EURēCA! Work-Study Program
Faculty Mentor Handbook

Federal Work-Study Student Assistantships

A program of the Office of Undergraduate Research and Creative Activities with
support from the Office of the Provost and involving collaboration with the Financial Aid
and Scholarships Office, Experiential Learning Center, and Career Center
| Fall 2020 |

Note: This EURēCA! Work-Study Program Handbook is intended to provide an
overview of this program and to summarize policies described in detail in the University
of Colorado Denver | Anschutz Student Employment Handbook, published annually by
the Student Employment Office. All on-campus University employers should read, be
familiar with, and adhere to policies described in detail in the University of Colorado
Denver | Anschutz Student Employment Handbook in addition to this program overview
document. Every student should also be familiar with the Student Employment
Handbook, in particular, the sections on Student Employee Information and Policy.
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Welcome Students and Faculty!

Thank you for your interest in the EURēCA! Work-Study Program. This is one of several Education through Undergraduate Research and Creative Activities (EURēCA!) programs run by the Office of Undergraduate Research and Creative Activities, all of which are designed to provide CU Denver students an opportunity to engage in educational collaborations with faculty mentors. The EURēCA! Work-Study Program, specifically, facilitates the use of Federal Work-study by qualified undergraduates to pursue professionally relevant paid research opportunities at CU Denver | Anschutz, either for- or not-for-credit.

Students, we are excited that CU Denver is able to offer you a variety of exciting opportunities to engage in mentored learning outside of the classroom. Take this time to learn to conduct original scholarship in your field, develop a professional relationship with a faculty mentor, immerse yourself in your discipline, explore academic and career options, follow your passion, and have fun!

Faculty, help us to introduce students to scholarship in your discipline, challenge our students by engaging them in professionally relevant and meaningful scholarly activities, and support them as they disseminate their findings to broader audiences. Ideally, participating in one or more of our EURēCA! Programs will advance your scholarship as well, as it has for many faculty members across our schools and colleges.

We are here to provide support as you navigate the process of joining our community of scholars and mentors. Please do not hesitate to contact our office with questions about this or other EURēCA! Programs. We are here to support you!

Sincerely,

Erin Golden, PhD
Director of Undergraduate Research and Creative Activities
https://www.ucdenver.edu/lynxconnect/undergraduate-research
undergrad.research@ucdenver.edu
What is the Office of Undergraduate Research and Creative Activities?

The Office of Undergraduate Research and Creative Activities (URCA) provides CU Denver | Anschutz students the opportunity to connect with the research and creative mission of the University. Our Education through Undergraduate Research and Creative Activities (EURēCA!) programs facilitate collaboration between students and faculty to incorporate inquiry, design, investigation and discovery into learning experiences outside of the classroom.

In addition to the EURēCA! Work-Study Program, URCA also runs the EURēCA! Summer Fellows Program, the Undergraduate Research Opportunities Program (UROP), and organizes the annual Research and Creative Activities Symposium (RaCAS). Our office also provides advising services to CU Denver undergraduates interested in accessing mentored learning opportunities across the CU Denver | Anschutz campuses.

The URCA Team:

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The EURēCA! Work-Study Program - Why should faculty participate?

Recognizing that CU Denver is a research institution, the EURēCA! Programs have been designed with a goal of advancing the scholarship of our faculty while helping students connect with the University’s research and creative mission. The EURēCA! Work-Study Program helps match faculty with qualified students — talented undergraduates with a Work-Study Award as part of their Financial Aid Package — who can assist them in completing their research, creative, and other scholarly activities. The program supports faculty by assisting them with many aspects of the student employment process, from creating and posting job descriptions to hiring, mentoring, and paying student salaries. But that’s not the best part! Currently, the EURēCA! Work-Study Program provides participating faculty with the financial support to cover the 25.5% employer contribution — typically $765 each semester — to employ student assistants.

Why work-study? Expanding work-study jobs to include research-based activities increases the opportunity for students who might not otherwise be able to engage in this type of scholarship due to their academic and economic backgrounds. Furthermore, a recent study at CU Denver showed that work-study eligible students who take advantage of their awards are twice as likely to graduate within six years as those who do not!

You may be eligible to sponsor a EURēCA! Work-Study Student Assistant (EURēCA! Mentee) if you are affiliated with the University of Colorado Denver | Anschutz as a faculty member, research scientist, librarian, academic administrator, and/or professional staff member in any school or college, research center, institute, or hospital. The EURēCA! Work-Study Program also welcomes professionals working in the greater Denver community and community-based organizations. Post-docs, graduate students, staff, and others working under the guidance of a faculty member or senior staff member require that person’s permission before submitting an application to become a EURēCA! Mentor.
What does it meant to be a mentor?

Across studies, students report that the most important aspect of the undergraduate research experience is their relationship with a mentor. An essential aspect and expectation of the EURēCA! Work-Study Program is mentorship. The intention of this program is to support faculty that will take an active role in nurturing the intellectual and scholarly development of their student(s) by involving them in all aspects of their research. This program should not be viewed as a source for free labor or “hands”, instead it is an opportunity to foster student learning outside of the classroom – an often exciting and personally fulfilling experience!

As you prepare to enter a new mentor/mentee relationship please keep in mind:

- Mentors are essential in ensuring the success of a student’s scholarly experience. For some students, their EURēCA! Mentor will be the first individual to intellectually engage them outside of the classroom.
- Through this program students should gain both discipline-specific and universal career skills. Mentors play an essential role in teaching students the techniques and methodologies that will prepare them to address relevant questions in their field, as well as general professional skills. These include creativity, judgement, communication, organization, and persistence, among others.  
- Mentors provide opportunities for students to participate in research, creative, and other scholarly activities. They also facilitate dissemination of the outcomes from these activities, encouraging students to present at group meetings, attend conferences, and contribute to publications or other professional works.
- Mentors provide guidance to students as they plan their training trajectories by elucidating what is needed to become a professional in their discipline and by helping to set goals and milestones. In doing so, mentors train a new generation of scholars and practitioners.
- Mentors should gain personal satisfaction from working with students. Watching students gain new skills, mature intellectually, and begin contributing original ideas to their discipline are all part of the joys of mentoring.

Click here to access some of our favorite publications addressing the importance of mentorship in undergraduate research.

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Who is eligible to be a EURēCA! Work-Study Mentor?

To be eligible to mentor a EURēCA! Work-Study student, the primary mentor must:

- be a CU Denver | Anschutz faculty member or be a CU Denver | Anschutz employee affiliated with a faculty member, who will serve as the primary mentor (e.g., research instructor, post-doctoral scholar, professional research associate, advanced graduate student);
- hold or be affiliated with someone who holds a full-time tenured, tenure-track, or clinical teaching track appointment;
- maintain an active scholarly program in any discipline, academic unit, or college at CU Denver | Anschutz;
- be committed to engaging a EURēCA! Work-Study eligible undergraduate in their scholarship, to include providing University trainings, one-on-one mentoring meetings, and group meetings;
- complete pre- and post-activity assessment materials, as requested by the Office of Undergraduate Research and Creative Activities;
- demonstrate a commitment to EURēCA! Programs at CU Denver, including the Research and Creative Activities Symposium (RaCAS) held each spring. Note: EURēCA! Mentors may also be invited to serve on student grant and fellowship review committees, join the EURēCA! Program advisory board, or help organize student-facing workshops and seminars on a voluntary basis;
- participate annually in at least one Center for Excellence in Teaching and Learning workshop or similar mentorship training event.
Who is eligible to be a EURēCA! Work-Study Mentee?

To be eligible to hold a EURēCA! Work-Study position, a student must:

- hold degree-seeking CU Denver undergraduate status;
- submit a Free Application for Federal Student Aid (FAFSA) and receive a work-study award as part of their financial aid package;
- complete a University of Colorado Background Request Form, pursuant to the CU Denver | Anschutz Background Investigations Policy;
- be enrolled part-time or full-time (at least 6 credit hours) throughout the semester, including summer semesters (see CU Denver | Anschutz Student Employment Handbook for details);
- maintain Satisfactory Academic Progress assessed at the end of each semester based upon grade point average, completion rate, and overall attempted credit hour limit;
- have relevant coursework and demonstrated skills, which will vary with the proposed scholarly activity;
- commit to presenting outcomes of scholarly activity at the CU Denver Research and Creative Activities Symposium (RaCAS), held each spring.

**Note #1:** It is highly recommended that work-study eligible undergraduates interested in applying for a EURēCA! Work-Study position meet briefly with an advisor or counselor in LynxConnect to answer questions about the program and to ensure that their application materials (i.e., resume, cover letter, transcript, work-study award letter) are appropriate for these positions.

**Note #2:** Students also may choose to use their research toward academic internship credit in addition to receiving financial compensation as part of their work-study award.

Undergraduate Research advising appointments can be scheduled with the Undergraduate Research Advisor (Liz Evans) or URCA Director (Dr. Erin Golden) in Handshake: [https://ucdenver.joinhandshake.com/appointments/new](https://ucdenver.joinhandshake.com/appointments/new)
Recruiting and Hiring a Work-Study Student

CU Denver undergraduates are eager to learn, interact with faculty, and put the knowledge and skills they are learning in the classroom to work in the real world. Strategically tap into the talented workforce awaiting you here! Mentors, ask yourself, what activities will benefit a student while also advancing your own scholarship? Of these activities, which can be accomplished by undergraduates? And what qualifications are most important to successfully complete them? How many hours are needed to accomplish this work? How flexible can you be in scheduling student hours?

1. Write a Good Job Description

In order to initiate a EURēCA! Work-Study job posting, primary faculty mentors are required to complete an online application that addresses all of the elements of a job description and that, if approved, will be used to compose a job posting on the University's student employment platform.

The EURēCA! Mentor application is accessible from our website:
https://www.ucdenver.edu/lynxconnect/undergraduate-research/jobs

Each EURēCA! Work-Study job must provide the undergraduate employee direct experience with scholarship in your discipline at a level that is compatible with the student's interests, knowledge, skills, and professional goals. EURēCA! Work-Study jobs are not administrative support positions that limit student involvement to the role of “gopher,” data entry clerk, or any other menial work unrelated to a collegiate program. As such, we expect that mentors will treat their EURēCA! Work-Study student(s) as a full member of their scholarly team. Above all, undergraduates participating in this program must maintain satisfactory progress toward the completion of their degree.

Tips and examples for EURēCA! Work-Study job postings can be found in Appendices A and B. The Office of Undergraduate Research and Creative Activities staff are happy to assist you in completing your Mentor application – contact undergrad.research@ucdenver.edu with any questions you may have.

Click here to access some of our favorite publications addressing the importance of mentorship in undergraduate research.
EURēCA! Mentor Application Components

1. Name of the position (e.g., Research Assistant in Bioinformatics) Note: This is not the job classification.
2. Name and address of the faculty mentor
3. Department/unit in which student will be employed.
4. Location at which the student will perform their duties.
5. Name of student’s direct supervisor.
6. Position description 2-5 sentences long describing the nature of the position in reasonably nontechnical language geared toward undergraduates.
7. Purpose/role of the position within the group.
8. Duties and responsibilities associated with the position and how they relate to the purpose/role.
9. Specific skills that students can expect to gain as a result of working with you.
10. Description of your mentoring plan, including how you will provide a structured learning environment for the student. *For fall 2020, this should include details of remote work and Safe Return accommodations.*
11. Minimum and preferred qualifications required for the position. Specific knowledge, skills, or other abilities required to complete the work as well as those desired but not required for the position.
12. Coursework and/or minimum GPA required for the position.
13. A list of any required trainings (University mandated or otherwise) that the student will need to complete for this position.
14. Number of hours per week the student should commit to working on the project.
15. Preferred work times (Note: Federal guidelines dictate that the work schedule must not conflict with student assistant's class schedule or academic progress).
16. Materials beyond a CV/Resume, Cover Letter, and Transcript, that students should submit when applying.
2. Register for Handshake

CU Denver’s career platform, Handshake, is where students can search and apply for research positions, internships, and other opportunities. Once your mentor application is accepted, URCA staff will use the information provided to post your position in Handshake. You will need to register as an “Employer” before the job can be posted. Once you are registered you will have access to edit the job post, review application materials, and update hiring status. The Office of Undergraduate Research and Creative Activities is here to provide support, but it is ultimately your responsibility to manage the process of interviewing and candidate selection.

You can find more information about creating your Handshake Account here.

3. Advertise Your Position and Recruit Students

Successful recruiting is a critical step to ensuring a positive and productive student-mentor relationship.

Any student with a Handshake account can search for EURēCA! job postings. However, only those undergraduates who have completed the online EURēCA! Work-Study presentation, and passed the accompanying quiz, will be able to apply. Students who are unsure if they have completed this requirement should look for a “eurecaok” label on their handshake account.

The Office of Undergraduate Research and Creative Activities and LynxConnect will advertise and recruit students to the EURēCA! Work-Study Program; however, undergraduates most often hear about opportunities directly from the faculty members themselves. As such, we highly recommend that you share your job posting within your networks. Announce that you are hiring and promote the EURēCA! Work-Study Program in your classes. Provide promotional materials to your colleagues and undergraduate major advisors. Distribute the job description through your department’s student listserv. Share information at faculty and committee meetings. The more people that know about the EURēCA! Work-Study Program, the more candidates you will have to choose from!

4. Hire Your Work-Study Student Researcher

The Handshake student employment platform will accept and manage all student applications and will send notifications directly to the email address provided in your Mentor application. URCA Office staff will be monitoring incoming applications, but it is the responsibility of the EURēCA! Mentor to track and review applications, interview candidates, and choose their student mentee.
You may decide to interview all, some, or none of the candidates that apply to your position. These applicants have already submitted proof of their work-study award, the one requirement mandated by the Office of Financial Aid and Scholarships. Any other requirements are completely up to you. Please note the even if a faculty member has a student in mind for the position, that student must apply and be hired through Handshake to qualify for the EURēCA! Work-Study Program. It should also be noted that faculty can hire student hourly and Work-Study employees outside of the EURēCA! program.

Once faculty have interviewed students and chosen a EURēCA! Mentee for their position, they should make the selection in Handshake and notify the Office of Undergraduate Research and Creative Activities. The Undergraduate Research Advisor, Liz Evans (elizabeth.evans@ucdenver.edu), will work with the selected candidate to complete the final steps in the hiring process, including meeting with URCA staff and completing of the Student Experience Learning Agreement. **Note that Students cannot begin working until this Learning Agreement is completed and approved by all parties, including the Office of Financial Aid and Scholarships. An employer/faculty member who has a student start working before they are hired is in violation of federal labor laws.**

Students with an already established university employee ID number will not need a background check or I-9 verification process typically. All students who do not have a university employee ID number will need to go through a background check and provide I-9 verification to work in the United States. Mary Baitinger (mary.baitinger@ucdenver.edu) will work directly with EURēCA! program students to finalize their employment status and hiring.
**General Employer Responsibilities**

All on-campus University employers must read, be familiar with, and adhere to policies described in detail in the [University of Colorado Denver | Anschutz Student Employment Handbook](#), which is abstracted here. Additionally, employers should ensure that every student researcher is familiar with the Student Employment Handbook and has read and understands the Student Employee Information and Policy sections of the handbook. Student researchers are considered employees; therefore, faculty mentors are employers and must adhere to employer guidelines.

**Employee Training**

All employers must ensure that all student employees complete the University of Colorado Denver | Anschutz mandatory Skillsoft trainings listed below:

- CU: Discrimination and Harassment
- CU: Information Security and Privacy Awareness training

Additional HR and departmental trainings associated with the student researcher position (e.g., FERPA, HIPAA, Sexual Harassment, Discrimination, Lab Safety Training) may also be required. If employers have questions regarding the specific training(s) student employees should complete, they should contact Student Employment and/or their home department.

**Timesheets**

Time reports are submitted and verified through the online system MyLeave. Daily time in and out is required on the time report. A mandatory 30-minute break is required when a student works six consecutive hours. This must be shown on the time report as time in and out.

*It is ultimately the student’s and supervisor’s responsibility to keep track of work-study earnings and awards throughout the semester.* Furthermore, it is the sole responsibility of the student to be aware of possible funding and status changes, along with any work-study award reductions to their Financial Aid during the semester. It is also the sole responsibility of the student to immediately inform their supervisor of any changes that can affect their work-study award and employment eligibility.

Any earnings over a student’s allotted Work-Study award will be paid at 100% by the employing department/unit not the EURēCA! Program.
Evaluating Students

Faculty will be asked to assess the student's skills and performance twice during the academic semester. This feedback will be prompted by emails from the Undergraduate Research Advisor during the middle of the semester and at the end of the semester. The feedback during the middle of the semester is more informal while the end of semester feedback will take the form of an evaluation link that must completed by the end of the academic semester. This completed evaluation from faculty is required for students using their work-study position as a For-Credit Academic Internship. Students will also complete an evaluation about their experience in the work-study position.
Additional Information

Contact the following for detailed information about the EURēCA! Work-Study Program:

- **Dr. Erin Golden,** Director of Undergraduate Research and Creative Activities  
  Phone: 303-315-5028  
  Email: Erin.Golden@ucdenver.edu  
  Location: LynxConnect, Tivoli 439

- **Liz Evans:** For-credit and not-for-credit undergraduate research advising  
  Phone: 303-315-4000  
  e-Mail: elizabeth.evans@ucdenver.edu  
  Location: LynxConnect, Tivoli 439

- **Financial Aid and Scholarships Office:** Work-study awards and hiring  
  Phone: 303-315-1850  
  Email: Financialaid@ucdenver.edu  
  Location: CU Student Commons Building, Suite 5105

- **LynxConnect:** Resume and cover letter assistance, trainings, and workshops  
  Phone: 303-315-4000  
  Email: LynxConnect@ucdenver.edu  
  Location: LynxConnect, Tivoli 439

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Federal Work Study and FAFSA Information

The Office of Financial Aid and Scholarships at CU Denver offers opportunities for Student employment on campus. To learn more and apply for positions begin by logging into **UCDAccess**, clicking the **Financial Aid** tab then **Student Employment** which will link to the **Handshake Job Board**. More information about Handshake can be found within this **student guide**.

To be considered for a Federal Work-Study Award at the University of Colorado Denver, you should complete the Free Application for Federal Student Aid (FAFSA) through the **FAFSA website**. **Priority Deadline is April 1st and online applications must be submitted by June 30th!** If you are initially not awarded Federal Work-Study as part of your aid package, reach out to the Office of Financial Aid and Scholarships and complete a Work Study Request Form. If you are subsequently awarded a Federal Work-Study award, you will receive a revised award notification.

**Questions?** Visit the Office of Financial Aid and Scholarships in Suite 5105 on the fifth floor of the Student Commons Building between 8:00 a.m. and 5:00 p.m. Monday-Friday. You can also contact the office by phone at 303-315-1850 or email at Financialaid@ucdenver.edu.
Appendix A: Tips for Writing a Job Description

The job description serves as the framework for the student’s work experience.

Job Description

1. Determine the actual tasks and responsibilities prior to determining any special qualifications required for the position.
2. Describe the position and responsibilities in a way that will entice the student to want to learn more about your research.
3. Include duties that peak student interests and demonstrate that you intend to assign meaningful and significant projects.
4. Include “Reports to” and “Consults with” information so the student understands with whom they will be interfacing.
5. A well-written job description is more than a list of tasks. It reflects a sense of priorities and opportunities for learning.
6. Ideally, word the job description in such a way that student’s performance can be measured.
7. For virtual/remote research, identify the technology platforms to be used and a plan for training and supervision of the intern.

What skills will the intern learn?
Consider these questions:

1. What can students learn that will advance their understanding of prior University coursework?
2. What industry-specific skills will the student gain to enter better prepared for a career in this field?
3. Are there any special training programs that will occur during this intensive experience?
4. What professional skills will the student acquire during this internship experience?

Qualifications

This section defines the specific minimum skills, attributes or credentials required to start in the position. Following are some examples:

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<th>Too General</th>
<th>Be Specific</th>
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<tbody>
<tr>
<td>Computer literate</td>
<td>Proficient with Microsoft Word, Excel, ARCsoft</td>
</tr>
<tr>
<td>Good Communication skills</td>
<td>Ability to communicate technical information to nontechnical audiences</td>
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<tr>
<td>Handles administrative tasks</td>
<td>Receives and processes monthly human resource action reports</td>
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Appendix B: Example Job Descriptions

1. EURēCA! Research Assistant in Behavioral Neuroscience

**Purpose:**
The research assistant will conduct independent experiments that will contribute to broader team projects. This work-study student will collaborate with other lab members, including research assistants, graduate assistants, and the principal investigator.

**Position Description:**
The research assistant will conduct behavioral neuroscience research aimed at understanding how exercise increases stress resilience in rodent models. This work-study student will be involved in all aspects of research, including study design, lab work, method development, data generation and analyses, and data presentation.

**Duties and Responsibilities:**
Duties may include data collection, working with live rats, small animal surgery, tissue collection, and microscopy supporting the principal investigator's research on exercise and stress resilience.

**Skills and Knowledge Gained:**
Critical thinking; problem solving; state of the field technical skills; experimental design; database management; statistical analyses of data; confidence conducting research; communication skills.

**Minimum Qualifications:**
Strong work ethic, willingness to work with live rodents, ability to work with others in a team environment, and previous lab experience.

**Preferred Qualifications:**
Previous experience in a neuroscience lab, prior work with live animals, microscopy, or molecular biology techniques preferred.

**Trainings to be completed:**
Environmental Health and Safety, Bio-safety, IACUC, Information Security and Privacy, and Discrimination and Harassment Trainings.

**Position Commitment:**
10 - 25 hrs./week.
2. EURêCA! Research Assistant in Photography

**Purpose:**
The research assistant will work with a faculty mentor on fine art photography projects and exhibits.

**Position Description:**
The research assistant will employ experimental analog techniques in the black and white darkroom, assist with the production of exhibition quality prints, and prepare photographic materials for exhibitions.

**Duties and Responsibilities:**
Duties may include shooting with medium and large format cameras, selecting props for still life photographs, developing black and white film, printing black and white photographs in the darkroom, experimenting with light-sensitive photographic materials, creating editions of final prints, preparing prints for exhibitions, creating print inventories, maintaining a clean studio space, preparing digital files for publicity materials, crating and shipping framed photographs, and participating in the business practices of a professional artist.

**Skills and Knowledge Gained:**
Creative and conceptual skills related to the production of contemporary art, technical skills in analog image production, understanding fine art business practices, ability to prepare artwork for an exhibition, confidence in conducting creative research, and communication skills.

**Minimum Qualifications:**
Experience developing black and white film and printing black and white negatives. Strong work ethic, organizational skills, communication skills, and ability to work independently.

**Preferred Qualifications:**
-Experience shooting medium and large format cameras, experience with mat cutting, framing and presentation of artwork, working knowledge of Photoshop, and working knowledge of Lightroom.

**Position Commitment:**
10 hrs./week

**Trainings to be Completed:**
Information Security and Privacy Awareness Training and Discrimination and Harassment Training. Will also receive training on equipment in the studio as needed.
3. EURēCA! Research Assistant in Virtual Reality Development

**Purpose:**
The research assistant will write code in c# that contributes to the CRC (The Creative Research Collaboration) research team project in building an audio-visual VR world via the Unity platform. This work-study student will collaborate with other research team members, including a senior Ph.D. researcher in the CS department, two professors from MEIS and CS department, and a program director in Recording Arts program from MEIS.

**Position Description:**
We are developing a social audio-visual VR application that promotes mental health and well-being. The final work will be published and exhibited at the most prestigious research/artistic venues and journals such as IEEE and Ars Electronica.

We are looking for a junior VR developer who is passionate about using technology skills to help people and wants to join a fun, dynamic team to help us build this intervention. You will work closely with other engineers and faculty mentors who are delivering both front and back-end functionality that will need to be integrated and maintained in Unity. We are building a scalable social environment targeting Oculus Rift, Oculus Quest, and other VR headsets.

**Duties and Responsibilities:**
Duties may include literature searches, computer programming in c# via the Unity VR environment, and conducting user studies that support the mentor on education/research intervention. Our CRC team will provide technical and research training as needed.

**Skills and Knowledge Gained:**
Critical thinking, state of the field technical skills in VR development, software development implementation, confidence in conducting research, and communication skills.

**Minimum Qualifications:**
- Some experience with Unity and c#
- A passionate computer programmer who is comfortable with exploring new platforms and programming languages.
- Creative coder

**Preferred Qualifications:**
- Experience with VR/AR headsets and controllers such as the HTC Vive, Oculus, HoloLens, Magic Leap, and motion capture accessories
- Ability to collaborate and communicate across disciplines
- Demonstrated curiosity and willingness to troubleshoot emerging technologies
- Can conduct independent research and studies with guidelines
- Demonstrated commitment to supporting diversity, equality, and inclusion.

**Position Commitment and Preferred Work Times:**
25 hrs./week
Weekly meetings on Mondays from 2pm - 3pm and by appointment.

**Trainings to be Completed:**
Information Security and Privacy Awareness Training and Discrimination and Harassment Training.
“[Being my research problem, it was up to me to solve. ...The crucial lesson was that the scope of things I didn’t know wasn’t merely vast; it was, for all practical purposes, infinite. That realization, instead of being discouraging, was liberating. If our ignorance is infinite, the only possible course of action is to muddle through as best we can (Schwartz 2008, 1771).

Research is hardly easy. As Martin Schwartz points out in his 2008 essay “The Importance of Stupidity in Scientific Research,” solving research problems requires us to immerse ourselves in the unknown. However intimidating it may be to overcome this infinite amount of ignorance, we believe there is a special set of traits that will equip an undergraduate researcher to successfully solve research problems. Creativity, judgment, communication, organization, and persistence are all equally important skills to make the leap from gaining knowledge from others’ discoveries to making discoveries on your own. Having and honing these skills, skills that encompass every level of research in every discipline, are key to an undergraduate developing the foundation for a successful career in research. As a group of undergraduate researchers and mentors, we want to motivate students to solve problems and make discoveries, and to start a discussion on how to forge the right path for each student toward research success. Following is our list of key skills.

Creativity

It is difficult to find a definition of undergraduate research that does not include a reference to creativity or that does not contain terms such as original, authentic, or unique. Clearly, then, creativity is a constant for the undergraduate research process. In an article by Jeffrey M. Osborn, dean of The College of New Jersey, and Kerry K. Karukstis, professor of chemistry at Harvey Mudd College, originality is said to be a “common thread that runs through every undergraduate research activity on campus.” Creativity and originality go hand in hand. Creativity is the ability to transcend mainstream ideas, and creativity all but requires originality. It is no surprise then that originality is so pervasive throughout the college or university campus. The Council of Undergraduate Research provides a universally applicable definition that describes undergraduate research as “an inquiry or investigation conducted by an undergraduate student that makes an original, intellectual, or creative contribution to the discipline” (Wenzel 1997, 2000). All researchers, not just undergraduates, require creative thinking and process development to build upon today’s knowledge. Creativity is an essential trait that undergraduate researchers should seek to develop and utilize within their research experience.

The first step in research is developing a topic or a plan for exploring a problem, and creativity is fundamental to this effort. As members of our university’s Student Undergraduate Research Council, we constantly come across prospective undergraduate researchers who don’t know where to begin. Students in all disciplines are unsure, even lost, as to how they should start deciding upon a research topic. We encourage students to research their discipline extensively, to find out what has and has not been studied, and to attempt to find a topic in which they are genuinely interested. Even by studying research outside their own disciplines, budding researchers can use the creative process to make new connections, pushing the envelope of what is possible in discovery. Ingenuity, uniqueness, and, most importantly, creativity are all skills that need to be applied in creating that standout research concept.

Students who are still hesitant about delving into the creative process of undergraduate research as part of an independent endeavor should seek to develop their creativity by participating in ongoing research and watching how a faculty mentor or graduate student employs creativity in conducting that research. During this time, undergraduate researchers can learn how to think creatively within the context of their field and possibly discover a topic of interest that will provide them with an independent, unique research opportunity. But students should not limit themselves to the expertise of their faculty mentors. To be a true researcher, undergraduates should strive to reach beyond their own disciplines, either into closely related disciplines or those completely unrelated to their own, for possible ideas.

Judgment

A quite specific sort of judgment is critical when participating in the world of research. Just as the mentor may exercise judgment in selecting a mentee, an undergraduate researcher should likewise evaluate and choose a mentor who will help the researcher to grow in the best possible way. Personality,
temperament, and style of research are all factors to consider when choosing a mentor. Another important aspect of judgment is recognizing when to ask for help in solving problems. To gain the most experience from research, students must make a calculation between knowing when to ask for help when they encounter an obstacle or possibly lose time by deciding to tackle the problem on their own. The progress of the research and perhaps the opportunity for the project to be finished successfully may rest on what they decide.

However, student researchers should not over-utilize a mentor's valuable time; instead, they should strike a balance between independence and seeking assistance. As undergraduate researchers move on to higher-level studies and professional careers, this ability to discern their own and others' needs, and thus make judgments in a fluid environment, must become automatic and unconscious, so they do not waste precious time and energy weighing the pros and cons of every single decision.

Undergraduate researchers also should consider and study the importance of good judgment in ethical dilemmas in research. Failure to exercise good ethical judgments can seriously jeopardize the careers and integrity of not only the student researchers, but also of their mentors, colleagues, and possibly even their college or university. Undergraduate researchers must be careful not to rely solely on the examples set by faculty mentors or fellow students. Additionally, students should spend ample time learning about the ethical issues associated with their particular fields and strive to utilize their own considered judgments to arrive at appropriate, safe, and ethical conclusions. Today's undergraduate researchers should be cognizant of and conversant with common areas of ethical failings, such as misuse and misrepresentation of findings, wrongful disclosure, and even plagiarism. Being aware of potential ethical issues will help to maintain the integrity of the research for all parties involved.

Although it may be difficult to always make the best choices in an unpredictable world as research, undergraduate researchers have the opportunity to develop ethical and rational decision-making skills in a lower-stakes environment with oversight by experienced researchers. They can, through practical application, gain experience in making ethical judgments. They can learn to recognize the issue at hand (whether it be time conflicts or personality conflicts or something else); determine the pros and cons of each possible way of dealing with the conflict; seek advice from veterans of research; and, when appropriate, take the occasional risk. Studying these different types of decision-making processes (Bennis et al. 2010, 191) can help students develop the skills in exercising judgment that undergraduate researchers require. Eventually the skills should become second nature.

Communication
For this article, we refer to communication as the set of skills necessary to develop and maintain an effective relationship between an undergraduate researcher and his or her faculty mentor. The importance of a mentee-mentor relationship to all undergraduate students is best characterized by UCLA's Alexander Astin, who counts these interactions as one of the most important factors in the development of a student's undergraduate experience (Astin 1991). The positive implications of these relationships extend to undergraduate research as well, because these interactions “potentially have the longest-lasting impact” on the undergraduate researcher's personal growth and academic development (Malachowski 1996, 90). Faculty mentors are the most valuable link between the student and the new and unfamiliar world of research. Mitchell Malachowski, in his discussion of the importance of faculty mentors to research projects, states they “encourage and guide the student’s personal growth and academic development, while providing support and assistance as the student works through the challenges” of undergraduate research (Malachowski 1996, 90).

Initiating communication with a faculty mentor during the early phases of the undergraduate research process can be an intimidating situation; students sometimes begin the process with faculty members with whom they have little experience. They may be hesitant to contact mentors outside of the predetermined research time at first, worried that their questions could be “annoying” or their concerns “silly.” However, in our experience, mentors are more than willing to accommodate students with in-person meetings and email exchanges, or to suggest the use of more-experienced student researchers as “peer mentors” for inexperienced undergraduate researchers.

Nonetheless, undergraduate researchers should be respectful of their mentors and their time; faculty mentors often balance a schedule consisting of multiple courses, their own independent research endeavors, and mentoring of additional undergraduate or graduate researchers. In our experience as undergraduate researchers, however, we have found that the creation and maintenance of productive relationships with our mentors have led to an increased understanding and knowledge of our respective fields, additional research opportunities, and overall enhanced personal and professional skills.

Organization
Well-honed organizational skills facilitate effective research and good science, as well as allowing students to balance classes, studying, research, socializing, hobbies, and maintaining a healthy lifestyle much easier. Keeping an organized
It is a common misconception that success as an undergraduate researcher depends solely on the student’s initiative, hard work, and dedication. The contributions of the supervisor in the student-mentor relationship, however, are equally crucial in promoting efficient and sustained undergraduate research (UR).

As a participant in the University of Ottawa’s Undergraduate Research Opportunity Program, I was enticed into research by an amazing professor who is not only renowned in his field, but also is able to enthusiastically communicate and transfer his knowledge. While research has been the most intellectually stimulating and useful opportunity of my university career, I soon discovered that many of my peers did not feel the same way about their experiences. In discussion with my fellow researchers, it became apparent that the supervisor’s involvement is the key to success. Drawing on my colleagues’ experiences, I present a few simple tips for UR mentors that will benefit faculty members’ work and improve the accomplishments of their UR assistants.

- **Schedule regular meetings with your undergraduate researcher.** This gives you a chance to check progress, answer questions, and minimize potential miscommunication concerning your research.

- **Communicate your research in layman’s term.** Explaining the bottom line and importance of your research motivates your undergraduate assistant by providing an overall goal to achieve.

- **Establish networking opportunities by introducing your student to colleagues and graduate students.** Your researcher will gather resources, develop partnerships between projects, and maximize the return received from the student’s investment in your research projects.

- **Express your energy, enthusiasm, and interest.** Passionate leadership results in passionate results!

- **Mutual respect is a two-way street.** Although undergraduates are at the bottom of research hierarchy, consideration and kindness encourage devotion and loyalty on the part of both parties.

- **Provide resources for your undergraduate researcher.** It is surprising how much a designated workspace or computer will encourage work in the lab.

- **Be available to your undergraduate researcher.** Professors will often shift the mentorship role onto graduate students. While a graduate student provides a great resource, the faculty member must also be available to teach and directly guide the undergraduate researchers.

Perhaps the real secret of any successful endeavor is communication!
of progress, and we often learn more from our mistakes than our successes, especially in research, where the investigator must consider many aspects of a problem. Many students pass up an opportunity to do research if there is a chance they might not succeed. Mistakes should be embraced as an opportunity to learn, and students should stop harboring a fear of failure. Although it is difficult to remain persistent at times, students must remember that it will pay off in the end, in the form of quality data, a solid synthesis, or even simply an educational experience.

Persistence is especially useful for budding undergraduate researchers who do not have strong resumes or previous experience. It’s a trait definitely noticed by most faculty mentors. Sometimes, a faculty mentor will pick a student for his or her lab even though the student has less experience than other candidates simply because the student has displayed strong motivation. Later, when a student is committed to research, persistence is essential to developing and carrying out a thorough project. Students who overcome roadblocks successfully by being diligent in reading the research literature and making use of their faculty mentor’s expertise will find that when it comes time to present their work, answering questions is effortless because the students have put in the foundational work. Persistence becomes an increasingly integral part of the research process as student researchers progress to graduate school and future academic endeavors. The majority of researchers must write several grants in order to initiate their research. This process inevitably involves rejection and, therefore, the motivation to rewrite and edit grant applications is crucial to launching the research process and a productive research career.

Conclusion

Applying the five skills outlined above will help an undergraduate transition from being a student to becoming a researcher and move from learning to discovering. Although we come from various backgrounds and research fields and have different personalities, we have found that these skills are common to all of our successes, from attending conferences on human factors in psychology, to writing a thesis on Italian architecture, to restoring oyster reefs, and even to studying molecular genetics in Germany. Creativity, judgment, communication, organization, and persistence are universally applicable in the pursuit of becoming a better researcher. We hope that this set of essential skills will provide a foundation not only for what it means to be an undergraduate researcher, but also will create the opportunity for a dialogue among researchers at all levels, from the undergraduate to the tenured professor, regarding what makes undergraduate researchers truly succeed.

References


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Adrienne Showman is a senior pursuing her bachelor’s of science in molecular biology and microbiology at the University of Central Florida. Having worked in a biochemistry and X-ray crystallography lab for the past year and a half, her research interests include molecular biology and structure determination. She spent a summer abroad in Germany, working at Humboldt University in the Breeding Biology and Molecular Genetics Department through the German Academic Exchange Service: Research Internships in Science and Engineering Program (DAAD RISE). She hopes to pursue a PhD in biochemistry, and enjoys hiking, traveling, and mentoring outside of class and lab work.

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