



Finding a Research Experience: On Campus and Beyond

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TIDES Engage – Your Gateway to Experiential Learning Painter Hall 3.04

- Undergraduate Research
- Internships
- Entrepreneurship
- Study Abroad/Research Abroad
- Service/volunteer
- Short-term activities
- And more...





Today's agenda

- Steps to finding a research placement on campus
- Strategies for finding a summer program
- Q&A

****We will send you all the materials and notes from today after the event.****

Activity: in groups

Sort the slips into 3 categories

Rank them from most important to least important

1 - Strategies for Finding a Research Experience
On Campus

2 - Strategies for Finding a Summer Experience
Beyond Campus

3 – These are really terrible tips!

On Campus

- Assist on a faculty member's project; work in a research group
- More independence as you advance
- Can be academic year or summer
- Goals:
 - Make contacts
 - Get experience
 - Fine-tune your research interests
 - Devote time to exploring a research topic
 - Gain skills
 - Find out what grad school is like
 - And more...





Step 1: Explore your interests.

- **What are you interested in?**
What drew you to science in the first place?
- **Are there courses/topics that you want to know more about?**
- **Browse faculty websites.** Read research summaries, and see what catches your interest.



Step 2: Come up with a list of 2-3 faculty members you want to contact.

- [CNS departmental](#) faculty profiles
- Your network - faculty members/instructors, TA's, your peers, courses, advisors
- [EUREKA!](#) search tool
- CNS [experiential learning listserve](#)

Step 3: Prepare for contact

- Come up with a list of 3-5 faculty members you'd like to contact
- Plan to contact them one at a time.
- Find the list of recent publications by this person; browse titles and abstracts. (Use google scholar.)

Catalysis and Regioselectivity of the Aqueous Heck Reaction by Pd(0) Nanoparticles under Ultrasonic Irradiation

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An aqueous Heck reaction carried out under ultrasonic irradiation at the ambient temperature (25 °C) has been shown in this study to afford high yields of corresponding products. It was found that as a catalyst for corresponding palladium forms nanoparticles in-situ, characterized by transmission electron microscopy (TEM) and X-ray powder diffraction (XRD) analyses, and can be recycled. Furthermore, the Heck reaction under such mild and environmentally friendly conditions offers excellent regioselectivity of *para*-ortho-substitution in phenyl iodides especially with electron-donating groups.

The palladium-catalyzed Heck reaction¹ between aryl halides and alkenes is a versatile method for carbon-carbon bond formation in organic synthesis.² To minimize adverse impact of organic solvents on the environment, recent efforts have been

directed toward using aqueous solvents including the Heck reaction.³ However, in all of the latter cases,³ more regioselectivity is required for constructing complex molecules. As far as we know, the regioselectivity of aryl iodides in the Heck reaction has been extensively investigated. In this study, we report a Heck reaction of *para*-ortho-substituted aryl iodides that is catalyzed in situ by palladium nanoparticles under aqueous and ultrasonic condition at ambient temperature.

The Heck reaction of iodobenzene with methyl acrylate in the presence of PdCl₂ and NiCl₂·6H₂O in a mixture of 1 mmol of iodobenzene, 2 mmol of methyl acrylate, 0.02 mmol of PdCl₂, NiCl₂·6H₂O, as base, and tetrabutylammonium bromide (TBAB) in water at 25 °C for 4.5 h, (E)-Methyl cinnamate **1** was obtained with a yield of only 10%. Inspired by the report that the same reaction may promote organic reactions,⁴ we performed the Heck reaction under ultrasonic irradiation hoping to realize the reaction in water without heating. Indeed, the reaction carried out under such conditions resulted in an enhanced yield from 10% to 86%. The reaction conditions were systematically optimized, and the results are presented in Table 1.

(1) For a general introduction to organic reactions in water, see: (a) P. J. Flinn, Ed., *Blackie Academic and Professional, Organic Synthesis in Water*; Green Chemistry, London, 1998; (b) J. L. Kice, J. Chen, T. H. Organic Reaction in Aqueous Media; Wiley: New York, 1997; (c) J. L. Kice, C. T. Chen, (d) Genet, J.-P.; Sauvignon, M. L. *Chem. Rev.* **1999**, *99*, 376, 305.

(2) For recent changes, see: (a) Arvelo, R. K.; Lindström, N. E.; Rørdahl, R. B. *Chem. Rev.* **2005**, *105*, 3557. (b) Bhattacharya, S.; Srivastava, R. K.; Ghosh, M. *Chem. Rev.* **2002**, *102*, 1247. (c) Sato, T.; Nishimura, S. *Chem. Rev.* **1999**, *99*, 1247. (d) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (e) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (f) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (g) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (h) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (i) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (j) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (k) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (l) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (m) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (n) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (o) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (p) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (q) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (r) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (s) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (t) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (u) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (v) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (w) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (x) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (y) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485. (z) Miyaura, N.; Suzuki, M. *Chem. Rev.* **1995**, *95*, 2485.



Step 4: Email Faculty

What should you include in an e-mail?

- Use professional, formal writing
- Introduce yourself
- Give your background and qualifications
- Show interest in the research, not just personal gains
- Express interest in assisting on the project
- Be flexible on times and expect to devote substantial time
- Include formal signature with full contact info

To: i.b.scientist@utexas.edu;
betty.biologist@utexas.edu; dean@cns.utexas.edu

Subject: wanna do research with you

hey professor,

i am looking to do research to help with my med school applications next year.

can i work in your lab?

i can work mondays from 3:15-4:00 and thursdays 6-7 starting next week.

thanks,

joe



To: betty.biologist@utexas.edu

Subject: Interest in your antibiotics research

Dear Professor Biologist,

I am a sophomore molecular biology major here at UT Austin. Last semester my BIO 327Q instructor, Prof. Professorson, had us read your 2016 antibiotics microbial synthesis paper and I was really interested in your field of research.

I am interested in participating in research work while here at UT and was hoping you might be willing to meet with me to discuss possible opportunities in your laboratory.

I have not yet done formal research work. However, in my laboratory classes, I have been very successful in bench work and my BIO 233M instructor said I follow protocols well. I have a 3.8 GPA and all A's in my micro biology courses. Attached is my resume with more details on my background. I am a hard worker and would be happy to make a multi-year commitment to work in your group, should you find I am perform to your standards.

Thank you for your consideration of this meeting request. I look forward to meeting with you.

Sincerely,

Joseph B. Researcher



Subject line: *Seeking Undergraduate Research Opportunity*

Dear Dr. _____ ,

My name is _____, and I am a _____ year _____ major interested in conducting research related to _____. I have taken _____ and _____.

I have read your recently published articles on _____ and find them very interesting. I'm especially intrigued by _____.

Would it be possible to meet with you to further discuss your research and my possible involvement on the project? I am generally free _____ and _____ afternoons during the week.

Sincerely,



Step 5: Meet with Faculty

Prepare to answer these kinds of questions:

1. Why do you want to get involved in research?
2. What is it that made you want to join our research group?
3. How much time can you dedicate to research?
(hrs/week and number of semesters)
4. I don't have any space in my lab right now. Do you have any other questions for me?

Step 6: Do Research!

What if all goes well and you join a lab?

Clear communication from the outset is important.

Research can be done as a volunteer, for course credit, or sometimes, for more advanced positions, for pay. Speak with your faculty supervisor about options.

Negotiate a plan/schedule with your faculty mentor.

Ask key questions like:

- Is there any reading I should do to prepare?
- Is there a weekly lab meeting I should plan to attend?
- Who should I schedule my lab time with?
- What other expectations do you have?

Keep your commitment. Ask if anything is unclear.



RECAP STEPS:

1. Explore your interests.
2. Come up with your list of faculty to contact
3. Prepare for contact.
4. Email faculty member(s).
5. Meet with the faculty member(s).
6. Follow through and do research!

NEXT...

Summer Programs





Summer programs – beyond UT Austin

- Research programs with formal application process and firm deadlines
- Competitive
- Hosted at universities, institutes, agencies across the country
- Significant time commitment – full time for 8-10 weeks
- Benefits:
 - Intensive summer experience without distractions
 - Make contacts
 - Explore career paths or grad school possibilities
 - Travel!
- Usually offer a generous stipend, often with support for travel/room and board
- Application season November – February (right now!)



Finding a program

- [NSF Research Experience for Undergraduates](#) (REU) – database can be searched by area of interest or location (600+ programs)
- [Science.gov](#) – database of federal fellowships/internships in STEM
- [Pathways to Science](#) – database of summer research and internships
- CNS Health Professions Office [list of summer programs](#)
- Professional societies (ex: American Chemical Society, American Mathematical Society, etc) You can find most of these in the TIDES portal.
- Texas Institute for Discovery Education in Science (TIDES): [Experiential Learning for Your Major portal](#)

Research abroad

- Combine your passion for science with exploration of a new culture!
- Travel and live abroad
- Second language usually not required

Example:

[DAAD Research Internships in Science and Engineering \(RISE\)](#)

- Offers summer research internships in Germany
- Biology, chemistry, physics, earth sciences and engineering
- Students must have completed 2 years of undergrad degree
- Deadline to apply: December 15, 2018

Find more programs here: [CNS Research and Internships Abroad](#)

Snapshots of Chemistry: Visualization at the Molecular Level

- NSF REU program
- University of Southern California
- Research focus: gaining insights on key chemical features of molecular processes via visual images
- May 28-Aug 3, 2019
- \$500/week stipend. Housing, travel, insurance covered.
- Juniors are given priority, although sophomores considered.
- Application deadline: Feb 15, 2019

There are so many opportunities.

Narrow your options by...

Topic

Eligibility

Location

Dates

Benefits

Structured vs. on your own?

Read carefully...

What are the application requirements for the program?

Common:

- Personal statement
- Letter of recommendation
- Resume/CV
- Transcript



Overview: Writing the Personal Statement

1. Read the prompt.
2. Tell a story. Paint a mental picture of who you are (but don't start at birth!).
3. Use specific anecdotes and examples of your experience to show how you are a good fit for the opportunity.
4. Make it clear that you understand the opportunity by referring to the program description or specific faculty who are involved.
5. Explain how this opportunity will help you achieve your goals and future plans.
6. Write clearly. Ask several people to proof-read your work.



Personal Statement Assistance

[University Writing Center](#) - They can assist at any point in the writing process, from brainstorming to final revisions.

- Located in PCL 2.330
- Go online to make an appointment.

Also, there are numerous resources on the web:

- <https://undergraduate.research.gwu.edu/personal-statement-writing-tips>
- https://www.chronicle.com/article/Helping-Students-to-Tell-Their/134502/?cid=at&utm_medium=en&utm_source=at



Letters of recommendation

Activity: 2 min

Discuss with your partner:

When approaching faculty for recommendation letters, what do you think is important to remember?

Keep in mind...

- ✓ Select someone you think will be supportive
- ✓ Ask *before* you list them as a reference
- ✓ Remind them of your relationship (you took their course. . .)
- ✓ Ask if they can write a supportive letter
- ✓ Waive your right to read the letter
- ✓ Provide necessary materials
- ✓ Provide information about yourself (resume, personal statement)
- ✓ Allow enough time (at least two weeks, a month is better)
- ✓ Send a thank you note

Using the criteria we discussed, what do you think of this message?

Hey Dr.-----:

My name is ----- . I was in your CH 301 class 2 years ago. You might remember me. I would like to ask for a recommendation letter for my application to a summer research position.

Thank you,
Student A





Dear Dr.-----

I hope this email finds you well. My name is ---. I was in your CH 301 class a year ago. I enjoyed that class very much, and I am writing to ask if you would write a letter of recommendation on my behalf. I am applying for.....

During the past year, I have been....

For your convenience and more information, I have attached my resume and the . I will be glad to meet with you in person to discuss the letter and the opportunities I am considering.

Sincerely,
Student B

Resume Assistance

CNS Career Services offers:

- [Resume Resources](#) – guides, templates, formatting tips
- Walk-in Wednesdays – 10am-4pm each Wednesday; 15 min coaching appointments
- Career Lab – Walk-in every Friday, 10am-12noon, PAI 5.33



TIDES Support

Review of your completed summer program application materials through TIDES

- Email your materials to tides@cns.utexas.edu
- Allow at least one week for review.
- Set an appointment to go over review comments/suggestions.



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