Citizenship Project Proposal:

MANUFACTURING ENGINEERING TECHNOLOGY – DR. name

Having participated in professional citizenship activities domestically and internationally for the last decade, my focus this next year will be to expand collaborations with my faculty colleagues at BYU. The manufacturing engineering technology program within the school of technology is currently pursuing developing a new "smart production simulator." This new laboratory is designed to enhance meaningful experiential learning opportunities within the School of Technology. Integrating smart manufacturing principles into a production environment is designed to create an incubator for undergraduate and graduate research while simultaneously providing a working lab space for undergraduate courses.

My citizenship efforts will therefore focus on working with specific faculty within the manufacturing program to further develop this concept. Additionally, as smart manufacturing is the merger of information technology and process technology (manufacturing), I will reach out to faculty outside my program within the School of Technology to explore joint opportunities with faculty in information technology (IT) and teaching and engineering education (TEE).

The aims of this project are to first, better establish program specific collaboration with my colleagues in MET and second to establish relationships with faculty across programs within the school of technology.

Success in this area will be measured based on increased understanding of other faculty, their goals, and better understanding of how we may collaborate in the future.

Course Development Project: Grant Proposal

MFG 434 – MANUFACTURING AUTOMATION – DR. NAME

To better align with the message presented by President Worthen regarding the need for experiential learning in the classroom, I propose using the $300 grant made available to support my course development project for the following:

1. The purchase of equipment to enable an additional lab in the course relating to vision systems.
    a. Colored lighting to demonstrate the influence of lighting on image recognition
    b. Various parts that require either front lighting or back lighting for image analysis
    c. Camera fixtures for our Cognex vision systems to allow for repeatable operation
    d. Backdrops and lighting boxes to enhance non-direct illumination

While historically vision systems in automation were an extremely expensive endeavor, recent technology advancements related to handheld devices and smart phones have significantly changed the market. As such, vision systems are used much more extensively than ever before in automation systems. I would like to be able to develop a new lab using industrial Cognex cameras that were recently donated to our department. These funds will allow me and the course TAs to purchase the required ancillary equipment to bring this new teaching opportunity into our automation course.

The funds will be used during the spring/summer period of 2017 in order to prepare the laboratory instruction for the course being taught during the fall 2017 semester.

Faculty Development Plan and Proposed Development Projects

Name

Manufacturing Engineering Technology

June 15, 2017

Overview

This document contains a Faculty Development Plan as outlined in Section 3.1.2 of the "University Policy on Rank and Status." Three sections, Scholarship, Teaching and Citizenship, are included, and each contain 1) self-assessments, 2) short and long-term goals, and 3) current progress towards my goals. Performance in these three areas will be used to determine continuing faculty status at the three- and five-year reviews.

1. Scholarship

1.1. Self-Assessment

1.1.1. Areas of Interest

- Dissimilar materials joining, with an emphasis on friction stir technologies
- Smart Manufacturing

These areas are selected based on recognized expertise, interests and funding, as well as program needs.

1.1.2. Strengths, Skills and Competencies

- Experienced researcher with demonstrated history of successful proposal development
- Contacts in industry and government agencies (DoD, DOE, etc.)
- Recognized industrial expert with international recognition

1.1.3. Areas for Improvement or Growth

- I need to become more familiar with collaborative resources at BYU for proposal development and research.
- I need to continue to build industrial relationships to expand Smart MFG base.
- I need to establish unique research capabilities here at BYU in both joining and smart manufacturing.

1.2. Scholarship Goals

Building a solid foundation for continued scholarly success at the university include the following key elements:

1) Develop state of the art facilities to provide high quality, industrially relevant research
2) Continued external funding

3) Recruitment and productive use of capable, motivated research assistants

4) Publication of research results in peer reviewed journals

The following short-term and long-term plans have been identified to help build and maintain a solid research program.

1.2.1. Short-term Plans (1-5 years)

- Review feedback from NSF proposal submitted during 2016, seek feedback from peers, NSF program managers and mentor, and prepare to resubmit during the next available window.
- Regularly meet with and prepare a new proposal with my mentor, Dr. Carl Sorensen, relating to defect detection in friction stir welds for submittal to either NSF or NEUP during 2017.
- Sponsor at least one ORCA proposal with undergraduate researchers annually
- Submit a mentoring environments grant (MEG) proposal related to refill friction stir scribe spot joints of dissimilar materials, specifically carbon fiber reinforced polymers to metals.
- Partner with an industrial collaborator (targeting automotive community) for applied FSW research.

1.2.2. Long-term Plans (5-10 years)

- Develop a funded research group with 3-5 graduate students and 6-10 undergraduates.
- Continue to disseminate technology for industrial implementation.
- Submit an average of 5 articles annually including peer reviewed journals, conference papers and reports.
- Maintain international leadership position in the FSW community
- Become a nationally recognized leader in smart manufacturing.
- Attend 2-3 technical conferences annually, present research results, and participate in organization.

1.3. Relationship to Program Goals and Needs

As a goal of MET, we want to demonstrate excellence in a few specific research areas within manufacturing. In collaboration with others in the program, these scholarship goals with further strength our history as a leader in solid-state friction stir technologies, and establish a future leadership in Smart Manufacturing.

1.4. Required Resources

<u>Solid-State Joining</u>

- Dedicated lab space for solid-state joining (to be shared with Dr. Miles)
- Materials storage for aluminum, steel, composites, tools

- Data Acquisitions hardware and software
- SEM resources (available on-campus)

Smart Manufacturing

- Dedicated lab space to setup the Smart MFG Simulator (CTB 145)
- Faculty collaboration in the design and layout of the facility (Eric McKell, etc.)
- Funding for equipment and facility setup (internal and external funding)

1.5. Progress to Date

- Awarded $5600 experientially learning grant for undergraduate research in FSSW and conference fees for student attendance of Smart and Connected Round Table (Fall of 2017.
- Initiated collaboration with Dr. Blair Carlson of GM R&D, to perform FSSW research in ultra-thin section, a novel application of FSSW to automotive steels, in which all research materials were provided by GM, and collaborative materials R&D will be performed on-site at GM.
- Recruited Adam Christensen, graduate student, to work on the development of a novel FSW tool capable of joining closed sections with variable wall thicknesses (start in F17)
- Submitted NSF proposal F16 entitled “Establishing a Phenomenological Constitutive Relationship for Bonding in Friction Based Solid-State Joining of Aluminum Alloys”
- Recruited Brigham Larsen, undergraduate student, to perform research in FSSW of automotive steels (started W17).
- Recruited Brian Russell and Andrew Nemrow, graduate students, to develop smart MFG capabilities at BYU to establish a smart MFG simulator.
- Recruited several undergraduate researchers to help establish the smart manufacturing simulator (David Williams, Meghan David, and Travis Ward).
- Developed collaboration/sponsor with PTC on a Smart MFG Simulator, with other companies also interested in collaboration and sponsorship

2. Teaching

2.1. Teaching Philosophy

My teaching at BYU will focus on instruction in the classroom, shared student mentoring experiences and applied research projects. I will work to provide experiential learning opportunities in each of these three areas. Furthermore, I believe that preparing students to be ready to immediately provide benefit to their future employers is crucial, so I will expect students to act and perform like professionals.

2.2. Self-Assessment

2.2.1. Areas of Interest

- Mentored research opportunities
- Experiential learning
- Expanded graduate curriculum

2.2.2. Strengths, Skills and Competencies

- Greater than a decade of experience mentoring young researchers
- Real-world industrial experience to share with students
- Passion for learning and helping other reach their potential

2.2.3. Areas for Improvement or Growth

- Increase student engagement during classroom lectures (determine what best leads to interactive discussion)
- Improve organization of lectures (flow, concept development, and challenges)
- Empower graduate students to mentor undergraduate researchers
- Develop new graduate curriculum to expand horizons of future students

2.3. Academic Goals

2.3.1. Short-term Plans (1-5 years)

- Provide clear expectations in the classroom for students, both via syllabus and throughout the course
- Use mid-course evaluations for the next 3 years.
- Further the spiritual development of students with both spontaneous (by the spirit) and designed opportunities to facilitate spiritual discussion
- Continue to provide off-campus experiences for courses

2.3.2. Long-term Plans (5-10 years)

- Develop curriculum for additional graduate courses
- Help establish undergraduate curriculum to support ABET accreditation for MFG Systems.

- Establish a reputation among students as a distinguished faculty

2.4. Relationship to Program Goals and Needs

Providing mentored research opportunities and experiential learning in the classroom helps to prepare our students to excel in their future endeavors. So far as we continue to develop excellence in students the reputation of the program will grow.

2.5. Required Resources

- Opportunity to continue to teach MFG 434 – Manufacturing Automation

2.6. Progress to Date

- Participated in Faculty Development Series
- Attended Teaching and Learning Luncheons
- Received a 4.5 student rating for MFG 491A (F16)
- Received a 4.1 student rating for MFG 434 (W17) up from the historical average of 4.0
- Provided extra-credit to students that attended an automation tradeshow of campus

3. Citizenship

3.1. Self-Assessment

3.1.1. Areas of Interest

- Provide reviews of friction stir welding related literature
- Organize internationally recognized conferences that share the latest developments in friction stir technologies.
- Disseminate the latest developments in friction stir technologies via conference proceedings, workshops, and journal topics.

3.1.2. Strengths, Skills and Competencies

- Internationally recognized leader in materials community
- Experience in organizing and editing publication topics
- Veteran symposium organizer in multiple organizations

3.1.3. Areas for Improvement or Growth

- Recognition in the smart MFG area
- Increased participation in smart MFG conferences sponsored by SME
- Join Society of Manufacturing Engineers (SME)

3.2. Professional Goals

3.2.1. Short-term Plans (1-5 years)

- Serve on committee for SoT, external relations
- Take a long-term role as the BYU mini-baja capstone coach
- Become involved with BYU SAE club
- Continue to serve in international leadership roles within engineering societies
- Review ~ 1 journal article per month (pre-CFS)

3.2.2. Long-term Plans (5-10 years)

- Serve on college level committee as requested
- Review >1 journal article per month (post-CFS)

3.3. Relationship to Program Goals and Needs

3.4. Required Resources

3.5. Progress to Date

- Attended program faculty meetings, socials, and orientation
- Served on the program IAB external relations committee
- Assisted in course realignment for MFG 533 to Smart MFG

- Served as a reviewer for Department of Energy – Vehicle Technologies 2017 Annual Merit Review
- Organized the 2017 Friction Stir Welding and Processing Symposium (~80 talks and 40 papers)
- Chaired sessions for 6 symposia in 2016-7
- Current Chair of the TMS Shaping and Forming Committee
- Current Program Committee Advisor to the TMS Materials Processing and Manufacturing Division
- Organizer of the bi-annual Friction Stir Welding and Processing Symposium
- Current secretary for the ASM Joining Committee

MFG 434 - Manufacturing Automation

Fall 2017

Section 001: 240 CTB on Th from 3:00 pm - 5:30 pm, 150 CTB on M from 1:00 pm - 2:50 pm

Section 002: 240 CTB on Th from 3:00 pm - 5:30 pm, 150 CTB on T from 2:00 pm - 3:50 pm

Section 003: 240 CTB on Th from 3:00 pm - 5:30 pm, 150 CTB on W from 5:00 pm - 7:00 pm

Section 004: 240 CTB on Th from 3:00 pm - 5:30 pm, 150 CTB on Th from 10:00 am - 11:50 am

Section 005: 240 CTB on Th from 3:00 pm - 5:30 pm, 150 CTB on Th from 1:00 pm - 2:50 pm

Section 006: 240 CTB on Th from 3:00 pm - 5:30 pm, 150 CTB on F from 10:00 am - 11:50 am

Section 007: 240 CTB on Th from 3:00 pm - 5:30 pm, 150 CTB on F from 12:00 pm - 1:50 pm

Instructor/TA Info

Instructor Information

Name: Name
Office Location: Brigham Young University
Office Phone: 801-422-7858
Email: Name@byu.edu

TA Information

Name: Meaghan David
Email: meaghandavid01@gmail.com

Course Information

Description

Students will be introduced to the basics of production automation systems. They will be taught the fundamentals of how to correctly plan, specify, and justify the basic elements of automated manufacturing. They will become familiar with sensors, actuators, material-handling equipment, part feeding and orienting equipment, robotic equipment, and programmable logic controllers. They will also learn the application and control of hydraulic, electric and pneumatic power systems for automation systems.

Prerequisites

See the MET academic calendar for course prerequisites.
CEEn 203
MFG 230
IT 318

Materials

Learning Outcomes

Automation System and Process Design

Select appropriate automation processes and equipment
Creativity & Problem Solving, Materials, Science, and Experi

Assess the impact of part variation on production
Best Practices, Science, Competitiveness and Creativity and

Apply Design-for-Assembly principles to manufactured parts
Leadership and Communication

Communicate effectively through technical reports

Grading Scale

Grades	Percent
A	93%
A-	90%
B+	87%
B	83%
B-	80%
C+	77%
C	73%
C-	70%
D+	67%
D	63%
D-	60%
E	0%

Grading Policy

1. You are expected to work like professionals, so act like it!
2. All work expecting full credit must be turned in electronically by the due date specified in Learning Suite.
3. Late work should be emailed directly to the instructor, with written justification (late deduction will increase with increasing time elapsed after the due date)
4. Delays due to extenuating circumstances should be brought to the attention of the professor as soon as reasonably possible to avoid late penalties.

Participation Policy

While working in industry you will find that much of your work will be completed in teams. That being said, your individual contributions will be crucial to your personal success, your promotions and your annual salary actions and bonuses. As such in this course you will be evaluated both individually and as a team. You will be required to participate with you lab group to complete all labs and the semester design project. Each of you will evaluate the performance of

every member of your lab group in your peer review assignment. In combination, the peer review, labs and design project account for 50% of your total grade. As such your participation in group assignments is crucial to your performance in this course.

Attendance Policy

Attendance in class is highly suggested. Please remember that since this class only meets once a week, you miss an entire weeks lectures when you miss a single class. Pertinent information for assignments and test will be disseminated during each lecture.

While attendance in class is greatly beneficial to your success, attendance in lab is mandatory. TAs will take roll, and your peers will be required to access your performance and attendance.

Teaching Philosophy

My primary focus as a teacher is that every student learns the topics presented in this course and grows in knowledge. Thus enabling each student to go forth, have a successful career, and represent the character and standards of the Gospel of Jesus Christ, The Church of Jesus Christ of Latter Day Saints and Brigham Young University.

Assignment Submission

ASSIGNMENTS

•All work for assignments, quizzes, lab reports and exams is to be turned in electronically on Learning Suite.

•One File! – Preferred as a PDF

LABS

•Five laboratory exercises are scheduled - team project assignments. TAs will be in the labs at the scheduled times to assist teams with their projects

•A formal written lab protocol and report is required for each lab. The report is to be typed with the following sections per examples

Executive Summary, Purpose/ Objective, Scope, Materials/Equipment/Tools/Fixtures, Process/Procedures, Results & Conclusions.

•The lab report will be due per the schedule in learning suite. Lab Reports are to be turned in electronically on Learning Suite

•Only one report per team is required to be turned in.

Assignments

Assignment Descriptions

HW #12 - DFAA

Due: Wednesday, Sep 13 at 11:59 pm

HW #1 - Automation Research - Online

Due: Wednesday, Sep 13 at 11:59 pm

MFG 434 -Spring 2017- Assignment #1 -Web Search of Automation Success Story.docx Download

HW #2 - Parts Handling

Due: Wednesday, Sep 20 at 11:59 pm

MFG 434 - Spring 2017 - Assignment #3 - Parts Handling.docx Download

Lab #3 - PLC Trainers

Due: Thursday, Sep 21 at 11:59 pm

MF434 PLC Trainers - MPS 1000 Series.doc Download

HW #3 - Industrial Robots

Due: Wednesday, Sep 27 at 11:59 pm

MFG 434 -Spring 2017- Assignment #2 -Industrial Robots.docx Download

Lab #1 - Part Feeding

Due: Wednesday, Sep 27 at 11:59 pm

MFG 434 - Feeding and Handling Lab - Spring 2017.docx Download

Lab #4 - PLC Stations

Due: Friday, Sep 29 at 11:59 pm

MFG 434 - PLC Stations - Spring 2017.docx Download
PLC Stations Combined Inputs - Spring 2017.pdf Download

HW #4 - Controls & Programming

Due: Wednesday, Oct 04 at 11:59 pm

MFG 434 - Spring 2017 - Assignment #4 - Controls and Programing.docx Download

Lab #2 - Industrial Robotics

Due: Wednesday, Oct 11 at 11:59 pm

MFG 434 - Spring 2017 - Robotics FANUC teach pendant.doc Download

HW #5 - PLC Ladder Logic

Due: Wednesday, Oct 18 at 11:59 pm

MFG 434 - Spring 2017 - Assignment #5 - PLC Ladder Logic.docx Download

Mid-Term Exam

Due: Wednesday, Oct 18 at 11:59 pm

MFG 434 - Spring 2017 - Mid Term Exam.docx Download

HW #6 - PLC Programming

Due: Wednesday, Oct 25 at 11:59 pm

MFG 434 –Spring 2017 - Homework #6 – PLC Programming.docx Download

HW #7 - Fluid Power

Due: Wednesday, Nov 01 at 11:59 pm

MFG 434 -S17 -Fluid Power.docx Download

HW #8 - Actuators

Due: Wednesday, Nov 08 at 11:59 pm

HW #9 - Motors and Drives

Due: Wednesday, Nov 15 at 11:59 pm

HW #10 - Vision Systems

Due: Wednesday, Nov 29 at 11:59 pm

MFG 434 - S17 - Vision Systems.docx Download

HW #11 - Sensors

Due: Wednesday, Dec 06 at 11:59 pm

Semester Design Project

Due: Wednesday, Dec 13 at 11:59 pm

MFG 434 - Spring Project.doc Download

Lab #5 - Vision Systems

Due: Wednesday, Dec 13 at 11:59 pm

Peer Review

Due: Thursday, Dec 14 at 11:59 pm

University Policies

Honor Code

In keeping with the principles of the BYU Honor Code, students are expected to be honest in all of their academic work. Academic honesty means, most fundamentally, that any work you present as your own must in fact be your own work and not that of another. Violations of this principle may result in a failing grade in the course and additional disciplinary action by the university. Students are also expected to adhere to the Dress and Grooming Standards. Adherence demonstrates respect for yourself and others and ensures an effective learning and working environment. It is the university's expectation, and every

instructor's expectation in class, that each student will abide by all Honor Code standards. Please call the Honor Code Office at 422-2847 if you have questions about those standards.

Preventing Sexual Misconduct

As required by Title IX of the Education Amendments of 1972, the university prohibits sex discrimination against any participant in its education programs or activities. Title IX also prohibits sexual harassment-including sexual violence-committed by or against students, university employees, and visitors to campus. As outlined in university policy, sexual harassment, dating violence, domestic violence, sexual assault, and stalking are considered forms of "Sexual Misconduct" prohibited by the university.

University policy requires any university employee in a teaching, managerial, or supervisory role to report incidents of sexual misconduct that come to their attention through various forms including face-to-face conversation, a written class assignment or paper, class discussion, email, text, or social media post. If you encounter Sexual Misconduct, please contact the Title IX Coordinator at t9coordinator@byu.edu or 801-422-2130 or Ethics Point at https://titleix.byu.edu/report or 1-888-238-1062 (24-hours). Additional information about Title IX and resources available to you can be found at http://titleix.byu.edu.

Student Disability

Brigham Young University is committed to providing a working and learning atmosphere that reasonably accommodates qualified persons with disabilities. If you have any disability which may impair your ability to complete this course successfully, please contact the University Accessibility Center (UAC), 2170 WSC or 422-2767. Reasonable academic accommodations are reviewed for all students who have qualified, documented disabilities. The UAC can also assess students for learning, attention, and emotional concerns. Services are coordinated with the student and instructor by the UAC. If you need assistance or if you feel you have been unlawfully discriminated against on the basis of disability, you may seek resolution through established grievance policy and procedures by contacting the Equal Employment Office at 422-5895, D-285 ASB.

Academic Honesty

The first injunction of the Honor Code is the call to "be honest." Students come to the university not only to improve their minds, gain knowledge, and develop skills that will assist them in their life's work, but also to build character. "President David O. McKay taught that character is the highest aim of education" (The Aims of a BYU Education, p.6). It is the purpose of the BYU Academic Honesty Policy to assist in fulfilling that aim. BYU students should seek to be totally honest in their dealings with others. They should complete their own work and be evaluated based upon that work. They should avoid academic dishonesty and misconduct in all its forms, including but not limited to plagiarism, fabrication or falsification, cheating, and other academic misconduct.

Schedule

Date	Lecture Schedule	Assignment Due Dates
T Sep 05 Tuesday		
W Sep 06 Wednesday		
Th Sep 07 Thursday	Introduction - Automation & Feeding Systems	
F Sep 08 Friday		
M Sep 11 Monday		
T Sep 12 Tuesday		
W Sep 13 Wednesday		**HW #1 - Automation Research - Online** **HW #12 - DFAA**
Th Sep 14 Thursday	Parts Feeding and Handling	
F Sep 15 Friday		
M Sep 18 Monday		
T Sep 19 Tuesday		
W Sep 20 Wednesday		**HW #2 - Parts Handling**
Th Sep 21 Thursday	Industrial Robots	**Lab #3 - PLC Trainers**
F Sep 22 Friday		
M Sep 25 Monday		
T Sep 26 Tuesday		
W Sep 27 Wednesday		**HW #3 - Industrial Robots** **Lab #1 - Part Feeding**
Th Sep 28 Thursday	Controls & Programming	
F Sep 29 Friday		**Lab #4 - PLC Stations**

M Oct 02 Monday		
T Oct 03 Tuesday		
W Oct 04 Wednesday		**HW #4 - Controls & Programming**
Th Oct 05 Thursday	Programmable Logic Controllers (PLC)	
F Oct 06 Friday		
M Oct 09 Monday		
T Oct 10 Tuesday		
W Oct 11 Wednesday		**Lab #2 - Industrial Robotics**
Th Oct 12 Thursday	NO CLASS - Mid-Term	
F Oct 13 Friday		
M Oct 16 Monday		
T Oct 17 Tuesday		
W Oct 18 Wednesday		**HW #5 - PLC Ladder Logic** **Mid-Term Exam**
Th Oct 19 Thursday	Advanced PLC & Industrial PLC Field Trip	
F Oct 20 Friday		
M Oct 23 Monday		
T Oct 24 Tuesday		
W Oct 25 Wednesday		**HW #6 - PLC Programming**
Th Oct 26 Thursday	Fluid Power	
F Oct 27 Friday		

M Oct 30 Monday		
T Oct 31 Tuesday		
W Nov 01 Wednesday		**HW #7 - Fluid Power**
Th Nov 02 Thursday	Pneumatics and Actuators	
F Nov 03 Friday		
M Nov 06 Monday		
T Nov 07 Tuesday		
W Nov 08 Wednesday		**HW #8 - Actuators**
Th Nov 09 Thursday	Motors & Encoders	
F Nov 10 Friday		
M Nov 13 Monday		
T Nov 14 Tuesday		
W Nov 15 Wednesday		**HW #9 - Motors and Drives**
Th Nov 16 Thursday	Vision Systems	
F Nov 17 Friday		
M Nov 20 Monday		
T Nov 21 Tuesday	**Friday Instruction**	
W Nov 22 Wednesday	**No Classes**	
Th Nov 23 Thursday	**Thanksgiving**	
F Nov 24 Friday	**Thanksgiving Holiday**	

M Nov 27 Monday		
T Nov 28 Tuesday		
W Nov 29 Wednesday		**HW #10 - Vision Systems**
Th Nov 30 Thursday	Industrial Sensors	
F Dec 01 Friday		
M Dec 04 Monday		
T Dec 05 Tuesday		
W Dec 06 Wednesday		**HW #11 - Sensors**
Th Dec 07 Thursday	Design for Automated Assembly	
F Dec 08 Friday		
M Dec 11 Monday		
T Dec 12 Tuesday		
W Dec 13 Wednesday		**Lab #5 - Vision Systems** **Semester Design Project**
Th Dec 14 Thursday	Safety and Ethics	**Peer Review**
F Dec 15 Friday	**Fall Exam Preparation (12/15/2017 - 12/15/2017)**	
M Dec 18 Monday		
T Dec 19 Tuesday		
W Dec 20 Wednesday		
Th Dec 21 Thursday		

Scholarship Strategies Project Proposal:

MANUFACTURING ENGINEERING TECHNOLOGY – DR. NAME

As an internationally recognized expert in friction stir technologies, I will continue to research, publish, and collaborate in areas related to solid-state joining and processing. With established reputation in aiding industrial clients to commercialize various aspects of the technology, I will focus my near-term, future research and mentoring in the following three areas:

1. Developing fundamental understanding that aids in accurately predicting joint properties, fracture, and defects.
2. Tailoring developmental efforts to both novel and applied industrial application.
3. Furthering diverse application across multi-material platforms.

As a means of furthering these research foci, I will complete the following scholarly goals prior to February 2018:

1. Review feedback from NSF proposal submitted during 2016, seek feedback from peers, NSF program managers and mentor, and prepare to resubmit during the next available window.
2. Prepare a new proposal with mentor, Dr. Carl Sorensen, relating to defect detection in friction stir welds for submittal to either NSF or NEUP during 2017.
3. Sponsor at least one ORCA proposal with undergraduate researchers
4. Submit a mentoring environments grant (MEG) proposal related to refill friction stir scribe spot joints of dissimilar materials, specifically carbon fiber reinforced polymers to metals.
5. Partner with an industrial collaborator (targeting automotive community) for applied FSW research.

As an established professional researcher, I will continue to employ habits and tactics I've developed over the past decade working at Pacific Northwest National Laboratory. Additionally, I will strive to employ the following techniques to improve my effectiveness at Brigham Young University:

1. Schedule a monthly literature update and review with research team.
2. Join manufacturing focused professional organization (likely SME), and participate in a workshop and/or conference.
3. Use the center for statistical consultation and collaborative research to aid in planning and analysis of FSSW data.
4. Schedule several blocks each week for writing.
5. Use the faculty editing service for reviewing publications scheduled during 2017.

The methods I will use to evaluate my success in using these strategies to enhance my regular work habits during my concluding report are as follows:

1. Evaluate how integration of a monthly literature review in research meetings influenced student engagement, personal awareness, and research quality.
2. Identify new opportunities associated with participation in a manufacturing centric organization.

3. Qualitatively evaluate the benefits of using the center for statistical consultation and collaborative research as well as the faculty editing service in conjunction with research and publication quality.
4. Comparatively review writing in large blocks (current method) to scheduled writing periods several times each week.