



IBA & LSAMP Newsletter



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IBA Grant Renewed!

We are pleased to announce that the undergraduate training grant that supports the [Iowa Biosciences Academy \(IBA\)](#) was recently renewed by the National Institutes of Health. As a reminder, the mission of the IBA program is to support underrepresented students who are interested in pursuing PhD or MD/PhD upon graduation from UI.

If you have **junior or senior**, underrepresented students in your laboratory who are interested in pursuing graduate education, please encourage them to apply! Interested students should complete the [online application](#), submit a letter of recommendation and participate in an interview with program staff. We are looking to support students that are committed to stay with the IBA program as part of a community of undergraduate researchers for the duration of their time at UI.

Eligible students must identify as a member of an underrepresented group in STEM including first-generation college students, students from rural populations, economically disadvantaged students, individuals with disabilities, or underrepresented racial and ethnic groups (African Americans, Hispanic/Latinx, Native Americans, natives of the U.S. Pacific Islands).

NEW Science Alliance Program

The [Science Alliance](#) is a new, UI-sponsored collaborative connecting faculty, staff, graduate students, and post-docs who are interested in cultivating future generations of scientists. Three overarching goals drive the program: establishing an online network of campus-wide Science Allies, developing a peer leader program to increase awareness of undergraduate research opportunities, and a Science Alliance Internship Program.

High-school seniors, transfer students and current UI undergraduate science majors can request online to become a Science Alliance Member and connect with the network of faculty, graduate students, post-docs (Science Allies), and the Science Alliance Peer Leaders. Alliance members will receive information on different events to gain exposure to undergraduate research.

The Science Alliance Internship Program supports **first and second year students** interested in exploring research on campus. The program aims to enrich the undergraduate experience through coursework, mentor matching, career guidance, and creating a cohort of students with similar interests in science and research. Lab wages and access to a summer program for Science Alliance Interns will be provided.

Benefits include access to UI research faculty looking for undergraduate researchers; assistance in matching with research mentor; hands-on research experience, seminars and conferences; career counseling; hourly wages for laboratory research (year-round) and on-campus room & board (summer).

Student Spotlight: Lander Geadelmann

Department of Biology

Lander is 4th year undergraduate IBA Scholar and LSAMP ally. He does research in Dr. Cheng's lab who specializes in genetics and plant biology.

Lander became interested in IBA when he was a senior in high school. At the time, he knew he loved science and wanted to have a career in research. After reviewing IBA's goals, he decided to apply the program.

Throughout his time in a research lab, he has enjoyed the camaraderie of lab members and meeting new people. He also feels that responsibility in the lab and seeing the outcomes of scientific theories from his work is very rewarding.

For him, the most impactful part of IBA is learning about everyone else's research. Learning about what his friends and peers are doing in their own research fields and how data influences us is the most impactful part of being in IBA.

For those interested in going into the biology field he says to be open to all biology has to offer. It is not just genetics! Everything from ecology to DNA falls under biology. Start where you understand the biological concepts best and work your way up or around from there.

For those applying to graduate school, he has tons of advice. First, take a moment to be introspective about your personality, life history, and even your current skills. Those wanting to apply to graduate school really need to know who they are and what you want from this future experience. This will help with everything from applications, to interviews, and even the GRE. Introspection can really help you focus on your strengths and what you might need to improve on prior to this next chapter of your life.



Student Spotlight: Ashley Segura

Department of Biochemistry

Ashley is a 4th year undergraduate IBA Scholar and LSAMP liasion. She found out about IBA through her cousin who had been in a previous cohort. As she did more research about the program she realized it was a program that she wanted to be a part of. Her most meaningful IBA experience was meeting other undergraduate researchers in a variety of fields which led to the opportunity of creating a greater network and community. She also has met some of her best friends in IBA. She cannot pick one thing about research that she has enjoyed the most because it has all been so fantastic!

For those applying to graduate school she wants students to know that in the biomedical sciences, the GRE is phasing out. Your personal statement and recommendation letters will carry the most weight than what any score on the GRE would say. When writing your personal statement, do not lose your voice. Even though many people might edit make sure it is still what you want to say. She also recommends to not procrastinate – she started writing personal statement drafts in the summer which became incredibly helpful when she started applying to programs. This led to her being able to submit applications in early (around October and November) which also added to a less stressful application process. Additionally, she recommends to keep an eye out for fee waivers they will definitely come in handy. Finally, never be intimidated to apply to a top tier school – you will most likely surprise yourself by the opportunities you are given.

For those interested in Biochemistry research, she recommends reading professors' biographies to see if any of their research interests you – if it does, feel free to send an email asking about research opportunities! Additionally, each month the department offers workshops and seminars which is a great way to learn more about what is going on in the field.

The field of Biochemistry is working on using Cryo-EM, and electron microscope, which images frozen samples. This technique allows for the visualization of biomolecules *in a solution* at high-resolution. Previous methods have limited the environment of the biomolecule while this technique allows for visualization of a molecule in a solution. This has the ability to further the understanding of how biomolecules interact and function.



INTERESTING & NEW BIOLOGY RESEARCH

Title: The genetics of convergent evolution: insights from plant photosynthesis

Authors: Karolina Heyduk, Jose J. Moreno-Villena, Ian S. Gilman, Pascal-Antoine Christin, & Erika J. Edwards

Abstract: The tree of life is resplendent with examples of convergent evolution, whereby distinct species evolve the same trait independently. Many highly convergent adaptations are also complex, which makes their repeated emergence surprising. In plants, the evolutionary history of two carbon concentrating mechanisms (CCMs) — C₄ and crassulacean acid metabolism (CAM) photosynthesis — presents such a paradox. Both of these modifications of ancestral C₃ photosynthesis require the integration of multiple anatomical and biochemical components, yet together they have evolved more than one hundred times. The presence of CCM enzymes in all plants suggest that a rudimentary CCM might emerge via relatively few genetic changes in potentiated lineages. Here, we propose that many of the complexities often associated with C₄ and CAM photosynthesis may have evolved during a post-emergence optimization phase. The ongoing development of new model clades for young, emerging CCMs is enabling the comparative studies needed to test these ideas.

Link: <https://www.nature.com/articles/s41576-019-0107-5>

INTERESTING & NEW BIOCHEMISTRY RESEARCH

Title: Cryo-EM reveals distinct conformations of E. coli ATP synthase on exposure to ATP

Authors: Meghna Sobti, Robert Ishmukhametov, Jame C. Bouwer, Anita Ayer, Cacang Suarna, Nicola J. Smith, Mary Christie, Roland Stocker, Thomas M. Duncan

Abstract: ATP synthase produces the majority of cellular energy in most cells. We have previously reported cryo-EM maps of autoinhibited E. coli ATP synthase imaged without addition of nucleotide (Sobti et al. 2016), indicating that the subunit ϵ engages the α , β and γ subunits to lock the enzyme and prevent functional rotation. Here we present multiple cryo-EM reconstructions of the enzyme frozen after the addition of MgATP to identify the changes that occur when this ϵ inhibition is removed. The maps generated show that, after exposure to MgATP, E. coli ATP synthase adopts a different conformation with a catalytic subunit changing conformation substantially and the ϵ C-terminal domain transitioning via an intermediate 'half-up' state to a condensed 'down' state. This work provides direct evidence for unique conformational states that occur in E. coli ATP synthase when ATP binding prevents the ϵ C-terminal domain from entering the inhibitory 'up' state.

Link: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5214741/>

IBA SOCIAL ACTIVITY: STUDENTS GO BOWLING

The event took place Sunday, March 3rd from 1-3pm at Colonial Lanes in Iowa City.



Have any recruitment ideas?

If you are interested in helping IBA and the new Science Alliance program with recruitment please contact Zoe Horak

(zosia-horak@uiowa.edu) and Brinda Shetty (Brinda-shetty@uiowa.edu). We would love to hear ideas!

If any current IBA or LSAMP students are willing to speak to classes or reach out to old professors, please let us know that as well!

UPCOMING BIRTHDAYS

Margaret Mungai – April 7th



Glorie Borsay – April 8th



Lander Geadelmann – April 16th



SEMINARS BY DEPARTMENT

Microbiology: <https://medicine.uiowa.edu/microbiology/events>

Biology: <https://biology.uiowa.edu/about/seminars>

Chemistry: <https://chem.uiowa.edu/news/colloquium-seminar-schedule>

Physics: <https://physics.uiowa.edu/resources/events/calendar>

Psychology: <https://psychology.uiowa.edu/bbip/seminars>

Biochemistry: <https://medicine.uiowa.edu/biochemistry/news-events/seminars>

MARK YOUR CALENDAR:

IBA/LSAMP

GRADUATION CELEBRATION

**May 3rd, 2019
from 4pm to 6pm**