

2018 Chemical Engineering Faculty Retreat

September 21, 2018 | UW Waterfront Activities Center Great Room 3710 Montlake Blvd NE

Faculty Present (blank=absent)

Department Chair, Francois Baneyx - Present

Stu Adler	P	James Carothers	P	Brad Holt	P	Elizabeth Nance	P	Buddy Ratner	P
Graham Allan	P	David Castner	P	Samson Jenekhe		Rene Overney	P	Daniel Schwartz	P
François Baneyx	P	Cole DeForest		Shaoyi Jiang	P	James Pfaendtner	P	Eric Stuve	
David Beck	P	Hugh Hillhouse	P	Andy Kim	P	Jonathan Posner		Venkat Subramanian	P
John Berg	P	Vincent Holmberg	P	Mary Lidstrom		Lilo Pozzo	P	Qiuming Yu	P

Others Present

Stephanie Ashby	Debbie Carnes	Emeritus: Barbara Krieger-Brockett	Kameron Harmon	
Jesse Chiem	Dave Drischell	Greg Miller Vice Dean CoE	Chloe DeWolfe-Domingo	

MINUTES

A Welcome and announcements – Baneyx

Chair Baneyx presented slides with announcements, including:

1. Pfaendtner appointed Associate Vice Provost for Computing Resources
2. Computing and Technology Manager, Jesse Chiem secures \$100K in Student Technology funding to replace all computers in ChemE computer lab
3. Pozzo featured on cover of Columns Alumni magazine for work in Puerto Rico, will present at Engineering Lecture Series 11/13/18: Meeting Our Global Obligations: The Hurricane Maria Energy and Health Project
4. ChemE startup / 2017 business plan competition winner Membrion receives combined 1.8M funding from investors and NSF
5. Baneyx start-up Proteios receives \$225K Phase I SIBR funding

B COE Update and Q&A – Vice Dean Greg Miller

Dean Miller shared slide presentation on College of Engineering, including Dean's focus areas, funding, direct to college admissions (DTC) and diversity.

1. DTC incoming cohort: 930 incoming DTC students; 301 women, 629 men, 71 URM
2. Funds received last legislative session include
 - a. \$600K for facility predesign; \$20M for CAMCET building; \$9M for UW faculty and staff compensation and \$18.5M for State Need Grant
3. 2019-21 session: operating request – CoE asks UW for \$6M; UW asking state for \$4M for CoE: ~35 new faculty for CoE; \$500K for STARS
4. Dean's focus for 2018-19:
 - a. Get growth proviso and building design/construction funded
 - b. Campaign for students
 - c. DTC – build student support and F/S courses
 - d. Diversity strategic plan implementation
 - e. Find new ways to engage with campus leadership (plan for housing, etc)
 - f. Further developing leadership program

C State of the Department and Directions – Baneyx

Chair Baneyx shared a slide presentation with department updates

2018 Chemical Engineering Faculty Retreat

September 21, 2018 | UW Waterfront Activities Center Great Room 3710 Montlake Blvd NE

1. 2018 Awards = 5.47M / Expenditures 6.34M ; 4.504 in operations costs
2. \$1.275M in new gifts \ 2018 Endowment value: \$22M
3. Undergrads
 - a. As of Spring 2018: 218 undergrads - 33% female and 8% URM
 - b. 62 BS awarded 2016-17 / 64 BS anticipated 2017-2018
4. Grads
 - a. 98 graduate students - 39% female and 7% URM
 - b. 10 Ph.D. awarded in 2016-17 / 39 MS Awarded
5. Faculty (will be 19 FTE in AU 2019)
 - a. One new faculty line for 2019-20 awaiting Provost approval
 - b. P&T underway: Carothers, Pozzo and Pfaendtner
 - c. Over 110 journal articles published / 17 patents filed and 14 patents issued in 2017
6. Infrastructure update: \$515K+ investment over 3 yrs / 7,859 sf of Benson Hall remodeled: ~19% of total assignable square footage
7. Data Science
 - a. Progress: Chair Baneyx outlined proposals funded and underway, including Micron award of \$25K for equipment; and a 16M DOE EFRC proposal for the Center for the Science of Synthesis across Scales, which includes a DS thrust
 - b. Faculty Incentive: Chair established \$100K of departmental funding for proposals that either establish the department as a leader in data science in the chemical engineering, bioengineering and/or materials science communities or produce undergraduate or graduate educational materials that will be integrated within the departmental curriculum (modules, labs, software)
 - i. Winners were announced in February | Deliverables Fall 2018
 1. *Education*: Qiuming Yu — *Introducing data science methodologies to the heat exchanger experiment in the ChemE 436 lab*
 2. *Research*: Elizabeth Nance — *Experimental diffusion analysis to extract change in tissue-structure function in the diseased brain*
 3. *Research*: Lilo Pozzo — *A repository and machine-learning fitting algorithm for small-angle neutron scattering data*
 - c. The undergraduate committee distributed a survey to undergrads to discern interest in DS:
 - i. Of 110 respondents, 94% believe there should be more DS opportunities for BS ChemE Students, for reasons of employability, job growth, essential tools/skills, relevance to modern engineering
 - ii. 25% indicated that DS should be integral part of curriculum and over 52% have taken or are planning to take more programming courses than are required for the BS ChemE.
 - iii. When asked about interest in a 5th year master's program, 37% reported definite interest and 43% possible interest in a 5th year master's DS program
 - d. Next Steps to promote DS in ChemE:
 - i. Decide on the path forward to best integrate DS in the UG and Graduate curriculum

2018 Chemical Engineering Faculty Retreat

September 21, 2018 | UW Waterfront Activities Center Great Room 3710 Montlake Blvd NE

- ii. Explore partnerships with Industry and other UW departments
- iii. Hire new professor with DS expertise
- iv. Consider organizing an Orcas DS conference to raise visibility

D Budget (Vote) – Baneyx & Carnes

Administrator Debbie Carnes presented a slide showing revenue and expenditure budgets for the coming year (see slide).

1. Faculty start-up: Prof. Schwartz asked if we had allocated enough for faculty startup (hiring), Chair Baneyx responded that we have asked for CoE match, and can also ask office of research for funds (we currently ask CoE for \$750K).
2. Grad Fellowships: these provide support during 1st quarter; Prof. Pozzo suggested starting a rainy day fund for fellowships, Prof Schwartz offered assistance from CEI for energy/Data science fellowships, another prof. suggested more TA / lecturer support is needed to grow MS program. Debbie estimated that it would cost 10K per student for a full year of support
3. **A motion was made by Prof. Dan Schwartz and seconded by Prof. Lilo Pozzo to accept the FY 2019 budget as presented by Debbie Carnes. All present were in favor, and the motion passed.**

E Peer reviews & OEA Dept. Evaluations – Holt (20)

Prof Holt presented slides on Peer reviews and provided a handout on OEA methodology, and a short discussion followed:

1. Prof Holt recommended that faculty teaching a new class look back at old reviews to gain insight on how to best teach
2. Prof Pfaendtner suggested that the department invite tech writing experts to help students build skills
 - a. Prof Adler asked if tech writing was an issue for students across CoE; Prof Holt answered that there is not as much CoE support for this as in the past, more departments are taking this on. Prof. Allan noted that ChemE 309 has a daily writing assignment, and Debbie Carnes informed that there is a writing center on campus with classes. There was general agreement that this would help with employment placement, and that the idea of incorporating tech writing into lab classes is a good idea.
3. OEA program feedback session for Seniors yielded good results, top recommended areas for improvement are: Grade scale, Professional development and Credits for courses
 - a. Grade Scale: Undergrad Committee will review and recommend grade assignment best practices to prevent GPA inflation, yet keep ChemE grades on par with other departments
 - b. Professional Development: Prof. Pozzo asks students to bring resume to advising; Prof. Holt suggested to faculty that they inform students to actively look for a job now; Prof. Baneyx mentioned that it is important to instill that the “job search starts on day one”

2018 Chemical Engineering Faculty Retreat

September 21, 2018 | UW Waterfront Activities Center Great Room 3710 Montlake Blvd NE

- i. It was also suggested that a 1 credit 499 class, "Job Skills" be added to the curriculum, or make 436-437 4 credits
- ii. Prof Holt asked that faculty send their ideas about curriculum, improvements or best practices in this area to him

F Scholarships & AIChE – Berg & Kim (5)

1. Applications: 60 total Applicants for 2018-19: 24 seniors, 25 juniors, 11 Soph/Freshman
2. Awards: 48 total awards: 45 Scholarships @ \$5k each; 2 Scholarships @ \$4k each (administered by COE); 1 Scholarship @ \$3k

G DYSS & Department Seminars – Holmberg & Nance (5)

1. DYSS Committee contacted top 40 ChemE Chairs with call for applications and asked students to reach out to their past mentors to promote applications; Top 5 Applicant Affiliations: MIT, Stanford, UC Boulder, UC Berkeley, Northwestern; record number of applications this year
2. 13 external speakers scheduled for 2018-19; Asking ACES to monitor student and faculty attendance; **Seminar committee asks that more faculty attend**

H Awards – Jiang (5)

1. **Chair Baneyx asked faculty to "please send Prof Jiang a list of awards for your community and professional societies"**

I Computing – Chiem (5)

1. CoE is trying to create a remote server farm, with ChemE as a pilot with remote access to Aspen/Comsol
2. Please send Benson Hall related IT issues through new ChemE ticketing system: chemsupport@engr.wa (BNS issues only)
3. There are now 38 new I-Macs purchased with Student technology funds in the main computer lab. Old workstations have been distributed throughout the department.
4. Mathematica is now \$100 per license - at department /PI discretion to keep; (still free to students)

J Infrastructure – Harmon (10)

1. Executed 2016-17
 - a. 1st floor staff consolidation: 137 Academic Services (450 sf)
 - b. 303 Grants Coordinator office (435 sf)
 - c. 239 graduate student space (423 sf) 10 new workspaces
 - d. 235 Shared Lab Space (234 sf)
 - e. 137 Academic Services suite (393 sf)
2. Ongoing & Planned
 - a. 105 Reception Renovation
 - b. Small Conference Room (225 sf)

2018 Chemical Engineering Faculty Retreat

September 21, 2018 | UW Waterfront Activities Center Great Room 3710 Montlake Blvd NE

- c. Lobby Renovation?
- d. New elevator (Summer 2020?)

K ABET – Adler (20)

Prof. Adler presented slides on ABET and informed faculty of upcoming ABET review visit in Fall of 2019, and there was some discussion of changes and clarification of certain performance indicators.

1. Dept. is doing well overall, except in indicators 3b and 7b/c Options are to Adjust 3b and 7b to better align our expectations with what/how we currently teach, or adjust curriculum to raise attainment.
2. 3b: Can the student analyze a measured relationship among variables to quantify an unknown substance property or system parameter?
 - a. 3b is measured in 455 and 460 – Prof. Pozzo noted that this seems to indicate if a student can do well in all aspects, but not a good indicator of formal error analysis on a parameter extraction; Prof Berg agreed that it is not a good measure of error analysis. Profs. Berg and Baneyx suggested Chem 436 for error analysis measure and Prof Adler noted that 436 was currently measuring 2 other outcomes. There was general agreement in the room to consider revision of 3b as shown above.
 - b. Profs. Nance, Holt and Adler will revise and bring back to faculty for a vote in a regular faculty meeting
3. 7b and 7c: An ability to function effectively as a member or leader of a team that establishes goals, plans tasks, meets deadlines, and creates a collaborative and inclusive environment.
 - a. 7c: Does the student contribute to a collaborative and inclusive environment? Was developed in 2017, tried to measure in 486, unable to do so – survey did not provide meaningful data
 - b. 7b: Does the student demonstrate effective time management and project planning skills? also measured in 486, with low results – likely due to the standard definitions All agreed to keep these standard definitions and address in curriculum
4. ABET Site visit Timeline
 - a. Fall 2018 – Assemble mock Self Study (due: January) Adler, Staff
 - b. Jan 2019 – Request for Evaluation (RFE) Chair, Dean's Office
 - c. March/April 2019 – Mock visit Adler, ABET committee, Staff
 - d. Winter/Spring 2019 – Assemble Self Study (due: July 1) Adler, Staff
 - e. Summer 2019: work with COE to identify site visit date Adler, Chair
 - f. Summer 2019: review and approve a program evaluator Adler, cmte, Chair
 - g. Fall 2019 - Site Visit
5. ABET Site visit Preparations
 - a. Proof that our curriculum is what we say it is (Criterion 5).
 - i. Copies of recent, graded course materials.(all courses, no exclusions)
 - ii. Most recent syllabus
 - iii. Peer review materials
 - iv. Course URLs
 - b. Proof that our continuous improvement process is what we say it is (Criterion 3,4).

2018 Chemical Engineering Faculty Retreat

September 21, 2018 | UW Waterfront Activities Center Great Room 3710 Montlake Blvd NE

- i. Copies of documents related to outcome assessment.(only AY 18-19 courses, and courses with outcome assessments)
- ii. Transcripts of peer review, ADFMs

L Undergraduate - Holt (20) - Admissions, DTC and Focus (Specialty) Areas

Prof Holt Presented slides on the Undergrad program that covered admissions, Direct to College impacts on admissions and Department role, and provided update on undergrad Focus areas:

1. Admissions Statistics: 165 Undergrads / 99 Grads
2. DTC Implementations
 - a. details not fully worked out, but if more qualified engineering students for a major than “slots,” admission to that department will be competitive and: Chemical Engineering will set the criteria for determining who is admitted / Chemical Engineering will select the students to be admitted.
 - b. DTC ChemE Timeline:
 - c. July 1, 2019: DTC student placement request deadline. First placement process
 - d. January 15, 2020: DTC student placement request deadline. Non-DTC (Interest changers and Transfer students) spring admission application deadline.
3. Specialty Areas – Change this to “Focus Areas”
 - a. Provide an Unlimited number of Focus Areas:Students who believe they have an educational plan which has involved significant depth in one or more areas may request departmental recognition by submitting a one paragraph proposal
 - b. Generally Requires (Similar to old requirements): 6 credits of relevant electives plus combination of research, study abroad, additional courses, etc.
 - c. The department provided suggestions for some possible Focus Areas:
 - i. Bio & Biomedical Materials, Interfaces and Systems
 - ii. Data Science
 - iii. Computation, Statistics, and Modeling
 - iv. Entrepreneurship
 - v. Environmental Engineering
 - vi. Energy Systems
 - vii. Polymers, Composites, Colloids, and Interfaces
 - d. **Prof. Schwartz moved and Prof. Pfaendtner seconded a motion to adopt new Focus areas as presented. All present agreed and the motion was passed.**

M 10 Year Academic Review Update Holt (10)

1. The 10 year review will need information from the department; we will request specific information from faculty – eg labs – all those with labs will be asked to contribute to a report on labs.
2. Timeline:
 - a. 2/27/19: internal deadline for drafts
 - b. 3/25/19: Site visit agenda and self-study report due to 10 Year review Committee-Grad school
 - c. 5/9 and 5/10/19 – Site Visit

2018 Chemical Engineering Faculty Retreat

September 21, 2018 | UW Waterfront Activities Center Great Room 3710 Montlake Blvd NE

- d. Jun. 14: Review Committee Written Report
- e. Nov. 1: Dept. Written Response
- f. TBD: Graduate School Report

N Committee Assignments (Vote) – Baneyx (10)

Proposed committee assignments were presented to the faculty. It was agreed that a grad student should be nominated to participate on the Faculty Search Committee. Committee assignments as presented were updated and will be voted upon in a later regular faculty meeting.

O Faculty Search Update and discussion – Baneyx, Schwartz (15)

1. Timeline – 2018-19
 - a. Oct 15 - ad Placement
 - b. Dec 15 - Priority consideration date
 - c. Week of Dec 17 - Application review / hone to final 30 / request reference letters
 - d. Week of Jan 7 - Top 10 applicants – Phone/Skype Interviews
 - e. Week of Jan 14 - Invitations to top candidates to visit (2/4, 2/11, 2/25, 3/4)
 - f. Mar 11 - Faculty Session – review candidates / determine 2nd visits
 - g. April 1 - Make offer(s)
2. **Prof. Schwartz made the following motion, which was seconded by Prof. Pfaendtner:**
Motion on continuity of search communication: If a permanent Chair of Chemical Engineering has not been selected by January 15, the faculty request that the search committee chair be delegated responsibility for managing all search-related candidate communications. The search committee chair will not assume any of the decision-making or budget authority of the faculty, acting chair, chair, or dean's office representatives during this period.
All in attendance agreed, and the motion was passed.

P Graduate Program PhD Program - Pfaendtner (20); Master's program – Yu (10)

Profs. Pfaendtner and Yu presented updates and statistics on the PhD and MS programs. Key highlights are:

1. PhD Program:
 - a. If / when you are unhappy with a student's performance come talk to the GPC/GPA.
 - b. Any graduate students in the MS program must be evaluated against the full cohort of applicants during Winter quarter. Admissions of our any students into PhD program are determined by the graduate committee (i.e., an individual PI in the department may not offer admission to students). The graduate committee / GPC are the final decision making entity for graduate admissions
 - c. 2017-18: 73 students currently in PhD program (including 11 new 1st years – 8 are new admits, 3 are from the MS program)
 - d. See slides for Degree progress, milestones and "additional degree requirements", including PI-specific "additional degree requirements" **Faculty are asked to document their additional degree requirements, share with students before joining**

2018 Chemical Engineering Faculty Retreat

September 21, 2018 | UW Waterfront Activities Center Great Room 3710 Montlake Blvd NE

group, file with GPA and apply uniformly to all – this is not required, but very much recommended

2. NRT / DIRECT: NRT is the new version of NSF IGERT (5 year effort) to develop new graduate training program / DIRECT is our traineeship. Emphasis area “data science + advanced materials // clean energy” / this is a lean “traineeship”; NSF requires the program cannot extend time to degree / All DIRECT PhD students who complete the program are eligible to apply for additional funds “Data Science Accelerator” (DSA program)
3. MS Program: Prof Yu provided admissions statistics for the MS program; there are 18 incoming for 2018.

Q Integrating Data Science into the ChemE Curriculum / Next Steps in DS Initiative (Intro and Faculty Discussion) - (Baneyx / Pozzo)

The strategic planning committee presented four scenarios for DS implementation in the UG/Grad curriculum to the faculty for discussion: Module based Curriculum (UG), All-Class new curriculum (UG), Cohort based curriculum (UG) and a 5th year MS Program in DS. Additionally, advisory board feedback on these options was shared. The Board’s strongest recommendation was to focus on the Graduate-level with ChemE-owned curriculum, noting that the UG curriculum may not be the best place to start. The board also asked the department to consider its top priority for implementation: Does the department want a new breed of ChE undergrad, Graduate researchers w/DS expertise, or a World-class recognized DS-focused department? The faculty discussed pros and cons of each approach, possible partnerships, steps and priorities for implementation.

5th Year Masters Option discussion points:

- There is demand for it (positive interest indicated from undergrad DS survey)
- Institutionalization of NRT courses – could replace NRT when this sunsets
- Students have positive perception of starting salary in DS sector and there is a strong local presence in DS; employers ask for statistics/ data handling
- Value proposition – DS tools alongside an engineering degree
 - Process engineer working with data-rich streams (e.g., Jupyter notebooks)
 - Boeing / Biotech omics
 - Contextualized -- Focus on molecules
- We have growing visibility in ChemE - Our recognition as a DS leader among ChemE peers is good; how do we differentiate ourselves in UW environment?
- Cost to students:
 - Multi-tier – haves and have nots
 - Need to build in scholarships / fellowships (Micron Foundation)
- Running it online or at night – would be in high demand
 - Could grow very big ---
 - Scalable courses to 200
 - Could rely on local expertise – People would be honored to come teach for the program
- 5th year could help students connect with industry

2018 Chemical Engineering Faculty Retreat

September 21, 2018 | UW Waterfront Activities Center Great Room 3710 Montlake Blvd NE

- with a value-added Capstone included: internship, placement, employment as an outcome
 - Goes hand in hand with sponsored research, industry partnerships
 - Already a MS in Information Science at UW / Chemistry is rolling out a DS program / MSE is interested
 - UG curriculum (change to “prefer stats” to other math classes) – Coach advisors to push.
1. What is our Strategy? What do we want to grow into / what do we want to achieve?
 - a. Does DS have a 5 year window? – the new “thing” is “Quantum”
 - b. We should do this because we believe it is game-changing
 - c. Could we offer ChemE MS in DS to chemists/related fields?
 - d. Students already have DS options in other departments that are already up and running – can we write a ChemE textbook to differentiate? Prof. Pfaendtner is currently working on a book JP is working on such a book – this could help to establish UW in the field / differentiate from Chemistry MS
 - e. Could partner with CPAC
 - f. Could change flavor to a 12 months MS program for our UGs
 - g. MS program: DS and Engineering - If UG are too well educated in DS they will be ahead of other MS students
 2. Undergrad Programs (Module based, New curriculum, Cohort based)
 - a. New - There is an opportunity to tune curriculum to what ChemEs care about
 - b. One of the NRT goal was to give people access to tools that will enhance their research programs
 - c. Cohort - Could provide a better student experience
 - d. Module based - Difficult to do it well at the UG level because it is so crowded
 - e. UG level – Make good choices (e.g., review what software, etc) EASY TO DO
 - f. Having a cohort, a series of courses, that you consistently emphasize
 - g. Eventually trickle up to faculty – Gain expertise

Conclusion:

- Prof Hillhouse suggested to the faculty that the Department start an MS in Data Science Program. There was agreement from those present. Prof. Pfaendtner suggested the creation of a DS track in an existing program; to redesign existing MS program into 2 tracks. There was general agreement with this idea, and the faculty concluded that the best way to begin to incorporate DS into the ChemE curriculum is to fast-track the implementation of a DS MS Program. Profs. Pfaendtner and Beck will develop a preliminary MS proposal for this.

Adjourned at 5pm

2018 Chemical Engineering Faculty Retreat

September 21, 2018 | UW Waterfront Activities Center Great Room 3710 Montlake Blvd NE

2018 – 2019 FACULTY MEETINGS | Mondays, 2:30 – 3:30 pm in BNS 109

AUTUMN 2018 10/8, 10/22, 11/5, 11/19, 12/3, 12/10 (P&T executive session 10/1)

WINTER 2019 1/14, 1/28, 2/11, 2/25, 3/11

SPRING 2019 4/8, 4/22, 5/6, 5/20, 6/3

CONFERENCES

ECS FALL AiMES MEETING

Sept 30 - Oct 4, 2018 | Cancun, Mexico

<https://www.electrochem.org/aimes2018>

ECS SPRING 2019 MEETING (235th Annual)

May 26 – May 31 | Dallas, Texas

<https://www.electrochem.org/235>

AVS 65th INTERNATIONAL SYMPOSIUM & EXHIBITION

Oct 21–26, 2018 | Long Beach, CA

<http://www.avs.org/Symposium>

AICHE 2018 ANNUAL MEETING:

Oct 28 – Nov 2, 2018 | Pittsburgh, Pennsylvania

<https://www.aiche.org/conferences/aiche-annual-meeting/2018>

MRS 2018 FALL MEETING and 2019 SPRING MEETING:

Nov 25-30, 2018 | Boston, MA - <http://www.mrs.org/fall2018>

Apr 22-29, 2019 | Phoenix, AZ - <https://www.mrs.org/spring2019>

ACS 2019 SPRING MEETING:

March 31 - Apr 4, 2019 | Orlando, Florida

<https://www.acs.org/content/acs/en/meetings/national-meeting/about/future-meetings.html>

ASEE 2019 MEETING:

June 16 – 19, 2019 | Tampa, Florida

<https://www.asee.org/conferences-and-events/conferences/future-conferences>