



# CAREER PATHS WITHIN MATHEMATICS

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PREPARED BY THE DEPARTMENT OF MATHEMATICS STAFF AT THE UNIVERSITY OF UTAH, SALT LAKE CITY. (2009 REVISED 2018, 2019)

This contains information that was surveyed directly from alumni of the University of Utah Department of Mathematics in 2016, and from a website exploring majors developed by the University of Tennessee's Center for Career Development. See Center for Career Development, "What Can I Do With This Major?--Mathematics," University of Tennessee, <https://whatcanidowiththismajor.com/major/mathematics/>, accessed on 26 November 2017.

# WHERE DO OUR GRADUATES WORK?

## COMPANIES

3M Global Gateway  
America First Credit Union  
ASLIS  
BAE Systems  
BioFire Diagnostics  
Bluehost  
Centre for Hydrology  
DealerSocket  
Epic Systems  
Equitable Life & Casualty  
Experticity  
Facebook / Oculus VR  
Freeport-McMoRan  
Goldman Sachs  
HealthFirst  
Hill Air Force Base  
Huntsman Cancer Institute  
Institute for Humane Studies  
Instructure  
Inverse Limit, LLC  
ITT Tech  
KPMG US LLP  
Keller Williams SLC  
Lennox International  
Lockheed Martin  
Mantyla McReynolds  
Mary Kay Cosmetics  
Medallia Inc.  
Michael Bigelow Music  
Modify Ink  
Northrop Grumman  
Overstock.com  
PEHP Health & Benefits  
Permutation Ventures  
Priceline  
Primary Data  
Rakuten Marketing  
Schlumberger  
SelectHealth Inc.  
Spring Mobile  
St. Jude Children's Research Hospital  
United Way of Salt Lake  
UPMC Presbyterian  
US Navy  
US Air Forces  
Wellington Management  
Xactware

## SCHOOLS, COLLEGES, & UNIVERSITIES

Alpine School District  
American Preparatory Academy  
Bellevue School District  
Bradenton Prep Academy - Dubai  
Brigham Young University  
Canyons School District  
Chung Hsin Academy  
Colorado State University  
Dallas Independent School District  
Davis School District  
Dixie High School  
Granite School District  
James Madison University  
Jordan School District  
Legacy Preparatory Academy  
Missoula County Public Schools  
Ohio State University  
Salt Lake Community College  
Skyline High School  
Stillwater Academy  
The Overlake School – Redmond, WA  
University of California, Los Angeles (UCLA)  
Università degli Studi di Padova – Padua, Italy  
Universität Regensburg – Germany  
University of Central Oklahoma  
University of North Carolina  
University of Northern Colorado  
University of Oregon  
University of Utah  
University of Utah – Department of Chemistry  
University of Utah - Department of Mathematics  
University of Utah – Department of Medicine  
University of Utah - Department of Physics and Astronomy  
University of Virginia  
University of Washington  
Virginia Commonwealth University School of Medicine  
Walla Walla University  
Washington County School District  
Watertown High School  
Yale University

# WHAT KIND OF CAREER CAN I HAVE WITH A MATHEMATICS DEGREE?\*

MATHEMATICS/STATISTICS		
CAREER EXAMPLES	UNIVERSITY OF UTAH ALUM CAREERS	PLANNING
<ul style="list-style-type: none"> <li>Accounting and Finance</li> <li>Computer Programming</li> <li>Computer Systems</li> <li>Operations Analysis</li> <li>Sales and Marketing Management</li> <li>Actuarial Science</li> <li>Engineering</li> <li>Analysis and Control of Processes</li> <li>Optimization and Scheduling of Resources</li> </ul>	<p><b>B.S./B.A. DEGREE</b></p> <ul style="list-style-type: none"> <li>Founding Researcher</li> <li>Operations Analyst (Minor in Biomedical Engineering)</li> <li>Reporting Analyst (Emphasis in Statistics)</li> <li>Research Assistant/Analyst (Applied Mathematics)</li> <li>Software Biomathematician</li> <li>Systems Engineer</li> <li>Technical Analyst (Double Major in International Studies Emphasis Global Health)</li> <li>User Interface (UI) Engineer</li> </ul> <p><b>MASTER/PH.D. DEGREE</b></p> <ul style="list-style-type: none"> <li>Business Data Analyst (M.S. in Statistics)</li> <li>Data Analyst (M.S. Information Systems/Certificate in Business Analytics)</li> <li>Data Scientist (Emphasis in Computation and M.S. Computer Science) (Emphasis Computation/M.S. Predictive Analytics)</li> <li>Quality/Test Engineer (B.S. Mathematics , B.S. Mechanical Engineering, and M.S. Engineering)</li> <li>Senior Director, Media Buying and Analytics (M.S. in Statistics)</li> <li>Systems Engineer (B.S. Applied Mathematics, B.S. Electrical Engineering, and M.S. Electrical Engineering)</li> </ul>	<ul style="list-style-type: none"> <li>Plan to earn a doctoral degree to work as a "mathematician."</li> <li>To work in applied mathematics, consider earning a double major in a scientific or technical area.</li> <li>Develop substantial knowledge of computer programming and software administration. Seek experience with relevant software packages.</li> <li>Learn to work well within a team of people from diverse backgrounds and differing technical specialties.</li> <li>Gain experience in an area of interest through internships or research programs.</li> <li>Maintain a high-grade point average and secure strong faculty recommendations to gain graduate school admittance.</li> <li>Research government hiring processes and internship opportunities if the public sector appeals to you.</li> </ul>

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## EDUCATION

CAREER EXAMPLES	UNIVERSITY OF UTAH ALUM CAREERS	PLANNING
<ul style="list-style-type: none"> <li>Teacher</li> <li>Research</li> <li>Higher Education Administration</li> </ul>	<p style="text-align: center; background-color: black; color: white; padding: 2px;"><b>B.S./B.A. DEGREE</b></p> <ul style="list-style-type: none"> <li>Academic Advisor</li> <li>Director of Undergraduate Studies</li> <li>Teacher (K-12)</li> </ul> <p style="text-align: center; background-color: black; color: white; padding: 2px;"><b>MASTER/PH.D. DEGREE</b></p> <ul style="list-style-type: none"> <li>Adjunct Professor</li> <li>Assistant Professor (M.S./Ph.D.)</li> <li>Assistant Professor/Graduate Advisor (Ph.D.)</li> <li>Assistant Adjunct Professor (Ph.D.)</li> <li>Math Coordinator (Ph.D.)</li> <li>Math Lab Aide- High School (M.S. Mathematics Teaching)</li> <li>Professor (Ph.D.)</li> <li>Teacher (M.S. Mathematics Teaching/Ph.D.)</li> </ul>	<ul style="list-style-type: none"> <li>Develop excellent communication skills, both verbal and written.</li> <li>Gain experience working with age group of interest through volunteering and tutoring.</li> <li>Acquire appropriate state teacher certification for K-12 teaching opportunities.</li> <li>Earn a doctoral degree in math to teach at four-year institutions. A master's degree may be sufficient for two-year colleges.</li> <li>Maintain a high-grade point average and secure strong faculty recommendations to prepare for graduate school.</li> <li>Assist a professor with research.</li> <li>Seek the appropriate graduate degree to enter higher education administration. Gain experience on campus in student leadership roles such as Resident Assistant or Orientation Leader.</li> </ul>

## COMPUTERS/COMPUTATIONAL SCIENCE

CAREER EXAMPLES	UNIVERSITY OF UTAH ALUM CAREERS	PLANNING
<ul style="list-style-type: none"> <li>Programming</li> <li>Systems Development</li> <li>Systems Analysis</li> <li>Software Development</li> <li>Network Administration</li> <li>Web Administration</li> <li>Technical Support</li> <li>Training</li> </ul>	<p style="text-align: center; background-color: black; color: white; padding: 2px;"><b>B.S./B.A. DEGREE</b></p> <ul style="list-style-type: none"> <li>Computer Assistant</li> <li>Data Specialist (Emphasis in Statistics)</li> <li>Senior Developer (Triple majored in Applied Mathematics, Physics, Film &amp; Media Studies)</li> <li>Software Analyst (Applied Mathematics)</li> <li>Senior Graphics Software Engineer</li> <li>Software Developer (Applied Mathematics)</li> </ul> <p style="text-align: center; background-color: black; color: white; padding: 2px;"><b>MASTER/PH.D. DEGREE</b></p> <ul style="list-style-type: none"> <li>Chief Technology Officer (M.S. in Statistics)</li> <li>Computer Scientist (M.S. EAE)</li> <li>Director of Data Science (M.S. Mathematics, M.S. Information Systems, Ph.D. Mathematics)</li> <li>Programmer (Emphasis in Statistics, B.S. Computer Science, and M.S. Mathematics)</li> <li>Software Biomathematician (B.S. Mathematics, B.S. Biostatistics, M. Stat., and Ph.D. Statistics)</li> <li>Software Developer (M.S.)</li> </ul>	<ul style="list-style-type: none"> <li>Develop substantial knowledge of computer programming and software administration.</li> <li>Take classes to earn relevant certifications.</li> <li>Gain related experience through internships, part-time positions, or summer jobs.</li> <li>Work in a campus computer lab or volunteer to maintain the website for a student organization.</li> <li>Learn effective listening and verbal communication skills and how to work well with end users.</li> <li>Stay abreast of the latest developments in computer technology through reading journals.</li> <li>Participating in professional associations is another way to stay up to date on recent technology.</li> <li>Consider earning an advanced degree in computer science or management information systems.</li> <li>Exhibit patience and creativity for designing programs.</li> <li>To advance into management, learn to effectively manage multiple projects and to meet deadlines.</li> <li>Obtain experience with public speaking/teaching and learn to develop curriculum for training positions.</li> </ul>

## BANKING AND FINANCE

### CAREER EXAMPLES

- Corporate and Consumer Credit Analysis
- Commercial Lending
- Trust Management
- Capital Services and Mergers and Acquisitions
- Mortgage Loans
- Originations and Packaging
- Branch Management
- Operations
- Cash Management
- Credit Scoring and Risk Management
- Private Banking
- Financial Analysis
- Investment Banking

### UNIVERSITY OF UTAH ALUM CAREERS

#### **B.S./B.A. DEGREE**

- Loan Officer
- Vice President of Equities/Technologies

#### **MASTER/PH.D. DEGREE**

- Investment Researcher (**Emphasis in Statistics/M.Stat**)
- Investment Risk Analyst

### PLANNING

- Double major or minor in business to build a solid background in marketing, finance, and accounting.
- Gain experience through part-time, summer or internship positions in a financial services firm.
- Develop strong interpersonal and communication skills in order to work well with a diverse clientele.
- Serve as the financial officer or treasurer of a student organization.
- Plan to earn an MBA to enter investment banking.
- Be geographically flexible when job searching.
- Serve as the financial officer or treasurer of a student organization.
- Plan to earn an MBA to enter investment banking.

## OTHER AREAS

### CAREER EXAMPLES

- Actuarial Science
- Risk Management/Assessment
- Loss Management/Control
- Underwriting
- Industrial Sales
- Consumer Product Sales
- Financial Services Sales
- Services Sales
- Advertising Sales
- E-commerce
- Customer Service
- Sales Management: District, Regional, and Higher

### UNIVERSITY OF UTAH ALUM CAREERS

#### **B.S./B.A. DEGREE**

- Actuarial Analyst
- Assistant Sales Development Manager (**Emphasis in Statistics**)
- Audit Associate (**Emphasis in Statistics**)
- Business Analyst (**Emphasis in Statistics**)
- Geophysicist
- Manager (**Emphasis in Statistics**)

#### **MASTER/PH.D. DEGREE**

- Actuarial Analyst III (PMST)
- Archival Assistant (Ph.D. Economics)
- Assistant Librarian (M.S. Library Science)
- Assurance Associate (MAcc)
- Biostatistician (M.S./Ph.D. Biostatistics)
- Director, Business Development (MBA/SM Engineering)
- Lieutenant -Navy (M.S. Electrical Engineering)
- Manager (**Emphasis Statistics/M.Stat**)
- Medical Officer (MD)
- Metallurgist (B.S. Mathematics, B.A. English, and M.S. Metallurgical Engineering)

### PLANNING

- Take additional courses in statistics and finance.
- Complete an internship with an insurance agency to gain relevant experience.
- Actuarial science is a good career path for those who want to extensively use math on the job. Areas such as claims, underwriting, and risk management are less math-intensive. Talk to professionals in the industry to learn more about various positions.
- Develop strong communication skills, as many positions require interaction with others and the ability to explain information clearly and concisely.
- Learn how to use statistical analysis software and various computer programming languages.
- Plan to take a series of actuarial exams to gain licensure from either the Society of Actuaries or the Casualty Actuarial Society. The type of insurance you deal with will determine which path to pursue. Most actuaries take these exams while working full-time, and the process takes several years.
- Obtain experience through internships or summer and part-time jobs.
- Seek leadership positions in campus organizations.

# ADVICE FOR CURRENT STUDENTS\*



## REGARDING CLASSES AND EDUCATION:

“Spend as much time as you can talking to people in or connected to the math department about what they do, what they like about what they do, and what they’ve seen others do with a math degree. The possibilities seem to be numerous and trying to get a sense of these things early will let you take advantage of the flexibility in the degree program to craft an experience that helps you get where you want to go.”

“Learn computer languages. I also would say to talk to as many faculty members as possible. That is how I got into what I’m doing now, by talking to one of my professors and taking a few classes from him.”

“Take what’s interesting, not what’s easy, not what fits in your schedule. You’ll have an easier time during interviews when they asked what you learned or what you liked in school.”

“Look at job opening postings of careers you think you would want and then tailor the remainder of your education to fit the description.”

“Getting involved with research as an undergraduate was the best thing I did. So many doors and opportunities were opened to me because of this. I feel like my education was more rounded and diverse than it would have been otherwise.”

“Learning to ask people for help was something that was critical to me making it through my mathematics education and is valuable today, five years later. I remember spending a lot of time in the basement whiteboard rooms - those are some of the days that I’ve felt the most intellectually challenged and connected to my classmates.”

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## REGARDING SKILLS AND EXPERIENCE:

“Linear algebra is extremely important and versatile. Learning to code is really relevant to qualifying for many of the higher paying jobs that hire mathematics majors. Check job boards for qualifications while you’re still a student.”

“Start now putting together a list of skills that you are developing, like programming. If you do work, like tutoring or TA’ing, that can count as leadership skills.”

“I wish I would have put more effort into resume building, extracurriculars, more internships, research, applicable part-time jobs, etc. I started doing research as a senior and wish I would have started much sooner. These types of things can really strengthen a resume and make it much easier to write when you have plenty of relevant content to draw on.”

“Start networking early. Contact places of employment before your schooling is complete. Let schools/companies know of your interest in working there.”

“I wish I’d taken more advantage of the opportunities as a student to get involved and prepare for a career: doing research, participating in internships, and making connections. Utilize the opportunities now!”

“Be sure to familiarize yourself with the software development world. Any technical degree or discipline oriented in math is also going to be associated with software development. Understanding the software planning/development/release process would be a major benefit.”

“I would say to be flexible and realize that mathematics gives you skills that can be applied across a wide range of careers, not all of which use mathematics. Remember that your undergraduate degree gives you a base to build on, and that a lot of what you need to know will be learned on the job. I would also recommend that students take advantage of Career Services here on campus.”





## REGARDING LOOKING FOR A JOB:

"I applied to many industries before graduating (energy, finance, consulting, etc.). My advice would be to prepare a lot for interviews. Your career counselor is a great resource and the career fair actually works."

"Start early to apply for jobs. It takes about 6 months to find a job, so start early."

"Apply for all sorts of jobs that look interesting. Having a math degree is impressive so don't limit yourself to just numbers jobs. There's tons of positions that would like an analytical person."

"Create a personal website early, and showcase all of your assignments and work from day 1. When you go to an interview with a website put together and say look at all the stuff I've done they are much more likely to hire you."

"Find something that you are willing to spend 8 hours a day doing, because that's what will lead you to success and fulfillment."



## REGARDING "SELLING POINTS" WHEN LOOKING FOR A JOB:

"A math degree from Utah is essentially a degree in analytical thinking and problem solving, which is both interesting and very applicable to a wide range of careers (I'm a perfect example of this - I started my career in manufacturing engineering and am now in mergers and acquisitions/business strategy)."

"It's extremely versatile, applies to almost any subject, and shows potential employers that you have the ability to think in abstract and applied ways to tackle problems."

"Mathematics gives students good thinking, reasoning, and problem solving skills. If students have chosen their courses wisely they may also gain computing skills and knowledge of statistics, which are key in many fields. Having a math degree tells potential employers that you are smart and have the ability to learn on the job."



## REGARDING COMPUTING/SOFTWARE TO LEARN WHILE GETTING A DEGREE:

“I loved learning and using MatLab and other math softwares but I wish I would have also taken computer science courses as part of the math major. I think it would have been useful to learn Python, Java, HTML, and other non math softwares more rigorously.”

“R, SAS, SQL, C++. I would have liked to learn ANY language just so I could have experience in computer languages. Not a side note or a “by the way you need skill this in our class” but a full on mathematical computer science language learning class.”

“I wish I had perhaps done a little more programming (e.g. Matlab, or even Java or C++) as an undergraduate. I know a math degree is not a computer science degree, and math majors can generally pick up programming languages quickly, but it still seems like almost every mathematics-related (not teaching-related) job posting I have come across has a requirement for programming languages.”

“I wish I learned programming, as it seemed every company was looking for programming experience.”

### PROGRAMMING LANGUAGES COMMONLY MENTIONED IN ALUMNI SURVEY:

- C++
- LaTeX
- Mathematica
- MatLab
- Python
- R
- SAS
- SQL

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