

Academic Assessment Plan

(M.S., Ph.D. / Microelectronics-Photonics)

2018 Calendar Year Report

Program Goals

- 1. Provide students with interdisciplinary education and training in engineering and science to meet the needs of emerging technology industries.**
- 2. Place students in interdisciplinary groups performing rigorous and challenging research to prepare them for careers in industrial research teams, national labs, and academic positions.**
- 3. Prepare students to be effective in technology management and entrepreneurship.**

Student Learning Outcomes

- 1. Conduct independent investigations (M.S.) or define and explore new areas of research (Ph.D.) in an interdisciplinary environment, expanding the breadth and depth of state-of-the-art knowledge in the field of micro to nanoscale materials, processing, and devices.**
- 2. Master knowledge, practices, and skills from traditional graduate level programs in Physics, Chemistry, Electrical Engineering, Chemical Engineering, Mechanical Engineering, Biological Engineering, and Biomedical Engineering, regardless of prior traditional educational background.**
- 3. Communicate effectively deep level knowledge of their work to persons well-versed in their field, detailed technical concepts to persons with strong technical backgrounds outside of their field, and general concepts and applications to the general public.**
- 4. Work efficiently in interdisciplinary team environments, fully supporting team goals through active membership or through team leadership as appropriate.**
- 5. Implement intellectual property management and research commercialization processes, encouraging migration of ideas from formulation to societal benefit during their professional careers.**
- 6. Execute duties found in entry-level professional positions with the operational skills equivalent to at least one year's experience in that position.**

7. Embrace the role of citizen-scientist in both their professional and societal communities, utilizing their sound ethical and analytical backgrounds, to lead the discussions that will be needed to balance what can be done with what should be done.

Process for Assessing each Student Learning Outcome

1. Ph.D. Candidacy Exam Process (Direct): This process addresses the Ph.D. level knowledge portion of outcomes 1 and 2, communications requirements of outcome 3, IP and the commercialization aspects of outcome 5, and professional behaviors found in outcomes 6 and 7. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.

The MicroEP Ph.D. candidacy process is in two parts which may be taken in either order. One part is a formal written research proposal 15 pages in length that is similar in nature to a NSF proposal. It is written in strong collaboration with the major professor, and must be presented and approved by the student's Ph.D. committee at the end of the formative stage of the research definition but well before the student is deep into the execution stage of the research. It is designed to assure that the field of the research is well understood by the student, that the proposed research topic has sufficient depth and breadth to demonstrate Ph.D. level professional work, and that the research has a reasonable chance of completion within four years after being accepted as a Ph.D. student after completion of a MS degree.

The second part is a written exam with oral discussion taken by the student during prior to the start of the spring semester. This exam is a combination of a NSF solicitation and a Request for Quotation received by a technology-based company. Students are allowed access to any written information they wish to use, but they may not discuss the exam scenario or their work with any person. The student is limited to 15 pages, and the written document and the oral discussion are both evaluated by the same faculty panel. A student who fails the exam may take it one additional time during the same time the following year. This document is almost always the first complex problem assessment and development proposal written by the student, and provides very good information on how the student will perform in the types of assignments typically given in a professional position where a Ph.D. is the minimum education requirement for being hired. The exam is given to the students the week before the start of the spring semester.

Data Collection and Analysis:

Candidacy Research Proposal, 2018 Calendar Year

Number of Students Presenting Candidacy Research Proposal / Number Accepted = 3/3.

Written Candidacy Exam, Spring 2018

Number of Students Taking Exam: 5.

Number of Students Passed Exam (First Attempt): 2.

Number of Students Passed Exam (Second Attempt): 2.

Number of Students Failed Exam (First Attempt): 1.

Number of Students Failed Exam (Second Attempt)*: 0.

* - Removed from MicroEP PhD program.

Students Admitted to MicroEP PhD Candidacy, 2018 Calendar Year

Number of Students Admitted to Candidacy** = 4.

** - Passed both parts of MicroEP PhD candidacy process.

Five Year Statistics for Written Candidacy Exam

Pass rate (first attempt) = $26/39 = 67\%$.

Pass rate (second attempt) = $11/14 = 79\%$.

Assessment:

- The candidacy exam process continues to provide a good assessment of the student's capability to meet the requirements of PhD level research. The written candidacy exam provides a good indication of how the student will perform in the types of assignments typically given in a professional position where a Ph.D. is the minimum education requirement for being hired.
- Several students who do not pass the written candidacy exam on the first attempt voluntarily move to other PhD programs at the university.
- The written candidacy exam results are presented to, and accepted by, the MicroEP faculty.

- The MicroEP director and associate director review the results of the written exam and the faculty panel assessment with each student examinee and their major professor. Constructive feedback is given to the students regarding strengths and areas for improvement – either in preparation for their PhD research and dissertation or to re-take the exam the following year.
- The MicroEP staff solicits feedback from the faculty and students each year following the exam on the exam process and ways in which it may be improved. For example, addition of a summary highlighting the novel fundamental aspects of the written proposal is being considered for addition to the candidacy exam.
- In 2018, Associate Director Dr. Keith Roper again conducted a series of three candidacy exam preparation sessions with the students scheduled to participate in the candidacy exam. These sessions provided an in-depth introduction to the requirements of the exam, reviewed best practices in preparing for and taking the candidacy exam, and provided guidance to students to take steps in advance to prepare themselves for the candidacy exam. Examples included preparing a schedule for the exam in advance; notifying those potentially affected of the process; developing proficiency with a reference/citation manager; increasing familiarity with library and research resources available on campus; reviewing previous candidacy exam questions; drafting an outline of a response to an anticipated question; improving oral and written communication skills; and discussion of professional responses to input from evaluators. The sessions also elicited input from the participants on ways to improve the candidacy exam process. Feedback from candidacy exam participants in post-exam debriefings about the preparation sessions was uniformly positive.

2. Curriculum and career advising each semester at pre-registration (Indirect): This process addresses outcomes 2, 4, and 6. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.

This formal advising process gives an opportunity to discuss with the student such things as their academic performance in the prior semester, how they are working with their professor and their research group members, and what is affecting their ability to make satisfactory progress on their research. All students are advised by Director Dr. Rick Wise and co-advised by their major professor.

Data Collection and Analysis:

23 MS and 38 PhD students were advised for Spring 2018.

23 MS and 36 PhD students were advised for Fall 2018.

Assessment:

The advising process is helpful to the program director to get to know the students better and to track the progress of the students, or address issues, toward completing their degree requirements. It is also used as a time to check milestones including their research document (3-5 page description of their intended research initially signed by their committee and updated each semester by the student and approved by their major professor), committee form, title form, annual reviews, and reminders of dates for their written candidacy exam and candidacy research proposal.

- 3. Small Group Student Meetings (peer assessment and mentoring) (Indirect): This process addresses outcomes 3, 4, 6, and 7. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.**

These peer mentoring groups are led by senior MicroEP students, and participation is required for all MicroEP students during their first two years in the program. The groups meet six times each fall and spring semester and focus on how to effectively communicate to other students that are not already familiar with the work. In this way, they practice communicating with young professionals unfamiliar with their field, and also have an opportunity to discuss operational problems with their peers and receive feedback on their way of handling the problems. They are also taught the use of MS Project.

Data Collection and Analysis:

Spring 2018:

27 first and second year students in four Small Group Teams met six times.

Attendance (excluding illness and conference travel) = 97%.

Fall 2018:

21 first and second year students in four Small Group Teams met six times.

Attendance (excluding illness and conference travel) = 99%.

Assessment:

The Small Group Leaders teach the students to use MS Project to map out their key project as a graduate student – meeting the requirements to get their graduate degree. Each student's MS Project file must be updated and submitted to MicroEP management three times in the fall semester and four times in the spring semester. The student's completed MS Project summary of their graduate program path is included as an appendix in their thesis/dissertation.

The students also prepare and practice presenting their research to their small group team and are coached by their small group leader. Each small group rotates presenting their research at monthly Research Communication Seminars to all MicroEP students. This practice improves the student's public speaking skills and prepares them for conference presentations, oral defense of candidacy exams, defense of their thesis/dissertation, and becoming effective communicators throughout their careers.

- 4. Use of Microsoft Project software (Indirect): This software usage addresses outcomes 4 and 6. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.**

One large predictor of professional success is the ability to plan your work such that you have no downtime during the day. All students in their first two years must use Microsoft Project software for their research planning to help them learn the time management and project management practices they will need in their early careers.

Data Collection and Analysis:

All MicroEP graduate students learn the use of Microsoft Project in their Small Group teams (see Student Learning Outcomes Process #3). 27 students learned use of MS Project in Small Group teams and how to develop their 'Degree Project Plan' in spring 2018 and 21 students in fall 2018. Except for their first full month in the program, students in their first two years in the program are required to submit their updated MS Project plan monthly to MicroEP program management. This submission is part of their grade for the Operations Management seminar grades.

Assessment:

This methodology is fully integrated into the MicroEP graduate program and helps the students understand what is needed to complete their graduate degree (and helps drive conversations with their major advisor or MicroEP program director when it is not). The students include their completed MS Project plan summary as an appendix in their thesis or dissertation. Program alumni

and employers alike frequently provide feedback regarding how this skill clearly and positively distinguishes MicroEP graduates from most new hires from other STEM graduate degree programs.

- 5. Research Communications Seminars (Indirect): This process addresses outcomes 3, 4, 6, and 7. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.**

Monthly seminars are held to update the students on the MicroEP announcements, news, events, and recognition. Students in the first two years of the MicroEP program also present their research to their peers at these seminars. These one hour and 15 min seminars are held the first Monday evening of each month during the spring and fall semester. Attendance is required for all MS students in their first three semesters and all PhD students in their first five semesters.

Data Collection and Analysis:

Spring 2018:

Three research communication seminars were held.

Attendance of MS students in their first three semesters = 100%*.

Attendance of PhD students in their first five semesters = 100%*.

Fall 2018:

Four research communication seminars were held.

Attendance of MS students in their first three semesters = 100%*.

Attendance of PhD students in their first five semesters = 100%*.

* - Students who miss a seminar are required to attend a thesis or dissertation defense or other technical seminar authorized by the program director.

Assessment:

Students in the four Small Groups give two types of presentations – a three minute (elevator pitch) presentation and a 12 minute conference-style presentation. This gives them valuable experience in learning how to present their research at the level appropriate for their audience.

- 6. Small Group Leader meetings (Indirect): This process addresses outcomes 4, 6, and 7. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.**

Senior MicroEP students that lead these small groups experience their first taste of administrative responsibility, performance assessment and feedback, and management team discussions as they find common issues of concern from the different Small Groups. They have the responsibility to not only assess and prioritize common issues and the responsibility to propose and help implement program changes needed to address the issues. These meetings are facilitated by Associate Director Dr. Panneer Selvam.

Data Collection and Analysis:

MicroEP program management met with Small Group Leaders on May 9, August 29, January 24 (2019), to share best practices, discuss and implement new initiatives among the students, and to gain support among these student leaders to affect these changes. In addition, to teaching soft skills in these small group meetings, community service is also advocated. Service initiatives for 2018 included volunteering for the Razorback Regional Greenway Trail Clean-Up (April 28, July 21, and December 1) and leading the Butterfield Elementary Science Club after school event on March 1. There were 54 MicroEP student and faculty volunteer participants in these events.

Assessment:

The Small Group Team concept is working as intended giving senior MicroEP students an opportunity to develop their leadership skills and more direct access to the program management to explore and implement new initiatives to help other students in the program with their professional and academic development.

- 7. Annual student performance reviews (Indirect): This process addresses outcomes 1, 2, 3, 4, and 6. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.**

An annual review process was established by the Graduate School several years ago that is designed to tell the student if they are making satisfactory research and academic progress toward their degree, or if they are not. The MicroEP grad program expanded the feedback forms significantly to allow the major professor to separately address the quantity and quality of a student's work in many different performance attributes including academic progress, interaction with professor, interaction with other students, laboratory work, research documentation, thesis/dissertation progress, and research planning. The student fills out a self-assessment and then brings that document with him/her to the meeting with the major professor, which gives the student practice in how to align their self-assessment of their work to their direct supervisor's assessment. All review forms are then reviewed by Associate Director Dr. Panneer Selvam to both create a program wide composite view and to identify any students that need further program level performance review before the forms are forwarded to the Graduate School.

Data Collection and Analysis:

Annual performance reviews were received from 39 students. Performance reviews were expected from 47 students.

Assessment:

The annual performance review serves its intended purpose of identifying performance issues as well as differences in performance perception between the student and their major professor. These differences can be used to facilitate a useful discussion during the review meeting.

Although the level of participation in this process increased compared to previous years, further attention will need to be given to this process by the MicroEP graduate program management to ensure full compliance by the students and faculty.

- 8. Formal Exit Interviews with all graduates (Indirect): This process addresses all outcomes. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.**

While the MicroEP program receives student feedback through many channels, as a result of feedback from external reviewers during the first program review a formal exit interview policy was implemented and a script was created to help guide the interview. Associate Director Dr. Keith

Roper performs these exit interviews; then the forms are scanned and stored in both hardcopy and electronic forms.

Data Collection and Analysis:

Exit interviews were performed by Dr. Leftwich (new associate director) and Dr. Roper (departed associated director, Dec 2018) with 9 of 14 students who graduated from the program during the 2018 calendar year. Participating in the exit interview has now been formalized as a requirement before final sign-off of the student's record of progress.

Assessment:

The students generally reflect positively on the unique and interdisciplinary nature of the MicroEP program. Students appreciated belonging to a cohort and participating in the community culture of the program, e.g., the summer camp, seminars, presentations to peers and service activities. Students also provided positive comments regarding the entrepreneurial and business development aspects of the MicroEP program. In particular, students appreciate becoming familiar with organizational tools, e.g., Microsoft Project, that increase their productivity, Microsoft Powerpoint, to improve their presentation quality, and the courses that utilize those tools to aid in the development of communication skills that are critical to their success. Many students report getting positions in the microelectronics industry. Some students comment on the difficulty of obtaining jobs specific to the "Microelectronics-Photonics" disciplinary areas, the majority of which consist of international students. Specific to MicroEP, students suggested providing a framework that supports incoming and matriculating students in meeting all requirements of the program, graduate school, and university on the way to graduation. Most of the criticisms are associated with individual students' personnel experiences on campus, with some departments, some faculty, and/or one or more of the educational tools utilized for particular courses that did not sit well with them. These criticisms are few and far between and typically are unique cases that do not point to systemic or MicroEP-wide problem areas. For example, one student commented on the lack of value utilizing Silvaco over MATLAB for the Semiconductor Device Fabrication course. Another student commented on how demanding faculty are of their RA/GAs. Most students do not believe the University Career Center was valuable to them in regards to aiding in determining career direction and/or opportunity, resume assistance, etc.; or they did not use the Career Center in that capacity. Efforts will be made to engage the Career Center more systematically with the graduate students.

- 9. M.S. and early stage Ph.D. Research Document (Direct): This process addresses outcomes 1 and 3. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.**

All early stage MicroEP students are required to create a research description document to both help them fully understand their proposed research and to assist in communicating the goals and limits of their proposed research with their committee members. It is updated each semester with progress made and current issues hampering progress. When a Ph.D. student completes the Ph.D. Candidacy Research Proposal, this document is no longer required.

Data Collection and Analysis:

In 2018, Associate Director Dr. Roper met with incoming graduate students to introduce the research document, describe its purpose as a tool to establish goals and expectations, guide research activities, and provide continuous feedback regarding research results. Each section of the research document was discussed in detail. Dr. Roper met individually with each graduate student as they prepared their performance review to provide feedback and guidance in completing the review as well as establishing and communicating their research direction.

Research documents and updates were received from 26 MS and early stage PhD students during the 2018 calendar year.

Assessment:

The initial research documents were reviewed and signed by the student's major professor, committee, and a member of the MicroEP management team. Subsequent updates, submitted each fall and spring semester, are reviewed and signed by the major professor and the MicroEP management team. This helps document the student's progress on their intended research – through completion for MS students and, for PhD students, until the candidacy research proposal is approved by their committee.

- 10. Research Commercialization course MPEH 5383 (Indirect): This course addresses outcomes 3, 4, 5, and 7. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.**

This course, taught by Director Dr. Rick Wise, is a core requirement of both the MicroEP M.S. and Ph.D. curricula, and leads the student through the full process of commercialization of research. It is a team based course that requires development of a commercialization plan for an on-campus professor's research and extensive presentations on that work to the class.

Data Collection and Analysis:

Research Commercialization (MEPH 5383) was taken by 16 MicroEP students during the 2018 calendar year (offered in spring semester). A patent co-invented by a MicroEP PhD student, Thomas White, along with a post-doc (Satish Shetty) and three faculty members (Dr. Alan Mantooth, ELEG; Dr. Greg Salamo, PHYS; and, Dr. Morgan Ware, ELEG) entitled “Micro-Hall Effect Devices for Simultaneous Current and Temperature Measurements for both High and Low Temperature Environments” was used for the commercialization project for the class. Teams were formed to cover: 1) Intellectual Property and Technology Space, 2) Market Space: Competitor Analysis / Methods & Strategy, 3) Production & Manufacturing / Financials, and 4) Business Plan.

Assessment:

The course gives students an exposure to the entrepreneurial process of commercializing research. This helps prepare the students for the MicroEP PhD written candidacy exam as well as providing insight into the research commercialization process for those who may consider an entrepreneurial career path. Several local entrepreneurial ventures have been started by graduates of the MicroEP program.

11. Operations Management seminar courses MEPH 5811/5911/6811/6911 and Proposal Writing course MEPH 5832 (Indirect): This five semester course sequence addresses outcomes 6 and 7. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.

This is a required core course sequence for every MicroEP student, and is designed to introduce aspects of management of a technical group in a high tech workplace.

Data Collection and Analysis:

MEPH 5811 (Operations Mgmt: Infrastructure Management) Fall 2018: 8 students enrolled.

MEPH 5911 (Operations Mgmt: Personnel Management) Spring 2018: 15 students enrolled.

MEPH 6811 (Operations Mgmt: Management&Leadership I) Fall 2018: 13 students enrolled.

MEPH 6911 (Operations Mgmt: Management&Leadership II) Spring 2018: 12 students enrolled.

Assessment:

These seminars, taught by Director Dr. Rick Wise, provide students in the interdisciplinary MicroEP graduate program with an insight into organizational, personnel, and management topics and issues

typically encountered in the corporate world which most STEM graduates receive no, or little, exposure to until they make the sudden and rather dramatic change to an engineer or scientist hired into industry. These seminars help prepare the graduates for this transition and improve the likelihood of making a favorable impression as they start their new careers. A portion of the seminars is also allocated to improving the students' resumes using resources brought in from the UA Career Development Center. The students also present the MS Project plan for completing their degree requirements as a means of 'best practices' sharing.

12. Ethics course MEPH 5821 (Indirect): This course addresses outcome 7. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.

This is a required core course, taught by Director Dr. Rick Wise, for every MicroEP student, and is designed to prepare MicroEP graduates with discussions of alternative actions that may be taken in many typical ethically uncomfortable positions that may arise in the technology workplace.

Data Collection and Analysis:

Twelve MicroEP graduate students were enrolled in MEPH 5821 – Ethics for Scientist and Engineers.

Assessment:

In this class, the students learn about famous examples of unethical practices and decisions which led to engineering catastrophes such as the Challenger disaster, about understanding what plagiarism is and how to avoid it, and about appropriate and ethical authorship of research papers.

13. M.S. Thesis preparation and defense (Direct): This process addresses outcomes 1, 2, 3, and 5. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.

The M.S. thesis work and documentation demonstrates both a student's skills and knowledge, and is often the first major professional work done by the student where he/she has the responsibility to both guide the work and overcome whatever obstacles arise. We see this as the demonstration vehicle of the student demonstrating through achievement that they are now professionals. The

MicroEP program requires all Ph.D. path students that enter the MicroEP program after the B.S. degree to complete a thesis based M.S. MicroEP degree before being admitted as a Ph.D. student. The thesis is first used to assess a student's capability for independent work and analysis and then used as a career guidance tool. In this sense the M.S. thesis is part of the Ph.D. candidacy process as well.

Data Collection and Analysis:

Spring 2018 – 2 MS thesis graduates.

Summer 2018 – 0 MS thesis graduates.

Fall 2018 – 1 MS thesis graduate.

Assessment:

N/A.

14. Ph.D. Dissertation preparation and defense (Direct): This process addresses outcomes 1, 2, 3, 4, 5, and 7. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.

A student completing a Ph.D. dissertation has a responsibility to have created a new field of investigation, performed a meaningful investigation, performed analysis to tie current work to prior theory, examined the societal and commercial potential of their work, and found a way to communicate deep level knowledge in an understandable fashion to their committee and public.

Data Collection and Analysis:

Spring 2018 – 4 PhD graduates.

Summer 2018 – 1 PhD graduate.

Fall 2018 – 6 PhD graduates.

Assessment:

N/A.

15. Industrial Advisory Board (IAB) (Indirect): This board meets annually and addresses outcomes 2, 3, and 7. Assessment of the report year will begin on January 15th of the following year and results will be reported by May 1st.

The IAB is comprised of proven professionals in companies that have a strong interest in the MicroEP fields of research, including several early graduates from the MicroEP program. During its annual meeting it reviews program attributes and gives feedback on proposed changes, as well as having the authority to propose changes to the program from their own intuitions or observations. During the annual meeting selected students present their research in progress to the IAB and discuss the societal implications of their work with this group of outside professionals.

Data Collection and Analysis:

The Industrial Advisory Board meeting was held November 11-12, 2018 in Fayetteville with six board members from industry attending. Approximately 40 board, faculty, and students attended the IAB dinner on Sunday evening, November 11th. Six students participated in the three-minute thesis and poster contest held before the dinner. Small Group Leaders, Student Community Service Coordinator, and MicroEP student Volunteer of the Year were also recognized at the event. In addition to a review of the program on Monday morning, the board members held breakout meetings with MicroEP faculty and students. Mike Seacrist, Senior Fellow from SundEdison Semiconductor, serves as the board chair. Associate Director Dr. Keith Roper gave a talk on the first year progress of NSF supported MicroEP REU (Research Experience for Undergraduates) entitled: "Tomorrow's Nanomanufacturing: Engineering with Science". Dr. Roper also gave an update about the preparation of NSF-ERC proposal in collaboration with Agricultural College titled, Mariah Program: Materials for Agricultural Resource Imaging Analytics at High Resolution. Director Dr. Rick Wise gave an overview of the MicroEP program metrics.

Assessment:

The Industrial Advisory Board continues to provide a valued service to the MicroEP graduate program in assessing the academic coursework, research, and processes used to prepare the students to compete and contribute in the high tech industry. The board members provide the program with good contacts to industry and serve as role models for the students.

Key feedback from the IAB for consideration by the MicroEP Management team:

(From breakout meeting with students)

Topics/discussion raised by the students included:

- What are key skills needed in industry which are generally not taught in school?
- Interviewing tips; how can they differentiate themselves?
- Resume guidance, listing coursework and relevant skill, tailoring to the employer.
- What are key challenges when starting a job?
- How do you deal with conflict on a job?
- Importance of finding mentors in your company.
- Given job experiences they have had, what would IAB members do differently starting their career?
- Non-traditional job paths – what else is out there that builds on science/engineering skills acquired through MicroEP degree?
- Continued interest in the MicroEP to MSE name change.

There was a student request about providing a one-page career bio and job function description on IAB members ahead of the meeting. This is probably not much different than what IAB provided to Dr. Wise prior to this year's meeting. Another student request was about the possibility of submitting a question list to the IAB prior to next year's meeting.

Overall, a very good session. Continued recognition by the students of the value the MicroEP graduate program offers in addition to / beyond purely technical research and coursework.

(From breakout meeting with faculty)

Several topics were discussed. The commercialization focus continues to be regarded by faculty as a key strength of MicroEP. The topic of industry / university and faculty/company engagements was discussed but with the acknowledgement that most of the research funds come from grants. Faculty does maintain interest to improve research focus with regard to industry needs. Managing information was discussed as an important topic and potentially something that could be added to the MicroEP skillset. There was discussion about the Data Science College. More from a self-assessment side the distinguishing features of MicroEP were discussed along with potential shortcomings. Finally, it was suggested that there should be some kind of informational share to MicroEP alumni about the upcoming name change from MicroEP to MSE.

(Summary Review with MicroEP management)

Thanks to all the MicroEP staff for coordinating an excellent meeting. The accommodations for the meeting were outstanding! The IAB members really appreciate the effort from students/faculty/admin to conduct the posters and 3-minute presentations at the Sunday evening event. As stated earlier the changes in format and the number of topics were regarded very positively. IAB congratulates MicroEP on the progress towards the change from MicroEP to MSE. We look forward to the positive changes this will bring and further build on the legacy of success in MicroEP.

Timeline for Data Collection and Analysis

Collection, Analysis, and Reporting of Assessment Data	(Program Director)	May 1
Document Key Findings		May 1

Use of Results

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| - Actions for MicroEP Management Team Approval | June 30 |
| - Actions for MicroEP Graduate Studies Committee Approval | July 31 |
| - Actions for MicroEP Graduate Faculty Approval | September 15 |
| - Program review with Industrial Advisory Board | November 15 |

In addition to the actions taken by these groups in response to the Academic Assessment report, other issues will be addressed as appropriate in a timely manner.