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Undergraduate Research Opportunities



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Why Do Research?




- Develop skills for a career in research
- Explore your interests in a specialized field
- Apply your academic knowledge to real world situations
- Try out the grad student experience without the commitment

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MECH 493 – Introduction to Academic Research


- 3 credits over 2 terms
- Mech 493 will help you:
 - Gain experience in the practice of academic research
 - Understand the difference in thinking style required when doing research compared to when doing coursework studies
 - Gain a deeper knowledge of a specialized area of interest
 - Gain personal insights into the practice of research to provide data for your decisions regarding future study/career choices



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Course Prerequisites:




- 80% average in 3rd year
- 4th year standing
- Permission of instructor
- A short proposal written in collaboration between the student and the Research Supervisor who must be a faculty member in Mechanical Engineering

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Interested? Here's how you get started:

1. Find a faculty member in Mechanical Engineering who is willing to be your Research Supervisor
2. Work together to write a research proposal over the summer
3. Submit the proposal to the course instructor for approval




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Questions?

If you have any questions or would like more information on the course, you can contact this year's course instructor:

Dr. James Olsen
604.822.5705
olson@mech.ubc.ca



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What is a NSERC USRA?

- NSERC = Natural Sciences and Engineering Research Council
 - Supports research by university students, postdocs and professors
- USRA = Undergraduate Student Research Awards
 - Offered by NSERC
 - Provides opportunities for students to get research experience in an academic setting



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Why Should You Do a USRA?



- Excellent chance to get paid while getting research experience in a University setting
- Discover whether research is for you before entering graduate studies
- Looks good on a grad school application and a great way to meet a prospective supervisor
- Most positions count as co-op work terms (check with the co-op office first)
- Fun to be on campus in the summer time!

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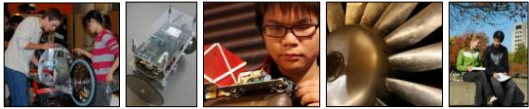
Eligibility Criteria



- Canadian citizenship or permanent residency
- Registered as a full-time undergraduate student at the time you apply (you can hold a USRA for the term directly after your graduation requirements are met)
- An overall cumulative average of 68% (B-)
 - Competitive average is typically >80-85%
- Completed all required first year courses
- Have not started graduate studies
- No more than 3 in your lifetime (including IUSRAs)

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Application Procedure




- Find an eligible professor who conducts research in an area you are interested in and contact them directly, as they make the hiring decisions
- If they agree, fill out Form 202 Part I online and ask the professor to complete Part II
- Submit both forms, along with an original, sealed transcript to the Mechanical Engineering Undergraduate Office (CEME 1214) by the deadline
- For more information, visit http://www.nserc-crsng.gc.ca/Students-Etudiants/UG-PC/USRA-BRPC_eng.asp

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Location & Travel Subsidy

- USRAs are held at the school you applied for them at, with the professor you applied with. You can't transfer them.
- You can apply at other institutions. Check their websites for details.
- NSERC may approve a travel allowance for the actual costs you incur to get to your host university, if it is different from the one you are attending at the time of the award. The maximum allowance is an amount equivalent to economy airfare between the cities where the universities are located.



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IUSRA


- IUSRA = Industrial Undergraduate Student Research Awards
 - IUSRA is the same as USRA, but in industry
- Select Canadian companies can also participate in the NSERC USRA program. A list of eligible organizations can be found at http://www.nserc-crsng.gc.ca/NSERC-CRSNG/eligibility-admissibilite/EligibleOrganizations-OrganismesAdmissibles_eng.asp
- Interested students should contact the company directly



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Who Can Do a Work Study/Work Learn?

- Work Study (for domestic undergraduate and graduate students) and Work Learn (for international undergraduate students) offer part time, on campus jobs to eligible students
- Work Study Eligibility:
 - Undergraduates must be enrolled in at least 9 credits per term (or 6 credits at any time during the summer session)
 - Graduate students must be paying full time fees




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Who Can Do a Work Study/Work Learn?

- Work Learn Eligibility:
 - Undergraduates must be a full time, degree-seeking student and registered in the Faculty of Applied Science (or others – see the website for full list)
 - Students must have a study permit that is valid for at least 6 months
 - Visiting/exchange students and graduate students not eligible for Work Learn

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Getting Started



- Work Study and Work Learn job postings can be found on the Career Services website at:
 - Work Study: <http://www.students.ubc.ca/careers/students/work-and-volunteer-opportunities/work-study-work-learn/work-study-job-postings/>
 - Work Learn: <http://www.students.ubc.ca/careers/students/work-and-volunteer-opportunities/work-study-work-learn/work-learn-job-postings/>

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Can't Find the Right Job? Make Your Own!



- As a UBC student, you can create an employment opportunity in your area of interest by asking potential supervisors to develop a Work Study or Work Learn job for you
- See the website for more information on how to do this, as well as tips on approaching potential employers

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Sample Work Study Jobs in MECH

Work Study Winter job postings

PROJECT NUMBER: 2464

Job title	Laboratory Assistant
Description	Assist to researchers in the Collaborative Advanced Robotics and Intelligent Systems Laboratory. Assist with general lab activities such as maintaining and ordering the lab materials, tools, consumables and equipment. Operate and program the robots. Update, adjust and integrate experimental code and equipment for ongoing robotic experiments as experience allows. Perform and train students, run experiments, collect data. Prepare contributions to technical reports and papers, prepare figures and do analysis of results.
Skills required	C++, Matlab, Labview, shop and electronic skills all desirable. Must be very well organized, pay attention to detail, self starting, have excellent verbal and written communication skills, and desire to get along with their students interested in robotics and intelligent systems.
Skill and knowledge acquisition	Opportunity to participate in a dynamic and thriving robotics research group. Learn about research work in this area, and develop lab related skills.
In this position research oriented	Yes
Hourly wage	\$16.41
Hours per week	10
Number of positions	2
Apply with (all)	Resumé Cover letter Other: electronic copy of transcript
Apply to	Project supervisor

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Co-operative Education



- Undergraduate positions in research are sometimes available to students through the co-op program
- Look for keywords like "research", "development", or "testing"
- You may need to do an independent job search for research positions, so students are encouraged to contact professors and/or companies that are doing research that is of interest to them

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Interested in Research? Prepare Yourself!

- What are potential employers in research looking for?
- What is a good way to show your professor that you are interested in their research?
- What research is going on in Mech?
 - Our department is home to one of the most active research programs in Canada
 - Four main research groups: Biomedical, Applied Mechanics and Design, Thermofluids, Mechatronics and Manufacturing
 - www.mech.ubc.ca/research





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Biomedical Engineering Research Group




Current Projects:

- MEMS drug delivery devices
- Safe vehicle seat design
- Medical robotics & computer-assisted surgery
- Biomedical sensing
- Cerebrospinal fluid pressure sensor
- Biomechanics:
 - Injury prevention & treatment
 - Medical device development
- 3D ultrasound

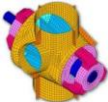
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Design and Applied Mechanics Research Group




Current Projects:

- Mechanics of nano-composites
- Vehicle occupant dynamics
- Measuring residual stresses
- Development of high-speed scanner for lumber inspection
- Fatigue of Memory Shape Alloys
- Crack detection and propagation in rotating components





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Thermofluids Research Group




Current Projects:

- Computational fluid mechanics for biomechanics, engines, aerospace and industrial applications
- Aerosols, sprays and fibers: healthy buildings, industry and the environment
- Advanced power systems: natural gas engines and fuel cells
- Active noise control and acoustics in green buildings
- Energy conservation

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Mechatronics and Manufacturing Research Group



Current Projects:

- Virtual machining, milling, drilling, and turning
- MEMS optical scanner
- Vision guided robots, industrial robots
- Human-Robot interaction
- High performance machine tools
- Electromechanics