

33rd ANNUAL UNDERGRADUATE BIOLOGY RESEARCH PROGRAM CONFERENCE

January 22, 2022 | 8:30am - 12:00pm
Environment & Natural Resources 2 Building



Details and event schedule:
ubrp.arizona.edu

WELCOME

Every year, I look forward to the UBRP Conference. It's an opportunity to be energized by the talent and ambitions of our bright students, and a reminder of how much we can learn through the scientific process... as well as perhaps how much more we still have yet to learn. The UBRP Conference is a perfect place for a curious person to explore, and I invite you all to take full advantage of the opportunity to learn today. How do antibodies change after SARS-CoV-2 infection? How do fruit flies fight off wasps? Can math cure cancer? Do plants' features impact how they utilize nitrogen? How does acetaminophen affect the blood brain barrier? I hope you enjoy asking lots of questions and learning about all of these topics and more from today's student presenters.

In a year full of ups and downs, I am grateful for the perseverance of our students, the wonderful mentorship and guidance provided by our faculty, and the selfless generosity of the donors, volunteers, and supporters who have made it possible for our students to receive hands-on research experiences through UBRP. Today, I hope you will rediscover a sense of wonder, awe, and appreciation through the scientific projects on display, as well as for those whose hard work has made them possible. Thank you for sharing this event with us!

Sincerely,



Jennifer Cubeta, M.Ed.
UBRP Director



CONFERENCE SCHEDULE

Environment and Natural Resources 2 Building (1064 E. Lowell Street)

8:30 – 9:30am

KEYNOTE ADDRESS

ROOM N120, GROUND FLOOR

- Welcome and Acknowledgements by Jennifer Cubeta, UBRP Director
- Introduction of Keynote Speaker by Dr. Indraneel Ghosh
- Keynote Address: “Teaching Old Machines New Activities: Engineering Cellular Protein Translation for New-to-Nature Functions” by Dr. Ahmed Badran, PhD, UBRP and Beckman Scholars Program Alumnus and Assistant Professor of Chemistry at the Scripps Research Institute
- Conference Logistics by Jennifer Cubeta

9:30 – 11:30am

STUDENT POSTER SESSIONS

VARIOUS LOCATIONS, FIRST AND SECOND FLOORS

- Odd-numbered posters present from 9:30 - 10:30am
- Even-numbered posters present from 10:30 - 11:30am
- Refreshments available in the courtyard

11:35am – 12:00pm

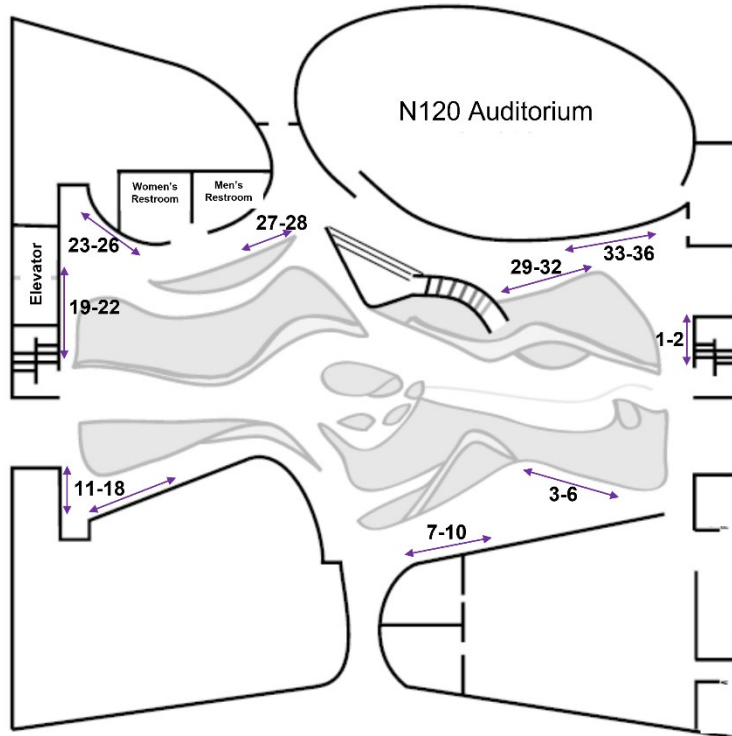
RECOGNITION, AWARDS, AND CLOSING REMARKS

ROOM N120, GROUND FLOOR

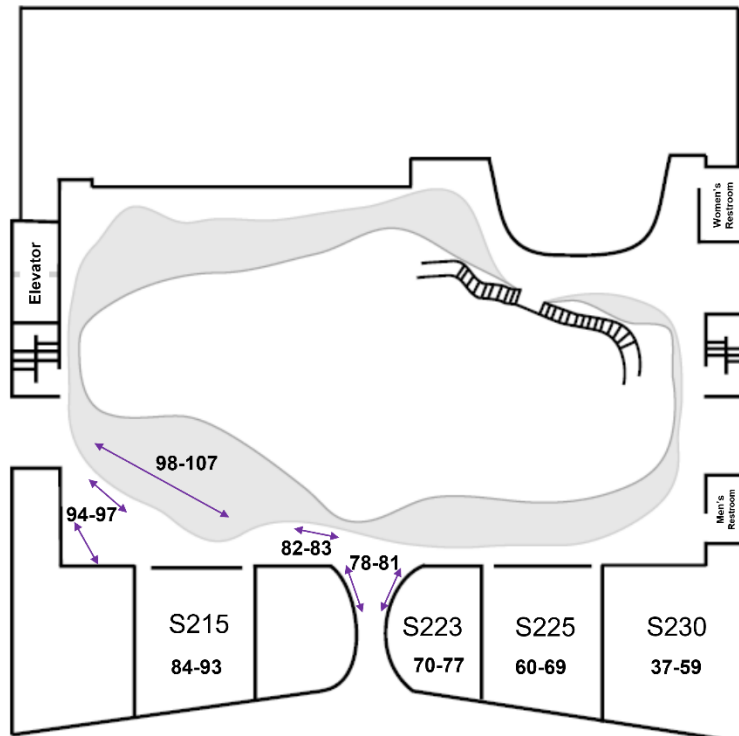
- Recognition of Graduating Seniors, Ambassador Officers, Pen Pals
- Recognition of Outstanding Mentor Award Nominees
- Outstanding Postdoctoral Mentor Award
- Outstanding Faculty Mentor Award

VENUE MAP: ENVIRONMENT AND NATURAL RESOURCES 2 BUILDING

*GROUND FLOOR
POSTERS 1 – 36*



*SECOND FLOOR
POSTERS 37 - 107*



TODAY'S ACTIVITIES

8:30 – 9:30am ♦ WELCOME AND KEYNOTE ADDRESS

ACKNOWLEDGEMENTS

UBRP thanks the following for their support:

Office of the Provost
Office of Research, Innovation, and Impact
BIO5 Institute
College of Science
College of Medicine
College of Agriculture & Life Sciences
College of Pharmacy
American Society for Pharmacology & Experimental Therapeutics (ASPET)
Arnold and Mabel Beckman Foundation for the Beckman Scholars Program
National Institute of Environmental Health Sciences (NIEHS) – EHS-TRUE
National Cancer Institute (NCI) – NACP
Western Alliance to Expand Student Opportunities (WAESO)
UBRP Advisory Board
UBRP Summer 2021 Small Group Leaders
[Private Donors](#)

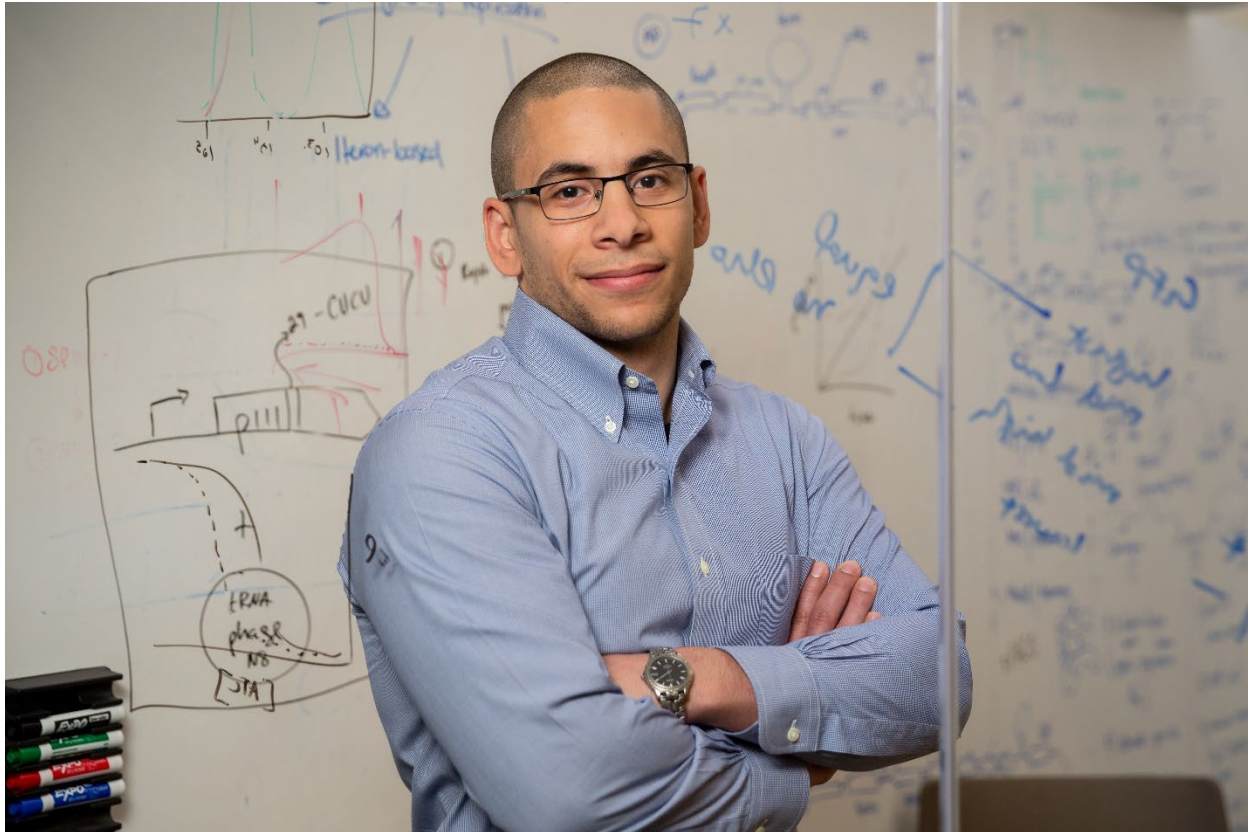
KEYNOTE ADDRESS

Introduction of Keynote Speaker by
Dr. Indraneel Ghosh, Professor of Chemistry & Biochemistry

**“Teaching Old Machines New Activities:
Engineering Cellular Protein Translation for New-to-Nature Functions”
by Dr. Ahmed Badran, Ph.D.**

UBRP and Beckman Scholars Program Alumnus
Assistant Professor of Chemistry at the Scripps Research Institute

Ahmed H. Badran is an Assistant Professor in the Department of Chemistry at The Scripps Research Institute. His work aims to probe and engineer the most fundamental biomolecules and genetic circuits in living cells, and to develop next generation solutions to long-standing global issues in healthcare and climate change. Badran has earned several distinctions for his research, including the Arnold and Mabel Beckman Scholarship, the National Science Foundation Graduate Research Fellowship, the Harvard Graduate School of Arts and Sciences Merit Fellowship, and the National Institutes of Health Director's Early Independence Award.



Dr. Badran earned his B.Sc. in Biochemistry & Molecular Biophysics, as well as Molecular & Cellular Biology, from the University of Arizona. Subsequently, he earned his Ph.D. in Chemical Biology from Harvard University under the guidance of Prof. David R. Liu, leading the development and application of rapid methods for continuous directed evolution. Following that, he was a Principal Investigator and Fellow of the Broad Institute of MIT and Harvard where his lab developed new technologies to reprogram protein translation.

The Badran Lab has developed strategies for efficient mutagenesis in bacteria that have provided unprecedented access to new functions for proteins and catalytic RNAs. More broadly, Badran has led the development and application of rapid methods for continuous directed evolution that overcome bioinsecticide resistance, provide insight in antiviral resistance, and improve specificity of genome editing reagents. Recently, the lab developed new technologies for genetic code expansion approaches. These contributions significantly improved the effectiveness and fidelity of non-canonical amino acid mutagenesis in living cells. These strategies are now widely applied across the life sciences.

9:30 – 11:30am ♦ STUDENT POSTER SESSIONS

Our students are excited to share their research with you! We invite our visitors to be curious and to ask questions such as *“Can you walk me through your poster? How did you get involved in research? What excites you about doing research? What is the ‘take home’ message from your project?”*

Student presenters are listed in the **Topical Guide to UBRP Conference Posters**, in alphabetical order by last name, within each topic. Access full abstracts and posters from today's event via [SARSEF School Fairs](#). Scroll down to the *Arizona Virtual Science Fairs* heading, and under the *School Name* dropdown menu, select *UArizona – Undergraduate Biology Research Program*, and click the teal *Virtual Exhibit Hall* button. The Fair Password is *UBRP2022*.

To give our students a chance to see each other's work:

- Odd-numbered posters will be presented from 9:30 – 10:30am.
- Even-numbered posters will be presented from 10:30 – 11:30am.

11:30am – 12:00pm ◆ RECOGNITION, AWARDS, AND CLOSING REMARKS

CONGRATUATIONS TO OUR GRADUATING SENIORS!

Congratulations to UBRP seniors who will be graduating in 2022! To celebrate all they have accomplished through our program, we are recognizing seniors with a teal UBRP graduation cord. Seniors, we wish you all the best for the future and look forward to receiving updates about your post-graduation positions and accomplishments. Make sure to update your profile on LinkedIn and join our UBRP group at <https://www.linkedin.com/groups/3762234/>

UBRP AMBASSADORS

UBRP Ambassadors are charged with the responsibility of helping to create community among undergraduate researchers by organizing social activities, providing feedback to program staff, and representing UBRP in speaking to on- and off-campus groups. We thank our 2021-2022 UBRP Ambassador officers for their service.

My Duyen Tran
President

Kerry Chou
Treasurer

Brandon Good
Vice President

Elizabeth Hanh Le
Volunteer Chair

Vivian Nguyen
Secretary

Nicholas Mortimore
Pen Pals Coordinator

UBRP PEN PALS

During the 2008-2009 academic year, UBRP participant Misha Pangasa, in conjunction with sixth grade teacher Patricia Robles-Medina at Mansfeld Middle School, initiated the UBRP Pen Pals Project. UBRPers volunteer to correspond with sixth grade students throughout the course of the year. Every May and December, UBRP students host their sixth-grade Pen Pals in a morning of science activities on campus. We thank everyone who participated in the program this year!

Nick Mortimore
Pen Pals Coordinator

Susan Sumner
Mansfeld Middle School Pen Pals Teacher

2021-22 UBRP Pen Pal Participants:

Carly Chellman
Kerry Chou
Angela Ding
Amy Fan
Cynthia Ge
Parker Geffre

Brandon Good
Paolo Guerra
Anna Gabrielsen
Shelby Herrick
Shifat Hossain
Sun Woo Kim

Meccah Jarrah
Elizabeth Le
Atley Moberly
Nick Mortimore
Vivian Nguyen
Grace Parkeh

Cecilia Roessle
Hasina Shir
Caleb Seekins
Alexandra Sundman
Niall Thorns
My Duyen Tran

MENTOR AWARDS

Each year, we celebrate UA's supportive culture for undergraduate research and the outstanding mentorship UBRP students enjoy by granting the Outstanding UBRP Graduate Student, Postdoctoral Fellow, or Research Specialist Mentor Award and the Outstanding UBRP Faculty Mentor Award. Candidates are nominated by current UBRP students and UBRP alumni. A committee composed of UBRP students and alumni reviews the nominees and selects the finalists.



2021-22 UBRP Outstanding Postdoctoral Mentor
Dr. Edward (Ted) Wickstead
Postdoctoral Research Associate, Neuroscience
Nominated by Cecilia Roessle



2021-22 UBRP Outstanding Faculty Mentor
Dr. Laura Meredith
Assistant Professor,
School of Natural Resources and the Environment
Nominated by Parker Geffre

2021-22 UBRP Outstanding Mentor Nominees:

Alex Badyaev

Nominated by Max Gleason

Lalitha Madhavan

Nominated by Nhat Nguyen

Matthew Cordes

Nominated by Alexandra Sundman

Dominic McGrath

Nominated by Shameema Sikder

Caroline Machado Kopruszinski

Nominated by Radhey Ruparel

Timothy Secomb

Nominated by Vivian Nguyen

Thank you for your wonderful mentorship of our students!

THANK YOU FOR YOUR SERVICE!

UBRP ADVISORY BOARD MEMBERS

John Szivek, Chair
Nathan Ellis
Teri Suzuki

Samantha Szuter
Doug Wellington
Ken Wertman

Emeriti Board Members:
Carol Bender
John Enemark

SUMMER 2021 SMALL GROUP LEADERS

UBRP students meet in small groups every other week during the summer to discuss their research with their peers. Faculty, postdocs, graduate students, and advanced undergraduates volunteer their time to facilitate these groups and to mentor undergraduate researchers.

We are incredibly fortunate that these individuals volunteered their time and talents to serving as small group leaders in Summer 2021. We deeply appreciate their contributions to enriching UBRP students' experiences.

Marco Contreras

Researcher/Scientist, Psychology

Carolina Pineda

Program Coordinator, Partnership for Native American Cancer Prevention

Alexander Hamby

Postdoctoral Research Associate, Molecular & Cellular Biology

Logan Porrazzo

Beckman Scholar

Adrienne Kinney

Graduate Student, Applied Mathematics

Rudolph Rodriguez

UBRP Participant

Kimberly Leon

Graduate Student, Psychology

Jennifer Roxas

Research Associate,
Animal and Comparative Biomedical Sciences

Heidi Mettler

Graduate Student, Speech, Language & Hearing Science

Ashwin Siby

UBRP Participant

Sarah Lynn Neiling

Graduate Student, Speech, Language & Hearing Science

Sam Sugerman

Graduate Student, Biochemistry

Megan Nickerson

Graduate Student, Environmental Science

Julia Townsend

Graduate Student, Biochemistry

Emily Peters

Graduate Student Physiological Sciences

My Duyen Tran

UBRP Participant

Lila Wollman

Postdoctoral Research Associate, Physiology

SUPPORT UBRP!

The Undergraduate Biology Research Program (UBRP) gives University of Arizona undergraduate students the opportunity to work towards becoming world-class researchers and professionals by becoming involved in research with top-notch UA science professors. Students participate in hands-on mentored, self-directed work, allowing them to contribute to advancing scientific knowledge early in their careers.

For 33 years, UBRP has enabled the best and brightest undergraduate students to hone their critical thinking and problems solving skills, launching them to become successful scientists, engineers, physicians, and allied health professionals who make a positive difference to society.



Please consider giving to support UBRP students in one of the following ways:

- The **UBRP Greatest Needs Fund** (20-10-0426) supports our most financially challenged students in work-study research positions and helps to alleviate the need for students to take on another job to support themselves in college. On average, it takes \$30,000 per year to fully fund all of our work-study eligible students.
- The **UBRP Endowment** (40-10-4740) provides steady funds equivalent to 4% of the endowment's balance on a yearly basis to support UBRP participants. As the endowment grows, we will be able to provide paid research positions for a growing number of UBRPers, regardless of changes in internal funding, the tenuous availability of external grants, and fluctuations in annual donor giving.

To donate online, visit <https://ubrp.arizona.edu/donate>.

To donate by check, please make your check out to the **University of Arizona Foundation** with your gift designation, "Greatest Needs for UBRP Fund, 20-10-0426" or "UBRP Endowment, 40-10-4740," noted in the memo line. Checks should be mailed to University of Arizona Foundation, 1111 N. Cherry Avenue, P.O. Box 210109, Tucson, AZ 85721-0109.

2021-22 PROGRAMS, PARTICIPANTS, AND FACULTY MENTORS

OVERVIEW

The programs housed within the Undergraduate Biology Research Program (UBRP) are designed to teach students science by involving them in biologically related research. Students are paid for their time doing research where they develop an understanding of the scientific method and receive a realistic view of research. They also participate in professional development workshops, scientific seminars, and supplementary activities to acquire the tools necessary to be successful in post-graduate studies should they choose careers related to biology or biomedical research, and join a community of scholars as undergraduate researchers.

UNDERGRADUATE BIOLOGY RESEARCH PROGRAM (UBRP)

Funding for UBRP students is provided by private donors, the UArizona Office of the Provost, Office of Research, Innovation, & Impact, BIO5 Institute, the deans of the Colleges of Medicine, Science, Agriculture and Life Sciences, and Pharmacy. Individual student support is provided by the Western Alliance to Expand Student Opportunities (WAESO). The UBRP Office is also supported by the Department of Molecular and Cellular Biology. We gratefully acknowledge this support!

Student

Makenna Aitken
Geethika Ameneni
Amal Anilkumar
Rodrigo Arana
Elnaz Asadi
Shruti Attreya
Thai Bui
Hannah Burns
Rhea Carlson
Nicole Carmiol
Joshua Castillo
Caitlin Cegavske
Carly Chellman
Kerry Chou
Charbel Curiel
Camille DeMarcus
Angela Ding
Lady Elli
Isabella Feldmann
Anissa Ferris
Anna Gabrielsen
Cynthia Ge
Parker Geffre

Faculty Mentor

Jennifer Barton
Janet Funk
Frank Porreca
Magdalene So
John Paul SanGiovanni
Anita Koshy
John Streicher
Jessica Andrews-Hanna & Matt Grilli
Elizabeth Hutchinson
Andrew Capaldi
Daniela Zarnescu
Jessica Andrews-Hanna
Daniela Zarnescu
John Streicher
Christopher Banek
Karen Weihs
Frank Duca
Robin Harris
Pascale Charest
Curtis Thorne
Rajesh Khanna
Minkyu Kim
Laura Meredith

Maxwell Gleason	Alex Badyaev
Amanda Gong	Ralph Fregosi
Brandon Good	Brian McKay
Paolo Guerra	Timothy Bolger
Joshua Hack	Michael Hammer
Zachary Hammer	Daniela Zarnescu
Sage Hamming	George Sutphin
Anne Haskins	George Sutphin
Giovanni Hernandez-De La Pena	Ralph Fregosi
Shifat Hossain	Michael Brown
Meccah Jarrah	Pascale Charest
Advait Jeevanandam	Samuel Campos
David Jurkowitz	Michael Brown
Dong Kyun Kim	Frans Tax
Rachel Knight	James Galligan
Elizabeth Hanh Le	Kristian Doyle
Brent Lee	Matthew Cordes
Hyeon Seung Lee	Eugene Chang
Kyleigh Masterson	Rajesh Khanna
Chloe Mikolajczyk	Deepta Bhattacharya
Bassam Mitri	Andrew Capaldi
Atley Moberly	Paul Langlais
Bradley Moffett	Michael Kuhns
Nicholas Mortimore	Daniela Zarnescu
Mary Isabelle Mundo	Pascale Charest
Sami Muslmani	Marvin Slepian
Kris Narisawa	Frank Porreca
Nhat Nguyen	Lalitha Madhavan
Gizem Ozturk	Betul Kacar
Chloe Park	Anita Koshy
William Peterson	George Sutphin
Bhumika Phanindra	Melissa Halpern
Danielle Philo	Deepta Bhattacharya
Collin Preszler	Elizabeth Hutchinson
Hannah Quick	Lisa Nagy
Kayla Reddy	Todd Schlenke
Mayra Rivera	Ross Buchan
Rudolph Rodriguez	Ying-Hui Chou
Cecilia Coloma-Roessle	Martha Bhattacharya
Chaitanya Sanghadia	Theresa Currier Thomas
Andrea Savu	Paulo Pires
Hillary Schiff	Scott Boitano
Siena Schoelen	Mary Alt
Caleb Seekins	John Streicher
Ali Shaikh	Catharine Smith

Hasina Shir	Jennifer Barton
Ashwin Siby	Tim Bolger
Vanessa Silbar	George Sutphin
Mansi Singh	Marvin Slepian
Kiah Sleiman	Hsin-Jung Joyce Wu
Cassandra Smith	Julie Ledford
Tessa Spangler	Ying-Hui Chou
Christopher Sterzinar	Jean-Marc Fellous
Alexandra Sundman	Matthew Cordes
Niall Thorns	George Sutphin
Sayujya Timilsena	Jean-Marc Fellous
Isaiah Toth	Mark Beilstein
My Duyen Tran	Daniela Zarnescu
Julio Trejo	Todd Schlenke
Gaige Tucker	Martha Bhattacharya
Dorothy Tung	Brian McKay
Esteban Ureña	Arthur Riegel
Italia Williams	Mary Alt
Meiven Yang	Felicia Goodrum
Suetmui Yu	Ningning Zhao

THE BECKMAN SCHOLARS PROGRAM

The Beckman Scholars Program is designed to help stimulate, encourage and support research activities by exceptionally talented undergraduate students at our nation’s universities and colleges. The Beckman Scholarship at the University of Arizona provides funding for students to conduct in-depth research with one of 15 stellar research mentors in UA’s College of Science. Funding for this program is provided by the Arnold and Mabel Beckman Foundation.

<u>Student</u>	<u>Faculty Mentor</u>
Logan Porrazzo	Joanna Masel

DATA SCIENCES ACADEMY

The Data Sciences Academy (DSA) is an initiative to mobilize researchers across disciplinary boundaries who share a passion for data science, to deepen partnerships with both industry and government agencies, and to challenge students at all degree levels to explore new, innovative domains of expertise, to ensure the nexus between research and education is captured.

<u>Student</u>	<u>Faculty Mentor</u>
Hrithik Aghav	Laura Miller
Amy Fan	Carol Gregorio & Daniela Zarnescu
Justin Grigory	Laura Meredith
Faith Kennedy	Megha Padi
Sun Woo Kim	Katalin Gothard

Lane Lewis
Vivian Nguyen
Zachary Schlamowitz

Kevin Lin
Timothy Secomb
Andrew Paek

JOHN G. HILDEBRAND SCHOLARS IN NEUROSCIENCE

John G. Hildebrand Scholars in Neuroscience are supported by a generous endowment from Dr. John G. Hildebrand, Regents Professor of Neuroscience, to further careers in science.

Student

Heather Kwapiszeski

Faculty Mentor

Nadine Bakkar

AMERICAN SOCIETY FOR PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS SUMMER UNDERGRADUATE RESEARCH FELLOWSHIP (ASPET SURF)

The ASPET SURF Program, funded by a grant from the American Society for Pharmacology and Experimental Therapeutics, supports five undergraduate students per year who work under the mentorship of ASPET members. The program's goal is to introduce undergraduate students to pharmacology research using authentic, mentored research experiences to heighten student interest in careers in research and related health care disciplines.

Student

Brianna Lent
Braden Lopez
Grace Parekh
Giselle Ruiz
Radhey Ruparel

Faculty Mentor

John Streicher
Arthur Riegel
Todd Vanderah
Arthur Riegel
Frank Porreca

ENVIRONMENTAL HEALTH SCIENCES TRANSFORMATIVE RESEARCH UNDERGRADUATE EXPERIENCE (EHS-TRUE)

EHS-TRUE, funded by the National Institute of Environmental Health Sciences grant #1-R25-ES025494 under Dr. Yin Chen, provides two years of paid training and research experience in an environmental health sciences research laboratory. The program targets students from STEM-underrepresented backgrounds. The goal of EHS-TRUE is to enhance the competitiveness of our undergraduates for post-baccalaureate education in the environmental health sciences. Additional individual student support is provided by WAESO.

Student

Karina Gonzalez
Shelby Herrick
Maile McSwain
Cassandra Myers
Chidinma Ogbonnaya
Kayleigh Paddock
Samantha Elizabeth Reddell

Faculty Mentor

Jianqin Lu
Yin Chen
Zelieann Craig
Nathan Cherrington
Patrick Ronaldson
Jennifer Teske
Patrick Ronaldson

PARTNERSHIP FOR NATIVE AMERICAN CANCER PREVENTION (NACP)

The Partnership for Native American Cancer Prevention (NACP) is a collaboration between Northern Arizona University and the University of Arizona’s Cancer Center. The mission of the NACP is to alleviate the unequal burden of cancer among Native Americans of the Southwest through research, training and community outreach programs in collaboration with the communities they serve. The Training Core of NACP at the University of Arizona is led by Dr. Jennifer Bea, and funding for NACP is provided by the National Cancer Institute grant #2U54CA143924. Additional individual student support is provided by WAESO.

Student

Michael Becenti
LeCario Benashley
Ciara Faude
Elijah Keeswood
Ferris Saad
Chelsea Claw
Kristiann Ferreira

Faculty Mentor

Ronald Heimark
Jennifer Bea
Konrad Zinsmaier
Anne Cress
Jennifer Bea
Suwon "Sue" Kim
Taben Hale