

## **ABSTRACT: 2017 ELAM Institutional Action Project Symposium**

**Project Title:** Strategic initiative for Biomedical Engineering faculty at the University of Cincinnati to enhance recruitment and career development

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University of Cincinnati

**Collaborators and Mentors:** Frank Gerner, Ph.D., Margaret Hanson, Ph.D., Alex Lentsch, Ph.D., Patrick Limbach, Ph.D., Louis Muglia, M.D., Ph.D., Teri Reed, Ph.D.

**Background and Significance of project:** Biomedical Engineering (BME) has the potential to become a major hub at the University of Cincinnati (UC) for translation of fundamental discoveries into the clinical arena. In general, this discipline attracts some of the strongest engineering students (undergraduate and graduate), ties into multiple research funding agencies with the longest history of high investment (in health and engineering fields), and has strong visibility for donors and societal impact.

**Purpose and Objectives:** The goal of this ELAM Institutional Action Project was to develop a robust process for faculty expansion and development in a planned Biomedical Engineering Department in the UC College of Engineering and Applied Sciences (CEAS), with support from the College of Medicine (COM), and Cincinnati Children's Hospital Medical Center (CCHMC). A long-term strategy was developed to determine a sustainable number of BME faculty, leverage BME faculty hires to improve interdisciplinary research programs at COM, CCHMC, and CEAS, revitalize the BME undergraduate and graduate educational programs, and support BME faculty development with laboratories spanning two colleges (COM and CEAS) and two institutions (UC and CCHMC).

**Methods and Approach:** UC BME educational enrollment and faculty appointment data were collected and compared to data from the American Society of Engineering Education Office of Assessment, Evaluation, and Institutional Research database. The UC BME undergraduate student/faculty ratio was benchmarked against regional institutions, as well as universities with similar 2015 total institutional research expenditures. Current UC BME program faculty were interviewed to determine what faculty development opportunities have been provided, how faculty prepared for teaching their first course, how collaborators were found, whether they sought advice regarding research, teaching, service, or leadership, and what characteristics and ideal BME departmental faculty development program would possess.

**Outcomes and Evaluation Strategy:** An individual development plan (IDP) template was created to provide a planning process for faculty to help them identify career goals, objectives necessary for achieving career goals, professional development needs, and progress toward achieving the career goals. Identifying short-term objectives gives the faculty member a clearer sense of their own expectations and helps define milestones along the way to achieving specific goals. The IDP template and process provides a tool for communication between the faculty member and their mentorship committee.

**Potential impact and Conclusion:** Within 10 years of the formation of the BME Department, the impact on UC will be an increase in research funding, an increase in student quality and student number, an increase in intellectual property filings, and perhaps most importantly a strengthened culture for interdisciplinary work that positively impacts patient health.

# Biomedical Engineering Program Benchmarking and Faculty Development

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## Background and Significance

Biomedical Engineering (BME) has the potential to become a major hub at the University of Cincinnati (UC) for translation of fundamental discoveries into the clinical arena. In general, this discipline attracts some of the strongest engineering students (undergraduate and graduate), ties into multiple research funding agencies with the longest history of high investment (in health and engineering fields), and has strong visibility for donors and societal impact.

## Purpose and Objective

- To develop a robust process for faculty expansion and development in a planned Biomedical Engineering Department in the UC College of Engineering and Applied Sciences (CEAS), with support from the College of Medicine (COM), and Cincinnati Children's Hospital Medical Center (CCHMC).
- To develop a long-term strategy to determine the number of BME faculty needed to improve interdisciplinary educational and research programs at COM, CCHMC, and CEAS, and support BME faculty development with laboratories spanning two colleges (COM and CEAS) and two institutions (UC and CCHMC).

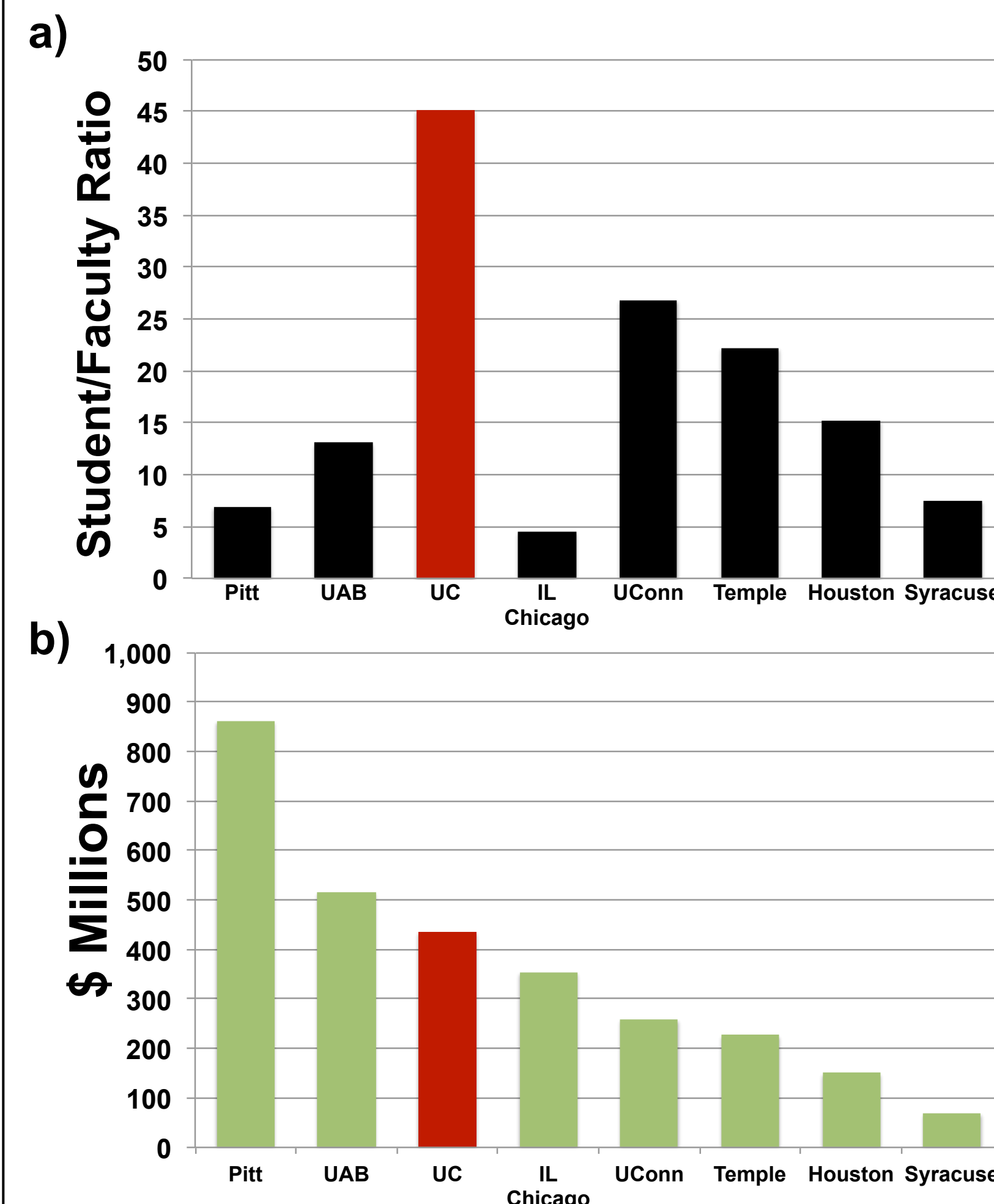
## Methods

- UC BME educational enrollment and faculty appointment data was collected and compared to data from the American Society of Engineering Education database [1].
- UC BME undergraduate student/faculty ratio was benchmarked against urban universities, regional institutions, as well as universities with similar 2015 total institutional research expenditures [2].
- Current UC BME program faculty were interviewed to determine what faculty development opportunities have been provided and what characteristics an ideal BME departmental faculty development program would possess.

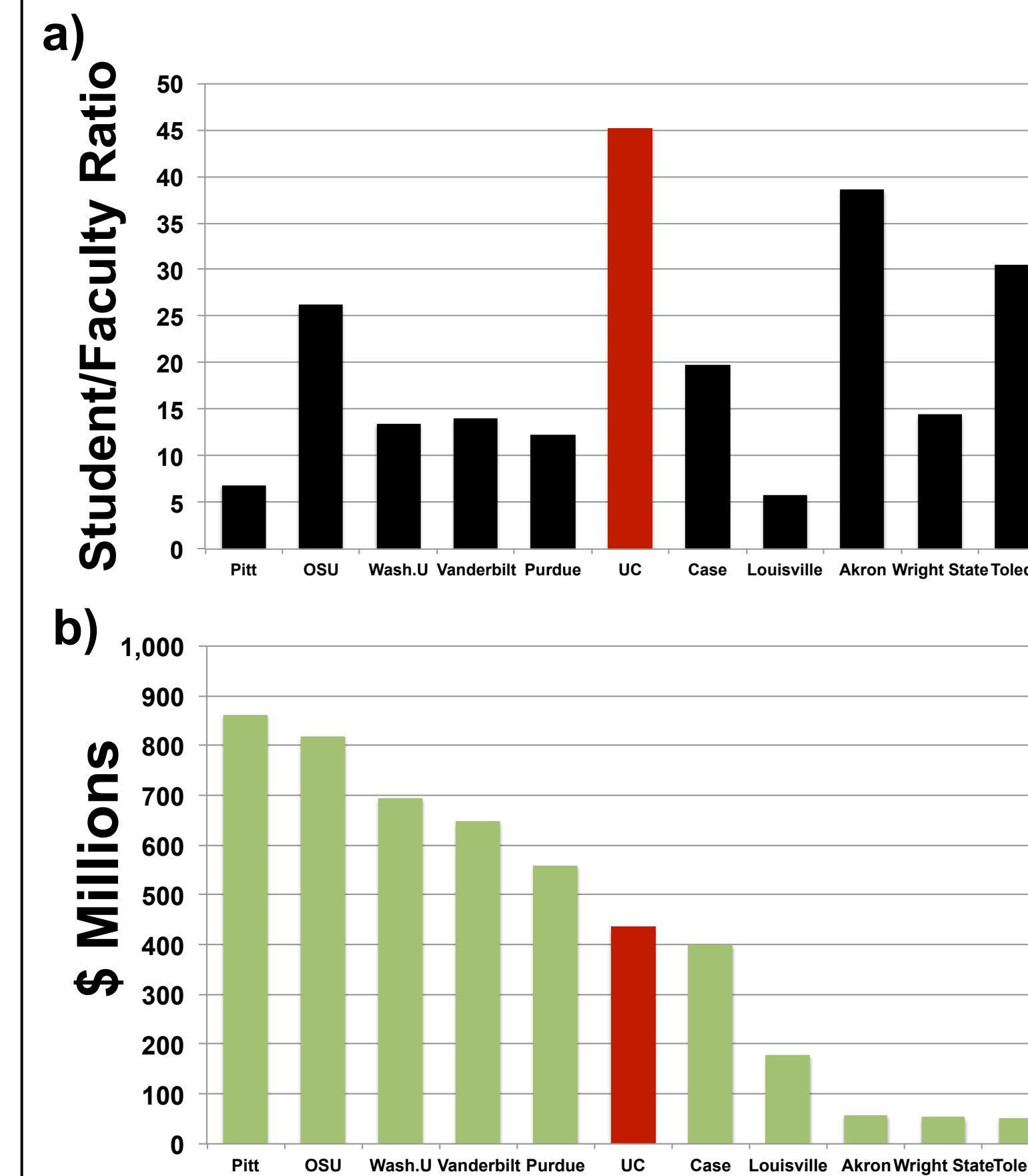
## Outcomes

57% (4 of 7) survey participation by UC BME faculty, who identified the following support would be helpful:

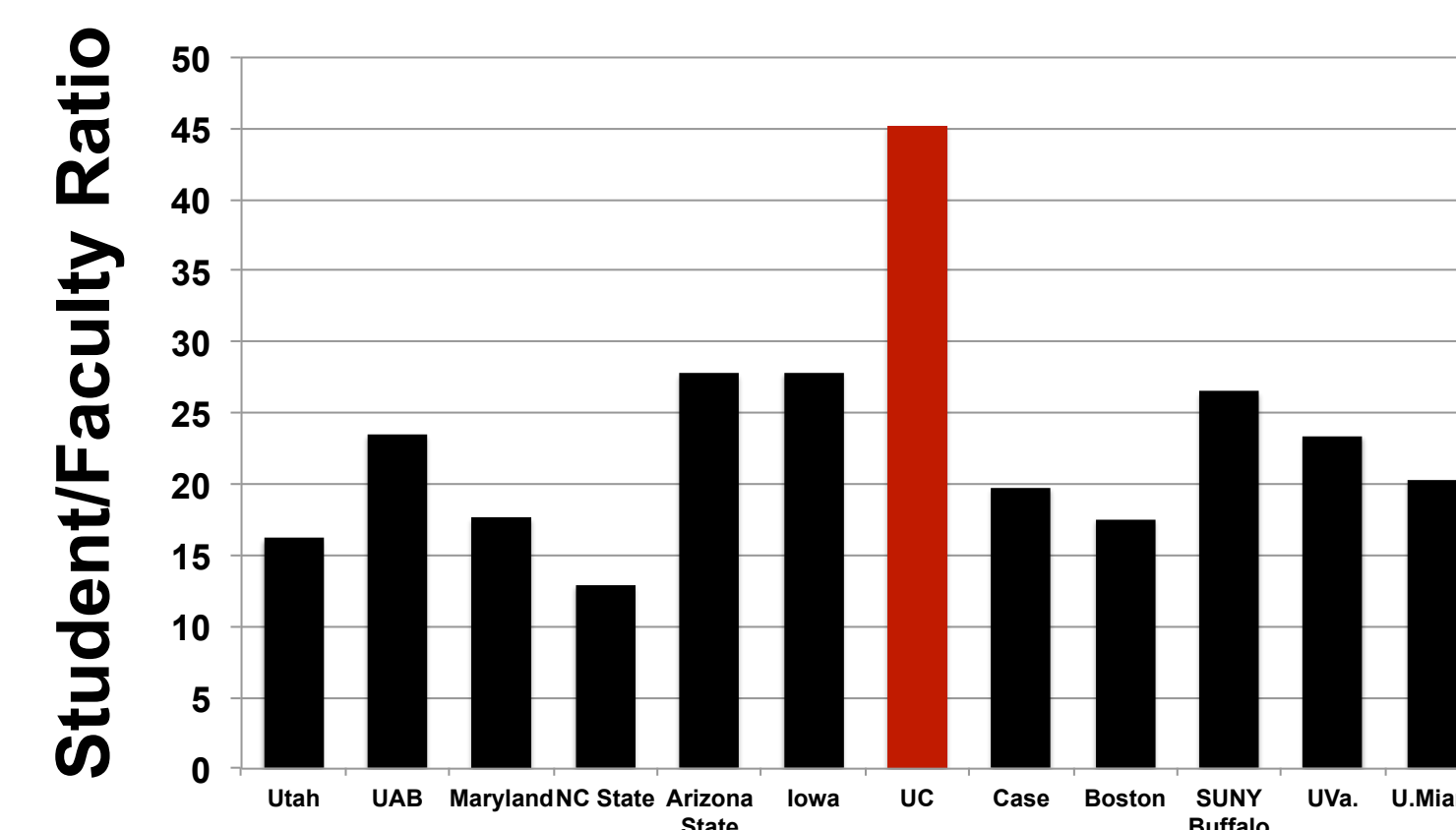
- Faculty mentorship program
- Research infrastructure funding
- Pilot funds for "Just in Time" data collection to improve extramural funding grant success
- Co-location of faculty research laboratories to enhance collaboration
- Inclusion of BME faculty in faculty search committees
- Development of faculty handbook with list of resources for new faculty



**Figure 1.** a) Undergraduate student to academic track faculty ratios in urban universities b) 2015 research expenditures in urban universities.



**Figure 2.** a) Undergraduate student to academic track faculty ratios in Midwest universities b) 2015 research expenditures in Midwest universities.



**Figure 3.** Undergraduate student to academic track faculty ratios in universities with 5<sup>th</sup> - 7<sup>th</sup> percentile 2015 research expenditures [2].

## Discussion

- Demonstrated need to expand UC BME academic track faculty from 7 to 18 - 21.
- An individual development plan (IDP) template was created for faculty to identify career goals, objectives necessary for achieving goals and professional development needs.
- Identifying short-term objectives gives the faculty member a clearer sense of their own expectations and helps define milestones along the way to achieving specific goals.
- The IDP process provides a tool for communication between the faculty member and their mentorship committee.

## Conclusions and Future Work

- Within 10 years of the BME Department formation, the impact on UC will be an increase in research funding, an increase in student quality and student number, an increase in intellectual property filings, and perhaps most importantly a strengthened culture for interdisciplinary work that positively impacts patient health.

## References

- American Society of Engineering Education Office of Assessment, Evaluation, and Institutional Research 2015 survey results.
- National Center for Science and Engineering Statistics 2015 academic institution rankings by total research and development expenditures: <https://ncesdata.nsf.gov/profiles/site?method=rankingBySource&ds=herd>

## Acknowledgements

This work was presented at the 2017 ELAM<sup>®</sup> Leaders Forum in Philadelphia, PA.