

CONGRATULATIONS TO THE GRADUATING CLASS OF 2018

The Genetics Department would like to congratulate all of the graduating seniors on their outstanding achievements. You all worked very hard to get this far, and we wish you the very best in your future endeavors.



Photographer: Dr. Jay Tischfield

Vice Chair and Undergraduate Director—Dr. Chris Rongo, Chair—Dr. Linda Brzustowicz, and Faculty Coordinator—Dr. Andrew Singson.

A Note from the Vice Chair

As Vice Chair and Undergraduate Director for the Department of Genetics, it is my pleasure to get to know our majors and watch them truly grow into independent thinkers and scientists. Our goal for the educational mission of the department is to develop a curriculum that builds the skills needed to navigate the professional world of the 21st century. To foster compelling writing and excellent communication skills. To sharpen our students' analytical and problem-solving skills. To learn to adapt to rapidly changing technology and a rapidly changing world. To be more than just consumers of information, but to be producers of new information in our society. We require all of our majors to conduct independent research with our faculty to achieve these very goals, as research grows these specific skills in our students through a direct connection with our faculty. This regular newsletter will continue to solidify that connection and help all of us move towards these important goals.—Chris Rongo, Ph.D.



The Genetics Department Graduating Class of 2018

Mones Abo El Ata
Nidhi Agrawal
Jimena Argenal
Tania Atanassova
Shannon Barley
Sabrina Carmant
Laura Corella
Victoria Crans
Shweta Dipali
Alexandra Faeth
Stevyn Fernandes
Robert Fullem
Maria Garcia
Dana Godrich
Kacey Griffin
Amanda Gu
Christina Haydu
Patricia Ibrahimian

Zainab Jamali
Aden Khan
Kelly King
Gabrielle Kleyner
Jonathan Korabelnikov
Athriya Kumar
Julia Lin
Brandon Lungo
Shirley Luo
Paulee Manich
Emmanuel Marfo
Julianne McLaughlin
Shivani Mehra
Tristan Mekarzel
Cameron Mohrfeld
James Mullin
Elizabeth Nand
Brian Osmond

Rebecca Padersky
Drew Patel
Priya Patel
Sarthak Patel
Stephen Poos
Anza Rizvi
Fatima Rizvi
Ria Rungta
Sana Sajjad
Pooja Shah
Kritika Singh
Zachary Sisco
Shawn Sorrels
Mahir Sufian
Tahab Talib
Natalie Toke
Sarah Warda
Bailey Warder

Please visit the Genetics Department website for photos of our graduating seniors: genetics.rutgers.edu

Genetics Department Honors Program

The Departmental Honors Program was established to provide highly motivated seniors with an opportunity to immerse themselves in an original scientific research project. Students are expected to conduct their own research project during their senior year, culminating in a written thesis around mid-April. Then, students will present their research at the annual Departmental Honors Symposium. Students in this program are also eligible to apply to the three departmental academic awards.

THE DUNCAN AND NANCY MACMILLAN AWARD FOR RESEARCH EXCELLENCE- This award recognizes a graduating senior, majoring in Genetics, who has demonstrated outstanding accomplishment in Research by the completion of a project of publication quality. The Awardees are:

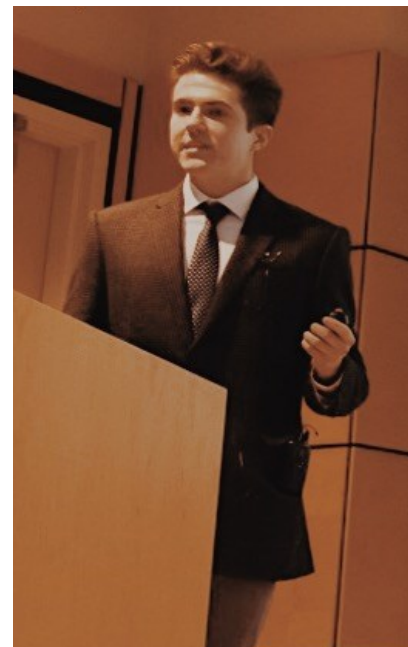
Shweta Dipali **Kritika Singh** **Bailey Warder**

THE HOWARD C. PASSMORE AWARD FOR DISTINGUISHED ACADEMIC ACHIEVEMENT- This award recognizes a graduating senior, majoring in Genetics, who has demonstrated outstanding achievement in academic coursework, participation in research and commitment to service. The Awardees are:

James Mullin **Elizabeth Nand**

THE DEPARTMENT OF GENETICS AWARD FOR EXCELLENCE IN A RESEARCH PRESENTATION- This award is presented to a graduating senior, majoring in Genetics, who shows extraordinary skills in scientific communication to an audience of peers at the Departmental Honors Day. The Awardees are:

Victoria Crans **Athriya Kumar** **Pooja Shah** **Natalie Toke**



Pictured: James Mullin

The 2018 Genetics Department Honors Program Participants/Mentor

Mones Abo El Atta (Mentor, Dr. Andrew Zloza)	Shweta Dipali (Mentor, Dr. Karen Schindler)	Shirley Luo (Mentor, Dr. Michael P. Verzi)	Sana Sajjad (Mentor, Dr. Ning Zhang)
Nidhi Agrawal (Mentor, Dr. Andrew Singson)	Stevyn Fernandes (Mentor, Dr. K. Chada)	James Mullin (Mentor, Dr. Christopher Rongo)	Pooja Shah (Mentor, Dr. Michael Verzi)
Tania Atanassova (Mentor, Dr. Mikel Zaratiegui)	Amanda Gu (Mentors, Drs. Maureen Barr and Robert O'Hagan)	Elizabeth Nand (Mentor, Dr. Monica J. Roth)	Kritika Singh (Mentor, Dr. Rick I. Cohen)
Shannon Barley (Mentor, Dr. Aparna Zama)	Kelly King (Mentor, Dr. Karen Schindler)	Stephen Poos (Mentor, Dr. James Goydos)	Natalie Toke (Mentor, Dr. Michael Verzi)
Victoria Crans (Mentor, Dr. Zhiyuan Shen)	Athriya Kumar (Mentor, Dr. Andrew Singson)	Anza Rizvi (Mentor, Dr. Maureen Barr)	Bailey Warder (Mentor, Dr. Michael Verzi)
		Fatima Rizvi (Mentor, Dr. Maureen Barr)	

Genetic Counseling Certificate

The Department of Genetics offers an undergraduate Genetic Counseling Certificate Program (GCCP). The GCCP program is intended for a select group of students interested in applying to the masters-level programs in genetic counseling. The goal is to provide students with guidance, coursework, and relevant clinical experience to improve their graduate school applications. The Awardees are:

Julia Lin **Rebecca Padersky** **Ria Rungta**

Certificate in Computational Genetics

The Department of Genetics offers a Certificate in Computational Genetics (CCG). The volume of data being generated in genetics has been expanding tremendously in recent years, and career opportunities for geneticists with computational and quantitative expertise are also growing. This certificate program is intended for students who are interested in applying to graduate-level programs, and/or planning careers in Computational Genetics, Statistical Genetics, Bioinformatics, or other programs in quantitative biomedical related research. The goal of the CCG is to provide students with guidance, coursework, and relevant data design and analysis experience to prepare them for graduate studies in the field. The Awardees are:

Dana Godrich (works with Dr. Derek Gordon)

Shirley Luo (works with Dr. Michael Verzi)

A Global Compass Set Towards Compassion, Service, Health

For some students, being on summer break is a time to relax and unwind from studies. Not for Athriya Kumar, a graduating senior, and Honors Program student who spent the last four years with her time split between her studies, volunteering as an EMT in her hometown, and working abroad in a health clinic. Athriya's desire to help began before she became a student at Rutgers. "My Aunt has a son with a neurological deficit, and having a special needs child in the family impacted me a lot. Seeing him do his best and because he has access to resources. But there are some people who don't have this access. That's why I want to continue working towards genetics, because, you have to go down to the genome to see what causes these kinds of phenotypes where there are neurological deficits."



Athriya remembers when she decided to become a genetics major. "One summer while working in the lab of Dr. Andy Singson, my genetics research advisor, and one of the friendliest professors I've ever met, told me how great the department is and, after experiencing the lab and environment, I decided to trust his advice. It was one of the best decisions I ever made." Athriya is also the President of the student non-profit group, GlobeMed at RU, an international organization that focuses on partnerships to help with educational and healthcare initiatives. She spent last summer volunteering in Uganda.

Switching Gears: One Major Change That Led To A Different Path

Natalie Toke, a graduating senior and genetics Honors student, came to college with a general interest in cancer research and the scientific process. She knew early on that she would go to Rutgers to study research, but didn't realize how much her plans would change once she was introduced to the genetics major. "Coming in I thought I was going to be a biology major. Then, in my first general biology course we were going through the different sections and I loved the genetics unit. That was my favorite subject throughout the entire course." Natalie also said that her interest in intestinal health led her to Dr. Michael Verzi's lab where she studied two transcription factors and intestinal stem cells.



When asked what ultimately made her switch to genetics, she replied, "I came in thinking I wanted to go to medical school, which the genetics major fulfills all of the pre-reqs needed for that while also setting me apart from the other applicants. Now, I am going to Chiropractic School and the genetics major also fulfills those requirements as well." While her favorite genetics course is Genetic Analysis with Dr. Verzi, she also said that Dr. Karen Schindler's course: Social, Legal, and Ethical Implications in Genetics was very interesting. Natalie will soon begin school at the University of Bridgeport's College of Chiropractic (UBCC) and wants to work with athletes. She credits her choice and change of direction to the deep understanding of the field of genetics she received as an undergraduate.

Student Spotlight

Double The Aspiration - Double The Impact: Two Sisters' Goals to Break Down Barriers

Fatima and Anza Rivzi, twins who are graduating seniors and genetics Honors students, are determined to explore life without boundaries and not let anything hold them back. Anza initially began research in Dr. Maureen Barr's lab working on investigating the role of Extracellular Matrix Protein MEC-9 in sensory neuron activity. "As soon as I started working in Dr. Barr's lab, I thought genetics was great and I really fell in love with it," said Anza. "My sister told me of how great an experience she was having and how much she was learning, then I became interested to get involved with this new field of research, investigating the role of RAB-28 in Extracellular Vesicle Biology," said Fatima when recalling how she got into genetics.



When asked about what motivated them to go into science Anza replied, "There is a bit of a stereotype in some cultures where males are preferred, and even though I haven't had to experience it to the extreme points like others, I'm sure my mom did, but our parents raised us and our siblings to strive to be the best we can be in everything we do." "Coming from that angle, I want to prove to myself and to others that I can do it and that I deserve to be here, and that I am just as capable as any other person in the room. But I also want it just for my own personal gain and knowledge of learning. It's motivating in itself to learn so much," said Fatima. Both Fatima and Anza plan to attend medical school, after they spend time traveling and doing a fashion internship. They also want to continue research with a larger goal of helping others.

Anza and Fatima also shared some advice for rising genetics majors: "Don't be afraid to try different areas of research. I loved all the different techniques and cutting edge research in genetics," replied Anza. "Don't stress so much, and remember to be present in the moment. Also, genetics focuses on problem-based learning and you are able to apply what you learn from the classroom to the lab, so let your lab help you learn," said Fatima.

Bonds That Build Bridges to Success

Jeffrey Wu (RU Alum-SAS 17') was inspired to major in genetics after taking AP Biology in high school, where he was intrigued by his teacher's passion for the subject. "One thing I loved most about the genetics major was that every course provided me with the opportunity to bond with my professors. Bonding with my professors was a great way for me to discuss my ideas and learn more about research," Jeffrey said while lamenting on what was so special about his experience as an undergrad genetics student. While at Rutgers he worked in Dr. Derek Gordon's lab gathering data that would inform geneticists on cost-effective methods for gene mapping studies. This according to him, was the first step in helping others live happily. Jeffrey also explained how a trip to China helped him decide what academic steps to take next. "I found out that most of my relatives in China are suffering from Type I diabetes and were exposed to environmental risk factors like diet, smoking, and pollution. Epidemiology focuses on both genetic and environmental factors responsible for disease, and will provide me with the knowledge to educate people like my relatives on a healthier diet. That visit made me realize that I should study this in graduate school." Jeffrey will be pursuing a Masters of Public Health (MPH) in Epidemiology from the Milken Institute School of Public Health at The George Washington University starting this fall.



"The Genetics department gives you a solid background in all of the different sciences and also really allows you to dive deeply into the genetics field." - Natalie Toke (SAS' 18)

The More You Know

Genetics senior **Anza Rizvi** (SAS'18) presented a blog post during her coursework in 447:354 Social, Legal, and Ethical Implications of the New Genetics, to explain Preimplantation Genetic Diagnosis (PGD) to a lay audience; (what it is, why we need it, who would want it, how it works). She also described the possible ethical, legal, and social implications.



Can Preimplantation Genetic Diagnosis (PGD) make it Rain Men?

ASSOCIATION OF UNDERGRADUATE GENETICISTS

Here are some events that AUG organized during the 2017-2018 school year:

“What is Genetic Counseling”: Professor Jessica Joines spoke about the career of genetic counseling, including what a genetic counselor does as well as what kind of training is involved. (10/9/17)

“The Principles of Ethics”: Dr. Karen Schindler led a discussion on the ethical implications of modern genetic and biomedical technologies. Case studies were analyzed and discussed. (10/23/17)

“Fall Eat & Greet”: Professors and students had lunch together while discussing topics such as research, lab opportunities, and the genetics major. (11/17/17)

“AUG Movie Night”: AUG presented *Twitch*, a documentary about Huntington’s Disease. After the movie, Francesca Spinoso, a student in the Rutgers Genetic Counseling Master’s program led a discussion about the role of a genetic counselor in genetic testing and the various factors that come into play when deciding to undergo genetic testing. (2/26/18)

“Spring Benefit”: Speakers from the Huntington’s Disease Society of America discussed what Huntington’s Disease is, the current research going on in the field, and ways to increase awareness. AUG raised money for the Huntington’s Disease Society of America through apparel sales and Spring Benefit ticket sales. (4/6/18)

Pictured below: AUG Executive Board Members 17-18 (from right to left):

President: Muhammed Rahim
Vice President: Dana Godrich
Treasurer: Pooja Deshpande
Secretary: Adiba Salim
PR Chair: Tania Atanassova (not in picture)



Photo Submitted by AUG

What is Preimplantation Genetic Diagnosis (PGD)?

Preimplantation Genetic Diagnosis (PGD) is a relatively new procedure and is performed in combination with in vitro fertilization (IVF). PGD helps in detecting genetic abnormalities either at the gene level or the chromosomal level before implantation to help avoid the transfer of genetically affected embryos. PGD can also be used to detect which embryos are female (XX) or male (XY). Currently, PGD is the only method for gender selection that is close to 100% accurate. When gender selection is used to prevent a genetic disease, the process is called “medical gender selection”. Medical gender selection is often used to prevent several sex-linked disorders. The use of preimplantation genetic diagnosis (PGD) for sex selection in non-medical cases has been considered an unethical procedure as the ethical implications are far-reaching. Ethical concerns associated with sex selection of male offspring are that it disrupts the sex ratio, discriminates against women, and leads to the disposal of perfectly normal embryos of the non-desired gender.

Stance on PGD for Sex Selection

I was born into a culture and extended family in Pakistan that has deep-rooted cultural preferences for sons and remains opposed to sending women down paths of higher education. Twins run in my mom’s family and it was my one of my mom’s biggest hope that she too would have twins. My mom was extremely ecstatic when she learned that she was pregnant with twins and equally ecstatic when she learned she had two *healthy daughters*. However, she knew that her extended family would not have the same feelings. Understanding of the situation, the doctor relayed the news to my extended family, explaining that he had confirmed the sex of one of the fetuses, but could not accurately determine the sex of the other fetus and explained that any attempts of an abortion would put both fetuses at risk. My extended family was incredibly disappointed with the news of my mom having a daughter, but desperately clung onto the hope that the second baby would be a boy.

I have been incredibly fortunate to have open-minded parents who have never agreed with these sentiments and have sacrificed a lot to give me every opportunity to succeed and distance me from this narrow-minded social stigma against females. I do not have to lead a life limited by cultural expectations. Instead, I have been surrounded by inspiring female professors, mentors, peers and friends who have paved the way, encouraging and motivating me to strive higher each day. I still struggle to understand and find myself unable to relate to the traditional roots of “son-preference” that lie deep within Pakistani culture. I completely understand and respect a parent’s decision to use PGD to prevent passing down a threatening disorder or disease to their child. However, I do not agree with the use of PGD for the sole purpose of sex selection in a non-medical case. It’s unfortunate that in so many cultures women continue to have such a low status. I hope that I can serve as a positive influence and do my part to help break the social stigma surrounding having a daughter.

“ I stand on the sacrifices of a million women before me thinking what can I do to make this mountain taller so the women after me can see further ”

legacy – Rupri Kaur

“The Genetics department is one of the most supportive departments in the university.”-
Athriya Kumar (SAS' 18)

Faculty Mentions



Professor Michael Verzi teaches the first half of Genetic Analysis I, concentrating on Transmission Genetics, and his lab investigates the transcription factors involved in intestinal diseases. He did research at UCSF on the transcription factors involved in craniofacial development and did his postdoc at Harvard studying transcription factors in the intestinal epithelium. AUG (Association of Undergraduate Geneticists) sat down with Dr. Verzi to discuss his teaching methods, which include circulating in class to ask and answer questions as seen above, the genetics major, and more.

AUG: How will a major in Genetics help students in the future and why is it a worthwhile field?

Dr. Verzi: I think Genetics is the best fit for people interested in areas of

inheritance, genome scale biology, and evolution. I think that's where the Genetics department stands out differently than the other Life Sciences departments.

AUG: Genetic Analysis is the first class that Genetics majors are required to take. How do you feel about teaching brand new Genetics majors and what are the most important lessons that you want them to learn as they begin their major?

Dr. Verzi: The theme for Genetic Analysis I is about the students being able to learn, think, find information, solve problems, work as teams, and be a cohesive group. A lot of what I emphasize in class are the things that I think would be most important for the labs that our students end up in and the classes that they're going to take later on. For example, why I emphasize meiosis and crossing over is because of the impacts that they have on many of the processes you're going to learn down the road ranging from population genetics, evolutionary biology, etcetera. I think that it is definitely an honor that I am the first faculty that gets to teach you as new genetics majors. I'm definitely aware of a responsibility to hopefully put you on a solid foundation for everything else that you're going to encounter in the subsequent semesters.

AUG: What is something that you like to do for fun other than teaching or working on running your lab?

Dr. Verzi: First of all, I enjoy my kids. They're a lot of fun; they're 3, 6, and 8 and they're fascinating. I like to be fairly active, exercise, and be outside. I like food; cooking it, going out and getting it. Spending time with friends and family is also really important to me.

GENETICS DEPARTMENT FACULTY

Maureen Barr, Professor
Linda Brzustowicz, Distinguished Professor & Chair
Kevin Chen, Associate Professor
Chris Ellison, Assistant Professor
Judy Flax, Associate Research Professor
Doreen Glodowski, Instructor
Derek Gordon, Associate Professor
Gary Heiman, Associate Professor

Jessica Joines, Clinical Assistant Professor
Tara Matise, Professor
Kim McKim, Professor
Ron Michaelis, Instructor
Tetsuya Nakamura, Assistant Professor
Bryce Nickels, Professor
Chris Rongo, Professor & Vice Chair
Amrik Sahota, Research Professor

Karen Schindler, Associate Professor
Premal Shah, Assistant Professor
Michael Sheldon, Associate Research Professor
Gleb Shumyatsky, Associate Professor
Andrew Singson, Professor
Jay Tischfield, Distinguished Professor
Michael Verzi, Associate Professor
Jinchuan Xing, Associate Professor



Not Pictured:

David Axelrod, Professor
Marco Azaro, Assistant Research Professor
Andy Brooks, Associate Research Professor
Andrew Kern, Associate Professor
Jennifer Moore, Assistant Research Professor
Rober O'Hagan, Assistant Research Professor
Lourdes Serrano, Assistant Research Professor
Juan Wang, Assistant Research Professor
Lei Yu, Distinguished Professor