

Week of July 19-25, 2025

Announcements, Shoutouts, and Accolades



Congratulations to our new and our continuing student researchers for successfully making in through the first half of Summer 2025!

For the vast majority of continuing and new ASDRP student researchers, summer is an opportunity to fully engage in research, enjoy mini-courses, attend guest lectures, receive advanced training, participate in R101 and R201, have some fun at BBQs, play soccer (and soon, "online gaming nights"), grab food together, hang out on Zoom or Google Meet while working on projects, and challenge themselves to reach new heights. Summer offers our student researchers the gift of *focused time*—and offers us parents the gift of spending more time with our kiddos, driving back and forth to the lab, and occasionally listening in on remote team meetings. As we often hear from advisors, ASDRP leadership, and fellow students: time is the most valuable resource we have because it allows for consistent learning, knowledge acquisition, and hands-on lab or project training (in-person or remote). With all things ASDRP, you just can't beat summer—because we all have the time to move forward with our projects and ideas.

Research is not easy—nor is it supposed to be. It can feel like a daily grind: reviewing literature, listening to advisors talk about concepts you've never heard of, applying new and established ideas to projects, deciphering unfamiliar vocabulary in literature surveys, watching peers run experiments, and waiting for that "aha!" moment when it all finally clicks. Research is a continuum, and we love that our students have the opportunity to learn not only from their advisors but also from more seasoned fellow researchers.

To our new student researchers: it's completely normal to feel overwhelmed and even a little lost (sometimes more than a little). Lean into your summer and lean on your advisors, project teams, and parents for support and guidance. Believe us when we say—we've all been there. The good news? We've watched thousands of students succeed year after year. You're here because you want to be challenged. Embrace that challenge and keep striving. *Keep striving*.



[NewsBytes]

To our continuing researchers: challenge yourself to go beyond your current understanding. Conduct your own literature review, listen in on other advisors' lab meetings (with permission), participate in colloquia and ask questions, jot down personal goals and review them periodically, think about how you'd like to participate in Blitz Talks and Expo—and above all, stay active and engaged. You've come so far—keep enjoying the ride!

To our seniors: this upcoming year will bring many challenges. You'll be working hard to make progress on your research, possibly publish a paper, attend conferences, apply to universities, request letters of recommendation, finish high school, figure out how to pay for college, and celebrate senior year—*all while trying to stay focused and finish strong.* That's quite a list! Remember: take it one step at a time, and use what you've learned at ASDRP to guide you through each phase. Your advisors, parents, family, coaches, and so many others are here to support you. *You've got this. You've got this!*

And finally, a big thank-you to all our Advisors and ASDRP Parents. Thank you for your time, patience, understanding, and for being part of this incredible community dedicated to the success of our student researchers. We couldn't do it without you.

A Few Notes about Attending and Participating in Conferences

- 1. Students should discuss plans with advisors *early* rather than *late*.
- 2. Science and continued progress is key...
- 3. Conference registrations and abstract submissions are typically submitted 5-8 months in advance.

From time to time, faculty at ASDRP may bring their students to a conference outside of the organization to present their work. Typically, it is students who have been working on research for several months to a year who can generate data of sufficient quality to present at a conference, whose abstracts still undergo a review process by the conference, wherein a student's work is measured against the bar in that field of study.

Some conferences, such as IEEE conferences, the American Chemical Society National Meeting, Society for Neuroscience, or ASBMB, are conferences that are meant for industry professionals, postdocs, or postgraduate students. These are quite intense experiences for students to engage in, and every year we have a half dozen or so faculty who elect to bring their students to a conference of this caliber.

Some of these conferences are more student-friendly, and perhaps are catered for undergraduates. For example, each year, over a dozen faculty bring students to the Southern California Conferences for Undergraduate Research (SCCUR). Typically, conference submissions are due months in advance of the actual conference. For example, the ACS National Meeting, which students from some of our chemistry labs go to every year, is a big national level conference where abstracts must be submitted six to nine months in advance to be considered for the conference that year. This means that kids who go with their advisor to such a conference have been at



ASDRP for a year or more.

As is true in publishing work, it is ultimately each advisor's prerogative to identify and decide when a project has reached a sufficient level to present at a conference, which conferences (if any) they will bring students to, etc.

Parent Volunteer Opportunities	
Sept 13: ASDRP Expo & Symposium	Volunteer Please complete this form if you would like to Volunteer for various events and opportunities with ASDRP. We'd love to hear from you! Please fill out the form and we'll get back to you as soon as possible.
@ Mission College 8:30am - 1:30PM	First Name* Last Name* Email* example: david.linnevers@asdrp.org
	Volunteer* We love our volunteers! Select all areas you are interested in volunteering. >> Expo and Symposium >> Bitz Talks >> Orientation >> Parent Specific Events >> Career Panel >> Donation Connection >> Other

Parent Volunteers...sign up today! Parent Volunteer Form link - click here.



In our fifth week of R101 and R201

Last week, both of our flagship research core courses launched officially for the summer semester. Research 101, which is our "**Introduction to Research**" Pre-Work course for first semester students, began with a blast at 9:30 AM with a packed room of our rising freshmen coming together for 101 and donuts. This summer, <u>Dr. Edward Njoo</u> and <u>Prof. Clinton Cunha</u> are our co-instructors for R101, and have spent much time redeveloping the course content with the aim of driving student engagement in connection to other aspects of ASDRP life.

[Research 101 Summary] This week, Dr. Njoo introduced the process of peer reviewed research to our newest students, and described not only the different parts of a paper, but also how the peer review process works, and the role of authors, editors, and reviewers in this realm. The class spent part of this morning discussing what impact factor means for a journal's readership, and also how it should only be used as a proxy metric to determine whether one's research is fitting in that journal. Additionally, Dr. Njoo walked the students through example publications written by students at ASDRP that have made it past peer review, and shared experience as a reviewer in different journals on what reviewers look for. Finally, the process of responding to reviewers, and the ultimate goals of peer review in science, were described.



This summer, Research 201, which is mandatory for all second-semester students, launched earlier this month, this time with <u>Dr. Larry McMahan</u> and <u>Dr. Harrison Rahn</u> at the helm. The intention of 201 is to continue the development of hard-core research skills, such as rigorous referencing, literature reviews, and preparing high quality figures, for our second semester students who are now deep in the thicket of research.

[Research 201 Summary] This week, we had our second Practical wherein students shared their graphical abstracts, and our teaching team gave feedback to how to construct aesthetic and descriptive graphical figures. Additionally, students were coached on how to construct meaningful, descriptive, and pinpoint aims of research deliverables, and the importance of rationalizing the scientific precedent behind one's work. This week, our second semester students will be preparing the next aspect of their prospectus - specific aims and objectives.



July 19, 2025 Rising Freshmen Update... What we did today...

At today's **Donuts at Dawn** session on Saturday, July 19, each of our rising ninth graders practiced delivering a *One-Minute Flash Speech*. Mr. Linnevers led the morning and spoke about the importance of being able to give a quick and effective presentation. These one-minute speeches help our newest student researchers practice presenting their research clearly and concisely to a live audience.

It's always impressive to see how quickly our student researchers embrace their projects and dive right in! They also had the opportunity to hear from Kimberly Khow, an ASDRP alumna who began her journey with us as a rising ninth-grade student researcher and remained involved for four years. Kimberly, now a student at UC San Diego, briefly shared her research, reflected on her experience at ASDRP, and offered some words of encouragement.

Thank you for jumping in to share, Kimberly — we love our alumni!

For our Summer 2025 Rising Freshmen... Starting Fresh with Donuts at Dawn for Rising Freshmen

When? 9:30 - 11:30 AM, every Saturday morning (beginning June 7)

Where? In-Person Only, leads directly into in-person R101 each weekend. Rising freshmen should plan on attending Research 101 in person after

We will be serving breakfast items to our 9th graders at 9:30 AM - 10:00 AM while engaging in freshmen-specific discussions about what they are learning and how they are progressing.

Parents please have them come in person at 9:30 AM Creating a sense of community, belonging, and collective engagement is all the more important in our youngest students.

Informed by years' worth of data indicating that our freshmen function best in a collective, concentrated environment rather than on Zoom, and also enables our leadership team to create and foster unique community with the youngest members of the ASDRP community.

Events schedule list is subject to change with or without notice. Please check the ASDRP website for the most up to date information. © Aspiring Scholars Directed Research Program 2025, All rights reserved. ASDRP is a production of Olive Children Foundation, a 501(c)(3) nonprofit organization in Fremont, California.



August 1, 2025 is the kick off date for the ASDRP annual giving and donation drive.

More information about the annual giving and donation drive will be provided closer to the end of July.

Our giving drive goal is \$250,000.



Saturday, July 19

9:30 - 10:00 AM For our Summer 2025 Rising 9th Graders Starting Fresh with Donuts at Dawn for Rising Freshmen. Be here an enjoy time learning about ASDRP, developing your confidence and skills, and becoming active members of the ADSRP community.

10:00 - 12:30 PM: Summer 2025 Research 101 week 7 (Led by Clinton Cunha/Edward Njoo) held via zoom. This week the course will be discussing **Parts of a Paper, the Peer Review and Publication Process**. All new student researchers are required to attend.

11:00 AM - 1:00 PM: Summer 2025 Mini Course: "Protein Folding, Structure and Function" (Dr. Zane Chen). The structure type determines the function of a protein. A protein's shape is determined by its primary structure (the amino acid sequence). The amino acid sequence within a protein is determined by the encoding sequence of nucleotides in the gene (DNA).

Sunday, July 20

11:00 AM - Noon: Summer 2025 Mini Course: "Lipid and Fatty Acid Metabolism" (Dr. Joey Pazzi). Lipids are available to the body from three sources. They can be ingested in the diet, stored in the adipose tissue of the body, or synthesized in the liver. Fats ingested in the diet are digested in the small intestine. The triglycerides are broken down into monoglycerides and free fatty acids, then imported across the intestinal mucosa. Once across, the triglycerides are resynthesized and transported to the liver or adipose tissue. Fatty acids are oxidized through fatty acid or β -oxidation into two-carbon acetyl CoA molecules, which can then enter the Krebs cycle to generate ATP.

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6:00 - 7:30 PM: Summer 2025 Mini Course: "Statistics and Probability for Data Science" (Prof. Clinton Cunha). This course provides a rigorous yet practical foundation in probability theory and statistical inference, tailored for data science applications. Students will explore key topics such as random variables, distributions, conditional probability, Bayes theorem, expectation, estimation, A/B testing, bootstrapping, cross validation, hypothesis testing, regression, data variability and much more.

Monday, July 21

10:00 - 11:30 AM: Summer 2025 Mini Course: "Absolutely Small" - an introduction to Quantum (Dr. McMahan). The purpose of this course is to give an overview of Quantum Physics and how it differs from the classical view of the physical world. An historic account of the discoveries leading to Quantum Theory will be presented, along with the equations used to prove those concepts. The results will be used to show how the internal structure of the atom was discovered, and how this affects everything from physics to chemistry to biology. You will not be required to have taken Calculus, but a few tenets of calculus will be presented to explain how the quantum equations were achieved.

10:00 - 11:00 AM: Summer 2025 Mini-Course: "Hit Identification to Lead Optimization in Medicinal Chemistry" (Dr. Edward Njoo). The success of synthetic chemistry in the identification and development of therapeutic leads is predicated on strategic design of target-driven small molecule programs in approaching molecular mechanisms of disease. In this series we will explore different strategies that have demonstrated clinical success.

2:30 - 3:30 PM: Summer 2025 Mini-Course: "Data Analytics and ML with Python" (Dr. Viktoriia Liu). In this 8-week hands-on course students will learn the basics of Python programming, data manipulation with Pandas and NumPy, and how to create impactful data visualizations using Matplotlib and Seaborn. The course will guide students through building their first machine learning models using Scikit-learn, and dive into deep learning with simple Convolutional Neural Networks (CNNs) using TensorFlow and PyTorch. In the final week, students will explore Explainable AI (XAI) tools to understand how machine learning models make decisions—especially in medical and health-related contexts.

4:45 - 5:45 PM: Summer 2025 Mini-Course: "Intro to MATLAB" (Prof. Laurienzo) MATLAB and Data Visualization Collecting data is necessary for any type of research, but without the proper computational skills, it can be challenging to see patterns and draw conclusions. In this 8 week course, students will be introduced to the MATLAB language and computing environment, with a goal of making publication-worthy figures for a variety of datasets. From simple functional plotting to high-dimensional data representations, students may expect to elevate themselves from no programming experience whatsoever to having the practical skills necessary to contribute to their research project.

6:00 - 7:00 PM: Summer 2025 Mini Course: "Statistics and Probability for Data Science" (Prof. Clinton Cunha). In this 8-week hands-on course students will learn the basics of Python programming, data manipulation with Pandas and NumPy, and how to create impactful data visualizations using Matplotlib and Seaborn. The course will guide students through building their first machine learning models using Scikit-learn, and dive into deep learning with simple Convolutional Neural Networks (CNNs) using TensorFlow and PyTorch. In the final week, students will explore Explainable AI (XAI) tools to understand how machine learning models make decisions—especially in medical and health-related contexts.

8:00 - 10:00 PM Software Training: DFT calculations on ORCA (linux).

Orca is a widely used quantum chemistry program that includes a comprehensive set of tools for performing density functional theory (DFT) calculations. It's known for its flexibility in handling various <u>density functionals</u>, <u>basis sets</u>, and <u>relativistic methods</u>, making it suitable for a broad range of applications, especially for larger molecules and transition metal complexes

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Tuesday, July 22

10:30 - 12:00 PM: Tier 1 [Theory] Core Training: Cell Culture (ASDRP Faculty).

Prerequisites: Mandatory for all students who wish to be eligible to take Tier 1 (Practical) Cell Culture training in the Autumn 2025 semester. In person only.

4:00 - 7:00 PM: Tier 2 [Practical] Core Training: Cell Culture (2nd+ semester students only) - Part 2 of 2 **Prerequisites:** Must be second semester or older student. No first semester students. Must have completed Tier 1 Cell Culture Training. Core training is offered once per semester in a tiered system. In order to participate in the next tier, students must first complete the previous tier in a previous semester. Sign-ups are available for eligible students on the Laboratory Practicum Canvas Course.

3:30 - 4:45 PM: Summer 2025 Mini Course: "Creativity Meets AI: The Future of Design Thinking in the Age of Innovation" (Prof. Sahar Jahanikia).

By the end of this 8-week course, students will understand the intersection of artificial intelligence and creativity, apply design thinking methodologies enhanced by AI tools, and critically assess the ethical and human-centered implications of innovation in research.

7:00 - 8:30 PM: Weekly Colloquia for all ASDRP Student Researchers via zoom. Visit the ASDRP <u>Colloquia</u> <u>Webpage</u> for details & zoom link.

- Department of Computer Science & Engineering "AVX - Using Drones to Measure Air Pollution" Anirudh Rao, Christon Rex, McMahan Lab
- Department of Chemistry, Biochemistry & Physics
 "Synthesis, biological evaluation, and structure-activity relationship of diversified C-4 analogs of podophyllotoxin as tubulin inhibitors" Shreya Somani, Stella Yang, Njoo Lab
- Department of Biological, Human and Life Sciences
 "MolecularTDA: Building Models to Personalize Drugs" Divya Raghuraman, Minjee Kim, Pransh Dalal, Jahanikia Lab

Wednesday, July 23

10:00 - **11:30** AM: Summer 2025 Mini Course: "Techniques in the Quantification of Biological Phenomena" (Dr. John Wang / Dr. Edward Njoo).

Remarkably, nearly all measurement of biological function takes place through an optical readout that exists as a proxy for the otherwise unobservable biological phenomena that is being studied. But, what exactly are we measuring? And, how do we go about measuring such things? From cell signaling pathways to surface marker expression, to proximity effects between intracellular agents, this mini course takes a survey of contemporary techniques in how molecular biologists and chemical biologists take precise measurements of biological phenomena, whether at the cellular, genetic, or molecular in scope.



11:30 AM - 12:30 PM, In person only: Summer 2025 Mini Course: "Soft Matter Physics" (Dr. Joseph Pazzi).

This mini-course will teach you the fundamental physics behind different soft materials we commonly see in everyday life and industry. What gives materials their properties and what are the different models to explain these properties. The course will demonstrate the link between microscopic structure and bulk properties in a variety of soft condensed matter systems including liquid crystals, polymers, colloidal systems and surfactants including biologicals like lipids. This course will have a focus on teaching macromolecular self assembly processes and understanding the physical structures that result. The course will also prepare you to carry out research and read cutting edge scientific articles in the field of biophysics and to write on a scientific topic.

1:00 - 2:00 PM, Zoom: Summer 2025 Mini Course: "Social Minds: An Introduction to Social Psychology" (Prof. Sahar Jahanikia).

This course introduces students to the foundational concepts, theories, and real-world applications of social psychology. Through the exploration of classic experiments and contemporary research, students will develop a critical understanding of how individuals think about, influence, and relate to one another in social contexts. By the end of the course, students will be able to analyze social behavior through the lenses of cognition, persuasion, conformity, group dynamics, prejudice, altruism, and practical application in everyday life.

8:00 - 9:00 PM, Google Meet: Summer 2025 Mini Course: "Introduction to Project Management in Research" (Prof. Clinton Cunha).

As we grow in our lives, we have to find better ways to manage and deal with data, time, and other urgent tasks. In this mini-course, we will focus on the principles of project management and how they can be applied to improve your research project. We will talk about the following: The Project Life Cycle, Frameworks for Project Management, Working with Others, Project Management Software, Project Time Management, Project Planning, Project Implementation, Assessing Project Quality, Project Completion, Applying Project Management in your Research and Beyond. Each week, we will talk about important project management skills that will help you in your research project and beyond. Each class, there will be activities based on the principles of that topic and will have questions which could involve group work. At the end of the course, you will learn how to self-learn and continuously update your knowledge in Project Management.

Thursday, July 24

10:00 AM - 11:00 AM, In person only: Summer 2025 Mini Course: "Theory and Practice in Separation Science" (Dr. Harrison Rahn).

Separation is a key part of how scientists uncover new materials, medicines, and discoveries. In this course, students will dive into the art and science of separating mixtures, from pulling apart differently-sized molecules to isolating substances based on how they interact with their surrounding solvents. They'll explore how changes in phase, like dissolution or crystallization, help scientists create pure compounds, and how tools like chromatography and electrophoresis can sort complex mixtures with incredible precision. Along the way, students will see how mastering separation techniques is essential for planning experiments, solving real-world problems, and pushing the boundaries of chemical and biological research.

12:30 PM - 2:30 PM: ASDRP Summer Soccer Cup @ Warm Springs Community Park

3:00 PM - 4:00 PM, Google Meet: Summer 2025 Mini Course: "Evolution of Astrophysics" (Professor Robert Downing). The evolution of Astronomy & Astrophysics over the Millenia, & how they have not only led to the incredible precision today, but also to untold opportunity in Data Mining the immense repositories of observations warehoused by contributing Nations. Periodic exercises will be offered, to be completed at the discretion of the attendee. Practical application of



varying types of Machine Learning will be demonstrated using current topics of interest: exoplanets, black holes, other civilizations...

3:00 PM - 4:45 PM, Zoom: Research 201, Week 8, Module 3, Lecture three.: (Dr. Larry McMahan / Dr. Harrison Rahn). Developing and Delivering a Research Plan.

This week's lecture "Charting the Course: Developing and Delivering a Research Plan." Addressed challenge: Executing aims vs. understanding background preliminary info is much more challenging, not only from the information but also the skill set gap. Training Objective: Identifying a feasibility plan and direct actionable steps towards accomplishing the research goals outlined in Module 2. This is by nature highly discipline specific and will challenge students to identify how the ultimate goals of a research project should be approached and eventually realized. While a lot of this discussion may already exist within individual research groups, the aim of this is to have students articulate and fully understand specific actionables and the chosen techniques to accomplish the targeted research. Rationale: Once students have identified the background, rationale, and aims of their area of research within their advisor's group, the next skill they must build is developing a stepwise plan on short-term and long-term goals, as well as the feasibility and resources required for such goals, in order to achieve their research aims.

9:00 - 10:00 PM: Summer 2025 Mini-Course: "Hit Identification to Lead Optimization in Medicinal Chemistry" (Dr. Edward Njoo).

The success of synthetic chemistry in the identification and development of therapeutic leads is predicated on strategic design of target-driven small molecule programs in approaching molecular mechanisms of disease. In this series we will explore different strategies that have demonstrated clinical success.

Friday, July 25

Check with your advisor for any special events, trainings and continue to work on your research

Saturday, July 26

9:30 - 10:00 AM For our Summer 2025 Rising 9th Graders

Starting Fresh with Donuts at Dawn for Rising Freshmen. Be here an enjoy time learning about ASDRP, developing your confidence and skills, and becoming active members of the ADSRP community.

10:00 - 12:30 PM: Summer 2025 Research 101 week 7 (Led by Clinton Cunha/Edward Njoo). This week will be an extended Research 101 due to the fact that R101 will not be held on Saturday, July 5th. Come prepared to be challenged on your understanding of plagiarism, intellectual property, protocol development and reproducibility in science.

11:00 AM - 1:00 PM: Summer 2025 Mini Course: "Protein Folding, Structure and Function" (Dr. Zane Chen). The structure type determines the function of a protein. A protein's shape is determined by its primary structure (the amino acid sequence). The amino acid sequence within a protein is determined by the encoding sequence of nucleotides in the gene (DNA).

1:00 - 4:00 PM: Tier 2 [Practical] Core Training: High Performance Liquid Chromatography

Prerequisites: Must have completed Tier 1 (Theory) HPLC core training and general safety training. Only open to 2nd+ semester students. <u>No first semester students permitted</u>. Mandatory for all students who wish to be eligible to take Tier 3 (Advanced) HPLC training in the Autumn 2025 semester. In person only.

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End Note

Dr. Madhulika Jupelli and her student researchers gaining hands-on experience in the Cell Culture Lab.



End Note Bonus - Free Boba to the first 5 student researchers who can name all the students in the picture? Include "from left to right" in your submission. Email your best guess to <u>asdrp.admin@asdrp.org</u> - make the subject line in the email: Jupelli Pic (oh yeah...only one submission per student)