Distributed Research Experiences for Undergraduate Students (DREU) Faculty Mentor Comparative Evaluation

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Prepared by
CRA's Center for Evaluating the Research Pipeline

Jane G. Stout, Ph.D.
Jessica L. Cundiff, Ph.D.

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**Center for
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About CERP

The CRA Center for Evaluating the Research Pipeline (CERP) evaluates the effectiveness of intervention programs designed to increase retention of students from underrepresented groups in computing, namely men from underrepresented racial/ethnic groups and women of all racial/ethnic backgrounds. More generally, CERP strives to inform the computing community about patterns of entry, experience, progress, and success among individuals involved in academic programs and research careers related to computing.

CERP was created by the Committee on the Status of Women in Computing Research (CRA-W)/Coalition to Diversity Computing (CDC) Alliance and is funded by the National Science Foundation (NSF). Visit CERP online at http://cra.org/cerp/ or contact cerp@cra.org to learn more.

Background

"Tell me and I forget, teach me and I may remember, involve me and I learn."

- Benjamin Franklin

The Education Committee of the Computing Research Association (CRA-E) is a committee of the Computing Research Association (CRA). CRA-E's mission is to address society's need for a continuous supply of talented and well-educated computing researchers. In particular, the committee works toward the objective of maintaining a healthy pipeline of domestic students who continue on to graduate school and enter careers in research.

At the request of the CRA-E, the current report measures faculty members' motivation for mentoring undergraduate researchers; characteristics of established research experience programs in computing; and student success outcomes among different types of research experiences. Due to the CRA-E's affiliation with the Committee on the Status of Women in Computing (CRA-W), the report focuses on mentors from CRA-W's Distributed Research Experiences for Undergraduates (DREU) programs. Briefly, DREU is a highly selective program that matches promising undergraduate women and individuals from underrepresented groups with a faculty mentor for a summer research experience at the faculty member's home institution. The current report compares mentor's motivations, student and mentors' responsibilities, and student outcomes among DREU mentors versus mentors for similarly structured research programs.

> *"Having a well-defined piece of work and a plan for training was especially helpful to get students into a project quickly, and give them a sense of accomplishment."*
>
> - DREU Faculty Mentor

Method

Procedure

During the fall of 2013, 269 faculty members from a broad range of computing departments at colleges and universities across the U.S. completed CERP's annual faculty survey. This report focuses on a subset of questions from the faculty survey that assessed faculty members' experiences as a mentor for undergraduate research. We report on findings from a subsample of faculty members who indicated that they had previously mentored or currently mentor undergraduate students in formal research settings (n=121). See Appendix for sample demographics. See Table 1 for a list of contributing universities.

Analytic Strategy

102 faculty members indicated current involvement and 19 faculty members indicated past involvement as mentors for formal, structured research programs for undergraduates. Of those who indicated current or past involvement, 26 indicated involvement as a DREU mentor (these individuals may have done other programs in addition to DREU) and 95 indicated involvement as a mentor for an institution-organized academic program or for an NSF funded Research Experience for Undergraduates (REU)

program (none of these individuals had ever been DREU mentors). These two groups (past and present DREU mentors; mentors for other formal research programs) constituted our comparison groups for the current report.

> *"Pairing undergraduate students with outgoing, friendly graduate students helps to engage them in the work. Showing the undergraduate students how their work advances the entire research project also helps them to see their contribution ... even if they may not understand everything you talk about, [this] helps build their confidence."*
> - DREU Faculty Mentor

Table 1. *Universities that contributed to the fall 2013 sample of faculty.*

Auburn University	University of Alabama
California State University Dominguez Hills	University of Delaware
Clemson University	University of Hawaii at Hilo
Columbia University	University of Illinois at Chicago
Cornell University	University of Illinois at Springfield
Drexel University	University of Kansas
Duke University	University of Maryland Baltimore County
Elizabeth City State University	University of Massachusetts Amherst
Florida International University	University of Michigan-Ann Arbor
Harvey Mudd College	University of Michigan-Flint
Kean University	University of Missouri-Columbia
Miami Dade College	University of Nebraska at Kearney
Miami University-Oxford	University of Nebraska at Omaha
New Mexico State University-	University of Nevada-Reno
Main Campus	University of New Mexico
Radford University	University of Pittsburgh
Saint Joseph's University	University of Puerto Rico at Mayaguez
Sonoma State University	University of Puget Sound
Spelman College	University of South Florida-Main Campus
Stanford University	University of Texas at El Paso
SUNY College at Plattsburgh	University of Utah
Syracuse University	Virginia Tech
Texas A&M Corpus Christi	Washington and Lee University
Texas A&M University	Washington University in St Louis
Texas Southern University	Wellesley College
Texas State University- San Marcos	Western Oregon University
The University of Texas at Dallas	Worcester Polytechnic Institute
University of Akron Main Campus	Yale University

Results

Table 1. *Reasons for mentoring in an undergraduate research program.*

Which of the following reasons describe why you do or have done research with undergraduates?	DREU Mentor	Mentor for Other Formal Research Program
I want to help undergraduates advance professionally	92%	85%
I want to help members of underrepresented groups advance in computing research	85%	73%
Mentoring undergraduate students is personally important to me	77%	78%
I was asked by a student to be a faculty research mentor	58%	70%
I participated in research as an undergraduate and want to share that experience with current undergraduates	46%	34%
Undergraduate students help my research productivity	23%	50%**
I was asked by a colleague to be a faculty research mentor	19%	38%*
I was curious to find out what it would be like to be a faculty research mentor	12%	10%
Being a faculty research mentor help builds my tenure portfolio	8%	22%*

* p < .10 and ** p < .05; Comparison against DREU Mentor group is significantly different.

Note. Respondents could select more than one option.

Table 2. *Faculty activities as part of undergraduate research program.*

Which of the following faculty activities have taken place during your time as a mentor for each type of formal research experience for undergraduates?	DREU Mentor	Mentor for Other Formal Research Program
Hold regular individual meetings	81%	80%
Hold regular group meetings	65%	52%
Required final report	65%	35%**
Required faculty program report	50%	14%**

** p < .05; Comparison against DREU Mentor group is significantly different.
Note. Respondents could select more than one option.

Table 3. *Student activities as part of undergraduate research program.*

Which of the following student activities have taken place during your time as a mentor for each type of formal research experience for undergraduates?	DREU Mentor	Mentor for Other Formal Research Program
Interaction with graduate students and/or postdocs	80%	65%
Required presentations	77%	73%
Keep progress journal	73%	34%**
Prepare website	69%	25%**
Prepared research proposal	32%	34%

** p < .05; Comparison against DREU Mentor group is significantly different.
Note. Respondents could select more than one option.

Table 4. *Student outcomes.*

Among students you've mentored through undergraduate research, have any of the following occurred?	DREU Mentor	Mentor for Other Formal Research Program
Undergraduate student(s) went on to graduate school in computing	89%	80%
Undergraduate student(s) held authorship on a paper reporting research that you mentored	81%	67%
Undergraduate student(s) presented research that you mentored at a conference	65%	61%
Undergraduate student(s) received an external fellowship	31%	19%

** p < .05; Comparison against DREU Mentor group is significantly different.
Note. Respondents could select more than one option.

Table 5. *Reasons for no longer being a mentor.*

Think about why you no longer do research with undergraduate students, then rate your agreement vs. disagreement with the following statements: (1) Strongly disagree (2) Disagree (3) Neither agree nor disagree (4) Agree (5) Strongly Agree	Faculty who are no longer mentoring (n=19)
I don't have time	3.88**
I don't have grant money to support an REU	3.59**
I have little involvement with undergraduate students	2.81
I feel like students weren't motivated	2.60
Research is not suited to undergraduates	2.44
I found the experience to be frustrating	2.41
It didn't interest me	2.31
I don't feel like I did a good job	2.25
My involvement with undergraduate research was at a different institution or with a different position	1.94

** p < .05; Mean is significantly above the midpoint of the scale.

Summary

The findings from this report suggest that, relative to mentors of other formal undergraduate research programs:
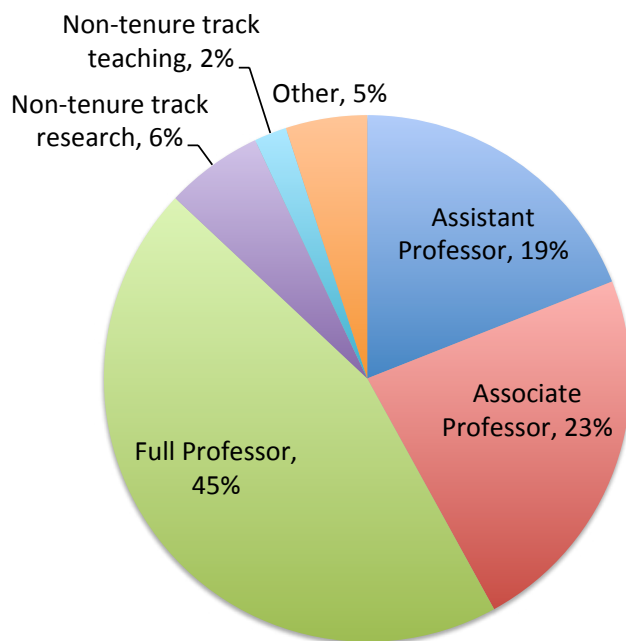
- DREU mentors are less likely to report external factors as their reason for being a mentor (e.g., promoting research productivity)

- DREU mentors are held more accountable for their role as a mentor (i.e., obligated to provide external reports)

- DREU students have greater requirements to document their research activities, particularly through a journal and a website

- DREU students are more likely to interact with graduate students and postdocs during their research experience (though this trend is not statistically significant)

- DREU students are more likely to publish and obtain external fellowships (though this trend is not statistically significant)

Findings also indicate that the primary reasons for why faculty decide to no longer be a mentor are constraints on resources, namely a lack of time and money.
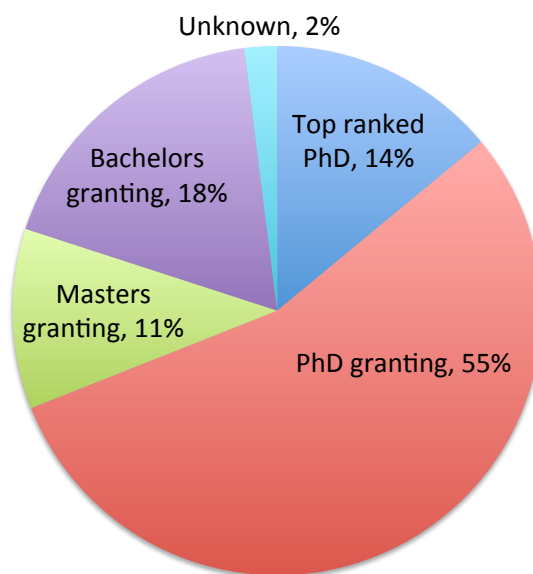
Appendix

The following is demographic information for the 121 faculty members whose data were analyzed in this report.
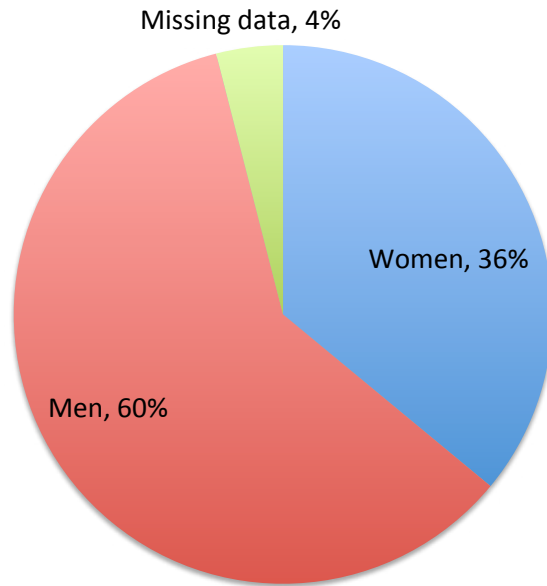
Faculty Rank

- Non-tenure track teaching, 2%
- Other, 5%
- Non-tenure track research, 6%
- Assistant Professor, 19%
- Associate Professor, 23%
- Full Professor, 45%

Type of institution from which faculty were sampled

- Unknown, 2%
- Top ranked PhD, 14%
- Bachelors granting, 18%
- Masters granting, 11%
- PhD granting, 55%

Faculty Gender

Missing data, 4%

Women, 36%

Men, 60%

Faculty Race

Missing data, 7%

Asian, 12%

Black or African American, 4%

Hispanic, Latina/o, Spanish origin, 5%

White, 72%