

TECHNOLOGY, DATA AND ANALYTICS

Developing Technical Skills

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Working On Campus at UW-Madison

Consider working on campus! UW-Madison is a huge campus with hundreds of offices that need help to get their work done. The [Student Job Board](#) is a great place to begin your search for jobs aimed at students like you.

Student Orgs are a great way to build experience on campus! Check out the Wisconsin Involvement Network (WIN) or look at the curated list of [Student Orgs Popular with CDIS Students](#).

UW-Madison Online Skill-Building Resources

- The **Data Science Institute** offers [workshops on data programming skills](#) for researchers and students at UW-Madison. Courses cover topics like Python, SQL, machine learning basics and version control tools. Check the website for class schedules and archived recordings.
- The **Dept of IT (DoIT)** offers access to the [entire LinkedIn Learning library](#) for no cost - just log in with your WiscID. In addition to courses on programming and technology tools,

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LinkedIn Learning includes videos on interpersonal skills, leadership, project management skills, and career exploration topics in a variety of industries.

- **DoIT** also offers [Software Training for Students \(STS\)](#), where you can attend workshops, schedule appointments, and access many more resources to learn tools like Python, GitHub, Figma and more.
- **Tech Exploration Lab** (<https://techexplorationlab.wisc.edu/>) is an on-campus office to support the growth, development and exploration of data science projects. Undergrad students can bring their ideas here to get help with ideation, to meet others to collaborate with, and to further develop their ideas into reality.

Online Learning Resources

Interested in the technology, data, and analytics field, but may not have technical skills and or want to further develop technical skills? Check out the links below to learn these skills virtually.

Coding

1. **CS50** (<https://pll.harvard.edu/course/cs50-introduction-computer-science?delta=0>) Harvard University's introduction to the intellectual enterprises of computer science and the art of programming for majors and non-majors alike, with or without prior programming experience. *A great place to start to familiarize yourself with Computer Science as a discipline.*
2. **Coursera** (<https://www.coursera.org/>) Coursera provides universal access by offering courses online and partnering with top universities and organizations.
3. **Leetcode** (www.leetcode.com) Leetcode has a large collection of practice codetests and interview preparation tactics for many high-competition employers like Facebook, Google and more.
 - a. Visit this site if you want to practice your technical interview skills
4. **HackerRank** <https://www.hackerrank.com/>
 - a. This site is used by both aspiring programmers and employers. Check out the blog, the employer events, and the additional resources!
5. **AnalyticsVidhya** <https://www.analyticsvidhya.com/>
 - a. A learning database for data science and analytics. Videos, training, interviews, open-source datasets and more. Free!
6. **Codeforces** <https://codeforces.com/>
 - a. A competitive programming website focused on constructive and adhoc problems which are grounded in more mathematical and logical reasoning which could help with certain niche fields like quant trading (e.g. Jane Street, Hudson River Trading, Citadel, etc.).
7. **Quant Questions** <https://www.quantquestions.com/>
 - a. Website which contains an extensive list of quant trading problems to practice

with additional problems you can access if you choose to unlock them.

8. edX <https://www.edx.org/>
 - a. edX also provides universal access by offering courses online and partnering with top universities and organizations.
9. [DataQuest - Data Science Tutorials](#) - data science lessons and learning kits
10. Codepath <https://codepath.org/>
 - a. Codepath has lots of multiweek classes on programming and job readiness skills (e.g. interviewing). It also has technical mentorship connections and career fairs.
 - b. This site leans toward minority, women and underrepresented students, but is open to all interested people.
11. Egghead.io <https://egghead.io/>
 - a. Egghead provides learning opportunities for JavaScript.
12. Learn Python The Hard Way <https://learnpythonthehardway.org/>
 - a. Learn Python the Hard Way takes you from absolute zero to being able to read and write basic Python to then understanding other books on Python.
13. The Python Tutorial <https://docs.python.org/3/tutorial/>
 - a. This website introduces python.
14. The Hitchhiker's Guide to Python <https://docs.python-guide.org/intro/learning/>
 - a. This website introduces python.
15. Mode <https://modeanalytics.com/>
 - a. Mode gives you the opportunity to use databases with code, connect data from anywhere, and analyze with your tool of choice.
16. Udacity <https://www.udacity.com/>
 - a. **This resource is not for free, and you will have to pay for the classes you take.** However, I still wanted to include it in this list because it may provide a different avenue for learning technical skills for the field.
17. Codesignal
<https://medium.freecodecamp.org/the-best-data-science-courses-on-the-internet-ranked-by-your-reviews-6dc5b910ea40>
 - a. Codesignal can help you prepare for the technical questions you may be answering in an interview.

Environmental Sciences

- [ArcGIS Online](#) - a great free resource to try out the ArcGIS program, a popular industry tool for digital cartography and geographic modeling. A “must-know” if you’re interested in environment/climate-based roles.

CyberSecurity

- [Hackerone](#) - blog, resources, events and discussion on the important areas of cybersecurity

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- [Bugcrowd](#) - bug bounty list site, for aspiring ethical hackers to practice their skills while maintaining good netizen security.

Free Coding Packages and Tools

[Anaconda](#) is a Python library management tool, and an open-source workbench for data science programming. This tool is very commonly used in the professional data science field, as it eases collaboration and code consistency. [Anaconda Nucleus](#) is the forum maintained by the company to support data scientists in collaboration through Anaconda tools. *If you're interested in Data Science, you should know about Anaconda!*

Volunteer Your Coding Skills

Join a Student Org –

- Software Development Club
- Web Development Club
- Biokind Analytics

You can look for **Open-Source Projects** that are seeking development skills. Browse **Github** by cross-referencing tools and languages you're familiar with and look for calls for open-source bug fixes (especially those marked with "Good First Issue" tags). Look for ways to contribute to the code of others - you'll earn attention, and potentially make networking connections too!

- Apache Software Foundation projects - <https://github.com/orgs/apache/projects?query=is%3Aopen>
- Airflow job scheduler - <https://github.com/apache/airflow>

Additional matchmaking project platforms include:

[Develop for Good](#) matches student developers with nonprofits who need technical help.

[Social Coder](#) is a matching platform for nonprofits and charities to gain volunteer developer support for their technical needs.

[Call for Code](#), hosted by IBM, invites problem-solvers from around the world to contribute to sustainable, open source technology projects that address social and humanitarian issues, while ensuring the top solutions are deployed to make a meaningful difference.

- Any skill level is welcome!
- Through Call for Code, you'll develop your own skills while making an impact on the world, and you'll make new professional connections along the way.

[The Forage](#) connects students with virtual work experiences at major employers. These projects tend to be shorter-duration and may be unpaid, which can be beneficial for students with limitations on paid opportunities.

The following sites are volunteer organizations that serve a variety of areas, not just Computer and Data needs. Sort by opportunity, and be sure to assess the suitability of each posting as you proceed.

- [DonateCode.com](https://www.donatecode.com) - just like it says – provide coding support for small businesses and entrepreneurs.
- [Catchafire.org](https://www.catchafire.org) - volunteer your time to provide small businesses and entrepreneurs with technical expertise - data analysis, web development, IT and business tech, search engine optimization
- [Volunteermatch.org](https://www.volunteermatch.org) - lots of volunteer opportunities - filter by data, IT or software.
- [Points of Light](https://www.points of light.org) - online volunteering hub, with a page dedicated to virtual opportunities

Campus Research

Having a hard time finding an internship? Interested in going to grad school in the future? Consider a campus research assistant position! Some benefits of campus research positions are detailed below.

Considerations for Students doing Research with Faculty:

https://docs.google.com/document/d/1iBQtc3dENA77c3OggcftpfnzJT_28usqqr39VCsY7U/edit

Check out our [Undergraduate Research Guide](#)

Campus research jobs give great hands-on experience in complex, theoretical environments rarely seen in industry roles. Additionally, campus research positions are structured with student needs in mind - they are often flexible and will work around varying class loads and schedules.

Grad School applications want students to prove their investment, enthusiasm and proficiency in their chosen field of masters work. Gaining research experience in your undergrad career will help you demonstrate these qualifications.

It's true that the first job is the hardest to get -- if you're struggling to add experience to your resume, or just aren't getting noticed for internship applications, a campus research or on-campus student job can be a great first step to build and demonstrate those working skills.

Job Shadow Experiences

Did you know that you can make your own job shadow experience?

A "job shadow" is an on-the-job observation experience in which a student follows a professional around during their daily work duties. Job Shadows are customizable - each is designed based on the student and employers' needs.

Why would you do a job shadow? Some suggested reasons:

- You can't find an internship that builds the skills you want to use, but have a company in mind that you want to work with.

- You want to learn more about a career before applying for internships - job duties, industry knowledge, work culture or more. Maybe you want to see what a career in this field actually looks like.
- You want to make good impressions with an employer that may not have internships available.
- You want to gain work experience, but are having a hard time getting employers to notice you and want to supplement your resume with unpaid experience.

Learn how to [create your own job shadow opportunity!](#)

Personal Projects

The peak of software engineering skills is the ability to define a concept and use programming tools to convert it into a real tool that can help people's lives.

Employers absolutely *love* to see personal projects on resumes. They demonstrate the following skills:

- **Application of Learned Skills:** projects let you 'prove' the skills you learned in your classes
- **Design Thinking:** They also show you can carry an idea from concept to execution
- **Project Management:** and may demonstrate leadership if you work with a team of friends to create something new.
- **Dedication:** a personal project shows your personality – it shows you believed in an idea so much that you spent your free time bringing it to life.

Stuck on where to begin a personal project? Consider these three starting points:

1. Think about the jobs you want, and practice those skills.

To get your ideal job, you'll need to build the right skills. If you want to be a Software Developer, build a small application. If you want to be a Data Scientist, build a data visualization using publicly available datasets. If you want to be a Front-End Developer, build a website.

2. Make a technical solution to a problem you've noticed in your life.

Have you used a phone app that didn't work well? Are you frustrated with the bus system apps, or trackers for local events? Perhaps you wish you had a study support app, or a program to track your homework deadlines.

Good entrepreneurs are always looking for ways to improve the lives of those around them. If you see a problem, see if you can fix it!

A great recent example of this is [Demic](#), a student-developed app released in Fall 2021. These students noticed a need for students to connect during the isolation of the COVID-19 pandemic. A year later, their app is live and being used on campus!

3. Get inspired by your hobbies or interests.

Just like solving problems with technology, CS Students can use their hobbies to identify problems to solve with technology. Collection organizers, hiking or workout trackers, news or forum aggregators, websites, tool apps, and practice games are all examples of personal projects we've seen in the past.

At UW-Madison, the [Undergraduate Project Lab](#) is a great student org for students working on

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their personal projects. The UPL is a space for students with an interest in computer science to meet each other, work on projects together, and participate in events. Whether you're brainstorming project ideas, or needing advice on your project's finishing touches, the UPL is open for you!

Things to Keep In Mind as you Develop

- **Start small, make it scalable.**

Personal projects don't need to be massive or complicated applications. Just like in professional tech development, it's a good idea to plan your project in stages. Start small, and plan for future expanded features when you have time. Consider running your own [Iterative Development Cycle](#) (hint: this is good practice for Software Development roles too!)

- **Embrace whimsey - be creative, intriguing and engaging**

Employers want to know what you're capable of programming, but they also need to know about your soft skills and personality. Use personal projects to show off your creativity and design skills.

- **Familiar +1**

Still not sure where to start? Begin with the technology stack or development tools you're most comfortable with, and try to add one brand-new tool or language to the project.

[How to Put Personal Projects on your Resume](#) (tips resource)

[Personal Project Examples, Resources and Links](#) (external link)

Hackathons, Contests and Conventions

On Campus

Madhacks (coding competitions) Madhacks is a software development hackathon hosted twice a year at UW-Madison, in November and March. Prizes for design, tool use, and innovation are awarded, and some come with prizes!

- [More info on previous events](#)

Conventions

DevCon - cybersecurity convention <https://defcon.org/html/defcon-32/dc-32-index.html>

Grace Hopper - women-focused technology convention <https://ghc.anitab.org/>

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Employer-Hosted

[Social Good Hackathons with JPMC](#) - JP Morgan Chase hosts both in-person and virtual hackathons where teams of students have 24 hours to design and build an application. JPMC may even hire competitors who do well! Five events are open to different experience levels:

- **Code for Good** – Bachelors students
- **Data for Good** - Bachelors, Masters or PhD students
- **Design for Good** - Bachelors students
- **Experience for Good** - mid-level to experienced software engineers
- **Hack for Good** - early-career professionals with nontraditional education, *not* enrolled in a degree program

Other

[Big Data Bowl](#) - Data science competition using NFL organizational data - signup early January

[HackerEarth](#) - directory for hackathons and events around the world

[DevPost](#) - directory for hackathons and events around the world

[MIT Sloan Sports Analytics Conference](#) - held in May

[DrivenData](#) - provides a variety of online challenges of varying duration.

[ARCathon](#) - AI training and modeling competition

[Hackathons](#) nationally and internationally (coding competitions)

[Kaggle](#) (data competitions)

[Machinehack](#) (data competitions)

[UX design challenges](#)

[Product design challenges](#)