Welcome to the

Chemistry Education Major

in the College of Physical and Mathematical Sciences

College Advisement Center

Website: https://science.byu.edu/advisement
https://science.byu.edu/advisement
science.math.advisement@byu.edu

Phone: 801-422-2674 Office: N-181 ESC

Chemistry and Biochemistry Department

Website: chem.byu.edu Phone: 801-422-3667 Office: C-100 BNSN

Department Advisor - Sue Mortensen*

Email: suemort@chem.byu.edu

Phone: 801-422-6269 Office: C-104 BNSN

Education Advisement Center

Website: education.byu.edu Email: eac.frontdesk@byu.edu

Phone: 801-422-3426 Office: 350 MCKB

Teaching Major Advisor—Adam Bennion

Email: <u>adam_bennion@byu.edu</u>

Phone: 801-422-3095 Office: N-319 ESC



Educator: Apply to the program at educator.byu.edu. If you have any technical issues, contact the EPP Help Center at 801-422-1190, https://epp.byu.edu/. You should plan to have the application completely done by the time you finish the PHY S 276 class.

Career Advising

Phone: 801-422-6535

Website: careers.byu.edu (Handshake--see flyer in packet)

STEM Alliance--Connect with STEM employers, mentors, and clubs: stemalliance.byu.edu

Clubs

YChem: Walter Paxton, E111 BNSN, paxton@chem.byu.edu; 422-4917

Women in Chemistry: Kara Stowers, C309 BNSN, kstowers@chem.byu.edu, 801-422-0835

Cougs v Cancer: Cristy Welsh, E-181 BNSN, sccr@chem.byu.edu. 801-422-3913

*Please visit Sue Mortensen in the Chemistry and Biochemistry Department as soon as possible if you have not already done so.

Learning outcomes can be found here: https://learningoutcomes.byu.edu/Courses/program-courses/692828/Chemistry+Education+BS+/1322

Things to Know

Resources for Graduation Planning

- Flow Charts and Major Academic Plans (MAPs) can be found here:
 https://science.byu.edu/advisement/flowcharts.
- Academic advisors in N-181 ESC will help you understand course sequencing and help you plan classes to
 efficiently fill requirements. They can also help you with study skills and initial career exploration as well as
 connecting you with correct resources.
- Plan and register from your plan on MyMAP. Your academic advisor can help you understand how to best utilize this resource.
- Evaluate your current program. Periodically major programs are updated. An academic advisor would be happy to review the differences between the programs with you to help you determine what would be best for you.
- o Consider meeting with a faculty advisor in your department. Contact info is found on first page of this packet.

Tutoring Resources and Research

- Volunteer peer tutors are available through Y Serve if you need help with a class. Also, if you excel in a subject,
 consider serving your fellow students by becoming a tutor. Find out more here: https://tutoring.byu.edu/.
- Many departments provide TA Tutorial Labs and research opportunities. Check your department for details:
 - Chemistry and Biochemistry: C-100 BNSN, 801-422-3667, https://www.chem.byu.edu/
 - Computer Science: 3361 TMCB, 801-422-3027, csoffice@cs.byu.edu
 - Geological Sciences: S-389 ESC, 801-422-3918, geology@byu.edu
 - Mathematics: 275 TMCB, 801-422-2061, office@mathematics.byu.edu
 - Mathematics Education: 167 TMCB, 801-422-1735, office@mathed.byu.edu
 - Physics and Astronomy: N-283 ESC, 801-422-4361, physics_office@byu.edu
 - Statistics: 2152 WVB, 801-422-4505, statsec@stat.byu.edu

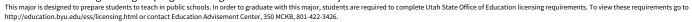
Prepare Early for a Career

- o Check out University Career Services in 2590 WSC and at https://ucs.byu.edu/.
- Consider doing an internship.
 - Attend the STEM and Career Fairs held in fall and winter semesters.
 - Talk to your department about internship opportunities.
 - Use LinkedIn and Handshake (see flyer in this packet) to connect with alumni and apply for jobs/internships. BYU Connect is another great resource for networking (connect.byu.edu).
 - Talk with the college Career Director who can help you search for internships as well as assist you with many other career related strategies (see first page of this packet).
- o Consider taking StDev 317 (Career Strategies) your junior year.
- O Consider taking either Chem 502, CS 502, Geol 502, Math 502, PHSCS 502, or STAT 502 (1-credit Job Search Class). Class is held for 1 hour per week for eight non-consecutive weeks throughout the semester.

BS in Chemistry Education (692828) MAP Sheet

Physical and Mathematical Sciences, Chemistry and Biochemistry

For students entering the degree program during the 2022-2023 curricular year.





University Core and Graduation Requirements			Suggested Sequence of Courses				
University Core Requirements:				FRESHMAN YEAR		JUNIOR YEAR	
Requirements	#Classes	Hours	Classes	1st Semester		5th Semester	
Religion Cornerstones				CHEM 111* (F)	4.0	CHEM 462 (F) or other Req. #4	3.0
ŭ				First-year Writing or A HTG 100 (FWSpSu)	3.0 4.0	IP&T 371 IP&T 373	1.0 1.0
Teachings and Doctrine of The Book of	1	2.0	REL A 275	MATH 112 (FWSpSu) PWS 150** (FW) or other Requirement #5	3.0	IP&I 373 SC ED 353	3.0
Mormon				Religion Cornerstone course	2.0	PHIL 423* or Requirement 5	3.0
Jesus Christ and the Everlasting Gospel	1	2.0	REL A 250	Total Hours	16.0	Religion elective	2.0
Foundations of the Restoration	1	2.0	REL C 225	*With department approval, CHEM 105 may be substituted for CF	EM	Open Elective	3.0
The Eternal Family	1	2.0	REL C 200	111.	EIVI	Total Hours	16.0
The Individual and Society				**PWS 150 partially fulfills Requirement #5 and G.E. Biological Sc	ences.	*PHIL 423 partially fulfills Requirement #5 and G.E.	Letters. If another
American Heritage	1-2	3-6.0	from approved list	If another course is chosen for Requirement #5, another Biologica		course is chosen for Requirement #5, another Lette	
Global and Cultural Awareness	1		SC ED 353*	Sciences course from the G.E. approved list will also be required.		G.E. approved list will also be required.	
	1	3.0	30 00 333	2-4 C		Call Comments	
Skills				2nd Semester First-year Writing or A HTG 100	3.0	6th Semester CHEM 391 (FW)	3.0
First Year Writing	1	3.0	from approved list	CHEM 112* (W)	3.0	CHEM 331	3.0
Advanced Written and Oral Communications	1	3.0	CHEM 391*	CHEM 113* (FW)	2.0	SC ED 375	3.0
Quantitative Reasoning	1	4.0	MATH 112* or 113*	CHEM 201 (FWSp)	0.5	IP&T 372	1.0
Languages of Learning (Math or Language)	1	4.0	MATH 112* or 113*	MATH 113 (FWSpSu)	4.0	Social Science	3.0
Arts, Letters, and Sciences				Religion Cornerstone course	2.0	Religion Elective	2.0
•		2.0	f	Open Elective	1.0	Total Hours	15.0
Civilization 1	1		from approved list	Total Hours	15.5	SENIOR YEAR	
Civilization 2	1		from approved list	*With department approval, CHEM 106 may be substituted for CH	EM	7th Semester	
Arts	1		from approved list	112; CHEM 107 for CHEM 113.		CHEM 495 (FW)	1.0
Letters	1	3.0	PHIL 423*	SOPHOMORE YEAR		Arts	3.0
			(Requirement #5 opt.)	3rd Semester		CPSE 402 PHY S 377	2.0 3.0
Biological Science	1	3.0	PWS 150* or CHEM	CHEM 227 (FSp)	4.0	PHY S 378	1.0
			481* (Requirement #4	CHEM 351M* or CHEM 357 (F)	3.0	Civilization 2	3.0
			opt.)	PHSCS 121 (FWSp)	3.0	Religion Elective	2.0
Physical Science	2	7.0	CHEM 111* and PHSCS	Religion Cornerstone course	2.0	Total Hours	15.0
			121*	Civilization 1	3.0	8th Semester	
Social Science	1	3.0	from approved list	Total Hours	15.0	PHY S 476 or 496 (FW)	12.0
Core Enrichment: Electives				*CHEM 351 may substitute for CHEM 351M.		Total Hours	12.0
Religion Electives	3-4	6.0	from approved list	All Comments			
Open Electives			personal choice	4th Semester CHEM 352M* (W) or other Req. #4	3.0		
Open Liectives	variable	variable	personal choice	PHSCS 123 (FWSp)	3.0		
*THESE CLASSES FILL BOTH UNIVERSITY CORE A	ND PROGRA	M REOUIF	REMENTS (up to 27	PHY S 276R (FW)	4.0		
hours overlap)			. (,)	Religion Cornerstone course	2.0		
.,				CHEM 381M (W) or other Requirement 4	3.0		
				Total Hours	15.0		
Graduation Requirements:				*CHEM 352 may substitute for CHEM 352M.			
Minimum residence hours required		30.0					
Minimum hours needed to graduate		120.0					

BS in Chemistry Education (692828)

2022-2023 Program Requirements (83.5 Credit Hours)

Licensure: This program meets the educational requirements designed to lead to an occupationally required professional license or certificate in the state of Utah. Students pursuing occupations requiring a license or certificate in a state other than Utah should contact the appropriate BYU academic advisement center as well as the licensing agency in the state where they intend to work to seek information and guidance regarding licensure and certification requirements.

This major is designed to prepare students to teach in public schools. In order to graduate with this major, students are required to complete Utah State Office of Education licensing requirements. To view these requirements go to https://www.schools.utah.gov/curr/licensing or contact the Education Advisement Center, 350 MCKB, 801-422-3426.

For students accepted into the major after December 16, 2019, grades below C in any required coursework in a teaching major or teaching minor will not be accepted. Teacher candidates must maintain a cumulative GPA of 2.7 or higher once admitted into the program and to qualify for student teaching. For additional details on admission and retention requirements for teaching majors and teaching minors, see Educator Preparation Program Requirements in the Undergraduate Catalog.

Contact Education Student Services for entrance requirements into the

A teaching minor is not required for licensure. However, it is strongly recommended.

REQUIREMENT 1 Complete 8 courses

NOTE: WITH DEPARTMENT APPROVAL CHEM 105 MAY SUBSTITUTE FOR CHEM 111: AND CHEM 106 FOR CHEM 112: AND CHEM 107 FOR CHEM 113

CHEM 111; AND CHEM 106 FOR CHEM 112; AND CHEM 107 FOR CHEM	113.
CHEM 111 - Principles of Chemistry 1	4.0
CHEM 112 - Principles of Chemistry 2	3.0
CHEM 113 - Introductory General Chemistry Laboratory	2.0
CHEM 201 - Chemical Handling and Safe Laboratory Practices	0.5
CHEM 227 - Principles of Chemical Analysis	4.0
CHEM 331 - Guided Learning for Chemistry Instruction	3.0
*CHEM 391 - Technical Writing Using Chemical Literature	3.0
CHEM 495 - Senior Seminar	1.0
REQUIREMENT 2 Complete 1 course	
CHEM 351M - Organic Chemistry 1 - Majors	3.0
CHEM 357 - Industrial Organic Chemistry	3.0

REQUIREMENT 3 Complete 4 courses				
MATH 112 - Calculus 1	4.			
MATH 113 - Calculus 2	4.			
PHSCS 121 - Introduction to Newtonian Mechanics	3.			
PHSCS 123 - Introduction to Waves, Optics, and Thermodynamics	3.			
REQUIREMENT 4 Complete 9.0 hours from the following course(s)				
NOTE: CHEM 354 MAY BE TAKEN FOR EITHER 1 OR 2 CREDIT HOURS.				
CHEM 352M - Organic Chemistry 2 - Majors	3.			
CHEM 354 - Organic Chemistry LaboratoryMajors				
CHEM 381M - Fundamentals of Biochemistry	3.			
CHEM 384 - Biochemistry Methods	1.			
CHEM 397R - Mentored Outreach and Service Learning	3.0			
You may take up to 3 credit hours.				
CHEM 460 - Mathematics for Physical Chemistry	1.			
CHEM 462 - Physical Chemistry 1	3.			
CHEM 463 - Physical Chemistry 2	3.			
CHEM 464 - Physical Chemistry Laboratory 1	1.			
CHEM 465 - Physical Chemistry Laboratory 2	1.			
CHEM 468 - Biophysical Chemistry	3.			
CHEM 498R - Capstone Experience in Chemistry/Biochemistry	4.0			
You may take up to 3 credit hours.				
CHEM 514 - Inorganic Chemistry	3.			
HONRS 499R - Honors Thesis	6.0			
You may take up to 3 credit hours.				
REQUIREMENT 5 Complete 6.0 hours from the following course(s)				
ONLY ONE OF GEOL 101 OR 111 CAN BE APPLIED TO THIS REQUIREM	IENT.			
ONLY ONE OF BIO 100, BIO 130, CELL 120, OR PWS 150 CAN BE APPL	IED TO			
THIS REQUIREMENT. WITH APPROVAL, CERTAIN OTHER COURSES I	V			
PHYSICS, GEOLOGY, MATHEMATICS, AND BIOLOGY MAY BE TAKEN T	O			
SATISFY THIS REQUIREMENT. NOTE: ANY COURSE NOT TAKEN TO SA	ATISFY			
REQUIREMENT 4 CAN BE TAKEN TO SATISFY REQUIREMENT 5.				
BIO 100 - Principles of Biology	3.			
BIO 130 - Biology	4.			
CELL 120 - Science of Biology	3.			
GEOL 101 - Introduction to Geology	3.			
GEOL 111 - Physical Geology	4.			
MATH 213 - Elementary Linear Algebra	2.			
MATH 215 - Computational Linear Algebra	1.			
MATH 290 - Fundamentals of Mathematics	3.			

MATH 302 - Mathematics for Engineering 1	4.0
MATH 314 - Calculus of Several Variables	3.0
MATH 334 - Ordinary Differential Equations	3.0
PHIL 423R - History and Philosophy of Science	3.0
PHSCS 127 - Descriptive Astronomy	3.0
PHSCS 137 - Energy, Climate, and the Environment	3.0
PHSCS 220 - Introduction to Electricity and Magnetism	3.0
PHSCS 222 - Modern Physics	3.0
PHSCS 225 - Introduction to Experimental Physics	2.0
PHSCS 240 - Design, Fabrication, and Use of Scientific Apparatus	2.0
PWS 150 - Environmental Biology	3.0
REQUIREMENT 6 Complete 2 options	
PROFESSIONAL EDUCATION COMPONENT. COMPLETE BOTH 6.1 AND 6	.2.
Licensure requirements: Contact the Education Advisement Center,	350
MCKB, 801-422-3426, to schedule the final interview to clear your	
application for the secondary teaching license. You should be regist	ered
for your last semester at BYU prior to the scheduled appointment.	
OPTION 6.1 Complete 9 courses	
CPSE 402 - Educating Students with Disabilities in Secondary Classr	001 2.0
IP&T 371 - Integrating K-12 Educational Technology 1	1.0
IP&T 372 - Integrating K-12 Educational Technology 2	1.0
IP&T 373 - Teaching in K-12 Online and Blended Learning Contexts	1.0
PHY S 276 - Exploration of Teaching	4.0
PHY S 377 - Teaching Methods and Instruction	3.0
PHY S 378 - Practicum in Secondary Education	1.0
*SC ED 353 - Multicultural Education for Secondary Education	3.0
SC ED 375 - Adolescent Development and Classroom Management	3.0
Note: FBI fingerprint and background clearance must be completed	i
before enrollment into Phy S 276.	
OPTION 6.2 Complete 12.0 hours from the following course(s)	
PHY S 476 - Secondary Student Teaching	12.0v
PHY S 496 - Academic Internship: Secondary Education	12.0v
Student teachers/interns must complete three forms in their Educa	tor
accounts (PIBS, CDS, FED) and attach their TWS to the Educator acc	ount
for their program. All four must be completed to be cleared for	
graduation.	

BS in Chemistry Education (692828)

2022-2023

REGISTRATION ADVISEMENT

We want to assist students in their academic pursuit toward an undergraduate degree. Students are encouraged to complete an average of 15 credit hours each semester or 30 credit hours each year, which could include spring and/or summer terms. Taking fewer credits substantially increases the number of semesters to graduate.

New students should attend the chemistry and biochemistry session during New Student Orientation, where they can meet with a faculty advisor and review their planned registration. Transfer or mid-year incoming students should meet with an advisor prior to the add/drop deadline of their first semester, usually at the end of the first week of class.

The department recommends a review of progress and planned registration with a faculty advisor in the semester when 30, 60, and 90 hours are completed. However, academic advisement is available to all majors at *any* point in their academic career. Contact the department advisement office to schedule an appointment with a faculty advisor: in person C104 BNSN; by phone 801- 422-6269; by email suemort@chem.byu.edu or coffice@chem.byu.edu

MENTORED RESEARCH/EXPERIENTIAL LEARNING

We strongly encourage our majors to participate in mentored learning and receive credit toward completing their major requirements. Approximately 80% of our faculty conduct independent, externally funded research and invite undergraduates to participate in on-campus mentored learning opportunities. Students initiate contact with a faculty whose research interests them. Upon acceptance to participate in a research lab, students enroll in a series of mentored research courses (CHEM 297R, 497R) throughout their academic career, culminating in a capstone research experience (CHEM 498R). Contact the department advisement center for additional information: 801-422-6269; C104 BNSN; suemort@chem.byu.edu or coffice@chem.byu.edu.

THE DISCIPLINE

The Chemistry Education Bachelor of Science degree provides preparation for chemistry/science high school teaching. High school chemistry teachers will find exciting opportunities available to help students take the first steps to becoming scientists. Chemists and biochemists study the fundamental processes that govern the natural world.

including atomic structure and how atoms interact to form molecules and materials. They study the mechanisms of chemical processes, including those that underpin living systems such as the transfer of information from DNA to RNA to proteins. They work to develop simplifying models (theories) that permit the correlation and explanation of observations about the behavior of life to the structure of rocks and minerals.

Chemistry and biochemistry provide an essential foundation for the medical sciences, engineering (especially chemical engineering), electronics, energy, environmental sciences, materials science, pharmacy, and virtually all manufacturing processes.

Chemistry and biochemistry are active branches of science that are vital to human existence. Inasmuch as the field embraces all aspects of the material world, it is subdivided into five areas of interest. Examples of these diverse areas include the regulation of protein synthesis, cellular signal transduction at the molecular level and proteomics (biochemistry), design and synthesis of medicinal compounds, catalysts and polymers (organic chemistry), design and synthesis of new molecular structures and materials (inorganic chemistry), spectroscopic study of energy transfer and molecular structures (physical chemistry), and analysis of medicinal compounds, biological materials, and contaminants or trace elements found in the environment (analytical chemistry).

Chemistry and biochemistry involve far more than test tubes and beakers. They include sophisticated methodologies such as recombinant DNA technology, working with a variety of instruments such as mass spectrometers, calorimeters, chromatographs, ultracentrifuges, lasers, X-ray diffractometers, electron microscopes and nuclear magnetic resonance spectrometers, all of which are used by undergraduate chemistry and biochemistry students at BYU. Computers also play an important role in these disciplines, with applications ranging from simulation of molecules and their interactions to the collection and analysis of data. The chemistry and biochemistry curricula are both rigorous and intellectually rewarding.

CAREER OPPORTUNITIES

Graduates in chemistry and biochemistry obtain positions in education and in many different industries, performing analysis, synthesis, characterization, observation, and modeling. Those who work

hard, are creative, and have intellectual curiosity are in particular demand. The discipline also provides an excellent preprofessional course of study for those interested in medicine, dentistry, law, and business.

MAP DISCLAIMER

While every reasonable effort is made to ensure accuracy, there are some student populations that could have exceptions to listed requirements. Please refer to the university catalog and your college advisement center/department for complete guidelines.

DEPARTMENT INFORMATION

Department of Chemistry and Biochemistry Advisement

Brigham Young University C-104 BNSN

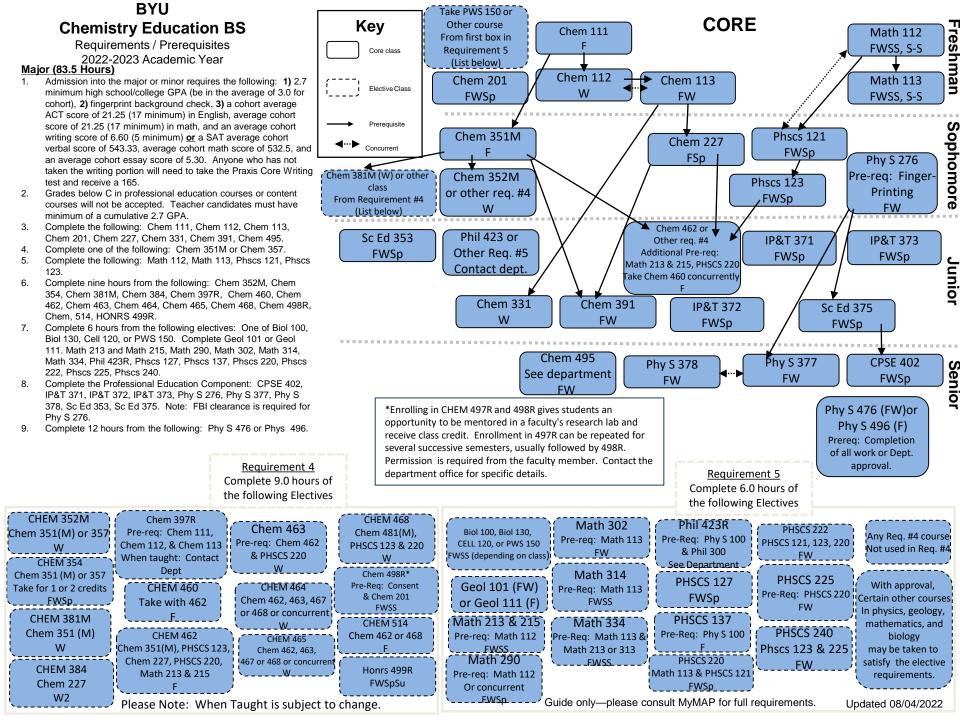
Provo, UT 84602 Telephone: (801) 422-6269

ADVISEMENT CENTER INFORMATION

Physical and Mathematical Sciences College Advisement Center

Brigham Young University N-181 ESC Provo, UT 84602

Telephone: (801) 422-2674



ii handshake

BYU's own job board. Employers who want to hire BYU graduates or offer internships to current students post job openings to this website and students apply. Just like LinkedIn, employers can view student profiles and students can network as they apply for jobs and internships

Login to handshake.byu.edu >>> BYU Net ID

*you do not need to create an account, just sign in with you BYU information



HOW TO MAKE THE MOST OUT OF HANDSHAKE:

1. COMPLETE YOUR PROFILE

- Upload your resume and it will auto-fill in your profile
- Completed profiles tailor your Handshake experience
- Information from your transcript is already uploaded
- Fill in the Summary/Bio section
- Fill in yor past jobs and experiences, including all the bullet points you use on your resume
- Add a professional headshot and background photo

Remember: every word in your profile will be searchable by students and employers

employers are

5X MORE LIKELY

to view a profile that has at least one job/skill/organization

2. APPLY FOR JOBS

- Search for job titles, employers, or skills
- Apply for interesting jobs that meet your skill set

3. RESEARCH COMPANIES

- Under the "Jobs" Tab there is an "Employers" Tab
- Search for keywords or locations to find companies that are the right fit for you
- Plan to attend their info sessions on BYU Campus, connect with them at Career Fairs, or set up informational interviews to learn more

Remember: when looking at companies or jobs, Handshake will tell you what other BYU students have worked there. Use this resource to network and discover more information!

4. EXPLORE FELLOW STUDENTS

- "Students" tab
- Search for fellow BYU students to view their profiles and job positions (Facebook stalking... "networking")

5. ATTEND EVENTS

- The "Events" tab will be your key to attending info sessions, interviews, and Career Fairs
- The "Calendar" tab under "Events" will show you what events are coming soon
- Make sure to save events you are interested in or RSVP so you do not forget to attend
- Spread the word to your friends on social media

6. DOWNLOAD HANDSHAKE APP

- Search: "Handshake" not "Handshake Career Services"
- Input your BYU e-mail address: netID@byu.edu (it will forward emails to the e-mail you have on file with BYU)
- Handshake will send you a link via e-mail to enable your account in the app
- Navigate the app to perform all the functions of the website that have been previously mentioned

7. VISIT THE CAREER STUDIO

- Freshen up your resume, cover letter, or LinkedIn
- Receive networking help
- Practice interviewing with a mock interview
- Meet with a full-time Career Counselor in your field

8. GET A JOB, RING THE BELL

 Once you're hired, stop by the Career Studio to ring our Victory Bell and get a picture for the Victory Board



BYU CAREER SERVICES careers.byu.edu 1134 WSC (801) 422-3000