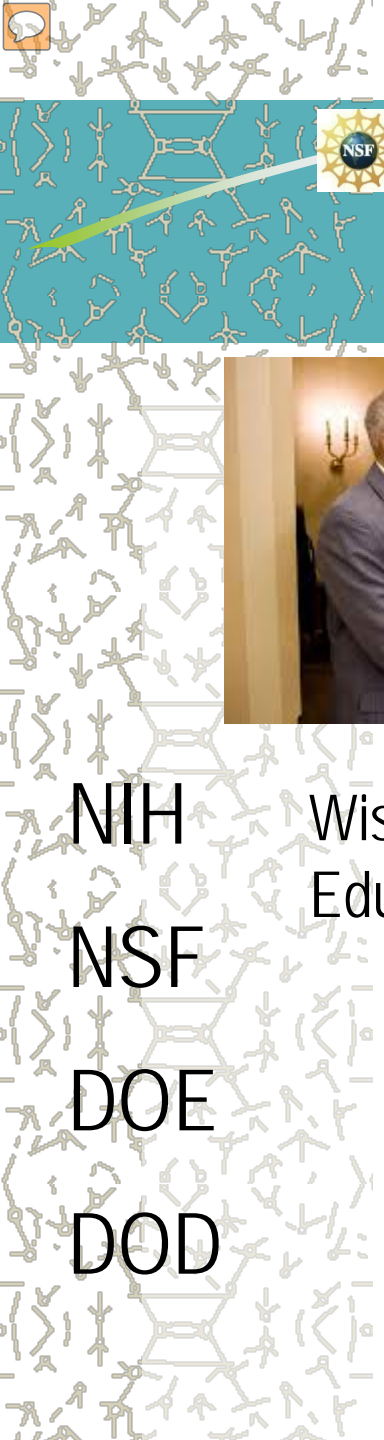# Graduate Programming to Develop Leadership for Broadening Participation in STEM

Gail Coover, WiscAMPCo-PI & Executive Director
Molly Carnes, WiscAMP Co-PI, Director Center for Women's Health Research, School of Medicine & Public Health
Douglass Henderson, WiscAMP Co-PI, Chair of Engineering Physics, College of Engineering

Industry Partners

NIH

NSF

DOE

DOD

Wisconsin Center for Education Research

Graduate School
College of Engineering
School of Medicine & Public Health
College of Agriculture & Life Sciences
School of Pharmacy
School of Nursing
School of Veterinary Medicine

Behind Every Successful PHD in STEM…

Committed Faculty mentors
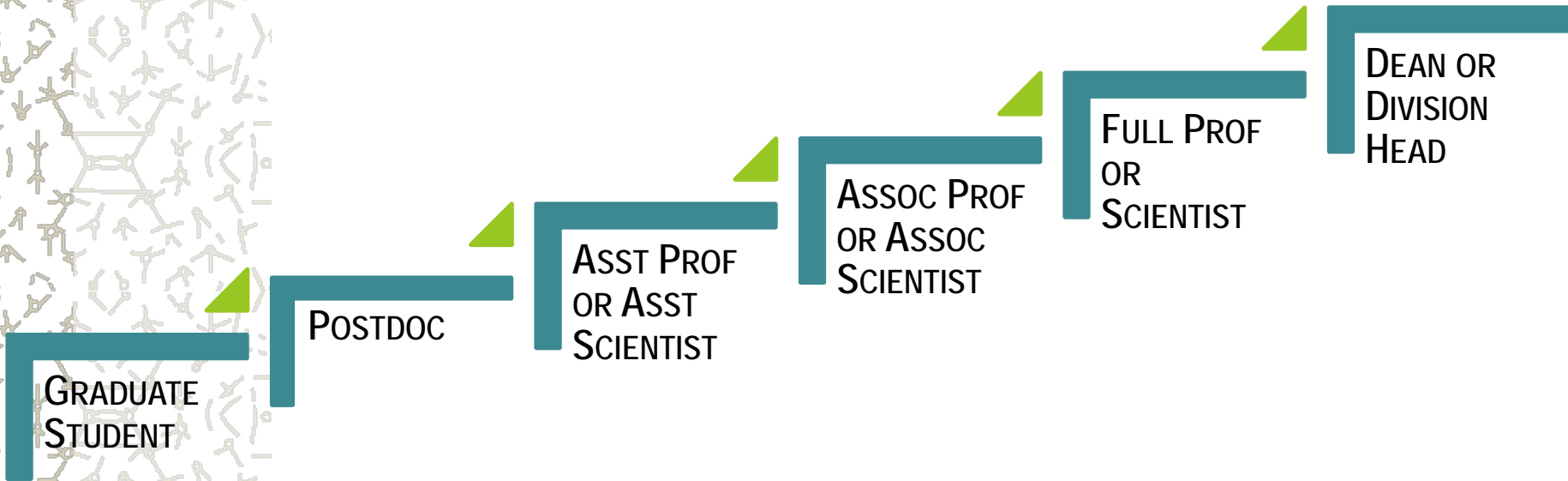
Training program directors, coordinators and staff

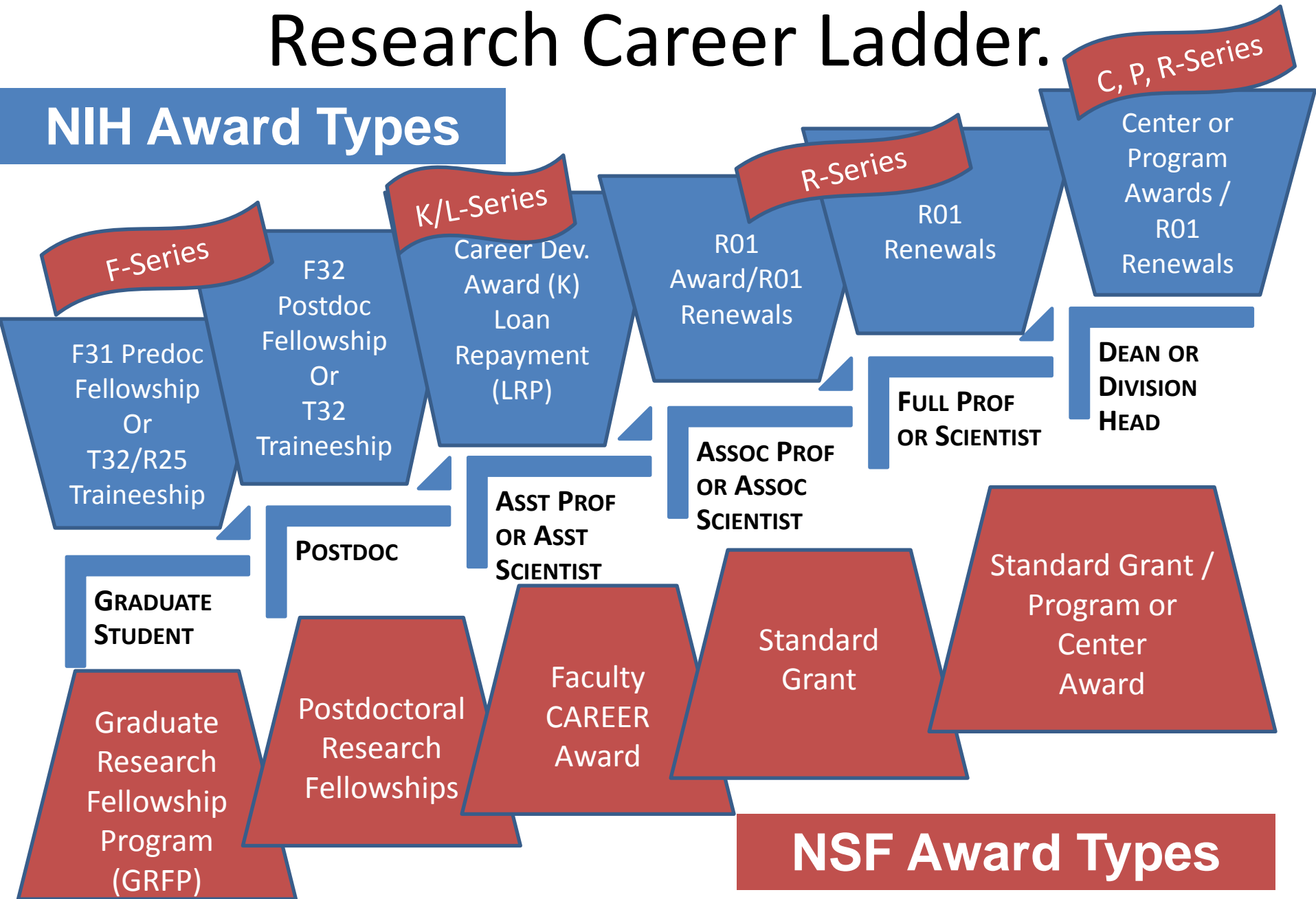

Family and Friends

Supportive Community of Peers
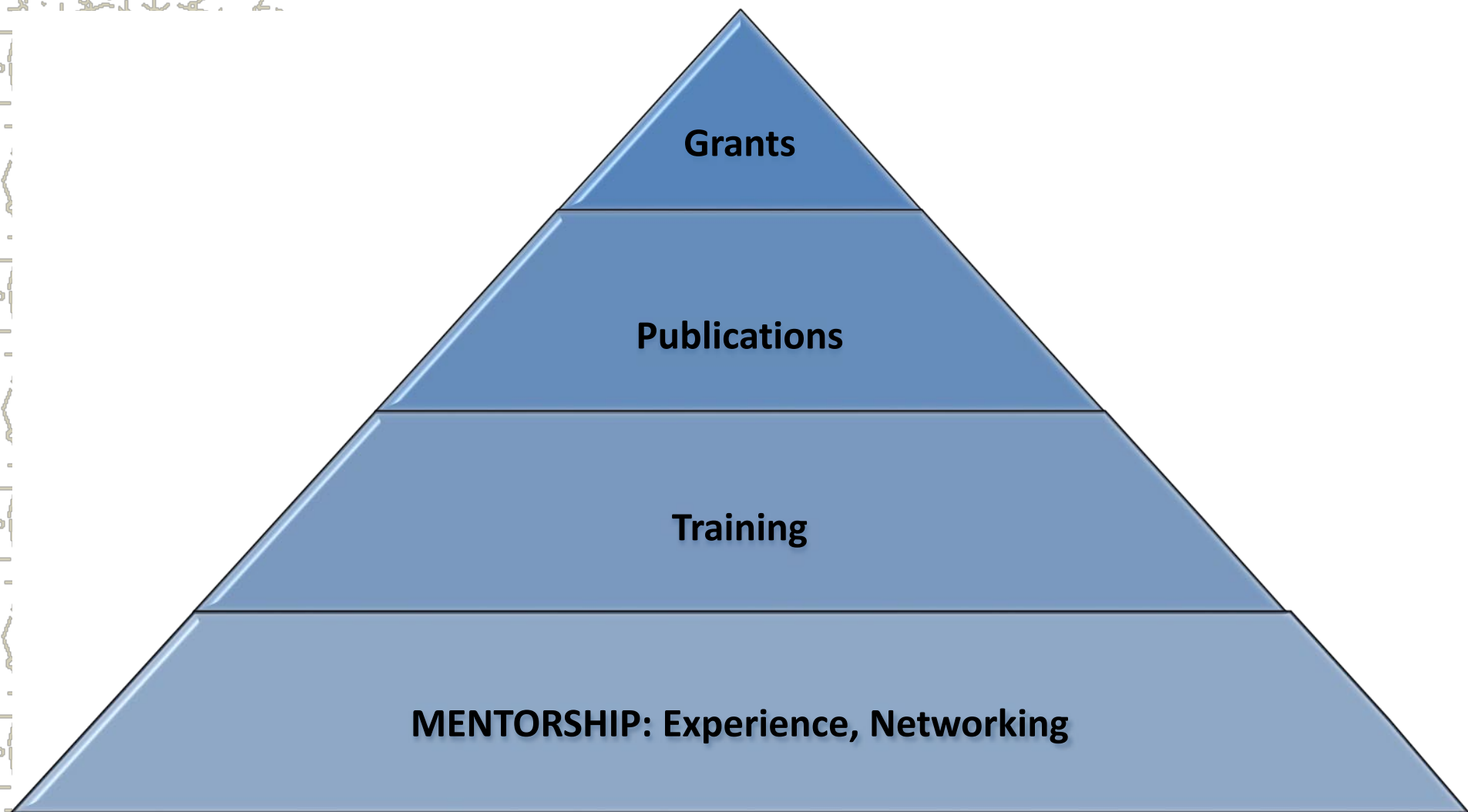
And???

Academic Research Career Ladder

GRADUATE STUDENT

POSTDOC

ASST PROF OR ASST SCIENTIST

ASSOC PROF OR ASSOC SCIENTIST

FULL PROF OR SCIENTIST

DEAN OR DIVISION HEAD

Research Career Ladder.

NIH Award Types

F-Series

F31 Predoc Fellowship Or T32/R25 Traineeship

F32 Postdoc Fellowship Or T32 Traineeship

K/L-Series

Career Dev. Award (K) Loan Repayment (LRP)

R-Series

R01 Award/R01 Renewals

R01 Renewals

C, P, R-Series

Center or Program Awards / R01 Renewals

GRADUATE STUDENT

POSTDOC

ASST PROF OR ASST SCIENTIST

ASSOC PROF OR ASSOC SCIENTIST

FULL PROF OR SCIENTIST

DEAN OR DIVISION HEAD

Graduate Research Fellowship Program (GRFP)

Postdoctoral Research Fellowships

Faculty CAREER Award

Standard Grant

Standard Grant / Program or Center Award

NSF Award Types

Grants

Publications

Training

MENTORSHIP: Experience, Networking

Faculty Mentoring

Strong mentor relationships are critical determinants of career persistence and advancement in STEM

- Mentors provide:
  - Resources (funding, space to do research) .
  - Opportunities (prof dev, conference participation).
  - Training (grant writing, manuscript writing).
  - Critical feedback (skills, knowledge).

(Byars-Winston et al., 2015; Pfund et al., 2014; National Acad. of Sciences, 2007; 2010)

Catalyzing Impact of Grant Proposals…

WiscAMP Bridge to the Doctorate (2015, 2016, 2018)

Training, Education And Mentoring (TEAM) Science Grant (2008, 2012, 2016)

Life Sciences and Biomedical Graduate Research Scholars (SciMed GRS) (2008)

Graduate Engineering Research Scholars (1999)

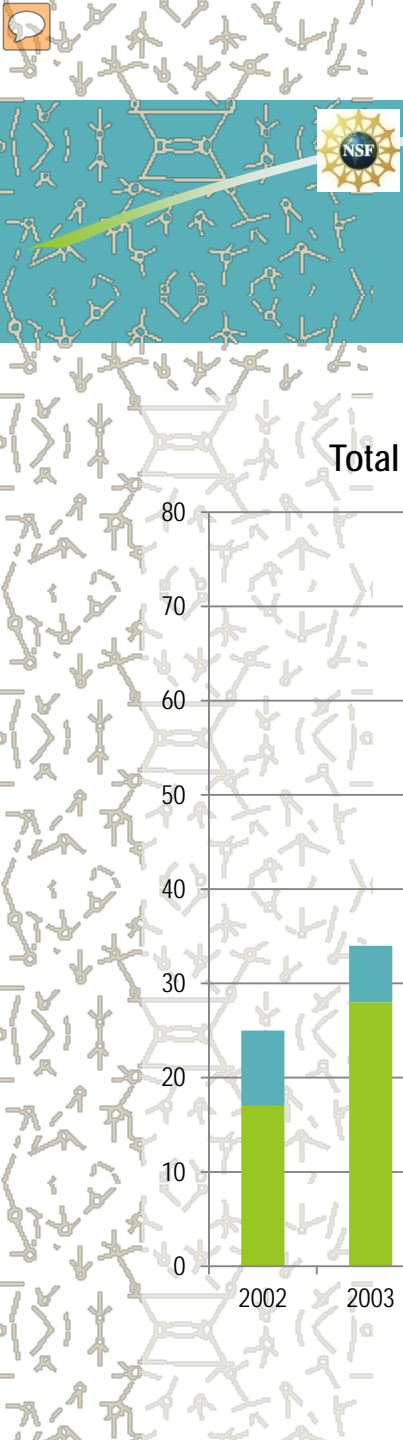AGEP Proposal Planning with Richard Tapia (1998)

Original Program Model

Goal: to build a community of Graduate Scholars for the Professoriate
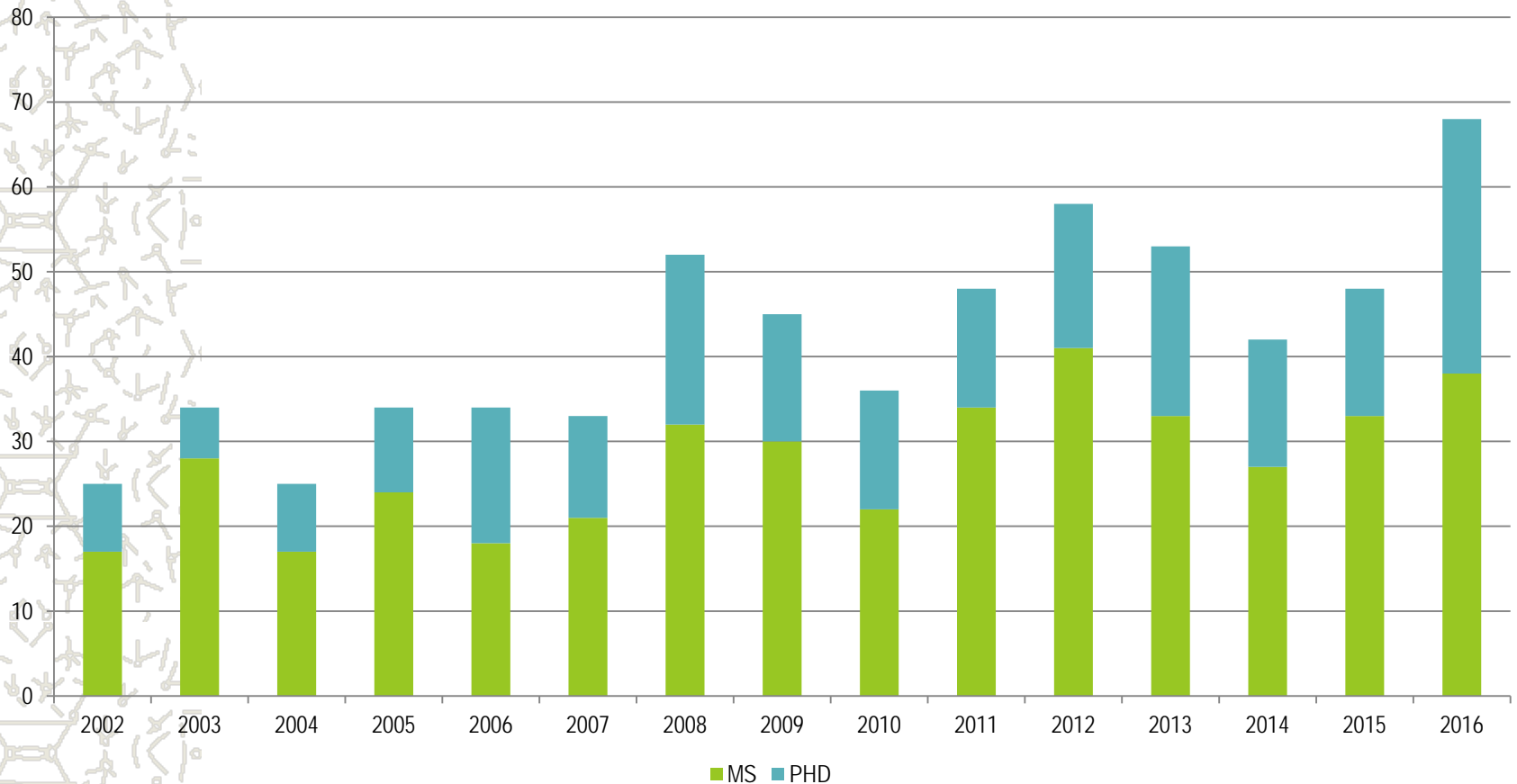
- Recruitment of talented students

- Community building and professional development activities for retention

- **Financial support and faculty commitment from the time of recruitment**
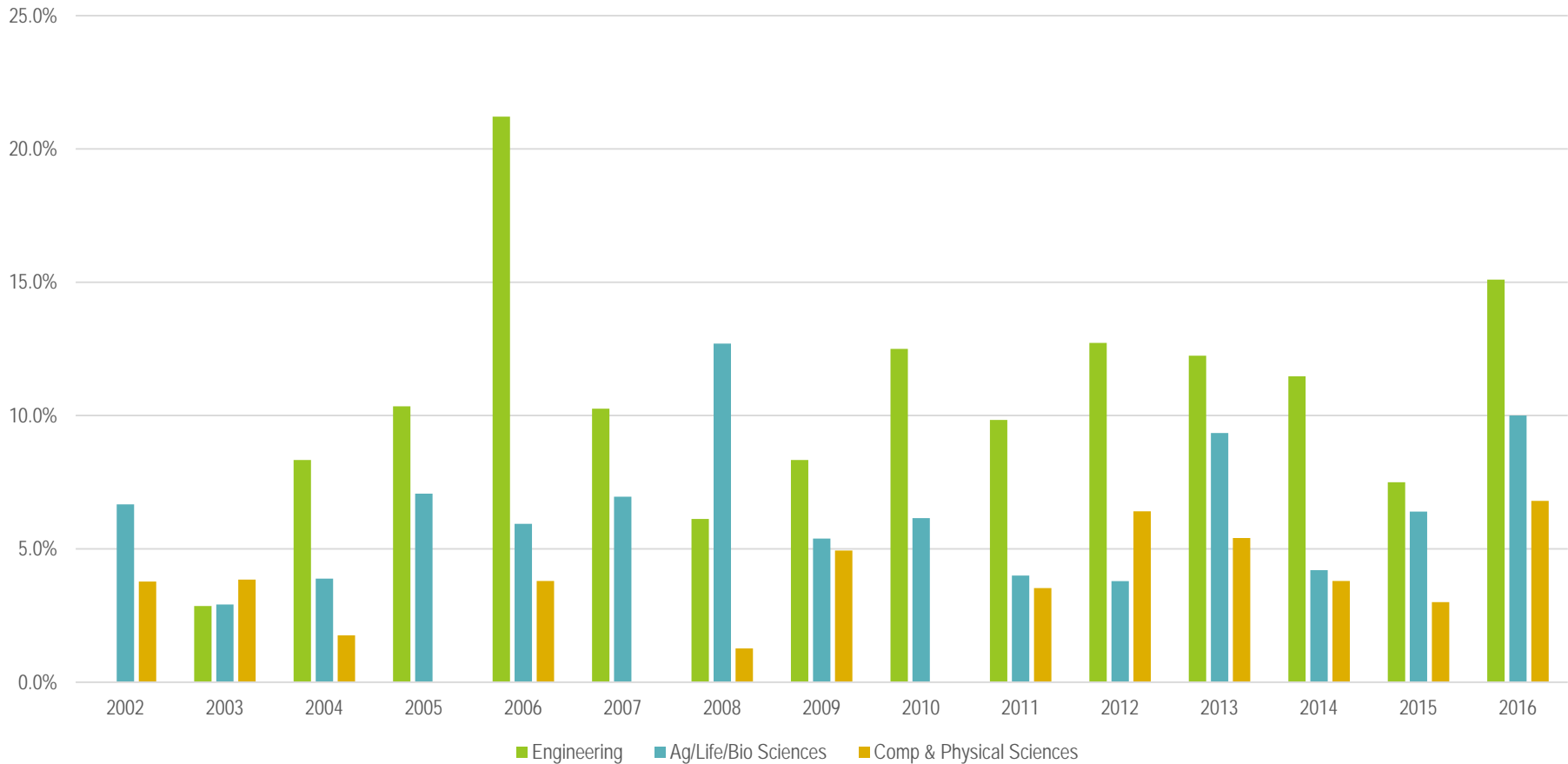
Program Outcomes

Total Master's and PhD Degrees at UW-Madison awarded to URM graduates in STEM by Year

Legend: MS, PHD

Diversifying the STEM Doctorate

Percent of domestic PhDs awarded at UW-Madison to URM Graduates by Year and STEM Discipline Cluster

Program Evolution

Formalized Mentoring Curriculum (TEAM Science & WiscAMP-BD)

- 8 Core Competences & Individualized Professional Development Plans

Faculty Mentor Development

- On-line training & resource materials

- Norming

- Career Coaches

Program Evolution

Research Efficacy
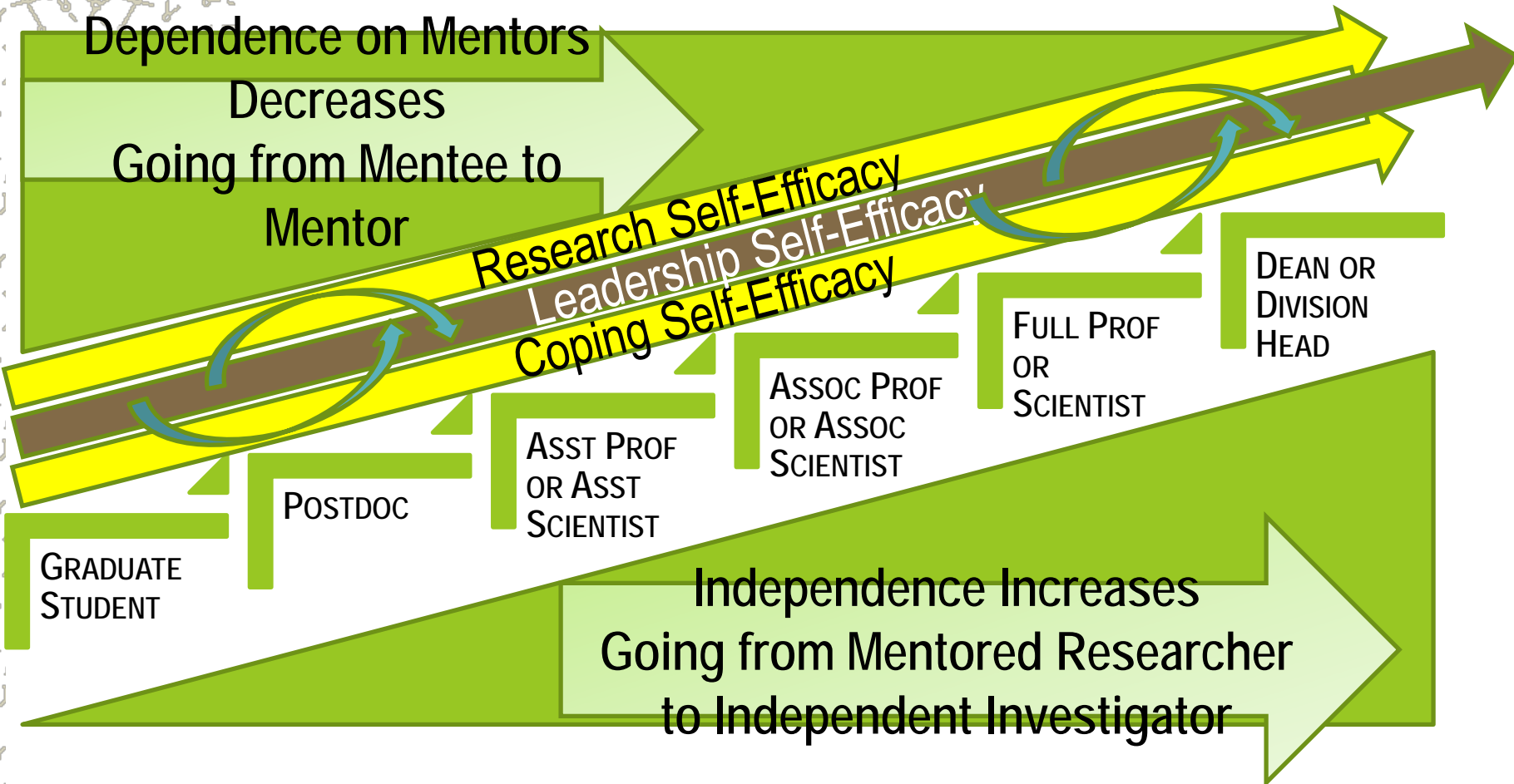
Coping Efficacy

  Behavioral coping

  Emotional coping

Leadership Efficacy

Science Identity

Research Career Ladder.

Dependence on Mentors Decreases Going from Mentee to Mentor

Research Self-Efficacy
Leadership Self-Efficacy
Coping Self-Efficacy

DEAN OR DIVISION HEAD

FULL PROF OR SCIENTIST

ASSOC PROF OR ASSOC SCIENTIST

ASST PROF OR ASST SCIENTIST

POSTDOC

GRADUATE STUDENT

Independence Increases Going from Mentored Researcher to Independent Investigator

Program Outcomes

Scale range: 1 (strongly disagree) to 5 (strongly agree)	Programmed	Non Programmed
I have a strong sense of belonging in my doctoral training program	3.46	3.44
Being a scholar is compatible with other aspects of my cultural background	3.19	3.50
I have a strong sense of belonging in my scientific community	3.24	2.83
I feel like I belong in my field of science	3.72	3.39
I am a scholar	4.29	3.78
My ethnic identity is an important part of who I am	4.43	3.39
My ethnic identity is an important part of my being a scholar	3.86	2.83
My gender identity is an important part of my being a scholar	3.63	2.94
Having more people with my cultural background (e.g., race, ethnicity, gender, nationality) in my field makes me feel more like a scholar	4.01	2.83

THANK YOU!

Gail Coover

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