

How to Apply for and Win a Prestigious National Fellowship

Fellowships, Undergraduate Research, and Grad School

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College Fellowships Committee
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Today's Goal

You

Opportunities:

Fellowships, Graduate School,
Undergraduate Research,
BYU Honors, Faculty Mentoring,
Research, Innovation, Leadership



A TRAJECTORY TO OPPORTUNITIES

A graduate fellowship can be a key to your engineering success. Begin now to prepare for fellowship applications and place yourself on a trajectory to opportunity.



1 FRESHMAN

Participate in the
BYU Honors Program

2 SOPHOMORE

Find a faculty mentor
Apply for an ORCA Grant

3 JUNIOR

Participate in undergraduate research
Publish a research paper
or give a conference presentation

4 SENIOR

Apply for fellowships

5 GRAD SCHOOL

Pursue an MS or PhD—or both

OPPORTUNITIES

Breakthrough research
Leadership
Strategy
Innovation
Policy
Grand challenges
Entrepreneurship

PRESTIGIOUS NATIONAL FELLOWSHIPS IN ENGINEERING

GRADUATE RESEARCH FELLOWSHIPS

Winners typically go to top U.S. graduate schools
Worth \$30,000–60,000 per year

Aim for 3.8 GPA or higher

Participate in undergraduate research

Apply in the fall of your senior year

Generally reserved for U.S. citizens or U.S. persons

BYU's engineering program has a good track record of successful candidates



National Science Foundation



Department of Defense



Department of Energy



NASA



SMART



Hertz

GRADUATE STUDY ABROAD FELLOWSHIPS

Winners go to graduate school in the United Kingdom or elsewhere

Various dollar values

Aim for 3.9 GPA

Seek broadening experiences

Apply at the end of your junior year

Generally reserved for U.S. citizens or U.S. persons

Can be very competitive



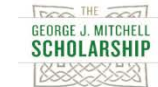
Fulbright



Gates



Marshall



Mitchell



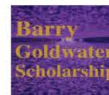
Rhodes

UNDERGRADUATE SCHOLARSHIPS

Good practice for graduate fellowships

Can be worth several thousand dollars

Apply as a sophomore or junior



Goldwater



Tau Beta Pi



Phi Kappa Phi



Many other options

For more information, contact your department fellowship expert (listed below) or visit www.et.byu.edu.

CHEMICAL ENGINEERING: John Harb, 801-422-4393, john_harb@byu.edu

CIVIL ENGINEERING: Michael Scott, 801-422-6324, michael.scott@byu.edu

ELECTRICAL AND COMPUTER ENGINEERING: Karl Warnick, 801-422-1732, warnick@ee.byu.edu

MECHANICAL ENGINEERING: David Fullwood, 801-422-6316, dfullwood@byu.edu

SCHOOL OF TECHNOLOGY: Richard Helps, 801-422-6305, richard_helps@byu.edu

Trajectory to Opportunities

- Freshman
 - Scholarships
 - Honors Program
- Sophomore
 - Find a faculty mentor
 - Apply for an ORCA grant
- Junior
 - Participate in undergraduate research
 - Write a paper or present at a conference
- Senior
 - **Apply for fellowships**
- Graduate school
 - MS and/or PhD degrees
 - Breakthrough research, public policy, grand challenges, innovation, entrepreneurship

BYU Honors Program

BYU Honors Program

- The ideal engineering student has a “renaissance background”
- Creative, excels at communication and other non-technical skills, and has a broad education
- Leadership ability (a major College and Department emphasis)
- BYU Honors program is a perfect way to enrich the university experience and realize full potential in a technical career and in the community.
- University Honors is the highest recognition awarded to graduates and recorded on diploma and official transcript

The Basics...

- Enroll in the program (Maeser Building)



Take Classes

- Honors classes:
 - Requirements have recently changed – significantly streamlined!
 - HONRS 120 (Freshman Honors)
 - UNIV 291, 292, 293
 - Accommodations for late-joining students – visit the Maeser Building
- Benefits:
 - Smaller class sizes
 - High quality teaching
 - More discussion
 - Less busy work, not necessarily more difficult!

Have some cool experiences...

- Great Questions Essay, HONRS 320
- Honors Peer Mentoring, Study Abroad, or Service
- Create a portfolio

Honors Thesis

- Select a faculty mentor (usually in your department, but not always)
- Choose a topic and submit a proposal. Can be related to a Capstone or Senior Project (Junior or Senior year)
- Do the research
- Write it up (some undergraduate research can also be published as a journal paper!)
- Defend it (last semester)

Topics from around campus...

A Prediction Model of Successful Total Quality Management Programs

Identity Fraud: Definitions and Solutions

The Sarbanes-Oxley Act of 2002: Impact on Auditor Switching and Quality of Audit Effort

Transient Response Compensation Method Using a Nonlinear Element

Analysis of Field Programmable Gate Array Implementations of Constant Coefficient Finite Impulse Response Filters

A Study of Coordinated Robot Control: Robot Soccer

Mechanisms of Estrogen Receptor Mediated Transcriptional Repression

A Study of the Iron-stress Response Mechanism in Black-eyed Pea

Mitochondrial DNA Variation in Quechua Villages and Interpretation of Distribution

If We Don't Eat Milpa, We Will Die: The Cultural Basis of Medical Health in Nahuatl

New Light on the Dark Side of Vesuvius: the Production and Use of Glass in the Late Antiquity

Na Wahi Pana O Hawai'i: Sacred Place Names of Hawai'i

The Long-term Implications of Maternal Separation and Subsequent Tactile Stimulation Deprivation in the Rat Neonate Hypothalamus-Pituitary-Adrenal (HPA) Response to Stress

Honors Program Activities

- Opening Socials
- Talks by some of the world's best thinkers
- Mingle in the Maeser Building
- Discussions on “great questions”
- Coaching for prestigious fellowship applications
- See honors.byu.edu!

FAQ

Will it take me longer to graduate with honors?

Not generally. Honors courses fill GE requirements.

Should I wait a semester or two before enrolling?

No. Honors courses are designed to make the most of the full college experience.

What if I'm a Sophomore or Junior and want to enroll?

No problem. Stop by the Maeser building and work with the Honors folks.

Will Honors classes make it harder to maintain a high GPA?

As you rise to the challenge, your grades will probably be higher.

Isn't Honors just for the humanities and fine arts?

No! Only one third of honors students are in those majors.

How do I get involved?

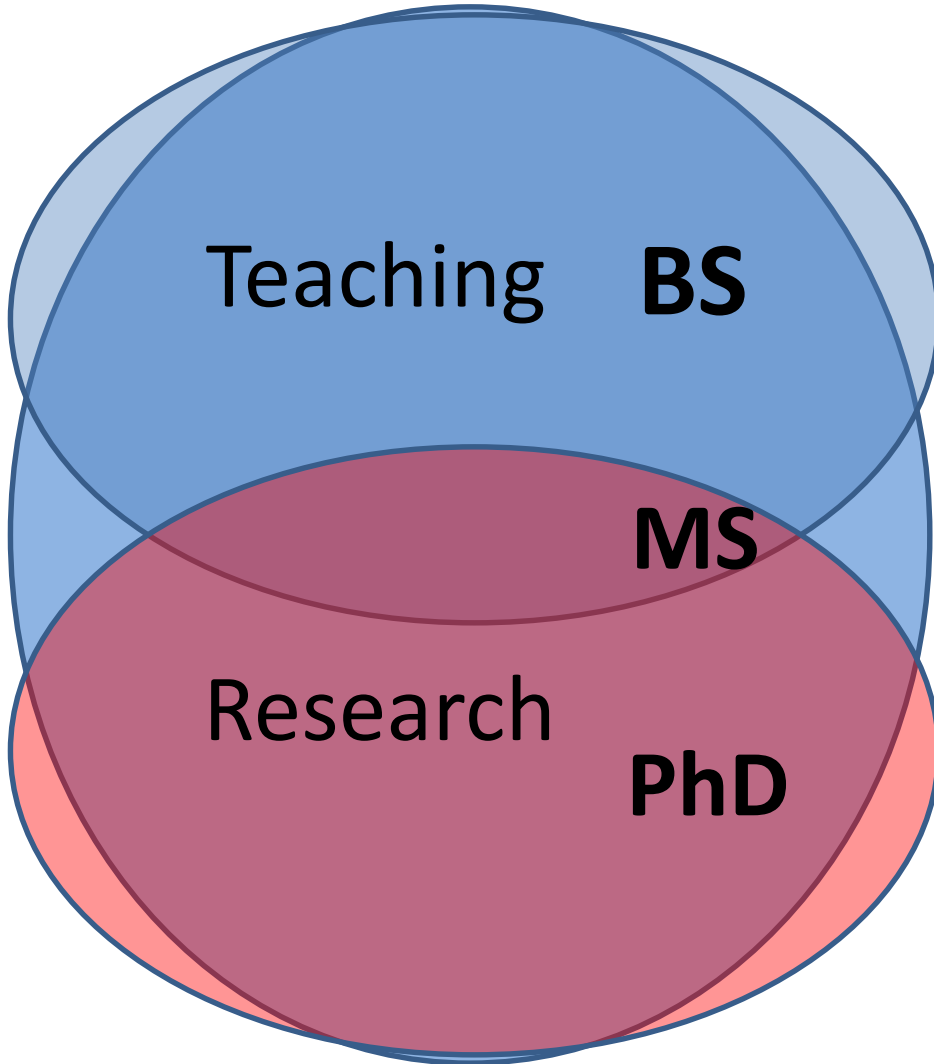
Pick up a form at the Maeser Building!

Undergraduate Research

What is undergraduate research?

- Most commonly:
 - A student is hired in the Junior or Senior year by an faculty member as a research assistant (paid)
 - Works with graduate students and other team members on an open research question, experiment, mathematical analysis, numerical simulation, or hardware design
 - 5-10 hours per week (sometimes up to 20) at university-designated rate (approx. \$11/hr) in Fall and Winter, more hours during Spring/Summer terms
 - May go on to obtain an MS or PhD degree at BYU or elsewhere, apply for prestigious national fellowships, publish a paper on original research
- Other modes:
 - Independent research
 - Unpaid or volunteer research
 - Research in other departments

The University's Two Worlds



How can we integrate both?
Undergraduate Research!

Benefits of Undergraduate Research

- Apply classroom knowledge
- Be a part of world-class research projects
- Enriches the university experience
- Form close connections with faculty and graduate students
- Obtain academic year and summer stipends
- Prepare for senior projects and Honors Thesis
- Assistance with graduate school admissions and fellowships
- Work in a stimulating collaborative team environment



Fellowships

BYU has a “National Scholarships, Fellowships, and Programs” Office

- They are not BYU’s Scholarship Office or BYU’s Financial Aid Office
- What they do:
 - Promote national & international scholarships & fellowships
 - Help students apply for external scholarships
 - Make scholarship resources easily accessible
- Where they are:
 - 102B MRSB
 - M-F 9:00AM-5:00PM
- Contact info:
 - prestigious_scholarships@byu.edu
 - (801) 422-6137
 - <http://nsfp.byu.edu/>



History of Prestigious Scholarships

BYU has a heritage of excellence since 1995 to 2013:

- 35 Goldwater
- 28 Gilman
- 59 Fulbright
- 4 Gates Cambridge
- 5 James Madison
- 11 National Defense Science & Engineering
- 157 National Science Foundation Graduate Research

Undergraduate Scholarships

- Barry M. Goldwater
- Morris K. Udall
- National Security Education Program
- Phi Eta Sigma
- Phi Kappa Phi
- Golden Key
- Harry S. Truman

Graduate Fellowships

General and Humanities Fellowships:

- Marshall
- Mitchell
- Rhodes
- Gates
- Fulbright
- Institute for Humane Studies (IHS)
- Intercollegiate Studies Institute (ISI)
- National Security Education Program (Boren)
- Woodrow Wilson (Pickering)
- Samuel Huntington Public Service Award
- James Madison Memorial Fellowship

Science, Engineering & Technology:

- Hertz Foundation
- Department of Energy Computational Science Graduate Fellowship
- National Defense Science and Engineering Graduate Research Fellowship
- National Science Foundation Graduate Research Fellowship Program
- NASA Space Technology Research Fellowship
- National Institutes of Health-Graduate Partnerships Program
- Rocky Mountain NASA Space Grant
- Tau Beta Pi (Engineering)
- U.S. Department of Energy
- U.S. Department of Homeland Security
- Science, Mathematics And Research for Transformation (SMART) Scholarship (DOD)

NASA Space Technology Research Fellowship

- “NASA’s Space Technology Mission Directorate (STMD) seeks to sponsor U.S. citizen and permanent resident graduate student researchers who show significant potential to contribute to NASA’s goal of creating innovative new space technologies for our Nation’s science, exploration, and economic future.”
- Technology areas: propulsion systems, space power and energy storage, communication, sensor systems, science instruments, nanotech, materials, structures, thermal management, etc.
- MS and/or PhD students
- \$36,000/yr stipend, \$32,000/yr in travel, fees, etc. – up to \$204,000 total value!
- NASA research collaborator, visit to NASA research center or lab
- Application:
 - Personal statement
 - Project narrative
 - Schedule
 - Curriculum Vitae (CV)
 - Transcripts and GRE scores
 - Letters of recommendation
- **Deadline: November**
- An ECEn student received this in 2012, three ME students in 2013-2014!

National Science Foundation Graduate Research Fellowship

- *Support students who have demonstrated their potential for significant achievements in science and engineering research*
- College seniors or 1st year graduate students
- Fields of science, mathematics, or engineering
- Stipend of \$32,000, education allowance, one-time \$1,000 International Research Travel Allowance (\$132k total value)
- 3 years
- Good GPA (3.8+), research products – journal paper and/or conference paper

Deadline: Mid-November 2013
(deadlines vary by discipline)

NSF GRFP Application

- Submit at www.fastlane.gov/grfp
- U.S. citizens, nationals, and permanent residents
- Academic transcripts
- Three letters of reference (online)
- Personal statement
 - How will grad school prepare you to expand scientific understanding and broadly benefit society?
- Research statement
 - Intellectual merit and broader impact on society
 - Creative and transformative
 - Well-reasoned research plan
- GRE scores optional
- 2013: 2,000 awards out of 12,000 applications (17%)
- See nsf.gov/grfp for more info

Students Preparing for Prestigious Scholarships Should

- **Participate in undergraduate research**
- **Develop meaningful relationships with people who can open doors for you – faculty mentor!**
- Seek out leadership positions.
- Involve yourself in extra-curricular activities.
- Know scholarship eligibility requirements and deadlines.
- Apply!
- Keep trying!

Advisor and Recommenders

- Scholarship Advisor

- An advisor is a critical contact; he/she will help you develop a competitive application, give you meaningful revision advice, and provide answers to questions you have along the way.

- Recommenders

- Choosing the right recommenders can give your application the competitive edge. Glowing letters from a wide range of professionals and academics reflects a well-rounded and esteemed applicant

Letters of Recommendation

- Carefully select your recommenders
 - Letters must be specific and include details
 - Choose professionals and academics, but remember that the *quality* of the letter is generally better than the prestige of the recommender's title.
 - Recommendations need to be positive and well written (we can help faculty with this)
- Be helpful
 - Provide recommenders with specific information about the scholarship and yourself. A brief listing of your accomplishments or a draft letter will make writing a glowing letter about you much easier for them.
- Respect your recommenders' time
 - Give recommenders 2-4 weeks to write the letter.
 - Let them know the deadline
- Follow up
 - Drop in a week before it is due to offer any additional help and remind them of the approaching deadline.

Application

- Make sure to follow directions:
 - Deadline.
 - Be complete and correct.
 - Appearance is important.
- Start early and revise!
 - Write your essays early and seek feedback from qualified editors! Revision is not optional. Only those who revise, revise, revise will be successful. (Trust us; we know.)
 - Aim to submit your application early; last minute crises often occur.

Personal Statement

- It is NOT a resume!
 - Curriculum Vitae (CV): “personal/intellectual biography in narrative form.”
- Discuss personal motivations, experiences, activities, and future goals.
- Reveal your personality.
- Make it memorable (i.e. entertaining) but not frivolous or canned.

Example Rubric (NDSEG)

Points	Section
25	Academic Background (institutions, grades, GRE)
20	Scientific or Research Experiences (incl. employment)
15	Summary of Goals (research interests, why DoD might be interested in the research, relation to long-term goals)
10	Publications, Presentations, and Patents
10	Reference Letters
5	Awards and Honors (since start of undergraduate)
5	Leadership Experiences
5	Memberships & Certifications, Community and Volunteer Experiences
5	Teamwork Experiences

- Students need to publish or present papers
- Lots of diversity in leadership, teamwork, membership/community entries, but there has to be something. Encourage membership in technical societies, Tau Beta Pi, etc. (from Prof. David Penry)

Tips from Awardees

- Essays
 - Start early, taking significant time to compose essays and rewrite so your passion comes through.
 - Demonstrate your personal motivation and excitement for research.
 - Spend time to thoroughly research your topic.
 - Integrate essays to create singular theme, link the content together.
 - Keep essays clear and simple to read.
 - Give essays to many people for review.
 - Get input from professors or university office.
 - Get input from previous applicants or winners.
 - NSF: Thoroughly address both “Intellectual Merit” and “Broader Impacts.”
 - Highlight the significance of your research and how it will impact society.
- Personal info:
 - Be sure to include all volunteer, leadership and extracurricular activities.
 - Mention what sets you apart from a typical applicant - be unique!
- Pay close attention to instructions in the Program Solicitation.
- Focus on getting strong recommendation letters.

Takeaways

1. **Enroll in the BYU Honors program**
2. **Find a faculty mentor and get involved in undergraduate research**
3. **Get more information about fellowships:**

College website:

www.et.byu.edu/advisement/scholarships/fellowships

BYU Honors Program: honors.byu.edu

ECEn info: honors.ee.byu.edu (I'll post these slides on this site)

Visit Karl Warnick (ECEn), David Fullwood (ME), John Harb (ChE), Michael Scott (CE), Richard Helps (SoT)