

Faculty Development Plan

Assistant Professor, Department of Mechanical Engineering

Last revision: July 2022

This document articulates my Faculty Development Plan leading up to the 3rd year review for Continuing Faculty Status (CFS) and includes specific goals for the year 2022. The desired outcome of the goals included herein is to strengthen my portfolio for CFS and to benefit BYU students and the University.

Self-assessment

Scholarship strengths

1. Decade of experience in MRgFUS research to build upon & resulting publication record
2. Strong writing abilities
3. Willingness to collaborate

Scholarship areas to improve

1. Clarifying the vision of the Bioheat Transfer Lab
2. Obtaining funding
3. Transition from researcher to mentor in scholarship activities

Teaching strengths

1. Love of students and desire to see them succeed
2. Enthusiasm for subject matter
3. Organized approach

Teaching areas to improve

1. Make the most of prep time
2. Develop opportunities for 1-on-1 mentoring

Citizenship strengths

1. Desire and willingness to contribute

Citizenship areas to improve

1. Understanding strengths, needs, and workings of the department
2. Expanding internal and external visibility of my work and abilities

Medium range goals (2022-2025)

Scholarship

1. Demonstrate ability to fund and mentor 1-2 graduate students and 3-4 undergraduates with trajectory for 4 graduate students and 6 undergraduates by Fall 2027
2. Publish 2-3 journal articles per year with student co-authors
3. Establish BYU collaborations at the department, college, and university levels
4. Obtain external funding from Sandia, NIH, and NSF

Teaching

1. Consistently teach with >70% of students evaluating me as effective or very effective
2. Make consistent, incremental improvements to each course I teach based on feedback from peer reviews, student ratings, and using best practices (including experiential learning)
3. Re-use materials from previous semesters or other faculty to decrease prep time

Citizenship

1. Actively contribute to the Graduate Committee and organize Graduate Seminar
2. Strengthen external visibility by (a) reviewing journal articles and (b) chairing/organizing conference sessions at STM and BMES

2022 Goals

2022 Scholarship Development Goals

1. Establish three research projects in different areas.
2. Write and submit a NIH proposal for MRgFUS research objectives.
3. Build the computational and experimental capabilities of my lab.
4. Establish a collaborative relationship and obtain initial funding from Sandia National Laboratories.
5. Submit manuscript from Sandia/BYU ROM collaboration for publication.
6. Establish collaborative relationships in the department, college, and university.
7. **(M)** Hire 1-2 graduate students and 2-3 undergraduate students.
8. **(M)** Establish weekly research group meetings and hold a research lab picnic.

2022 Teaching Development Goals

1. Use online student rating results for Winter 2022 ME EN 321 to make instructional improvements for Fall 2022 ME En 340 and Winter 2023 ME EN 321.
2. Each semester, collect mid-semester student feedback (What am I doing that I should continue doing? What am I doing that I should change/stop doing? What am I not doing that I should start doing?) and implement changes.
3. Revamp syllabus to include (1) warmer language, (2) growth-mindset language, and (3) emphasis on office hours and my desire to have students attend.
4. Use BYU Class Rolls App with flashcards to learn all student names.
5. **(M)** Initiate efforts to get more students attending office hours.

2022 Citizenship Development Goals

1. Be a contributing member on the Graduate Committee.
2. **(M)** Organize and lead the Graduate Seminar in Fall 2022.
3. Attend annual meetings for BMES and STM.
4. Review 1-2 journal publications.

(M) indicates a mentoring opportunity.

Progress thus far

Scholarship

- Three initial projects identified
 - Achilles Tendinopathy
 - ROM techniques
 - Temperature-dependent fat properties
 - Multiple ideas on the backburner for now
- Hiring students
 - Winter 2022: Hired 3 undergraduate students to assemble lab equipment and begin computational research efforts
 - Spring/Summer 2022: Hired 5 undergraduate students to develop temperature-dependent property measurement capabilities, perform literature reviews, and investigate use of COMSOL Multiphysics for our lab's use
 - Fall 2022: One undergrad from Winter 2022 transitioned to graduate student, and potential to hire another grad student as of 7/27/22
- Lab Capabilities
 - Winter 2022: Acoustic property measurements with through transmission
 - Winter 2022: Phantom fabrication
 - Summer 2022: Temperature-control for measurements
 - Summer 2022: Thermal property measurements (TEMPOS, DSC, C-Therm)
 - Pending: Radiation force balance, MR properties, Elastography
- Lab Culture
 - Summer 2022: Established weekly research group meetings that include 2-3 minute "Lessons for life", student-led research article review, and student-presented research updates
 - Planned Fall 2022: Lab Picnic with all current and former students
- BYU Collaboration
 - 2/2022: IDR Grant started collaborations with Electrical Engineering, Exercise Science, and Dance Departments
 - 3/2022: Reduced Order Modeling (ROM) project started with [REDACTED] (ME EN) and Sandia National Laboratories (SNL)
 - 7/2022: Joined Simmons Center for Cancer Research (SCCR) at BYU
 - 7/2022: Meeting with [REDACTED] (Statistics) about future collaborations
 - Planning to investigate with [REDACTED] (ME EN): Shape memory alloy actuation using FUS
 - Interested in finding a CS collaborator for accelerating/optimizing computations and doing machine learning
- External Collaboration
 - 3/2022: ROM project with [REDACTED] at SNL
 - Working with University of Utah MRgFUS Lab to develop process for retrospective analysis of breast cancer treatments
 - Working with Stanford University researchers to investigate temperature-dependent fat properties
- Publications
 - Preparing manuscript to submit by year end for ROM methods comparison with student [REDACTED]
 - Laying groundwork for papers on (a) temperature-dependent fat property measurements, (b) retrospective analysis of breast cancer treatments, (c) retrospective analysis of desmoid tumor treatments

- Grant Proposals and Funding
 - 2022 BYU IDR: Achilles Tendinopathy (\$120k over 2 years)
 - 3/2022 SNL: ROM techniques (\$15k in 2022)
 - Planned 10/2022: NIH R21 Trailblazer (\$400k over 3 years) on temperature-dependent fat properties
 - Planned 2/2023: BYU IDR: ROM techniques for MRgFUS treatment planning (ME EN, Statistics, CS)

Teaching

- Winter 2022: ME EN 321
 - Adopted materials, schedule, assignments, quizzes, and exams from [REDACTED]
 - Provided fresh homework solutions for students' self-grading
 - Made lecture slides my own
 - High percentage of students rated my teaching as effective or very effective
- Fall 2022: ME EN 340
 - Adopted schedule and portfolios from [REDACTED]
 - Collaborating with [REDACTED] to provide students with homework solutions for self-grading
 - Making lecture slides (my own) and exams (may try to adopt parts from other faculty)
- Attended New Faculty Seminar and Effective Teaching Workshop

Citizenship

Nov 2021: OMEGA Research Poster Conference Judge (11/19/21)

Feb 2022: iWME (increasing Women in Mechanical Engineering) attendance

Feb 2022: 3MT Fulton College Judge (2/23/22)

Feb 2022: Graduate Seminar Presentation (2/28/22)

Mar 2022: ME Sweet Talks Presentation (3/4/22)

Mar 2022: Biomechanics Grand Rounds Presentation (3/24/22)

May 2022: New Faculty Seminar (supporting Women students and faculty, modifying course content, using examples from my own career that include women)

May 2022: Joined STM and watched Annual Meeting virtually

Apr-May 2022: PMB Journal Article Review

May 2022: Grad committee- Created table for Grad Student Holistic Evaluation

May 2022: Peer review: observed and provided feedback to Dr Jones teaching ME 340

July 2022: Grad committee- Gathered faculty feedback on PhD candidate 1.5 year committee mtg

July 2022: Effective teaching seminar for new faculty