**<u>Present</u>**: Vladimir Alvarado, David Bagley, Marge Bedessem, Tom Findlow, Stephen Ftaclas, Wyatt Keller, Billy Lew, Kevin Milliman, Ravi Ravikiran (via Zoom), Aaron Reichl, Jessica Schlicting, Mary Shafer-Malicki, Len Switzer, Mike Thomas and Elyse Johnson (Support Staff).

#### Welcome:

- Vladimir Alvarado welcomed the board and introduced the newsletter presented in the member's packets. The newsletter will be produced once a semester and will focus on a specific theme. The SP19 will focus on Materials Science and Engineering.
- Alvarado thanked Genesis Alkali for their donation.
- Alvarado introduced Dean Pishko.
- Steve Ftaclas moved to approve meeting minutes from the meeting last April all approved.

## Fundraising Committee Report. Process Control and Instrumentation:

- Mary Shafer-Malicki began by talking about the fundraising committee's goals. This January the committee made the goal to come up with no more than five fundraising opportunities. The group would come up with who to approach about donations, and would also work with the UW Foundation.
- Aaron Reichl, one of our IAB members, and Genesis Alkali approached Alvarado about financially supporting a process control minor or certificate program. This would involve obtaining facility space and a Professor of Practice. This is hoped to be put in place by spring of 2018.
- Shafer-Malicki recognized Dean Pishko for attending the meeting and for him approving the Professor of Practice funding. Dean Pishko added that there are five different positions that are conducting interviews for candidates, and our Professor of Practice position is one of them. He also added that they are looking for an individual to start summer of 2019. Shafer-Malicki went on to say that Dean Pishko's support has been important. Also, other groups have come together and are excited for this opportunity. Sam Bethea from Genesis Alkali, and Steve Bauer of Sinclair have been very helpful.
- Shafer-Malicki continued that John McInroy of the Electrical and Computer Engineering (ECE) department and Bruce Pivic of the ECE advisory board have been collaborating on this project. This working group is headed by David Bagley. Work is ongoing for creating the curriculum and obtaining the facility and equipment needed. Shafer-Malicki added that she is open to any input from the other members of the IAB, and that at some point the committee may need help identifying other fundraising methods.
- Alvarado thanked Genesis Alkali for their donation. Alvarado also spoke about the benefits of meeting with industry. This allows the department to reflect on how to create opportunities with industry to help students have access to jobs. As the process control minor and certificate are being developed, other process control programs from other universities have been looked at to see how they work. Page 8 in the newsletter, titled "Process Control and Instrumentation Program" is the flier the department has been using to talk about the program. Jessica Schlicting's article in the newsletter was a good example on seeing how chemical engineering gets placed in process control. The visits to Genesis Alkali and Sinclair were very eye opening. To continue to progress we need to build fundraising in stages, and it needs to be sustainable.
- Dean Pishko went on to talk about how working with industry creates an opportunity for increased funding. With an industry fellowship, if money is donated the college will match it. Specifics can be worked out in the future if this happens.

- Ftaclas continued by stating the department needs to send a clear message as to where the monetary donations are going. With this program it is not easy to see this. Ftaclas asked would it be helpful to break fundraising up into sections, possibly by year, which could create the benefit of moving the program along. Aaron Reichl asked to see Craig Russow's information on funding and how he plans to bring in more as the donation Genesis Alkali gave is not enough money to run the Process Control and Instrumentation program. Shafer-Malicki went on to say that Russow is a great resource to be able to reach out to potential donors. The plan is to work in stages. Fall 2019 students can come in and start their coursework for the program. Dean Pishko agreed this is a good approach.
- Dean Pishko went on to say that more than one person is needed in the Process Control and Instrumentation program, and a core group of people is needed in order to make the program impactful. There are many opportunities to develop an integrated fluids lab where there could be good implementation of process control. Bagley added that he is currently looking at what equipment is needed and is making an itemized list. He went on to say that one Professor of Practice would be enough to get the program started, but there needs to be further funding. Ftaclas suggested that one of the five fundraising targets should be a stretch goal. Ftaclas continued that as the state budget fluctuates the department may not have the same amount of money next year as we do now.
- Alvarado went on to talk about enrollment in chemical engineering and how we want it to grow, but at the same time want to make sure there are job opportunities for students. Currently the job placement rates for UW graduates in chemical engineering is 82%. Students and parents may not be aware of this and that salaries have increased. This could be solved by engaging in more PR. Alvarado continued to talk about the first year seminar on brewing that he is starting. He will be meeting with New Belgium and Cold Creek Tap on how to put together the seminar, and see if they will be willing to donate towards it. The hope is to be able to lure students to chemical engineering and process control.
- Bagley continued by talking about how in his experience university dollars may be promised, but taken away, but with help from Genesis Alkali and hopefully other industry partners, the college may release more money. This is important for our goals will drive up excitement. Ftaclas added that more fundraising opportunities should be pursued.

## Process Control Minor and Certificate (See attachment 1):

- Bagley began to talk about the Process Control and Instrumentation minor and certificate. The certificate is meant for students who are working on their degree but would like something else to advance their learning and to get deeper training. It would also be available to people in the workforce, so they can be provided an education, but not be actively pursuing a degree. The minor is meant to enhance studies in chemical engineering. Our minor is helpful for chemical engineering students so they can go down a certain path, a certificate is focused on specialized instruction and is marketable. The minor will need approval through Academic Affairs while the certificate will need approval from the Board of Trustees. With the certificate needing this approval process it could add six months or more onto the approval process as they do their due diligence very thoroughly. The tactical decision is to have the minor in place by fall of 2019, and will be implemented with the faculty we have. The certificate will be deferred until the Professor of Practice is brought on so they can give expertise on what classes to offer.
- The minor will have a proposal (Bagley is currently working on this) that will be submitted to the Dean. The Dean then transmits the proposal for College review and approval. Once the proposal is approved by the College, it is sent to Academic Affairs and it may be submitted to the Faculty Senate for review (this is the slowest step.) Implementing a minor is not as big of a process as implementing

a bachelor's degree, such as the Construction Management one just implemented by the Civil and Architectural Engineering department. Shafer-Malicki asked what Bagley's experience was with the Faculty Senate and whether or not they would be inclined to approve or put a reign on the minor, and whether there was a certain way we should approach the request to them. Bagley responded that the planning committee should make sure they aren't missing anything. When brought to the Faculty Senate everything should be complete, with no overlap. They will ask questions along the way, and want to make sure the minor will be good for the University, the state of Wyoming and beyond.

- Ftaclas asked if there are any programs in other schools that we are benchmarking. Bagley answered that he has looked, and there are very few, but he hasn't dug into their curriculum and has found no minor program yet. Ftaclas suggested looking at other successful programs and look at what steps they took first. Alvarado added that when he attended the department heads meeting in New Mexico it was discussed that a couple of universities were discontinuing their process control programs because there was no specific focus, they wanted to minimize space being used, and because local markets, national labs, and the military don't seem to need such a program.
- Schlicting asked if process control is currently offered as a concentration. Bagley responded that it currently is not. Ftaclas asked if a process control concentration should be implemented. Schlicting added that since adding the minor will take time perhaps adding a concentration could bridge the gap of the wait time. Alvarado answered that it will take a couple of months to get the Process Control and Instrumentation program's curriculum ready, so the time frame isn't much different. The goal is to have students have something official, which a minor would show up on their transcripts, unlike a concentration. It is also hard to track a concentration.
- Bagley went on to cover the current development towards implementing the minor. Currently feedback is being received from the Electrical and Computer Engineering's Department Head which was added to the minor curriculum, any additional feedback is welcome. The goal is to finalize the proposal including benchmarking, send it to Alvarado for approval and then send it off to the Dean. Alvarado added that he and Bagley are working closely together and meet frequently about the minor and certificate. Shafer-Malicki talked about the new search criteria and asked if it is typical to get industry people involved in this search. Bagley answered that this is a great idea, and that it is a goal to get someone from industry. Alvarado went on to say that the search quality has been narrowed but isn't too fluid so there won't be any failure to hire. Shafer-Malicki asked if anyone was aware of any restrictions on outside members being hired. Bagley responded that there weren't any that he was aware of.
- Schlicting asked about if a company was looking to recruit for a process control position what would the value of our program be over industry trainings, and what sets us apart from these companies with our minor?
- Recihl added that there could be students interested in our program but wouldn't know what sets us apart from other programs. Not many students have the foresight to take extra coursework to be informed about process control. The department would want to have a pool that has interest in the area of process control so there are enough people who stay and fill positions. This may not make a huge difference but would allow for students to walk away with the fundamentals without going outside of the University. Companies can hire engineers who don't have experience in process control, but they need someone with interest and experience. There needs to be a stream of talented students who have been exposed to process control and hopefully end up in a career where they can stay long-term.
- Kevin Milliman went on to say that there is an advantage of focusing on instrumentation as this is a huge part of engineering and comes with a broad range of choices, adds value, and also help

students understand the basic principles of process control. Mike Thomas added that this allows for students to learn the basic fundamentals.

- Bagley continued that the program needs to have value outside of the college. He has been working on a learning outcome for the minor which focuses on solving broader process control problems. The department needs someone who understands how this all fits in with process control and not how to just build the program. That's what the focus will be on. Alvarado added that this gives structure, which is important to the department. The idea is to channel the energies of students focused on instrumentation systems, not computer science, and process control and instrumentation gives us a model on how to do things in the department.
- Schlicting added that it will be important to articulate all of this for the minor. The brewing first year seminar, does focus on how industry needs process control and has a cool factor. It shows that industry is evolving quickly, and makes a good argument that pursuing process control is important.
- Bagley went on to talk about how this program will be an educational challenge that will focus on strong practical and theoretical aspects and will also use the student's enthusiasm to strengthen common sense. When students first come into the program they don't have much common sense or life experience in this field.
- Bagley continued that the minor will require 18 credit hours of coursework and 6 of those hours of that coursework also counts as required (non-elective) coursework towards the students major. Teaching CHE 2005, students don't know the class is there to help them learn these things. In the Process Control and Instrumentation program CHE 2005 will be required. There will also be a practical fundamentals class on process control, which will introduce components as well as other things and will consist of one hour of lecture and two hours of lab work per week. There will also be a 3000 level simulation course which will allow students to apply what they have learned so far. The 4000 level class being developed will put together everything the students have learned and they will be given process control problems to solve. There will be components of design concepts, but the real focus will be on how to control problems. Internships are also encouraged, but not required. Any engineer in the college could do the minor, the prerequisites just have to be met
- Marge Bedessem added that the six hours of non-electives, and the remaining twelve electives could be taken care of with chemical engineering courses, but other departments my not be able to use their categories of electives towards the twelve required credits, thus adding on more total hours needed towards the student's degree. Bagley responded that this is a good point, and that the department will do what they can on this. When a student comes to us about the minor the department will advise the student that they will be getting something valuable. Electrical engineering students should be able to take the process control minor without adding on any extra time to their degree. Alvarado added that he has been approached by the Petroleum Engineering department about collaborating. He would be okay with sharing labs as long as nothing interferes, but the labs will not be turned into drilling labs. This would make sense and creates PR for the department.
- Recihl continued that if the minor focuses on control instrumentation, as process control, there will be no process background to go with the Process Control and Instrumentation minor, just a control thought process. Ftaclas added that it can take years to get a job in industry, and that students could be missing the process angle. Bedessem added that she liked where the program is focused on, but wasn't sure about any engineer being able to obtain the minor. Alvarado answered that our facilities are available for others to use if they would like, an example of this is the Unit Operations Lab. Bagley added that if a student from another department wanted to complete the minor they will not be excluded, but the program may not be designed specifically for them.
- Alvarado continued that the department needs to get space from the Dean and proceed with getting a Professor of Practice. Alvarado will stay on as Department Head to make sure the program is

successful. He added that a department head that is focused and passionate about the department and its continuity is needed. Tom Findlow added that this will allow the department to provide better graduates. He continued to elaborate on Reichl's point that the process happens to be chemical engineering related but the students need to have the basic knowledge of how things work in process control and how to control them. Other departments also need to step out and see how process control involves everyone.

## Process Control and Fundraising (Q/A with Dean Pishko):

- Alvarado began by talking about the proposed simulation space. It will not be a computer room, but will operate off of a cloud server, and there will be tablet consoles. It will be a centralized system with a process control simulation console. This will serve the sophomore and senior classes and will be a place where they can learn to measure flow level and to control temperature. The simulation space will serve more than one purpose. Alvarado has looked at a number of US didactic systems, and would like one that could reconfigurable for the space since it will serve more than one purpose. Schlicting pointed out this will be a great way to teach students hands on.
- Ftaclas asked if in industry there is a strong demand for dynamic simulation. Schlicting and Reichl both answered, yes. Milliman added that there is a growing interest in this in industry. Alvarado continued that all of this allows the program to have process design teams where students design things to use in process control.
- Alvarado continued that on February 13<sup>th</sup>, 2019 the ERB will be complete and can be moved into. This will allow space within the engineering building to free up. Alvarado requested three open spaces, one will be used for the Unit Operations Lab as it is currently cramped. Dean Pishko added that the lab on the first floor will be open for all projects, and will be a shared space. Bagley acknowledged Alvarado for his hard work of finding more space for the department. Dean Pishko added that since many will be moving into the new building, it doesn't make sense to shuffle around spaces now. He continued that all that is occupying the saw tooth, which contains storage and the shop, will have to be moved as it is not ADA compliant. The cost to tear it down was too expensive so it will be kept for just storage. New space has to be found for everyone in this area.
- Alvarado went on to say that US Didactic has a way of switching units which allows students to learn more. This is a tremendous advantage for students. US Didactic also has significant discounts on equipment. The department will need to be selective and will need to ask experts at the company for direction. A wish list has been made, and no duplication units exist except for level control. Ftaclas asked what size of orders do you see more reasonable prices for equipment, and whether any companies would donate software and equipment. Bagley responded that this was a good question but he wasn't sure of an answer, but will look into it. Alvarado added that he is looking into a vendor in Denver to see how much they can possibly donate.
- Dean Pishko continued that there are other instances within the college where equipment has been donated, such as the drilling simulator. He went on to say that if we develop a setup which shows that students can be successfully hired after graduation. This is a good incentive to get vendors to donate. By having more than one person involved in the minor would allow for the opportunity to have short courses, spending three to four days training in process control and instrumentation. This would make us more desirable. Bedessem asked it this would be in addition to the certificate. Dean Pishko answered, yes. This would involve people not being enrolled as a student at the university, so they would pay a fee to engage in the event. This would be another revenue stream for the department. It would also be an incentive for faculty members to engage, and not just focus on research.

- Reichl went on to say that there needs to be a list of equipment that the department would like donated. Vendors can then be called and told how much the department will be buying from them and see what they are willing to donate. Thomas added that there are brands who provide funding to schools, the department just needs to make sure to reach out and ask. Dean Pishko went on to say that Russow may have connections where free software could be obtained and possibly free maintenance to equipment.
- Alvarado added that there is an Advisory Board for the Process Control and Instrumentation program.
- Ftaclas continued that often control rooms look like rooms just full of computers. Alvarado went on to say that our simulation space will need to be flexible. Bagley added that Bruce Pivic is hands on, and that is how the program will be run. Mike Thomas continued that teaching students what to do and not telling them what to do is the most difficult problem. Alvarado added that today with technology you can touch the screen on your phone and something happens. This simulation space will allow students to learn real transient response. It won't look like a video game, it will look real, but be a safe place for students to learn. Bagley went on to say that the Unit Operations Lab has a water level control that can have malfunctions, and shoots water out. Engineers don't want things failing in the real world, but if things do fail in the lab it is a safe space to learn. Schlicting added that in the real world of process control safety is a huge factor.
- Bagley asked if there was anything else the IAB could do for the Process Control and Instrumentation program after all of the information was just covered. Johnson suggested that a subcommittee be formed to review any part of the minor. Ftaclas asked if the Process Control Advisory Board had someone looking at the curriculum, was anyone else needed. Shafer-Malicki answered that Steve Bauer was. Recihl answered that collectively, no one else was needed, but thoughts can be rolled together between the two boards.

# Action Item: if any chemical engineering IAB members want to join the Process Control Advisory Board please email Shafer-Malicki, Ftaclas and Alvarado to let them know.

- Alvarado continued that having Dean Pishko sit in the meeting and commit to space was a good thing. Some people in the engineering building don't think they will have to vacate space. Friction with this is trying to be avoided. Alvarado is making sure to identify space. Amy's space would be perfect, and currently there isn't a computer lab for just our department. Johnson went on to say that the CPE computer lab has 29 computers, which is shared by around 500 students between both the Chemical Engineering and Petroleum Engineering departments.
- Ftaclas went on to request a wish list from the department for instrumentation. Alvarado answered that there is a list, but work needs to be done to make sure all of the equipment would fit in our space. The estimate for the cost of equipment for sophomores would be \$300,000 and for juniors \$100,000. This would be an important time for sophomores to build common sense.

Action Item: Once the wish list is distributed to board members within our region, they can reach out to their contacts about donating equipment.

## Material Science and Engineering (MSE) Fundraising (Craig Russow):

Russow began by saying that he is excited about the direction the Process Control program is taking. The goal is to look at different milestones that can be completed with the cooperation of others to gain traction. The ball park estimate for the lab is in pretty good shape, and the funds will ideally be raised by the end of this calendar year. The materials effort is exciting and has good competency

behind it. There has been good conversations with Mechanical Engineering, and things are looking up.

- Reichl asked what the timeline is to start reaching out to other companies for donations. Russow replied that last week he had met with another company. Shafer-Malicki asked Alvarado if getting money for the lab equipment is straight forward, what about other funds. Alvarado responded that the funding needed to sustain the process control program is \$2 million dollars, but the program could get started with just a Professor of Practice. By getting excellence funds enough money could be pooled together to have a Visiting Professor. Russow added that there is currently a non-endowed chair concept in Mechanical engineering. This is a good idea and would be something that could be done with the Process Control and Instrumentation program. Bagley responded that to keep process control alive, and to see how it will work out with the minor and certificate, is there money available now for a Visiting Professor, which could then leap into a non-endowed position. Alvarado asked what it would take to jump in now and look for a Visiting Professor. Russow answered that to start now funding would have to be looked into, but we could search for someone that would be a good fit. Names could be gathered for some candidates.
- Alvarado clarified that a Visiting Professor is like a Professor of Practice. They would work on class work in engineering and arts and sciences which improves our visibility, gives us the expertise we need, and helps programmatically. Alvarado continued that the department could go through the process of hiring a Visiting Professor now and they could help build the program. Bagley added that we need to build a better program with better opportunities for the chemical engineering department which would help us programmatically and could help open up the program to the University and the state. Bagley went on to say that we need to be realistic and need help in order to build a strong Process Control and Instrumentation program. Bedessem asked if hiring a Visiting Professor could be done now and a Professor of Practice hired a year later. Alvarado responded that the department is currently moving forward with hiring a Professor of Practice and will work towards getting a Visiting Professor position. This will allow the department to build up the Process Control program and stabilize it. Milliman asked how funding would work to hire a Visiting Professor. Russow replied that the Foundation would handle this. Ftaclas asked if the position's salary would be covered by UW. Russow answered that no, it would not. Alvarado went on to say that there is nothing stopping us from raising funding to build a salary for a year.
- Alvarado continued that there needs to be a strategy for getting equipment for the program. Russow responded that if he is given ideas about what equipment is needed the Foundation can collaborate to secure the equipment. The more people that are involved in collaborating to secure equipment the better. In kind donations are the best kind. Recihl added that it could be important to get industry groups involved, and more people can be reached this way. Russow agreed and said he would be happy to work together on this. Russow went on to say that all the reaching out the Alvarado has done about process control has been very beneficial. Pretty nice partners for donations can happen by this type of reaching out.

## MSE Current Research Directions (See attachment 2):

Johnson began by talking about MSE and chemical engineering generating a wish list for the ERB, as well as a list of all the equipment that will be moved. The list was prioritized and sent to Dean Pishko. There currently is a \$2 million dollar budget for new equipment to be purchased for the ERB across all departments. The engineering college has an engineering initiative funded by Biomedical as well as MSE. Materials discovery as a researcher allows for engineers to probe different processes. Currently MSE is building a laser that can look at parameters. There has been

conversations with NASA on this, and they are very interested because they would like such a thing to be manufactured in space. This laser can be integrated into processes, and is not just conducive to lines. The military is also interested in this.

- Johnson continued that with the laser coal and graphite have been used to oxidize into separate sheets. Laser printing is also being used. There is software in place to use a 3D printer to make complex designs. Currently there are 78 experiments with thousands of different parameters and space to explore. The laser power and duration can be controlled which can be used to control film thickness. This drive with AI can optimize parameter searches.
- Johnson went on to talk about how this project helps students physically understand why certain conditions allow for transformation of what they are working on. Ftaclas asked if this project is more for research or if there is an academic component. Johnson replied that it is mainly used for research, but it could be used more academically to make devices. Johnson continued by talking about how MSE is working towards automation and optimization. This will be of interest to donors who have an interest in AI manufacturing. Russow added that labs are being configured so there is a cross pollination of space. The goal is to have people going in between labs.
- Alvarado went on to say that the new facility will house the ongoing program where the drive for economic diversity will be focused on. The MSE activity will be centered by the department. By pushing forward with this program it will make us stronger as a department and as a college. Materials and processes are our thing, and this is a way to create an attractive center/lab. Russow added that process control will be happening rather soon, and the MSE program is well aligned with this.
- Alvarado continued to say that rather than to compete with Mechanical Engineering and Computer Science on the topic of MSE, it would be best to align with both departments. Johnson added that the department should strive towards having an interdisciplinary MSE graduate degree. The degree would be one focused in MSE while working in the physics lab, so it doesn't have the same core competencies as a CHE degree. The current courses would be used and other departments would have to be accommodating to students that are not in their core disciplines. Alvarado went on to say that this feels aligned with the department, but it needs to be set up concretely without distracting from the Process Control and Instrumentation program.
- Ftaclas agreed that the department is headed in the right direction with the Process Control and MSE programs, and also that there should be an MSE graduate degree. Schlicting asked with the conversation earlier about how the department is doing, how you would handle implementing these changes in your current circumstances. Alvarado replied that we are fine now with the faculty we have. There could be an issue if new ideas keep coming forth, but there is no way of giving back with those ideas. This hasn't been the case with process control. The Dean has committed to it because the right team was brought to the discussion. This program will make the department more competitive and will make sure to get students involved. If the department were to reach twelve faculty members it would put us in a much better position, but first we need to show where the prize is.
- Milliman asked what the department needs from the IAB on this. Johnson responded that aligning with the state endowment is important, and that interacting with them and getting integrated allows us to plant a bug in their ear. The program is not just about experimentation, but the overall approach of integrating MSE with chemical engineering and computer science. Alvarado ended with saying that by making these things attractive we can get more faculty on board which can help us invest in success.

Ftaclas asked what the status of making student email addresses permanent was. Russow responded that Keener Fry has put an email in about this to Student Affairs, and they are working to see what they can do.

## Outreach:

- Elyse Johnson began by talking about trying to set up a department Facebook group. Currently Facebook has blocked her from creating a new account because it gets flagged as a fraudulent account. She will continue to try to get an account setup.
- Alvarado added that Elyse Johnson is working on obtaining alumni's yearbook photos in order to use in the Facebook group and to tag them. This will be used for fundraising efforts. The department is also putting forth a newsletter each semester with a different theme.

## Environmental Engineering Program:

- Bagley began by talking about the current enrollment in the Environmental Engineering program. Currently there are only three or four students enrolled, and they are on the civil engineering side, not chemical engineering. Not much has been done with the program, mainly because the department has been so busy. The program hasn't been able to offer as much as Bagley would like. Bedessem asked where he would like to see the program go. Bagley responded that he would like twenty to thirty students enrolled, with seven to eight graduating per year. A masters in environmental engineering is a great way to go. Alvarado asked what we need to do to get where Bagley would like to see the program. Is the problem that we are short faculty and applicants? Bagley responded, yes, but the main reason is because of non-active recruitment. No advertising has truly been done, and in order to have students you must recruit.
- Bagley went on to say that where prospective students could immediately be recruited from is our own students. Both civil engineering and chemical engineering have Quickstart master's degree programs. The chemical engineering program would be good for recruiting students to environmental engineering. Ftaclas asked what opportunities do we have to use environmental engineering to get students into the field instead of chemical engineering or civil engineering. Bagley responded that gender equality is one way. Also like bioengineering a pathway is created to attract people.
- Bagley continued that undergraduate students don't feel like they are getting anything currently from the program because it doesn't show up on their degree. A minor could be offered with existing coursework and would target high school seniors. Bedessem asked what core classes would be taught in such a minor. Bagley responded that the program would consist of microbiology, chemistry and transport phenomena. All courses could be taught by chemical engineering faculty. Bedessem pointed out that there is no focus on air quality at UW. Alvarado responded that we don't do anything with this, but Atmospheric Science does, but they do not have an undergraduate degree. Alvarado continued that it needs to be evaluated on whether or not UW can get by with not having an Environmental Engineering program. We need to have an answer to explain why or why not. Bagley responded that the program currently isn't costing anyone anything, but that is probably why it isn't growing. Johnson added that the classes do serve as electives.
- Bedessem asked Bagley if he is the only one running this program. With the start of the Process Control and Instrumentation program Bagley will not have the time to grow the Environmental Engineering program. Bagley responded that Karen Wawrousek would be a good faculty member to teach classes, but she currently has a full class load. Bedessem asked Bagley if the Process Control program will ease up eventually so he could focus on environmental engineering as well. Bagley

responded that process control needs to be sustainable before this could happen, but bringing on a Professor of Practice would help. Bagley went on to say that he would love to see process control flourish so he could move on to environmental engineering.

- Bedessem continued that for the next three years environmental engineering will have a hard road. Funding is needed for recruitment to the program as well as more faculty. Also, offering a PhD would be very beneficial. Bagley agreed that a PhD would be beneficial, and that it is hard to recruit just for a master's degree. A minor would help build a path for a master's degree through Quickstart. Bedessem asked if support and funding was needed for this. Bagley responded, yes. The matching program that the Dean talked about could be a good approach for the master's degree.
- Bedessem went on to ask if industry is supporting the program are students then doing an internship. Alvarado responded that this could be any model, but it would have to look like a fellowship with no products/deliverables, the student would just need to work in that area. Bagley went on to say that it could be an internship because the students need to learn to become and environmental engineering practitioner. Alvarado added that this could be a semi-informal commitment with a faculty member on what a student will do, but can have no products in return. Bedessem asked if this is currently available. Bagley responded, no, this would be new.
- Bedessem continued by asking how students know that the Quickstart program is available. Bagley responded that there needs to be a better job done on advertising. This can be done by sharing opportunities with classes. Alvarado added that Quickstart students are cheaper as we cannot pay them their stipend while they are an undergraduate.
- Ftaclas added that he had pulled up Indeed and that there were 39 available jobs in environmental engineering. Bedessem added that we do our students a disservice without sharing with them how important environmental engineering is. The university is not paying attention and isn't spending resources to reflect the demand for the program. Bagley added that the program is important to Wyoming and industry. Bedessem added that the Dean should publicize the match opportunity. Ftaclas went on to say that there should be a pipeline to work towards a concentration or a minor. Schlicting added that the program is currently very resource constrained, and is there a medium long term strategy and how does this fit in with the department. This is needed in order to justify where to put money.
- Alvarado continued that we currently have support in MSE and process control. In the Unit Operations Lab Judd Larson is teaching. The goal is to get to twelve faculty members which would release Bagley from the responsibility of managing students, and would release fifteen credit hours which would allow him to focus on environmental engineering.
- Milliman added that the department seems to be on track and in alignment. With the recognition and great opportunities in front of us it would be useful to have a timeline on each program. There is an idea on how things will proceed, but having an actual timeline will help everyone see where the resource pinches are. By mapping this out in detail the Advisory Board will have a better understanding. Alvarado responded that we are working on this. Currently there are other people helping us out such as a faculty member in Atmospheric Science teaching Thermodynamics. Otherwise the department wouldn't be able to manage. David Bell and Bagley had to be taken off of overload. Process control also needs to be strategically built. Bagley added that we are short and that he agrees with Alvarado.
- Findlow went on to say that he would like to see this on the Dean's strategic plan. Alvarado added that if we don't have faculty to teach Thermodynamics or Unit Operations, what does the department do? Bedessem asked what the board can do to help the department. Bagley responded that he has no suggestions now, but he will come up with some.

- Ftaclas wrote down the items that the department is working on. This includes: automation, materials, bioengineering and environmental engineering. Each item should be addressed as to what the benefits are of each. Once these are identified it helps determine what the next step is, and what resources are needed and when they are needed. This allows us to lay it out in a cohesive way. Schlicting went on to say that the University plan makes it so the department gets marching orders, this needs to be noted where they lie.
- Ftaclas continued that the strategic planning party should look at what is being done to grow the department and how it fits with the plan. Bagley added that President Nichols just had her first talk and addressed many of these issues in her speech, but wasn't sure how this all fits in the college plan. Switzer added that it does fit right in.
- Alvarado went on to say that there are two points that need to be covered at the same time. Enrollment numbers need to be increased and more teaching resources need to be obtained. Ftaclas added that the first step we have the most control on implementing, but both steps may not be mutually exclusive. More space needs to be obtained for Bagley to teach environmental engineering and to do research. What space we have is small and we need more to be attractive to students. Bagley agreed that his space is tight even with one person.
- Ftaclas continued that the board has been around since the Petroleum and Chemical Engineering departments split and they saw the drain on resources and lack of focus from the University and College, which has been difficult. What would it cost the department right now to get a small win for each of our struggles? Getting three to five more students would be a big change. Bagley added that he liked how this has all been laid out and is looking forward to talking about it in a department meeting, and also at the faculty retreat building our own strategic plan. Reichl added that with the faculty retreat coming up the following week it needs to be decided how students and faculty can be balanced. Bioengineering and MSE are potential industries where balance between can be obtained now and in the future, and also can be where we put resources short-term.
- Alvarado went on to say that the faculty retreat is being held so there can be agreement and answers about things such as selling bioengineering. Should it be called biomedical, or not. This area is very vague.
- Johnson added that there is an opportunity for the department to grow, and that we need to add to the curriculum if we want to see this type of growth. Milliman asked if this would be done by targeting undergraduates. Johnson responded, yes. Alvarado continued that currently no one is approaching us about bioengineering, so the questions is how to sell this when no one in the state is interested. A powerful message is needed in order to make people aware. Ftaclas went on to say that research money is needed in order for this to be self-maintaining. Reichl added that the department needs to prioritize and have faculty focused on other research.
- Johnson suggested that each concentration should be laid out, and then turned into minor. Bedessem added that minors need to be chosen that can provide for the department. Alvarado went on to say that there has to be a pipeline to create a minor.
- Milliman added that the department should try and influence the upwards enrollment objective and if changing the name means increased enrollment then things can be weighed to tackle such an opportunity. Influencing upward enrollment may be difficult but it can be done. Reichl added that growing bioengineering may detract from other programs, it is important to time it right. Alvarado added that choosing a right name should not be a problem, it is having enough people to teach. Bagley went on to say that with ABET we must be careful on what we call the degree as we may end up being supervised by someone that we don't know. With having done the ABET coordinator position doing a minor might mean some paper shuffling, but then students would have something put on their diploma.

- Alvarado went on to say timing is important with the name change issue. Ftaclas asked if there could be an unaccredited bioengineering degree. Bagley responded that undergraduate students wouldn't touch it. He continued that it may be ugly for a couple of years with the low faculty count but once enrollment is sustained things will get better. Reichl added that the department should be at a sustainable level before pulling the trigger. Alvarado agreed and said every step needs to be planned carefully. There is a huge risk on this campus of doubling enrollment and not getting enough faculty to teach for two years.
- Bagley added that President Nichols' enrollment goal is moderate and as long as we stay within her goal mark we should be good. Ftaclas asked how many faculty positions need to be filled now. Alvarado answered just one, the Professor of Practice. It would be nice to have a Visiting Professor, and an APL is a dream. Bagley added that for the Visiting Professor there wouldn't need to be a formal search. Alvarado went on to say that there is not enough money to have a salary for a year, but he will work with Russow on this. Ftaclas ended the discussion by asking if a donor could write off a donation. Alvarado responded yes, or at least some of one.

## Student Recruiting:

- Ftaclas began by talking about how automation and materials are not known for bringing diversity. MSE and I&E don't have many women going into them, and is almost as bad as chemical engineering. Schlicting added that she felt that process control had quite a few women involved. Ftaclas added that the article that Schlicting wrote for the newsletter was a great thing.
- Ftaclas continued by asking if there is anything that can be done to not alienate women from wanting to obtain a degree. Reaching out to SWE would be one way. Schlicting added that it would be effective to reach out to younger age students that have an interest in math and science. Ftaclas went on to say that SWE should be visited and talked to about the minor. Alvarado continued by saying that the department needs to make sure that the SWE students are being supported. Schlicting added that she didn't ask the student from SWE this when she attended lunch, but the student didn't bring it up as a problem either.
- Alvarado continued that the Dean has funding to help the student chapters with travel. The department was approached by the National Society of Black Engineers asking for a donation, which the department provided. It needs to be prioritized and communicated to SWE and the other sorority's that they are supported by the department, and that we are here to help them.

# Action Item: Keep this subject for the next IAB meeting.

Bagley went on to say that there needs to be a focus on increasing enrollment of women and underrepresented students. If recruitment is made exciting it then becomes exciting for everyone. Schlicting asked if this was something any of the IAB member's companies were working on. Milliman replied that this was a good question, but he wasn't sure what was being done. Shafer-Malicki added that major oil and gas company's perspectives were to focus on retention and not recruiting. Schlicting added that this is something being consistently heard, and that she sensed there wasn't a lot of progress in this area.

# Committee Reports:

# Fundraising (Mary Shafer-Malicki):

Craig has a lot on his plate and will keep in contact with him.

#### Membership/Recruitment (Kevin Milliman):

Milliman reported that there were no new developments. A question from the IAB perspective, is do we need new membership? Ftaclas responded that since Mike Achacoso left there was one open spot. This spot was staying open and as there are some big players from industry that may want the position. Johnson continued that the governor's group list could be used to look for members. This would allow the board to have a diversified group from the economy to pull from.

Action Item: Milliman will get names from this list and cross-list them with the College and University boards. If there are any names on the college IAB, they don't need to be pursued. By the spring meeting there will a plan and some names.

Ftaclas asked if anyone else is aware of any alumni within a company that hasn't been involved in an IAB as they should. Switzer responded that he is no longer with Cody Labs, but he can give some names of alumni that aren't represented there.

#### **Professional Development:**

Action Item: Korby Bracken was not present to give update, Ftaclas will reach out to him.

Ftaclas added that during this meeting the department strategic plan was talked about, and is in a holding pattern until after the faculty retreat. If anything comes up get ahold of Bedessem, Ftaclas and Alvarado.

#### Senior Design and Peer Review (Wyatt Keller):

Keller began by talking about the senior design project. Keller is starting to think of ideas for next year's projects. First he will pursue ideas from within this group and then contact outside of the group. A call list will be made.

Due Date: A senior design project needs to be decided on by the first part of December.

- Alvarado asked that the senior design project be something that can be finished in one semester. Bagley added that you can do a good senior design project in one semester.
- Keller responded that there is a lot of value in feedback, especially when it is given early. Switzer added that the senior design project is all about scope. Alvarado agreed and said that there are huge jumps from things in the research level. Scope is important.

Action Item: Each committee member focus on one goal, fundraising is a huge lift. In senior design judges need to be found as well as industry related projects. By January let Ftaclas know what you need.

#### Committee Reports Wrap Up:

In regards to the Professional Development Committee Ftaclas suggested that perhaps a committee isn't needed, and it could be trimmed and other major initiatives could be focused on. He will speak to Bracken.

Action Item: For Professional Development items you can contact Elyse.

Schlicting added that she is giving an annual training course that is usually given to entry level positions. If anyone would like this presentation to be made to students let her know.

#### **Board Administrative Business:**

Ftaclas asked if there was any old business. There was none. New business consisted of a split in the board in the fall of 2019. A new Vice Chair will need to be elected as Bedessem will be the new Chair.

#### Action Item: In spring 2019 a new Vice Chair needs to be elected.

#### Feedback and Wrap-Up:

Ftaclas began by talking about how the AICHE and SWE students that attended lunch didn't know why they were there. In the spring Elyse will email the students about the meeting and explain that it is an opportunity to meet with people in industry who can line up jobs and to eat good food.

# Action Item: If in the spring any members can come early and give a talk to students this can make a big difference.

- Ftaclas added that the updates are not done, but is this okay to do once a year? Milliman requested that a simple dashboard be included in the IAB member's folders. Alvarado said he will bring this up in the next faculty meeting.
- Ftaclas continued that AIChE and SWE should come to the next meeting to touch base. Reichl added that the recruiting office should be contacted and see if anything has changed.

Action Item: Alvarado went on to say that for the next meeting the Dean's office should be invited, and that stats should be asked for such as a map of where students are coming from. Alvarado would like to know what the regional distribution is, and if it is not captured, a conversation should be started as we need this information.

Action Item: Milliman asked that the IAB agenda for the spring meeting be provided early so the board knows what needs to be covered.

Action Item: Alvarado requested that the Dean come to the spring meeting and give an update on process control and the current agenda for that program.

Ftaclas added that for the students that went through the FE exam training their results won't be out for two years, but it should be kept on watch for how they did. These will be the first actual metrics. Bagley added that he gave an overview of the FE exam at an AIChE meeting after an advisee approached him about offering a review. Bagley talked about how to prepare and why it was important. The FE exam was taken out of the ABET analysis because the results were hard to interpret, and if there was a large international student population taking the exam the score can be brought down. Schlicting asked if the college is giving FE exam reviews. Bagley responded that they give ES centered reviews, not chemical engineering specific. The department offered an FE review once and no one showed up. The students can take the exam any time so there is no harm in taking the ES review.

- Ftaclas asked if there is any more information that needs to be covered in the spring. Alvarado responded that there will be updates from the faculty retreat. Ftaclas asked if the new ERB building will be done by the spring meeting. Alvarado responded that, yes, it would. Ftaclas suggested that the board should take a tour.
- Ftaclas asked if anyone would like to draft a letter about keeping alumni emails active.

Action Item: Ftaclas will draft the letter about keeping alumni emails active.

- Milliman asked Bagley, Johnson and Alvarado if they need anything else from the board, or if they had any questions. Alvarado replied that he was grateful for the feedback, and will email if he thinks of anything else.
- Alvarado asked if a different place should be picked for the IAB dinner in the spring. All said Chalk N' Chees was nice. Ftaclas suggested having a poster or slides displaying what the department is up to during the dinner.
- Alvarado suggested that next time the board could meet in the new building.

Meeting adjourned 4:20 pm

Minutes typed by Elyse Johnson, support staff