

# How to build skills and get experience in the aquatic sciences

April 30, 2025



Markus Min, SAFS Graduate Student (mmin@uw.edu)

*The LEAPS program is supported by Marine Biology, the School of Aquatic and Fishery Sciences, and the School of Oceanography*

# Outline for today

Different ways to build skills  
+ gain experience during the  
academic year

Undergraduate research

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# Ways to build develop skills and gain experience as an undergrad

- Coursework
- On-campus opportunities
- Off-campus opportunities
- Undergraduate research
- Other!

Remember: Skills can be learned in many different ways that don't have to be directly related to your major!

# Coursework isn't just for checking off a degree checklist!

## DECLARE A MAJOR IN MARINE BIOLOGY

Marine Biology is an open major that can be declared at any time by currently enrolled UW undergraduates. To declare the major, set up an appointment with a Marine Biology Academic Adviser at <https://marinebiology.uw.edu/students/advising/>.

## COLLEGE OF THE ENVIRONMENT GENERAL EDUCATION

### Basic Skills (Credits vary)

#### English Composition "C" (5) \*

☐ \_\_\_\_\_

#### Writing "W" (10) *8–10 credits fulfilled with major requirements*

☐ MARBIO 305 (3) or FHL 333 (3–5)☐ FISH 323 (5)☐ *Possible additional 2 credits needed \**

#### Reasoning "RSN" (10) *Fulfilled by Math requirements \**

☐ MATH 124/Q SCI 291☐ MATH 125/Q SCI 292

#### Diversity "DIV" (5) *can overlap with Aol \**

☐ \_\_\_\_\_

### Areas of Inquiry (Aol) (60 credits)

#### Arts and Humanities "A&H" (10 credits) \*

☐ \_\_\_\_\_☐ \_\_\_\_\_

#### Social Sciences "SSc" (20 credits) \*

☐ \_\_\_\_\_☐ \_\_\_\_\_☐ \_\_\_\_\_☐ \_\_\_\_\_

#### Natural Sciences "NSc" (20 total) *10 credits of NSc must be outside the major (i.e., not a major prefix and no overlap with major) \**

☐ \_\_\_\_\_☐ \_\_\_\_\_☐ *Fulfilled with Foundation Courses in Science and Mathematics*☐ *Fulfilled with Foundation Courses in Science and Mathematics*

#### 10 additional Aol credits from any category

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\* Equivalent course options available at Washington State Community Colleges.

Coursework from the perspective of transferable skills

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- Examples of elective courses you might select for skill building:
  - FISH 428: Stream and Watershed Restoration
  - FISH 454: Introduction to Quantitative Ecology
  - Some graduate-level courses are open to undergraduates
    - E.g., FISH 552: Introduction to R Programming for Natural Scientists



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- Consider taking field-specific courses earlier during your degree!

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  - Student representative on different committees
- Teaching Assistant/Grader
  - Peer tutoring

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- Volunteer with local organizations
  - Examples: [NW Straits Foundation](#), [Snohomish-King County Marine Mammal Stranding Response](#), [Friends of the Issaquah Salmon Hatchery](#), [WDFW](#), [Seattle Aquarium](#), [Long Live the Kings](#)
  - The degree of involvement is often flexible



# Talk to people in the field to find out what they did as an undergrad!

- Informational interview/career conversation
  - Questions to ask:
    - What were the experiences that best prepared you for your current job?
    - What were you involved with as an undergraduate?
    - What do you wish you had done more of as an undergraduate?

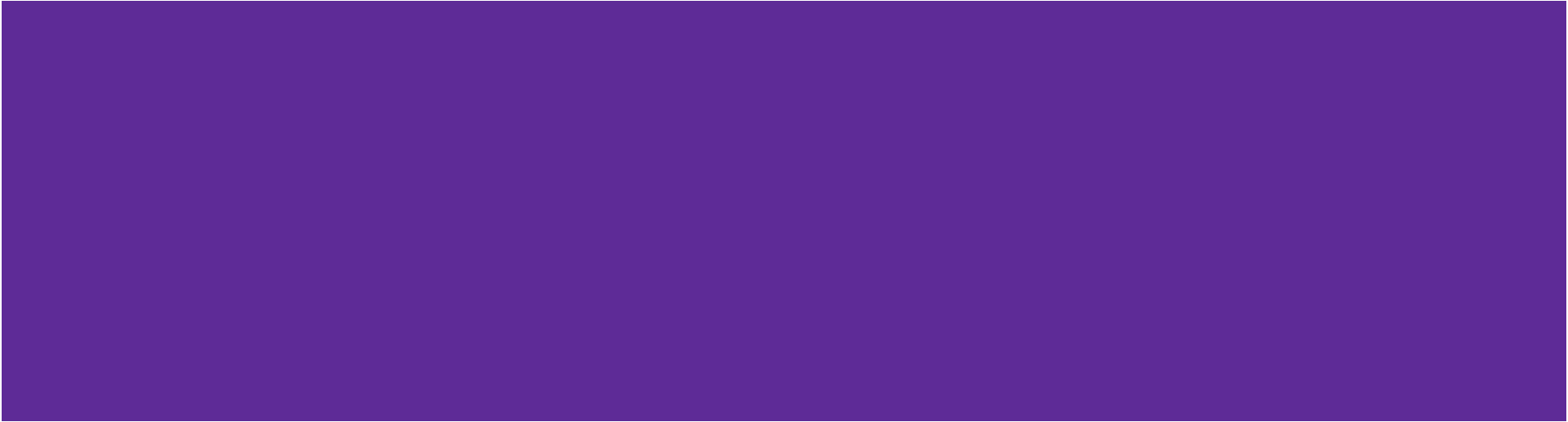
**Questions?**



# Introducing Undergraduate Research



**Undergraduate Research is highly  
variable!**



# Undergraduate research assistant responsibilities

Some subset of the following:

- Sample collection
- Sample processing
- Support tasks (e.g., washing glassware, making solutions, organizing shelves)
- Data analysis/statistics
- Data visualization
- Manuscript writing
- Lots of other tasks!

# Degree of involvement/integration with the lab

- The culture of research labs is highly variable with respect to relationships among members and how undergraduate researchers are integrated into the lab (or not)
- Who you work with directly will vary (grad student, postdoc, faculty member)
- How much time are you expected to commit? Typically somewhere in the 5-15 hours/week range

# Undergraduate research and compensation/credit

- Ways that you may be compensated (or not):
  - Volunteer
  - Course credit
  - Capstone
  - Paid (hourly)
  - Paid (via [Mary Gates](#) or [similar programs](#))
  - Stipend via program like [IBIS](#)

# **Undergraduate research: how you fit into the bigger picture**





# The structure of our college

College

College of the Environment

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College

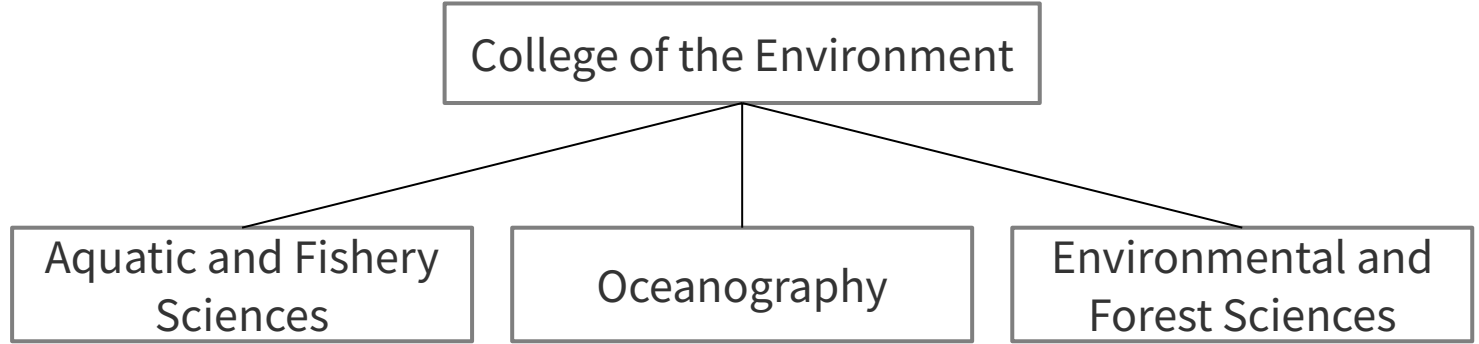
College of the Environment

School/  
Department

Aquatic and Fishery  
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Oceanography

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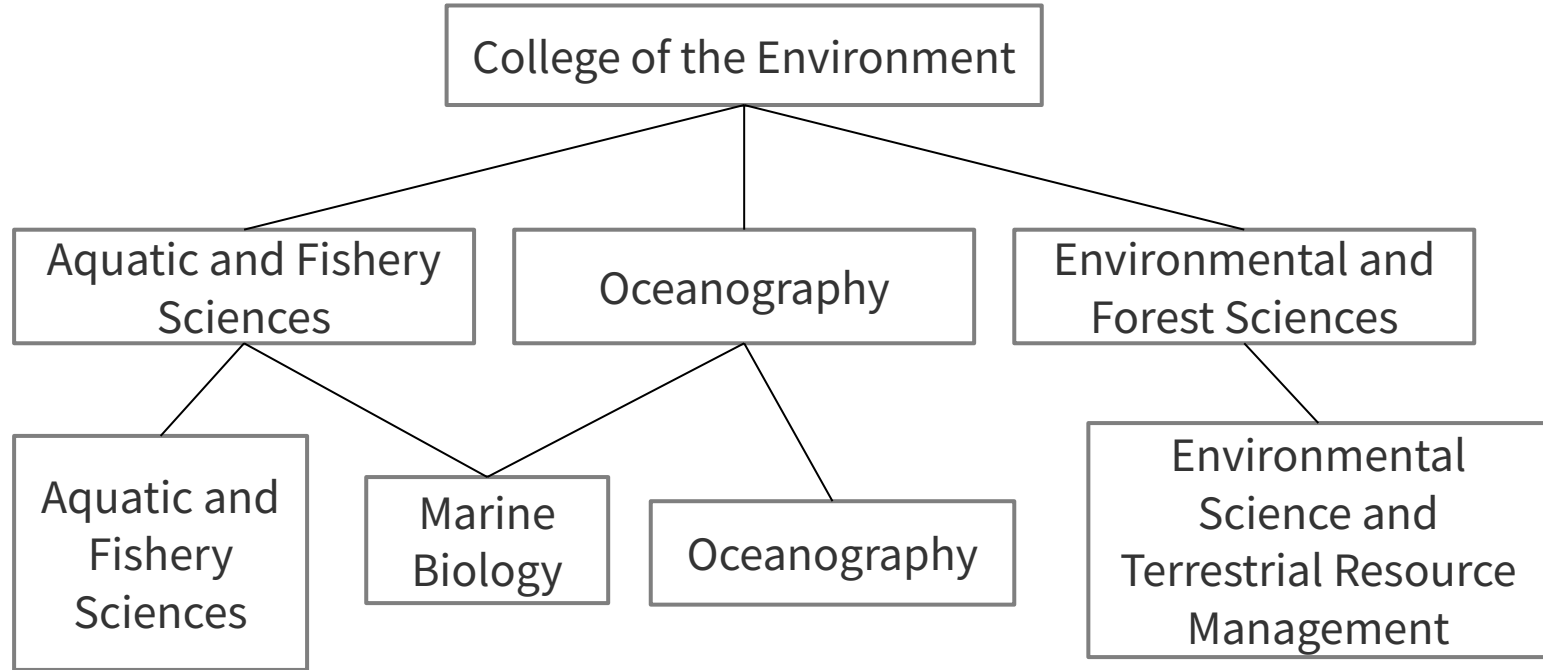


# The structure of our college

College

School/  
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Major



# The structure of our college

College

College of the Environment

**Faculty -> research!**

School/  
Department

Aquatic and Fishery  
Sciences

Oceanography

Environmental and  
Forest Sciences

Major

**Undergraduates**

Aquatic and  
Fishery  
Sciences

Marine  
Biology

Oceanography

Environmental  
Science and  
Terrestrial Resource  
Management

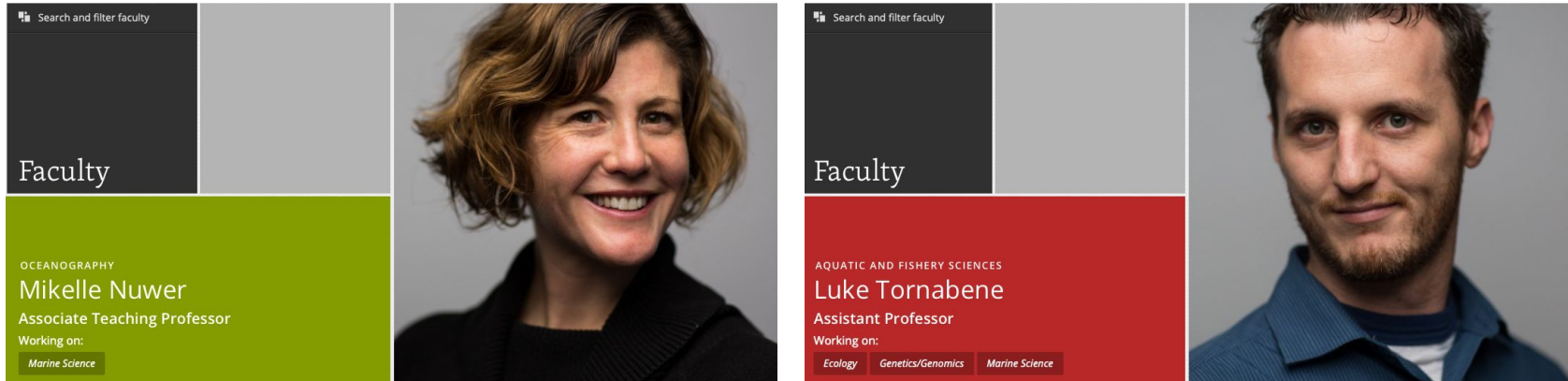
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- Not all faculty do research, and not all faculty work with undergraduates
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*If a faculty member is listed as a “teaching professor” or a “lecturer”, their emphasis is on teaching; if the word “teaching” is not mentioned, they are research focused*

# Faculty research lab composition

Principal Investigator  
(faculty)

Graduate students

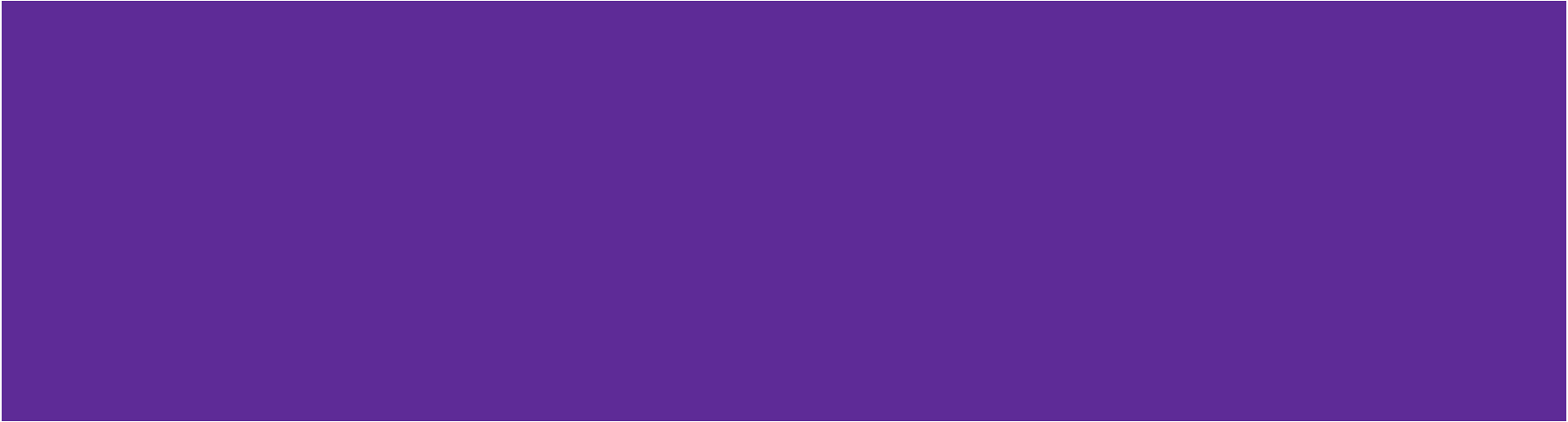
Postdoctoral  
researchers

Staff (e.g., research  
scientists, lab managers)

Undergraduate  
researchers



# **Mechanics of finding a position I: Find a lab**



# What should you look to gain from undergrad research?

“It's more important to use your time in undergrad to cultivate an understanding of what research approaches you enjoy and are good at, and to really focus on developing those - in any lab that uses those methods, regardless of the organism. All of this can be done in a way that is relatively agnostic to taxon, and could later be applied to a variety of taxa. While it is useful to know the ecology of a particular group of species, that can be learned relatively quickly compared to the development of research skills, so research skills are much more highly valued by potential graduate advisors or employers.”



Amy Van Cise  
Assistant Professor,  
UW SAFS

# How do you find a research position?

- Summer research positions/internships tend to have formal advertisements. Academic year positions do not.
  - There are some centralized databases, like the [UW Office of Undergraduate Research](#), but these are far from complete
  - You will see some ads being posted to listservs and [news pages](#)
- **The majority of undergraduate research positions are found by contacting faculty directly**

# Faculty webpages

The screenshot shows a web browser window with the URL `fish.uw.edu`. The page has a header image of a pond with the text **FACULTY & RESEARCH**. On the left, there is a navigation menu with 'FACULTY' and 'RESEARCH' sections. Under 'FACULTY', there are links for 'Adjunct Faculty', 'Affiliate Faculty', and 'Emeritus Faculty'. Under 'RESEARCH', there is a 'FILTER:' section with a link to 'Sort faculty by research area'. Below this, a list of research areas is shown, each with a checkbox. The 'ALL RESEARCH AREAS' checkbox is selected. The main content area on the right contains a paragraph about the faculty's broad academic expertise and research interests. Below this, there is another paragraph stating that the faculty come from various countries and share a common drive to seek facts, inspire and teach students, and work alongside peers and partner agencies. At the bottom, there are two rows of faculty member portraits, each with a name caption below it.

**FACULTY & RESEARCH**

**FACULTY**

- Adjunct Faculty
- Affiliate Faculty
- Emeritus Faculty

**RESEARCH**

**FILTER:**

[Sort faculty by research area](#)

- ☒ ALL RESEARCH AREAS
- ☐ GENETICS AND GENOMICS
- ☐ MARINE TECHNOLOGY
- ☐ MARINE
- ☐ DIVERSITY IN STEM
- ☐ FRESHWATER
- ☐ POLLUTION
- ☐ RESOURCE MANAGEMENT
- ☐ TOXICOLOGY
- ☐ CLIMATE AND GLOBAL CHANGE
- ☐ HUMAN HEALTH
- ☐ ORGANISMAL BIOLOGY
- ☐ FISH NUTRIENTS
- ☐ STATISTICS AND MODELING
- ☐ PHYSIOLOGY

Our faculty have broad academic expertise and research interests. Partnering with our peers in academia, government, and non-governmental agencies world-wide, we contribute influential research on topics ranging from organisms, populations, and ecosystems to human users of aquatic ecosystems.

Our faculty come from across the United States and Canada and as far away as South Africa, Zimbabwe, Austria, and the United Kingdom. A common thread that connects them is an unquenchable drive to seek the facts, inspire and teach students, and work alongside peers and partner agencies to learn and disseminate knowledge about the aquatic world.

**Chris Anderson**

**Andrew Berdahl**

**Trevor Branch**

**Sarah J. Converse**

**Tim Essington**

**Corey Garza**

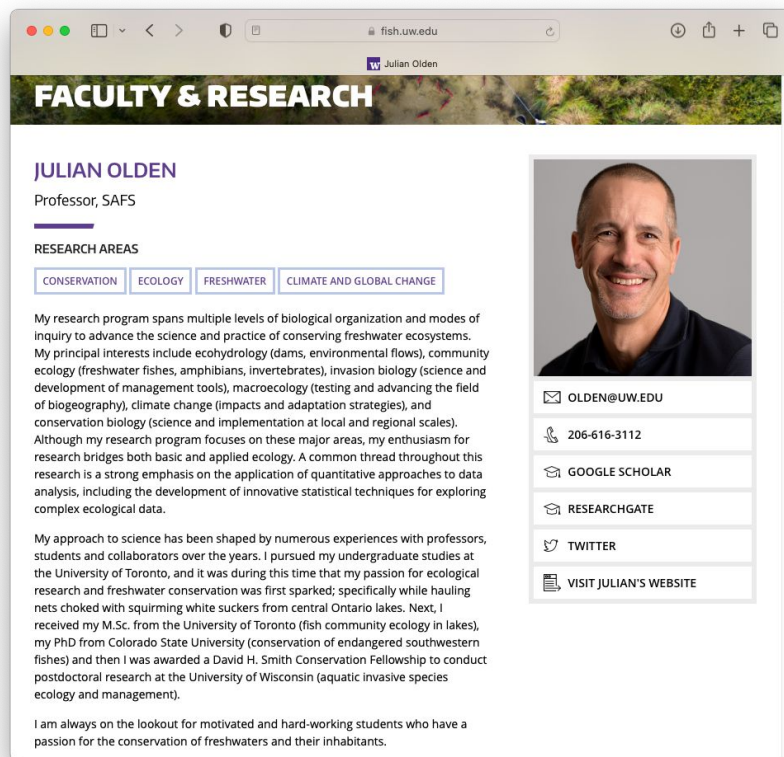
**Jessica Gephart**

**José Guzmán**

**Lorenz Hauser**

**Ray Hilborn**

# Faculty webpages



The screenshot shows a web browser window with the address bar displaying 'fish.uw.edu'. The page title is 'Julian Olden'. The main heading is 'FACULTY & RESEARCH'. Below this, the name 'JULIAN OLDEN' is displayed in purple, followed by 'Professor, SAFS'. A section titled 'RESEARCH AREAS' contains four buttons: 'CONSERVATION', 'ECOLOGY', 'FRESHWATER', and 'CLIMATE AND GLOBAL CHANGE'. The 'FRESHWATER' button is highlighted. The main text describes his research program, focusing on biological organization, conservation, and various ecological fields. A sidebar on the right features a portrait of Julian Olden and a list of links: 'OLDEN@UW.EDU', '206-616-3112', 'GOOGLE SCHOLAR', 'RESEARCHGATE', 'TWITTER', and 'VISIT JULIAN'S WEBSITE'.

**FACULTY & RESEARCH**

**JULIAN OLDEN**  
Professor, SAFS

**RESEARCH AREAS**

CONSERVATION ECOLOGY **FRESHWATER** CLIMATE AND GLOBAL CHANGE

My research program spans multiple levels of biological organization and modes of inquiry to advance the science and practice of conserving freshwater ecosystems. My principal interests include ecohydrology (dams, environmental flows), community ecology (freshwater fishes, amphibians, invertebrates), invasion biology (science and development of management tools), macroecology (testing and advancing the field of biogeography), climate change (impacts and adaptation strategies), and conservation biology (science and implementation at local and regional scales). Although my research program focuses on these major areas, my enthusiasm for research bridges both basic and applied ecology. A common thread throughout this research is a strong emphasis on the application of quantitative approaches to data analysis, including the development of innovative statistical techniques for exploring complex ecological data.

My approach to science has been shaped by numerous experiences with professors, students and collaborators over the years. I pursued my undergraduate studies at the University of Toronto, and it was during this time that my passion for ecological research and freshwater conservation was first sparked; specifically while hauling nets choked with squirming white suckers from central Ontario lakes. Next, I received my M.Sc. from the University of Toronto (fish community ecology in lakes), my PhD from Colorado State University (conservation of endangered southwestern fishes) and then I was awarded a David H. Smith Conservation Fellowship to conduct postdoctoral research at the University of Wisconsin (aquatic invasive species ecology and management).

I am always on the lookout for motivated and hard-working students who have a passion for the conservation of freshwaters and their inhabitants.

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fish.uw.edu

Julian Olden

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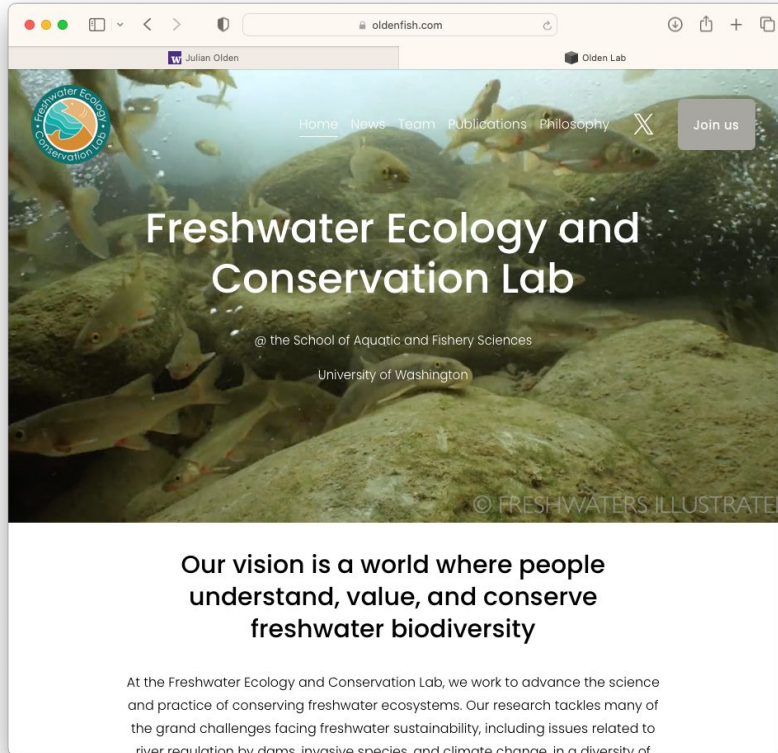
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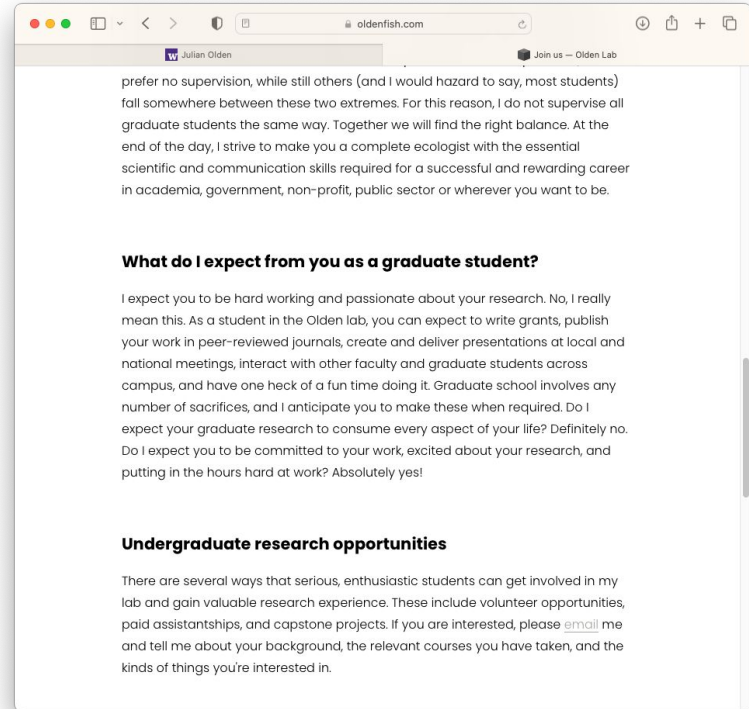
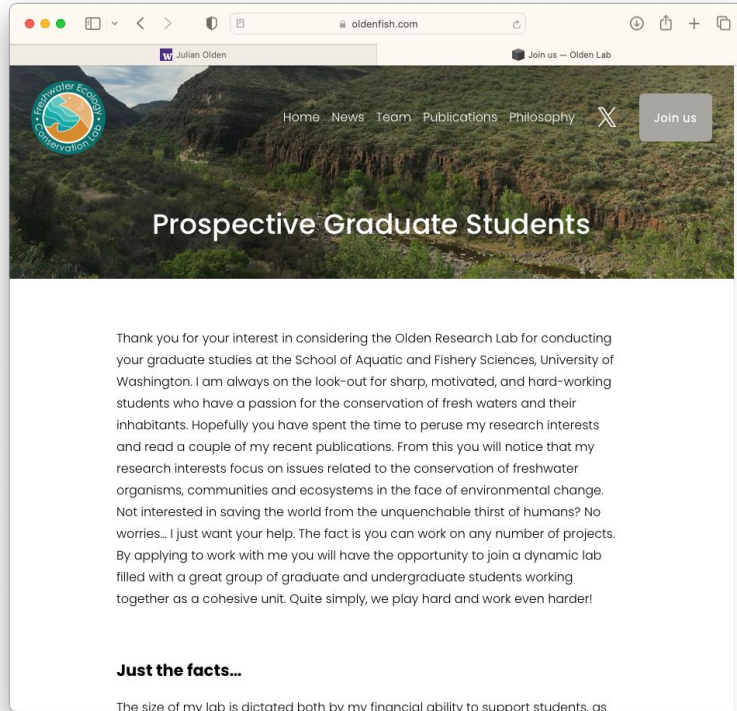
# Get a sense of the lab from the website



- Faculty webpages are outdated to various degrees
- Go to research or publications to get a sense of what they work on - but remember that publications are by nature finished projects!



# If you're interested, go to join us/prospective students

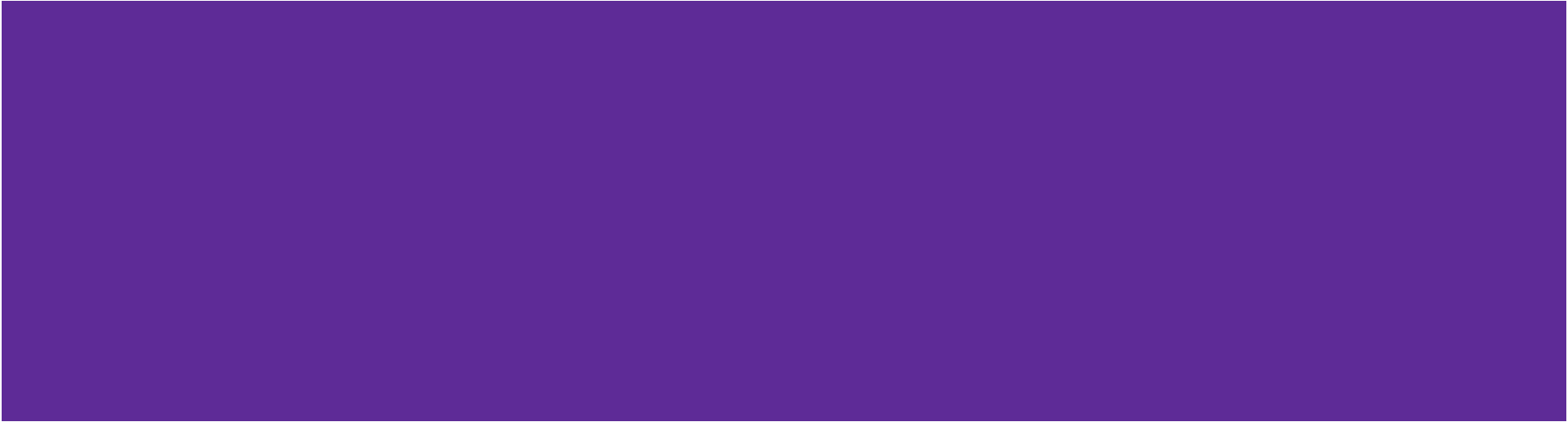




# Exercise: Explore faculty webpages

1. What research questions do they ask?
  2. How do answer those research questions?
  3. Do they have information for prospective undergraduates?
-

# **Mechanics of finding a position II: Make contact**



# What are faculty looking for in undergraduate research assistants?

- General characteristics:
  - Enthusiasm
  - Dependability: responsible, on-time, organized, resilient, and hard-working
  - Curiosity
  - Honest about making mistakes
  - Attention to detail
  - Knows when to ask for help, but also able to be independent
  - Written and oral communication skills

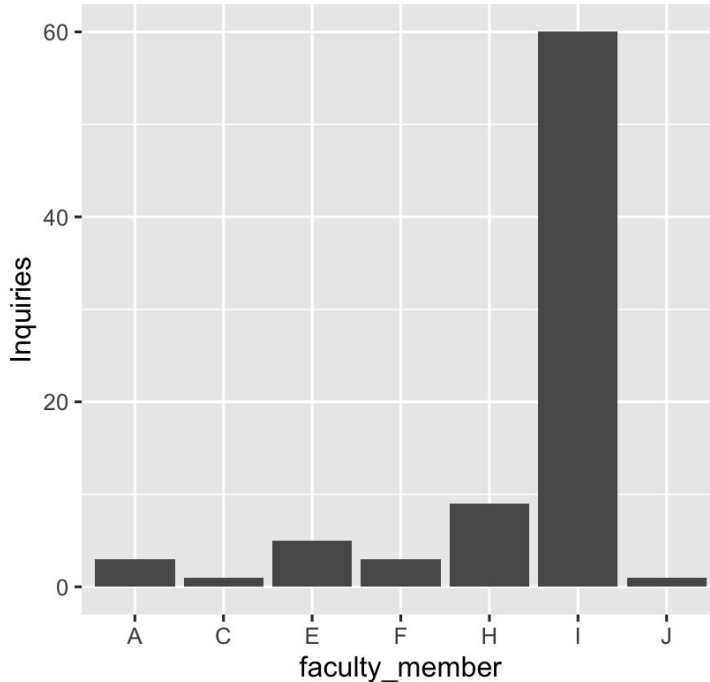
# What are faculty looking for in undergraduate research assistants?

- Alignment with the lab
  - Experience or interest in the **type of work done in the lab**
    - Not one faculty member mentioned anything taxon-specific!
  - Desire to learn those skills and techniques used in the lab
  - If it is more advanced, will want someone with specific skills or experience (e.g., field work or analysis)

# **Mechanics of finding a position III: Setting appropriate expectations**



# How often are you contacted each quarter regarding undergraduate research opportunities?



Range: 1-60!

Remember, faculty typically have between 0 and 5 undergraduates

# The undergraduate research search timeline

Re: Interested in Undergraduate  
Research



Inbox x



← **Barber, Paul** <pa...Tue, Sep 27, 2016, 8:25 PM



to me ▼

Hi Markus,

Thanks for your email and interest in our lab. It's great that you are looking into this as a sophomore. I'd love to support you, but right now, we don't have any openings. However, I would encourage you to keep checking in over the course of the year. Things change and spots open up.

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🖨️ ↗️

## Re: lab opening

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🖨️ |

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to me, Paul ▼

☆ 😊 ↩

Hi Markus,

Sounds great. Let's plan to meet Tuesday at 12:30. We can discuss the project and lab work.

Best,

Zack

Ph.D. student

Barber Group, Ecology and Evolutionary Biology, UCLA



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  - Recognize that a lot of this is out of your control - funding, research needs, current graduate student projects are the main factors that determine whether or not a lab can take you on
  - Remember: There are a lot more undergraduates who want to do research than there are positions

Please take three minutes to fill out this survey and help us improve this workshop!

