Faculty Development Plan Report

NAME

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Overview: This document contains a Faculty Development Plan as per Section 3.1.2 of the "University Policy on Rank and Status". There are three key sections of the document which focus on scholarship, teaching, and citizenship. Each of these sections contains the following, (a) an overview or focus of the key area, (b) the goals set for the project and their current progress, (c) an evaluation and strategy for the next steps.

1. Scholarship

1.1 **Scholarship Focus**: My current focus of research lies in the following focus areas:

- Cooperative control of intelligent, autonomous vehicles to achieve complex objectives in uncertain and dynamic environments.
- Decentralized control algorithms that are scalable enabling them to work despite hardware and time constraints as the number of vehicles in the system increases.

The following list includes some of the critical elements that are necessary for long-term scholarly success. My goals for the next 6+ months will focus on developing the structure for success by ensuring I am developing habits that will enable scholarly success. Rather than trying to work on all of these attributes, my objective will be to take a slice of them and ensure they are solidified into regular practices or habits. These critical elements include:

1. Activities that ensure progress occurs daily. These include daily planning, regular writing, reading/reviewing relevant journal articles, developing good relationships and communication with students that I mentor, short and long-term planning and goal setting that is trackable.
2. Continuing to develop and expanding expertise in my research field
3. Recruiting and supporting high quality students
4. Completing high quality research and sharing that research in peer reviewed journals

1.2 **Goals**

1. Tracking research progress:
   Goal: By the beginning of the school year (Sept. 2017) develop a board that is visible and tracks all research from idea to publication with the various steps in-between. Each research item should have a clear "next step" task to indicate what is needed to progress it further.
   Evaluation: If by Feb 2018 this board is being used regularly to evaluate scholarly progress and accurately reflects my current efforts. Also, should have work throughout the pipeline.

Progress: I have a board up and tracking. I have found this to be most useful in times when I have more discretionary time. This helps me to keep focus when I am not forced to do so by imminent deadlines.

2. Become a greater expert in my field:
   Goal: Read 2-3 journal papers or book chapters a month.
   Evaluation: Track the papers read by writing a short summary of the article, the date read, and ideas generated of how that particular work could be incorporated into my research or extended.
   Progress: Done.
   Goal: Complete a literature review on current research being done on honey-bee/ant type swarm algorithms.
   Evaluation: Written result with summary of important publications on the topic, bibliography references, and section describing ways in which the research might be extended.
   Progress: I completed a literature review on the work done with bias estimation (rather than honey-bee/ant swarming) that is being used in a journal paper under preparation.

3. Support for high quality students:
   Goal: Submit proposals to obtain funding for students, proposals will include C-UAS project proposal and ORCA student proposals.
   Evaluation: Have at least two undergrads submit an ORCA proposal, count of other proposals submitted.
   Progress: I submitted three proposals over the past six months, one of which received funding, a second did not, and the third is still under evaluation. Two of my students submitted ORCA proposals and one of them was funded.

4. Daily writing:
   Goal: Write for at least 25 minutes every day, 4 days/week.
   Evaluation: Track time spent writing in google doc or on daily planning sheets.
   Progress: I had high success in achieving this weekly goal and over the past month have expanded this goal both in time and scope. I now set aside one hour of daily writing time at a set time of day. I have gradually become better at ensuring that other meetings and commitments do not interfere with this time. I also have expanded the scope of what I include as "writing" to encompass reading/reviewing papers and writing down or organizing research ideas. I have found that spending just a short time on a project each day provides good continuity and that I don't require large blocks of time to make progress (although it is also helpful).

1.3 **Evaluation:** I think this goal helped in pushing me towards the right direction of establishing habits that are going to make long-term success. I also realized that this comes at the cost of being able to become fully obsessed/focused with a single problem/topic (mostly due to the non-research commitments such as teaching). Making progress daily is a good thing and I have been pleasantly surprised to learn that I can keep progress going across multiple days while only spending a small amount of time on that project. However, this "daily progress" breaks down when I try to make "daily progress" on too many things – like writing, doing research, finishing paper reviews, etc. Going forward

I would like to continue along this daily habit, but limit the number of skills or items I will try to progress on at once.

2. **Citizenship Project:**

2.1 **Citizenship Focus:** During my first year at BYU I will be cognizant of time limitations and energy that needs to be dedicated to establishing a research program and improving my teaching skills. Although these goals will be designed to stretch me to do things I may not otherwise have done, it will be meted with prudence. Within BYU and my department my focus for developing collegial relationships will be concentrated in working with my department mentor, serving on internal committees, and participating with the Magicc lab. Externally I will participate in activities to establish my presence and become familiar with my research community.

2.2 **Goals:**

1. **Goal:** Participate in regular mentor meetings with Michael Rice
   a. Use this as a mechanism for staying accountable to my goals and soliciting feedback and advice
   Progress: My mentor has been extremely helpful this year in helping me to get oriented and giving good advice. Though we did fall off from having weekly meetings, due mostly to me being busy, his door was always open and I frequently sought advice and know he would continue to welcome my questions in the future.
2. **Goal**: Participate as a member of the department external relations committee
   a. Assist in technology week (Winter 2017)
   b. Work with faculty and staff to document demonstrations and ensure they are ready for outreach events
   Progress: I have participated in several outreach events, including technology week, and ensured that the department's demonstrations were in place and working. I spent time over the summer in working with students to get them in good working order and make them more operator friendly.
3. **Goal:** Develop external collaborations:
   a. Attend the LATTICE symposium and follow through on connections made
   b. Work with Sachit Butail (University of Illinois) to develop a collaborative project idea
   c. Propose writing a joint proposal with APL folks
   d. Attend C-UAS meeting and discuss research/ideas with industry members and other faculty
   e. Volunteer to be a panel reviewer for NSF
   Progress: I have completed all these goals, including being on an NSF review panel. I have reached out to various people and strive to continue to make connections with those mentioned and others.
4. **Goal:** Attend two conferences:
   a. Organize and chair the Intelligent and Cooperative UAV Systems session at the IEEE CCTA conference (August 2017)
   b. IROS, AIAA SciTech or similar quality conference

> **Progress:** I organized and chaired an invited session at the CCTA conference. I did not attend another formal conference, but have participated in and attended the bi-annual C-UAS meetings.
> 5. **Goal:** Develop internal relationships with those in the Magicc lab
>   a. Solicit feedback by sharing ideas and papers
>   b. Look for opportunities of shared research and writing proposals
>
> **Progress:** I have collaborative projects with faculty in both the ECE and ME departments. I am happy with those collaborations and will focus on continuing to build those relationships in the future.

2.3 **Evaluation:** I believe this is the right level of focus for me at this point. Continuing forward I will keep working towards collaborative opportunities and keep a similar level of effort for my internal service commitments on the external relations committee. I will, however, engage more in the external community by defining which conference (or two) I would like to regularly participate in and attend it yearly.

Completion Date: February 2018

3. Teaching

3.1 **Teaching Focus:** I truly enjoy learning and being able to assist others in their learning process is very satisfying. This is one of the aspects I found attractive in deciding to move to academia. I care about students and want to see them succeed. In general I am a good listener and actively try to understand others perspective. I am also willing to adapt and try new methods. I am not attached to a specific method of teaching and therefore am willing to experiment with different techniques to see what works best for the students.

Teaching in a classroom setting is a new experience for me and though I feel that I have made significant improvement throughout my first semester, my focus will be on learning the following skills:

1. Being able to tell when the students are understanding concepts or when they need to be explained again
2. Try to solve problems for them instead of letting them struggle and learn.
3. Learning to explain difficult concepts in several different ways so that I can help students understand if my preferred way of explaining doesn't resonate with them.
4. Making the classroom more interactive; this entails a balance between teaching new materials and letting them practice or demonstrating concepts already covered.
5. Balancing prep time for teaching and student questions with my other responsibilities.

2.3 **Teaching Goals**

> 1. **Goal:** Solicit feedback and incorporate advice
>   a. Hold mid-term (SCOT) and end of term evaluation to elicit specific feedback on course load, teaching style, etc.

b. Ask for faculty evaluation of teaching and learn from other faculty members teaching style and strategies

Progress: I had a student evaluator (SCOT) interview my class. This process was extremely helpful in showing me what the students understood and needed. We were able to make adjustments to the course, including switching some TA schedules, reviewing some past material, and getting everyone on the same page in terms of homework. I think the most helpful outcome from that process is that afterwards the students understood that I was interested and willing to make changes to help their learning experience. Afterwards I continued to receive student feedback. I have also asked other faculty for advice in specific teaching instances and gotten good tips and ideas for class improvement.

2. **Goal:** Make changes to teaching plans based on student feedback
    a. Evaluate comments following each class and use this (and teaching journal) to develop a course of action for what to change for both this class (next time it is taught) and my teaching style generally

Progress: This is a hard goal to measure since I have yet to reteach a class. However, I am keeping a teaching journal where I write down things that I feel went well or poorly. And I am making changes to my teaching style and course content based upon these insights as well as student feedback.

3. **Goal:** Keep a teaching journal describing techniques I tried along with the result. Use this regularly for self-evaluation and ideas for class improvement.
    Progress: Did this and found it helpful both in terms of evaluating how things were going as well as thinking through different techniques I would like to try. Class evaluations showed that some students would like an even wider variety of teaching techniques to reach different learning preferences.

4. **Goal:** Introduce low-penalty quizzes (inside and outside of class) to motivate recall (Make It Stick).
    Progress: I have "quizzes" as opportunities for the students to test their understanding and recall. I decided to make these extremely low-penalty, i.e. no grade reward/penalty, but do it in a setting so they are motivated to impress their peers. Once a week we have these questions that test concepts learned in class. Students are broken up into groups and asked to try to solve the problem individually, then work with peers to get the solution. As time permits a student will work out the problem on the board for the rest of class.

5. **Goal:** Read "Make it Stick" by Peter Brown and incorporate the teaching practices discovered therein.
    Progress: I read the book and gained many ideas into teaching that I would like to slowly introduce into my classroom curriculum.

6. **Goal:** Participate in IMMERSE to mentor undergraduate students in research

Progress: I participated in IMMERSE last summer and was able to recruit some fantastic students. I feel like being in IMMERSE was a great learning experience for them as they were able to interact with other faculty members and learn from their peers.

3.3 **Evaluation:** In the past year I have made a lot of progress in becoming a better teacher. I believe that the feedback loop of regularly soliciting (or self-evaluating) suggestions and then incorporating those changes immediately is key in continued improvement. I am also looking forward to next Fall when I will have the opportunity to reteach a course and make larger scale improvements to the course. I intend to modify many aspects of the course including: the course organization, topics covered and depth in which we cover them, number of examples presented, etc.