UNIVERSITY OF MARYLAND
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DEPARTMENT OF
ANIMAL &
AVIAN SCIENCES

SUMMER 2018

ANSC Annual Symposium

The Department of Animal and Avian Sciences held the 32nd Annual Symposium on May 22, 2018.

This full-day event showcased our department's ongoing research as presented by our graduate students and postdocs. The keynote speaker was Dr. Tom Lawlor, Executive Director of Research and Development for Holstein Association, USA. Dr. Lawlor's talk was entitled "Transferring Science into Practice: Uptake of genomic information in the dairy industry." Graduate students and postdocs competed throughout the day with posters and oral presentations. Many thanks to our speaker and the other guest judges: **John Cole, Erin Connor, Kristen Gaddis, Robert Li, George Liu, and Jonathan Moyle.**

Here are this year's winners:

Outstanding Ph.D. Student
Latisha Judd

Outstanding Masters Student
Kristina Davis

Staff Member of the Year
Michael Mobley

Graduate Student Poster Award
First Place: Ian Chambers
Second Place: Kristen Brady

Graduate Student Oral Presentation Award
First Place: Jicai Jiang
Second Place: Rini Pek

Research Assistant/Postdoc Poster Award
First Place: Wei Zhang
Second Place: Meghan Maguire

Research Assistant/Postdoc Oral Presentation Award
First Place: Karyn Jourdeuil
Second Place: Jaewook Chung

Shaffner Award for Research in Poultry
First Place: Chaitra Surugihalli
Second Place: Ronique Beckford

Timothy Sheets presents his findings at ANSC's 2018 Symposium.

TIMOTHY SHEETS RECEIVES YOUNG INVESTIGATOR AWARD

Timothy Sheets, doctoral candidate in Dr. Bhanu Telugu's laboratory, was recently selected for the young investigator travel award to present his research during the Large Animal Genetic Engineering Summit in Park City, Utah. His research focuses on eliminating the gene Neurogenin 3 (NGN3) by targeting the genome of the domestic pig. He and his co-authors first, performed microinjection into zygotes and embryo transfer into surrogate gilts to create NGN3-edited offspring. Then, they used cells derived from one offspring, with a homozygous deletion for NGN3, as a donor cell for somatic cell nuclear transfer (cloning) in order to generate three live cloned animals, with a condition resembling type 1 diabetes, lacking all endocrine cell types of the pancreas.

This study demonstrates for the first time, that CRISPR/Cas9 targeting of the NGN3 gene in pigs results in a loss of all four major hormone producing cell types of the pancreas. NGN3 ablated animals offer hope towards future goals for growing human NGN3 expressing cells within embryos derived from mutant pigs. The result would be human endocrine producing cells, that can be isolated from the pig organ, for cell transplantation in diabetic patients.

This study is the first to target NGN3 in any species using the CRISPR/Cas9 system.

Latisha Judd

LATISHA JUDD RECIPIENT OF THREE OUTSTANDING GRADUATE STUDENT AWARDS

The Alumni Association of the College of Agriculture and Natural Resources selected Latisha Judd, Ph.D. graduate student working in the laboratory of Dr. Rick Kohn, as both the 2018 Outstanding Graduate Student for the Department of Animal and Avian Sciences and the overall Outstanding Graduate Student for the college. Latisha was presented these awards at the Alumni Showcase and Celebration on April 12 at the Riggs Alumni Center. The awards honor her excellence in conducting research in pursuit of her advanced degree, as well as her excellence in teaching, leadership and service to the department and the college.

Latisha Judd was also recognized by the UMCP President's Commission on Ethnic Minority Issues (PCEMI) at the 2018 Ethnic Minority Achievement Awards Ceremony held Special Events Room in McKeldin Library on May 4. Latisha, graduate student in Dr. Kohn's lab, was awarded the PCEMI's Graduate Student Minority Achievement Award.

Jonatan Mendez

AAVI POSTER AWARD WINNER

Jonatan Mendez, graduate student in the Xiao lab, was recognized as a poster winner for his poster entitled, "Bovine neutrophils form extracellular traps in response to the gastrointestinal parasite Ostertagia ostertagi" by the American Association of Immunologists (AAVI) at CRWAD 2017, the 98th Annual Conference of Research Workers in Animal Diseases held December 4-5 in Chicago. AAVI is a sister society to CWRAD, which is dedicated to the development, promotion, and dissemination of knowledge in veterinary immunology.

STUDENT NEWS

ANNUAL EVENT

1 Announcer Libby Dufor & Chad Dulin Clark Memorial Herdsmanship Award winner Lydia Printz.

2 Dairy cow show.

3 (Left to Right) Judges Garrett Hamby & Trish Hildebrand, Grand Champion Kaitlyn Smith, Judges Bret Bucci & Kyle Plummer.

4 Sigma Alpha Kiss-A-Pig: Meghan Bowman

5 (Left to Right) Champion showmen Alisa McNamara, Allie Agate, Carly Guiltinan, & Grand Champion Kaitlyn Smith.

Maryland Day Recap 2018

This year, the weather was beautiful for the Ag Day Livestock Show held on April 28 as part of the campus-wide Maryland Day. Congratulations to Kaitlyn Smith, winner of the Grand Champion Award, and Lydia Printz, winner of the Chad Dulin Clark Memorial Herdsmanship Award and all the other winners. Many thanks to all who competed, the sponsors, judges, coaches, and all the others who helped to make the Livestock Show a success.

Ag Day Livestock Show Results
Grand Champion: **Kaitlyn Smith**

Swine
Kaitlyn Smith,
Champion

Class 1:
1. Tabitha Gregory
2. Cassie Bernhardt
3. Abbi Santoni

Class 2:
1. Kaitlyn Smith
2. David Floyd

Lamb
Alisa McNamara,
Champion

Class 1:
1. Alisa McNamara
2. Kelsey Nelson
3. Jillian Yant
4. Tess Butler-LaPointe
5. Elizabeth Johnson
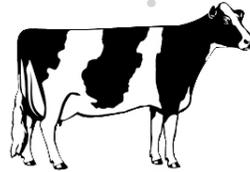6. Audrey Resnicow

Class 2:
1. Danielle White
2. Deena Silton
3. Bailey Clark
4. Rachele Franceschi
5. Shannon Lamastra
6. Katie Aceto

Class 3:
1. Rebecca Thompson
2. Scott Klug
3. Nadia Khan
4. John (Ross) Foraker
5. Andrea Wilson

Class 4:
1. Esther Martinez Garcia
2. Allison Hatfield
3. Ashley Houser
4. Elsibel Espinal

Dairy
Carly Guiltinan,
Champion

Class 1:
1. Carly Guiltinan
2. Emily Davis
3. Claudia Gomez
4. Claire Shields

Class 2:
1. Adrianna Sniezek
2. Amanda Retallack
3. Ember Lucier
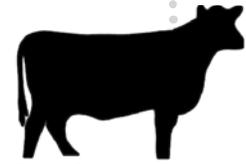4. Hannah Mosley

Class 3:
1. Rachel Gagliardi
2. Megan Mihalik
3. Paola Martinez
4. Grace Brinsfield

Class 4:
1. Jade Loewenstein
2. Lydia Cairns
3. Trey Maybury
4. Ellie Hidalgo
5. Tiffany Thompson

Class 5:
1. Gabby Rowan
2. Grace Markley
3. Nicole Burgos

Beef
Allie Agate,
Champion

Class 1:
1. Sarah King
2. Lindsey Jacobs

Class 2:
1. Allie Agate
2. Emily Davis
3. David Floyd
4. Cheyenne Eller

Chad Dulin Clark Memorial Herdsmanship Award: **Lydia Printz**
Sigma Alpha Kiss-A-Pig: **Meghan Bowman**

Student Coaches: Swine: Lydia Printz I **Sheep:** Sarah Gitterman, Samantha Kaminski, Grace Markley, & Adrianna Sniezek **Dairy:** Allie Agate and Maura McGraw I **Beef:** Emily Solis
Judges: Garrett Hamby, Trish Hildebrand, Bret Bucci, and Kyle Plummer
Faculty/Staff Coaches: Libby Dufour, Victoria Lake, Jennifer Reynolds, Racheal Slattery, & Monica VanKlompenberg
Announcer: Libby Dufour **Club Advisors:** Racheal Slattery & Monica VanKlompenberg
Sponsors: Maryland Agricultural & Resource-Based Industry Development Corporation and Southern Maryland Agricultural Development Commission

Grant Awarded to Dr. Kohn

Drs. Rick Kohn, Fernando Escribano (Spain) and others received a grant from the World Bank for almost $400,000 titled "Innovative Research and Development for Use of Typha (Cattails) for Animal Feed and Biogas Production in Hadejia Valley, Nigeria" with Federal Ministry of Water Resources (Nigeria), Polytechnical University of Madrid, and University of Maryland. This project will develop and introduce methods to preserve and use cattails, which are a nuisance weed in sub-Saharan Africa, for use as silage to feed cattle and for use in making biogas for cooking.

Biswas Awarded NIFA Grant

Dr. Debabrata Biswas has been awarded $100,000 by NIFA for his proposal entitled, "Competitive exclusion of Campylobactercolonization in poultry by overexpression of linoleate isomerase gene in Lactobacillus casei."
A natural probiotic able to improve growth and competitively exclude zoonotic pathogens from the poultry gut, leading to safer and more improved poultry products and a reduction in foodborne infections in humans, could be a critical step forward in sustainable poultry farming. The beneficial effects of probiotics depend upon the total quantity of probiotic and the amount and type of functional byproducts they produce. In a recent study, we found that in the presence of prebiotic-like components (peanut flour and cocoa), production of linoleic acid by Lactobacillus casei (LC) increased 100 fold; it was also able to outcompete several enteric bacterial pathogens, including Campylobacter jejuni. Therefore, we have developed a genetically engineered, naturally bacteriophage-resistant LC strain that overepresses the linoleate isomerase (mcra) gene called LC-JPR-CLA. We have already verified its ability to inhibit C. jejuni growth, attachment, and infection in vitro in chicken cells. In this research project, we aim to evaluate if LC-JPR-CLA is also able to outcompete C. jejuni in an in vivo chick model, while maintaining its capacity to improve growth and maintain overall gut health by production of byproducts with anti-inflammatory properties. This research into the properties and bioactive capacities of LC-JPR-CLA has the potential to provide a novel, cost-effective, consumer-friendly, and simple-to-use natural probiotic that could improve poultry growth, support poultry immune health, and reduce transmission of poultry-borne Campylobacter to humans.

Dr. Telugu Awarded NIFA Grant

Dr. Bhanu Telugu has been awarded a five hundred thousand dollar grant from the National Institute of Food and Agriculture for his grant proposal titled "Genome Editing To Create Germ Cell Deficient Livestock."
Genetic gain in food animal production is critical for enhancing growth efficiency, animal health, and product quality. In pig production, genetic gain is achieved via selective breeding with desirable sires. At present, artificial insemination (AI) is a widely used option for exploiting this principle. However, the number of sperm that can be collected from an individual boar is a major limiting factor for widespread dissemination in the commercial pig production. Also, AI methodology limits the gains to the reproductive lifespan of a male. Thus, development of novel approaches for expanding the output and preservation of germline from desirable sires is of significant need. Dr. Telugu and his collaborators at Washington State University will generate lines of boar that completely lack endogenous spermatogonial stem cell (SSC), and use them as surrogates for exogenous SSC transplantation and spermatogenesis. To achieve this objective, Dr. Telugu utilized the CRISPR/Cas9 system to edit the NANOS2 gene in pig embryos that lack germline but other aspects of testicular development are normal. This study will for the first time generate SSC-deficient animals by genome editing and test the feasibility of SSC transplantation in a large animal species. Arguably this project will have wide ranging applications in germline preservation technologies.

Gates Foundation Grant Awarded to Dr. Telugu
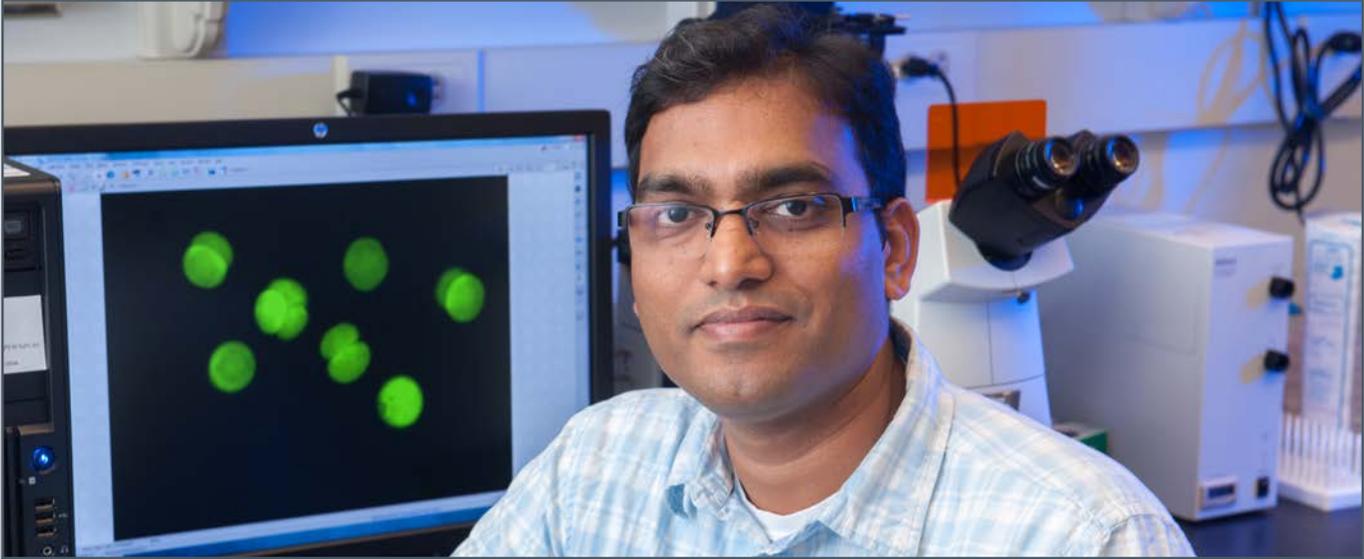
The Gates Foundation awarded a $1.3 million dollar grant to Dr. Bhanu Telugu in the Department of Animal and Avian Sciences in the College of Agriculture and Natural Resources to facilitate cutting-edge research into the development of precision breeding technologies. Specifically, the grant will fund development of methodologies for generating genome edited livestock with improved tropical adaptability and performance traits.

Genetic modification of livestock has a longstanding and successful history, starting with domestication and breeding of animals several thousand years ago. Modern animal breeding based on marker-assisted selection, genomic selection, artificial insemination, and embryo transfer have led to a significant improvement in the performance of domestic animals, and are the basis for a regular supply of high quality animal derived food. However, the major limitations of current breeding paradigm is the requirement to breed over multiple generations to introduce novel traits. This strategy is not realistic in responding to the unprecedented challenges faced by the animal agriculture such as climate change, pandemic diseases, and feeding an anticipated 3-billion increase in global population in the next three decades. Addressing these pressing challenges require "next generation" breeding technologies that permit replacement or transfer of genetic information between individuals, lines, breeds, and even species. The availability of genome editors such as CRISPR/Cas that allow for facile genetic modification are therefore needed to make this a reality.
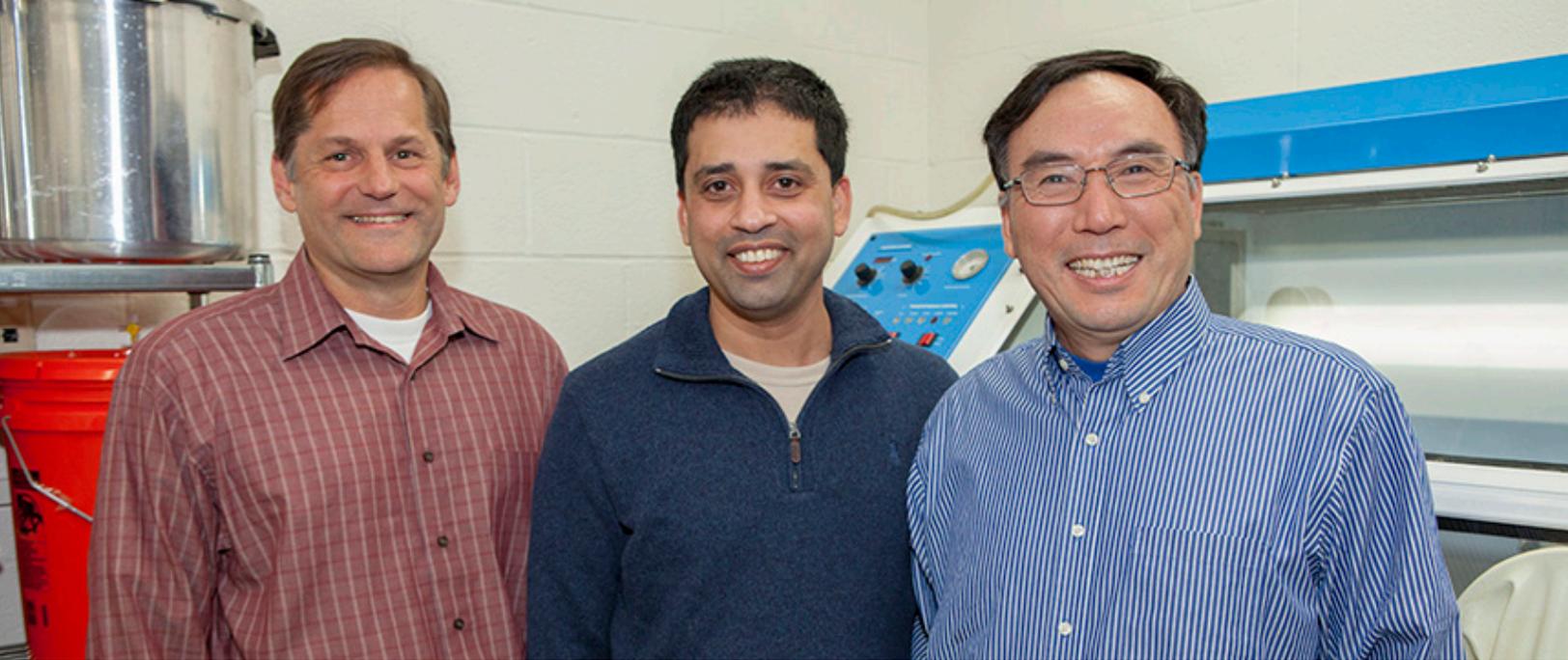
NIFA Grant Awarded to 3 ANSC Faculty

Drs. Rick Kohn, Nishanth Sunny, and John Song received a grant from USDA-NIFA for $493,000 in the AFRI Foundational Animal Nutrition, Growth and Lactation section titled, "Understanding Mechanisms of Changes in Ruminal Metabolism". This project will explore the mechanisms of regulation of the rumen microbiome that digests feeds in dairy cattle.

Dr. Porter Awarded USDA Grant

Dr. Tom Porter and Dr. Hsiao-Ching Liu at North Carolina State University have been awarded a five hundred thousand dollar grant from the National Institute of Food and Agriculture for their grant proposal titled "MicroRNA Regulation of Metabolic Pathways during the Metabolic Switch in Broiler Chickens."

The transition from embryonic development to life after hatching in chickens represents a massive switch in their metabolism from primarily utilizing fat stored in the egg yolk to primarily utilizing carbohydrates in their chicken feed. This metabolic switch is essential for the chick to successfully transition from development in the egg to growth on corn-based feed. However, regulation of this metabolic switch is not understood. Dr. Porter and Dr. Liu hypothesize that very short RNA molecules called microRNAs play an important role in the metabolic switch that is essential to efficient growth of broiler chickens by regulating levels of messenger RNAs (mRNAs) in metabolic pathways. Their collaborator on the project, Dr. Nishanth Sunny in our department, will be performing metabolomics analysis on the project. The experiments to be performed in this project will define the contributions of miRNAs to the metabolic switch during development that is critical to growth on corn-based feed in broiler chickens. Completion of this research will lead to new information that can be used in poultry breeding programs and by the poultry companies to produce meat more efficiently for the world's growing population.

AMY BURK OUTSTANDING EDUCATOR OF THE YEAR

Dr. Amy Burk was honored by the AGNR Student Council as its Outstanding Educator of the Year at their annual awards banquet on May 7 at the Riggs Alumni Center. The council chose Dr. Burk for this award due to her "spectacular teaching skills, extreme dedication to the Equine Studies Program, and (her) endless desire to help students succeed in their endeavors.

MARIE IWANIUK 2018 OUTSTANDING GRADUATE TEACHING ASSISTANT

Marie Iwaniuk, graduate student in Dr. Rich Erdman's lab, was chosen as the 2018 Outstanding Graduate Teaching Assistant in the college by the AGNR Student Council. Marie received this award at the annual banquet on May 7 at Riggs Alumni Center.

EQUINE FACULTY, STAFF, & STUDENTS HONORED WITH AWARD

The Equine Studies Program was honored with a Special Recognition Award from the Maryland Horse Breeders Association on January 30 at the Maryland Horse Industry Day in Annapolis. Many legislators, including Senate President Mike Miller and House Speaker Michael Busch, addressed the group throughout the day. The department is proud of the recognition for our UMD Breeding Program, giving students real work experiences in the business and practice of breeding horses.

UNIVERSITY OF MARYLAND BRED GO LASSIE GO 2ND IN FIRST RACE

In his first race ever, Go Lassie Go, place 2nd in the 2nd race at Belmont racecourse on May 3, 2018 after an extremely slow start left him trailing the field. The colt (Buffum-Daylight Lassie) was foaled at the the University of Maryland in 2015 to much fanfare from the students in the Animal and Avian Science Department. Dr. Amy Burk remembers the colt being slow to start back then, "his hind legs were so long that the students had to help him stand for the first few hours until he learned how to get up on his own." It looks like he's doing it on his own now and we wish him and his connections all the best as he continues his racing career.

UMD EDUCATES SMALL FLOCK OWNERS

123 people from Maryland and surrounding states attended the Mid Atlantic Small Flock Expo, held February 10, 2018 at the Carroll County Ag Center in Westminster, Maryland. Extension faculty and Maryland Department of Agriculture staff provided 15 educational sessions covering everything from how to get started with a new flock, disease and health management, and marketing of eggs and meat. Event sponsors included The Mill, Mid Atlantic Farm Credit, Bowman's Feed and Pet, and AHPharma.

ALUMNUS DANIEL CASTRANOVA AT CHARLES RIVER

Daniel Castranov ('03) former MS graduate student in Dr. Woods laboratory is an aquatic research specialist who uses cameras and microscopes to view the living cells and tissues of zebrafish. The Charles River scientist is an insourced contractor with the Weinstein Lab, part of the Eunice Kennedy Shriver National Institute of Child Health and Human Development at the US National Institutes of Health.

Congratulations to the ANSC Spring 2018 Graduates

The University wide commencement was held Sunday, May 20, 2018 at 1:00 p.m in the Xfinity Center. The College of Agriculture and Natural Sciences commencement ceremony was on May 19, 2018 at 3:00 p.m. in the Reckord Armory.

ANSC Graduate Students

Yi Ding Ph.D.
Aubrey Jaqueth, Ph.D.
Jonatan Mendez, MS.
Jasmine Mengers, MS.
Robert Murray, Ph.D.
Shelley Sandmaier, Ph.D.
Botong Shen, Ph.D.
Shu Wei Wu, MS.

ANSC Undergraduates

Dalia Rachel Badamo
Melissa Marie Benjamin
Cassandra Rose Bernhardt
Emily Marie Bugbee
Nicole Camelo-Lopez
Lauren Paige Carter
Dena Marie Castellani
Cassandra Kim Champ
Brittany Eilene Curry
Emily Rae Davis
Grace Marie DeWitt

Cierra Kay Dilks
Ian Doody
Ruby Amanda Fishbein
Annette Elena Folgueras
Atessa Foroutan
Rachel   Gagliardi
Erin Gary
Megan Elizabeth George
Sarah Jane Gitterman
Claudia Rose Gomez
Briana Maria Gooden
Morgan Gray
Carly Anne Guiltinan
Jisselle Guzman Pineda
Kayla Marie Harvey
Kelsey Anne Hoffman
Haley Alicia Honegger
Joshua Bradley Julian
Zora-Maya Nicole Keith
Mitchell Brandon Kenyon
Dong Ok Kim
Kristian Koeser

Ashley Marie Mann
Grace Irene Markley
Alisa McNamara
Marissa Rose Melzer
Aviva Leah Movsas
Taylor Elizabeth Park Muir
Thomas Mullineaux
Danielle Nicole Naundorf
Zoe Cheyanne Putman
Katelyn Mahree Repoli
Cristians Esau Rivas Morales
Edahlia Singleton
Julie Nicole Summerfield
Anne Tavera
Rebecca Thompson
Sophia Francesca Tomaselli
Erika Tonnon
Hannah Leah Warshawsky
Julianna Monique Wood
Morgan Leigh Wooten
Jillian Elizabeth Yant