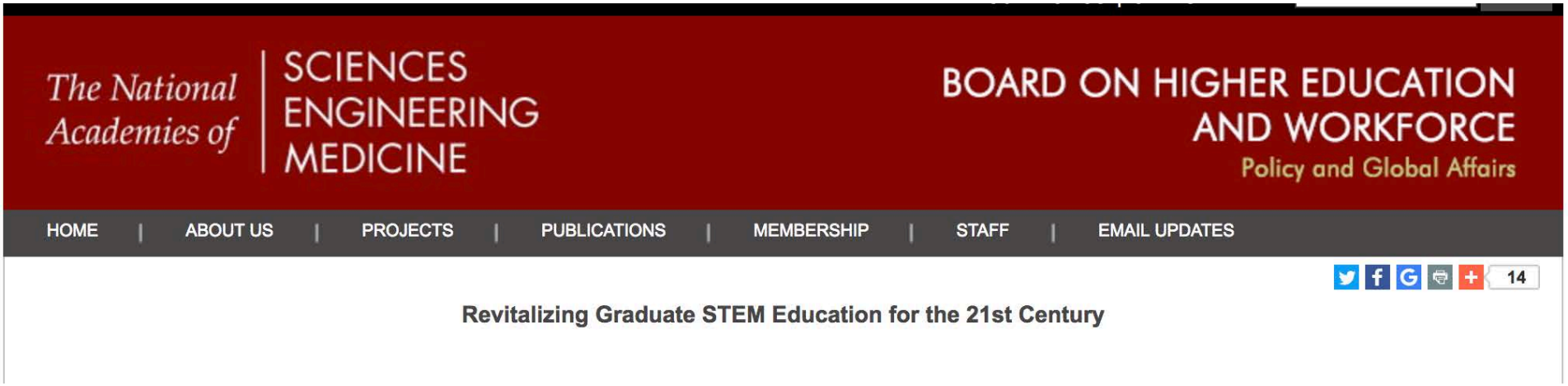
Early Notice: New NIGMS Institutional Predoctoral Training Grant Funding Opportunity Announcement



Posted by Dr. Alison Gammie, Dr. Kenneth Gibbs and Dr. Shiva Singh on March 1, 2017
Post a Comment | No Comments ↓

https://loop.nigms.nih.gov/author/dr-kenneth-gibbs/

NAS Study on Revitalizing Graduate STEM Education



"Create a set of national goals for graduate STEM education that can be used by research universities, Congress, federal agencies, state governments and the private sector to guide graduate level programs, policies and investments over the next decade, and ensure that this "blueprint" for graduate education reform is revisited and updated on a periodic basis to reflect changing realities."

http://sites.nationalacademies.org/PGA/bhew/graded/index.htm

Your Story

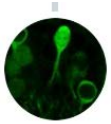
Kenneth Gibbs
@KennyGibbsPhD

Dear Science Twitter, if you were giving a talk to ~150 URM college students interested in Ph.D., what would you say?

The Road Ahead: To Grad School or Not?

E J Sacho @ejsacho · 16m

Make sure you need the degree for the career path you want to be on. Don't go just to avoid making career decisions.



Dr. Katiesci
@katiesci

Replying to @KennyGibbsPhD and @ThePurplePage

Explore science careers before deciding to do a PhD because you might not need a PhD for the job you end up wanting once you know more.

Bridges to the Doctorate Program

Postbaccalaureate Research Education Program (PREP)

BE INTENTIONAL IN YOUR CAREER DECISIONS

Picking the Right Graduate School

- Good science, good community & **good for you!**

M. Matthews, PhD @PhDeez · 7m

i advice undergrads to prioritize their needs/wants & pick a prog that suits those priorities. it's OK to be "picky".

Dr Ben Britton
@BMatB

Replying to @KennyGibbsPhD

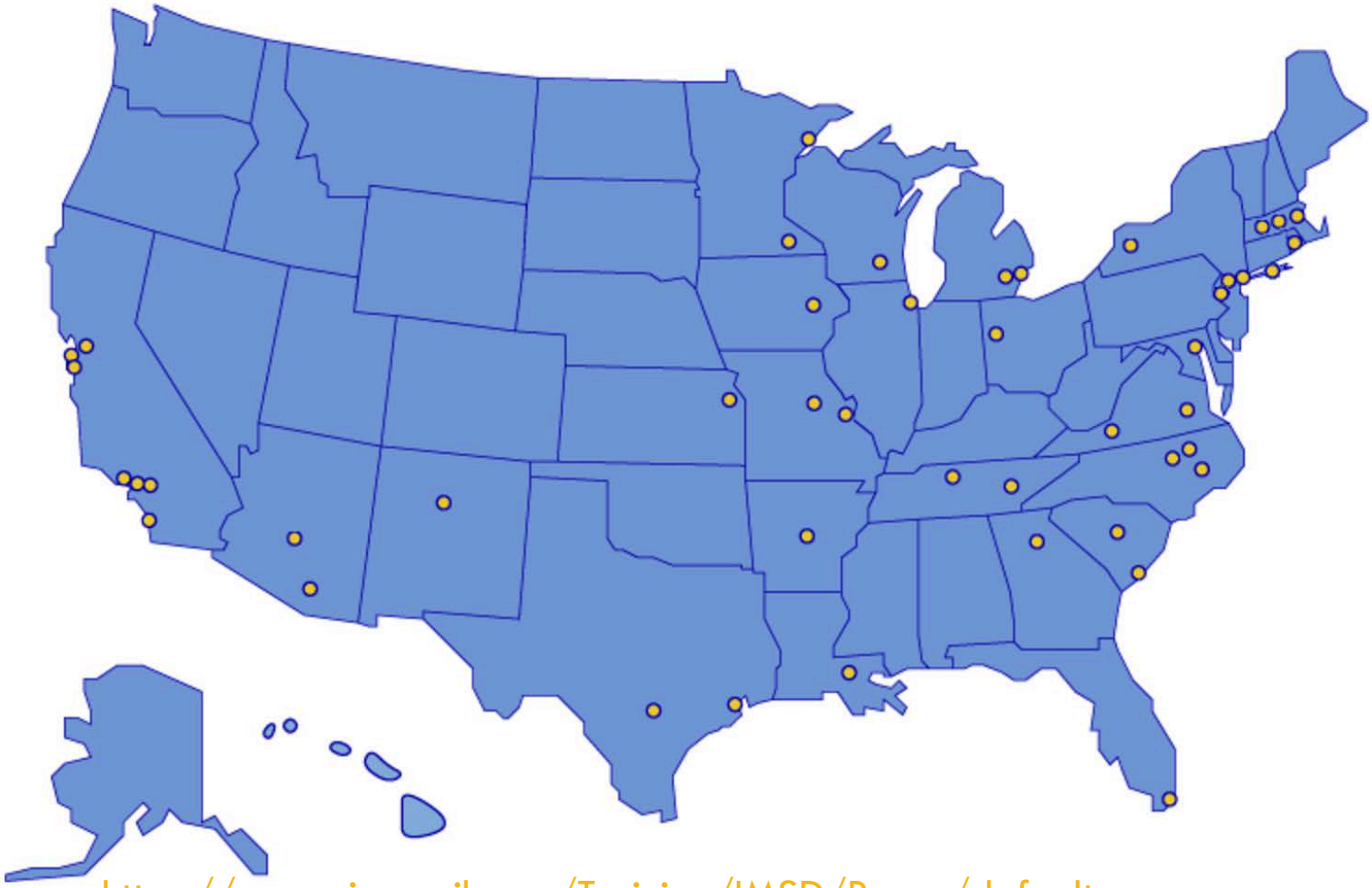
Build a support network - mentors, friends, family life outside work (sport, books, culture), and ensure good self-care.

Jonathan Jackson
@egaly

Tell them to find their people, whomever they are, whatever they look like, and to hold on for dear life. #SCIENCE

Find Community: IMSD Institutions

Initiative for Maximizing Student Development



https://www.nigms.nih.gov/Training/IMSD/Pages/default.aspx

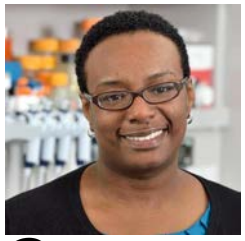
Find Community: Social Media

#BLACKandSTEM

Vanguard STEM

CienciaPR.org

oSTEM


@BerondaM


@_ChristineOrtiz


@dacolon


@SherilynnBlack


@DNLee5


@blacksciblog


@ThePurplePage


@moefeliu


@NLouissaint_PhD


@HeyDrWilson

Mentors Matter: Choose Your PI Wisely

Vanessa Yanez
@vanesque89

Replying to @KennyGibbsPhD and @StemPhDCareers

Tell them to focus on finding a great mentor--that should be a priority.

Kyle Sousa
@DrBiochemistry

Follow

Replying to @KennyGibbsPhD

Find a mentor who is invested in you! One who will stand by you through a failed set of experiments and let u run with cool ideas

Believe in Yourself + Ask for Help

Beronda Montgomery @BerondaM · 44m

Replying to @KennyGibbsPhD @moefeliu and 3 others

Encourage each of them that they have MUCH more to offer than they have to PROVE & they can refuse to be pushed into the servitude of proof!

Pinar Gurel @pinar_gurel · 49m

Replying to @pinar_gurel @KennyGibbsPhD

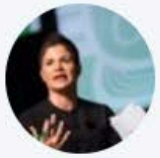
There will always be obstacles, but if you are confident in yourself and keep fighting, you will be able to tackle and overcome them.

Michael D L Johnson @blacksciblog · 22m

Replying to @moefeliu @KennyGibbsPhD and 3 others

I would add that asking for help is not a weakness, but expecting help is.

Use Your Science to Improve Our Communities



Mónica Feliú-Mójer @moefeliu · 35m

Replying to @BerondaM @KennyGibbsPhD and 3 others

Also remind them that they CAN serve their communities by pursuing PhDs and doing research, in many ways

SalasRamirez,PhD
@SaveCPE1

Replying to @KennyGibbsPhD and @brainlayman

As a PhD you can change the way the world sees something, how they interpret it and use it for improving society. Find support, but shine

Science Needs You!

Dwayne Godwin
@BrainyActs

Follow

Replying to @KennyGibbsPhD @JoRichers @Chemjobber

We need you, welcome you, and value your contribution.

Dai Shizuka
@ShizukaLab

Replying to @KennyGibbsPhD @birdsoundscapes

We need you.

Mica Estrada @MicaPhD_growjoy

Replying to @KennyGibbsPhD

We need you!

Richard Prather
@PratherLab

Replying to @KennyGibbsPhD

good luck.

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