

FACULTY DEVELOPMENT PLAN

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Research & Scholarship

Research Overview:

I'm interested in applying inverse optimization to problems where observed human decisions diverge from "optimal" prescriptions estimated by statistical models. Inverse optimization provides a methodology to reconcile optimization models with observed decisions, which can help bridge gaps and create understanding between analysts and decision makers. While inverse optimization is an inference problem at its core, it has primarily been studied in the field of operations research (OR). For this reason, while I primarily aim to publish in statistics journals, my collaborators and I also publish in OR journals and decision science journals.

The other primary area of my research is in statistical applications in sports. I have published research applied to basketball and have ongoing projects in soccer, tennis, football, wheelchair rugby, and slopestyle snowboarding. Within these contexts I am mainly interested in strategic decisions, which I often look at through the lens of inverse optimization. Other research interests include Bayesian methods and Markov decision processes.

Self Assessment:

- Strengths:
 1. I feel confident as a writer.
 2. I think I have a knack for coming up with creative research ideas.
- Weaknesses
 1. Perfectionism. I have obsessive-compulsive disorder and while I believe this helps me iron out a strong, coherent logic throughout my papers, it also makes me tend to spend too long perfecting a paper before submitting it.
 2. I don't feel confident about my theoretical foundations in statistics.
 3. I'm not great at keeping a good work schedule. I'd like to get in a routine where I block out a regular set of hours each day for research and honor that block of time as if it were a social obligation with the dean, or my department chair.
 4. I'm not in a good habit of keeping up to date on the literature in the areas I do research in.

Report on 2021 Scholarship Efforts:

1. **Grants and External Funding.** I didn't submit any grant proposals in 2021.

2. **Research Publications.** In 2021 I submitted 2 research articles. The first of these is a scoping review paper on machine learning in sports medicine of which I am the second author. It has been rejected at a number of journals and we are still trying to find a home for it. The second paper is a stat methodology paper which was accepted at the end of 2021 in *Bayesian Analysis*. I also began a project with the men's and women's tennis teams, the goal being to learn optimal serve placement strategy.

Plans for Scholarship in 2022:

1. I will be submitting an IDR proposal in January 2023 which I have been and will be preparing in 2022. This is in tandem with the aforementioned tennis project. Technically this will be a 2023 submission.
2. I have submitted two papers so far in 2022. One is a teaching case under review at *INFORMS Transactions on Education*. The other is a research paper on soccer analytics which is under review at the *Journal of Quantitative Analysis in Sports*. I plan to submit an inverse optimization methodology paper applied to the fourth down decision in football to *JASA Case Studies and Applications* in the coming weeks.

Other papers that are currently in progress include a paper on points system design in slopestyle snowboarding, a methodological paper on uncertainty quantification in inverse optimization, and the aforementioned review paper that we have had a hard time getting accepted. These will likely be winter 2023 submissions since I will be on parental leave for the fall semester.

3. I want to set a goal to read for an hour everyday, minimum. Most of this time will be spent reading papers and staying up to date on literature in my field, but I would also like to spend some time on foundational stat theory to increase my confidence in that area.

Teaching

Overall Teaching Philosophy: In the two classes I took from Dr. Bruce Schaalje while in the BYU Masters program, he often counseled us to become masters of SAS and R (the statistical software we used), rather than servants to them. This concept resonated with me then, and it shaped my perspective as I continued my education and as I have begun my tenure as a professor. Statisticians can easily become servants to their data and their methods rather than the other way around. Research agendas become largely determined by the methods in our toolboxes and applications are often governed by whatever interesting data sets we have access to. While this is inevitable to some degree, I aim to engender a proactive attitude in my teaching and mentorship.

On a separate note, a quote from Plato on a plaque outside the Talmage Building states, "Mathematics will draw the soul towards truth." While this has been true of my statistics education, certain truths extend beyond mathematics. I strive to have my testimony and values shine through my teaching, ultimately to help bring souls to Christ.

Self Assessment:

- Strengths:
 1. I've only taught Stat 250 thus far, but I feel like I am a good R programmer and I genuinely enjoy coding in R. I think this radiates in my teaching to the students.

2. I strive to be an understanding and approachable professor. I received higher than average student ratings around being respectful to students. I want my students to feel safe and respected in asking questions in class and in office hours.

- Weaknesses

1. I would like to improve my homework assignments. One piece of feedback that I got from many students is that some of the homework questions were way too hard and were not connected to material that was tested.
2. I didn't learn all of my students names last semester. I would like to learn all of my students names in the first week of class next time I teach.
3. Teaching breadth—I have only taught one course so far. I think it would strengthen my teaching profile to teach another class this upcoming year. I hope to have this opportunity in the fall of 2023.

2022 Teaching Assignment Table:

Semester	Course	Enrollment	Times Taught	% A's	GPA	Satisfaction
Winter '22	250 Sec 001	59	1	32%	3.2	9/10
Winter '22	250 Sec 002	39	1	26%	3.0	9/10

Plans for Teaching in 2023:

1. Use the BYU flashcards app to test whether I know my students names.
2. Compare my mid-course and end of course evaluations to those from last semester to assess whether the complaints about some of my homework assignments have improved.
3. Implement the bootstrap and permutation test mini-projects, first getting feedback from Garritt Page on their design. Get feedback from the students on how they go.

Citizenship

Overall Citizenship Philosophy: I believe a great department is built by faculty who are willing to serve within the department and in their respective professional societies. I also believe that a strong department needs genuine friendships and to exist among its members.

Self Assessment:

- Strengths:

1. I am actively involved in departmental service. This is reflected in my involvement in the learning outcomes committee and on masters student committees. I also organize and lead a Sports Analytics Reading Group with [REDACTED]
2. I am actively involved in professional service. I have been nominated to serve as the program chair of the ASA section on Statistics in Sports in 2024. I also review articles when asked and my time permits.

- Weaknesses

1. I think I participate in maybe a tad too many work-related social activities. I greatly value fostering relationships with my colleagues outside of department meetings and research meetings, but I tend to go to everything I can ranging from exercise to lunch. I think I should be a little more judicious in these decisions and hammer out some more research and writing time with some of them time I save.

Report on 2021-2022 Citizenship Efforts:

1. I served on the scholarships committee with [REDACTED]
2. I organized the Sports Analytics Reading Group for winter 2022.
3. I was nominated and elected as program chair for the ASA Section on Statistics in Sports for 2024.
4. I referreed two articles for journals.
5. I fostered friendships with my colleagues in a multitude of ways.

2022-2023 Citizenship Plans:

1. Continue to run the Sports Analytics Reading Group.
2. Prepare for my role as program chair of the Statistics in Sports Section by working with [REDACTED], the current program chair, staying up to date on literature on statistics in sports, attending conferences with sports analytics research—especially JSM and NESSIS—and keeping an eye on the programs of the sports conferences I am unable to attend).
3. Actively fulfill committee assignments given to me by the chair.