



Iowa Sciences Academy

IOWA

ANNUAL REPORT

June 1, 2023 – May 30, 2024



A MESSAGE FROM THE DIRECTOR



Dr. Lori Adams, ISA Director

Welcome to the Iowa Sciences Academy (ISA) Annual Report! We invite you to explore the highlights of our activities from Summer 2023, Fall 2023, and Spring 2024. This report showcases the incredible achievements and events that have shaped our community over the past year.

From June 1, 2023, to May 30, 2024, ISA served a total of 55 students across all our programs. Students affiliated with ISA took part in enriching activities that support student success throughout the year. Starting last summer, the ISA Summer 2023 Undergraduate Research Program served 24 students. Weekly seminar topics included a graduate student panel featuring ISA alumni currently engaged in PhD research, a session on Research Ethics in the Age of Social Media, a Responsible Conduct of Research Case Study Discussion Session focused on research misconduct led by UI Research Integrity Officer Mike Andrews, and a session on Imposter Syndrome led by Monee' Turner, a PhD candidate in Counseling Psychology.

The fall semester began with the ISA Fall Kick-off and Peer Mentoring Event, where new and returning students connected and set the tone for a productive semester. Throughout the fall, Jahnvi Pandya led Graduate School Application Workshops twice a week, providing guidance to students preparing their applications. Prof. Jon Houtman from the Department of Microbiology and Immunology hosted a Responsible, Reproducible, and Rigorous (R3) Research Conduct Roundtable focused on blinding and randomization, emphasizing the importance of ethical research practices. Friendsgiving brought the ISA community together to foster a sense of camaraderie and celebration. The semester culminated with the ISA Scholar Symposium, where ISA scholars presented their research in Kollros Auditorium.

The spring semester began with the ISA Winter Retreat, where Assistant Prof. Ebonee Johnson led a thought-provoking session on the intersection of science and social justice. Jahnvi Pandya conducted several workshops, including sessions on graduate school interview preparation, study techniques, and enhancing CVs, resumes, and LinkedIn profiles. Prof. James Ankrum, Department of Biomedical Engineering, hosted a Responsible, Reproducible, and Rigorous (R3) Research Conduct Roundtable focused on transparency in research. As the semester progressed, ISA seniors presented their capstone projects, showcasing their innovative research and effective scientific communication skills. The semester culminated in the ISA Graduation Event, where we celebrated our graduating students with an inspiring speech from Prof. Ece Demir-Lira. This memorable occasion honored the hard work and achievements of our graduates, marking the end of a productive and successful year for our students engaged in undergraduate research.

This year's 9th Annual Project Engage Showcase highlighted the creativity and dedication of the Latham Fellows. Projects included engaging lesson plans on evolution for kids, a health perspectives magazine, and an exploration of art and music's impact on neurodegenerative diseases. Additionally, an interactive guide demystified the research process, and various individual projects tackled topics like atrial fibrillation awareness and the effects of psychosocial stressors on health. These efforts demonstrated the Fellows' commitment to making science accessible and engaging for the public.

MISSION, PROGRAMS, AND GOALS

The Iowa Sciences Academy (ISA) is situated in the College of Liberal Arts & Sciences (CLAS) at the University of Iowa (UI) as a key component of the outreach and engagement portfolio. ISA collaborates with other colleges including the Carver College of Medicine, College of Education, College of Engineering, College of Public Health, College of Nursing, College of Pharmacy, and Graduate College.

Mission: ISA is committed to fostering undergraduate success in research and scientific communication. Through collaborative programs, ISA offers hands-on research, science outreach opportunities, mentoring, and professional development. Our mission is to build a supportive community that empowers students to excel academically and professionally, communicate scientific concepts effectively, and contribute to the advancement of the STEM workforce.

Programs: Students in ISA may participate in one or more of the following programs.

Science Alliance Internship is a UI-sponsored research internship program that provides competitive wages to undergraduates to carry out research in laboratories 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 research careers. During 2023-24, twenty-three students were supported. Four students transitioned to the UI MARC program in 2024-25.



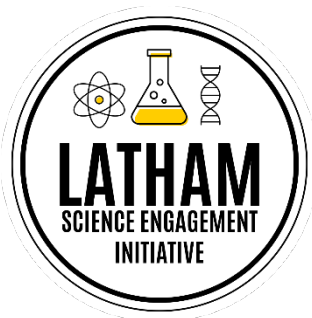
UI-LSAMP (Louis Stokes Alliance for Minority Participation) is funded by the National Science Foundation (NSF) and is part of the Iowa, Illinois, Nebraska (IINSPIRE) LSAMP alliance among 16 two-year and four-year colleges and universities in the Midwest. The focus of the UI-LSAMP program is to support the STEM workforce. During 2023-24, six students were supported through the UI LSAMP program, four of which were transfer students.



UI-MARC (Maximizing Access to Research Careers) is a NIH-funded (National Institute of Health) T34 training program supporting the academic and personal success of juniors and seniors committed to pursuing a PhD after graduation. UI-MARC trainees have access to hands-on mentored research opportunities, professional development workshops, competitive monthly stipends, and a strong community of students, faculty and staff with common goals. During 2023-24, thirteen junior and senior students were supported as UI MARC trainees. Eight seniors graduated with STEM bachelor's degrees. Of the eight students, 2 enrolled in Bioscience-related PhD programs, 2 students enrolled in MS programs, and 4 students accepted research assistant positions with the intent to apply to PhD programs in the future.



Latham Science Engagement Initiative (LSEI) is designed to enhance research opportunities and strengthen science outreach communication skills for undergraduate students. Students selected for the Latham Fellows program complete 2 courses (2 s.h. each - LATH:3000 in the Fall and LATH:3001 in the Spring), design and implement outreach projects, and participate in a year-end event that highlights their achievements. The program was established in 2014 through the generous donation of Drs. Robert J. and Sue B. Latham. Fourteen students completed the Latham Fellows program in 2023-24.

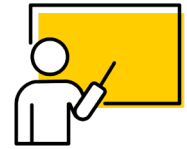


Goals: While each ISA program has different specific goals, collectively, the ISA goals include:

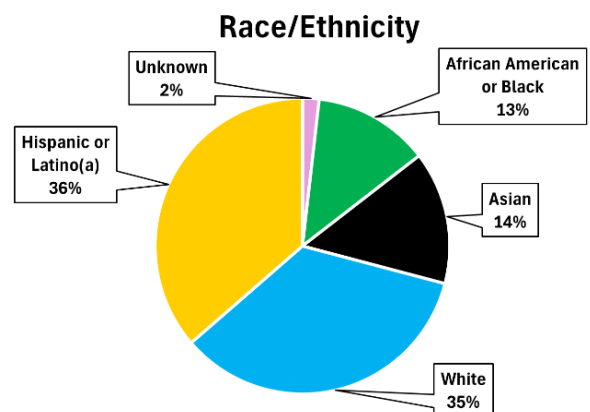
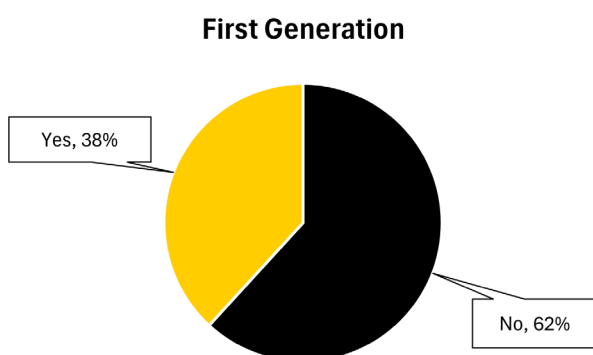
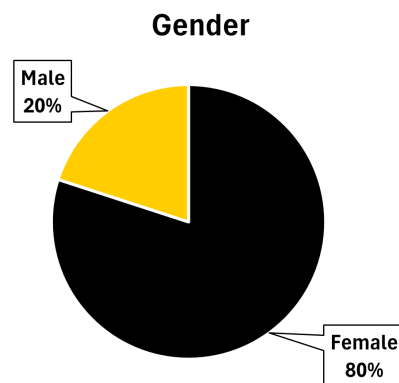
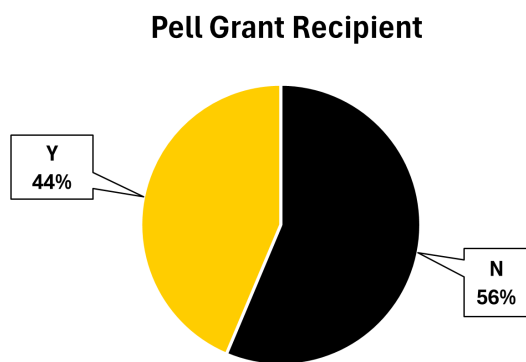
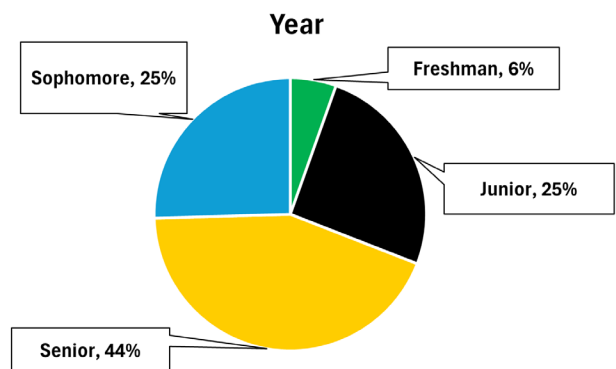
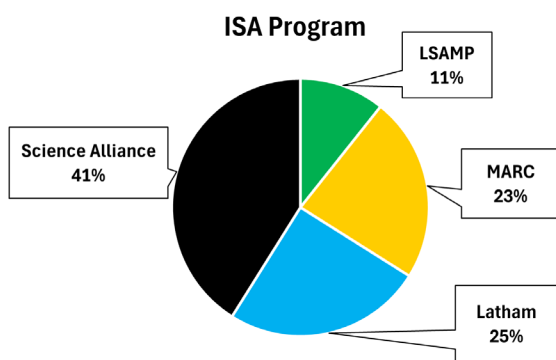
- **Support Undergraduate Research:** Facilitate hands-on mentored research opportunities for undergraduate students through financial support, particularly those who have faced barriers in their pursuit in a career in scientific research.
- **Professional Development:** Provide training and resources that help students develop skills necessary for scientific careers with a focus on science communication.
- **Welcoming and Inclusive Environment:** Foster a strong community of students, staff, and faculty who are passionate about science.
- **Career Guidance:** Offer mentorship and career guidance to help students navigate their academic and professional paths towards a career in scientific research.

Student Engagement:

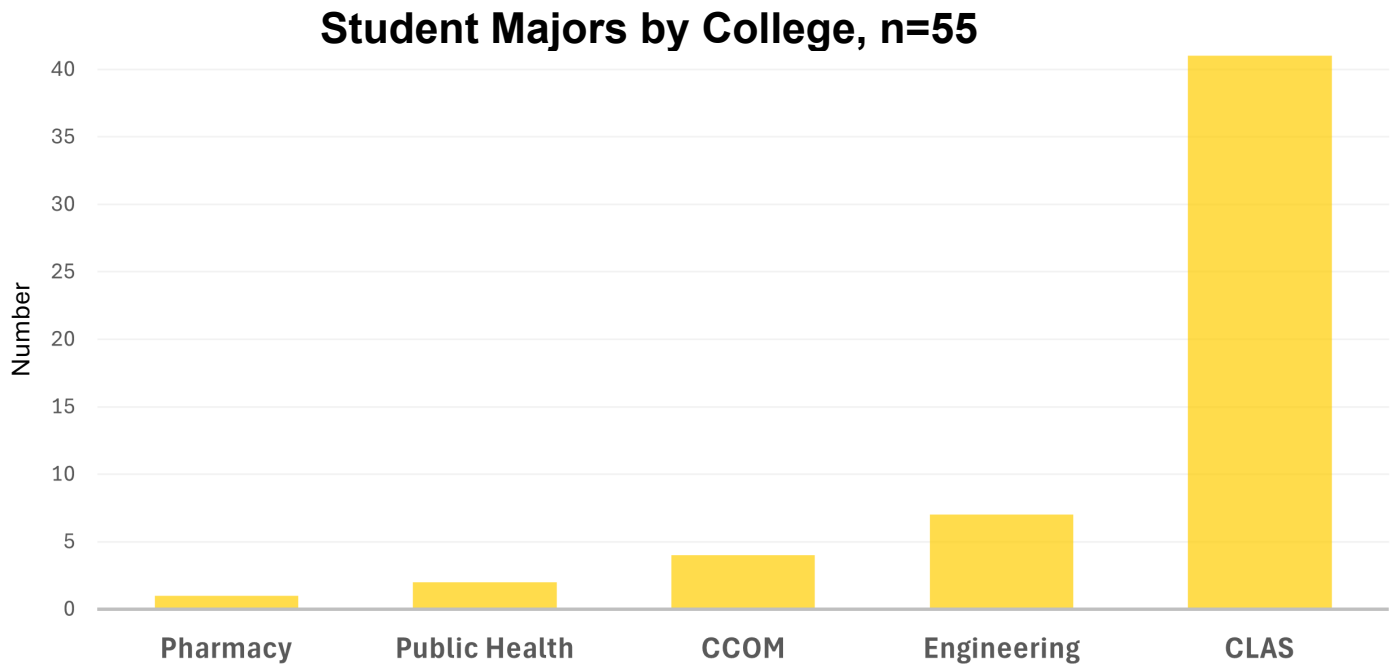
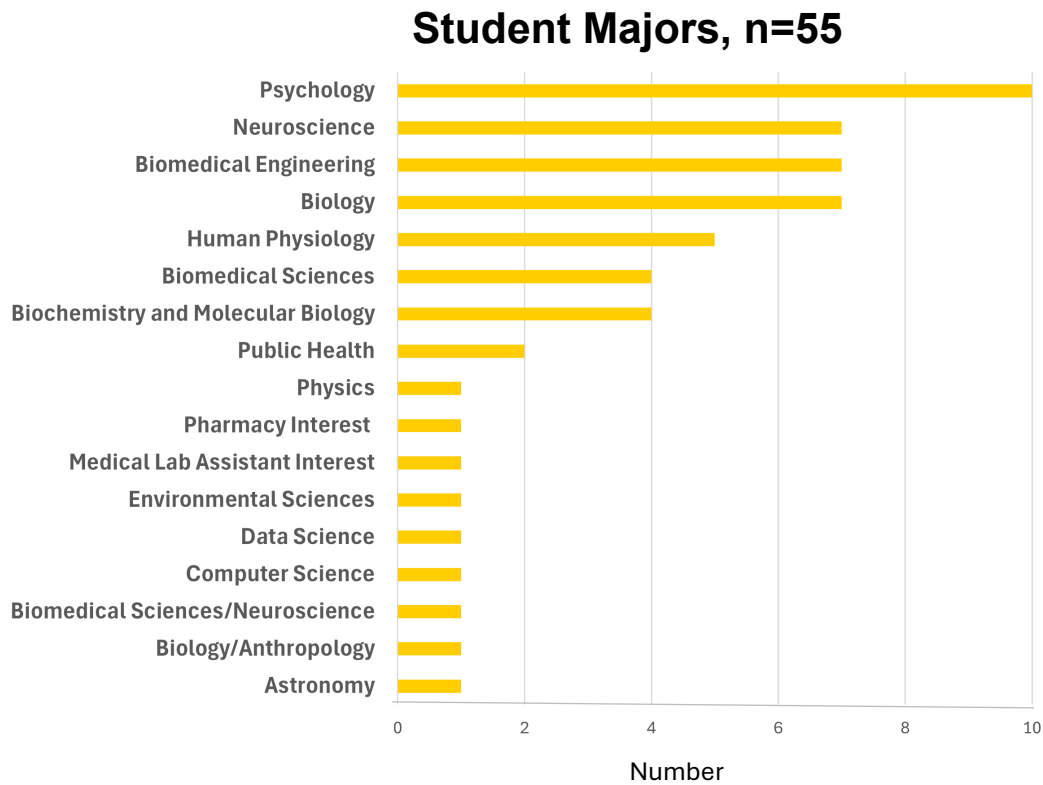
A Look at the Numbers: June 2023 – May 2024



The graphs and charts below represent all students in programs under the umbrella of the Iowa Sciences Academy, **55 unique students in total**. This breaks out to 42 students in three programs supporting paid research opportunities (Science Alliance, LSAMP, and MARC) and 14 students that were enrolled in the Latham Science Engagement Initiative (LSEI) Fellowship program. One student was in both the Science Alliance and LSEI, so the enrollment is reflected in the program numbers but not counted twice in the demographics.



A Look at the Numbers, cont'd:



A Look at the Numbers, cont'd:

Science Alliance, LSAMP, and MARC programs prioritize students who may have faced challenges or barriers to pursuing their higher education goals. The charts below represent 42 students in these three programs supporting paid research opportunities and does not include Latham students.

These data suggest that ISA is serving underrepresented students at a rate greater than the represented student population on campus.

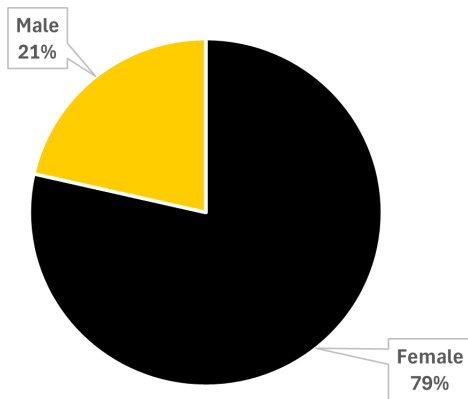
Category	ISA %	UI %	Category	ISA %	UI %
Gender (Female)	79%	55.5%	African American/Black	17%	3%
First Generation	50%	21%	Asian	12%	5%
Pell Grant Recipient	52%	18%	Hispanic or Latino (a)	45%	9%
			White	26%	75%

Sources:

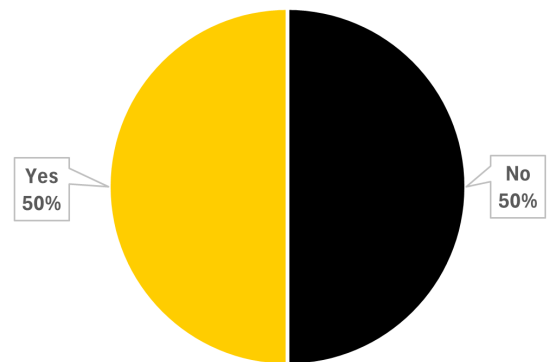
https://provost.uiowa.edu/sites/provost.uiowa.edu/files/2024-03/Digest_2023-24.pdf

<https://nces.ed.gov/ipeds/reported-data/153658?year=2023&surveyNumber=7>

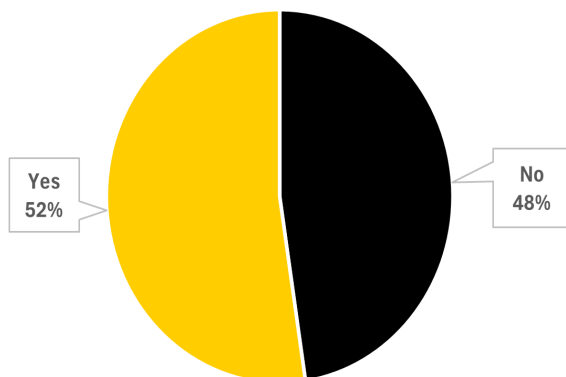
Gender



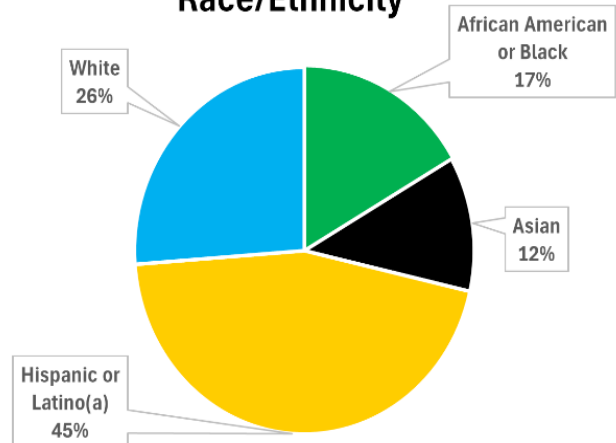
First Generation



Pell Grant Recipient

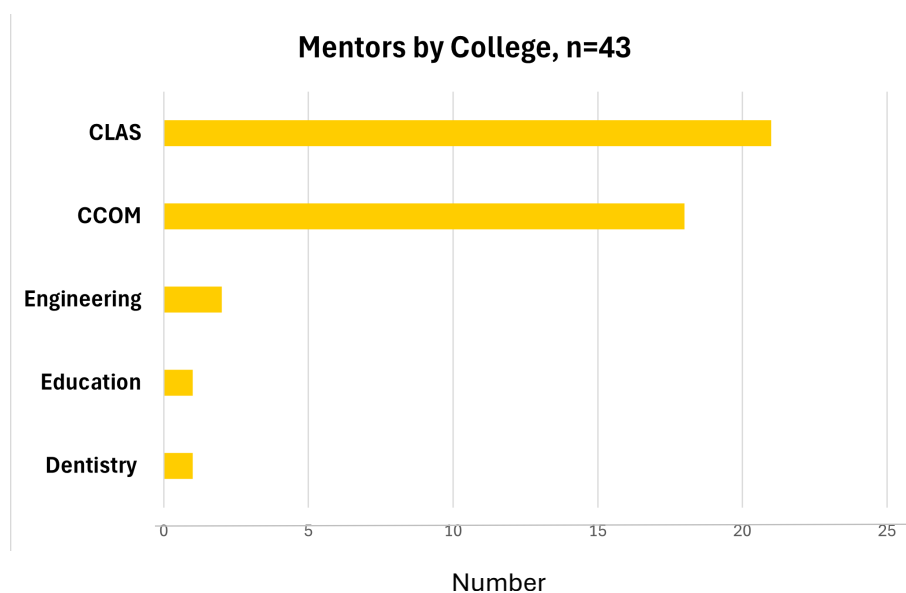
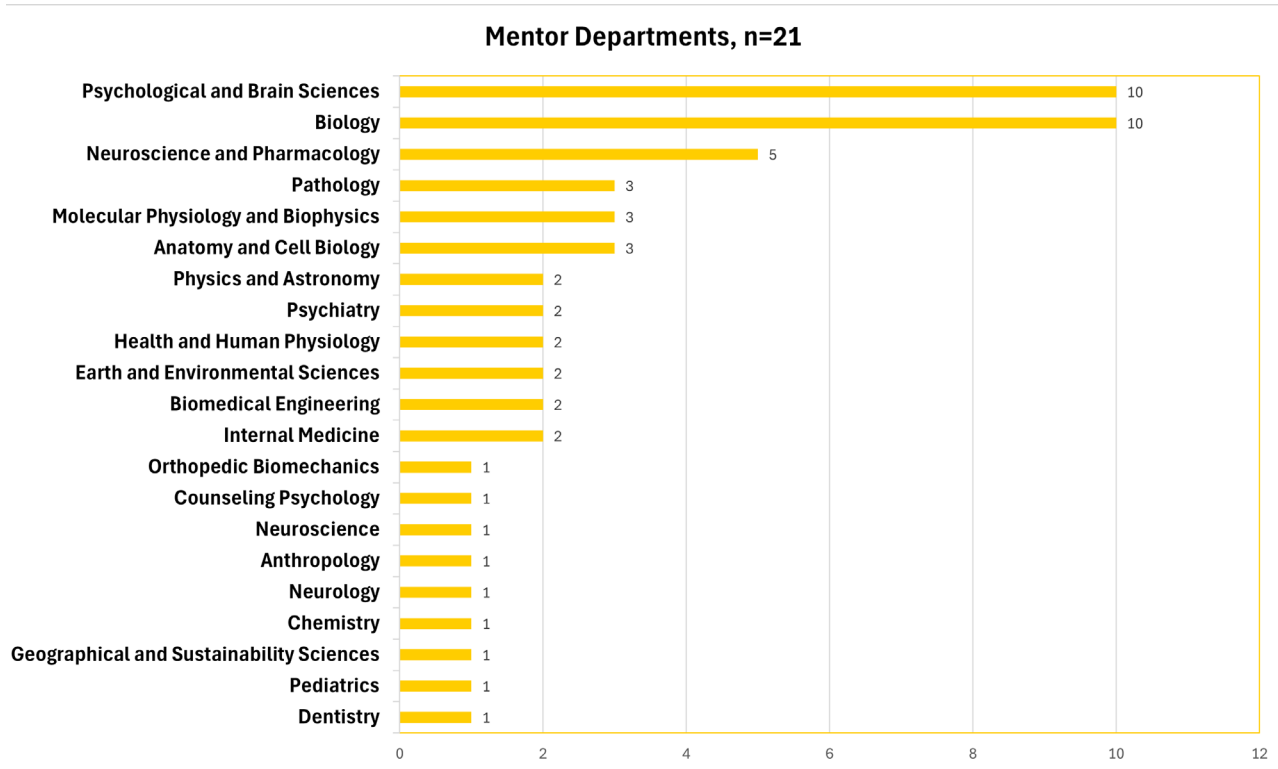


Race/Ethnicity



FACULTY ENGAGEMENT

University faculty members play a crucial role in ISA programs as research mentors and benefit from student participation in their research. During 2023-24, 43 faculty from 21 different departments across campus participated as research mentors to ISA students. Two faculty served as ISA program Co-Directors - from Chemistry (Dr. Tori Forbes for UI-MARC) and Physics (Dr. Vincent Rogers for LSAMP). Four faculty members from the Departments of Psychological and Brain Sciences, Immunology, Biomedical Engineering, and Community and Behavioral Health graciously donated their time as guest speakers.



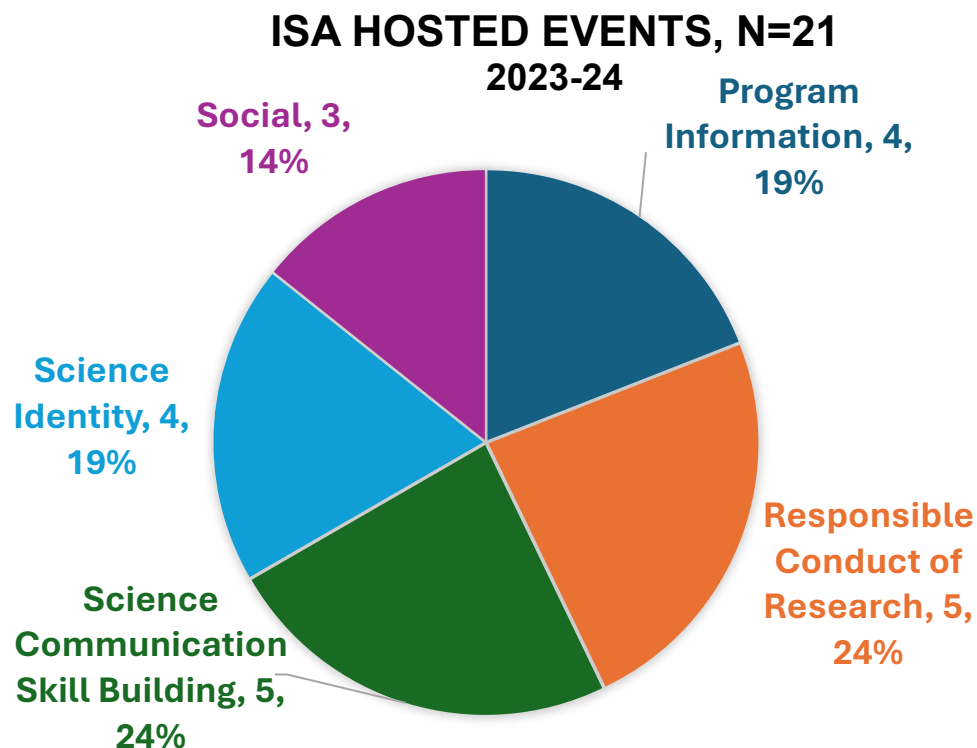
TRAINING & OPPORTUNITIES

In addition to carrying out mentored undergraduate research, ISA students participate in coursework on critical thinking, science communication, and leadership skills. ISA students have numerous opportunities to develop as scientists through hands-on year-round mentored research, conference participation, ISA events, poster presentations, projects, mentoring, and student authored publications.

Here are some highlights of ISA student opportunities during the 2023-24 academic year.

ISA Events Highlights at a Glance

- Twenty-one (21) formal events were hosted by ISA. Events included 5 Rigor, Reproducibility and Responsibility related events, 5 Science Communication Skill Building events like the ISA Scholar Symposium featuring short research talks by ISA students, 4 events designed to deliver information about ISA program goals and expectations, 4 events designed to support science identity including a panel of former ISA alumni, and 3 social events designed to build community. In total, 514 students, ISA staff, faculty, and in some cases, the public participated in these events.
- In addition, 23 graduate school application/assistance workshops, 2 peer mentoring group sessions and 10 study group/personal guidance sessions were offered.



ISA Coursework

Various required and optional classes are offered within the ISA curriculum. ISA faculty, staff and graduate students participate in teaching of these courses. Three graduate assistantships were awarded by the College of Liberal Arts and Sciences Dean's Office and provide doctoral students unique opportunities to participate in the college's outreach, engagement, and writing missions in ways designed to diversify and transform graduate career preparation. Additionally, the ISA funds a student from Counseling Psychology to be on the ISA staff offering additional support and guidance.

FALL 2023 COURSES

ISA:1040 – Exploring Research 1 s.h.

(Taught by Jacob Payne, Graduate Assistant in Physics and Astronomy and Briante Najev, Graduate Assistant in Biology; 4 enrolled)

This course is designed to support professional and career development of first-year students through exploring different types of research environments on campus and learning how to identify and contact potential research mentors.

ISA:2040 – Professionalism in the Scientific Community 1 s.h.

(Taught by Hailey Kingsbury, Graduate Assistant in Speech and Hearing Science; 14 enrolled)

This course teaches communication skills and appropriate professional conduct while maintaining ethical standards; main objectives include development of leadership skills in the community, further understanding of ethical issues in student's field, improve communication of student's research to the public, and understanding the significance of professional conduct.

ISA:3040 – Critical Analysis of Primary Literature 1 s.h.

(Two sections taught by Tori Forbes, Prof. of Chemistry and Lori Adams, Assoc. Prof. of Instruction, Biology, 14 enrolled)

Development of critical thinking and research skills through analysis of primary scientific research literature to demystify and humanize research science; how to analyze components of a good empirical article; students present a research paper from literature in their field of interest.

ISA:4040 – Teaching Your Undergraduate Research 1 s.h.

(Taught by Lori Adams, Assoc. Prof. of Instruction, Biology, 8 enrolled)

Scientific teaching principles (e.g., backwards design, active learning, formative assessment); students develop a teaching unit based on some aspect of their research and teach it to the class in preparation for future interviews.

LATH:3000 – Science Communication Skill Building 2 s.h.

(Taught by Lori Adams, Assoc. Prof. of Instruction, Biology, 16 enrolled. Note that 14 finished the program, and 1 student was also in Science Alliance).

Provide Latham Fellows with various communication skills needed to explain scientific research to varied audiences.

ISA Coursework cont'd

SPRING 2024 COURSES

ISA:1041 – Entering Research 1 s.h.

(Taught by Jacob Payne, Graduate Assistant in Physics and Astronomy, 9 enrolled)

This course is designed to complement independent scientific research experience; students meet weekly to share research experiences and feedback on the progress of their research projects; students gain experience searching databases, reading, and summarizing primary scientific papers.

ISA:2041 – Career Exploration and Specification 1 s.h.

(Taught by Jahnvi Pandya, Graduate Assistant in Counseling Psychology, 10 enrolled)

Students define career goals, increase knowledge about the process of obtaining a graduate degree, and create personal plans for future academic and research endeavors.

ISA:3041 – Pathways to Post-Undergraduate Education 1 s.h.

(Taught by Hailey Kingsbury, Graduate Assistant in Speech and Hearing Science, 10 enrolled)

Successful preparation for graduate school application process; students learn how to write their own curriculum vitae, personal statements, research statements, Graduate Record Examinations (GRE), and graduate school application action plan; students learn about available resources and further their professional development by giving an oral presentation on their current research.

ISA:4041 -- Senior Capstone Project 1 s.h.

(Taught by Briante Najev, Graduate Assistant in Biology, 10 enrolled)

Structure for development, planning, and implementation of a culminating project for the Iowa Sciences Academy; students dedicate three to five hours per week to the project and are encouraged to connect their projects to community issues or problems; integration of external learning experiences and activities including interviews, scientific observations, or internships.

LATH:3001 – Latham Fellows: Science Outreach Project 1 s.h.

(Taught by Lori Adams, Assoc. Prof. of Instruction, Biology, 14 enrolled)

This course provides guidance to Latham Fellows as they implement one individual and one group project proposed the previous fall. Students present their final outreach projects at a public showcase with the donors at the end of the semester.

Peer Mentoring Program

A peer mentoring program was established to increase awareness of research opportunities. Peer mentors complete training in basic relationship building, mentoring philosophy, negotiating goals, and building a mentoring team, resume/CV creation, and ethical considerations. The process for matching mentors with mentees takes place each fall. Peer mentoring is an opportunity to contribute to fellow students' success and development, build awareness of self, and network among others in STEM-related fields.

Ten students participated in the Peer Mentoring program during 2023-24 with the Peer Mentors receiving training via an interactive workshop. Students were paired up via a dynamic "speed dating" style event where mentors and mentees engaged in brief, structured interactions to identify compatibility. Each of the mentors and their mentees met informally which helped foster connections and rapport between them. This program was well received. One participant shared, "I enjoyed ISA. My mentor was very cool. He was the same age as me and helped me navigate engineering." Another student commented, "I loved the events, especially when all mentors and mentees met together."



Mentor Will Dong and Mentee Betsy Montiel receives certificates of participation at the ISA graduation ceremony

ISA Summer Program

ISA students are financially supported to do research on campus, including support for room and board. Twenty-four students (24) participated in the 2023 eight-week summer program. Weekly seminars were held focusing on skill-building on research poster development and communication. Students presented their research posters at the Summer Undergraduate Research Conference at the end of the program and received feedback from judges on their work.

Student Research Presentations/Publications

Research Presentations

ISA students presented their research 86 times at local, regional, and national conferences. One or more ISA students presented at the conferences listed below in the 2023-2024 year.

- Summer Undergraduate Research Conference (SURC)
- Fall Undergraduate Research Festival (FURF)
- Spring Undergraduate Research Festival (SURF)
- American Association of Microbiology Microbe Conference
- Association for Psychological Science Conference
- IINSPIRE LSAMP Annual Conference
- Louis Stokes Midwest Regional Center of Excellence (LSMRCE) Conference
- Midwest Tumor Microenvironment Conference
- Midwestern Psychological Association National Conference
- National Multicultural Conference and Summit
- Research in the Capitol
- Society for Advancement of Chicanos/Hispanics and Native Americans in Sciences (SACNAS)
- United States Association for Studying Pain National Meeting



Students and staff attend the annual LSAMP-IINSPIRE conference.

Research Publications

Three ISA students published research during this academic year.

Li, M., Berton, R.R., Qian, Q., Maschek, J.A., Chen, B., **Barroso, E.**, Rauckhorst, A.J., Griffith, T.S., Taylor, E.B., Cox, J.E. and Badovinac, V.P., 2023. Hepatic IRE1 Protects Against Septic Cardiac Failure. *bioRxiv*, pp.2023-03.

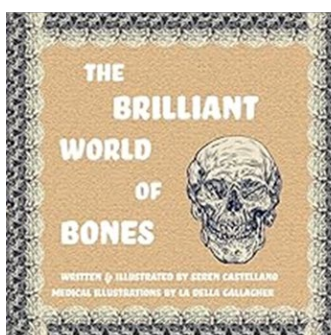
Carlson, A. S., Stegall, M. S., Sirotiak, Z., **Herrmann, F.**, & Thomas, E. B. (2024). Just as Essential: The Mental Health of Educators during the COVID-19 Pandemic. *Disaster medicine and public health preparedness*, 18, e6.

Steiert, B., Andersen, S.E., McCaslin, P.N., Elwell, C.A., Faris, R., Tijerina, X., Smith, P., **Eldridge, Q.**, Imai, B.S., Arrington, J.V. and Yau, P.M., 2024. Global mapping of the Chlamydia trachomatis conventional secreted effector–host interactome reveals CebN interacts with nucleoporins and Rae1 to impede STAT1 nuclear translocation. *bioRxiv*.

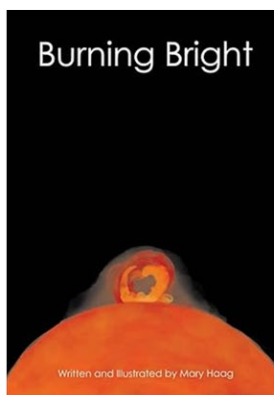
Science Outreach and Communication

Science outreach and communication are vital to the Iowa Sciences Academy (ISA) because they bridge the gap between scientific research and the broader community. Through initiatives like the Latham and ISA Capstone projects, students are empowered to design and execute their own outreach projects, fostering creativity and engagement.

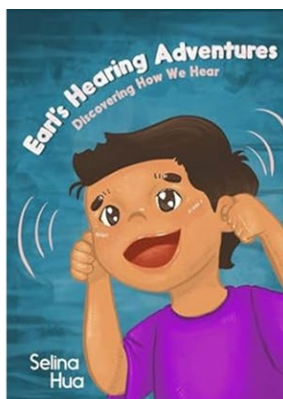
Student-driven projects, which range from poster boards and magazines to blogs, podcasts, books, and games, not only enhance students' communication skills but also make science accessible and exciting for audiences. Platforms like Stem-O-Sphere.org and the *Synthesis* journal further amplify student voices, showcasing their innovative approaches to science communication and ensuring that scientific knowledge resonates with a wide audience.



by Seren Castellano



By Mary Haag

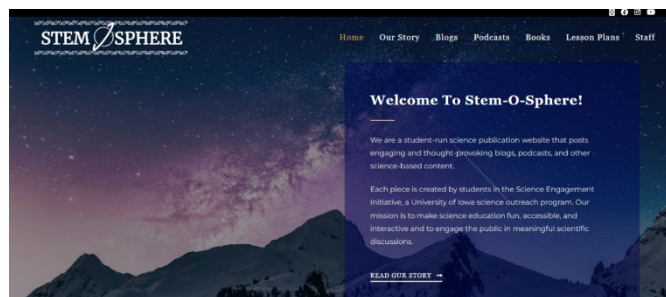


By Selina Hua

Three ISA students published children's books on Amazon during this academic year.

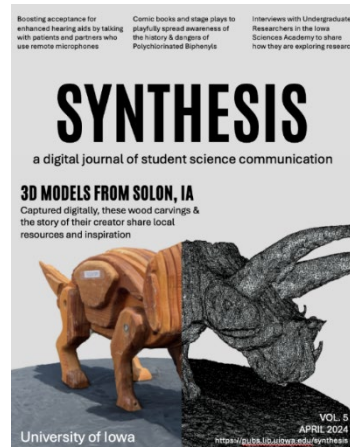
Stem-O-Sphere

Stem-O-Sphere.org is a student-run science publication website that posts engaging and thought-provoking blogs, podcasts, and other science-based content. You can check out more about Stem-O-Sphere [here](#).



Synthesis

Synthesis (ISSN 2643-8410 (online)) is a journal dedicated to publishing student science communication in various forms, including written, visual, and audio. Our mission is to showcase the innovative ways students communicate science to diverse audiences. The journal is published as a joint effort of the Latham Scientific Engagement Initiative and the UI Digital Scholarship and Publishing Studio. Volume 5 was published in 2023 and contained 6 submissions. Briante Najev and Jacob Payne served as Co-Editors.



FUNDING & CAMPUS COLLABORATION



The Iowa Sciences Academy receives funding and support from several sources:

- National Institutes of Health (NIH)
- National Science Foundation (NSF)
- Office of the Vice President for Research
- Graduate College
- College of Liberal Arts and Sciences
- Office of the Provost
- Department of Biology
- Donor support from Drs. Robert J. and Sue B. Latham - The Latham Science Engagement Initiative (LSEI) and Fellowship Program was established through the generous donation of Drs. Robert J. and Sue B. Latham, of Cedar Rapids, Iowa. The program is based in the University of Iowa College of Liberal Arts and Sciences (CLAS) and serves to enhance science communication skills and future opportunities for undergraduate students.

This diverse funding helps support the various programs and initiatives aimed at fostering student success in research and scientific communication.

The ISA collaborates with departments across the University of Iowa and beyond by:

- Offering student programs that support STEM majors across six colleges.
- Inviting staff and students from other departments and programs (e.g. iDREAM and iCARE postbaccalaureate program) to participate in ISA sponsored events and courses.
- Inviting staff, faculty, and graduate students as guest speakers at ISA events.
- The ISA assists departments with writing support letters for training grants and developing broader impacts sections for NIH and NSF grants.
- Partnering with UI departments and other local, regional, and national higher education facilities on Research Experiences for Undergraduates (REU) summer programs.
- Participating in the IINSPIRE LSAMP (Iowa, Illinois, Nebraska Louis Stokes Alliance for Minority Participation) Midwest STEM partnership for innovation in research and education.
- Partnering closely with OUR (Office of Undergraduate Research) on student events.

ISA STAFF & OFFICE INFORMATION

2023-24 ISA Staffing:

Lori Adams, PhD, Director, Prof. of Instruction, Biology

Kristina Venzke, Associate Director

Tori Forbes, PhD, Prof. of Chemistry, MARC Co-PI

Vincent Rodgers, PhD, Prof. of Physics, LSAMP Co-Director

Joan Aune, Administrative Services Coordinator

Hailey Odell, Undergraduate Student Assistant

Jahnvi Pandya, Graduate Research Assistant, Counseling Psychology

Briante Najev, Graduate Research Assistant, Biology

Jacob Payne, Graduate Research Assistant, Physics and Astronomy

Hailey Kingsbury, Graduate Research Assistant, Speech and Hearing

2023-24 ISA Advisory Board Members:

Saba Ali, PhD, Assoc. Dean for Research, College of Ed, and Prof. of Couns. Psychology

Mirra Anson, PhD, Director, Student Academic Success & Strategic Initiatives

Andrew Beckett, PhD, Associate Dean, University College

Nick Benson, JD, Executive Director, Office of Community Engagement

Michael Dailey, PhD, Assoc. Prof. of Biology

Daniel Eberl, PhD, Prof. of Biology

Ernesto Fuentes, PhD, Professor of Biochemistry and Molecular Biology

Jill Harmande, Senior Academic Advisor

Susan Lutgendorf, PhD, Professor of Psychological and Brain Sciences

Aliasger Salem, PhD, Assoc. Vice President for Research, Prof. in Pharmaceutical Sciences, Pharmaceutical Sciences and Experimental Therapeutics

Sheila Schechinger, Associate Director, Outreach and Recruitment

Joshua Weiner, PhD, Assoc. Dean for Research and Infrastructure, CLAS, Prof. of Biology

Pamela Geyer, PhD, Professor of Biochemistry and Molecular Biology

Robert Kirby, PhD, Director of Office of Undergraduate Research

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