



October 31, 2018

Daniel A. Reed
Senior Vice President for Academic Affairs
205 Park Bldg.
Campus

RE: Graduate Council Review
Department of Mechanical Engineering

Dear Vice President Reed:

Enclosed is the Graduate Council's review of the Department of Mechanical Engineering. Included in this review packet are the report prepared by the Graduate Council, the Department Profile, and the Memorandum of Understanding resulting from the review wrap-up meeting.

After your approval, please forward this packet to President Ruth Watkins for her review. It will then be sent to the Academic Senate to be placed on the information calendar for the next Senate meeting.

Sincerely,

David B. Kieda
Dean, The Graduate School

Encl.

XC: Bruce K. Gale, Chair, Department of Mechanical Engineering
Richard B. Brown, Dean, College of Engineering

The Graduate School
201 Presidents Circle, Room 302
Salt Lake City, Utah 84112-9016
(801)581-7642
FAX (801)581-6749
<http://www.gradschool.utah.edu>

The Department of Mechanical Engineering

Faculty were lauded for their productive scholarship and dedication to teaching. With increases in faculty numbers, the need for mentorship, as well as measures to ensure retention, was highlighted. To accommodate departmental growth, an expansion (Phase III) of the Rio Tinto Kennecott Mechanical Engineering building is necessary. Student satisfaction is high, but specific ways to improve the graduate program have been identified and are being implemented. Recruitment and retention of students and faculty from underrepresented groups continues to be an important goal.

The Graduate School - The University of Utah

GRADUATE COUNCIL REPORT TO THE SENIOR VICE PRESIDENT
FOR ACADEMIC AFFAIRS AND THE ACADEMIC SENATE

March 26, 2018

The Graduate Council has completed its review of the **Department of Mechanical Engineering**.
The External Review Committee included:

Kenneth Goodson, PhD
Davies Family Provostial Professor
Bosch Chair, Mechanical Engineering Department
Stanford University

Jayathi Murthy, PhD
Ronald and Valerie Sugar Dean
Henry Samueli School of Engineering and Applied Science
University of California, Los Angeles

Per Reinhall, PhD
Chair, Department of Mechanical Engineering
University of Washington

The Internal Review Committee of the University of Utah included:

Vincent Cheng, PhD
Professor
Department of English

Olivia R. Sheng, PhD
Presidential Professor
Department of Operations and Information Systems

Karen S. Wilcox, PhD
Professor and Chair
Department of Pharmacology and Toxicology

This report of the Graduate Council is based on the self-study submitted by the Department of Mechanical Engineering, the reports of the external and internal review committees, and a joint response to the external and internal reports from the Chair of the Mechanical Engineering Department and Dean of the College of Engineering.

DEPARTMENT PROFILE

Program Overview

The Department of Mechanical Engineering (ME) became a degreed program at the University of Utah in 1905 and is part of the College of Engineering. The Department is chaired by Professor Tim Ameal. There are four research divisions within the Department with an appointed chair for each: 1) Thermal Fluid and Energy Systems, 2) Solid Mechanics, 3) Design, Ergonomics, Manufacturing, and Systems, and 4) Robotics and Controls. The Department offers BS, MS, and PhD degrees, with ME being the largest undergraduate major in the College (4th largest in the University). Options at the graduate level include two certificate programs in Mechatronics and Systems Engineering and a single track in Robotics. There are 41 full-time and 6 part-time faculty in the Department. Since the last review, there has been a substantial expansion of faculty, with approximately 18 new faculty lines added to the Department through Engineering Initiative funding in 2012, 2015, and 2017. The Department is housed primarily in the Rio Tinto Kennecott Mechanical Engineering Building, which has undergone two of three planned phases of major renovation.

Faculty

The full-time faculty include 4 full professors, 15 associate professors, 16 assistant professors, 5 career-line assistant professors, and 1 associate professor-lecturer. The six part-time faculty range from distinguished professor to research assistant professor. All reports were in agreement that the Department has been substantially strengthened by the recruitment of numerous junior faculty over recent years. A relatively large number of faculty hires is planned for the next several years (i.e., eight new lines to be filled in the near future). The external reviewers stressed the need for strategic planning to guide future hiring. These reviewers suggested that specific "thrust areas" be identified to serve as a thematic basis for increasing the Department's national prominence through new hires. The current strategic plan, referred to in the Chair and Dean's response letter, specifies several areas of potential interest for future searches; these areas could be honed and prioritized, with an eye toward raising the Department's profile, as part of updated strategic planning.

Of the 21 tenure-line faculty hires since 2010, six have been women. The current percentage of women faculty in the Department is reportedly higher than the national average for ME departments. The new faculty represent a wide range of nationalities, with only 10 of the 21 recent hires being from the United States. Increasing faculty diversity was a recommendation of the previous review and overall diversity has increased since that time (92% Caucasian in 2010-2011 vs. 82% Caucasian in 2017-2018; departmental self-study, Table 2.1). Overall, the departmental faculty remains less diverse in terms of race/ethnicity than the average of all United States ME departments (i.e., 56% Caucasian). The departmental self-study recognizes that challenges remain concerning faculty diversity.

The faculty reportedly value teaching (internal report) and teaching evaluations across the Department are good. Notably, several faculty have won various teaching awards. Teaching loads are considered to be appropriate for tenure-line faculty. Research productivity has improved since the last review as demonstrated by increases in mean number of publications, presentations, and grant funding.

By all accounts, the faculty are collegial and morale is good. Dr. Ameal's leadership was praised by all and was considered to contribute to the positive faculty attitude. The external report indicated that mentoring of junior faculty appeared "strong and well structured". However, the internal report noted some concerns over relatively few full professors available for mentoring a large number of assistant professors; adequacy of mentoring reportedly varies across the research divisions. In addition, the external reviewers noted a need to improve mentoring of associate professors. Related to mentoring, a common concern raised by the external and internal reviewers was retention of junior faculty as they gain national prominence. That is, the Department was encouraged to be proactive relative to probable future retention challenges.

Students

There has been a 36% increase in the number of undergraduates since the last review, with over 800 current majors. The undergraduate students reportedly praised the quality of the faculty and their instruction, the availability of research opportunities, the accessibility of scholarships and the quality of advising. However, the students identified a need to increase advisor availability and suggested that more advisors were needed. From 2011 to 2017, the percentage of women undergraduates has increased from 6% to 13% and the percentage of minority undergraduates has increased from 19% to 27% (self-study, Table 3.1).

The number of graduate students increased by approximately 18%, from 187 graduate students in 2011 to 220 in 2017. The Department's graduate students indicated that the Department was supportive, faculty instruction was strong, and advising was good. The graduate students expressed a desire to be supported as RAs rather than TAs. The external reviewers suggested that the "unusually long time to graduation" for doctoral students was likely related to reliance on TA funding rather than RA funding. Differing levels of graduate student salary and differential tuition across advisors and departments was noted as a concern. Since 2011, the percentage of women graduate students has increased from 4% to 11% and the percentage of students who identified as ethnic/racial minorities increased from 9% to 16% (excluding non-U.S. citizens and students with unknown ethnicities). Comparative data concerning the racial and ethnic diversity of the ME students relative to students from similar universities were not readily available.

The Department has identified increasing recruitment and retention of women and racially/ethnically diverse students as an important goal. They have recently implemented several measures to achieve this goal, such as an "Inclusion in Engineering Luncheon," monthly "Women in Mechanical Engineering Lunches," a peer mentoring program, and diversity training for advisors. The ME faculty also participate in College of Engineering initiatives focused on recruiting and retaining students from traditionally underrepresented groups. Although inroads have been made toward improving diversity, challenges remain.

Overall, undergraduate and graduate student satisfaction was reported to be good, which is consistent with high student retention rates.

Curriculum

The ME program describes itself as a day program with courses offered in a traditional lecture/laboratory format. In order to accommodate engineers from local firms, some senior electives and many graduate courses are taught in late afternoons or evenings. Distance learning is offered for a few graduate classes.

The Department has an active Curriculum Committee that has taken a comprehensive approach to curriculum evaluation and improvement. The Department's self-study details major modifications made to the curriculum since the last review. As noted previously, the graduate and undergraduate students generally expressed satisfaction with their programs, but a few suggestions and/or complaints were noted. The undergraduates indicated that ME is a very demanding major that can take longer than four years to complete. They also had concerns about some large class sizes. Suggestions were also made regarding a perceived need for increased electives and summer offerings. The graduate students reported that heavy course loads and homework demands could interfere with research participation.

Space and resource challenges currently appear to impact curriculum. A need for expansion of teaching laboratories and the machine shop were noted by reviewers. The planned third phase of the Rio Tinto Kennecott renovation may alleviate curriculum concerns that relate to space and resources (see Facilities and Resources below).

Program Effectiveness and Outcomes Assessment

The Department utilizes a comprehensive continuous improvement process that includes regular outcomes assessment and facilitates program change. Effectiveness and outcome data are collected from a variety of sources; these data are then utilized at various departmental levels for program improvement. Although this process was praised by the internal reviewers, they indicated that "because of high load and turnovers in the graduate advising office, outcome assessment data of the graduate program has not been consistent or well maintained."

No concerns were expressed regarding graduates obtaining employment or graduate school placements. The majority of graduates (undergraduate and graduate) remain in Utah. Demand for mechanical engineers is expected to remain high.

The Department identifies students, industry, alumni, and faculty as its primary constituencies. Although the College of Engineering has an industry advisory board (IAB), a need for a department-specific IAB was noted. The Chair and Dean reported that a department IAB is being developed and the first board meeting is planned to coincide with the Department of Mechanical Engineering Design Day (April 2018).

Facilities and Resources

As indicated, ME is housed primarily in the Rio Tinto Kennecott Mechanical Engineering Building. Concern over space was expressed at all levels, particularly in the face of the substantial planned faculty expansion. According to the Chair and Dean's response, the planned third phase of the Mechanical Engineering build out will provide approximately 15 offices and 9-12 labs at a cost of ~\$7M (to be funded by the College and Department). Reportedly, Phase 3 planning will begin in Summer 2018 with a target completion date of Summer 2020.

According to all reports, the substantial growth of the faculty and student body has created increased demands on staff. Unfortunately, there has not been a corresponding growth in staff and, according to all reviewers, the Department is seriously understaffed. Needed expansion of staff in key areas such as advising, fiscal support, and the machine shop was noted. The Chair and Dean recognized the need for additional staff and reported that a .5 FTE undergraduate advisor hire was planned but "problematic" finances restricted other staff hiring. Additional recommendations concerning staff included increased engagement of staff in departmental planning and management as well as regular evaluations.

COMMENDATIONS

1. The Department has made outstanding changes since the last review and is viewed as being "vibrant, growing and healthy" (external review). The successful hiring of numerous excellent faculty as part of a major departmental expansion is laudatory. Other notable changes include increased numbers of students, improved facilities, and increased faculty productivity.
2. The faculty are reportedly collegial and collaborative, dedicated to teaching, productive in terms of scholarship and valued by their students. The departmental leadership has been excellent, which contributes to positive morale.
3. Students report high levels of satisfaction with their educational experience, including classroom instruction, research opportunities, and quality of advising.
4. The Department is on an excellent trajectory to make substantial gains in national prominence. Plans for additional, substantial faculty expansion and further renovation of the Mechanical Engineering building provide momentum for building an even more robust department. Furthermore, continued strong development of a large number of junior faculty will advance departmental recognition.

RECOMMENDATIONS

1. Increases in support staff and expansion of space (e.g., teaching and research labs, offices, machine shop) are needed to support past and future growth of the Department. Completion of the final phase of renovation of the Mechanical Engineering building is considered essential. Funding models to provide adequate staffing should be devised.
2. A strategic plan should be developed to inform "future hiring, research thrust areas, and the expansion of...academic programs" (external review). Expansion plans should align with plans to enhance the Department's national prominence and address challenges associated with departmental growth (e.g., maintaining excellent teaching quality in the context of increasingly large numbers of undergraduate students). The upcoming change in departmental administration should provide a well-timed opportunity to conduct such planning.
3. The Department has identified recruitment and retention of students and faculty from traditionally underrepresented groups as an important goal. Various measures to achieve this goal have been implemented and progress has been made toward improving diversity. However, challenges remain and efforts should be continued and expanded.
4. Plans for a departmental Industry Advisory Board should be brought to completion and leveraged for assistance with career mentoring, student placements, and fund raising.
5. Improvements to the graduate program should be prioritized and implemented, appraising such aspects as TA training, pre- and post-graduation tracking, programs of study, and the PhD funding model and pay structure.
6. Future retention challenges should be addressed through development and implementation of proactive strategies such as those described by the external reviewers.

Submitted by the Ad Hoc Committee of the Graduate Council:

Julie L. Wambaugh (Chair)
Professor, Department of Communication Sciences and Disorders

Isabel Dulfano
Associate Professor, Department of World Languages and Cultures

Christopher A. Reilly
Associate Professor, Department of Pharmacology and Toxicology

Marissa L. Diener (Undergraduate Council Representative)
Associate Professor, Department of Family and Consumer Studies

College Name
College of Engineering

Department Name
Mechanical Engineering

Program
All

Faculty Headcount

		2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
With Doctoral Degrees Including MFA and Other Terminal Degrees	Full-Time Tenured Faculty	12	13	14	13	14	14	16
	Full-Time Tenure Track	11	10	10	13	12	14	15
	Full-Time Career Line/Adjunct Faculty	5	5	5	4	4	3	4
	Part-Time Tenure/Tenure Track	3	3	3	3	5	5	5
	Part-Time Career Line/Adjunct Faculty	4	4	4	4	2	6	4
	Total	35	35	36	37	37	42	44
With Masters Degrees	Full-Time Tenured Faculty							
	Full-Time Tenure Track							
	Full-Time Career Line/Adjunct Faculty							
	Part-Time Tenure/Tenure Track							
	Part-Time Career Line/Adjunct Faculty							
	Total							
With Bachelor Degrees	Full-Time Tenured Faculty							
	Full-Time Tenure Track							
	Full-Time Career Line/Adjunct Faculty	0	0	1	0	0	0	0
	Part-Time Tenure/Tenure Track							
	Part-Time Career Line/Adjunct Faculty							
	Total	0	0	1	0	0	0	0
Total Headcount Faculty	Full-Time Tenured Faculty	12	13	14	13	14	14	16
	Full-Time Tenure Track	11	10	10	13	12	14	15
	Full-Time Career Line/Adjunct Faculty	5	5	6	4	4	3	4
	Part-Time Tenure/Tenure Track	3	3	3	3	5	5	5
	Part-Time Career Line/Adjunct Faculty	4	4	4	4	2	6	4
	Total	35	35	37	37	37	42	44

Cost Study

	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Direct Instructional Expenditures	4,283,428	4,841,081	4,885,625	5,397,698	5,610,497	6,136,823	6,760,844
Cost Per Student FTE	9,410	10,931	10,410	10,901	10,620	10,933	11,248

FTE from Cost Study

	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Full-Time	30	29	27	34	34	41	49
Part-Time	2	1	2	1	3	5	3
Teaching Assistants	0	1	1	1	0	0	0

Funding

	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Total Grants	2,649,141	2,647,197	3,501,831	3,252,804	3,400,778	3,861,095	6,153,145
State Appropriated Funds	4,133,753	4,309,665	4,374,785	4,702,313	5,222,002	5,193,487	6,290,449
Teaching Grants	274,776	120,606	24,226	65,215	66,216	66,768	401,696
Special Legislative Appropriation							

Differential Tuition

Student Credit Hours and FTE

		2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
SCH	Lower Division	2,639	2,810	3,552	3,691	4,497	4,734	4,535
	Upper Division	6,339	6,033	5,937	7,008	7,735	8,378	8,578
	Basic Graduate	1,901	1,827	1,761	1,540	1,239	1,346	1,836
	Advanced Graduate	1,219	1,136	1,300	1,231	1,172	1,139	1,444
FTE	Lower Division	88	94	118	123	150	158	151
	Upper Division	211	201	198	234	258	279	286
	Basic Graduate	95	91	88	77	62	67	92
	Advanced Graduate	61	57	65	62	59	57	72
FTE/FTE	LD FTE per Total Faculty FTE	3	3	4	3	4	3	3
	UD FTE per Total Faculty FTE	6	6	7	6	7	6	5
	BG FTE per Total Faculty FTE	3	3	3	2	2	1	2
	AG FTE per Total Faculty FTE	2	2	2	2	2	1	1

Enrolled Majors

	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Undergraduate Pre-Majors	252	318	192	137	121	150	162
Undergraduate Majors	431	402	624	680	740	800	747
Enrolled in Masters Program	144	132	119	112	87	78	95
Enrolled in Doctoral Program	64	79	87	89	83	99	117
Enrolled in First-Professional Program							

Degrees Awarded

	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Undergraduate Certificate	0	0	0	0	1	0	1
Graduate Certificate	6	2	6	9	1	0	0
Bachelors	126	130	121	128	138	141	182
Masters	63	57	68	44	57	36	40
Doctorate	6	11	8	6	11	8	10
First-Professional							



Memorandum of Understanding Department of Mechanical Engineering Graduate Council Review 2017-18

This memorandum of understanding is a summary of decisions reached at a wrap-up meeting on August 8, 2018, and concludes the Graduate Council Review of the Department of Mechanical Engineering. Daniel A. Reed, Senior Vice President for Academic Affairs; Richard B. Brown, Dean of the College of Engineering; Bruce K. Gale, Chair of the Department of Mechanical Engineering; Timothy A. Ameal, Former Chair of the Department of Mechanical Engineering; David B. Kieda, Dean of the Graduate School; and Katharine S. Ullman, Associate Dean of the Graduate School, were present.

The discussion centered on but was not limited to the recommendations contained in the review summary report presented to the Graduate Council on March 26, 2018. The working group agreed to endorse the following actions:

Recommendation 1: Increases in support staff and expansion of space (e.g., teaching and research labs, offices, machine shop) are needed to support past and future growth of the Department. Completion of the final phase of renovation of the Mechanical Engineering building is considered essential. Funding models to provide adequate staffing should be devised.

The Department was able to hire a new advisor this past Spring, but to keep up with the demands of their growth, they are still in need of a lab technician and a staff member for grant support. There had been a plan to budget for such hires with funds obtained through differential tuition on lower division classes. A full plan for this expansion of differential tuition previously progressed through several stages, but was paused prior to bringing forward for final approval. Dean Brown emphasized the expensive nature of training in engineering and the benefit of collecting these funds to offset costs, but future conversation will be needed to determine how to proceed. Given the current uncertainty, alternative funding models should be considered for the shorter term. With regard to expansion of space, much of the funding needed is already secured and there is an overall plan in place for the third phase of a very successful renovation of the Kennecott Mechanical Engineering Building. Thus, the Department is poised to move forward on this expansion once permission at the University and State level is received. The Graduate School would like an update on this in one year given its emergence during the review as a critical priority.

Recommendation 2: A strategic plan should be developed to inform “future hiring, research thrust areas, and the expansion of...academic programs” (external review). Expansion plans should align with plans to enhance the Department’s national prominence and address challenges associated with departmental growth (e.g., maintaining excellent teaching quality in the context of increasingly large numbers of undergraduate students). The upcoming change in departmental administration should provide a well-timed opportunity to conduct such planning.

The Department has a strategic plan that was developed in 2015 and is revisited annually. This plan identifies several areas of interest for future hiring. The former and current chair acknowledge the benefit of honing this list further to identify priority areas as themes for cluster hires, as suggested by external reviewers. Yet, this has to be balanced with practical considerations, such as the challenge of becoming too targeted in faculty searches and other constraints (e.g., with space currently so restrictive, in the nearer term it may be most practical to look for faculty whose research emphasis is computational in nature). At the departmental retreat planned for August 2018, refinement of strategic hiring plans will take place. Stemming from the topic of faculty hires, the group also discussed the benefit of collaborations with the School of Medicine; this partnership is already established but potentially could be further leveraged. Related to this, the Department has discussed the possibility of creating an Industrial Engineering degree, which would involve transdisciplinary links to areas such as Occupational and Environmental Health as well as Rehabilitative Medicine. This should be integrated into an updated strategic plan in the near future.

Recommendation 3: The Department has identified recruitment and retention of students and faculty from traditionally underrepresented groups as an important goal. Various measures to achieve this goal have been implemented and progress has been made toward improving diversity. However, challenges remain and efforts should be continued and expanded.

There has been good progress here; notably, the proportion of female faculty has significantly increased and is above the national average. Building on this success and further increasing faculty diversity will require proactive measures, but will benefit from having a critical threshold that creates momentum. It was noted that there has recently been a proliferation of new Mechanical Engineering degree programs in Utah, creating an overall challenge for recruiting that will likely impact the recruitment of diverse students as well. The Department is very active in outreach efforts, including ‘Discover Engineering’ across the state as well as the central role they play in the First Robotics competition. While the increase in state-wide choices for this degree is a challenge, it is also regarded as an opportunity to become a premier program that attracts students of the highest caliber both from within Utah and from out of state. Given the shifting landscape, vigorous marketing of the distinctive advantages that the Department and University offer will be especially critical, and having a direct admissions path can be leveraged to competitive advantage. Outreach to underrepresented students will also need to adapt (e.g., highlighting unique diversity resources at the University) and be increased (e.g., potentially including out-of-state events) in light of this new context. Scholarships may become increasingly important as well, which is touched on in Recommendation 6.

Recommendation 4: Plans for a departmental Industry Advisory Board should be brought to completion and leveraged for assistance with career mentoring, student placements, and fundraising.

This suggestion was well-received and plans to create such a board are underway, with invitations expected to go out this Fall (2018). Although not specifically discussed at the wrap-up meeting, keeping diversity in mind as much as possible in the selection of Industry Advisory Board members would be helpful to the Department's goals of recruitment and retention described in Recommendation 3.

Recommendation 5: Improvements to the graduate program should be prioritized and implemented, appraising such aspects as TA training, pre- and post-graduation tracking, programs of study, and the PhD funding model and pay structure.

The Department's Graduate Committee has been charged with assessing and addressing these issues, and several changes have already been implemented. These include more systematic graduate student tracking and interventional advising, and—as described in the Chair's response letter—an upcoming new process for TA training. A graduate advisor who has a PhD, Mark Fehlberg, was hired and is playing a key role in communication about milestones and creating the improvements that are underway. Dean Kieda expressed his gratitude for the constructive partnership with the Graduate School that has been facilitated by Dr. Fehlberg and the Director of Graduate Studies, Dr. Francoeur. The PhD pay structure, however, came up as a topic of concern at this meeting. In particular, it was felt that a pay structure determined by individual faculty members, which creates non-uniformity within the Department, was problematic. Additionally, the practice followed by some faculty members to have a tiered pay grade raised the concern of the potential for undue pressure to publish or to achieve certain results. The faculty, as a whole, should revisit the pay structure, which arose for historical reasons and needs to be addressed following contemporary standards. Dean Kieda mentioned that bumps in pay tied to graduate program milestones such as completing the qualifying exam are acceptable, although if adopted, this should be in a program-wide manner. Chair Gale said he would bring this topic to the upcoming faculty retreat. Clarifying the PhD funding model and pay structure would bring clarity to budgeting graduate student stipends in grant applications, and this discussion would also be a chance to address the external reviewers' observation that there may be too heavy a reliance on TA (vs RA) funding. Dean Kieda requested an update on the PhD funding model and pay structure in one year.

Recommendation 6: Future retention challenges should be addressed through development and implementation of proactive strategies such as those described by the external reviewers.

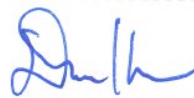
External reviewers specifically mentioned the need for endowed chair positions and faculty fellowships to help address retention challenges. While fundraising has focused on the Phase III expansion project, and some development activity remains for that, Dean Brown specifically expressed the notion that these priorities are not at odds. Rather, a new building project can be used to grow the donor base and galvanize them around the overall cause and excitement of the program. Dean Brown also felt that the College of Engineering was having good success in raising scholarship money. Thus, the outlook for development is optimistic and the Department and College should be in a position to deploy funds strategically.

Memorandum of Understanding
Department of Mechanical Engineering
Graduate Council Review 2017-18
Page 4

In closing comments, the Department's record of success in hiring great faculty was noted. At the same time, this brings up the need for proactive mentoring, especially as faculty progress to associate level rank. Faculty are taking advantage of several University- and College-wide opportunities that have been developed, including open discussions that Dean Brown holds in the College of Engineering about next steps after tenure. The Department also has a mentoring committee and is encouraging peer mentorship to complement other resources. Finally, a special thanks was given to outgoing chair, Tim Ameel. He has built a strong department that clearly impressed an illustrious panel of external reviewers and is on a very exciting trajectory.

This memorandum of understanding is to be followed by regular letters of progress, upon request of the Graduate School, from the Chair of the Department of Mechanical Engineering. Letters will be submitted until all of the actions described in the preceding paragraphs have been completed. In addition, a three-year follow-up meeting may be scheduled during AY 2020-21 to discuss progress made in addressing the review recommendations.

Daniel A. Reed
Richard B. Brown
Bruce K. Gale
Timothy A. Ameel
David B. Kieda
Katharine S. Ullman



David B. Kieda
Dean, The Graduate School
October 24, 2018