

GROWING RESEARCH
FROM THE GROUND UP

OFFICE OF THE VICE PRESIDENT FOR RESEARCH ANNUAL REPORT, FY2018-19



Office of the Vice
President for Research

RESEARCH AND SCHOLARSHIP

STUDENTS IN THE LAB

Research and creative scholarship are pillars of the University of Iowa's mission, but that's not limited to the work of faculty and staff. Students, including a growing number of undergraduates, have many opportunities to work in laboratories, libraries, and out in the field to help answer some of life's most challenging questions.

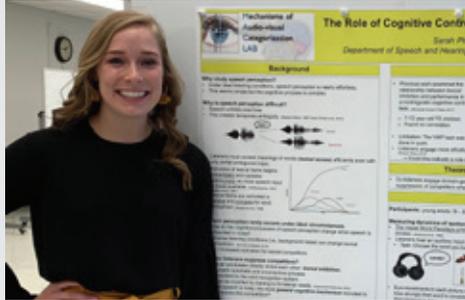
MIRANDA HENRY: Sound Scholarship

What do global health and music participation have to do with one another? What are the economics of Bollywood-style dancing? And what contribution does air guitar (pretend-playing the instrument, often with dramatic flair) make to music? These are some of the questions explored in the Ethnomusicology Today podcast, which is produced by UI music major Miranda Henry of Belleville, Illinois, and under the direction of Trevor Harvey, Ph.D., an associate professor of instruction in the UI School of Music. For each podcast, Miranda and Harvey create questions for the authors of academic articles on ethnomusicology, which is the study of the music of different cultures. Miranda edits the podcasts, works in clips of relevant music, and uploads the programs to UI radio station KRUI, iTunes, and the Society for Ethnomusicology's website. Miranda's goal is to engage a broad audience of educators, scholars, musicians, and the general public by highlighting the relevance of ethnomusicology to civic life in both a global society and the world of academics.

SABRINA CLAMAN: Drawn on the Farm

Sabrina Claman grew up on an Iowa farm in Calmar, Iowa, but as a Bachelor of Fine Arts student at the University of Iowa her interests lean more toward Faber Castell artist pens than cow pens. Under the guidance of mentor Rachel Marie-Crane Williams, Ph.D., an artist and associate professor with joint appointments to the UI School of Art & Art History (Intermedia) and Gender Women's and Sexuality Studies, Sabrina spent summer 2019 shadowing a farmer in northeast

Iowa and she's now working to preserve 150 years of family farming history through documentary comics. Her end goal is to translate her field research—recorded dialog, photographs, and other materials—into a documentary comic for her BFA show.



SARAH PLOCK: Cutting through the Noise

People with hearing impairments struggle to understand speech when there's lots of environmental noise. When people hear a word, they implicitly consider multiple words that partially match the auditory signal, creating competition. When hearing "sandal," they might consider "sandwich" and "candle." The ability to rapidly suppress competitors (e.g., "sandwich") is crucial. Sarah Plock, a Speech and Hearing Sciences major from Iowa City, Iowa, who works in the lab of Bob McMurray, F. Wendell Miller Distinguished Professor in the College of Liberal Arts and Sciences Department of Psychological and Brain Sciences, is working to understand what areas of the brain are involved in this process, which could lead to cognitive training that helps those with hearing impairments identify the right words in noisy situations.

NATHAN KOURI: Textual Evolution

UI cinema and English double major Nathan Kouri is trying to understand how and why a set of proofs for sections of James Joyce's *Finnegans Wake* has been kept in Des Moines since 1930—and what scholars have missed in overlooking it. Nathan, a Des Moines native, is a member of the UI Honors Program, and his research mentors are Tom Keegan, who directs the Digital Scholarship & Publishing Studio in the UI Libraries, and Associate Professor Blaine Greteman in the English Department. During summer visits to the National Library of Ireland and the Salisbury House in Des Moines, Nathan examined Joyce's manuscripts, drafts, notes, and other archival materials to get a better sense of the author's unique creative process.



STUDENTS WORKING ALONGSIDE RESEARCHERS

In 2019, the Iowa Center for Research by Undergraduates (ICRU) joined the Office of the Vice President for Research. Under this partnership, opportunities for undergraduates to participate in research and creative scholarship at the University of Iowa are expected to grow. Here are some of the ways ICRU supports the 30 percent of undergraduates who work with research faculty:

- Connects students with researchers working in their areas of interest.
- Deploys ICRU "ambassadors" to advocate for undergraduate research.
- Sponsors an annual Three Minute Research Story Competition, where students describe their research in concise, engaging, and accessible language, using a single PowerPoint slide.
- Holds annual poster sessions on campus, and organizes a Research in the Capitol each spring. Since its inception 15 years ago, Research in the Capitol has brought the research of nearly 900 undergraduates from the UI, Iowa State University, and the University of Northern Iowa to legislators in the Iowa State Capitol in Des Moines.

OLIVIA POWERS: Using Tech to Improve Orthotics

Olivia Powers, a major in biomedical engineering from Bondurant, Iowa, is working to improve the fitting process of ankle foot orthoses (AFOs), or braces used to maintain or restore mobility for individuals with lower limb pathology. Working in the lab of Jason Wilken, associate professor in the Carver College of Medicine's Department of Physical Therapy and Rehabilitation Science, her current project involves evaluating new low-cost 3D limb-scanning technology. She hopes the work will result in data that can be used to help standardize the AFO fitting process to improve the user's experience and comfort.



TECH TRANSFER

PROTECTING AND SHARING GREAT IDEAS

The University of Iowa Research Foundation (UIRF) helps protect faculty and staff intellectual property and take inventions from the lab out into the marketplace as medications, medical treatments and devices, and other products, procedures, and services. This enhances research, supports the university's educational mission, and improves patient care.

UIRF: SAME HOME, SHARPENED MISSION

In 2018, many of the University of Iowa's economic development activities shifted out of the Office of the Vice President for Research, allowing it to focus on its core activities in support of research and scholarship. The UI Research Foundation remains in OVPR to keep its activities tightly aligned with this mission. Among other things it is:

- Partnering with Ximbio, a non-profit dedicated to broadening access to life science research tools, to help market reagents developed by UI researchers—from unique antibodies and cell lines to mouse models and small molecules—that can help advance the discoveries of scientists across the globe.
- Shifting much of its energy toward licensing intellectual property (IP).
- Broadening the UI's IP portfolio beyond medicine and medical devices.
- Looking for opportunities to license both traditional and emerging IP.



Researcher Devotes Career to Bringing Better Cyst Treatment to U.S.

For decades, Japan has used a novel treatment for a rare, disfiguring and potentially dangerous condition among infants and toddlers called lymphatic malformations (LMs), large cysts that develop on the neck and face. Because of regulatory hurdles and drug-development costs in the United States, bringing a version of the drug here has proved difficult. But that hasn't stopped Richard Smith, M.D., director of the Molecular Otolaryngology and Renal Research Laboratories and the Iowa Institute of Human Genetics, from spending 20 years of his career conducting his own trials, which showed similarly remarkable results. Thanks to Smith's findings and the collaborative efforts of the UI Research Foundation and the Division of Sponsored Programs, U.S.-based clinical-stage biopharmaceutical company ArTara signed a licensing agreement with the university in 2019 to use Smith's research to pursue Food and Drug Administration approval of TARA-002, a "bio-similar" treatment based on the Japanese drug's properties. One unique aspect of this situation is that, unlike most tech transfer agreements, this license didn't involve or require a patent. "Patents serve an important role in protecting intellectual property, but there are many opportunities to commercialize IP without them," UIRF Executive Director Marie Kerbeshian said.



Startup Flexes Research Muscles to Battle Atrophy

Biotech company Emmyon Inc. is not only an up-and-coming UI startup; it's a good example of the time and commitment required by—and potential incentives for—faculty interested in taking their research out into the market. Emmyon's primary focus is on better understanding, and developing novel treatments for, muscle atrophy caused by aging, illness, and injury—a condition that affects millions of Americans. One outcome of that research, led by Christopher Adams, M.D., Ph.D., a professor of internal medicine in the UI Carver College of Medicine as well as founder and president of Emmyon, is the development of small molecules that improve muscle strength, mass, and metabolism. Some are being used to create new food products for muscle health (including, interestingly, for special dog treats to reverse muscle loss in canines), while others are being developed as medicines for muscle atrophy, obesity and type 2 diabetes. This didn't happen overnight, however. Working with the UIRF, Adams and his colleagues first disclosed their invention in 2009, filed their first patent in 2010, and struck their first license in 2014. The research has since netted grants from the National Institutes of Health, the U.S. Department of Veterans Affairs, and the Fraternal Order of Eagles Diabetes Research Center at the University of Iowa.

Putting High School Diplomas Within Easier Reach

The University of Iowa has a long history of education firsts, and that tradition continues with the recent development of new, innovative testing tools to help students and educators. Stephen B. Dunbar, the Hieronymus-Feldt Professor in Educational Measurement and co-director of the Iowa Testing Programs in the College of Education, and colleague Catherine Welch, a professor in the college and Iowa Testing Programs co-director, have created testing materials for the new HiSET™ test. The new exam is an alternative pathway to a high school equivalency credential for students who leave school before graduating. Their research caught the interest of educational companies, who have licensed their inventions for further development and commercialization.

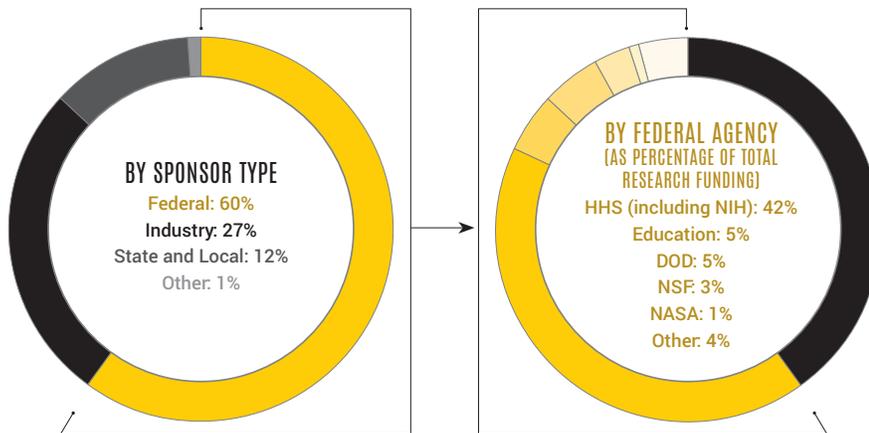
UNIVERSITY OF IOWA RESEARCH

The University of Iowa is Iowa's largest comprehensive research university, with a balanced commitment to the arts, sciences, and humanities. It's home to one of the nation's largest academic medical centers and the pioneering Iowa Writers' Workshop.

TOTAL FEDERAL AND NON-FEDERAL RESEARCH FUNDING FY17-19 (MILLIONS OF DOLLARS)



FY19 SPONSORED RESEARCH



FY19 RESEARCH HIGHLIGHTS

- 7% (\$32.4 million)**
increase in total research funding over FY18
- 207%**
increase in DOD funding
- 94%**
increase in NSF funding
- 27%**
increase in DHHS (non-NIH) funding
- 70%**
increase in College of Nursing funding
- 63%**
increase in Graduate College funding
- 51%**
increase in College of Education funding

TECHNOLOGY TRANSFER

FY19 FOREIGN PATENTS GLOBALLY



FY19 PATENTS AND LICENSES

83
invention disclosures

54
patents issued

48
licenses and options

\$1.8 million
in royalties and licensing income

\$11.6 million
in total revenue to companies from UI-licensed technologies (\$1.2 million of it for Iowa-based companies)

TOP EIGHT FY19 DISCLOSURES BY PRODUCT CATEGORY

General Medical	16
Diagnostic Test	9
Medical Device	9
Research Tool/Reagent	7
Engineering	6
Medical Imaging	6
Therapeutic Drug	5
Industrial Software	4