Faculty Development Plan

June 30, 2014
Self-Assessment

Strengths,
- I am creative, patient, self-motivated, self-directed.
- I have been good at finding important problems and then coalescing resources to overcome those difficult research challenges.

Challenges,
- To establish a publishing pipeline.
- To seek out regular input from faculty and others

It took me almost a decade and four rather sharp 'pivots' before completing my undergrad-graduate research goal of making my own low-cost holographic video display. The problem was an important one and the results exceeded everyone's expectations but looking back, there are many elements that could have been completed much sooner had I done a few things differently. My research made significant leaps after chance conversations with people who had experience in my area. For example, I just happened to stand next to a man in line at a conference who had spent 20 years working with prism coupling in lithium niobate waveguides. I just happened to have been struggling with getting prism coupling at the time and this man was able to give me the magic formula to make it work. There were several such incidents where outside information hastened my work. I think that it wasn't necessary that these events be accidental. I think I could have accelerated my progress by regularly seeking outside help.

Professional Goals

Citizenship Goals Summary:
- Make a weekly effort to engage with other faculty on and off campus.
- Complete a collaborative research project with Dr. Schultz.
- Faithfully execute my department committee assignments.
- Participate in my scholarly community.
Launch the Utah Mobile Fab Lab Initiative.
Create Fabrication Recipe Clearinghouse.

In my first three years, I will focus on establishing a publishing pipeline, however, I will also be working to faithfully execute my department committee responsibilities and participate in my chosen scholarly community (the Optical Society of America). I am currently the IEEE advisor and have taken assignments for the external relations committee. I will also be serving on a display conference committee this fall.

Once I have published my first 6 peer-reviewed papers, established a robust publication pipeline and passed my 3rd year review; I intend to begin the gradual rollout of two citizenship initiatives: the BYU Mobile Fab Initiative and Fabrication Clearinghouse Project.

The BYU Mobile Fab Lab is an outreach initiative to bolster EE enrollment at the undergrad and graduate levels as well as allow us to target certain under-represented demographics throughout Utah. This effort will place powerful fabrication tools at the disposal of EE students and connect them with a global network of professors and students at top schools in the US and abroad (see the included executive summary). To limit my personal time commitment, I intend to fully deploy this project only after I have secured sufficient funding to support a full-time, dedicated staff member. Also, this fab lab will function as part of a larger mobile science program, the Voyager Program, currently based at Southern Utah University.

Also I intend to apply for an NSF grant to fund a website dedicated to accumulating, annotating and ranking fabrication recipes. A huge amount of time and money is wasted in duplicated fabrication efforts; a centralized clearinghouse for fab information could reduce this significantly. The current director of the MIT NSL is sympathetic to my plans and I would hope to make this a collaborative effort. This effort, if successfully funded would provide support to students who are already doing this work for the IML website and pay dividends over the years in the form of faster process development times, wider visibility for the BYU fabrication website and broadened influence with our peers in microfabrication.

Teaching Goals Summary

- Improve my teaching scores over the course of three years.
- Show a trajectory toward 50% of the class receiving an ‘A’ grade on an MIT exam.
- Have total transparency. No teacher, assistant or student should feel any hesitation to share answers or collaborate.
- Reduce busy-work as much as possible (foster self-direction and correction).
- Eliminate the need for cramming.
- Create new goals for advanced students (Black Belt degrees or the like)
- Objective class evaluation. I would like to prepare students who can with those from other world-class engineering programs. No artificial manipulation of the curve.
- Make work flexible and self-throttling.
- Include problem sets from current research project and create a way for faculty and students to identify research interests.
- Have an overarching analogy or theme that gives context to abstract concepts and
makes new ideas memorable.

- Create a problem solving taxonomy tree for every course and a concise summary of relevant information.
- Reduce in class distractions, eliminate the need for note taking (can be done by TAs).
- Have every student declare that my judgments were just!

My recent class, Kung Fu Circuits, attempted to accomplish several of these goals. After teaching and then redesigning the course to reflect student and faculty input, I have settled on a structure that I intend to use for all of my classes for the next two years. The key elements are:

1) A large database of worked problems of both intermediate and high difficulty distributed to the students in study packs
2) Multiple paths, one with high flexibility and concentrated risk (no-retake midterm tests) and the other with less flexibility large time commitment and distributed risk (frequent, small, randomized, ‘retakeable’ exams).
3) Daily in-class quizzes
4) Incentive program for advanced students
5) A glyph or seal which has a pictorial representation of the key learning objectives in each class
6) Final exam made from other first tier engineering programs as objective standard

This fall I will be offering my first graduate class in holography. Holography is my area of expertise and I hope this class will be an example of how I can enrich the EE curriculum in our department. For this class, I have the following personal objectives:

1) To create in each student a strong mental model for diffraction and interference through a geometric approach to lecture material and a strong visceral intuition for these phenomena born of poignant laboratory experiences.
2) To give each student an appreciation for the broad application of diffraction and interference in phased arrays, grating coupling, adaptive optics, interferometry and other fields.
3) To teach advanced holographic techniques such as holographic transfers, aperture techniques and other information-limiting strategies which are the basis for the much of the current research in my field.

Research Goals Summary:

- Have paper accepted my first year
- By third year review, submit at a rate of one conference or journal paper per graduate student per year.
- Submit a major paper on a high risk project or new research direction every 2-3yrs
- Recruit student researchers through classes
- Have at least two students in each academic level: undergraduate, masters and PhD.
- Have at least one member of the research group be from another department: mechanical engineering, applied math or graphic art.
Themes: Advanced 3D display, novel waveguide spatial light modulation

Topics: Electroholographic displays, volumetric displays, phased array displays

Methods: resonant holography, visible light phased arrays, hybrid holographic/phased array modulation, occlusion-capable volumetric displays

Building on early success
My last journal article made brief mention of three effects: wavelength division multiplexing, increased angular deflection and noise reduction by polarization rotation. I intend to take two of these, expand them and write papers based on more in-depth analysis of these effects. I have created a holographic video monitor that can serve as a test bed for new spatial light modulators. I am currently developing two or three modulators that may be tested in the monitor to determine their fitness for holovideo applications. This will hopefully be a low-overhead method of creating publications of value in the space of spatial light modulators for holovideo.

Outside scholars
I plan on maintaining a correspondence with these outside researchers whom I hope will serve as external references.

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CURRENT RESEARCH INITIATIVES

Room-Sized Holovideo Display
A room-sized holovideo display would represent the ultimate instantiation of holographic video—below this scale, vignetting is a problem and beyond this scale, depth cues become less rich. Such a display would be the first of its kind and would merit a high impact publication as well as high visibility for BYU. This particular research goal is too ambitious to attack directly at this point in my career. However, each of the projects described below is both a worthy research effort in itself as well as a stepping stone toward a room-sized holovideo display. If all goes well I hope to be working on a proof of concept room-sized display by my 6th year review.

Holographic Video Monitor
We are creating the first low-cost, PC-driven, VGA resolution, color holographic video monitor. This project is about 80% complete and we will give our second conference paper on
our progress in July 2014. We intend to write a journal paper on the final display and then author several conference and journal papers on applications of the display. We have an auxiliary paper in the works which characterizes one of the components of this display: the guided wave modulator. We hope to have this paper completed and submitted by the end of the calendar year.

**Hybrid Holographic/Phased-Array Full-Parallax Display**
This seeks to demonstrate full-parallax by combining the holographic gratings and phased arrays in complementary ways. This research is currently supported by AFRL SBIR funds. We have shown some preliminary results which helped us win our Phase II support. This project, initiated at BYU is approximately 30% of the way toward a paper.

**Steerable Optical Brain Probe Array**
This may not sound like it has anything to do with 3D displays but it does! We intend to create the world's first steerable brain probe array and most of my recent grant proposals are based on this effort. There is a national priority in this area which will hopefully make funding easier to find, however, most important, is that the enabling technology for brain probes is also foundational for my future room-sized holovideo displays. We received Fulton college research initiation funds to enable us to gather preliminary results. Dr. Ed Boyden, an optogenetics pioneer from MIT, has expressed a desire to collaborate on this project. While my intent is to create and test the hardware ex-vivo, we are interested in connecting with other professors on campus who can perform the in-vivo tests. I would estimate that this project is approximately 10% of the way toward a paper.

**Occlusion-Capable Volumetric Display**
We are trying to create the world's first volumetric display capable of occlusion. There are those in my field that believe this is not possible, however we already have some results that seem support this possibility. This particular project has is novel and high risk. It was initiated at BYU and was born out of a collaboration between myself and Justin Peatross in the Physics department. This research has been directed by undergraduate students from the outset. Of all our research initiatives, I am most excited about this work. It has the potential to make 'Princess Leia' style displays that would satisfy a keen popular demand. This project has a very high potential and we will evaluate our progress at the end of the summer to see if we want to settle and publish or push forward.

**Collaboration Goals Summary:**
I'm currently involved in a large number of collaborations both formal and informal. I am not actively seeking additional collaborations with the exception of a brain probe collaboration that will hopefully exist between myself and Dr. Wood Chang who will be arriving on campus this fall.

**CURRENT COLLABORATIONS**
Dr. V. Michael Bove Jr. (MIT)-- My former advisor's group will hopefully be tightly connected with mine for many years to come. We are currently collaborating on a three year SBIR II for the Air Force and have just proposed another collaborative project to work on during that period for Samsung. BYU and MIT complement each other; my group has expertise in device fabrication for holovideo displays and Dr. Bove's group has expertise in the relevant supporting computer hardware and software design.

Dr. Ed. Boyden (MIT)-- Dr. Boyden has shown an interest in my waveguide modulators for brain stimulation. We are currently drafting a joint grant proposal for waveguide modulator brain probes.

Dr. Justin Peatross (BYU)-- Dr. Peatross and I are developing a new technique for volumetric display using optical trapping. We have some encouraging results which we hope to turn into a paper and/or grant proposal in the next few months.

Other collaborations include a joint proposal to the Air Force between myself and Dr. Josh Kvavle (BYU alum) to have a student funded for a holographic Head's-Up display. Also we're working to pool resources with Dr. Ware (BYU) for optical trapping experiments.

**Funding Goals Summary**
- Get outside funding. Try to achieve an average funding rate of $45k by my third year review and a funding rate of $150k by my sixth year review.
- Identify two sources of outside funding before my third-year review and five by my sixth year review. I’d like to also educate myself on ‘better’ sources of funding (e.g. STTRs seem to be better than SBIRs for universities).
- Get an award with myself as the PI.
- Submit a grant proposal each quarter.
- Create one-page summaries for wide distribution and distribute them widely.

**Concordance with Department and University Goals**
- My goals for publishing closely correspond with the department expectation of publishing in peer-reviewed venues twice annually.
- My funding goals ($45k/yr by 3rd year and $150k/yr by 6th year) came out of talks with Dr. Long who helped me identify these as reasonable numbers.
- My post-CFS citizenship goals attempt to address the department's enrollment concerns directly.

**Resources Needed**
I have been very happy with the generosity of physical, fiscal and human resources made available to me as a new faculty.
(near-term) Funding for the setup of my new graduate holography lab course.
I’m going to request $2.5k to build labs for my holography course this fall. This money will be used to purchase film and developer as well as to create optical breadboard setups that will allow us to perform laboratory experiments on optics tables, currently used for active research projects, with as little disruption as possible.

(near-term) The ability to etch lithium niobate for ridge waveguides.
This may be accomplished with one of the ICP etchers however the BYU IML etchers are either subject to dedicated processes or so heavily used that the owners are reluctant to risk the introduction of new materials. I’m trying to gather information to possibly assuage these fears, or if the material really is incompatible, I would like to make a capital equipment request for an ion mill or other piece of equipment suitable for the job.

(near-term) Travel Money for Conference Committee Duties
I’m glad to have the opportunity to serve on a conference committee and knock out one of my CFS requirements early, but this will mean two additional domestic trips in the coming fall. I’m hoping I can beg some department money to help cover these trips.

(medium-term) Interference Lithography System
To make large area input couplers and to pattern nanostructures for low-reflection surfaces, I need a and interference lithography system. An interference lithography system would allow us to create very fine patterns over very large areas, but this requires a dedicated isolation table and a large expensive laser. Dr. Schultz had one built for a short time but it was disassembled when his laser died. It would be nice to resurrect his system.

(medium-term) Scanning Interferometer
This would be a custom built piece of equipment that would be very specific to my research. I intend to write this into my future grant proposals.

(long-term) Space
My research space is adequate for my current research needs but I will probably wish I had another large optics table and another 100sq ft of laser-friendly floorspace by the time my CFS evaluation comes due and I'm transitioning to research on room-sized displays. Could someone put a good word in for me as space becomes available in the future (maybe as people situate themselves in the new building)?

Progress to Date:
Citizenship--
● Have met with my committee and IEEE student presidency regularly.
● I've been invited to participate on the subcommittee for a display conference this fall. (DISPLAY AND IMAGING SYSTEMS, IEDM)
● I have written an executive summary and identified collaborators, and possible funding sources for my post-CFS mobile fab lab initiative
Teaching--
- My first course ratings were 7.2 for course overall and 7.4 for instructor overall.
- Students in my first class averaged 79% on the final exam with half of the questions coming from the MIT equivalent course and with 11/44 receiving an A or A- on the final before partial credit was awarded.

Research--
- Before starting at BYU in August, I published two journal articles (full-peer review) and a conference paper (only abstract reviewed) over the course of the last calendar year.
- Since coming to BYU I've had two conference papers accepted (abstract reviewed for one and first three pages reviewed by committee for the other) and we appear to be on track to submit a journal article (for full review) by the end of this calendar year.
- I currently have two graduate students and five undergraduates with plans to add another graduate student in the fall.

Funding--
- Last year, after starting at BYU, I brought in $20k of SBIR phase I funding.
- This year I was awarded $50k for three years as part of an SBIR phase II subcontract.
- I received $10K in research initiation funds from the college.
- I was asked to help write a call for proposals for a Samsung GRO program (we applied for this and will hear back in Aug.)
- I have been averaging at least one grant proposal per quarter.

I was a finalist for a Knight Foundation Award but was cut in the second round. I'm also doing an autopsy on a NIH Young Investigator Award.

Evaluation Criteria
I would consider myself successful if I was on a trajectory to have 4-5 funding sources, >10 peer-reviewed papers and teaching scores >7 by my 6 year review.

Conclusion
I have been very happy with my first year at BYU. I have thoroughly enjoyed my work. I’ve loved teaching BYU students. They are as bright and more kind than any group young people I have known. I’m excited by the progress of our research and I often wake up anxious to come to work, hear the students’ reports and try new things. I have enjoyed writing grant proposals—I find I get a lot of new ideas as I flesh out a research plan. Deadline anxiety is no fun, but deadlines seem much more manageable than they were in grad school. I’m thrilled to be here and excited to share some of our recent progress with the world as we close out this year.
1) Themes, topics and methods for my research are found in the ‘Research Goal Summary’ section of my Faculty Development Plan and are reproduced below:

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- Have paper accepted my first year
- By third year review, submit at a rate of one conference or journal paper per graduate student per year.
- Submit a major paper on a high risk project or new research direction every 2-3yrs
- Recruit student researchers through classes
- Have at least two student in each academic level: undergrad, masters and PhD.
- Have at least one member of the research group be from another department: mechanical engineering, applied math or graphic art.
- Build the holodeck (room-sized holovideo display)

Themes: Advanced 3D display, novel waveguide spatial light modulation

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2) Scholarly Goals to be achieved by Feb 2015:
   ● Have a peer-reviewed journal paper accepted by Feb 2015
   ● Recruit student researchers through classes
   ● Have at least one student in each academic level: undergrad, masters and PhD.
   ● Have at least one member of the research group be from another department: mechanical engineering, applied math or graphic art.

3) Strategies for Scholarly Productivity:
   ● Early morning research—I’ll begin work at 7am at least 3 days a week so that we can fabricate with little interruption.
   ● I’ll write for at least 30min at least 3 days a week starting at 10am when my mind is still fresh.
   ● I’ll meet with my mentor, Dr. Shultz, once a week (currently Fridays at 1pm) to review research and receive feedback.

4) Evaluation of successful employment of strategies in (3):
   ● I’ll keep have track of fabrication milestones over the next 8 months.
   ● I’ll record pages produce in during my allotted writing time.
   ● I’ll report the approximate percentage of successful mentor meetings.
Citizenship Project Proposal

I propose to continue a collaborative project between myself and my faculty mentor, Dr. Shultz, to create a slab-waveguide bragg-reflecting electric field detector with a goal making substantial progress toward a peer-reviewed publication by February 2015.

This project will involve performing the following steps:

- Creating a titanium indiffused channel waveguide in lithium niobate (in progress).
- Etching a finely patterned grating to act as a Bragg mirror in the channel waveguide.
- Coupling light into, and out of, the waveguide.
- Measuring the behavior of the light in the presence of an electric field.

This project dovetails well with many of my other research initiatives.
UTAH STEM

MOBILE FAB

LAB
Utah Mobile Fab Lab Initiative
EXECUTIVE SUMMARY

Project Proposal: to create a mobile ‘fab-lab’ to stimulate interest in STEM majors among underserved communities throughout Utah with a special emphasis on rural Utah communities.

Project Description:
A fab lab is a space housing a group of modern computer-controlled tools for rapid fabrication such as 3D printers, laser cutters, vinyl cutters, CNC mills and routers (e.g. Shopbot). Fab labs enable low-cost customized fabrication from micro to architectural scales. Fab labs can be used to create interest in STEM careers among high school aged youth and help address the problem of declining STEM professionals nation-wide.

Target communities: rural, female and minority students throughout Utah.

Objectives:
1) Connect rural students to STEM majors and help them avoid under-matching (choosing a school or program poorly matched to their abilities).
2) Increase enrollment of women and minorities in STEM majors by using customized programs that appeal directly to these groups and by connecting them with women and minority engineers around the world.

Project Background (Fast Facts):
The Fab Lab movement was started by Dr. Neil Gershenfeld, director of the Center for Bits and Atoms at MIT. The movement includes the standardization of tools and processes for fixed and mobile fab labs as well as conferences (called FAB13 this year), class curricula (Fab Academy and the MIT ‘How to Build Almost Anything’ class) and an international network to support fab labs and their users.
- Fab Labs first initiated on a large scale by Dr. Neil Gershenfeld, MIT.
- Over 150 chartered ‘brick and mortar’ fab labs world-wide From Switzerland to Suriname.
- 20 US states with Fab Labs
- Mobile fab labs currently operate out of Pretoria South Africa; Weesp, Netherlands and Cleveland, Illinois.

Our Proposed Program Model (3 Steps):
The model of use for Fab Labs is as varied as the populations they serve. For our purposes we will seek to create engineering experiences and connections for underserved Utah students by implementing the following three-step program:
1) During the summer the fab lab travels to one school district per week conducting week-long, student-driven, engineering day camps with priority given to the most rural school districts (students where primary industry consists of agriculture local population below 5000 and/or 1hr from city center). The week’s project is a directed engineering project designed to excite students about engineering. Schools provide a CIT (what is this?) representative to become trained on fab-lab equipment during summer camps or at BYU during the school year.
2) Qualifying schools with a trained representative may have the mobile fab lab reside at their school for one semester to use as part of an engineering course which would focus enabling student-directed projects. The class will be modelled after the famous MIT class, "How to Make (Almost) Anything." Class participants are connected to the MIT Fab Lab network and other young engineers around the world.

3) Fab-lab personnel assist the school in creating their own brick and mortar fab labs and long term programs as well as helping them become a formally chartered Fab Lab and members of the international fab lab network.

**Strategy for Achieving Objectives:** (more specifics)

**Rural**

1) Rural students will be paired with BYU engineering mentors who will provide perspectives on the expansiveness of engineering and illuminate pathways for participation. They will also be connected via network with diverse peers around the world who possess enthusiasm for STEM topics and ambitions to become engineers and scientists.

**Women**

2) Camp and class programs can be constructed to appeal to a wide variety of interests including intelligent fabrics, bio-engineering and social applications.

**Minorities**

**Resources Needed:**

One-time costs(better breakdown)

$100k Basic startup equipment and materials

Recurring Costs:

$200k per year

For salaried full-time fab lab coordinator, program costs, travel, materials and maintenance. This sum also allows for some program scaling to 2 over the course of five years.

**Metrics for Success:**

This project will be considered successful if

[insert criteria for success here]

**VIGNETTES:**

**My own story: From Sanpete to MIT and back again**

Growing up in Manti, Utah I had little concept of what an engineer was, in fact, the only engineer I knew personally was my electronics merit badge counselor who commuted 3 hours to Salt Lake City every week. I would have remained oblivious to the virtues of engineering had I not made a chance acquaintance with a graduate student who invited me to intern at the MIT Media Lab where I was introduced to the wonderful world of modern technical innovation. I eventually attended MIT myself, where I participated in world-class research on holographic video displays and published my work in *Nature* before graduating with a Phd.
During my years at MIT, I met many young men and women from rural communities and inner-city/underdeveloped areas who had no concept of the world of engineering and would have lived a life well-below their potential had it not been for some epiphanic event or an enlightening personal encounter. I am convinced that it is well within our responsibility to provide such triggers to the students in rural parts of central and southern Utah. We cannot bring them all to an MIT Media Lab(local?), but through a Mobile Fab Lab initiative, we can bring the Media Lab to them.

[fab lab success stories]

Conclusion
[emotional appeal]

LINKS:

Comprehensive talk on on Fab Lab philosophy and Programs
http://www.youtube.com/watch?v=aPbJmYCSCgA

Cleveland Mobile Fab Lab
http://mc2stemhs.wordpress.com/mobile-trailer/

TED Talk on Fab Labs
http://www.ted.com/talks/neil_gershenfeld_on_fab_labs.html

‘Fab Central’
http://fab.cba.mit.edu/

Fab Lab FAQ (more links and presentations)
http://fab.cba.mit.edu/about/faq/

Fab Academy
http://www.fabacademy.org/

‘How to Make Almost Anything’ (MIT Fab Class)
http://fab.cba.mit.edu/classes/863.13/

Instructables (an MIT spin-off for makers)
http://www.instructables.com/
EC EN 662R - Hogwarts Holography

Fall 2014

Section 002: W141 BNSN on M W F from 9:00 am - 9:50 am

Instructor/TA Info

Instructor Information

Office Location:
Office Phone:
Email:

TA Information

Email:

Course Information

Description

Holography is a wizardly pursuit. It is a dark-room art that involves potions and arcane knowledge passed down by holographers down through the years. Those who master the formulae, techniques and technology of holography are capable of creating magic that is wonderous to behold.

Materials

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<th>Item</th>
<th>Vendor</th>
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<th>Price (used)</th>
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Learning Outcomes

1

Understand special topics in electromagnetics

**Diffraction and Interference**

To develop visual and mathematical models for understanding diffraction and interference.

**Hologram Creation**

To be able to create Gabor, Denisyuk, Leif-Upatnieks and Benton holograms.

**State of the Art**

To understand the limitations and opportunities in the current state of the art approached to advanced 3d display.

**Grading Scale**

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Grading Policy

You will be responsible for mastering 33 spells during this class to achieve ordinary wizarding level. You may pass these off individually via miniature tests (owlets) administered by the TA and the EE office or by taking the midterms (OWLs) which will each test 11 spells. The owlet test for a given spell must be taken no later than one week after it is covered in class, however, the owlet spell tests can be taken as early and as often as the student wishes. To pass on to the next owlet test a student must achieve 100%. Each of these spells will also be tested in class during class quizzes.

All students will present a project as part of their end of semester NEWT examination. For the NEWT examination students will choose a project form one of the following categories: Dark Arts (design and complete a lab project), Potions (characterize a holography chemistry process), Magical Creatures (create a set of new spell problems), Runes (report on a published holography paper) or Divination (propose a future holography project suitable for an ORCA grant proposal). Spells 34-40 are advanced spells which are optional. If you chose to do some or all of these advanced spells the scores you receive will be averaged with you NEWT (final exam) score.

Exceptional students who have passed off all 40 spells before the NEWT examination may request an *Incantatio Provectus* (grand spell) from the restricted section. Students who master these spells will be honored with a place in the Order of Merlin (with a third class rank for one mastered spell, second class for two and first class for three) and will appear on one of this year’s Famous Witch and Wizard Cards which will be placed prominently on display to inspire the rising generation of holography wizards.

Assignments

Assignment Descriptions
Spell 5
Due: Monday, Sep 29 at 11:59 pm

Spell 10
Due: Monday, Sep 29 at 11:59 pm

Spell 2
Due: Monday, Sep 29 at 11:59 pm

Spell 8
Due: Monday, Sep 29 at 11:59 pm

Spell 11
Due: Monday, Sep 29 at 11:59 pm

Spell 9
Due: Monday, Sep 29 at 11:59 pm

Spell 3
Due: Monday, Sep 29 at 11:59 pm

OWL 1 (midterm 1)
Due: Monday, Sep 29 at 11:59 pm

Spell 1
Due: Monday, Sep 29 at 11:59 pm

Spell 6
Due: Monday, Sep 29 at 11:59 pm

Spell 7
Due: Monday, Sep 29 at 11:59 pm
Spell 4
Due: Monday, Sep 29 at 11:59 pm

Spell 18
Due: Monday, Oct 27 at 11:59 pm

Spell 21
Due: Monday, Oct 27 at 11:59 pm

OWL 2 (midterm 2)
Due: Monday, Oct 27 at 11:59 pm

Spell 19
Due: Monday, Oct 27 at 11:59 pm

Spell 13
Due: Monday, Oct 27 at 11:59 pm

Spell 17
Due: Monday, Oct 27 at 11:59 pm

Spell 20
Due: Monday, Oct 27 at 11:59 pm

Spell 14
Due: Monday, Oct 27 at 11:59 pm

Spell 16
Due: Monday, Oct 27 at 11:59 pm

Spell 22
Due: Monday, Oct 27 at 11:59 pm
Spell 15
Due: Monday, Oct 27 at 11:59 pm

Spell 12
Due: Monday, Oct 27 at 11:59 pm

Spell 26
Due: Friday, Nov 21 at 11:59 pm

Spell 24
Due: Friday, Nov 21 at 11:59 pm

Spell 30
Due: Friday, Nov 21 at 11:59 pm

Spell 32
Due: Friday, Nov 21 at 11:59 pm

Spell 29
Due: Friday, Nov 21 at 11:59 pm

Spell 33
Due: Friday, Nov 21 at 11:59 pm

Spell 27
Due: Friday, Nov 21 at 11:59 pm

Spell 23
Due: Friday, Nov 21 at 11:59 pm

OWL 3 (midterm 3)
Due: Friday, Nov 21 at 11:59 pm
Spell 31
Due: Friday, Nov 21 at 11:59 pm

Spell 25
Due: Friday, Nov 21 at 11:59 pm

Spell 28
Due: Friday, Nov 21 at 11:59 pm

Quiz 28
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 22
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 3
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 37
Due: Wednesday, Dec 10 at 11:59 pm

Spell 40
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 11
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 19
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 7
Due: Wednesday, Dec 10 at 11:59 pm
Quiz 39
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 20
Due: Wednesday, Dec 10 at 11:59 pm

Spell 37
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 18
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 13
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 32
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 17
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 36
Due: Wednesday, Dec 10 at 11:59 pm

Spell 35
Due: Wednesday, Dec 10 at 11:59 pm

NEWT (final project/presentation)
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 1
Due: Wednesday, Dec 10 at 11:59 pm
Quiz 27
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 24
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 8
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 2
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 40
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 26
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 31
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 23
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 9
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 4
Due: Wednesday, Dec 10 at 11:59 pm

Spell 38
Due: Wednesday, Dec 10 at 11:59 pm
Quiz 33
Due: Wednesday, Dec 10 at 11:59 pm

Spell 36
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 21
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 29
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 38
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Quiz 25
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Quiz 30
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Quiz 12
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 5
Due: Wednesday, Dec 10 at 11:59 pm

Spell 39
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 15
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Quiz 14
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Quiz 34
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 35
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 16
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 10
Due: Wednesday, Dec 10 at 11:59 pm

Quiz 6
Due: Wednesday, Dec 10 at 11:59 pm

Spell 34
Due: Wednesday, Dec 10 at 11:59 pm

Point Breakdown

<table>
<thead>
<tr>
<th>Categories</th>
<th>Percent of Grade</th>
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<tbody>
<tr>
<td>Spells</td>
<td>60%</td>
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<td>Advanced Spells</td>
<td>0%</td>
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<td>Quizzes</td>
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<td>OWLS (midterm exams)</td>
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<td>NEWT (Final Project/Preso)</td>
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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 my own 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.

**Sexual Harassment**

Title IX of the Education Amendments of 1972 prohibits sex discrimination against any participant in an educational program or activity that receives federal funds. The act is intended to eliminate sex discrimination in education and pertains to admissions, academic and athletic programs, and university-sponsored activities. Title IX also prohibits sexual harassment of students by university employees, other students, and visitors to campus. If you encounter sexual harassment or gender-based discrimination, please talk to your professor or contact one of the following: the Title IX Coordinator at 801-422-2130; the Honor Code Office at 801-422-2847; the Equal Employment Office at 801-422-5895; or Ethics Point at http://www.ethicspoint.com, or 1-888-238-1062 (24-hours).

**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.

**Schedule**

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