Administrative Activities Review: College of Engineering

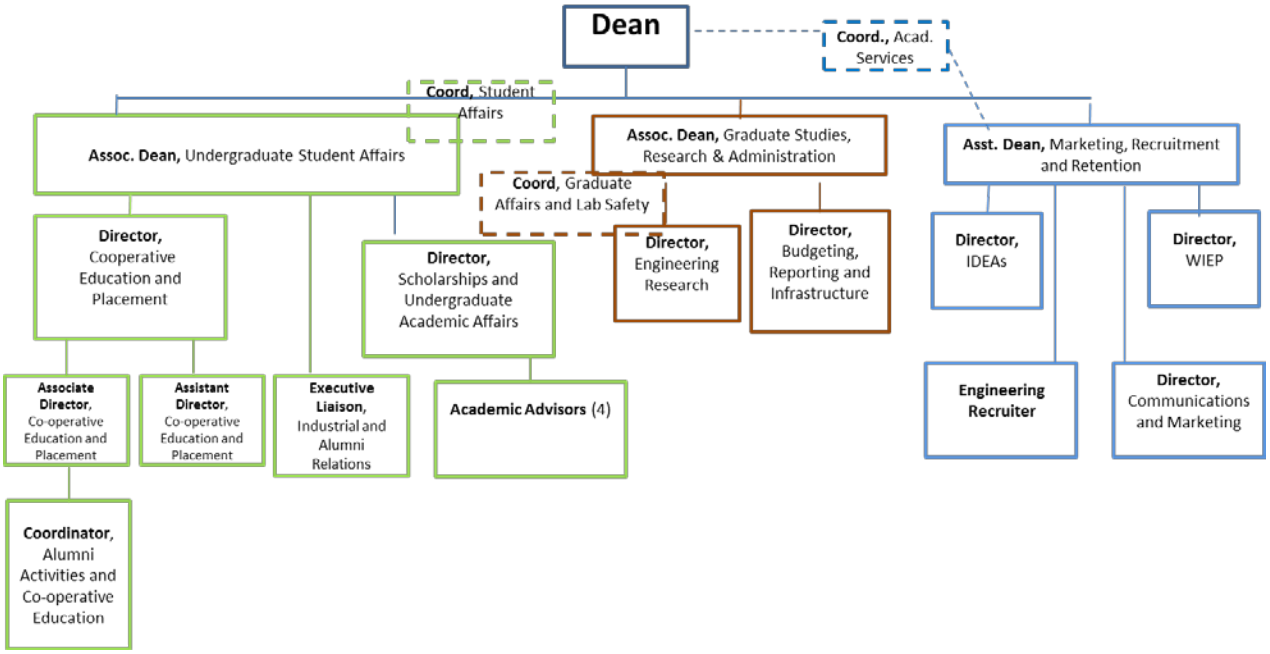
This review of the administrative functions within the College of Engineering has been separated into the following major areas:

- Undergraduate Studies and Advising
- Graduate Studies and Administration
- Recruiting, Retention and Marketing
- Women in Engineering Program
- Increasing Diversity in Engineering Academics (IDEAs)
- Co-operative Education and Placement
- Engineering Departments (5)

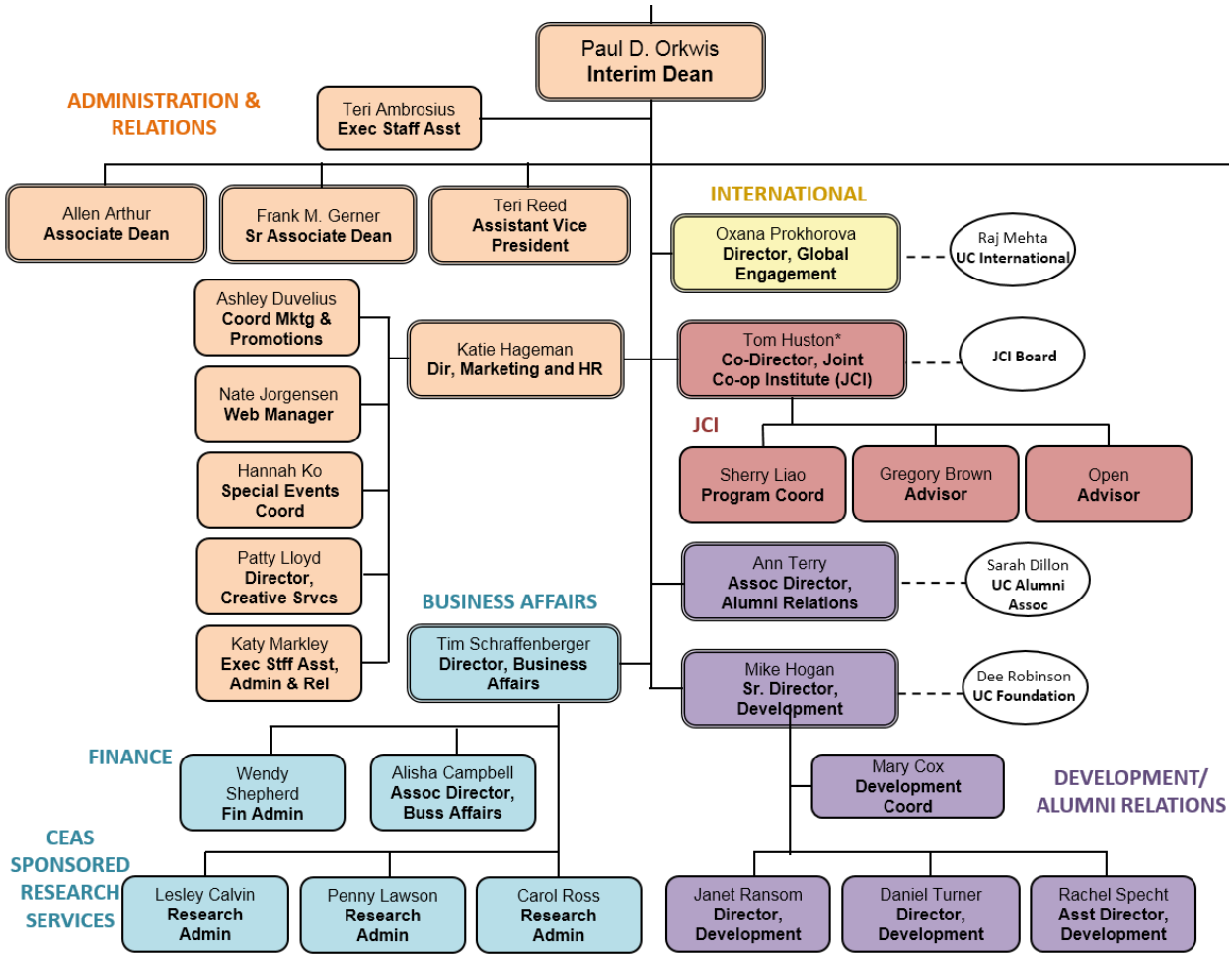
As such, each of the 11 areas will be reviewed separately. It is noted that there is some overlap between areas and this is described within the document. For example, the Women in Engineering Program is considered separately, though that program also reports through "Recruiting, Retention and Marketing".

Where applicable in each of the 11 documents, an organization chart is provided. Note that an organizational chart for the Engineering Dean's Office is provided below.

Administrative Structure, College of Engineering (Approved Plan)



By way of comparison, we provide the organizational chart for the College of Engineering at the University of Cincinnati (UC). We use UC because they have a similar enrollment (UA has 3250 engineering undergraduates, UC has about 3600) and similar co-op focus.



While there are a few people UA ENGR has that UC does not, they have many more people in places where we have none/few. A great contrast is in the Business Affairs area. In our College of Engineering, we have one person who does this – the Associate Dean for Graduate Studies and Administration. He gets some help (the added-on responsibilities) from our Director (Budgeting, Reporting and Infrastructure). At Cincinnati, they have a six person business staff in the college and none of them is the Associate Dean. This is not even to mention that some of the departments actually have their own business admin staff as well. Another contrast area is in Co-op. While we have a Director of Co-op at UA and three full-time employees in the college office, so does Cincinnati. However, Cincinnati also has full-time staff members in some departments as well (sometimes more than one…Mechanical Engineering has two co-op coordinators at UC in their department). Finally, UA ENGR has one Development Officer (Megan Hopper), while UC has six Development personnel (including an alumni person). At any rate, it is clear UA ENGR lags well behind UC in administrative staffing.

For completeness it is noted that the following two positions are not included in any of the 11 documents that are provided in the report: the Dean for the College of Engineering and the Coordinator, Academic Services. That information is provided below.

- Dr. Donald P. Visco, Jr., Dean: Provides oversight, leadership and direction to all areas of the College of Engineering.
- Mrs. Katey Yinger, Coordinator, Academic Services: Provides first point-of-contact for Engineering Dean's Office, provides service support to dean and assistant dean, manages various front office aspects of Engineering Dean's office.

In the 11 reports that follow this document, the picture painted is one where much administrative work is done within the unit, but staffing is in short supply. To patch over what needs to get done, faculty become involved in administrative work, while other items are placed on wish lists or future plans.

Owing to the timing and nature of the report, a detailed conversation and interaction with the BUF could not occur for the AAR. Thus, these reports should be looked at as a snapshot, but not a deep dive.

Undergraduate Studies and Advising – College of Engineering

Basic Facts and Description of the Unit

Mission

The Undergraduate Studies and Advising area of the College of Engineering provides the administrative home for advising, scholarships, co-operative education and placement, plus all paperwork associated with undergraduate students. The unit's mission is to provide top-quality, student-friendly services to meet the needs of the constituencies it serves.

Primary Services

We identify three primary services in the area of Undergraduate Studies and Advising. They include the following: advising, undergraduate services and scholarships.

1. **Advising services for students**. Estimated at about 1500 per year use services (mandatory *freshman* advising for DA; mandatory advising for all non-DA).

2. **Undergraduate services.** This primary service is wide and varies, interacting with students and others in many different areas. It services the more than 3000 undergraduate students in the College of Engineering. A sampling of the major services in this area include the following:
    - Inter-College Transfer – communication, advising and form processing
    - Exit interviews with students leaving ENGR
    - Late Add/Drop
    - Retroactive Withdrawal
    - Transient Permission Review/Approval
    - Transfer course equivalency evaluation
    - 4th Attempt for course enrollment
    - Probation/Suspension/Dismissal (AGOC)
    - Late Graduation Application/Degree Plan Change
    - Degree Clearance Report
    - Grade Changes
    - Gen Ed Program Change
    - Documents for Saudi Arabian Cultural Ministry (SACM)
    - Curriculum Proposals
    - Enrollment Reports/Stop Out Lists

3. **Scholarships.** This area focuses on gathering scholarship applications through an on-line application, assigning applications to certain scholarships (based on award criteria)**,** dissemination of materials to departments/committees/advisory boards for scholarship selections, communications with students for "thank you" letters, communication with recipients, and interaction with the Office of Development. A scholarship database that matches the awardees to a particular scholarship needs to be managed as well. Typically, there are about 1000 scholarship applications in a given year and more than 100 awards to be managed.

Critical Partners

- Inside UA
  - Other advising units and Dean's Offices
  - Office of Financial Aid/Scholarships
  - Office of Development
  - Registrar's Office
  - Office of Admissions/New Student Orientation
  - International Program Office (SACM in particular)
  - Faculty Senate (curriculum proposals)
  - Institutional Research

- Outside UA
  - Local/regional community college partners

End Users and Customers: Undergraduate Students, High School Students (for scholarships) Faculty, COE Departments, Other Campus Offices

Key Performance Analysis and Assessment

In this section, we provide analysis of some key performance indications from each of the three primary services areas, plus a brief assessment.

1. Advising Services for Students

Only within the last few months has the College of Engineering expanded its formal advising ranks from one to four persons (with the addition of the University Admit students to the college). Accordingly, we have been tracking the work of the Freshman Advisor that was hired a few years ago.

During the last three years, the Freshman Engineering Advisor has averaged about 500 advisement appointments per year. According to NACADA, median advising load for institutions like Akron (i.e. public doctorate) is 285. Thus, the advising load on the Freshman Engineering Advisor is much larger than most other institutions. Additionally, it must be emphasized that all engineering faculty have an assigned advising load which is handled internal to their department.

2. **Undergraduate services.**

As was mentioned previously, undergraduate services handle an immense diversity in activities for more than 3000 undergraduate students. And since the number of students this office services has increased this year (with no additional resource provided – except advising), this is a very challenging situation into the future.

Workflow estimates in some major areas for this office are provided in Figure 1.

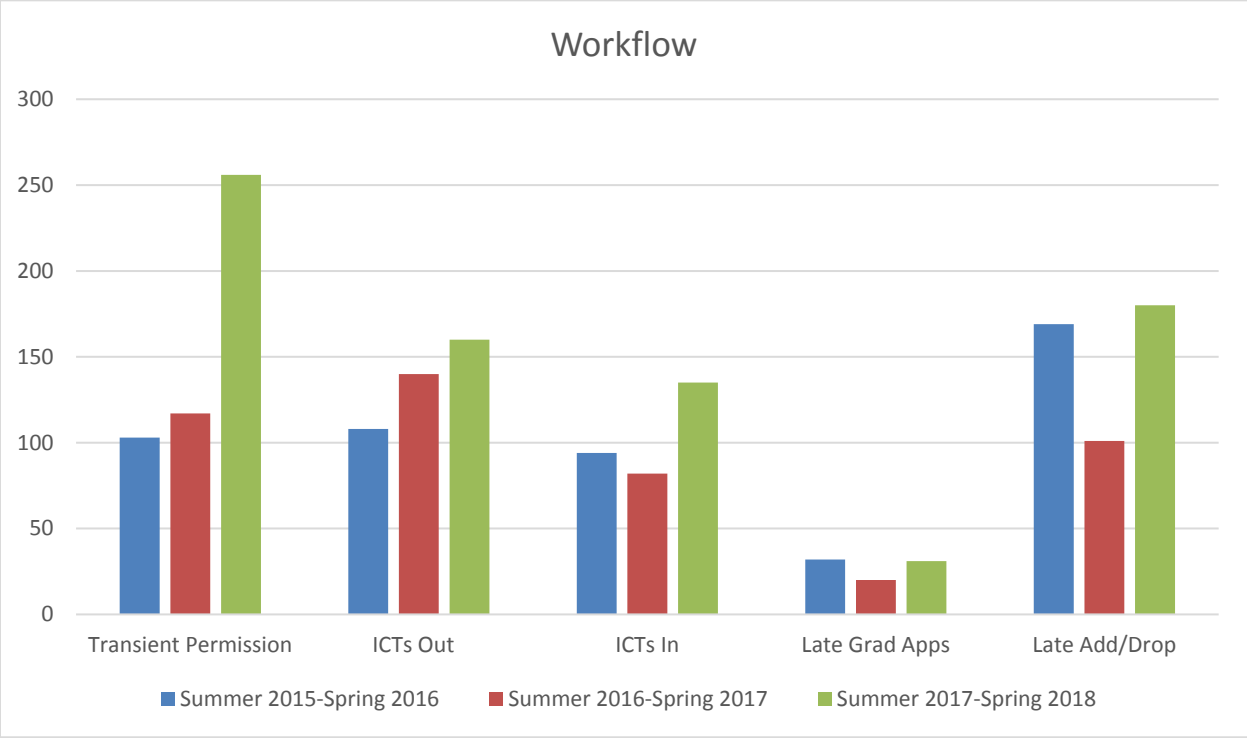


Figure 1: Amount of major paperwork items through undergraduate office

Additionally, this office is the place where students go who transfer out of the College of Engineering to pursue a different (non-engineering) major. Each of these students receive a "transfer" advising session, normally with the Associate Dean. At those meetings, the reasons for leaving an engineering major are discussed as we make sure students are making an informed decision about the choice to leave and their next major. The most popular reasons for leaving are provided in Figure 2.

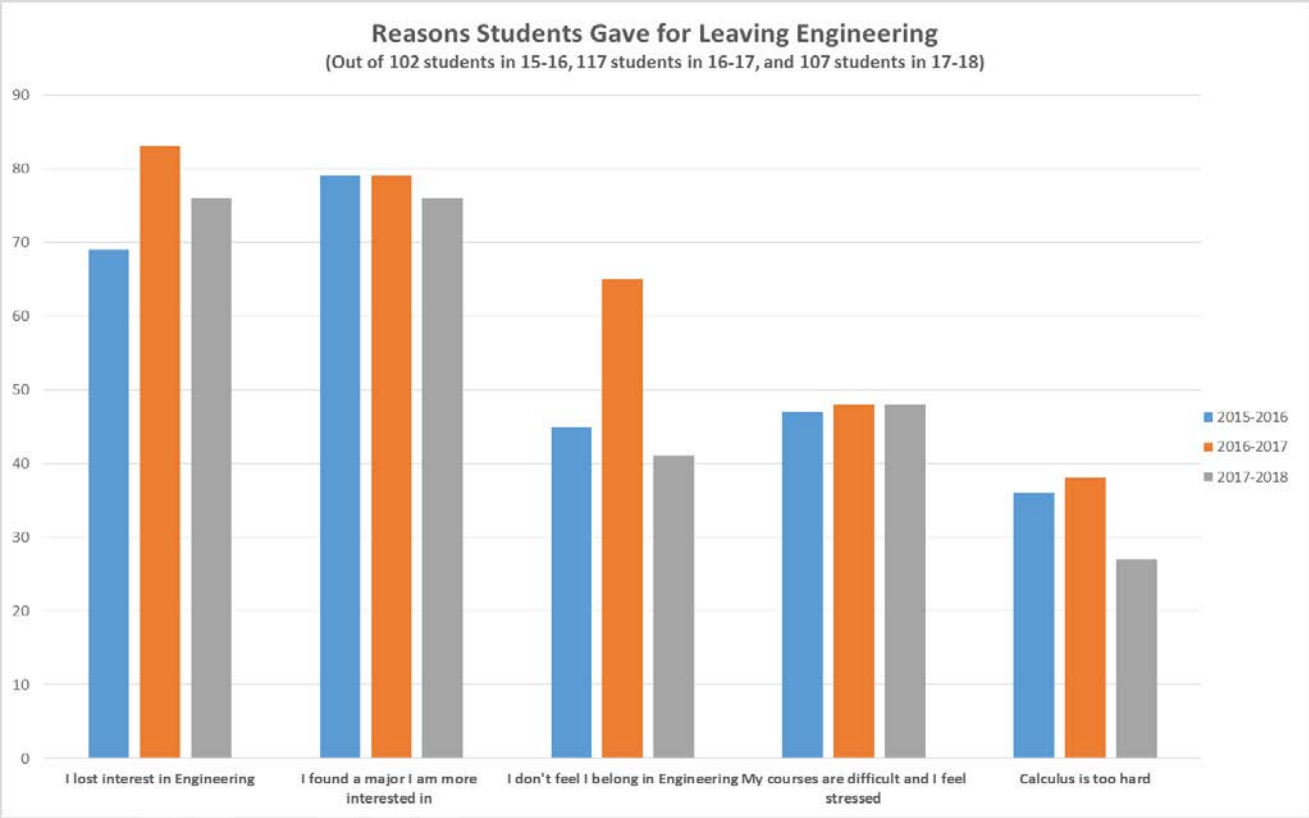


Figure 2: Top reasons student leave engineering

It is noted that results of this survey (over the years) strongly influenced the NSF-funded project (Zip to Industry) that takes freshman engineering/STEM students and places them into 10 shadowing experiences during their first year.

3. **Scholarships.**

The performance indicator on scholarships is the number of applications received. However, work flow scales with the number of awards distributed. We track both the number of applications and work flow items in Figure 3 and Figure 4, respectively.

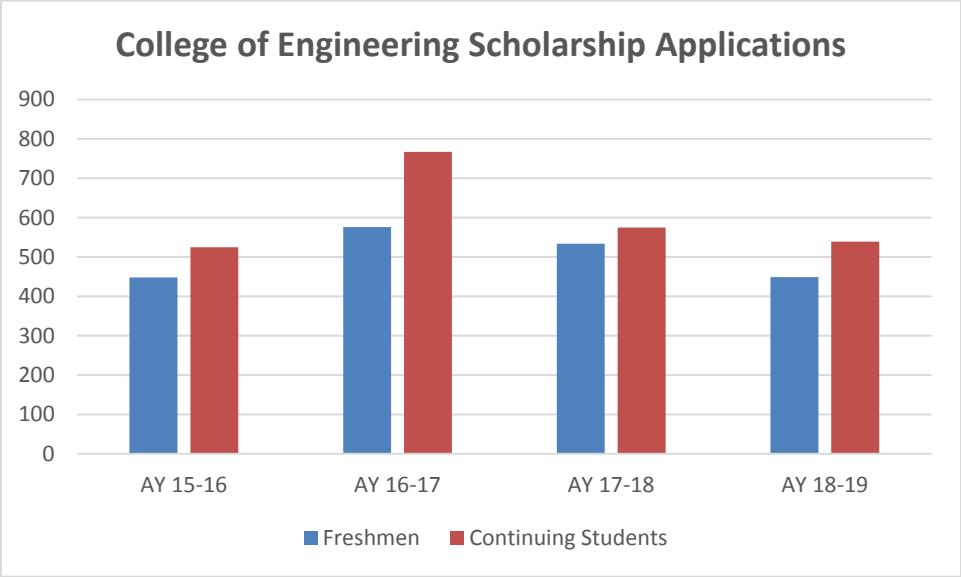


Figure 3: Scholarship applications

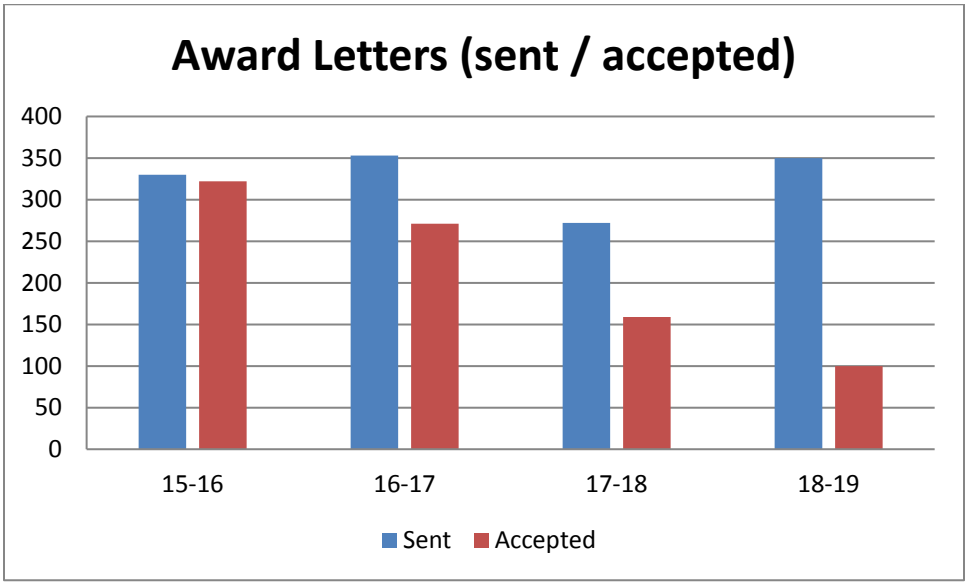
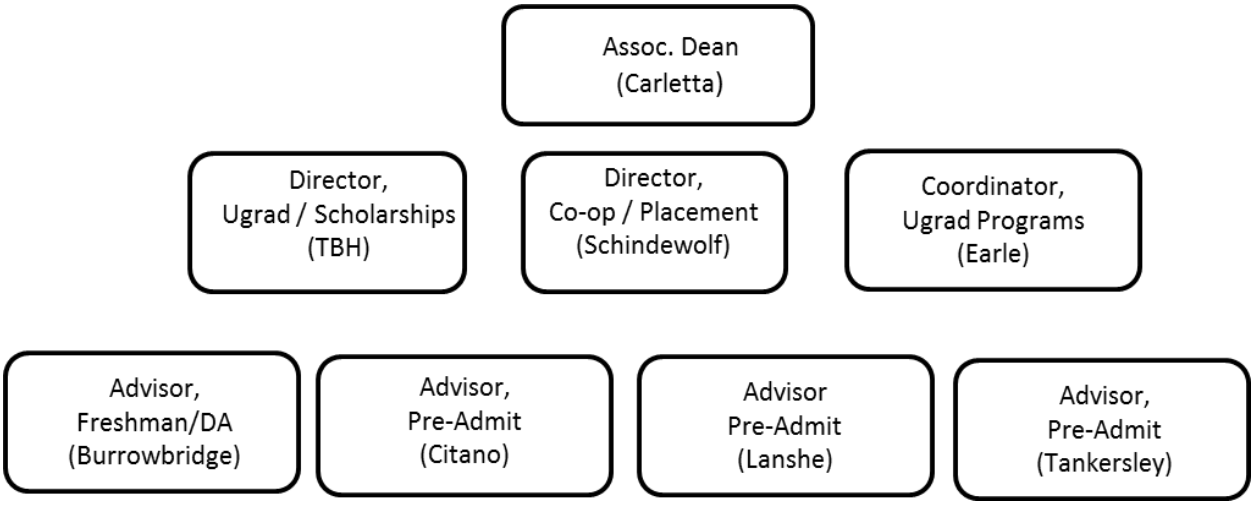


Figure 4: Award Notices. Note that 18-19 is incomplete as of this writing.

Resources

Personnel

Like the other areas in the Engineering Dean's Office, a restructuring is underway and nearing completion. The approved organization chart is found below. It is noted that the Co-op / Placement Director is placed in this organization chart for clarity, but that office is not discussed in this document. Co-op and Placement will have a unique AAR report.



Personnel and responsibilities are given as follows:

- Dr. Joan Carletta, Associate Dean: Provide oversight, leadership and direction to all areas that report to the Associate Dean. Provide guidance to the dean on matters concerning the undergraduate program. Interface with other units (on and off campus) representing the College of Engineering.
- Mrs. Stephanie Schindewolf, Director, Co-operative Education and Placement: Provide career guidance, advising and placement for all undergraduate engineering students. Responsible for coordinating all coop/intern and full-time placements within private and government industry. Engage employers and alumni in services provided by College of Engineering.
- Ms. Julie Earle, Coordinator of Undergraduate Programs: Interfaces directly with the 3000+ undergraduate engineering studies on administrative and procedural items that require information and approval.
- Director, Undergraduate Affairs and Scholarships: Provides oversight and direction to the advising activity within the College of Engineering, oversees all aspects of the scholarship

process within the College of Engineering, interfaces with outside entities for the purpose of articulation agreements

- Mrs. Diane Burrowbridge, Freshman Advisor: Provides advising to all incoming freshman engineering students, helps manage and implement new student orientation for Direct Admit students
- Mrs. Bernadette Citano, Pre-Admit Advisor: Provides advising to all pre-admit engineering students, helps manage and implement pre-admit new student orientation, implements various strategies to transition pre-admits to the degree-granting programs
- Mrs. Gail Tankersley, Pre-Admit Advisor: Provides advising to all pre-admit engineering students, helps manage and implement pre-admit new student orientation, implements various strategies to transition pre-admits to the degree-granting programs
- Mr. John Lanshe, Pre-Admit Advisor: Provides advising to all pre-admit engineering students, helps manage and implement pre-admit new student orientation, implements various strategies to transition pre-admits to the degree-granting programs

Financials

The financials for this office are included, overall, in the AAR for the Graduate Studies, Administration and Technology, since this is the area of the college where budgeting oversight occurs.

Equipment and Technology

Not applicable

Space

This group utilizes only office space for each of the employees listed. The advisors will move into an advising suite within one year, should construction be completed as scheduled

Future Plans

The restructuring within the College of Engineering will likely be impactful for this unit. The to-be-hired Director of Undergraduate Programs and Scholarships will lead the advising unit and off-load some of the day-to-day operations that previously fell onto the Associate Dean. This modification is crucial since the Associate Dean position has grown in both the number of students serviced and in scope/requirements. Such an approach can free up the Associate Dean for more detailed interactions with the academic aspect of the college at the undergraduate level.

New programs will be evaluated by the unit in the future and include, but are not limited to, the following: mechatronics, joint-program with education (engineering education), joint-program with law school (IP + engineering degree). Additionally, targeted on-line offerings will be evaluated.

Graduate Studies, Administration and Technology – College of Engineering

Basic Facts and Description of the Unit

Mission

The Graduate Studies and Administration area of the College of Engineering is responsible for oversight of the graduate programs within the College as well as; identification and resolution of safety matters; development, completion and resolution of budgeting for the unit, departments and Teams; oversight of start-up funds; joint software purchases; purchasing of major equipment; the College of Engineering Machine shop; Engineering and Computer Network Services personnel and interaction with IT staff; development of capital improvement plans from concept through start-up; building maintenance through interaction with PFOC and cleaning personnel; placement and monitoring of security cameras as required; completion of yearly national surveys; HR matters; oversight of College technicians; interface with IDEAs program; monitoring research awards and expenditures; assist with large research initiatives (ie: GPS/AVL), College matters as related to General Counsel's Office; and student discipline issues as it relates to competition Teams.

Primary Services

We have identified five primary services of Graduate Studies, Administration and Technology. They include the following: personnel, students, budgeting, infrastructure and research. Some individual details on each of the five areas are given below. Other information is provided afterwards.

1. **Personnel**
    - Completion and processing of PAFs – 310/year between research and teaching alone. In 2018, over 1000 personnel actions were recorded for the College.
    - Assist with faculty separations – disposition of equipment, PAFs...
    - Work with TAARS and AAF
    - Prepare and provide input to performance evaluations
    - Manage College computers, network and network services

2. **Students**
    - Processing of GA contracts – approximately 320/yr
    - Advise Engineering Management graduate students
    - Review, approve or reject CPT applications
    - Work with Design Teams on budgets and issue resolution
    - Call GCC meetings, develop curriculum proposals for graduate efforts, manage CPS for College
    - Machine shop safety training for undergraduates, graduate students and faculty – approximately 100 individuals/yr
    - Design support for student and faculty projects

- Weld training including GTAW, GMAW and SMAW
- Machine specific training including CAM, CNC and manual
- Fabrication of parts, assemblies test articles – approximately 1000/yr
- Graduate student recruiting

3. **Budget**
    - Development of spending plans and changes to start-up accounts
    - Development of annual College and unit budgets, tracking and resolution of conflicts – overruns, departments and faculty with inadequate funds, P-Card approvals
    - Yearly purchasing of joint software and major equipment

4. **Infrastructure**
    - Identification and resolution of safety related items – examples: high pressure gas cylinder handling, student project painting and body work, use of PPE issues, chemical inventory, building emergency response plans….
    - Identification of capital improvement projects and follow through to completion - examples: Co-op center, AERC, numerous faculty laboratories, SHN 155 study area, Advisor suite, assist with Vivarium, assist with first two phases of ASEC façade restoration, Olson green roof project, ASEC roof projects, West Tower rehabilitation, ASEC lab electrical issues, ASEC and Olson teaching lab renovations (6 current)
    - Identification and point of contact for building maintenance and cleaning
    - Maintenance of website for College of Engineering
    - Repair and rebuilding of lab equipment
    - Schedule use, maintain COE vehicles and trailers

5. **Research**
    - Completion of Faculty Salary, US News and World Report and 2 ASEE surveys
    - Assist with research initiatives – GPS/AVL, 3 state energy collaborative
    - Track research expenditures and awards

Critical Partners – Internal

- Graduate School
- International Center
- PFOC
- Capital Planning
- Resource Analysis and Budget Office
- Office of Research Administration
- Office of Academic Affairs
- UARF
- Purchasing
- Faculty
- Graduate Students
- Competition Team Members
- College of Engineering Technicians
- Institutional Research
- Departments of Mathematics and Statistics

- EOHS
- Student Judicial Affairs (not as much lately…..)
- College of Engineering department admins
- Department Chairs, Faculty
- ME 3D print lab
- Central Stores
- Special Services

Critical Partners – External

- MTS, Inc., Instron Corp., C&M Calibration, Stratasys (3D printers…), HAAS,Brewer – Garrett
- ANSYS/Wolfram Research/MasterCam/Computer and Structures/Dassault Systems/MathWorks/MicroMeasurements – Vishay/Stress Analysis Services/Tooling U, Mathematica
- Engineering and Industrial firms – source of part-time graduate students, industrial research, CPT employers including Luk, Parker-Hannifin, Westinghouse, OHM Advisors, DEP, Aerotek, Nexteer Automotive, Oak Ridge Institute for Science and Education, Hitachi, John Deere, Amway, Vesuvius USA, Panasonic Corp., US Hybrid

End Users and Customers: Undergraduate Students, Graduate Students, Faculty, Design Teams, COE Laboratories, Physical Facilities, Capital Planning, Graduate School, ORA, EOHS, COE Departments, Universities, engineering firms – public and private

Key Performance Analysis and Assessment

In this section, we provide analysis of some key performance indications from each of the five primary services areas, plus a brief assessment.

1. Personnel

The Graduate Studies, Administration and Technology Group consists of an Associate Dean, a Director of HR and Budget, an Administrative Secretary (future position of Coordinator – Graduate Programs and Lab Safety) and two machinists. There is dashed line to the Director of Engineering Computer and Network Services. He receives compensation, and formally reports through Distributed Technology Services. However, with the important and crucial help of two student assistants, the ECNS personnel manage over 900 computers and associated software. These computers include desktops for faculty, staff, students, computing and test labs as well as faculty laptops.

There were approximately 1100 personnel actions for the College of Engineering in 2018. Included are PAFs for teaching, research, administration, stipends for work above and beyond job descriptions, post-doctoral researchers, visiting personnel, etc… Development (some, not all), proof reading and approval are handled by the Director and currently, an Administrative Secretary. Figure 1 shows a breakdown of the personnel actions by position type. In addition, 300 GA contracts are proof read and approved/rejected within the office, including RA and TA.

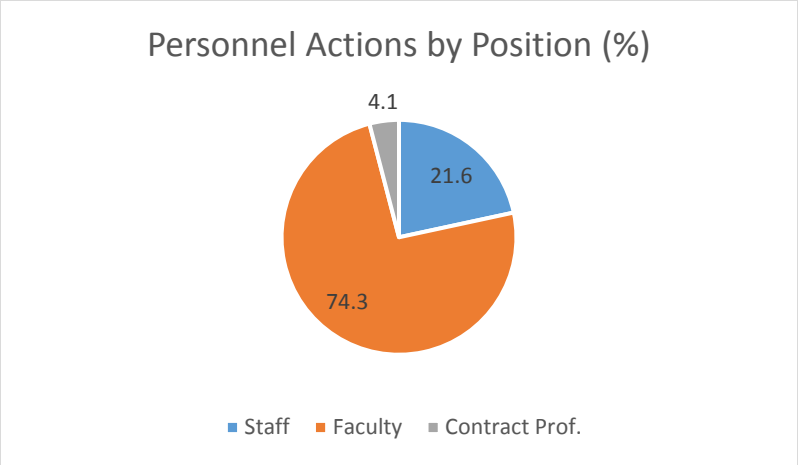


Figure 1: Personnel actions by position type.

2. Students

ASEE collects and maintains data on engineering programs throughout the U.S. Data recorded by ASEE is self-reported by institutions, and is useful for making program comparisons. While the College ultimately approves student theses and dissertations, the documents are a measure of the work of the student and faculty advisor. Figure 2 compares the number of theses and dissertations per faculty member for The University of Akron, The University of Toledo, Cleveland State University, Wright State University and Ohio University between 2014 and 2017. UA has been one of the top three in each of the four years. Note that keeping track of this measure accounts for activity within the Engineering Dean's Office associated with administrative functions pertaining to the students (e.g. GA contracts, forms for the graduate school, review of thesis and dissertations, etc.

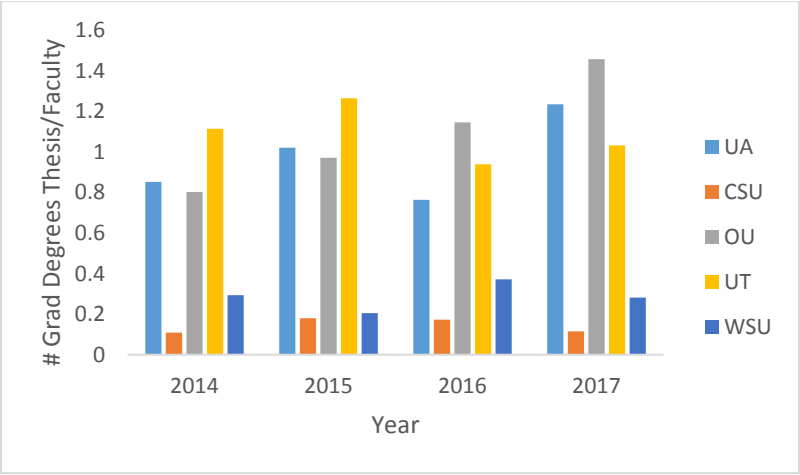


Figure 2: No. MS and PhD Degrees with Thesis/Dissertation per TT Faculty.

3. Budget

Figure 3 shows the operating expenses for FY16 and FY17, projected expenses for FY18 and the FY19 budget.

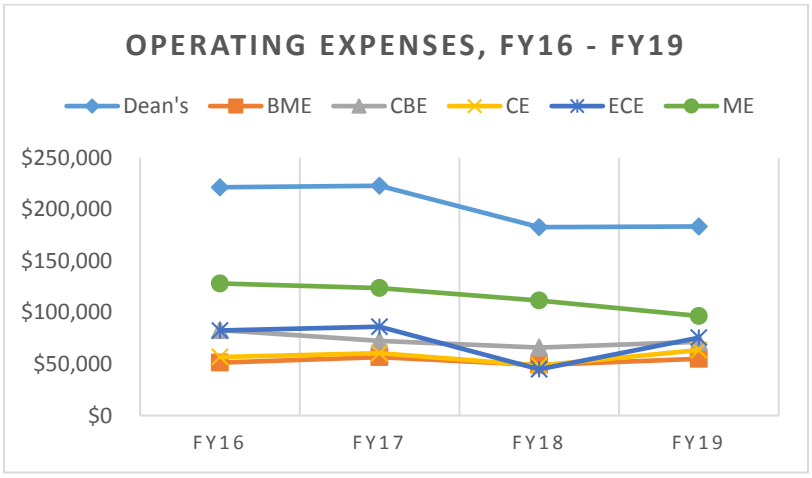


Figure 3: Operating expenses for Y=FY16-FY17, Projected FY18 and Budget FY19.

Between FY16 and FY18, operating expenses for the Dean's Office and all departments decreased. Figure 4 shows the auxiliary budgets for the College. In the majority of cases, expenses have remained relatively flat, with the exception of the IDEAs program, which has decreased.

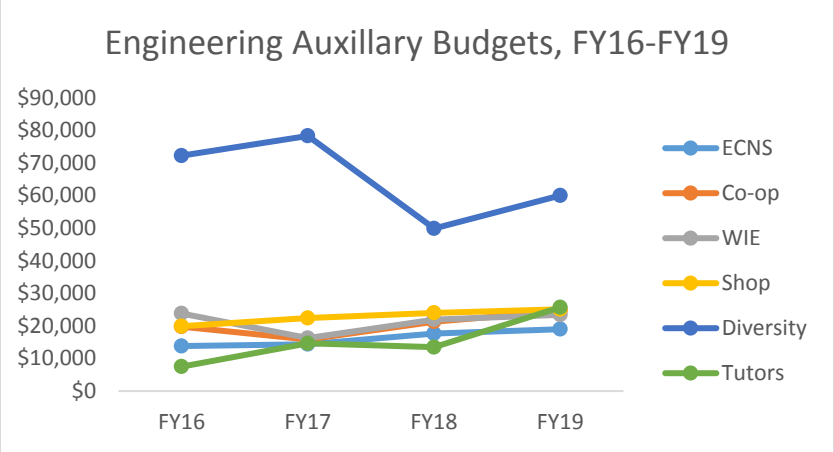


Figure 4: Auxiliary Expenses and Budget.

4. Infrastructure

Between FY16 and FY 18, the College of Engineering had active involvement in space renovations. Major renovations include the new Co-operative Education office and Lobby area, completion of laboratories for Drs. Gupta, Zhao, Morscher, Tan and Saunders and build-out of remaining space in AERC for NCERCAMP. Scheduled in 2019 are projects to build an Engineering Advisor's office

area, renovation of conference room ASEC 105 and renovation of teaching labs including Olson 321, ASEC 321, ASEC 212, ASEC 81, ASEC 52 and ASEC 15A/B. In total, these projects represent approximately 21,700 ft^2.

5. Research

Figure 5 shows the research awards for the College faculty for FY16 to FY18. The number of awards have varied, from a high of 67, to a low of 50. The awards during this time-period represent about $24M. The College faculty averages an award rate of about 30%.

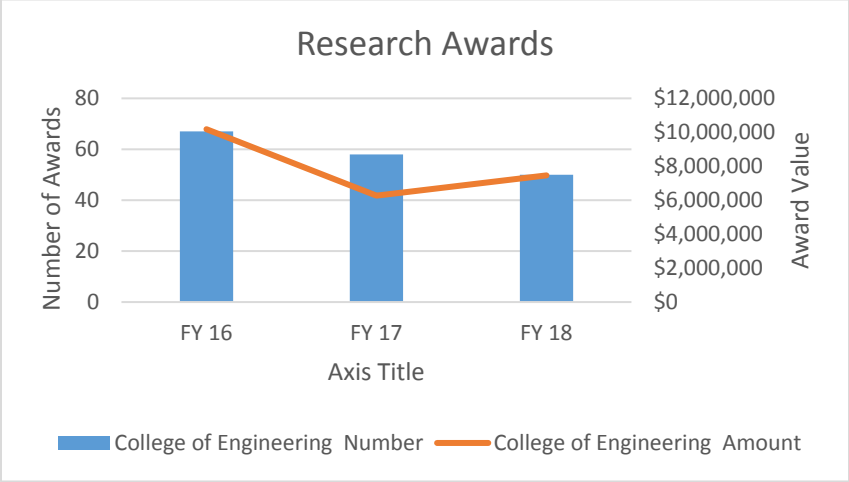


Figure 5: Research Awards, College of Engineering

Research expenditures for FY15, FY16 and FY17 are shown in Figure 6. Expenditures have averaged about $13M for the three years. Research Expenditures per tenured and tenure – track faculty members for 2015, 2016 and 2017 is shown in Figure 6 for The University of Akron, Cleveland State University, Ohio University, University of Toledo and Wright State University. The University of Akron ranks second among this peer group, and is consistent with about $150k/T TT faculty.

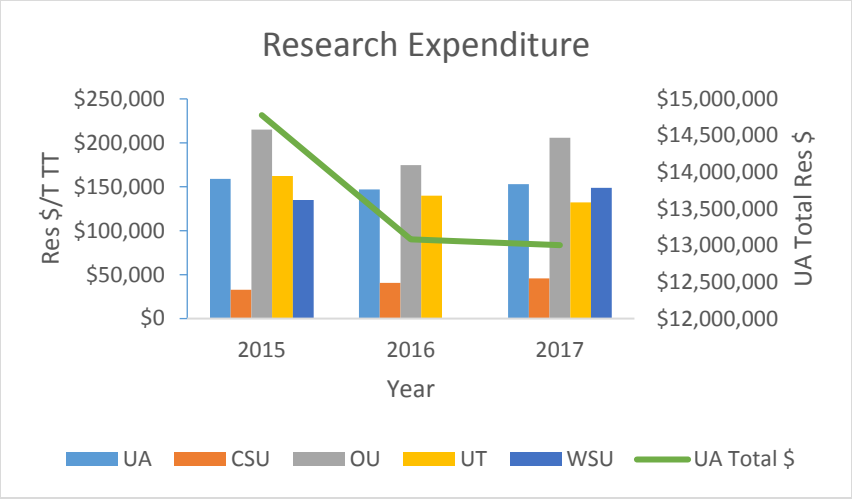


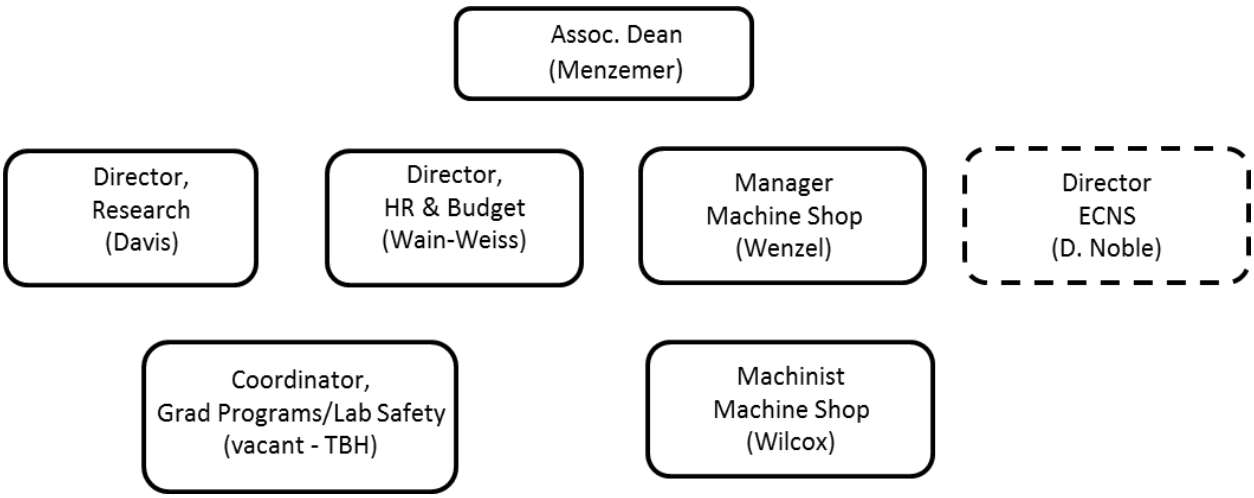
Figure 6: Research Expenditure per T TT Faculty and Total Research Expenditure for UA

Once again, research expenditures are tracked as it relates to administration as proxy for administrative work required within the College of Engineering offices. Additionally, research expenditures will be used to evaluate the effectiveness of the hire of a Director of Engineering Research.

Resources

Personnel

Like the other areas in the Engineering Dean's Office, a restructuring is underway and nearing completion. The approved organization chart is as follows:



Personnel and responsibilities are given as follows:

- Dr. Craig C. Menzemer, Associate Dean: Graduate program administration, capital improvements, budget preparation and administration, personnel actions, surveys, safety, research evaluation and initiatives, space allocation, large equipment purchases, joint lab equipment maintenance
- Mr. Doug Noble, Director ECNS: Develop and maintain standard images for each department, computer repair and trouble-shooting, software purchasing, license maintenance, student supervision, preparation of new computers and assists networking to resolve infrastructure issues. Note that this is a dashed-line reporting.
- Mr. William Wenzel, Machine Shop Manager: Maintain equipment, shop training for undergraduates, graduate students and faculty, assist with design of specimens and parts, welder training, machining and fabrication of parts, interface for teams
- Mr. Ian Wilcox, Machinist: Assist with shop and lab maintenance, work with students and faculty on specimens and part design, machining of parts, safety training of students, work on learning 3D printing, work on CNC programming skills
- Ms. Esther Wain-Weiss, Director of HR & Budgeting: Assist with completion of budgets, tracking of budget items, evaluation of research awards and expenditures, preparation of research PAFs, processing of GA contracts, processing of other personnel PAFs, infrastructure inspection and cleanliness.
- Coordinator of Graduate Programs and Lab Safety, open: Works with EOHS to maintain and develop new safety procedures, works with lab and shop personnel to remedy safety concerns, arranges graduate student safety training and certifications, manages CPT, OPT and CIGA programs, assists Director of Research with meetings and visits, acts as graduate program interface, calls and attends GCC meetings, works on graduate student contract preparation and maintains records.
- Dr. Brian Davis, Director of Research: Starting position at end of summer. Responsible for development of research initiatives, development of collaborative proposals, interface between College and funding agencies, plans and develops collaborative meetings with faculty and project sponsors.

Financials

Table 1 summarizes operating budgets and expenditures for the Engineering Dean's Office. It is noted that departmental budgets are provided within their own pages. FY2018 may not be final numbers. Provided in Table 1 are the original budget and actual expenses from the UA PS system. It does not reflect budgets that were altered or modified during a fiscal year. The Dean's Office has attempted to keep operating expenses within and below budget given the fiscal climate of the last several years. This means off-loading expenses to other (non-2) accounts and limiting other items.

Table 1: Engineering Dean's Office – Operating Budget without Personnel 2014 - 2018

Year	Budget	Expense	Comments
2014	$247,458	$265,172	
2015	$321.991	$195,073	
2016	$288,591	$203,483	
2017	$288,591	$180,236	
2018	$176,000	$146,386	Numbers not final

It is noted that, where possible, the college (and departments) off load operating budgets to other accounts (IDC, IT, etc.) where applicable in order to save general fund dollars. Thus, looking purely at budget and expense dollars does not tell the complete picture.

Equipment and Technology

The equipment provided below is housed in the College of Engineering machine shop, located in the basement of ASEC.

Haas Turning Center ST-20Y
Haas VF-2SSYT Machining Center
Haas VF-1 Machining Center
Four Vectrax vertical mills
Two Clausing engine lathes (15 in)
Two Clausing engine lathes (13 in)
Hydmech S-20 horizontal band saw
Roll-In JM1220 vertical band saw
Haberle 12 in cold saw
K.O. Lee surface grinder
Cincinnati Tool and Cutter Grinder
Pexto 42 in metal shear
Tennsmith 48 in sheet metal brake
Saw Stop 10 in table saw
Miller Dynasty 350 TIG welder
Lincoln 350MP MIG welder
New England 36 in oven

Carolina 30 ton shop press
Trinco blast cabinet
900+ desktop, laptop computers
Software (partial) ANSYS, LS-Dyna, Abaqus, SAP 2000, SolidWorks, MatLab Strainsmart….
Joint Testing Equipment
300 kip load frame
- 2 – 55 kip actuators
- 100 kip MTS
- 55 kip MTS
- 22 kip MTS axial – torsion

Exposure cabinets
High velocity gas gun
Bearing test rig
DIC/Spate full field strain measurement
High speed camera system
Burner test rig

Space

Overall, the College of Engineering is assigned approximately 245,000 ft^2, including ASEC North, ASEC South, ASEC West, Whitby, Olson, Gas Turbine Testing, AERC, Shrank Hall North, the Express Building and Quaker Square.

Future Plans

The modified structure of this unit allows for dedicated personnel to focus on increasing research opportunities for faculty (Davis) as well as place a greater focus/emphasis on lab safety (to be hired). In addition to these changes, the main focus is on increasing graduate students enrollment, especially surrounding self-pay students.

Since 2000, graduate degrees awarded in science and engineering fields have increased dramatically. Masters degrees awarded nearly doubled between 2000 and 2015 while doctoral degrees increased by nearly 60% during the same time-period. Historically, international enrollment in graduate science and engineering programs has accounted for a significant percentage of the total. In 2015, international enrollment in graduate programs accounted for 36%. In science and engineering, it is nearly 47% of the total graduate enrollment. Beginning in 2016, international graduate student enrollment has decreased by about 6%.

The University of Akron's policies regarding graduate student funding has shifted the majority of support towards PhD students and away from students seeking MS degrees. The College has placed increased emphasis on advertising the Evening Master's program, using Crain's Business, Facebook, Pandora radio and an e-mail campaign targeting younger UA alums. The Evening master's program is aimed at working students and firms who pay for graduate school education. There is some evidence that the advertising campaigns are beginning to pay off, with more than 20 students enrolled in the Engineering Management Program and the increase in number of inquiries received regarding part-time study. In addition, the College has developed a number of new agreements with foreign institutions in an effort to increase the number of graduate students in the College.

The College will continue to expand its' efforts to advertise part – time graduate study towards the MS degree through direct contact with employers. Although planning is in the early stages, we envision the use of something like a "Lunch and Learn" that may be taken to larger employers in the area. With the aid of a recent hire for recruitment and retention, attendance at graduate school fairs will increase as well.

Recruitment, Retention and Marketing – College of Engineering

Basic Facts and Description of the Unit

Mission

The Recruitment, Retention and Marketing area of the College of Engineering is responsible for attracting students to UA engineering (both undergraduate and graduate) and retaining them at UA during their first year. Additionally, this unit focuses on marketing and communication activities as well, many of which support the recruitment of students to UA.

Primary Services

We identify three primary services in the area of Recruitment, Retention and Marketing which, as the name implies, is recruitment, freshman retention and marketing.

1. **Recruitment**. This primary service focuses on the recruitment of students to UA at both the undergraduate and graduate levels. At the undergraduate level, this encompasses all interactions with prospective students. This includes outreach to partner schools, formal campus visit days, engineering visits by partner schools and one-off family visits to engineering.

2. **Retention.** This primary service focuses on retaining students at UA and, if possible, within a College of Engineering program. We focus most efforts on freshman students since retention rates are most important for this cohort. However, we also analyze graduation rates since early retention rates impact overall graduation rates.

3. **Marketing.** This primary service focuses on disseminating information about the college of engineering (faculty, staff and students) both inside of UA and outside, for recruitment purposes and beyond.

Critical Partners

- Inside UA
  - Office of Admissions. The COE works closely with Admissions to ensure success of monthly Visit Days and other events organized by Admissions.
  - Departments: They supply many of the personnel who help, educate and inspire students for recruiting.
  - Graduate School. For graduate level recruiting activities
  - International Center. For graduate level recruiting activities

- Development. For attraction and retention of undergraduate students.

- Outside UA

  Through continuous effort, the COE has developed external partnership with local Pre-engineering programs, PLTW programs, HS counselors and teachers.

End Users and Customers: HS students, Engineering students, regional community

Key Performance Analysis and Assessment

In this section, we provide analysis of some key performance indications from each of the three primary services areas, plus a brief assessment.

1. Recruitment

Table 1 describes the number of students impacted by formal visit days. These are number that are tracked annually. Upgraded process in the future will allow us to link individual students to specific events in order to have a deeper dive on what events impact certain students. It is noted that we now provide (within the College of Engineering) our own specific assessments after visit days in order to make more meaningful adjustments to future programs.

Table 1: 2017-2018 Visit Days

Event	**# of students**	**# Total guests**
June Summer Visit Day	90	236
July Summer Visit Day	82	219
August Summer Visit Day	68	173
Engineering Visit Day	188	439
October Fall Visit Day	56	156
November Fall Visit Day	91	244
UA Scholars Day	186	493
February Senior Day	57	153
March Senior Day	60	146
April Spring Visit Day	160	423
May Engineering Senior Design Day	25	
Individual Visits - Juniors by COE	17	
Total	**1,070**	**2,682**

We also effort to turn visiting students and matriculants into enrolled students. To do this, we track the special efforts for this cohort in Table 2.

Table 2: 2017-2018 Activities for Matriculation

Activity	**When**	**# of students**
Email Campaign – Scholarship	Nov. Dec.	1,247
Email Campaign – UA Scholars Day	Nov. Dec.	243
Phone Campaign to Students without any visit	Jan. Feb.	259
Notecard Campaign to Students without any visit	Jan. Feb.	339
Email Campaign – Newsletter; Student Story	Mar. Apr.	About 2,000
Social Media Campaign	Mar. Apr.	N/A
Individual Visits by UA You and the Roo	Nov. – Mar.	32
Individual Visits - Seniors by COE	Nov. – Jun.	42

Ultimately, we are looking at freshman enrollment and we track that at the Census Date. This information through 2017 is provided in Figure 1.

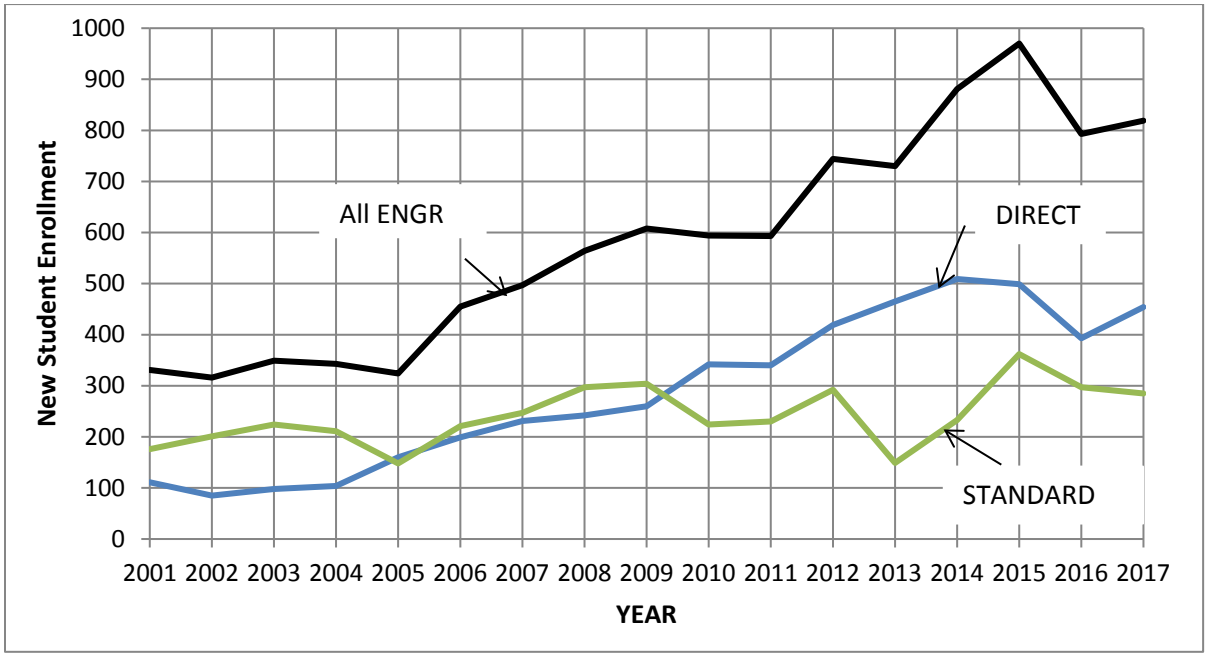


Figure 1: Freshman students identifying engineering as their major, as of Census Date.

At the graduate level, we have tracked two items. First is the number of new international agreements (MOU) for international partners. Since March 2017 we have developed 14 new international partnerships.

The second item that is tracked is program enrollment. Figure 2 provides this data in graphical format.

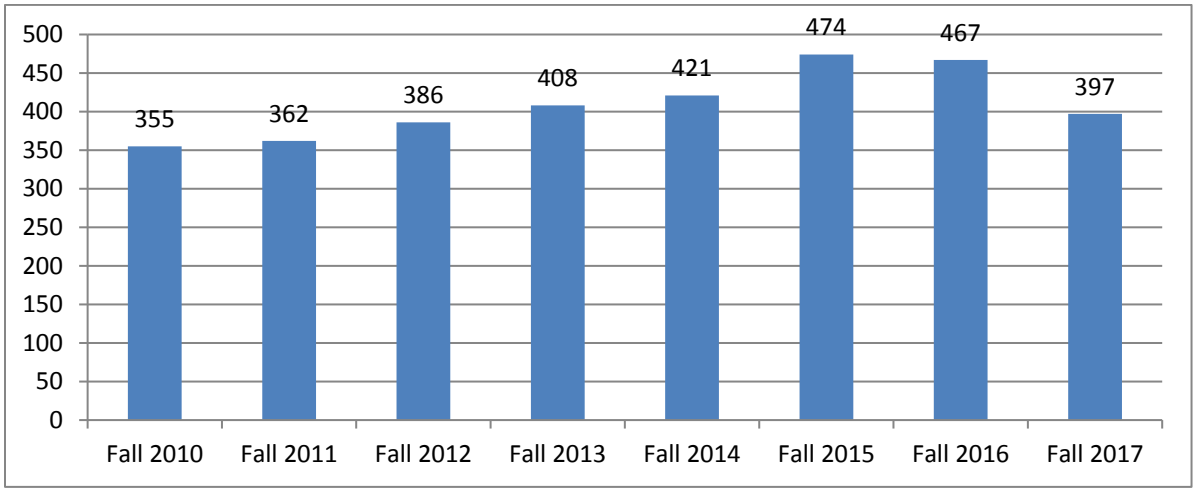


Figure 2: Number of graduate students enrolled in engineering.

2. **Retention**

We primarily analyze fall-to-fall retention rates for the freshman cohort, both within engineering and within UA. All of this data is available by cohort (e.g. discipline, gender, underrepresented groups, etc.) However, we only show the aggregated data in this report, as is seen in Figure 3.

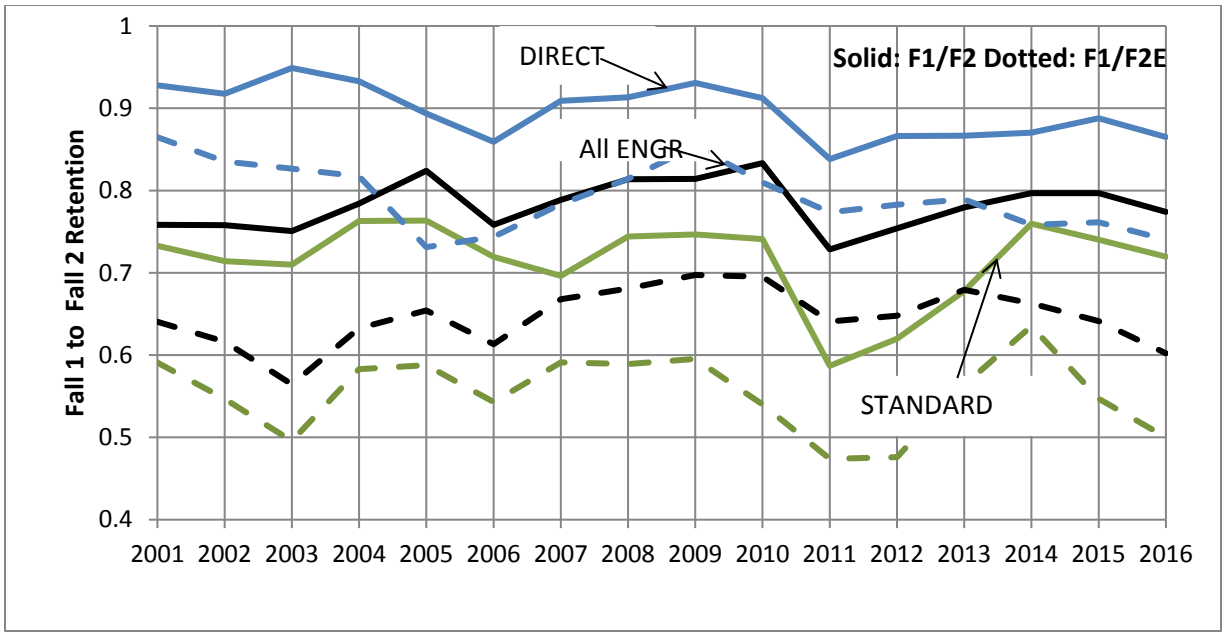


Figure 3: Fall-to-Fall Freshman Retention for Engineering Majors.

Course completion rate is also tracked for certain important courses and this is provided in Table 3.

Table 3: Course Completion retrieved from UA Dashboard.

			2013-2014		2014-2015		2015-2016		2016-2017	
Dep	**Course Name**	**Course #**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
BME	Tools for BME	4800-101	104	90%	124	96%	127	91%	110	96%
BME	BME Design	4800-111	83	99%	111	98%	105	99%	96	99%
BME	Bio Computing	4800-220	60	93%	70	97%	87	92%	82	96%
CBE	Tools for ChE	4200-101	92	88%	117	91%	141	89%	92	83%
CBE	PMT I	4200-110	145	94%	157	94%	189	93%	125	90%
CBE	PMT II	4200-210	77	99%	98	99%	109	98%	116	99%
CBE	MEB	4200-200	71	93%	68	88%	79	97%	86	95%
CBE	ChE Eng Computa	4200-121	72	88%	79	96%	101	93%	74	95%
CBE	Thermo	4200-225	66	83%	83	78%	104	88%	106	84%
CBE	Tools for Corr	4250-101	49	94%	41	100%	45	87%	35	91%
CBE	MS for Corr	4250-105	42	95%	45	96%	35	97%	16	75%
CBE	MEB Corr	4250-200	15	87%	32	84%	34	88%	29	83%
CE	Intro CE	4300-120	98	95%	125	99%	121	98%	121	94%
CE	Tools	4300-101	81	99%	89	87%	100	90%	88	85%

CE	Statics	4300-201	479	88%	532	90%	597	91%	600	94%
CE	Mech Solids	4300-202	322	88%	365	89%	410	86%	480	93%
CE	Environmental Eng.	4300-321	64	94%	67	88%	56	77%	88	76%
ECE	Tools for EE	4400-101	84	96%	78	96%	79	91%	69	93%
ECE	Circuit I	4400-231	115	83%	122	91%	103	92%	106	91%
ECE	Circuit II	4400-332	96	91%	100	87%	117	94%	90	93%
ECE	Tools for CpE	4400-340	69	94%	75	84%	101	92%	73	86%
ECE	Programming	4450-208	70	69%	73	88%	45	93%	35	60%
ECE	DLD	4450-220	144	89%	132	92%	149	88%	133	89%
ME	Tools for ME	4600-165	289	88%	313	91%	305	85%	277	90%
ME	Dynamics	4600-203	323	92%	370	94%	395	92%	444	94%
ME	EA I	4600-260	186	93%	217	96%	206	96%	245	98%
Math	Clg Algebra	3450-145	148	66%	166	69%	190	71%	135	69%
Math	PreMath	3450-149	352	72%	356	78%	393	70%	381	65%
Math	Cal I	3450-221	594	79%	686	78%	720	77%	618	78%
Math	Cal II	3450-222	619	77%	640	77%	655	71%	577	79%
Math	Cal III	3450-223	514	83%	578	81%	570	85%	623	84%
Math	Diff Eq	3450-335	406	86%	510	92%	529	83%	576	85%
Chemistry	Chem I	3150-151	758	84%	835	88%	923	85%	792	80%
Chemistry	Chem II	3150-153	501	92%	596	86%	620	91%	492	89%
Physics	Phy I	3150-291	517	96%	593	94%	584	96%	595	96%
Physics	Phy II	3150-292	438	98%	500	96%	567	97%	611	97%

Finally, six-year graduation rate is tracked and provided in Figure 4.

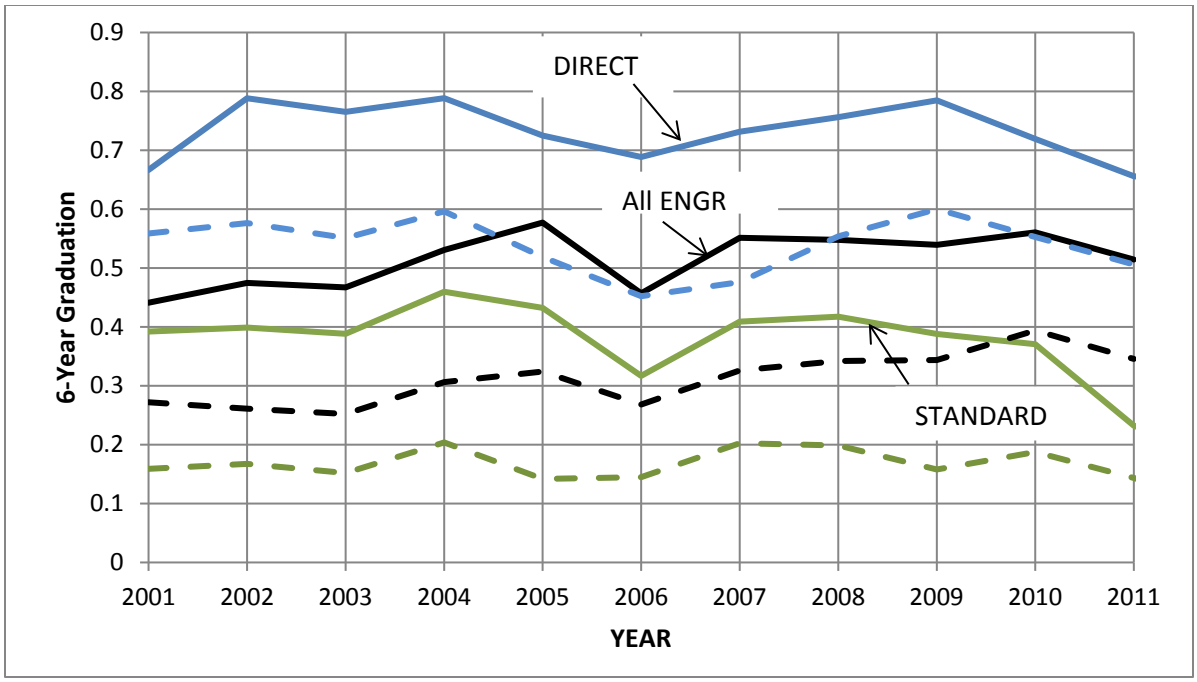


Figure 4: Six-year graduation rate for engineering students.

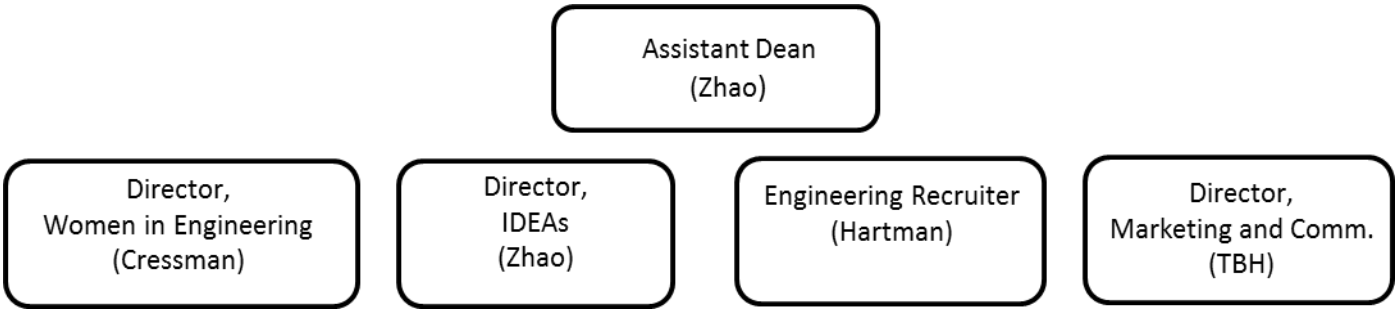
3. **Marketing**

Since this is a new area for the College of Engineering, no metrics exist currently. However, it is expected that these metrics will include numbers of feature articles external to UA, Twitter followers, etc.

Resources

Personnel

Like the other areas in the Engineering Dean's Office, a restructuring is underway and nearing completion. The approved organization chart is found below. Note that though the IDEAs and WIEP are included in the chart below, they will be discussed in a separate document.



Personnel and responsibilities are given as follows:

Position / Employee	**Key Functions on recruiting**
Assistant Dean, Recruiting, Retention and Marketing / Julie Zhao	Developing strategic plans on recruiting and retention; Leading the college's commitment; Conducting assessment;
Director, Women in Engineering / Heidi Cressman	Directing WIEP. Supporting COE mission on recruiting and retention.
Director, Increasing Diversity in Engineering Academics / Julie Zhao	Directing IDEAs. Supporting COE mission on recruiting and retention.
Director, Marketing and Communications / Search Underway	Managing COE marketing materials; developing and leading campaigns to promote COE and its programs.
Engineering Recruiter / Rebecca Hartman	Managing all recruiting activities; Maintaining internal database; leading Dean's Team;

Financials

The financials for this office are included, overall, in the AAR for the Graduate Studies, Administration and Technology.

Equipment and Technology

Not applicable

Space

This group utilizes only personnel office space

Future Plans

- Future Plans – Undergraduate Recruiting
    - Maintain the yield rate of the fall semester of 2019 to 40% in the next three years.
        - ✓ Add interactive activities to visit days and develop scripts for tours.
        - ✓ Develop a new program for undecided students, hosted before April 2019.
        - ✓ Analyze the data from state reports which would be available in late August for students who did not confirm with UA and then develop programs that enhance enrollment in corrosion, CE and ME, along with minority students.
        - ✓ Select means of communication and action items based on applicants' status.
    - Keep the number of applicants of the fall semester of 2019 above 2450, and adjust the goal based on the market analysis annually.
        - ✓ Finalize marketing materials for HS visitations.
        - ✓ Increase the number of HS visits. Develop hands-on workshops, surveys and presentations for HS visits.
        - ✓ Send newsletters to counselors, teachers and students.
        - ✓ Work with admissions to track communications and event participations.

- Future Plans – Graduate Recruiting
    - Complete active course lists and brochures for all majors.
    - Develop graduate liaison program to provide opportunities for graduate alumni to take an active role in recruiting from their undergraduate institution (normally international)
    - Develop 20 partner schools and 8 industrial partners for Akron Master's Program.
    - Market analysis of professional engineering programs, joint MS programs with education/ business, and BS+MS degrees with local private universities.
    - Develop new programs (Five-star Friday or summer) for recruiting graduate students.

- Future Plans – Retention
    - Form College of Engineering Retention Taskforce to address unit-level retention issues.

Women in Engineering Program – College of Engineering

Basic Facts and Description of the Unit

Mission

The mission of the Women in Engineering Program is to serve as a catalyst for increasing the number of women in engineering through a variety of strategic goals that focus on recruiting, retention, placement and internal/external partnerships.

Primary Services

Female engineering students, nationally, hover around 20%. Considering the almost daily desire for companies to have a distribution of employees that look like the community they serve, there is a strong need to increase the number of female engineering students. The Women in Engineering Program, which started in the mid-1990s, works to meet this overarching goal in the following ways:

- Coordinate and conduct career planning, leadership and management and information seminars for current and prospective students. Provide academic and career counseling to current and prospective students. Teach Women in Engineering Seminar and Peer Group Discussion Course to female freshmen students (72% average first-year retention rate for Women in WIE class).
- Develop and manage recruitment activities designed to recruit women into engineering fields of study, with a sample list as shown in Table 1.
- Develop retention programs designed to retain women in engineering fields of study, as shown in Table 2.
- Administer scholarship program for established foundations that promote and encourage women to pursue careers in engineering (more than $22,000 in 2017-2018 academic year). Solicit programmatic funding and collaborative partnerships for individual and governmental entities for the support of programmatic initiatives (more than $62,000 in 2017-2018 academic year).
- Market the WIEP at professional conferences, local community and other events.

Table 1: Outreach and recruiting events in 2017-2018 academic year.

Outreach Event	**# attendees**	**Area Targeted**	**Age Group**
Ada Lovelace Day	40 girls	Akron Public Schools	6th -10th grade
Inquire! Innovate! Invent!	118 girls	All schools within 1 hour drive	6th-12th grade
WIE Visit Day and Donovan Breakfast	34 girls, 15 professionals	Northeast Ohio	9th-12th grade
Kids' Career Day	220 girls	Schools within 1 hour drive	1st-6th grade
Western Reserve Science Fair	100 + girls and boys	Northeast Ohio	6th-12th grade
SWE Shadow Day	60 girls	Northeast Ohio	9th-12th grade
Goodyear STEM day	800 students	All Ohio Schools	6th-12th grade
Summer Camps	66 students	All Ohio Schools	6th-12th grade
Operation Outreach	>300 students	Rittman MS, Woodridge MS, Canton South MS	6th-8th grade
Library Visits	60 girls	Twinsburg and Hudson Cuyahoga Falls to start	4th-8th grade

Table 2: Sample retention activities.

Retention Activities	**No. of Attendees**
Replay for Kids	over 175 students
Engineering Service Design Team	over 80
Scholarships	Approx. 10
Welcome Back Social	32 students, 3 faculty
Living and Learning Community	Filled for 2018
Margaret Donovan Visit Day and Breakfast	Over 20 students, participated and 34 H.S. students
Alternative Winter Break	Over 96 students participated
National and Regional SWE Conference	18 students
Advising	36-75 girls each semester

Critical Partners on Campus

UA Partners: Dept. Of Mathematics; Honors; Counseling Services; Dept. of Physics; Financial Aid; Adult Focus; Dept. of Geology; CAST; Accounting; Dept. of Chemistry; Student Union; I.T.; Quaker Square; Marketing and Communications; Parking Services; Living and Learning Communities; Alumni and

Development; Athletics (for Infocision and SWRC rental) ; Residence Life and Housing; College of Polymer Engineering & Poly Sci.

Industry Partners: Dominion, Tektronix/ Keithley, Arconic, Goodyear Tire and Rubber Company, Lockheed Martin, Turner, Ohio Aerospace Institute, PPG Industries, Air Enterprises, Timken, Schaeffler Luk, Bridgestone, Crane Aerospace , etc.

Companies that support the Women in Engineering Program through the Advisory Council: Timken, Welty Construction, First Energy, Future Plus, Smithers Rapra, Cargill Salt, Lockheed Martin, PPG Industries, KS Associates, British Petroleum

End Users and Customers: Middle School and High School students, Engineering students, regional community, industry

Key Performance Analysis:

The most relevant metric to track for the WIEP is the number of entering Freshman students in engineering. In Figure 1 below is the number of female Freshman engineering students at UA during the last ten years, as well as the percentage of the whole. As can be seen, while the number of Female students has increased, so has the percentage of Female students (right axis).

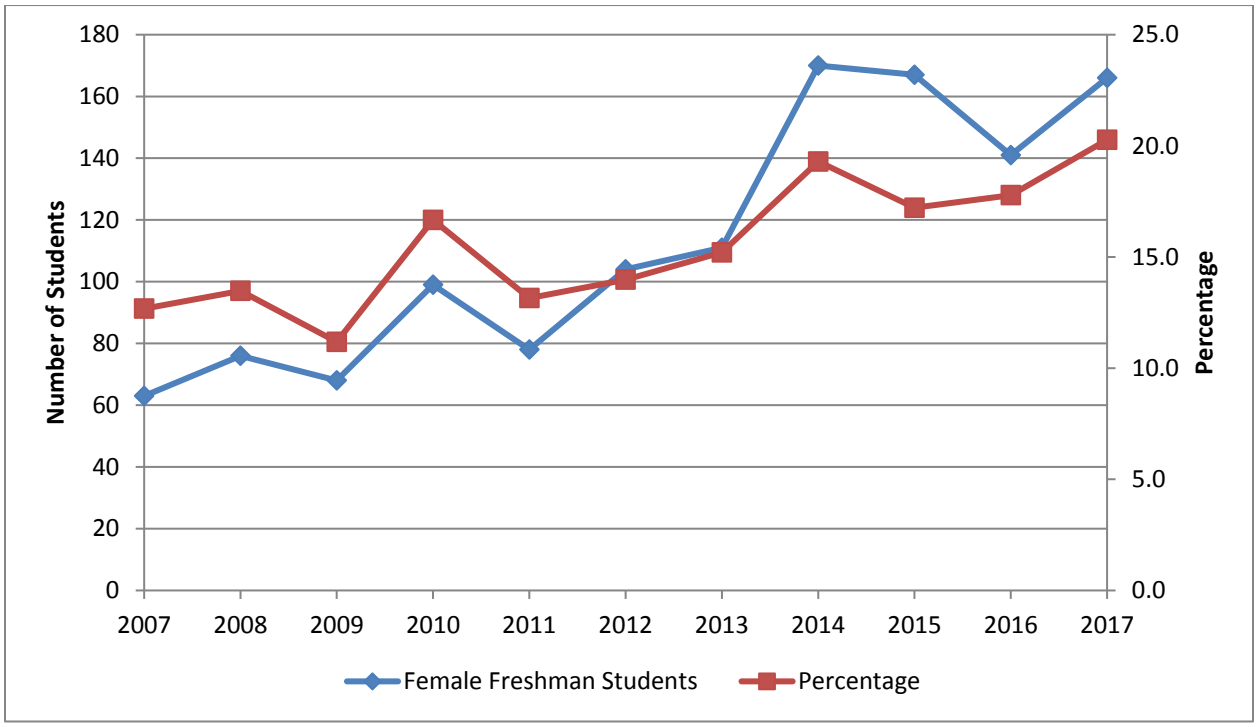


Figure 1: Female Engineering Majors

Personnel:

The amount of female engineering students, overall, at UA has doubled in the last ten years, but the program is still serviced by one single person – the Director of the Women in Engineering Program. There are no other full-time employees devoted to this program, though she uses what she can from other resources (e.g. admin help, student help, etc.) Since the College of Engineering is, administratively, vastly underfunded relative to other engineering institutions, no additional resources can be diverted towards helping WIEP.

The Director of the Women in Engineering Program reports, administratively, to the Assistant Dean of Recruitment, Retention and Marketing.

Table 3: Personnel for WIEP.

Position / Employee	**Key Functions**
Director, Women in Engineering Program / Heidi Cressman	Direct WIEP. Support COE mission on recruiting and retention.

Financials:

The program budget for the WIEP is provided in Figure 2. Note that almost all functions of the WIEP are based on externally funded projects.

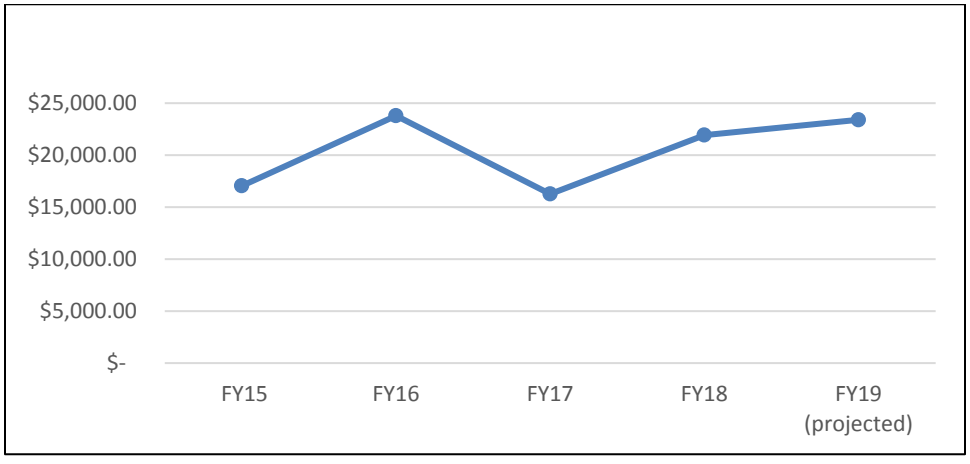


Figure 2: WIEP Program budget.

Equipment and Technology

Not applicable

Space

This program has one office for the Director and another small office for supplies/storage.

Future Plans

- Since 2007, the number of women who have been enrolled in the program has risen from 287 to over 680 students showing growth of nearly 236% over the last 10 years. The intent is to grow the program so that women constitute at least 35% or more of the incoming freshman class. Program size doubles approximately every 10 years so we should reach 35% within the next decade or sooner.
- Future work will be focused on increasing number of women entering into the engineering program but working with more out of state students, early outreach and community college graduates. We will continue to monitor outreach events that we provide to ensure quality and interesting content. We will also continue to monitor future events. One effort will include streamlining our current sign up processes with leading edge technology in order to make them more customer friendly.
- Five-star Fridays will become a focus for touring local engineering programs.
- We have also been asked to participate on the Girl Scouts of North East Ohio STEM steering committee, in its inaugural year.
- We will also be looking at a more focused strategy for outreach events and plan to develop better ways to monitor program effectiveness by incorporating JMP into our program analysis. We also hope that the analysis will allow us to drop programs that are not leading to our goals. Since trends indicate that outreach should begin in the 4th grade and continue through high school to spark interest in girls for engineering careers, we will continue to provide quality programming in this area. We will maintain our pipeline outreach program which currently reaches K-12th grade females. Cyber trends and new efforts to host hack-a-thons and to incorporate new technology will have us focusing more on improving in those areas so that we can attract more students. Our efforts on Facebook, Twitter and crowdsourcing sights like Indiegogo may provide alternative ways to raise money.

- Using JMP software, factors leading to the success of students in the women in engineering seminar class will be studied to determine which factors lead to highest success levels in women who take the class.
- A renewed focus on alumnae within the Women in Engineering Program which will begin with 25th anniversary celebration to be held in October. Additional programs will be focused on encouraging legacy children of these parents to attend functions on campus.
- Finally, efforts to create new industry ties is important to the success of the organization.

Increasing Diversity in Engineering Academics – College of Engineering

Basic Facts and Description of the Unit

Mission

The Increasing Diversity in Engineering Academics (IDEAs) program is committed to increasing diversity and inclusive excellence in the fields of engineering and enhancing enrollment, retention and graduation of engineering students – particularly students from underrepresented groups (African-American, Hispanics and American Indian).

Primary Services

According to American Society of Engineering Education (ASEE), African American, Hispanics and American Indian engineering students are considered as underrepresented groups because they under-represent the population they serve. They also show the lowest graduation rates among all other ethnic groups due to unique barriers. The Increasing Diversity in Engineering Academics (IDEAs) Program, established in 1990, is to enhance enrollment and graduation of underrepresented engineering students in the following ways:

- To increase the enrollment. It is done through structured recruiting events at UA and COE, along with target recruiting programs. In order for perspective students and family to feel more welcome after visit days, the IDEAs Program provides opportunities for continuous conversation, as shown in Table 1. The number of students in the IDEAs Program is shown in Figure 1.

Table 1: Target recruiting events.

Event	Brief description	Month
Anton Scholarships for Freshman	$300,00 to about 6-10 students	Nov-Feb
IDEAs Shadowing	About 30 students/year	Ongoing
NSBE STEM Workshops	About 150 MS students and teachers	April
After-school Mentoring	Local HS/MS	Ongoing

- To close the achievement gap. The IDEAs Program developed and implemented many programs to increase the retention and graduation of IDEAs students, as shown in Table 2.

Table 2: IDEAs retention strategies.

Event	Ease the barrier(s)
Donated scholarships	Financial needs;
Study tables, required for students taking math lower than Cal II	Preparation; study habits; academic standards
Ambassadors	Academic standards; Sense of belongs
Support NSBE/SHPE	Sense of belongs
Instructive advising; Open House	Early alert; early graduation

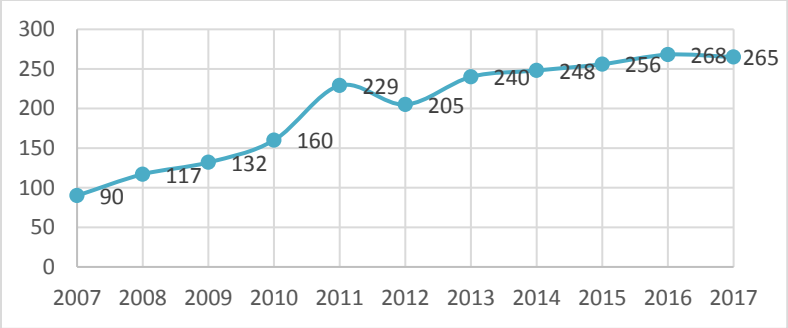


Figure 1: the number of students in the IDEAs Program.

- To enhance career awareness. The IDEAs Advisory Council put together IDEAs Workshop Series for career awareness. Bi-weekly workshops are run and organized by the council members and IDEAs alumni, focusing on professional development and career awareness, along with graduate studies.
- To promote inclusive excellence and good role models. With help from the Department of Development, the IDEAs Program was able to secure funding for Student Excellent Awards in order to honor underrepresented students who demonstrate academic excellence and community services; undergraduate research; book clubs; NSBE/SHPE leadership training and outreach activities, etc.
- To market the IDEAs Program at all levels. This is done through partnership, community outreach, professional conferences and professional organizations.

End Users and Customers

Underrepresented engineering students, Middle School and High School students and families, regional community, industry

Critical Partners

- The IDEAs Program, as one of the COE's academic support programs, works closely with all COE units, other units through COE's overall management, including Financial Aids, Admissions, etc. and other departments that the students of the IDEAs Program might be involved. All scholarships and funding opportunities are through the Department of Development.
- The external partners include individual donors, industrial partners who offer scholarships, tours, speakers, and information sessions to the IDEAs Programs, K12 school systems and professional organizations such as NAMEPA, NACME, NSBE and SHPE, and local communities.

Key performance analysis

- The percentage % of minority engineering students participating in the IDEAs Program. Consistently, this number is above 90%. The exception includes some Hispanic students, Native American students or students who already changed their majors but not shown in PeopleSoft.
- The number of freshman students and the first-year retention rate, as shown in Table 3. Through the IDEAs Program's continuous efforts, recently the retention rate is close to the national's average, which is 70%, according to ASEE.
- The graduation rates of IDEAs program students, shown in Table 3. According to ASEE analysis, the projected graduation rate would be less than 20% if the first year retention rate is less than 60%. The IDEAs Program graduation rate is higher than the predicted number. Our self-studies and exit-surveys imply that the slightly higher rate (than the projected) might be because of the activities in the IDEAs Program targeting at overcoming barriers of the IDEAs students, including financial needs, sense of belongs and academic preparation.

Table 3: Persistent and graduation rates of the IDEAs students.

Year	N	F1/F2	F1/F2E	6 YR grad	6 YR grad ENGR
2007	25	68.0%	56.0%	32.0%	12.0%
2008	38	63.2%	52.6%	26.3%	15.8%
2009	47	59.6%	53.2%	21.3%	17.0%
2010	58	69.0%	56.9%	29.3%	12.1%
2011	64	56.3%	51.6%	31.3%	12.5%
2012	83	55.4%	44.6%		
2013	63	66.7%	55.6%		
2014	108	67.6%	49.1%		
2015	103	70.9%	59.2%		
2016	89	70.8%	56.2%		
2017	97				

- Amount of scholarships. During the last several years, the amount of scholarship has been more than doubled (from $58,000 in 2007-2008 to $145,000 in 2017-2018), now all from industrial and individual donors.
- Alumni involvement. More and more alumni participate in bi-weekly workshops and scholarship campaigns. During their studies, the Program enhances the culture of sense of belongs and encourage students to give back to the community that they are from.
- During the last several years, the IDEAs Program was awarded and recognized by many professional organizations, including Nation-wide Minority Engineering Program Association, NAMEPA, Akron Urban League, Project GRAD Akron, Academic Achievement Program (AAP), Office of Multicultural Development (OMD), etc.

The IDEAs self-study shows the overall graduation rate during the last twenty years is about 53%, which means many minority students takes more than six years to graduate comparing to their peers with similar ACT scores. Lack of exposure to academic excellence and good study habits towards mathematics/engineering courses is still the main barrier of student success.

Resources

The amount of underrepresented engineering students, overall, at UA has increased by about 180% in the last ten years, but the program is still serviced by one single person – the Director of the IDEAs Program. There are no other full-time employees devoted to this program, though the director uses what can be available from other resources (e.g. admin help, student help, etc.) Since the College of Engineering is, administratively, vastly underfunded relative to other engineering institutions, no additional resources can be diverted towards helping IDEAs.

The Director of the IDEAs Program reports, administratively, to the Assistant Dean of Recruitment, Retention and Marketing.

Position / Employee	**Key Functions**
Director of the IDEAs Program / Julie Zhao	Develop and manage the IDEAs Program

Financials:

The program budget for the IDEAs during the last academic year is about $25,000 and all of it (and more) is expended. More detail is found in the "Graduate Studies and Administration" report. Note that all of IDEAs scholarships are from external funding and many activities are industrial sponsored.

Equipment and Technology

Not applicable

Space

This program has one office for the Director and a study hall in Schrank Hall North 353.

Future Plans

- Enhance the culture of friendly and home-away from home learning environment, by continuing structured programs such as Ambassadors, Open House, Scholar Greet and Meet, NSBE/SHPE Pizza Social, Thanksgiving Potluck Dinner, Book Clubs, etc.
- Provide peer support to freshman and sophomore students for better study habits toward engineering. With our best practices in mind, the focus would be “early action”, such as “retention starts at recruiting and orientation”, “intrusive advising through peer support”, and “early major awareness”.
- Design programs for career awareness and professional development. With support of the IDEAs Advisory Council, more targeted training workshops and information sessions will be provided.
- Develop a new program for target recruiting to ease the impact of admission policy change.
- Support NSBE and SHPE to offer social activities. During the last ten years, students leaders have been trained and supported to make both NSBE and SHPE appearance and stronger, which help develop the culture of diversity and promote inclusive excellence.
- Market the IDEAS Program and develop strong working relationship with local industry and sponsors.
- The IDEAs program will need a new director as the current director is now the Assistant Dean. She will work in both roles in the short term until such time as a plan for an additional person is developed and implemented.

Co-operative Education and Placement – College of Engineering

Basic Facts and Description of the Unit.

Mission

The primary function of the Engineering Co-op and Placement Office provides career education and advising to all eligible and interested undergraduate engineering students in respect to over a 104 year old experiential learning program as well as assisting seniors and alumni in full-time placement. The main priority in the Engineering Co-op and Placement Office is to secure a paid practical work experience related to the student's engineering academic curriculum. In addition, we provide services to ensure connections in placements for all undergraduate and full-time students, the office works diligently with all eligible students, employers, alumni, College of Engineering administration/faculty/staff and the University partners.

Primary Services.

The Engineering Co-op and Placement Office educates students on the hiring process, review resumes, and assists students/alumni in finding an internship, co-op, or a full-time position. We maintain an updated resume database for co-ops, upcoming graduates, recent graduates, and experienced alumni. The Office updates a database of over 2000 employers, as well as engineering salary statistics for Co-op and Full-Time by semester.

Services Provided for Students/Upcoming Graduates:

- One on One Meeting with each incoming Sophomore or Transfer
- Workshops: Orientation into Co-op, Interviewing Skills, Resume Building, Sign-Out (Going on Co-op), Return Meeting (Returning from Co-op), Employer Information Sessions, Senior Exit Meeting (collect data for College of Engineering)

Services for Employers:

- Post positions to Students/Graduates
- Set up Interview Schedules on or off campus
- Provide Salary Statistics (co-op and full-time)
- Host Information Sessions, Tabling Events, Office Hours
- Liaison between Employer and College of Engineering

Critical partners.

- Inside College of Engineering:
    - Administration, Departments, Advisory Councils, Student
- Outside College of Engineering:
    - Career Services, Alumni, Development
- Outside The University of Akron:
    - Community Outreach Organizations, Private and Government Employers (about 2000)

Customers or end-users of your services.

All engineering students, HS students, industries/companies, engineering departments

Key performance analysis and assessment

The two key performance metrics utilized are numbers of placements for co-op and full-time employment rates. As can be seen in Figure 1 below, placement rates for co-ops are continually increasing.

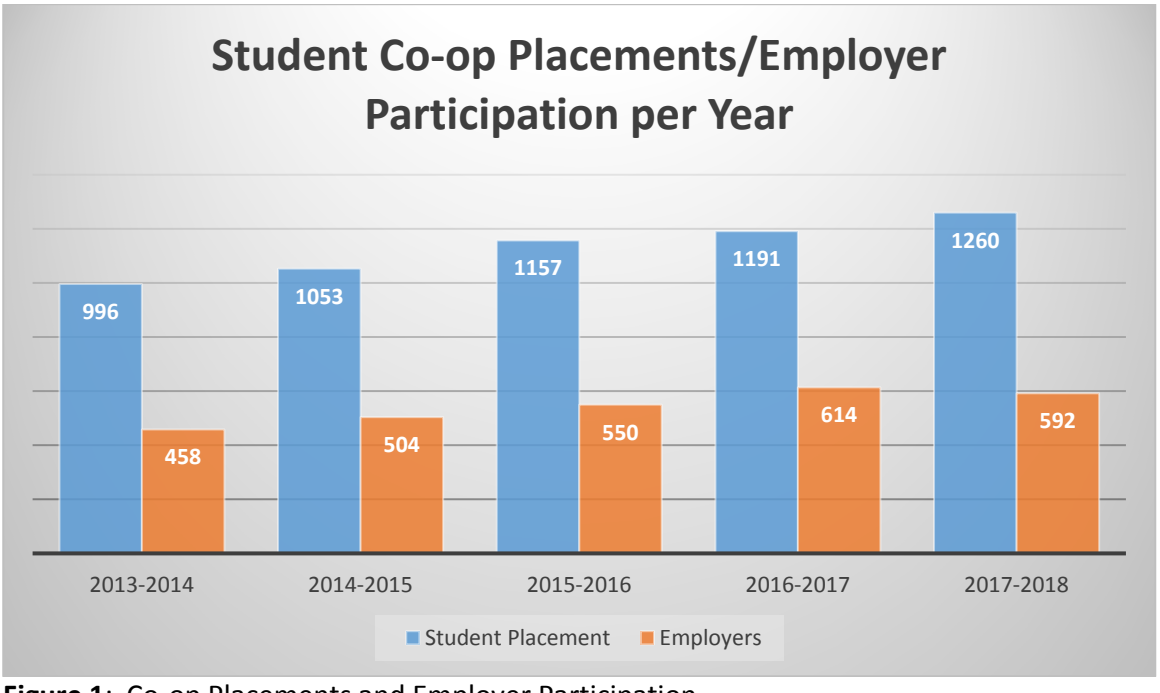


Figure 1: Co-op Placements and Employer Participation

As far as full-time employment is concerned, Table 1 below provides information on the strong placement rates for engineering graduates.

Table 1: Placement rate for B.S. Engineering graduates

Graduation Date	**Full-Time Placement or Continuation in Education after Graduation**
May 2015	96%
May 2016	88%
May 2017	94%
May 2018	- In Progress

The office also tracks career fair participation. There are two career fairs every year and the event is held, for convenience, in the Student Union. Other venues have been tried in the past, but the Student Union seems to be the best option at this point. Note that the number of tables is limited to 173 each year and some companies have more than one table.

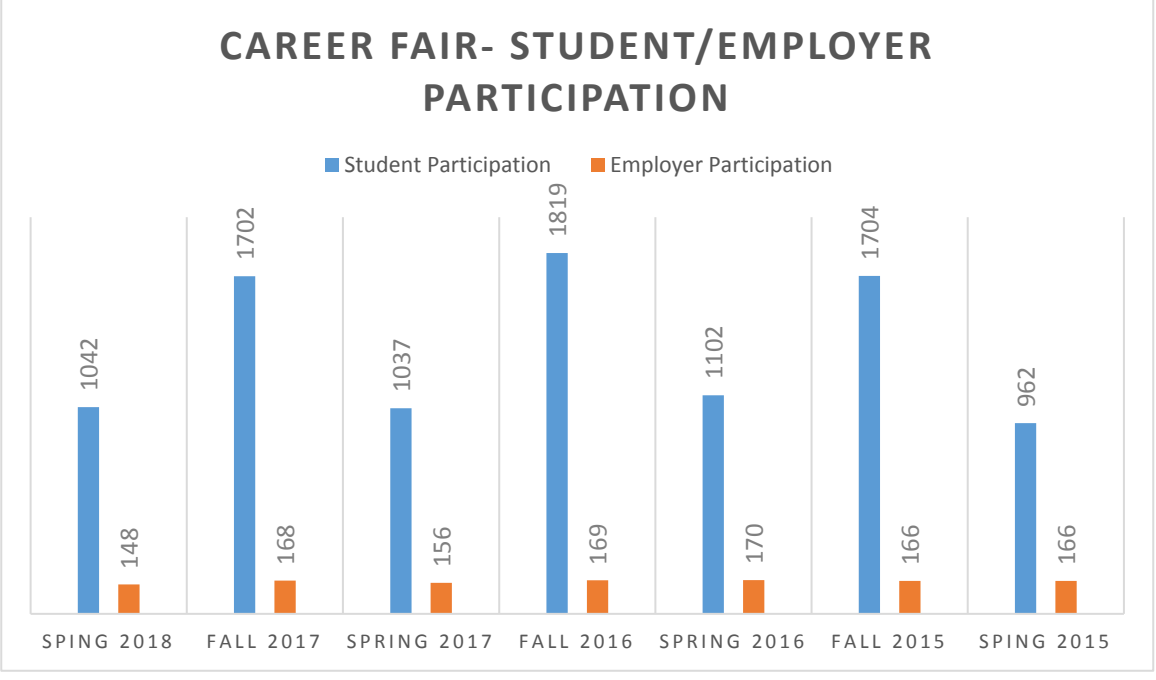


Figure 2: Career Fair Attendance

Resources.

Personnel

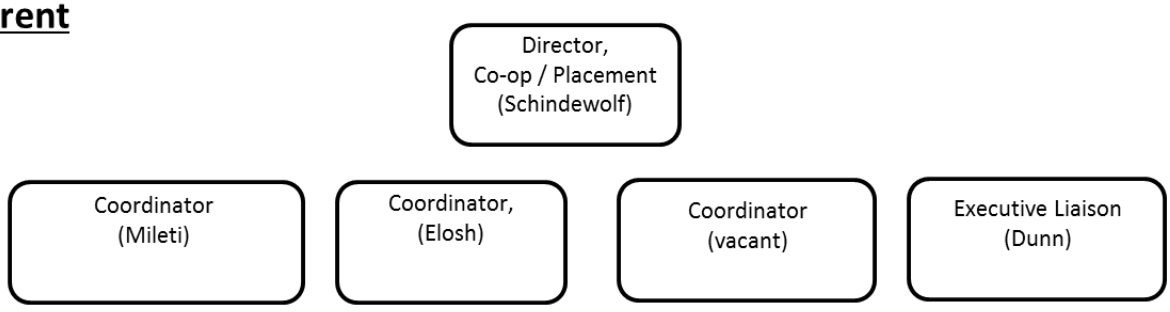
The Co-operative Education and Placement office currently employs the following personnel:

- Director
- Coordinator
- Coordinator
- Coordinator (vacant)
- Executive Liaison – Placements (part-time)

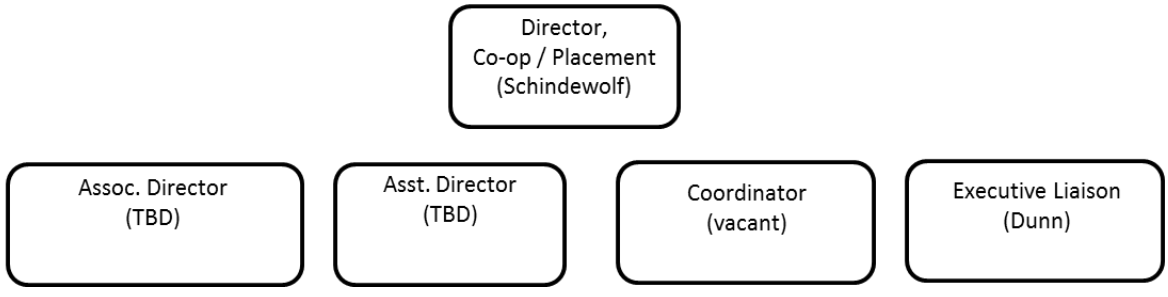
Through the approved restructuring plan, the office will contain the following personnel

- Director
- Associate Director
- Assistant Director
- Coordinator (to be hired)
- Executive Liaison – Placements (part-time; if applicable)

Current



Planned (Sept. 2018)



The current positions, employees and position description are as follows:

EMPLOYEE	TITLE	DESCRIPTION
Stephanie Schindewolf	Director, Co-op Placement and Engineering Alumni Engagement	Provide career guidance, advising and placement for all undergraduate engineering students. Responsible for coordinating all coop/intern and full-time placements within private and government industry. Oversight for Engineering employers and alumni in services/events provided by College of Engineering.
Unfilled	Associate Director, Cooperative Education	Counsel and advise students and alumni on all aspects of career planning. Create and deliver services in regards to placement. Solicit positions ranging from intern/coop to full-time positions. Coordinate coop/internships and full-time placement, organize all levels of the Engineering Career Fair, present career related information to groups of students and assist with computerized career management tools.

Unfilled	Assistant Director, Cooperative Education	Serves as career adviser for students and alumni with regards to career development, co-op internships, and job placement. Maintains database of students and employers. Provides support to the leadership team to assist with scheduling of events, marketing career service events, corresponding with faculty, and maintaining student programs in DPR.
Unfilled	Coordinator, Cooperative Education and Alumni Engagement	Serves as career adviser for students and alumni with regards to career development, co-op/internships, and full-time placement. Plans and implements programs for current seniors and recent graduates with the goal of creating early class identification, deepening alumni interest in the College of Engineering. Maintain communication with alumni and Development Department.
Deanna Dunn (Part-Time)	Executive Liaison Engineering Industrial Placements and Development	Cultivate and sustain external relationships with engineering employers and/or engineering alumni for the purposes of both engineering placements and engineering development. Work with the Office of Development, including Alumni Office, to support goals of the College of Engineering.

Note: Two of the three unfilled positions will very likely be filled by current employees (Mileti and Elosh)

Financials.

Fiscal Year	Operating Budget	Operating Expenses	Difference
July 2017-June 2018	$18,000	$15,367	$2,633
July 2016-June 2017	$14,500	$15,815	($1,3,15)
July 2015-June 2016	$14,500	$19,767	($5,267)

Where the expenses have exceeded the budget, other accounts have been used to make up for the short-fall.

Space.

The Engineering Co-op and Placement Office is in the Auburn Science and Engineering Center. It has the following dedicated space:

Engineering Co-op and Placement Office: 224 A, B, C
Interview Rooms: 125, 127, 128, 129

Future Plans.

- A program was designed to establish and maintain student paperwork in a more paperless process. This will begin in Fall 2018.
- Increase Employer Engagement
    - Adding two events:
        - Employer Golf Outing- September 23rd at Mayfair Country Club
        - Employer Recognition Breakfast and Reverse Career Fair: March 15th in Student Union
- Increase contact with Alumni, which increases opportunities for our Co-op and Full-Time
- Add a position- Coordinator, Cooperative Education and Alumni Engagement
    - Begin an Engineering New Graduate Alumni Group and Database
- Faculty Communication:
    - Participate more regularly in Engineering Department Meetings to educate faculty on the industry changes, requests, and placement statistics.

Administrative Activities Review – FY18
Department of Biomedical Engineering

I. Basic Facts and Description of the Unit

a) Mission and goals.

The Department of Biomedical Engineering is one of the 5 academic departments in the College of Engineering (COE) at The University of Akron. The Department of Biomedical Engineering's mission is to provide quality education and applied learning at the interface of engineering and medicine, improve health outcomes through interdisciplinary scientific discovery, and engage the community through partnerships and outreach.

The BME department met this past year and created the following key goals:

1. Increase both the quality and quantity of the BME Department Faculty and Student bodies
    a. Examine undergraduate trends
    b. Optimize undergraduate learning
2. Increase recognition of our program beyond our region
    a. Set up REU within 5 years
    b. Possibly start pilot REU program at UA
3. Increase the impact of our programs through regional industrial and clinical partnerships
    a. Evaluate Professional MS options.
    b. Possibly team with Law and CBA (Regulatory, QA and Project Management program).

b) Services.

The services provided by the department can be categorized in four areas: Student and Curriculum, Finances and Staffing, Recruitment, and Faculty. Table A lists some of the most common tasks that the department performs in each of these categories, with an approximate percentage workload assigned to each category.

Table A: Services provided by Biomedical Engineering.

Student and Curriculum (60%)	Finances and Staffing (20%)	Recruitment (10%)	Faculty (10%)
Mentor Design teams	TAARS	NSO, Visit Days, Individual Tours	RTP items
Advising students	Space Audits	Website Maintenance	Technical services to faculty
Technical services to students (labs)	ECRT	Graduate Admissions (Eval & Paper)	Seminars
Transfer Review	Payment NET (approval/Review)	Faculty recruitment	Merit review
Degree Clearance	Travel authorizations	Manage outreach activities	
ABET	Manage Accounts		
Class Scheduling	Time sheet approval		
Curriculum management proposals	Development and Advisory Boards		
Exit Interviews	Faculty/Staff appointments		
Lab and software maintenance	PAF and RFP		
Front desk services	Scholarships		
Course maintenance	Purchasing		
Teaching evaluations	GA contracts		
Managing course registration issues	Performance evaluations		
Managing post-bac transfer credits			

The administrative load for those performing items in Table 1 is considerable. In additional to the typical daily paperwork, examples include the following:

1. Administered a Faculty Search (October, 2017-April, 2018)
    - 122 total applicants
    - Scheduled 16 Skype interviews
    - Scheduled 4 in-person interviews

2. Issued paperwork for graduate student contracts. For FY 2018 (typical for each year since 2014), BME has:
    - 24 current Ph.D. students
    - 2 M.S. students (1 graduated, 1 graduating Dec., 2018)

3. Employed 13 undergraduate employees on an annual basis.

4. Coordinated process for assessing and issuing contracts for incoming accepted graduate students (typically five or six students each year).

5. Processed paperwork for Visiting Research Scholars (two for 2018/2019).

6. Scheduled Colloquia each semester (this includes distributing flyers, scheduling meetings, making travel arrangements for each speaker). Each semester there are eight speakers (i.e., sixteen each year).

7. Hosting conferences related to the field of Biomedical Engineering. Over the past 5 years, UA has hosted:
    - Two regional meetings of the American Society of Biomechanics
    - Regional Conference of the Biomedical Engineering Society
    - Two HealOhio wound healing conferences
    - Conquer Chiari Conference (led by Mechanical Engineering, but BME assisted)
    - National conference funded by NSF and focusing on diversity in BME
    - NSF conference focusing on underrepresented doctoral students
    - Five BEST Medicine Events.

These conferences attracted on average about 150 participants (ranging from the NSF conference for underrepresented doctoral students with about 15 participants, to the regional BMES conference or BEST Medicine events with about 300 participants).

8. Preparing newsletters (available at https://www.uakron.edu/engineering/bme/newsletters.dot) that get distributed to about 4,500 individuals nationally and internationally.

Critical partners. Dean's Office (for faculty appointments, PAF's, Scholarships etc), and Graduate School (for GA Contracts), Human Resources (TAARS, faculty and staff recruitment), Purchasing (PaymentNET), Admissions Office (to coordinate department visits as part of campus tours), Inclusioneers (an external non-profit organization that helps mentor BME Design Team members). IT Department (for software and computer issues), and UA Digest (for announcing seminars).

Customers or end-users. Undergraduate students (for scholarships), graduate students (for contracts and appointments), faculty and staff (for travel authorizations, summer PAF's and performance evaluations), High School students (for campus visits), graduate students (for contracts and appointments), middle school students (for outreach activities).

Key performance analysis. Metrics showing student enrollment (Figure 1) and staffing comparisons to similar midwest public universities (Table B) show (i) significant increase in student enrollment and (ii) the BME department is understaffed compared with other BME departments – especially in administrative staff of similarly sized departments.

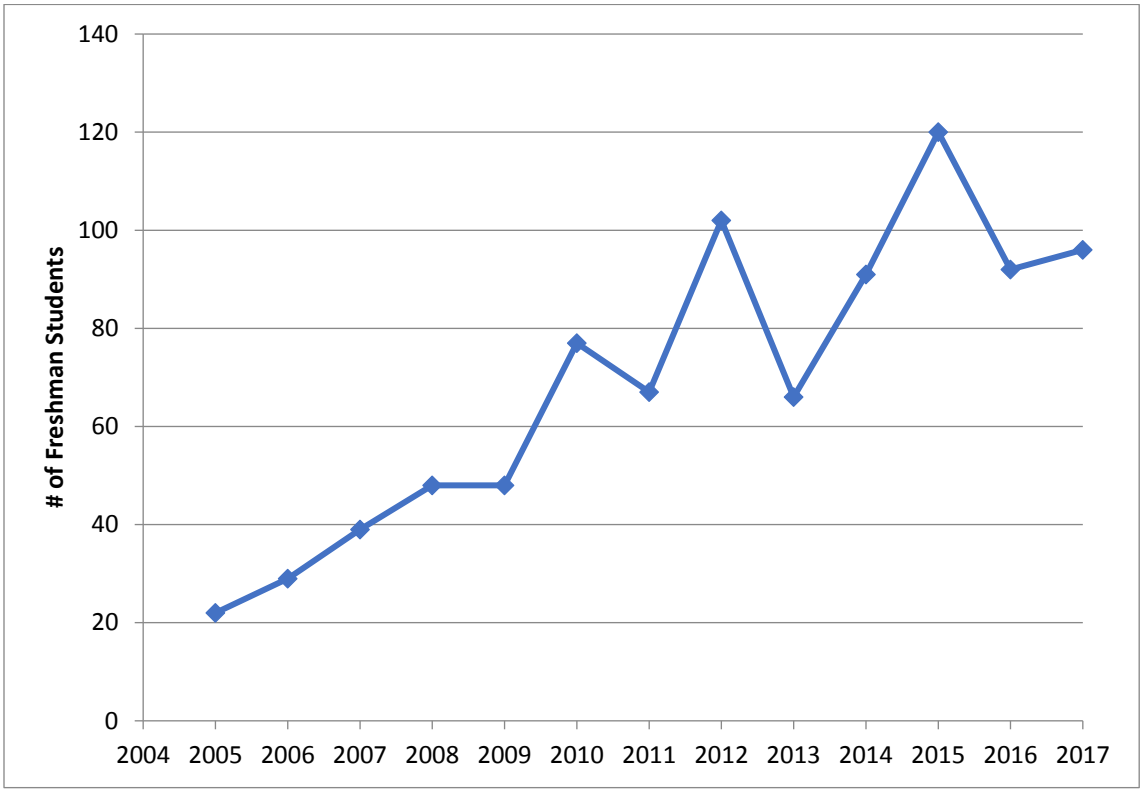


Figure 1. Freshman student enrollment in BME.

Table B. UA BME Faculty Comparison with the National Average

	National Average	UA
Average # Full Profs	6.1	2
Average # Assoc Profs	5.9	4
Average # Asst Profs	5.22	2
# NTT	3.6	2
# Open Faculty slots	2	0
# Admin Staff	6.3	2
# Undergrads (Yr2 - 4)	298	300

Table B. The BME department has far fewer faculty members in 2017 when compared with previous years, and has far fewer faculty when compared with Midwest public universities. This trend also applies to Administration Staff (about one third national average).

Brief assessment.

The BME Department is a high-achieving department that attracts outstanding students (average incoming GPA is 3.9 for direct admits), and has faculty who, on average, have more than one federal grant supporting their research. The department is the second largest in the College, yet has the smallest operating budget.

Each year the department hosts an event, "BEST Medicine", an engineering fair aimed at attracting the best students from NE Ohio to Akron. Over the past 5 years, the number of participants from 6^{th} to 12^{th} grade has ranged from 100 to 130 students. From 2012 to 2016 the BME department had a staff person (Dr. Carin Helfer) who was responsible for coordinating outreach efforts. She organized summer camps, co-chaired the "BEST Medicine" Engineering fair and hosted K-12 students. These responsibilities are now handled by the Chair, Associate Chair and other faculty.

The greatest barrier to enrolling higher numbers of quality students is simply the time it takes interacting with prospective students and their families. Nevertheless, the BME department has actively supported high school recruiting efforts of the College of Engineering to educate and interact with high-school age students, prior to the application process. Cumulatively, these efforts have resulted in high retention levels (Figure 2).

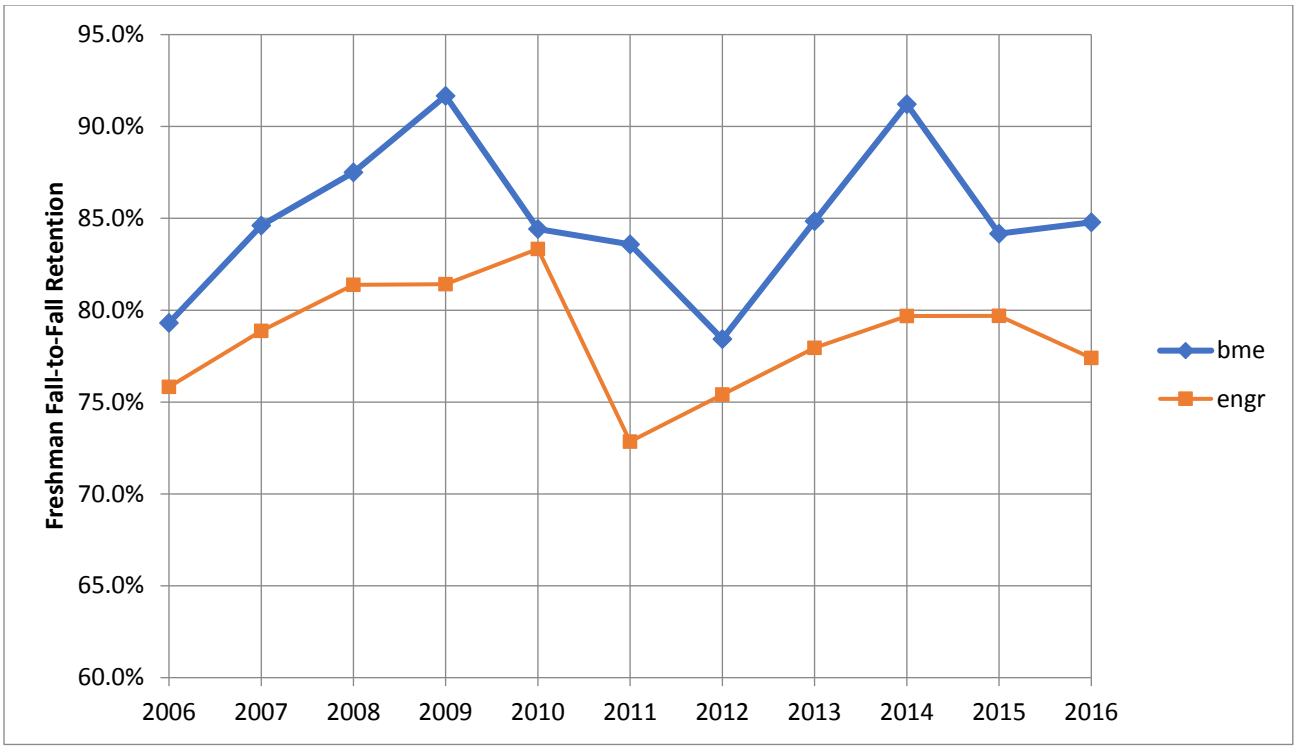


Figure 2. Retention of BME students from Year 1 to Year 2 relative to the College average. In every year, BME students are retained at a higher rate.

c) Resources.

1. Personnel.

The overall organizational chart (Figure 3) for Biomedical Engineering includes eight faculty, a Chair and two staff members. For a department with 409 students these resources are stretched thinly to accommodate the tasks required (Table C).

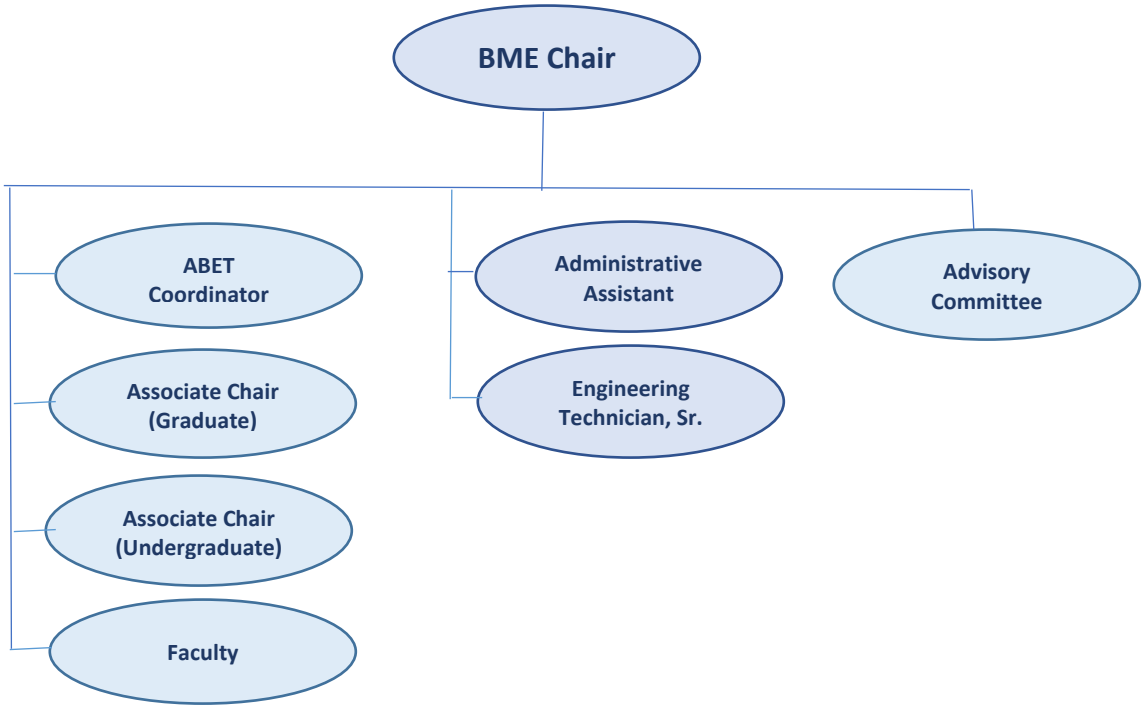


Figure 3. BME Organizational Chart. Detailed descriptions for each person (and the Advisory Committee) are given in Table B.

Table C. Descriptions for BME Personnel.

Titles / Employee	**Description of key functions of each position type**
BME Chair / Brian Davis	Oversees the administration of the department.
Associate Chair (Undergraduate) / Larry Noble	Coordinate New Student Orientations, Advise BME Students – particularly transfer students, Represent BME at recruiting events, Handle curriculum issues, Manage exit interviews, Deal with PERC reports.
Associate Chair (Graduate) / Yang Yun	Represent the department at recruiting events (such as national BMES conference), Coordinate review of applicants and selection process, conduct graduate student orientations, advise graduate students and help with advisor selection.
ABET Coordinator / Larry Noble	Prepare for ABET reviews.
Faculty	Teach graduate and undergraduate students, advise undergraduates, write proposals and conduct research, assist with service activities (student recruitment, commencement ceremonies, committee participation), contribute professionally to the field of biomedical engineering.
Administrative Assistant / Sandy Vasenda	Assist Director with administrative issues of department including financial, student contracts, payments, colloquium, and visitors.
Engineering Technician, Sr / Steve Patterson	Maintain equipment and software within the department, maintain inventory lists, respond to technical requests from faculty and students, manage high-end systems such as 3D printers, Instron test equipment, microscopes etc., respond to requests for door-access or computer access, assist BME Design Team and Capstone design teams.
Advisory Committee	Provide advice to faculty and BME Chair

2. Financials. BME's budgeted and actual expenses over the past five years (Table D) are at odds with what one would expect from an academic department with over 400 students. The national average (Table A) show faculty and staffing levels two to three times higher than those at UA.

Table D: Operating Expenses for BME

	Budgeted	**Expended**	**Deficit**
2014	26,439.78	26,439.78	0.00
2015	37,778.91	38,318.58	-539.67
2016	38,300.00	43,653.85	-5,353.85
2017	39,682.00	44,165.47	-4,483.47
2018	35,288.81	35,893.49	-604.68

3. Equipment and technology. Over the past 5 years, the department has upgraded much of its equipment in both the Auburn Science and Engineering Center (Table E) and the Olson Research Center (Table F).

Table E. Major Equipment in the Auburn Science and Engineering Center

ASEC	Labconco Biological Safety Cabinet
ASEC	Labconco Biological Safety Cabinet
ASEC	Labconco Biological Safety Cabinet
ASEC	Labconco Biological Safety Cabinet
ASEC	SPECTROPHOTMETER
ASEC	CENTRUFUGE WITH 2 CO2 WATER JAKETED INCUBATOR
ASEC	GONIOMETER MODEL 250
ASEC	DEMO AXIOOBSERVER MICROSCOPE
ASEC	TEKTRONIX OSCILLOSCOPE MODEL 2465
ASEC	SONY/TEKTRONIX OSCILLOSCOPE 336 50 MHZ DUAL TRACE DIGITAL W/CART
ASEC	AMTI FORCE PLATE SYSTEM I W/STRAIN GAGE FORCE PLATE
ASEC	AMTI FORCE PLATE SYSTEM 1
ASEC	10 CHANNEL MA 100 EMG SYST EM
ASEC	VICON MOTION CAPTURE SYSTE M
ASEC	MakerGear M2 3D Printer
ASEC	RAMAN SPECTROMETER
ASEC	MakerGear M2 3D Printer
ASEC	MakerGear M2 3D Printer
ASEC	HYPERSPECTRAL CAMERA (Too small to tag)
ASEC	JAVELIN SERIES FORCE GUAGE WITH STAND
ASEC	CORE 2 DUO 2.53 GHZ CONTRO LLER WITH WINDOWS XP TAN KUKA ROBOT CONTROLLER
ASEC	OPTOTRAKCERTUS SYSTEM COMPLETE SYSTEM-TAN
ASEC	SPINE
ASEC	Lab Equipment-KUKA ROBOT
ASEC	HPTLC BASIC KIT 10X10, CONSISTING OF NANOMAT 4
ASEC	INSTRON 3343 TESTING MACHINE
ASEC	INSTRON 3343 TESTING MACHINE
ASEC	INSTRON 3343 TESTING MACHINE
ASEC	INSTRON 3345 TESTING MACHINE
ASEC	IMPERIAL OPTICAL TABLE 4.8' X 8' X 8.3"
ASEC	1 CHANNEL OXYLITE TISSUE p02 AND TEMPERATURE MONITOR
ASEC	SANTEC TSL-510 TUNABLE LASER
ASEC	EPILOG MINI 18 LASER SYSTEM
ASEC	TEKTRONIX 1GHZ DIGITAL OSCILOSCOPE, DP04000
ASEC	TENNEY TEST CHAMBER, 1.25 CU.F

Table F. Major Equipment in the Auburn Science and Engineering Center

OLRC	SPECTRAMAX M2 (REFURB)
OLRC	CENGTRIFUGE (SORVALL LYNX)
OLRC	SORVALL LENGENT RT FREE RO TO SR#40404529
OLRC	MICROSCOPE E155 AXIOVERT 200 MANUAL W/ACCESSORIES
OLRC	PLASMA CLEANER PDC-001
OLRC	PIN TOOL - 3P AUTOMATED LIQUID HANDLER DI
OLRC	EPPENDORF MASTER CYCLER, MICROCENTRIFUGE 5254R and EPPENDORF 5804R CENTRIFUGE
OLRC	FLUORCHEME BLOT IMAGING SYSTEM
OLRC	PLATE READER SYNERGY HI
OLRC	INCUBATOR THEMO FISHER
OLRC	CABINET BIO UV 8IN A2 5FT 115V
OLRC	CABINET BIO UV 8IN A2 6FT 115V
OLRC	Carl Ziss microImaging AxioCam MRm Rev. 3w/Fire Wire
OLRC	Carl Zeiss MicroImaging Axio Observer A1 Kit
OLRC	96 CHANNEL DISPOSABLE TIP HEAD
OLRC	BRAVO LIQUID HANDLING PLATFORM
OLRC	DENSITY METER MODEL DA-100M
OLRC	STERLIZER
OLRC	CRYOSTAT CM1860
OLRC	Eppendorf Centrifuge 5810 R
OLRC	Synergy H1 Mono RDR
OLRC	COLOR CAMERA FOR MICROSCOPE
OLRC	MAIN MICROSCPE OBSERVER.Z1
OLRC	RHEMOTETER (RFS LLL)
OLRC	PURE LAB MODEL Part #PS-MD-2 Innovative Tech
OLRC	METTER TOLEDO TXP BALANCE 220G
OLRC	SUPER CENTRIFUGE
OLRC	BIAXIAL TESTING BASE AND CAMERA SYSTEM
OLRC	ATOMIC FORCE MICROSCOPE
OLRC	-80 FREEZER 20.5 CU FT FORMN 8600
OLRC	LOW TOC RODI
OLRC	Bose Testing Machine
OLRC	FORMA WJ Co2 INCUBATOR THEMO SCIENTIFIC
OLRC	SORV LEGENDX1CENTPKG TC16/36 Centrifuge
OLRC	AXIOCAM MRC REV. 3 WITH FIREWIRE
OLRC	ROTATING WALL BIOREACTOR
OLRC	SO LOW -80 DEGREE CHEST FREEZER MODEL NC85-3
OLRC	DEMO ZEISS AXIOOBSERVOR WITH MOTORIZED SCANNING STAGE
OLRC	BIOTEK SYNERGY HTX MULTI-MODE MICROPLATE READER
OLRC	MUSE CELL ANALYZER, EMD MILLIPORE, CLASS 1 LASER PRODUCT
OLRC	DIGITAL ULTRASONIC MEASUREMENT SYSTEM
OLRC	HEART PUMP SIMULATOR PUMP
OLRC	AB-FM100Z MEZOSCOPE

In addition to these major pieces of equipment, over the past 5 years, BME has upgraded or purchased:

- Departmental central computer consisting of:
  - 146 GB drives for the operating system
  - Six 3 GB drives for data
  - The server has 6 HD drives left for expansion.
- Laboratories for Drs. Zhang, Amini, Yu and Liu
- Roof repair to Olson
- Improvements to air handling systems in Olson
- Replacement/improvements of carpets, doors, ceiling tiles, wall poster mounts and office furniture.
- Card swipes for all teaching laboratories in ASEC
- Replacement laptops
- New screens, projectors and microphone systems for teaching labs in ASEC:

4. Space. BME is split between two locations: Olson Research Center (OLRC) and the Auburn Science and Engineering Center (ASEC). The former houses most of the research laboratories, whereas all the teaching labs are in ASEC (Figure 4).

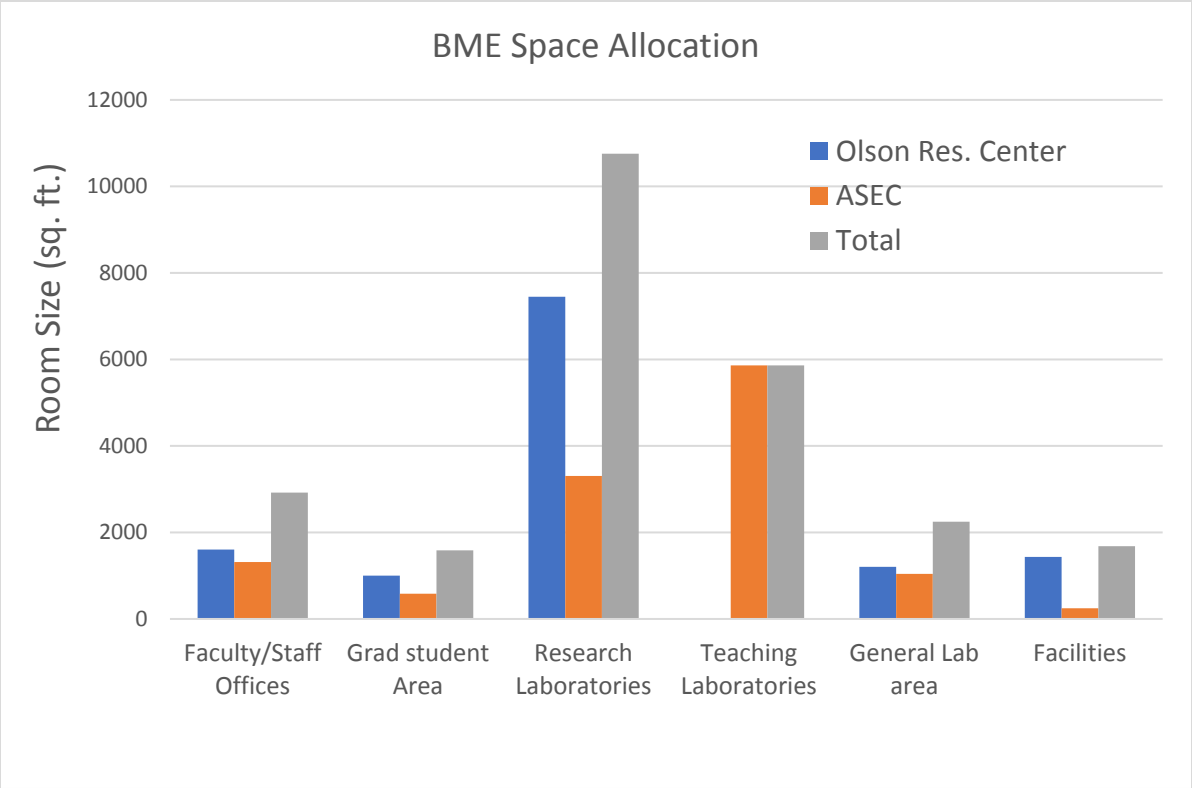


Figure 4. Offices and laboratories are located in Olson Research Center (12,695 sq. ft.) and the Auburn Science and Engineering Center (ASEC, 12357 sq. ft.).

II. Future Plans.

A. Short-term Objectives

The BME department met this past year to review existing and develop new strategies for strengthening the department. Faculty identified objectives in key opportunity areas of research, teaching, and service from which actionable items are being explored.

Our first objective was to increase the impact of the department research. We believe that BME research programs provide opportunities for students and faculty to engage communities, expand program recognition through conferences and publications, and serve to attract new students and faculty to the university. Actionable items for the research opportunity area involve interaction with leading research institutes such as Cleveland Clinic, obtaining faculty/student research opportunities at national funding agencies, increasing faculty participation in the I-Corps program, working with the University Development Department to identify new opportunities, and collaborating with medical schools such as NEOMED and Case Western Reserve University.

Increasing research furthers the impact, but this requires additional laboratories. At the end of Spring 2018, there were two offer letters that were sent to two potential faculty hires. Unfortunately, these individuals did not accept the offers, and the BME search was cancelled. Looking forward, it is imperative that new tenure-track (or tenured) faculty join the department.

The second objective relates to stabilizing our educational program. As part of the teaching area, we need to not only retain current faculty members, but to cease the outflow of faculty. The department has experienced a 100% increase in outflow over the past decade despite a growth of 400% in student numbers. Therefore, we must increase our department faculty consistent with other university benchmarks. For instance, the BME Department at University of Davis, California has a similar undergraduate student body of ~400, but with four times as many faculty members. Louisiana State University BME has the same number of faculty as UA BME, but four times fewer students, and these are but two of numerous examples. It appears that at a minimum we need to get back to our 2x factor, but quality growth that is expected by ABET cannot be achieved without considering 4x as our target growth factor. Towards this end, new tenure track hires are desperately needed to replace those faculty that exited this past year in areas of biomechanics, bioinstrumentation, and a new strategic area of machine learning and artificial intelligence.

The third objective relates to developing relationships with healthcare institutions and industry. In order to improve our educational programs, we seek to integrate more regulatory affairs curriculum into our program. This will involve introducing it to freshman in “Intro to Design”, as well as to the seniors in “BME Design I and II”. Further, we can serve a broader population by offering a regulatory affairs certificate program, which would be useful for local industry as well as graduate students that are interested in medical device commercialization.

The fourth objective relates to visibility. By engaging in public/private partnerships with industry and medical institutions, we believe we will increase the department’s visibility, thus creating greater desire to interact with faculty and students. These partnerships can be created through capstone team projects, faculty projects, consulting and grants, and direct interaction with industry including startup companies which seek technical expertise in our department. Student design teams work on many high quality projects that serve locals in need of assistance. Recognition of

their work frequently gets minimum public exposure. By providing newsworthy stories to press release organizations the university and BME department will expand their regional exposure and potentially increase the geographic student base. Further, the news may bring opportunities to collaborate with a broader population who can benefit from student design projects.

A large opportunity for showcasing our finest students is through the development of Senior Design Capstone Day where all the student projects are presented in one forum. This can be expanded to invite the BME advisory board members, industry leaders, and even invite middle and high school students. In order to attract the greatest population, we can have a sponsored luncheon, co-located research poster event, and or design competition.

B. Potential changes.

The current Chair of Biomedical Engineering (Dr. Brian Davis) is transitioning to a new role as Director of Research in the College of Engineering. In parallel with this change, the Associate Chair who is responsible for the Graduate Program (Dr. Willits) is transferring her responsibilities to Dr. Yang Yun. These two changes in leadership create both hurdles and opportunities for the department. For instance, the department needs to take care of critical issues such as faculty recruitment, preparations for an ABET review, and administer all the tasks that are the hallmark of an academic department (Table B). On the positive side, the department has recruited top-quality students over the past 4 years, and these students are committed to graduating from UA (Figure 3). The leadership changes are therefore unlikely to affect students currently enrolled in the BME program.

C. Trends.

There is a profound need for graduates in biomedical engineering. At the national level, the biomedical industry stands out as a key driver for future economic growth driven by aging populations and rising purchasing power for medical advances among developing countries.

- From 2001 to 2010, the U.S. bioscience industry gained jobs, despite wide-spread job losses across the U.S. During that time, the bioscience industry grew by 6.4 percent, adding more than 96,000 jobs. By comparison, total employment for all private sector industries in the U.S. fell by 2.9 percent, losing more than 3 million jobs.
- The U.S. bioscience industry, in addition to weathering the recession much better than the overall economy, also led other knowledge-based industries, such as information technology services, aerospace, computer equipment, and finance and insurance, all of which recorded net job losses during the same period.
- The bioscience sector continues to be a source of high-wage jobs. The average bioscience job paid $82,697 in 2010, $36,000 more than the average private sector job.
- The need for graduates in biomedical engineering is increasing. The Bureau of Labor Statistics predicts a 23% growth in employment for biomedical engineers from 2014 to 2024 due to the increase in the use of technology and the aging population. The growth is “much faster than the average for all occupations”

In 2014, the City of Akron and the Knight Foundation engaged with Battelle to survey the biomaterials sector within the Greater Akron region. Battelle’s findings included the following:

- There is significant potential to create a comparative advantage for the region within the biomaterials and biochemicals industrial sectors.

- The biomaterials opportunity represents more than 100 individual establishments employing more than 5,100 - nearly five times as specialized as the nation.
- Nationally the majority of bioscience-related research spending is in the medical sciences field.
- The Greater Akron Region lacks a highly-skilled bioscience workforce and has few scientists and engineers driving value-added innovation in its bioscience economy.

Administrative Activities Review – FY18
Department of Chemical & Biomolecular Engineering

I. Basic Facts and Description of the Unit

a) Mission and goals.

The Department of Chemical & Biomolecular Engineering is one of the 5 academic departments in the College of Engineering (COE) at The University of Akron. The department has a total of 20 full-time faculty members (18 tenured or tenure-track, 2 non- tenure-track), which are supported by a staff of three technicians and three administrative assistants. In Fall 2017 there were 566 students enrolled in our programs (480 undergraduate and 86 graduate). The department offers BS, MS, and PhD degrees in Chemical Engineering and a BS degree in Corrosion Engineering. Both of our undergraduate degree programs have full ABET accreditation. Our strengths are a strong research program with extensive involvement of undergraduates and the cooperative education program. We maintain active research programs in corrosion, polymers, biotechnology, sensors, multiphase engineering, and reaction engineering.

Our goal is to offer academically strong programs through a balanced approach of high quality teaching and research. Even though our undergraduate student enrollment has been growing vigorously (an 87% increase during 2011-2017), we still maintain both a robust research program and an emphasis on excellent teaching.

b) Services.

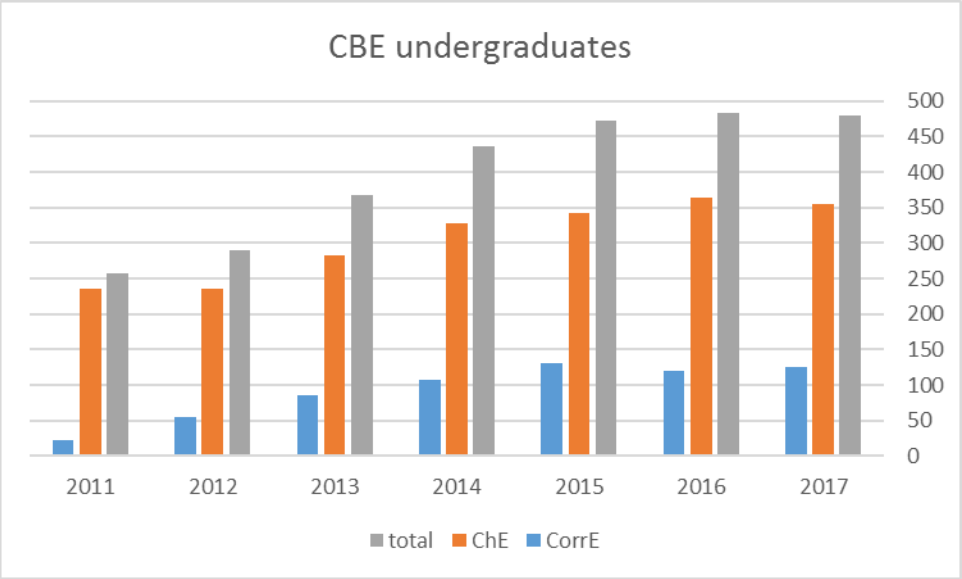
The services provided by the department can be categorized in four areas: Student and Curriculum, Finances and Staffing, Recruitment, and Faculty. The table below lists some of the most common tasks that the department performs in each of these categories, with an approximate percentage workload assigned to each category.

Service Provided by Chemical & Biomolecular Engineering			
Student and Curriculum (50%)	**Finances and Staffing (20%)**	**Recruitment (10%)**	**Faculty (20%)**
mentor teams	space audits	NSO, Visit Days, Individual tours	RTP
advising students	ECRT	website maintenance	technical services to faculty
technical services to students (labs)	PaymentNet	graduate admissions	seminars
transfer review	travel	faculty recruitment	merit review
degree clearance	manage accounts	manage outreach activities	
ABET	time sheet approval		
class scheduling	PAF and RFP		
curriculum proposals	Faculty/staff appointments		
exit interviews	purchasing		
computer and software maintenance	GA contracts		
front desk services	performance evaluations		
course maintenance			
teaching evaluations			
managing course registration issues			
managing post-bac transfer credits			
Industrial Advisory Board			
scholarships			

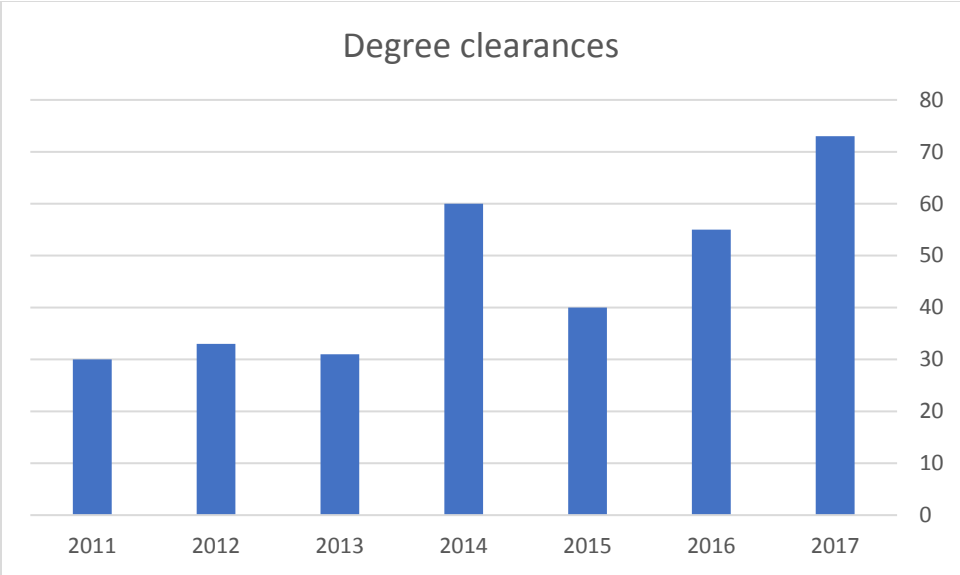
(i) **Critical partners**. To perform the services listed above, the department interacts with many other units at UA, including: COE, Scheduling, HR, Purchasing, ORA, OAA, Graduate School, etc.

(ii) **Customers or end-users of services**. Our main customers are the students (90%). We also serve local companies and state/federal agencies (10%) through co-op, research, and service projects.

(iii) **Key performance analysis.** The metrics we use to measure performance include enrollment, retention, graduations, placement, and generated revenue. Charts and comparison with peer institutions on some of these metrics were presented in the recent APR report. The largest growth has occurred in our undergraduate student numbers (graduate numbers have been relatively constant in the range of 80 to 100 in recent years). The chart below shows the undergraduate enrollment in CBE from 2011 to 2017.



Many of the service loads are directly proportional to the number of students served. As an example the chart below shows the number of degree clearances processed for graduating seniors.



The office staff to deliver these services has quantitatively remained unchanged over the 2011 to 2017 period. Qualitatively there was significant turnover (2 of 3) due to "bumping" during the layoffs in the Scarborough era. This effectively reduced the expertise and institutional memory of the CBE staff as the student numbers were increasing.

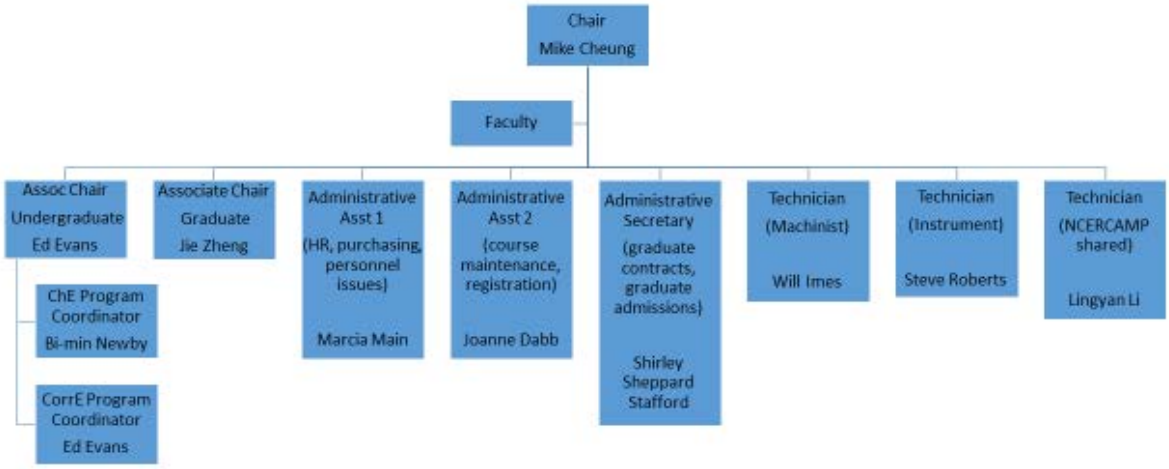
(iv) **Brief assessment.** The department enjoys an excellent reputation among employers in regard to the quality of students graduated. This is sustained by the strength of our co-op program and a dedicated research-active faculty body. However, we are facing increasing competition from area schools which are investing at a much higher rate than us, in starting new programs, hiring faculty, and construction of modern facilities.

c) Resources.

We describe next the departmental allocated resources in four main categories: personnel, financial, equipment, and space. The challenges we face in each category are also discussed.

(i) **Personnel**. The department has a total of 20 full-time faculty members (18 tenured or tenure-track and 2 non- tenure-track), which are supported by a staff of three technicians and three administrative assistants. The department has had a net reduction in faculty over the past few years and has not replaced recent departures. During the past several years, the number of core chemical engineering faculty has declined by two (from 17 to 15) and the number of core corrosion engineering faculty has remained nearly constant at five, but with the turnover of two faculty members. As a practical matter, if current faculty numbers remain as they are we will be able to maintain adequate teaching only by a reduction in research productivity. In the case of the corrosion program the loss of one or two faculty would made even adequate teaching delivery problematic. It is very likely that the reduction in time available to devote to research will cause the more research productive faculty to leave. In terms of staff, the front office complement of three administrative personnel is adequate for providing the services required by

students and faculty. The current complement of three technicians (one administratively shared with NCERCAMP and all providing support as needed to NCERCAMP) is marginally adequate. An organizational chart is shown below.



(i) **Financials.** The CBE core operating budget does not cover the full operating costs of the department, but is annually augmented by expenditures shared with or entirely made using the dept IDC account, as eligible. The table below shows the shortfall in the CBE operating budget for the past few fiscal years.

CBE operating budget and expenses			
FY	budget	expense	shortfall
2018	$56,000.00	$94,810.46	$38,810.46
2017	$70,500.00	$98,084.49	$27,584.49
2016	$70,500.00	$96,708.74	$26,208.74
2015	$71,000.00	$96,905.74	$25,905.74

(ii) **Equipment and Technology.** The department has several instructional and faculty laboratories in Whitby, ASEC and the ERC. The equipment and technology in these labs is mostly adequate, with some of them needing updates or replacement which we try to do annually with IDC or technology funds.

Confocal Microscope
Aqua Solutions and Millipore De-ionized Water Systems

Digital Balances
UV/Vis Spectrometers
Gas Chromatograph
24 ft large-scale distillation unit containing two selectable columns (i) a 12-inch diameter, 12-plate bubble-cap column, and (ii) an 6-inch diameter, 8 ft packed bed column.
Freeze drying system
Rotovaps
Bruker FTIR Bench IFS 66v
Syringe Pumps
Drop Shape Analyzer
Genrad 1531AB (Stroboscopic Imaging)
Pine Instruments Wavedriver 200 Potentiostats
MakerGear 3D Printers

Heat Exchanger Equipment
3 glass reactor systems
Vacuum Furnaces

13" Clausing engine lathe – machining various steels
Powermatic band saw – cutting mild steel
Sharp surface grinder – grinding mild and stainless steel
Linde mig welder – welding mild steel: stainless steel; cast iron; aluminum
Lincoln electric arc welder – welding various steels
Clausing 15" drill press – drilling wood; plastic; aluminum; and steel
Kondia vertical milling machine – machining plastic; steel; aluminum

Ellis mitre band saw – cutting various steels
Delta band saw – cutting wood and plastic
Rockwell 8" belt sander – sanding steel; plastic; wood; aluminum
JET vertical band-saw
JET Horizontal drop saw
JET belt/disc combo sander
JET knee mill w/ DRO, power-feed
JET drill press w/ DRO
Lincoln 225 TIG welding machine
Kam-Weld analog temp control plastic welder
National Metal Shear
National Metal Brake
Sharp Surface Grinder
Consolidated Sterilizer
Ionic Commercial water Softener
Toyota Fork Lift
Multiple Industrial Process Chillers

Environmental Chambers include

- Q-Lab Salt Spray Chambers
- Q-Lab Accelerated Weathering Tester QUV
- Q-Lab Condensation Tester QCT
- Box and tube furnaces
- CSZ Digital control environmental chambers
- Culligan Water system's commercial Di water farms
- Barnstead, Thermo-Fisher high purity Di and RO systems
- MTI Arc Melting System
- Orion Micro Welding system
- Presto Hydraulic Die Lift machine
- Cortest Nuclear Process Loop machine
- Instron Load frame System

Sample Preparation equipment includes multiple:

- Struers High-Precision Cutt-Off Accutom-10
- Struers Polisher Tegramin-30
- Buehler Isomet Low speed sectioning saws
- Buehler manual rotary polisher
- Buehler inline hand polisher
- MSC Glass Bead machine
- HBF Vibratory parts polisher
- Buehler Abrasimatic 300 large bar cutoff saw

Analytical Equipment include

- Leco 300 Metallograph instrument
- TGA/DSC
- Micro-hardness tester
- Cortest SSRT testing machine for slow strain rate testing
- MTS Landmark C45.105 servo-hydraulic test system for static and fatigue tests
- Horizontal MTS hydraulic universal tester

AmScope Phase Contrast Inverted Microscope
Bruker Optical Microscope Contour GT-I 3-D
Olympus Stereoscopic Microscope SZX16
Infinite Focus Microscope Alicona
Tabletop Microscope Hitachi TM3030
TESCAN LYRA-3 Model XMU Integrated Variable Pressure FIB-FESEM
Nikon X-ray Tomography XT H 320 system with 5-axis manipulator

(iii) **Space.** Current space in Whitby, Auburn south and west towers, Ayer, and the UA-ERC is adequate quantitatively to meet the department's mission. Qualitatively, the main ChE teaching lab in ASEC 81 is in need of serious renovation to meet the needs of the department and help attract quality undergraduates.

II. Future Plans.

a. **Potential changes**. No major changes in the services provided by the department are anticipated in the next 3 to 5 years.

b. **Trends**. The recent trend of increasing enrollment in ChE shows signs of leveling off. However, there will continue to be demographic pressure driving demand for chemical engineers. The baby boomer bubble of 25+ year experience engineers comprises about 40% of practicing chemical engineers (based on data in the biennial AIChE salary survey). The retirement of this cohort will continue to drive hiring and presumably undergraduate enrollment for the next decade or so. Corrosion Engineering's enrollment has not stabilized. It continues to trend upward, but has larger fractional fluctuations than Chemical Engineering. This is probably due to the newness of the program. Continued outreach to inform UA's applicant bases about the program should help enrollment to stabilize.

Administrative Activities Review – FY18
Department of Civil Engineering

I. Basic Facts and Description of the Unit

The Department of Civil Engineering is one of the five academic departments in the College of Engineering (COE) at The University of Akron. The department has a total of 14 full-time faculty members and is supported by two engineering technicians, one administrative assistant, and an administrative secretary.

a. Mission and Goals

Consistent with Vision 2020 and the strategic plan adapted for The University of Akron, our stated mission is:

> *To ensure student success and leverage our region's unique assets in the creation of knowledge and application of research that benefits humankind.*

Our overall goal is to continue to provide an excellent learning environment for our students and to meet the needs of the civil engineering industry by modernizing the learning and research experience for our undergraduate and graduate students. Our short-term goals are to increase the undergraduate enrollment through recruitment efforts coordinated by the College of Engineering. Furthermore, we will be introducing a 4+1 BS/MS program, growing our graduate programs, and increasing the research funding generated within the department.

b. Services

The Department of Civil Engineering provides two categories of service:

- Academic Services
- Support Services

Academic Services

The department offers three major programs: BS, MS, and PhD. The department also offers certificate programs in nuclear engineering, environmental engineering, geotechnical engineering and structural engineering. The PhD in Engineering is an interdisciplinary (IDC) doctoral program offered at the college level. Teaching of undergraduate level courses is mostly handled by full-time faculty, and to a small extent, by part-time instructors. Additionally, the department also offers service courses on statics and mechanics of solids to the students from other departments within COE. The enrollments as of Fall 2017 were 378 undergraduate students, 35 MS students and 39 PhD students. Historic enrollment trend for the department is shown in Table A.

Table A. CE Enrollments in Last 5 Years

	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017	5-Year % Change
UGRAD	336	359	378	379	378	11
GRAD	108	105	107	102	74	-46
Total	444	464	485	481	452	2

- **Critical Partners**

Other departments within COE and also Buchtel College of Arts and Sciences are our partners for the delivery the department's academic services. The academic services provided by the department do not overlap or duplicate the services provided by other units at UA. Partnerships with other UA units such as scheduling, purchasing, ORA, Graduate School, etc. are also critical in providing the department's academic services.

- **Customers or end users of the services**

The students are the primary customers (90%) of the services offered by the department. We also serve local and regional industry, state and federal agencies through student co-op employment, research and community projects.

- **Key Performance Analysis**

Our undergraduate students perform exceedingly well in regional and national student competitions such as concrete canoe and steel bridge competitions. Other strong features of our undergraduate program are the senior capstone design and the cooperative education program.

The undergraduate programs within the COE are governed by ABET accreditation; therefore, the department maintains detailed records of student performance in all undergraduate courses that are required for graduation. Data tracking is supported by faculty. Assessment data is also comprised of yearly exit interviews, employer surveys (sent to co-op employers and permanent employers), and alumni surveys. ABET accreditation is reviewed on a 6-year basis, with the most recent evaluation having taken place in 2013. The Department of Civil Engineering's 2013 ABET report received a very positive response from the accreditation board; the ABET evaluators listed the following as a Program Strength:

> *The civil engineering program has developed and followed through on a comprehensive and systematic assessment process for program educational objectives and student outcomes. These data and evaluations have allowed the program faculty to address the needs of their constituencies and improve outcomes for the program.*

The MS and PhD programs were last assessed by an external reviewer in 2009. Our latest comprehensive evaluation by the Higher Learning Commission (HLC) occurred in February 2017, and we were accredited by the HLC.

Our BS graduates have had great success over the years finding employment in the civil engineering field. Many local civil engineering firms participate in our Committee for the Future of Civil Engineering (CFCE) – a group that supports our department and provides scholarship funding to select students.

From the internal records maintained at the department level, out of 87 MS graduates in the last three to four years, about 10% have continued to pursue PhD program in our department or elsewhere. The vast majority of the remaining graduates have joined the workforce in the industry throughout the United States. Some international students opted to return to their home countries to join the local industry and academia.

The career outlook for well-qualified civil engineers has been better than it has been over the last two decades. Nearly all our graduate students are pursuing a career in one of the five areas of civil engineering. The key employers of our students are universities, industry, and government.

- **Brief Assessment**

The BS program in Civil Engineering is the largest in Northeast Ohio and is the third-largest in the state. The program is financially sound, as the undergraduate tuition and state subsidies for course completion and graduation more than offset the expenditures for faculty salaries and TA stipends/tuition waivers. Our department has significant capacity for growth; the market demand for our BS graduates is strong and exceeds our current graduation rate. With the continued commitment of our faculty to the undergraduate program and the aid of centrally-funded TAs, the Department of Civil Engineering can be a cornerstone of our College of Engineering for the foreseeable future.

Our MS program is the crucial link between a strong BS program that serves a large regional population and the only PhD program in Civil Engineering at a public university within a 100-mile radius of Akron. The synergy between these three programs forms the foundation of a financially sound and viable Department of Civil Engineering. Our MS students play an active role in providing teaching assistance in the delivery of our undergraduate classes, and they support faculty research while being trained to advance their careers in professional practice or to pursue doctoral studies.

We are also well-positioned to distinguish our PhD program to be a unique program in Northeast Ohio. The department offers a strong MS program in Civil Engineering that is designed to train students to be competent practicing engineers and also prepare them to pursue doctoral degrees. Our PhD students play an active role by providing teaching assistance in the delivery of our undergraduate classes and by supporting faculty research while they are training to advance their careers as future academics, researchers or professional engineering practitioners.

The market demand for our BS, MS and PhD graduates is very high, and it is projected by the US Department of Labor to be sustainable for at least the next 10 years. There is tremendous potential for near-term and long-term growth of our three major programs; the CE faculty are fully committed to facilitate such growth in order to accommodate the workforce needs of our nation in the area of civil and transportation infrastructure.

Support Services

Table B provides a list of many of the support services provided by the department staff in order to assist and support the department's academic efforts. These support services have been categorized into four areas: Finances and Staffing, Student and Curriculum- Related, Recruitment and Faculty-Related. Approximate percent of workload of the administrative staff for each category is shown in parentheses in the table.

Table B. List of Support Services

Finances and Staffing (20%)	**Student and Curriculum Related (60%)**
TAARS	Mentor Design teams
Space Audits	Advising students
ECRT	Technical services to Faculty/Staff (labs)
Payment NET (approval/Review)	Transfer Review
Travel authorizations/expense reports	Degree Clearance
Manage Accounts	ABET
Time sheet approval	Class Scheduling
Development and Advisory Boards	Textbook ordering
Faculty appointments (part-time, visiting lectures, post-docs, etc.)	Curriculum management proposals
PAF and RFP	Exit Interviews
Scholarships	Software Maintenance
Purchasing	Front desk services
GA contracts	Course maintenance
Performance evaluations	Teaching evaluations
Hiring Process Manager (faculty and staff)	Managing course registration issues (overrides, exceptions, perq)
Student assistants hiring processing	Managing post-bac transfer credits
Event planning (banquets, dinner)	
Recruitment (10%)	**Faculty Related (10%)**
Recruitment-NSO, Visit Day, Individual	RTP items
Website Maintenance	Technical services to faculty (RES)
Graduate Admissions (Evaluation & Paperwork)	Seminars
Faculty recruitment	Merit review
Manage outreach activities	Non-academic Service in UA Committees

c. Services

- **Personnel**

The department comprises a total of 14 full-time faculty members (13 tenured or tenure-track and 1 non-tenure track) along with two senior technicians, and one administrative assistant, and an administrative secretary. An organization chart for the Department is shown in Figure 1. The Department Chair reports to the Dean of COE.

Two associate chairs and an ABET coordinator assist the Department Chair in (i) undergraduate programs (ii) graduate programs, and ABET documentation, respectively. Three faculty members within the department are selected annually to assume these designated administrative roles. A partial listing of the primary roles for these positions is provided in Table C. Each of these positions demands sufficient time beyond the standard faculty service efforts.

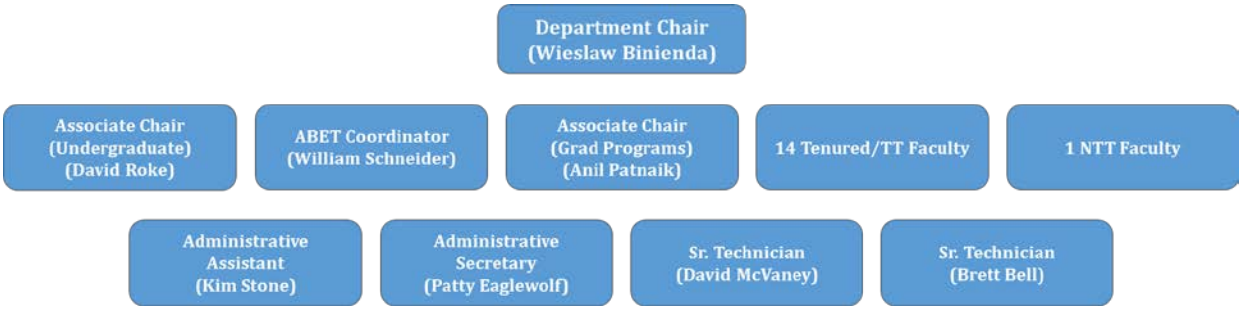


Figure 1. Organization Chart of the Department (FY 19)

Table C. Primary Administrative Roles of Associate Chairs and ABET Coordinator

Associate Chair (Undergraduate Programs)	ABET Coordinator	Associate Chair (Graduate Programs)
• Undergraduate committee chair • Transfer credit evaluation • Primary academic advisor for students transferring into the program (including pre-admits) • Curriculum proposal maintenance • Student recruitment, tours, and visit days • New student orientation (transfer students, as needed for direct admit and honors students) • Class scheduling • Academic program review • Help to develop strategic plan for the department • Coordinate with the Committee for the Future of Civil Engineering	• Work with other faculty in regards to their course performance evaluations • Maintain up-to-date performance outcomes with appropriate national boards • Work with exiting seniors on areas within the department to improve • Track national testing results from the Fundamentals of Engineering exam • Provide performance metric outcomes to internal administration from UA • Provide performance metric outcomes to the Civil Engineering Advisory Council	• Graduate committee chair • Evaluate and process applications of new graduate students • Graduate Students orientation • Interim faculty advisor of incoming students • Graduate curriculum issues • Maintain MSc and PhD guidebooks • Conduct qualifying exams • Coordinate applications and awards of TA positions • Attend meetings called by Associate Dean for Graduate study • Responsible for graduate data related documents

Table D shows the titles, a short description of the key functions of each position type, and the number of people in each position type. The administrative role of the full-time faculty is limited to the standard faculty service which is typically less than 20%. General examples of administrative services provided by the full-time faculty are serving on various committees at the department, college and university levels; reviewing student applications; ABET course documentation; serving as faculty advisers of undergraduate and graduate students; degree clearance, etc. The staff in the department devote 100% of their effort to administrative and support services. A complete description of the roles of the two administrative staff members and the two technicians is given in Appendix A.

Table D. Summary of Personnel in the Department

Position / Employee	Description	Number
Department Chair / Binienda	Overall management of the Department	1
Faculty / Varies	Teaching, research and service	12
Professor of Practice / Bunnell	Teaching and service	1
Engineering Technicians / McVaney and Bell	Lab maintenance and management	2
Administrative Assistant / Stone	Administrative management of the Department	1
Administrative Secretary / Eaglewolf	Secretarial and administrative assistance	1

Financials

The department operating budget is provided for the last five years. The department has been especially keen on reducing expenditures, per the directive from administration.

Table E. Department Operating Budget and Actual Expenses over the Past Five Years

FY	Budgeted	Expended	Surplus/ Deficit
2018	$ 53,903	$ 37,601	$ 16,303
2017	$ 75,118	$ 60,553	$ 14,565
2016	$ 65,539	$ 56,853	$ 8,685
2015	$ 69,690	$ 57,845	$ 11,845
2014	$ 74,737	$ 64,241	$ 10,496

Equipment and Technology

The department constantly evaluates and updates the equipment and technology needed for the effective delivery of our academic programs. We are also in the process of renovating and reclassifying laboratories for undergraduate education. A summary of the laboratory equipment available in the department for student use is provided in Appendix B.

Space

The department office is located in ASEC 210 and the space allocations for the academic and support activities of the department are shown in Table F.

Table F. Department Space Allocations (in Square Feet)

Department Administration	1,800
Faculty	3,500
Research Assistants	5,100
Teaching Laboratories	8,800
Research Laboratories	5,300
Common Areas	700
Student Space	2,000
Total Space	**27,200**

II. Future Plans

a. Potential Changes

BS Program

One growth opportunity available to our undergraduate program is outreach to local high schools. Another initiative that would benefit the program is a departmental teaching/workload policy rather than an individual policy. A third initiative that would benefit the program is a greater emphasis on computer software in the classroom for select courses.

MS Program

A five year BS/MS program (4+1) in CE is being discussed for UA graduates to provide superior undergraduate students with the opportunity to complete an MS with one additional year of study at UA beyond the undergraduate degree. Our goal is to retain and transition good UG students to the MS programs in their areas of interest in civil engineering. The CE department is currently working on participating in the Akron Master's Program, which is an accelerated BS/MS program for international students. This program aims to attract students to spend the final year of their UG program and an additional year in the graduate program at UA to earn a Master's degree.

Furthermore, with the regional economy showing signs of improvement due to increasing government investment in infrastructure projects, it is expected that the number of fee-paying part-time MS students will likely increase.

PhD Program

The following are some of the initiatives that we anticipate will improve our recruitment and retention efforts for our PhD program:

- We believe that retaining well-trained MS graduates from our own programs is an effective way of attracting good quality students to our PhD program.
- Assured GA funding and tuition discounts are essential for retaining Master's students who are committed to complete doctoral degrees in the department.
- The strengthening of our MS program will help consolidate our efforts to be the only civil engineering department at a public university within a 100-mile radius of Akron to offer strong MS and PhD programs in Civil Engineering in the same department.

b. Trends

Civil engineers are needed to manage projects to build or rebuild, repair, and upgrade bridges, roads, levees, dams, airports, buildings, and other aging or new infrastructure. The US population is growing steadily, which will place increasing demands on new infrastructure; at the same time, maintaining existing aging infrastructure to extend their service life is also critical.

The career outlook for well-qualified civil engineers is better than it has been in the last two decades. The key employers of our students are industry, universities, and government. Job prospects for civil engineers are projected to grow by 11 percent from 2016 to 2026 in the Occupational Outlook Handbook, which was prepared by the US Department of Labor's Bureau of Statistics in 2016. This growth rate is faster than the average for all occupations, and even faster than the projected growth rate of all engineering areas, as shown in Figure 2.

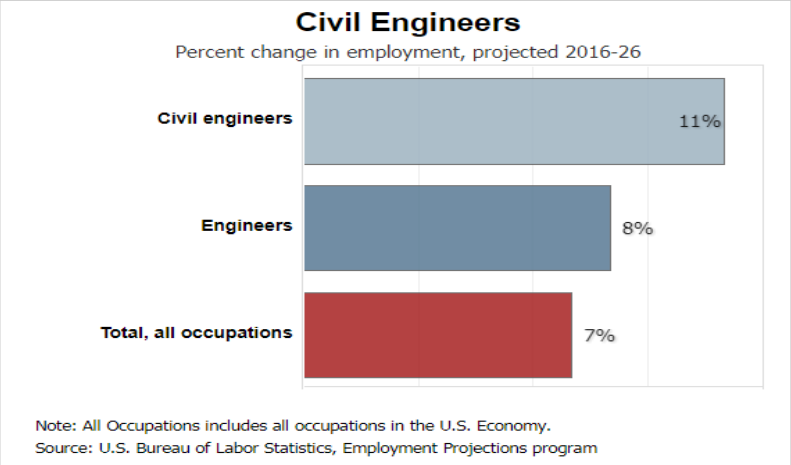


Figure 2. Employment Trends for Civil Engineers

Source: https://www.bls.gov/ooh/architecture-and-engineering/civil-engineers.htm#tab-6
Note: This figure shows positive growth of 11% in ten years for Civil Engineers

We believe that the market demand for our BS, MS and PhD graduates will remain very strong and that we are able to provide ample opportunities to students seeking to enter these programs in order to enhance their chances of leading a successful professional life with an exciting career in civil engineering. There is tremendous potential for near-term and long-term growth of our three major

programs, and the CE faculty are fully committed to facilitate such growth in order to accommodate the workforce needs of our nation in the area of civil and transportation infrastructure.

Appendix A. Administrative Staff Responsibilities

Administrative Assistant Primary Responsibilities (Stone)

Maintain Office Functions:

Review departmental budget
Prepare purchase requisitions, direct payments, review invoices for approval.
Supervise student assistants.
Prepare hiring documents for post-docs, visiting researchers, faculty searches.
Schedule interviews, make transportation, hotel, dinner, seminar reservations, prepare candidate itineraries.
Prepare budget information, budget transfers, track GA departmental budget.
Use Zip reports and PeopleSoft queries to obtain information requested by department chair and faculty.
Perform general office duties.

Student Success:

Track and maintain various databases: students, scholarships, graduate applications, graduate assistantships.
Prepare graduate assistant contracts, request I-20 for incoming international GAs.
Maintain student files, post grades, process new students, assist with registration problems.
Prepare exceptions and transfer evaluations with advisor requests in DPR to clear students for graduation.
Assist students on an individual basis with registration issues, enrollment verifications.
Prepare and maintain hiring documents for student assistants, maintain and submit timecards in EmpCenter.
Assist student chapter of ASCE with plans and purchases for attending regional and national conferences.

Course Maintenance:

Update and maintain course schedule each semester including class limits, instructors of record, cancel and add classes as needed on a timely basis.
Place textbook orders on a timely basis using FacultyEnlight system.
Faculty - Prepare TAARs reports each fall and spring.
Accurately calculate and prepare PAFs for faculty summer pay, meeting submission deadlines.
Prepare PAFs for part-time teaching faculty.

Miscellaneous:

Prepare departmental information as needed - newsletters, prospective student requests, preparing information folders for prospective students.
Perform secretarial functions for CFCE: minutes for monthly meetings, maintain database for donations, reconcile and report financials each month, make arrangements for annual awards breakfast - invitations, programs, certificates, organize and prepare departmental meetings on and off campus, reservations, contacts, menus, RSVPs, agendas, minutes.
Make room reservations and refreshment arrangements for AWWA on-campus review sessions.
Make room reservations and act as liason between Summit County Engineer's office and Student Union for annual high school model bridge building competition arrangements.
Make hotel, airline, rental car resevations, prepare expense reports for faculty and students as needed.
Other duties as assigned and that are requested as necessary to advance our department.

Administrative Secretary Primary Responsibilities (Eaglewolf)

Administrative support to Dr. Binienda, Dept. Chair

Prepare Monthly Financial Open Accounts Summary
ECRT Effort Coordinator: assist faculty to complete their ECRT entries
Prepare and submit Schedule of Classes for each semester, enter information into Computer Solutions with required information on classes, times, instructor, etc.
Submit requests for class changes on Scheduling Maintenance Form as requested
Assisted in preparing new 4-Day Schedule of Classes for Fall 2018 and Spring 2019 and entering of all changed into PeopleSoft Campus Solutions
Prepare Faculty Course Assignment Sheet and Course Distribution Summary reports for each semester
Created new 4-Day Schedule of Classes Chart of all faculty and classes for Civil Engineering, and update changes and changes occur

Confirm with each faculty member the textbook to be taught for each class each semester and order Desk Copies as requested.
Enter textbooks confirmed or No book required in Faculty Enlight for each class for each semester.
Hiring Process Manager – prepared Mallory Crow's documentation for Dr. Schneider and updated PAF changes as requested for grant account.
Enroll students as requested by faculty each semester.
Make copies of exams or handouts for faculty as requested. Greet visitors as needed.
Request key or swipe access as needed for faculty and students. Update database of Keys ordered and returned. Request deposit refunds as needed.

Process requests from faculty for new Graduate Students and new Hourly Student Workers by preparing and submitting all of the required documentation.
Update Data Bases for GA contracts and Hourly Workers including all of the salary, account code changes and terminations throughout their employment in Civil Engineering.
Prepare GA contracts and secure information required on each contract.
GA Contract, I-9 Form, SERS/OPERS, Payroll Direct Deposit, Timecard information, prepare Social Security Letters if required.
Update database of GA contracts and changes.
Prepare Hourly Student Worker documentation and submit required documents:
Hire/Termination forms, I-9, SERS/OPERS, Payroll Direct Deposit, Timecard information
Update database of Hourly workers: salary and account code changes and terminations.

Purchasing materials for faculty members and students
List Serve Manager for Civil Engineering faculty and students
Order Supplies for Civil Engineering
Prepare PeopleSoft Requisitions and required documentation.
Prepare On-Campus Order Forms and required documentation.
Prepare Direct Payment Forms and required documentation.
Request reimbursements as needed for faculty and/or students.
Coordinate the approval and credit card payments for Airgas, Air Products, Amazon, and Praxair invoices for faculty and/or students. Pay invoices via my credit card.
Verify all charges in J.P. Morgan with proper documentation and account codes.
Steel Bridge Team and Concrete Canoe Team make charges on my visa credit card and secure proper documentation to enter into J.P. Morgan.
List Serve Manager. Each semester update ListServe with faculty, part-time faculty, and all Civil Engineering students for communication of announcements, job postings, seminars, scholarship information, etc.
Order supplies for Civil Engineering: paper, Xerox supplies, office supplies, etc. and verify into J.P. Morgan account

<u>Commencement – Associate Marshal for the Faculty Room</u>
Prepare faculty line of march for each ceremony
Coordinate Hooding Faculty Members and seating arrangement
Explain procession onto the stage, hooding procession and procession off stage
Train Faculty Marshals for each ceremony
Contact Civil Engineering faculty to confirm attending commencement or hooding students.

Engineering Technicians (McVaney and Bell)

Description of typical work:
Helping faculty and students in conducting tests and experimental teaching and research

Maintaining and repair (if required) of the equipment and instruments -- see listing General house-keeping and laboratory functions Purchase supplies for laboratory tests and replacement parts

Appendix B. Major Laboratory Equipment Available for Student Use

Item	**Area**	**Description/Use**
Laser Velocity/Range Measuring Device	Transportation	Vehicle approach velocity, distance for transportation planning and control
GPS Transducer - Transponder	Transportation	Approach velocity, location/distance for transportation planning and control
Extensometers	Structures	Material testing equipment
UV- Vis Spectrophotometer	Environmental	Analysis of organic and inorganic contaminants
Mechanical Grips	Structures	Enable different orientation for material testing in existing equipment
COD Gauge	Geotech	Geotechnical research
Balances (3)	Geotech, Materials Lab	Weigh required material amounts for various mixtures, analysis of sieve fractions, etc.
Data Acquisition System	Transportation	Hands-on data collection
Traffic Signal Controller	Transportation	Hands-on data collection
Data Comm. System	Transportation	Interface for data acquisition and signal controller to provide real life data analysis
Load Frame	Structures	Component/Full size testing
55-kip MTS Machine	Materials Lab, Structures	Material characterization
Rockwell Hardness Tester	Materials Lab	Testing of material hardness
Hach Online Turbidimeter	Environmental	Continuous monitoring of turbidity
Laboratory Turbidimeter	Environmental	Laboratory turbidity
Long Gage Length Extensometer	Structures	Large coupon materials testing
Data Acquisition system	Materials Lab	Automate data from 300-kip machine
Data Acquisition System	Structures	High speed DAQ for dynamic tests
Pressure Sensors	Hydraulics	Used to acquire field pressure measurements from a water distribution system
Direct Shear Device	Geotechnical	Testing of soil strength and stiffness
Triaxial Device	Geotechnical	Testing of soil strength and stiffness

The University of Akron
PROPERTY INVENTORY BY DEPARTMENT, TAG NUMBER
#Type!

Home Department: 0625 Civil Engineering- Bell
Manager: Binienda,Wieslaw K

Contact: Bell, Brett
bell@uakron.edu
Zip: 3905 Ext: 6235

Tag No.	Description	Serial Number	Building/Room	Acquisition Date	Inventory Value
133176	SF 425 THE NNX11A157A AGREEMENT		ASEC	11/30/2015	$243,856.53
133711	SOILCONSOLIDATION SYSTEM		ASEC 3	7/24/2017	$20,610.76
133696	GRADIENT PUMP		ASEC 411	3/5/2010	$37,744.28
133535	FREEZE THAW CHAMBER		ASEC 8	4/7/2016	$19,841.05
133537	MODEL 9000-16-SM W/12 STRAIN c		ASEC 8	6/9/2016	$12,043.95
133547	SYNERGY		ASEC 8	4/20/2016	$24,841.00
131636	FLEXTEST GT 2ND STATION AD D (INSIDE OF TAG #126036)		ASEC TB 4	8/12/2008	$32,722.03
133536	HYDRAULIC GRIPS		ERC	4/2/2016	$19,715.00
119012	TEMPERATURE PROGRAMMED DES ORPTION-ALCOA	SN: 8311966	ERC 315	6/28/1997	$22,190.00
117247	TABLE TOP FILAMENT WINDING		GTTF	11/11/1996	$29,115.00
119121	TESTSTAR 11S CONTROL SYSTE M	353786	GTTF	6/30/1997	$23,200.00
123450	MTS MATERIAL TEST SYSTEM 50 KIP	1251	GTTF	6/26/1999	$43,773.00
126036	MTS BIAXIAL 22 KIP MATERIAL TEST SYS810 & TAG #131636 INSIDE	1150013	GTTF	6/19/2000	$125,955.00
129577	MODEL 647 AXIAL TORISON HYDRAULIC COLLETS	298	GTTF	6/30/2003	$12,436.00
130047	FATIGUE TESTER MACHINE		GTTF	8/6/2003	$6,678.00
130758	ARAMIS 3D SYSTEM		GTTF	9/16/2004	$151,647.79
130804	TURNKEY HIGH PERF BANDWIDT H VIBRATION SCANNER	5041875	GTTF	12/30/2004	$374,287.10
130825	FASTCAM ULTIMA APX RS FM		GTTF	1/4/2005	$121,588.50
131530	POWERTEAM ELECTRIC PUMP 10 0000 PSI MAX PRESSURE	339443	GTTF	5/14/2008	$27,639.17
131550	ENVIRONMENTAL CHAMBER ZP09 21886 SER	ZP0741502	GTTF	6/30/2008	$53,033.51
131587	PNUEMATIC GAS GUN GTTF S/N 28834	28834	GTTF	8/15/2008	$8,500.80
131856	8 Cubic Feed Chamber	ZP0921886	GTTF	5/1/2011	$25,268.00
131871	400 kips tension-torsion testing machine	Built Equipment	GTTF	8/17/2010	$149,154.22
132415	MTS Series 201 Actuator - Force Generator		GTTF	1/17/2012	$173,099.00
132791	Hydraulic Power Unit 505.90-62	10397155V01	GTTF	6/11/2013	$241,244.00
132936	WELDSALE PLATEN WSC-25B		GTTF	4/28/2014	$5,929.88
133220	FLAME SPRAY FACILITY 12x12x10 (Room within a room for burner rig)		GTTF	1/28/2016	$29,783.00
133464	ARAMIS/PONTOS 3D 5M SYSTEM		GTTF	4/20/2016	$238,000.00
133467	FM1-8 CHANNEL SYSTEM		GTTF	4/15/2016	$47,630.61

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The University of Akron
PROPERTY INVENTORY BY DEPARTMENT, TAG NUMBER
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Home Department: 0625 Civil Engineering- Bell
Manager: Binienda,Wieslaw K

Contact: Bell, Brett
bell@uakron.edu
Zip: 3905 Ext: 6235

Tag No.	Description	Serial Number	Building/Room	Acquisition Date	Inventory Value
133252	AXIAL FURNACE EXTENSOMETER	SN: 3648-0100-001-HT	GTTF 105	12/16/2015	$8,321.00
133682	PHOTRON FASTCAM MINI AX200 900K	SN: 10442426480	GTTF 201	6/30/2017	$36,348.75
133165	HVOF (High Velocity Oxygen Fuel) SPRAYER	No Serial Number	GTTF BIG ROO	10/1/2015	$46,772.00
132748	Yale Fork Truck 4000 lb	SN: F8017N05285E	GTTF Turbine	6/30/2013	$13,700.00
131447	ONE TEST FRAME FABRICATE I NSTRUMENTS(PARKER FAB)	Built Equipment	TRE	10/1/2007	$9,854.00

The undersigned certify that the above listed inventory, with notations, is complete and all items are accounted for.

Designated department representative: _____ Date: _____

Department Head or managing officer: _____ Date: _____

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Property A

The University of Akron
PROPERTY INVENTORY BY DEPARTMENT, TAG NUMBER
#Type!

Home Department: 0625 Civil Engineering- McVaney
Manager: Binienda,Wieslaw K

Contact: McVaney,David C
dmcvane@uakron.edu
Zip: 3905 Ext: 7295

Tag No.	Description	Serial Number	Building/Room	Acquisition Date	Inventory Value
133448	ENVIRONMENTAL STABILITY CHAMBER	SN:	ASEC 08	3/24/2016	$23,175.50
133449	DAQ		ASEC 08	3/23/2016	$20,282.30
133025	WELDING TABLE	SN: TM042146	ASEC 10	12/11/2014	$6,525.00
132960	DELL WORK STATION	SN: BH9FM02	ASEC 210-F	6/25/2014	$10,767.81
131675	INSTALL 3-TON CEILING MOUN TED AIRCONDITIONING UNIT		ASEC 212	9/22/2008	$11,110.00
131676	INSTALL 3-TON CEILING MOUN TED AIRCONDITIONING UNIT		ASEC 212	9/22/2008	$11,110.00
106338	GEOTEST MODEL S2843 BACK P RESSURE Consolidation Unit		ASEC 3	10/24/1991	$5,535.16
106339	GEOTEST MODEL S2843 BACK P RESSURE CONSOLIDATION UNIT		ASEC 3	10/24/1991	$5,535.17
114355	SOIL TEST DEAD WEIGHT TESTER MODEL C-240	84632	ASEC 3	8/21/1995	$6,456.08
119123	F-500-LC-1 DIGITAL COMPUTER COMPRESSION TESTER	97071	ASEC 3	6/30/1997	$14,311.00
129301	GEOTAC DIGISHEAR OID DIRECT SHEAR SYS SR#1530	1530	ASEC 3	3/6/2003	$13,010.19
131016	ASPHALT POLISHER JMP PART NO 68050811		ASEC 3	2/14/2006	$10,328.00
132159	TM-5 Gilson Test Master w/5 tr		ASEC 3	1/12/2011	$7,088.52
115711	GYRATORY COMPACTOR		ASEC 3B	3/28/1996	$21,044.52
118880	HIGH TEMP OVEN (ASPHALT TE STER) SR#945970482360	482360	ASEC 3B	6/18/1997	$9,300.00
119706	ASPHALT PAVEMENT ANALYZER	97010	ASEC 3B	9/24/1997	$66,439.89
119707	ASPHALT VIBRATORY COMPACTOR	97105	ASEC 3B	9/24/1997	$24,000.00
119120	STAINLESS STEEL SLAB SAW PWR GLIDE	NONE	ASEC 3C	6/30/1997	$8,216.10
027474	BALDWIN CONTROL PANEL MDL. 300-CT-1, COMPRESSION W/ACCESSORIE	300CT1	ASEC 4	7/27/1967	$9,703.00
040101	HYDRAULIC, MDL. 300 W/6 TESTING MACHINE BLOCKS W. SWAZY	1005	ASEC 4	8/23/1968	$18,455.00
091772	IMPACT TESTER-COMBINED CHARPY IZOD MOD 84 FOR METAL		ASEC 4	5/23/1985	$8,740.00
119192	BRIDGEPORT MODEL 12 BR2J	163039	ASEC 4	8/8/1997	$15,277.15
126427	WILSON ROCKWELL MOD 540T S R#R500AP2292	AP2292	ASEC 4	9/7/2000	$6,461.93
131507	FX-500F-TPILOT FRAME WITH STAND AND TEST PILOT COMPRESSION TEST	8013	ASEC 4	2/6/2008	$15,742.32
131758	INSTRON UNIVERSAL TESTING MACHINES/N1000DXR1551	SN: 1000DXR1551	ASEC 4	2/12/2009	$135,493.01
126900	DESIGNJET 800 42" PLAN SHT S SR#SSG09C2100H	9C2100H	ASEC 404	2/21/2001	$5,695.00
131958	MSD/DS DIFFUSION PUMP EL S YSTEM G3241A-5975C VL	SN: CN10949077	ASEC 411	1/13/2010	$83,500.16
121323	DYNAMIC PAVEMENT DESIGN TE STING SYSTEM MTS	351698	ASEC 4D	6/30/1997	$429,009.64
103561	FLOW IN CIRCULAR TUBES MOD EL 202	6308	ASEC 51	10/22/1990	$6,050.00

The University of Akron
PROPERTY INVENTORY BY DEPARTMENT, TAG NUMBER
#Type!

Home Department: 0625 Civil Engineering- McVaney
Manager: Binienda,Wieslaw K

Contact: McVaney,David C
dmcvane@uakron.edu
Zip: 3905 Ext: 7295

Tag No.	Description	Serial Number	Building/Room	Acquisition Date	Inventory Value
117586	BUCK 200A ATOMOC ABSORPTIO N Shared w./Cutright	956	ASEC 51	11/19/1996	$8,735.70
124877	LC-10ADVP UNIT SR#C2108350 0505 SOLVENT SYSTEM	3500505	ASEC 51	8/12/1999	$5,135.61
124881	ARRAY PHOTO DIODE SR#C2090 3502224 DETECTOR	3502224	ASEC 51	8/12/1999	$10,266.00
126848	SHIMADZU GC-17 GAS SR#C111 23803468SA CHROMATOGRAPH	34685A	ASEC 51	2/2/2001	$17,156.86
129375	FREEDON DATA PC		ASEC 51	4/17/2003	$6,537.59
129376	CROSSHOLE SONIC LOGGING ACCESSORIES CASE A & CASE B		ASEC 51	4/17/2003	$14,161.43
129377	PARALLEL SEISMIC SYSTEM		ASEC 51	4/17/2003	$8,046.27
131529	FM50 CENTRIFUGAL PUMP AND INTER FACE UNIT		ASEC 51	5/6/2008	$13,320.00
131698	FLUORESCENCEHITACHI SPECTROPHOTOM ETER F-7000 S/N 2021-008	Do not Remove. (Used in t	ASEC 51	10/27/2008	$17,568.13
132003	SEASECAT PLUS FERSION 2 PR OFILER PUMPED CONDUCTIVIT SEABIRD	Do not Remove. (Used in t	ASEC 51	5/24/2010	$10,122.90
132197	Tox-Analyzer for Organic Halogens/Absorption Module	A7M43710 (Analyzer)/A7A	ASEC 51	4/4/2011	$29,586.87
132647	TOC ANALYZER WITH AUTOSAMPLER	SN: TOC-VCPH:h51130413	ASEC 51	12/31/2012	$14,750.00
131572	SHAKE TABLE II	SN: 10425	ASEC 51B	6/4/2008	$17,445.17
113790	TSRST SYSTEM		ASEC 53	6/19/1995	$39,192.00
117248	PRESSURE AGING VESSEL SYST EM SR#W-3135-29 TEST UNIT	3135-29	ASEC 53	11/11/1996	$11,138.88
117599	REOMETRIC SCIENTIFIC ASPHA LT SR#4X619705D ANALYZER	619705D	ASEC 53	11/27/1996	$66,185.00
117635	BENDING BEAM RHEOMETER SR# H961219-11-96	9/11/1996	ASEC 53	12/4/1996	$20,635.34
118593	ROLLING THIN FILM ASPHALT OVEN	158606	ASEC 53	4/24/1997	$6,535.59
119339	ACCELERATED POLISHING MACH INE SR#1653-3-1013 ELE WHEEL	33-1013	ASEC 53	8/28/1997	$9,074.92
117814	WHEEL TRACK MACHINE (GILSO N)	A8841	ASEC 53.5	1/16/1997	$15,981.00
118661	IMMERSED WHEEL TRACK MACHI NE		ASEC 53.5	4/29/1997	$13,202.18
119703	OLYMPUS SZH STERO MICROSCOPE	158373	ASEC 53.5	9/24/1997	$7,985.75
119704	OLYMPUS B X 60 MICROSCOPE W/ COLOR VIDEO SYSTEM	5K00151	ASEC 53.5	9/24/1997	$38,235.38
130150	MOD 5569 TABLEMOUNT SR#556 9P7461 INSTRON TESTER	69P7461	ASEC 6	9/3/2003	$37,291.49
130589	SPATE SYSTEM GIFT FROM ALC OA SR#70A89031 CAMERA THERMAL	0A89031	ASEC 6	6/12/2004	$20,000.00
129583	VISHAY MICRO MEASUREMENT MOD 6200		ASEC Mobile	6/30/2003	$7,452.71
127157	RS200 MILLING GUIDE KIT SR #145623	SN: 145623	ASEC MOBL	5/1/2001	$8,909.45

The University of Akron
PROPERTY INVENTORY BY DEPARTMENT, TAG NUMBER
#Type!

Home Department: 0625 Civil Engineering- Liang
Manager: Binienda,Wieslaw K

Contact: McVaney,David C
dmcvane@uakron.edu
Zip: 3905 Ext: 7295

Tag No.	Description	Serial Number	Building/Room	Acquisition Date	Inventory Value
127315	OPTIM ELECTRONICS DATA ACQ SYS SR#S06675	S06675	ASEC 427CFIED	6/11/2001	$44,498.60

The undersigned certify that the above listed inventory, with notations, is complete and all items are accounted for.

Designated department representative: _____ Date: _____

Department Head or managing officer: _____ Date: _____

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Administrative Activities Review – FY18
Department of Electrical and Computer Engineering

I. Basic Facts and Description of the Unit

a) Mission and goals.

The Department of Electrical and Computer Engineering is one of the 5 academic departments in the College of Engineering (COE) at The University of Akron. The department has a total of 14 full-time faculty members (11 tenured or tenure-track, 3 non-tenure-track), which are supported by a staff of two technicians and one administrative assistant. (There were 18 faculty members and three technologists/technicians before changes this year due to retirements, resignations, and new administrative appointments.) In Fall 2017 there were about 690 students enrolled in our programs (about 600 undergraduate and 90 graduate). The department offers BS degrees in Electrical Engineering and Computer Engineering, an MS in Electrical Engineering, and interdisciplinary PhD degrees in Electrical Engineering and Computer Engineering. Both of our undergraduate degree programs have full ABET accreditation. Our strengths are the extracurricular design teams, senior capstone projects, and the cooperative education program. We maintain active research programs in communications and signal processing, power and energy, and sensors and controls.

The mission of the Department of Electrical and Computer Engineering is (1) to educate our undergraduate and graduate students, and (2) to participate in the creation of new engineering knowledge through research. Our comprehensive undergraduate programs prepare our students to identify, formulate, and implement solutions to real-world engineering problems. Our more specialized graduate programs give our students a deeper understanding of the foundations of engineering knowledge and guide them in making their own contributions to the state of the art in engineering theory and application. Our graduate research benefits our undergraduate programs by informing and enriching the undergraduate curricula, and as well as by providing undergraduate research opportunities to individual students.

From an administrative point of view, our principal goal is to support our students and our faculty in the accomplishment of our departmental mission. Our staff and administrative faculty are tasked with keeping the records, filing the forms, maintaining the labs, enforcing the rules, and documenting the outcomes for our academic programs. Practically all such functions are utterly essential to the continuation of the academic mission. Many are required by the upper administration; very few, if any, of the functions could be eliminated or reduced without the elimination or deterioration of our academic offerings. Thus, the administrative goal of supporting the departmental mission does not have short-term or long-term components, but rather is a continuing obligation to which the department adapts as the academic requirements and external administrative demands evolve.

Table 1. Essential services provided within Electrical and Computer Engineering, by ◆administrative assistant, ◆department chair, ◆technical staff, ◆assessment coordinators, ◆associate chair for graduate studies, and ◆faculty, including faculty advisors. Highest effort services are in color and italics.

Finances and Staffing	Student/Curriculum Related	Recruitment
◆◆ *GA contracts*	◆ *Front desk services*	◆◆ *Recruitment-NSO, Visit Day, Individual*
◆◆ *PAFs and RFP*	◆◆ *Managing course registration issues (overrides, exceptions, PERC)*	◆ Website Maintenance
◆◆ TAARS	◆◆ *Class Scheduling*	◆◆ *Graduate Admissions (Eval & Paper)*
◆◆ Faculty appointments (part-time, visiting lecturer, post-docs, etc)	◆◆ *Degree Clearance*	◆◆ Faculty recruitment
◆ *Management of accounts*	◆◆ Course maintenance	◆◆ Manage outreach activities
◆ ECRT	◆ Teaching evaluations	
◆ PaymentNET (approvals / reviews)	◆ *Technical services to faculty/staff (educational labs)*	**Faculty Related**
◆ Travel authorizations	◆ Software Maintenance	◆◆ *RTP items*
◆◆ Time sheet approval	◆◆ Mentoring design teams	◆◆ *Merit review*
◆ Development and Advisory Boards	◆◆ *Advising students*	◆ *Technical services to faculty (research)*
◆ Performance evaluations	◆ *Transfer credit review*	◆ Seminars
◆◆ Space Audits	◆ Managing post-bac transfer credits	
◆◆ Purchasing	◆◆ *ABET*	
	◆◆ Exit Interviews	
	◆ Curriculum management proposals	

b) Services.

The services provided by the administrative staff in the department fall into four main categories as shown in Table 1. The colored diamond-shaped tags preceding each service indicate which staff members are primarily responsible for the service, and the services which account for the biggest percentages of staff time are in italics. Each of the four categories is described in more detail next.

Finances and Staffing

(i) **Critical partners**. College staff, Budget Office, Purchasing, Payroll, Human Resources.

(ii) **Customers or end-users of services**. Students, faculty, staff, upper administration.

(iii) Key performance analysis. Processing paperwork associated with finance and staffing issues is time consuming. As an example of just one kind of paperwork that needs to be done, in years AY15-16, AY16-17, and AY17-18, the number of graduate assistantship (GA) contracts processed by our administrative assistant was 102, 128, and 112, respectively; each contract requires that the student's records in multiple UA servers (Campus Solutions, NOLIJ) be checked to determine how much tuition scholarship is appropriate, and to see if the student requires a time extension. Faculty often require changes to contracts as they manage their research accounts and deliverables, and those changes are done by a separate process not reflected in these numbers.

Processing personnel action forms (PAFs) also requires a great deal of effort. In AY16-17 and AY17-18, our administrative assistant processed 56 and 51 PAFs, respectively. Often, a PAF requires a back-and-forth communication with the faculty member, to understand his or her intentions. Each also requires work on the part of the department chair, who is responsible for managing the related accounts.

The department chair is tasked with monitoring 49 different 2-accounts, 99 active 5-accounts, and two 6-accounts on behalf of the department and individual faculty, along with the all p-card transaction approvals, travel expense reports, and cost transfer forms associated with those accounts. In AY16-17 and AY17-18, the chair individually vetted and approved 95 and 103 travel expense reports, respectively, for trips taken by faculty and research students that required reimbursement by check (rather than being solely on procurement card). The chair also individually vets and approves hundreds of individual procurement card purchases on behalf of faculty and staff each month, checking that the purchase is appropriate and that the account used for each purchase has available, appropriate funds.

(iv) **Brief assessment.** We have worked on communicating to faculty what information the administrative assistant and department chair need to process paperwork, and have put together templates for common functions, to try to reduce the amount of back-and-forth communication required. However, changes in policies in other units on campus have greatly increased the amount of effort needed to provide basic and essential services to our faculty, staff, and students. For example, the increasingly complicated policy on graduate assistant contracts and tuition remission has tripled the time required to take care of all of our graduate students.

Student/Curriculum Related

(i) **Critical partners**. College staff, Office of the Registrar, Transfer Student Services, Counseling and Testing Services.

(ii) **Customers or end-users of services**. Students, faculty, staff, upper administration.

A detailed list of the laboratories and facilities that support the teaching mission of the department are provided in Table 2.

(iii) **Key performance analysis.** The size of our student body translates into a large volume of work related to students and curriculum. Degree clearance is one service that requires an exceptionally large effort. In years 2014-2015, 2015-2016, 2016-2017, the administrative assistant and department chair worked together to clear 75 undergraduates and 11 graduate students, 52 undergraduates and 27 graduate students, and 81 undergraduates and 25 graduate students, respectively. Changes in the system that UA uses to clear degrees meant additional work going back and forth with the Registrar to correct discrepancies between the system checks and the actual degree requirements. All graduating students are cleared individually, one at a time, and nearly all of our students require individualized exceptions to be processed for one reason or another; the difficulty of the work has been exacerbated by lack of clarity on which unit on campus (Honors, Transfer Student Services, and so on) is responsible for various related tasks.

Table 2 – Laboratories and facilities that support the ECE teaching mission.

Room	NASF	DESCRIPTION
262S	1,018	Digital Hardware Undergraduate Laboratory
263S	1,018	Electronics Undergraduate Laboratory
360S	280	Power Electronics Laboratory
361S	1,440	Energy Conversion Undergraduate Laboratory
361BS	320	Energy Conversion Laboratory
460S	1,018	Circuits Laboratory
461S	374	ECE Electronics Shop
461BS	198	ECE Electronics Shop
462S	972	Controls Undergraduate Laboratory
552S	565	Graphics/Digital Inventory Facility
560S	1,054	Computer Cluster Facility
563S	524	Engineering Electronics/Senior Design Facility
506N	566	Senior Design Project Undergraduate Laboratory
507N	566	Senior Design Project Undergraduate Laboratory
512N	566	Senior Design Project Undergraduate Laboratory
519N	359	Senior Design Project Undergraduate Laboratory
525N	343	Senior Design Project Undergraduate Laboratory

(iv)

While most students are able to register for classes themselves, the amount of work required to assist students with registration in special situations is very significant. In AY16-17, our administrative assistant processed at least 870 course registrations. Many required several emails, as she discovered that the class the student requested did not fit their schedule, or that they did not have a required prerequisite. Many also required that an advisor first sit down with the student in a one-on-one meeting to determine whether a waiver of a prerequisite was appropriate, and then formally document that waiver for accreditation purposes. In AY17-18, after setting some new processes in place to try to reduce the volume of individualized registrations, our administrative assistant still processed at least 650 individual course registrations.

The three technical staff also have faced increasing demands in their service to the academic mission. The first responsibility of our technical staff is the maintenance of our teaching laboratories and facilities, which are listed in Table 2. A typical lab to support undergraduate courses has 12 benches with equipment specific to the course; for example, a circuits lab would have oscilloscopes, power supplies, function generators, and so on. Between semesters, there is significant work to change the lab set-up over for the course assigned to it next, and the technical staff also develop and implement plans to maintain and replace equipment on a rolling basis, using course fees. This responsibility has grown more demanding as the undergraduate population has increased. As an example, several years ago, when the needed number of Digital Logic Design Lab sections could no longer be accommodated in the lab space designed for it, our technical staff had to re-outfit another lab space with the required equipment, and subsequently maintain two sets

of lab equipment within that lab space. Despite increased demands, our technical staffing has not increased; on the contrary, one of our staff members has retired this year.

Like everyone else, the faculty themselves have experienced increased workload with respect to the support role. One example is the academic advising function. The advising demands have increased not only by growth of the student population, but also by the introduction of student-retention initiatives. We now conduct mandatory advising of direct-admit first-year students, check prerequisites in response to last-minute PERC reports, send "Routine Alerts" to make cohorts of students aware of requirements that they must soon satisfy to maintain their degree progress, and try to make contact with students who have not continued their enrollment.

Accreditation of our degree programs requires year-long, continuous effort by our assessment coordinators, who receive an administrative stipend. They work on a yearly cycle with eight different mechanisms for feedback on our degree programs as part of our continuous improvement process; among other things, these mechanisms include surveys and interviews of graduating seniors, surveys of co-op employers, and surveys of alumni. The single-most time-consuming feedback mechanism requires assessment of the degree to which program outcomes are met in individual classes. This requires 40 different measures (example: student can document experimental work in a written report) taken in different courses across the curriculum; the assessment coordinators work with the course section instructors to ensure that the measurements have been taken, compile the data, and lead the faculty in a collaborative discussion about what needs to be changed to address any concerns.

(v) **Brief assessment.** As our student body has grown, it has become increasingly difficult to manage our student and curriculum issues with a single administrative assistant; she now spends approximately half of her time engaged in front desk service, helping students and faculty with immediate needs. Tasks which require focused attention are a challenge, as the office traffic is incessant. The demands on our technical staff and faculty advisors have increased significantly and steadily in recent years.

Recruitment

(i) **Critical partners**. College staff, Office of Admissions, Graduate School, Human Resources.

(ii) **Customers or end-users of services**. Students, new faculty.

(iii) **Key performance analysis.** The department chair and faculty participate in a wide range of activities aimed at recruiting new students; this year, for example, ECE hosted 161 prospective students (and 495 guests all together) in ten different Visit Day, Scholars Day, and Senior Day events. The faculty also routinely speak with individual families one on one. This effort has paid off in a significantly better yield percentage than last year; as of July 18th this year, 51.6% of electrical engineering admits and 44.9% of computer engineering admits matriculated.

Graduate admissions is handled directly by the Associate Chair for Graduate Studies and the Department Chair, along with a faculty committee. Each applicant's

materials are compiled and vetted directly. In AY16-17 and AY17-18, 132 and 60 applications were processed, respectively. The Associate Chair and Department Chair also communicate with all applying students as needed; they often call or email for updates on their status, or to ask questions related to curriculum, visa status, and other issues.

(iv) **Brief assessment.** The department has gone to great effort to ramp up its efforts to recruit more students to UA; faculty enthusiastically participate in extra service for events like Visit Days, and have volunteered for activities like the letter-writing campaign to prospective students that was conducted last Spring. We recognize the importance of recruitment to UA's financial bottom line.

Faculty Related

(i) **Critical partners**. College staff, Office of Research Administration, upper administration, Human Resources.

(ii) **Customers or end-users of services**. Faculty and their research labs.

(iii) **Key performance analysis.** The department has done what it can to streamline processes related to merit review, by developing metrics (when possible) that can be pulled using queries from UA databases, rather than having faculty members spend time individually collecting their own data. We are also working to review our RTP processes to ensure consistency with the merit review processes. Still, RTP and merit review processes take a great deal of time on the part of both the department chair and the faculty, and the collaborative process we have used to review and draft new processes has taken a great deal of time at committee and department faculty meetings.

The faculty team well collaboratively to secure funding from federal, state, and industrial sources, and have grown research expenditures from $645K in FY15 to $1.746M in FY17. With increasing research activity, the technical staff spend significant time repairing and reconfiguring circuit boards, mounting electrical components and connectors, and devising and constructing mechanical structures and fixtures to support the faculty in their research projects. Although such tasks may be viewed as the responsibility of the graduate students in the research labs rather than of the technical staff, staff are critical to safety in the research labs, especially in the implementation of projects that involve high voltages or currents; the heavy involvement of skilled, experienced technologists is essential.

(iv) **Brief assessment.** It is essential that the department have the personnel and time to foster faculty development, maintain faculty-related processes, and provide support to the research mission.

c) Resources.

We describe next the departmental allocated resources in four main categories: personnel, financial, equipment, and space. The challenges we face in each category are also discussed.

(i) **Personnel**. An organizational chart and list of the department personnel are shown in Fig. 1 and Table 3, respectively. Organization of the department is flat, with all personnel reporting directly to the department chair, with the exception of student assistants, who report to the staff person or faculty member they are assisting. Our department of 18 (now 14, after resignations, retirements and reassignments) faculty members, about 600 undergraduates, and about 90 graduate students is supported by one administrative assistant and three technical staff persons (one of whom retired after Spring 2018), and a department chair. Three additional faculty members receive small administrative stipends for specific additional administrative responsibilities. We also hire a small number of hourly student assistants.

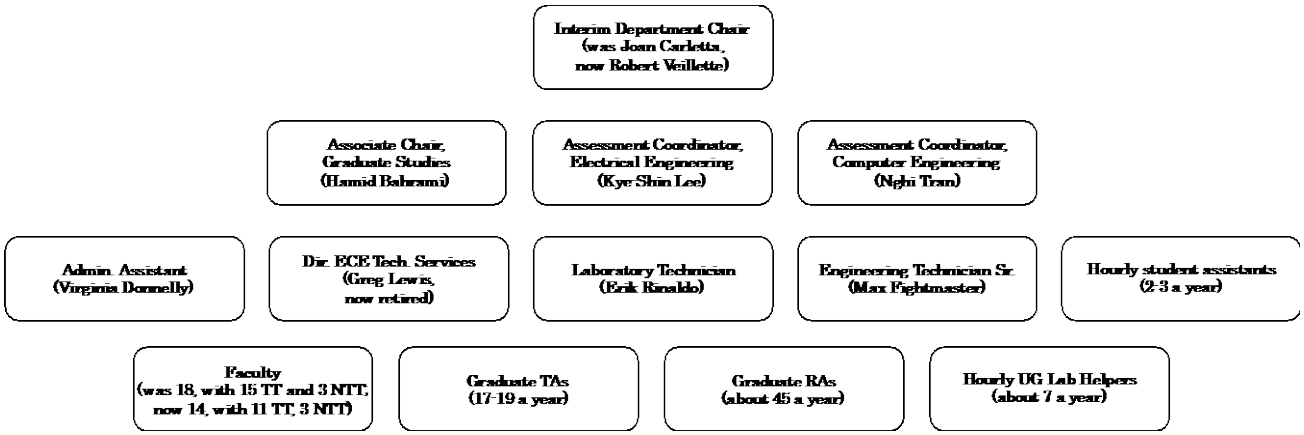

Fig. 1 – Electrical and Computer Engineering Organizational Chart

Table 3 – Personnel in Electrical and Computer Engineering

Administrative & Technical	
Virginia Donnelly ***Administrative Assistant***	Front desk and administrative support.
Gregory Lewis ***(retired Spring 2018)*** ***Director of ECE Technical Services*** ***(with additional admin stipend to serve as senior design coordinator)***	Maintenance schedules and equipment specification for educational labs, planning for use of course and information technology fees in keeping educational labs updated, software licensing for ECE-specific needs and computer labs. Educational support, such as instruction to students on electrical safety, soldering and proper electrical connections. Support for senior (capstone) design activities and design competition teams. Instruction of senior design courses and coordination of senior design activities with faculty advisors of the teams.
Erik Rinaldo ***Laboratory Technician***	Set-up of equipment in educational labs. Parts purchasing, maintenance of electronic shop, assistance to faculty and students in construction of special projects to meet research needs, design and construction to support educational labs. Educational support and supplemental instruction.
Max Fightmaster ***Engineering Technician Senior***	Oversight and maintenance of ECE-related research facilities in the Engineering Research Center. Assistance with setup of hardware and software in educational and research labs. Support for design competition teams and research projects.
Joan Carletta (until June 2018, now Robert Veillette) ***Interim Department Chair***	Management and administrative support.
Hamid Bahrami ***Associate Chair, Graduate Studies*** ***(faculty with admin stipend)***	Academic policies involving graduate students, graduate curriculum, advising of graduate students on academic matters, tracking of graduate student progress towards degrees.

Kye-Shin Lee and Nghi Tran ***Assessment Coordinators*** ***(faculty with admin stipends)***	Coordination of department activities to support assessment of its programs in Electrical Engineering and Computer Engineering, respectively, including ABET assessment of the BSEE, HLC and university-level assessment.
Hourly Student Assistants **(two or three a year)**	Front desk and office support (one or two), and technical support (one).
Non-Administrative	
Faculty (was 18; starting Fall 2018, down to 14 due to resignations, retirements and reassignments)	Our faculty perform many administrative services, including academic and career advising and admission evaluation for our graduate student applicants.
Graduate Teaching Assistants **(about 17 to 19 a year)**	Paid by the Graduate School GA allocation and on ECE sources like research IDC; provide essential services related to our educational mission.
Graduate Research Assistants **(about 45 a year)**	Paid on funded grants and on start-up, provide essential work on deliverables for funded research and our overall research mission.
Hourly Undergraduate Lab Helpers **(about 7 a year)**	Paid on College-provided funds or course fees; assist more junior students in educational laboratories.

(ii) **Financials.** Table 4 shows a five-year history of the parts of the ECE operating budget that goes towards administrative and support services (that is, neglecting salaries and fringe benefits; table includes student assistants, supplies and services, and travel and hospitality). Note that the travel category is used mostly for faculty professional development, but also for faculty searches.

Table 4 – Five-year history of ECE operating budget.

FY	Operating Budget	Actual Expenses	Difference
2018	$66,580	$59,999	$6,581
2017	$79,435	$71,519	$7,916
2016	$76,846	$67,866	$8,980
2015	$65,356	$42,989	$22,368
2014	$61,701	$59,605	$2,096

The small surplus should not be seen as an indication of the operating budget being too big. We routinely supplement the operating budget more and more from other sources, primarily ECE research IDC and help from the College's portion of research IDC, reducing our ability to support our own research mission. As our uncertainty about UA's financial situation has increased, we have deferred replacement and repair of items that are not immediately related to the educational mission; for example, some of our faculty and graduate student offices have carpeting that is threadbare. Part of the reason for the surplus is the uncertainty of scheduling UA services like carpet and paint in a reasonable time frame at the end of the fiscal year; the wait time for these services can be highly variable and significant.

(iii) **Equipment and Technology.** The department is supported by a standard suite of office equipment (two workstations, two copiers), and a laptop projector for our conference room. We also maintain an electronics shop with parts in stock and an assortment of tools needed for design and construction of printed circuit boards, embedded systems, specialized instrumentation and testing set-ups, and related needs of our educational and research labs. Various faculty members have department-provided technology beyond their UA faculty laptop that is needed to support their particular teaching needs, such as microphones and drawing tablets for development of distance learning materials.

The great bulk of the equipment in the ECE department is used in teaching and research labs. Table 5 is an itemized overview of laboratory equipment for specific ECE labs and the general procedures performed in the labs in preparation for and during the course of a given semester. The table summarizes the preparation of equipment and does not include time and efforts necessary for troubleshooting, diagnostics, repair, calibration, development, and manufacture of equipment and

associated peripheral accessories.

(iv) **Space.** The department occupies a total of just under 31,000 square feet, the majority of which is in Auburn Science and Engineering's South Tower. The South Tower houses the ECE main office, a conference room and small meeting room, a display space used in recruitment, faculty offices, teaching laboratories, graduate assistant offices, and research laboratories. Portions of the North and West Towers house additional faculty offices, research labs, graduate assistant offices, and a suite of educational labs used for our senior design courses. The Express Building, a small 2,197-square-foot building near Buckingham that was previously a train depot, is an additional research space used primarily for building and testing large items, like robots, hybrid electric vehicles, and utility power cables. A 1,950-square-foot suite of labs in the Engineering Research Center houses specialized equipment needed for testing electric machines and hybrid electric vehicles, testing devices in harsh environments, and designing, probing, and testing integrated circuits and sensors.

II. Future Plans.

a. **Potential changes**. The department has no plans to change our administrative practices at this time. Our only concern is to minimize any decline in the quality of our service – and hence in the quality of our academic programs – if there is a continued decline in resources. An additional administrative assistant would go a long way to help the department and is part of future plans.

b. **Trends**. It is obvious that our department is understaffed on both the administrative and faculty sides. We need to replace the faculty that we have lost in recent years, especially in the area of Computer Engineering, which an increasing proportion of our undergraduate students are choosing for their major – above 50% in Fall 2018. Therefore, we hope that our requests for faculty lines will be granted, and that we will be spending some time conducting searches in the next few years.

Table 5 – List of laboratory equipment and associated regular tasks.

<u>Circuits I & II Laboratory</u> 12 oscilloscopes 12 power supplies 12 computers 48 printed circuit boards	 - operational verification/preparation of units and accessories - operational verification/preparation of units - OS/software imaging and interface verification with peripheral eqpt - currently under development in support of laboratory instruction
<u>Controls I & II Laboratory</u> 12 oscilloscopes 12 power supplies 12 computers 12 data acquisition modules 12 function generators	 - operational verification/preparation of units and accessories - operational verification/preparation of units - OS/software imaging and interface verification with peripheral eqpt - operational verification/preparation of units - operational verification/preparation of units
<u>Electronic Design Laboratory</u> 12 oscilloscopes 12 power supplies 12 computers 12 function generators;	 - operational verification/preparation of units and accessories - operational verification/preparation of units - OS/software imaging and interface verification with peripheral eqpt - operational verification/preparation of units
<u>Digital Logic Design Lab</u> 12 oscilloscopes 12 power supplies 12 computers 12 function generators 24 PLC boards and digital evaluation modules	 - operational verification/preparation of units and accessories - operational verification/preparation of units - OS/software imaging and interface verification with peripheral eqpt - operational verification/preparation of units - operational verification/preparation of units
<u>Energy Conversion Lab</u> 6 oscilloscopes 12 power supplies 12 current probes 12 voltage isolation probes 6 torque sensor units, readouts 12 variable three-phase transformers 36 electric motors 12 AC and DC motor drives	 - operational verification/preparation of units and accessories - operational verification/preparation of units - operational verification/preparation of units - operational verification/preparation of units - operational verification/preparation of units - operational verification/preparation of units - operational verification/preparation of units - operational verification/preparation of units
<u>Power Electronics Lab</u> 10 oscilloscopes 20 power supplies 10 function generators 10 power electronics demonstration kits	 - operational verification/preparation of units and accessories - operational verification/preparation of units - operational verification/preparation of units - operational verification/preparation of units

(Table continued on next page.)

Table 5 – List of laboratory equipment and associated regular tasks (continued).

Senior Design Laboratories 22 oscilloscopes 66 power supplies 44 function generators 22 voltage isolation probes 44 computers	 - operational verification/preparation of units and accessories - operational verification/preparation of units - operational verification/preparation of units - operational verification/preparation of units - OS/software imaging and interface verification with peripheral eqpt
Computer Cluster 32 computers	 - OS/software imaging and operational verification/preparation of units
Power Electronics Research Laboratory 8 oscilloscopes 12 power supplies 8 function generators 10 computers	 operational verification/preparation of units and accessories operational verification/preparation of units operational verification/preparation of units OS/software imaging and interface verification with peripheral eqpt
Alternative Energy Research Laboratory 12 oscilloscopes 16 power supplies 12 function generators 14 computers 4 programmable power loads	 - operational verification/preparation of units and accessories - operational verification/preparation of units - operational verification/preparation of units - OS/software imaging and interface verification with peripheral eqpt - operational verification/preparation of units and accessories
Miscellaneous Laboratory Support Dynamometer (ERC) Microelectronic probe station (ERC) 2 3-D printers (ECE Support Facilities)	 - operational verification/preparation of unit and accessories - operational verification/preparation of unit and accessories - operational verification/preparation of unit and accessories

Administrative Activities Review – FY18
Department of Mechanical Engineering

I. Basic Facts and Description of the Unit

a) Mission and goals.

The Department of Mechanical Engineering is one of the 5 academic departments in the College of Engineering (COE) at The University of Akron. The department has a total of 30 full-time faculty members (27 tenured or tenure-track, 3 non- tenure-track), which are supported by a staff of three technicians and three administrative assistants. In Fall 2017 there were 1450 students enrolled in our programs (1320 undergraduate and 130 graduate), making it the largest department in the college. The department offers BS, MS, and PhD degrees in Mechanical Engineering and a BS degree in Aerospace Systems Engineering. Both of our undergraduate degree programs have full ABET accreditation. Our strengths are the SAE student design teams, the senior capstone projects, and the cooperative education program. We maintain active research programs in ceramics, polymers, biotechnology, and surface engineering. The department is host or co-host to several of the COE research centers, including the NSF Center for Tire Research, the Conquer Chiari Research Center, and the Center for Surface Engineering and Lubrication Research.

Our goal is to offer academically strong programs through a balanced approach of high quality teaching and research. Even though our student enrollment has been growing vigorously (64% during 2010-2017), we still observe many opportunities for further grow through the addition of new majors and programs that have been insistently requested by local employers.

b) Services.

The services provided by the department can be categorized in four areas: Student and Curriculum, Finances and Staffing, Recruitment, and Faculty. Table I lists some of the most common tasks that the department performs in each of these categories, with an approximate percentage workload assigned to each category.

Table I - Services Provided by Mechanical Engineering

Student and Curriculum (60%)	Finances and Staffing (20%)	Recruitment (10%)	Faculty (10%)
Mentor Design teams	TAARS	NSO, Visit Days, Individual Tours	RTP items
Advising students	Space Audits	Website Maintenance	Technical services to faculty
Technical services to students (labs)	ECRT	Graduate Admissions (Eval & Paper)	Seminars
Transfer Review	Payment NET (approval/Review)	Faculty recruitment	Merit review
Degree Clearance	Travel authorizations	Manage outreach activities	
ABET	Manage Accounts		
Class Scheduling	Time sheet approval		
Curriculum management proposals	Development and Advisory Boards		
Exit Interviews	Faculty/Staff appointments		
Lab and software maintenance	PAF and RFP		
Front desk services	Scholarships		
Course maintenance	Purchasing		
Teaching evaluations	GA contracts		
Managing course registration issues	Performance evaluations		
Managing post-bac transfer credits			

The several tasks listed in Table I translate into a huge amount of work when applied to a department of our size. To provide an idea of the work involved, we quantify next some of the above tasks just for the past year period:

Graduate applications processed: 175
(Processing applications has several steps: getting email from graduate school about new applications, pulling up and printing information from NOLIJ. If there is missing information, email the applicant and then check on a weekly basis until all information is received. Once all the application materials are in, send the application to the reviewer for processing. After the reviewer returns the application with a decision, email the graduate school who provides a letter to the applicant. Finally, make a copy of the letter and file it with the application)

GA contracts processed: 152
(This number does not include contracts that must be retyped and resubmitted due to funding/visa issues, PAF changes, and one-time/supplemental payment contracts)

Degree Clearances - Undergraduate: 71
(This number only includes those students that did not clear when their DPR was run. For each one of them, the reason for not clearing must be communicated to the Associate Chair, who then evaluates if an exception can be made)

Degree Clearances - Graduate: 38
(These are the ones that have graduated and does not include those that have applied but then postponed graduation. Also, it does not include the many graduate students that come frequently to the office to seek help in reading and understanding their DPRs. Degree clearance for PhD students also requires the regular follow-up throughout their studies to make sure they are submitting the appropriate DPFs within the required time frame, including Transferring Course forms and submission. All graduate students also require the regular update of their 698/898 course grades, which means going into each semester they took a course and change the grade).

Advising holds: 100+
(Provide a list of student names that have been obtained from freshman advisors to the dean's office regarding whether or not the students attended an advising appointment. For those students that did not attend, a hold is placed on their account. Once they attend, the faculty member will inform the office and the admin assistant will go in the system to remove the hold)

Override and enrollment of students: 100+
(These are frequent requests due to pre-requisites not satisfied, closed courses, etc. Each case must be analyzed individually, usually with faculty input)

(i) **Critical partners**. To perform the services listed in Table I, the department interacts with many other units at UA, including: COE, Scheduling, HR, Purchasing, ORA, OAA, Graduate School, etc.

(ii) **Customers or end-users of services**. Our main customers are the students (90%). We also serve local companies and state/federal agencies (10%) through co-op, research, and service projects.

(iii) **Key performance analysis.** The metrics we use to measure performance include enrollment, retention, graduations, placement, and generated revenue. Charts and comparison with peer institutions on some of these metrics were presented in the recent APR report. For inclusiveness, we show in Table 2 the enrollment trend of the department during the last 3 and 5 years.

Table 2 – Mechanical Engineering Enrollment in last 5 years

						3-Year	5-Year
	Fall 2013	Fall 2014	Fall 2015	Fall 2016	Fall 2017	%	%
UGRAD	979	1094	1236	1275	1315	20%	42%
GRAD	98	111	136	130	129	16%	37%
Total	1077	1205	1372	1405	1444	20%	42%
Yearly Growt	5.9%	11.9%	13.9%	2.4%	2.8%		

(iv) **Brief assessment.** The department enjoys an excellent reputation among local employers in regard to the quality of students graduated. This is sustained by the strength of our co-op program and a dedicated research-active faculty body. However, we are facing increasing competition from area schools which are investing at a much higher rate than us, in starting new programs, hiring faculty, and construction of modern facilities.

c) Resources.

We describe next the departmental allocated resources in four main categories: personnel, financial, equipment, and space. The challenges we face in each category are also discussed.

(i) **Personnel**. The department has a total of 30 full-time faculty members (27 tenured or tenure-track and 3 non- tenure-track), which are supported by a staff of three technicians and three administrative assistants. In addition to the full-time faculty, several part-time faculty members are hired every semester in order to respond to the high teaching demand within the department. Even with the part-timers, the permanent faculty carry a high teaching load in detriment of their research activity. The department has not hired new faculty in several years and has not replaced recent departures. This is not only seriously compromising the future viability of the department but we are also starting to look less attractive in comparison with competing area schools. In terms of staff, the front office needs at least three competent administrative assistants to adequately manage the high workload expected in a department of this size. Two of the current admins have just retired and we are in the process of searching their replacements. Two of the technicians are assigned to the machine shop area and can adequately manage the workload. The third technician is assigned to maintain computer and faculty labs; his workload is excessive and many times he struggles to respond to the many needs of the large student and faculty body. An organizational chart and list of the department personnel are shown in Fig. 1 and Table 3, respectively. Note that S. Meier is no longer with UA and N. Kusnyer is retiring at the end of August.

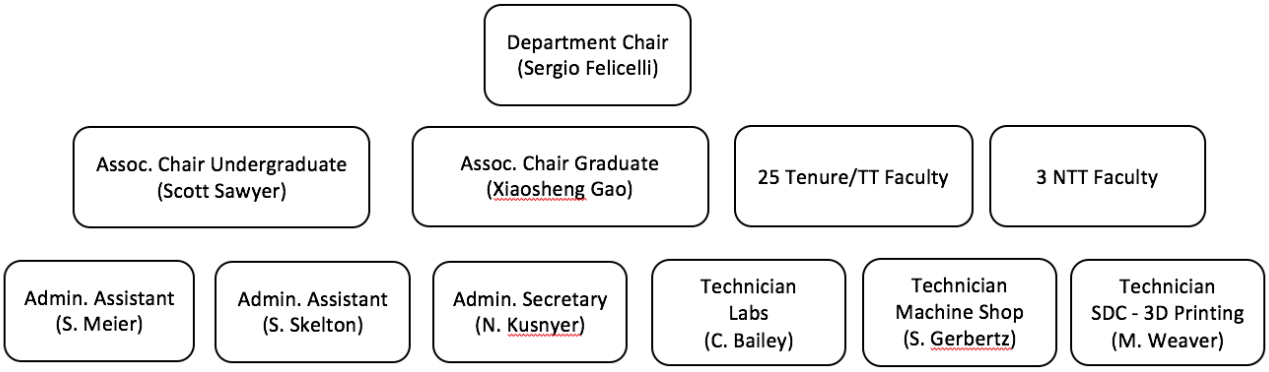

Fig. 1 – Mechanical Engineering Organizational Chart (FY18)

Table 3 – Personnel in Mechanical Engineering (FY18)

Position Type	Number	Key Roles
Faculty	30	Teaching, research, service
Administrative	4	scheduling, budget, purchasing, staffing
Technician	3	Lab/soft maintenance, student/faculty services

Employee	Title	Position Type
Bailey,Clifford G	Sr. Engineering Technician	Technician
Batur,Celal	Professor	Faculty
Braun,Minel J	Distinguished Professor	Faculty
Buldum,Alper	Professor	Faculty
Choi,Jae-Won	Associate Professor	Faculty
Daniels,Christopher C	Associate Professor of Practice	Faculty
Deckler,Daniel Carl	Professor of Engineering	Faculty
Dong,Yalin	Assistant Professor	Faculty
Farhad,Siamak	Assistant Professor	Faculty
Felicelli,Sergio	Department Chair	Administrative
Gao,Xiaosheng	Professor, Assoc. Chair	Faculty
Garafolo,Nicholas G	Assistant Professor	Faculty
Gerbetz,Stephen M	Sr. Engineering Technician	Technician
Haritos,George K	Professor	Faculty
Hoo Fatt,Michelle S	Professor	Faculty
Kelly III,S. Graham	Professor	Faculty
Kusnyer,Nancy M	Administrative Secretary	Administrative
Ling,Chen	Associate Professor	Faculty
Loth,Francis	Endowed Professor	Faculty
Madad,Reza	Assistant Professor of Practice	Faculty
Mahajan,Ajay Mohan	Professor	Faculty
Meier,Stacy	Administrative Assistant	Administrative
Morscher,Gregory N	Professor	Faculty
Nadkarni,Gopal R	Associate Professor	Faculty
Povitsky,Alex	Professor	Faculty
Quinn,Donald D	Professor, Assoc. Dean Honors College	Faculty
Sawyer,Scott D	Associate Professor, Assoc. Chair	Faculty
Skelton,Shannon M	Administrative Assistant	Administrative
Srivatsan,Tirumalai S	Professor	Faculty
Tan,Kwek Tze	Assistant Professor	Faculty
Wang,Guo-Xiang	Associate Professor	Faculty
Wang,Shao	Associate Professor of Practice	Faculty
Wang,Shengyong	Associate Professor, ABET Coord. ASE	Faculty
Weaver,Michael A	Sr. Engineering Technician	Technician
Wong,Shing-Chung Josh	Professor	Faculty
Ye,Chang	Assistant Professor	Faculty
Zhe,Jiang John	Professor	Faculty

(ii) **Financials.** In recent years, the operating budget of the department has been reduced substantially from what it used to be when we had less than half the number of students and faculty we have now. We usually run out of funds in March/April, even by using funds from other departmental accounts such as IDC or student fees. Table 4 shows the unit's budgeted and actual expenses in the last 5 years.

Table 4 – Mechanical Engineering Operating Budget

FY	Operating Budget	Actual Expenses	Deficit
2018	$79,006	$90,924	-$11,918
2017	$94,427	$102,219	-$7,792
2016	$89,270	$124,574	-$35,304
2015	$124,887	$129,140	-$4,253
2014	$105,331	$104,517	$814

(iii) **Equipment and Technology.** The department has two computer instructional labs in the main floor of ASEC and several instructional and faculty laboratories in ASEC, mostly in the machine shop area. The equipment and technology in these labs is mostly adequate, with some of them needing updates or replacement which we try to do annually with IDC or technology funds. A summarized description of equipment is given in Table 5.

(iv) **Space.** Together with faculty positions, this is one of the critical resources the department is seriously lacking. According to the recent 2018 space survey, the department has currently assigned about 18,000 sqft of research lab space, 10,000 sqft of class lab space, and 14,000 sqft of office space. The large enrollment increase in the last several years has amply outgrown the capability of the instructional laboratories, resulting in overcrowded classes or inability to offer enough number of lab sections to follow the program curriculum. A proposal to extend the ME lab space to the CHHS building has been submitted to the UA administration. Another area lacking in space is in offices for graduate students, particularly for teaching and research assistants; we have had to place students in off-campus locations which makes difficult for them to interact with faculty or undergraduate students.

II. Future Plans.

a. **Potential changes**. Using the strength of the college co-op program and the demand of local employers for ME students, we plan to increase the integration of our programs with industry, encouraging more participation of our industry sponsors in departmental activities, and facilitating ways in which they can support our students and faculty.

b. **Trends**. Several of the local employers that hire our students have repeatedly encouraged us to add new specializations that are needed to keep up with the advancement of manufacturing and industrial technology. Some of our competing schools are taking the lead and will be in a better position to capture future students looking for degrees in these areas. We need to invest in the necessary personnel and infrastructure resources in order to remain competitive among the many school options available in our area.

Table 5 – List of Major Equipment in Mechanical Engineering	
Laboratories	Major Equipment
Mechanical Engineering Department Laboratories	Wind and water tunnels, pressure control set-up, vibration experiment, engine dynamometers, compressors, turbines, HVAC units and fluid flow experiments.
Measurement Laboratories	Viscosity, pressure, strain, vibration, flow, temperature and acoustic measurements.
Materials Laboratory	Several cutting and polishing machines and microscope. Material testing equipment. Surface profilometer, atomic force microscope.
Parker Hannifin Motion Control Laboratory	Flow, level, temperature and speed control systems. Industrial PLCs and hydraulic/pneumatic/electrical motion control systems. Process Control Simulators.
Robotics Laboratory	Pneumatic, hydraulic and electrical robots both industrial and educational.
MEMS Laboratory (Research lab)	Equipment to characterize and manufacture MEMS devices.
Vibration Laboratory	B&K Vibration Exciters, HP Spectrum Analyzers
Heat Transfer Laboratory	Several heat exchangers, heat conduction experiment, crystal growth experiment
Lubrication Laboratory (Research lab)	Flow visualization in journal bearings and seals.
Fluid Mechanics Lab.	Experimental Impulse Turbine, nozzles, water tunnel, subsonic and supersonic wind tunnels, gas turbine.
CAD/CAM Laboratories	SME supported rapid prototyping machine. Several design software packages. CNC mills and lathes. 3-D printers (4).
Tensile Testing Laboratory	Instron tensile and fatigue testers. Impact tester. United testing machine. Electropulse and MTS testers. AFM/Raman, indentation measurement systems.
SAE Aero Design Room	Several scale remotely controlled airplanes and computers.
Rocket Design Room	Student Design Center is allocated for this project.
Mechanical Engineering Machine Shop	Lathe, planer, drilling and cutting machines. CNC machines.
Fluid Mechanics and TSC Labs.	Draining tanks and Cartesian Divergence. Air Compressor and Centrifugal Pump.
Nano Indentation and Electrospinning Lab (Research lab)	Material Characterization and electrospinning.
Additive Manufacturing Lab (Research Lab)	Several rapid prototyping instruments
3D Printing Lab	Eight 3D printers of intermediate and advanced capability for instructional and research support
Turbine Research Lab (Research lab)	12,000 sq-ft facility for intelligent propulsion systems
Fluid Mechanics Lab	Sub-sonic and super-sonic wind tunnels. Gas turbine.
Polymeric Materials Lab	Electrospun materials manufacturing equipment and rolling resistance measurements