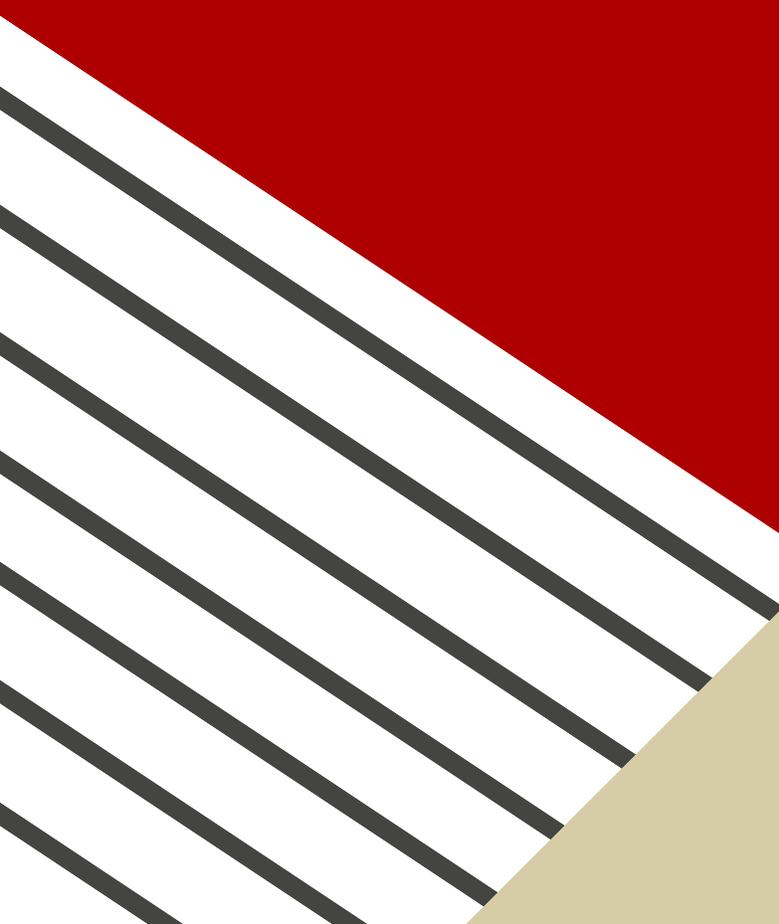


IMPACT REPORT

COORSTEK DENVER
METRO REGIONAL
SCIENCE &
ENGINEERING FAIR



DENVER
METRO
REGIONAL
SCIENCE AND
ENGINEERING
FAIR 



2021 IMPACT

We are delighted to present the impact report for the 58th season of the **CoorsTek Denver Metro Regional Science and Engineering Fair (DMRSEF)**, a program of the CU Denver College of Liberal Arts and Sciences that celebrates the scholarship, ingenuity, and tenacity of the region's middle and high school student scientists. These attributes, ingenuity and tenacity, were on full display at the 2021 fair.

Reflecting on the past 12-months, one word jumps out – **community**. This is perhaps a surprising word considering we were all stuck in our homes for over a year, but the lack of physical proximity did not stop our community of students, mentors, staff, and volunteers from showing up to support one another. The theme of this year's fair was **Think Outside the Box** and we did just that, transcending the boundaries of our screens to find new ways to connect.

In September, we welcomed Outreach & Engagement Program Director, Samantha Sands, to the science fair team and tasked her with expanding our year-round resources for student scientists. In November, we launched the **Competition Ready Series** – a suite of pre-fair events intended to build and connect our science fair community and support students as they prepared for the virtual fair. Through roughly 20 virtual events, including **Speak with a Scientist** discussions, **Science Fair Q&A** virtual office hours, and a series of **SciComm Workshops**, students were provided individualized guidance and feedback from local scientists, STEM professionals, and fair staff. To see our community unite to provide students a place to connect during an increasingly challenging year, was nothing short of inspiring.

The week of the fair itself brought a flurry of excitement as we expanded the competition from a one-day event into a week-long celebration of student research. Highlights included an opening keynote address from **Dr. Temple Grandin**, who reminded us why the world needs all different kinds of minds; an exploration of careers in materials science hosted by our title sponsor **CoorsTek**; a student **Trivia Night**, where DMRSEF students teamed up to show-off their general scientific knowledge; and a **Virtual STEM Activities Fair**, that featured hands-on demonstrations from nine partner organizations and ranged from making invisible ink with the NSA to learning about Zebrafish and the brain with neuroscientists from CU Anschutz. The fair week culminated in the competition itself – two days of category and special award interviews, where **113 student scientists** presented their original research over Zoom to our panel of **125 volunteer judges**. It was no small task moving the science fair online, but seeing our students, and our community, thrive in these unique circumstances was worth it!

As we return to an in-person event in 2022, there are many positive disruptions we will carry forward – including our **Virtual Project Showcase**, a living repository of the fair. If you were unable to attend this year's fair and would like to experience our students' fantastic work, you can! Visit the 2021 Virtual DMRSEF anytime at: <https://symposium.foragerone.com/2021-dmrsef>

Thank you for your support and we look forward to seeing you in person again soon!

- **The DMRSEF Team**

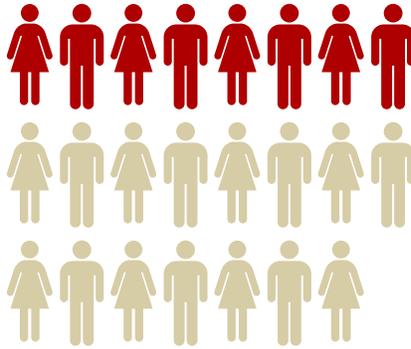
Erin Golden, PhD | Samantha Sands | Kayla Ahr

QUICK STATS

113
students
participated
in the 2021
DMRSEF

41
middle school
students

72
high school
students



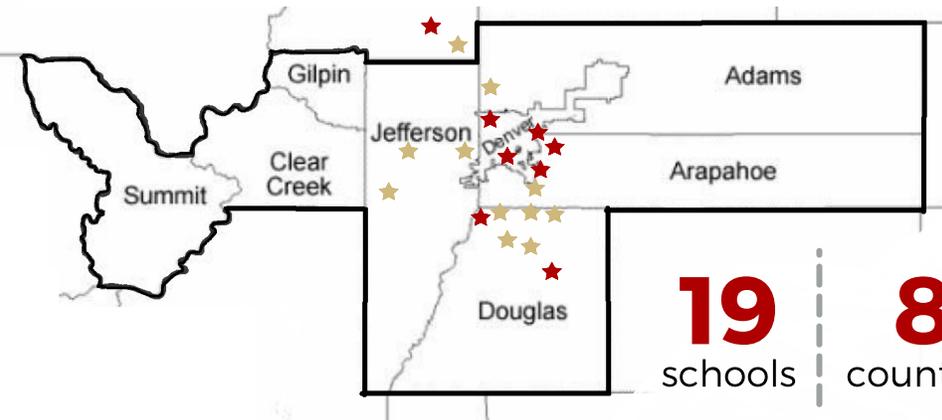
\$10,000

in cash & prizes

37
category awards

9
best in fair
awards

56
special awards



19 schools | **8** counties

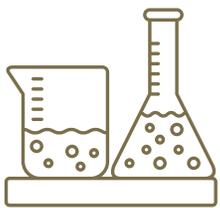
DMRSEF staff accumulated over
500 student contact hours
during the
2020-2021
fair season.



COMMUNITY
countless

teachers, mentors, families, and supporters

125 science fair judges | **50** program volunteers

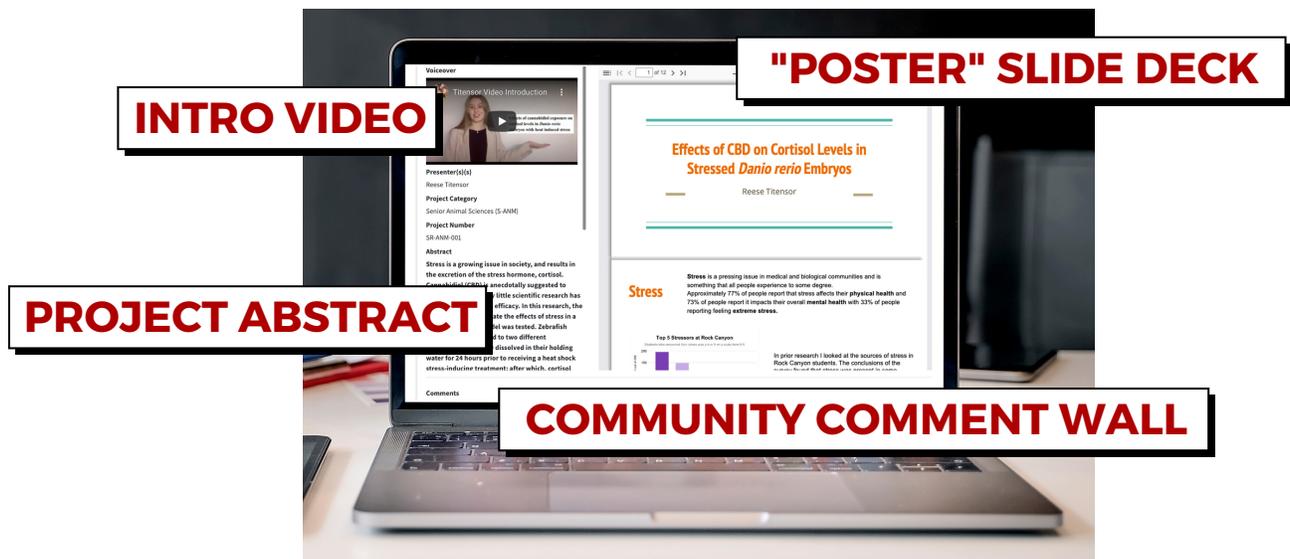


DMRSEF staff
22 hosted
pre-season
events

**The success of the 2021
fair belongs to the entire
DMRSEF community.
Thank you!**

A NEW FORMAT

In response to the COVID-19 pandemic, the DMRSEF, along with academic competitions around the world, was faced with the challenge of transitioning our dynamic in-person event to a virtual environment. To adapt, we used the online events platform Symposium by ForagerOne. Students' traditional tri-fold display boards were converted into digital slide decks, and their in-person interviews were converted to a 3-minute recorded video presentation followed by a Zoom interview with a team of judges. While the virtual environment presented new challenges, it also offered an opportunity for students to display their diverse learning and communication styles. This reimaged format was embraced by students, judges, and community members alike and we look forward to retaining and integrating these virtual components as we return to an in-person fair.



A positive disruption of the pandemic was the integration of new technologies into the science fair. Students' presentations were available to view throughout the week, giving judges, community members, and fair participants a chance to fully experience each project without the time crunch of the in-person event.

"My confidence participating in this fair was much higher, because of all the detailed explanations of what to do, and all the resources available to me! Even though this fair was virtual, it was AMAZING"
- DMRSEF Student

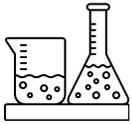
"The ability to preview student's projects so I could craft thoughtful questions about their work or provide better constructive feedback was really great."
- DMRSEF Judge

"The preseason resources made it easy to transition to the virtual environment. Hopefully, some of the virtual events can be kept even when in-person because the little things were often the most helpful."
- DMRSEF Student

RESOURCES & SUPPORT

Our team spent the year building a repertoire of virtual trainings and online resources to set students up for success at the fair. Highlights include the Competition Ready Series and 'how to science fair' videos from the CU Denver STEAM Team. Check these out on the [DMRSEF YouTube Channel!](#)

THE COMPETITION READY SERIES



SPEAK WITH A SCIENTIST

DMRSEF hosted 6 'Speak with a Scientist' panels, where 16 STEAM professionals shared their career stories and scientific advice with over 40 students and friends of the fair. Through these conversations, attendees were introduced to new career paths and learned that scientists are human too!



SCICOMM WORKSHOPS

83 students joined DMRSEF staff for tips and tricks for creating their digital displays and preparing for interviews. The series culminated with 2-days of practice sessions, during which students met with a team of mock judges that included members of a local Toastmasters Club and other community partners.



SCIENCE FAIR Q&A

DMRSEF staff hosted weekly office hours where Science Fair Pros helped students navigate each step of the science fair process. From paperwork and forms through presentations and interviews, students received individualized guidance and feedback to help them succeed!

THE CU DENVER STEAM TEAM

The CU Denver STEAM Team's mission is to support K-12 students from the Denver metro area in their exploration of STEAM subjects. Through hands-on outreach programs, STEAM Team members act as positive role models and mentors, helping students who may not otherwise see themselves as scientists embrace this identity. In addition to directly supporting students, the STEAM Team spent this season creating video guides to walk participants through each step of the fair process; resources that will continue to benefit students for years to come.



"I believe the focus on underserved communities makes STEAM Team one of the most valuable STEM-focused organizations [at CU]. I've seen students who otherwise would not be interested in scientific activities bond with [our] members and become regulars at our activities."
- Muhammad, CU Denver Undergrad

"My favorite part of STEAM Team is helping students recognize where their interests and hobbies overlap with science. Makeup, cars, video games - these can all make great starting points for a research project!"
- Mikayla, CU Denver Undergrad



WEEK OF FAIR

February 15 - 22, 2021

MONDAY

OPENING CEREMONY

The 58th annual DMRSEF kicked off with opening remarks from CU Denver CLAS Dean Pamela Jansma and CoorsTek CTO Randel Mercer, followed by a keynote address from Dr. Temple Grandin who spoke about why the world needs all different kinds of minds.



TUESDAY

SPEAK WITH A SCIENTIST: COORSTEK EDITION

The year's most popular preseason event "Speak with a Scientist" continued into fair week as the entire DMRSEF Community was invited to learn about the materials that make up our day-to-day lives and the science behind them; featuring a special panel of scientists and engineers from our lead sponsor, CoorsTek.

WEDNESDAY

STUDENT TRIVIA NIGHT

Wednesday night introduced our wildly successful, first-ever, student trivia night! This students-only event gave participants a chance to meet other young scientists and show off their STEM knowledge while competing for awesome prizes.



THURSDAY

VIRTUAL STEM ACTIVITIES FAIR

A staple of the DMRSEF is our STEM activities fair, which brings in local organizations to demonstrate the real-world applications of research science. As a fan favorite, we were determined not to let the pandemic hamper this event! With help from new and returning community partners and the magic of Zoom, students spent the evening participating in hands-on at-home projects that ranged from making invisible ink with the NSA to learning about Zebrafish and the brain with neuroscientists from CU Anschutz.



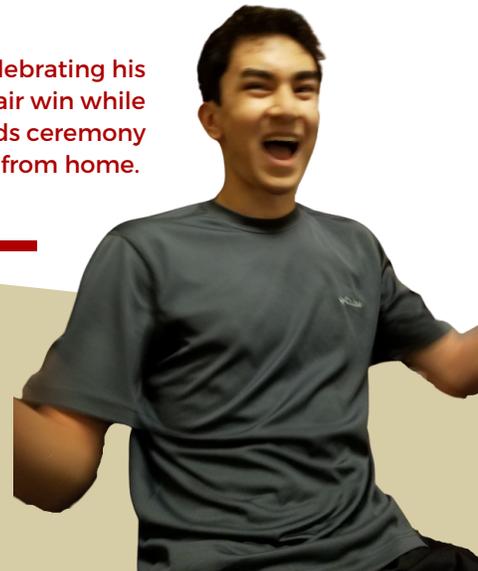
SATURDAY & SUNDAY JUDGE INTERVIEWS

After a week of community events, Saturday and Sunday brought on the main event of the academic competition. Virtual judge interviews looked a bit different than at the in-person fair; students interviewed with a single panel of expert judges rather than giving a series of individual presentations throughout the day. Judge teams were given a week to review student materials before the interview, allowing them to prepare more in-depth and project-specific questions. The integration of these asynchronous virtual presentation materials in addition to the live interviews allowed students' diverse talents to shine through in new ways.

MONDAY AWARDS CEREMONY

The fair week concluded with a virtual celebration of the commitment, creativity, and excellence of this year's science fair participants. Together as a community, we recognized the students, teachers, mentors, families, and volunteers that made the 2021 fair a resounding success. Highlights of the evening included closing remarks and Q&A with 2019 ISEF winner and DMRSEF alum, Krithik Ramesh, and awarding over \$10,000 in cash and prizes!

Senior **Tyler Burt** celebrating his 2nd Place Best In Fair win while watching the awards ceremony livestream from home.



BEST IN FAIR

SENIORS

1st Place: Reese Titensor, Rock Canyon High School

"Effects of CBD on Cortisol Levels in Stressed *Danio rerio* Embryos"

2nd Place: Tyler Burt, Wheat Ridge High School

"A Novel Mask Insert to Reduce Habitual Particle Transmission"

3rd Place: Aditi Avinash, Rock Canyon High School

"Breakdown of Gluten Proteins using a Newly Identified Combination of Fruit Derived Enzymes to Alleviate Symptoms of Gluten Intolerance"

JUNIORS

1st Place: Elizabeth Vossler, Skinner Middle School

"Blink-183: The Effect of Projected versus Reflected Light on Blinking Rate"

2nd Place: Kanshita Dam, Challenge School

"How do Vibrations from Sound Waves Affect Plant Growth?"

3rd Place: Chloe Pennington, Friends School

"Would You Drink That? The Relationship Between Batch Test and Amount of PFAS Per Trillion"

BEYOND DMRSEF

NEXT STOP: CSEF



DMRSEF was thrilled to nominate 52 projects to compete at the Colorado Science and Engineering Fair (CSEF). **Our students rocked the event, winning 30 category awards, 41 special awards, and 3 Best of CSEF awards.** In total, 38 DMRSEF projects were recognized at CSEF and our students took home \$7,875 in cash and prizes!

BEST OF CSEF WINNERS

2nd Place: Emily Zhang, Cherry Creek High School

"Fusing LiDAR and Camera Data for Advanced Context Recognition in Autonomous Navigation Sensory Systems Through Multidimensional Deep Neural Network Architectures"

4th Place: Matthew Anderson, Cherry Creek High School

"Early Diagnosis of Parkinsonism Via a Smartphone Application"

5th Place: Reese Titensor, Rock Canyon High School

"Effects of CBD on Cortisol Levels in Stressed *Danio rerio* Embryos"

CU DENVER RACAS

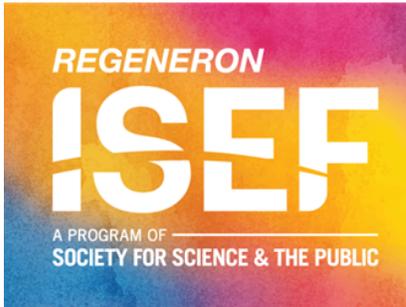
The Research and Creative Activities Symposium (RaCAS) is CU Denver's annual celebration of student-driven research and creative scholarship. Each year, the University invites senior division category winners to present alongside undergraduate and graduate students as they share their work with the CU Denver community. This year, four DMRSEF students joined the event.

- **Aditi Avinash - Rock Canyon High School, Grade 9**
- **Tyler Burt - Wheat Ridge High School, Grade 12**
- **Siena Negron - Skyview Academy, Grade 9**
- **Gitanjali Rao - STEM School Highlands Ranch, Grade 10**

**Research
and
Creative
Activities
Symposium**

BEYOND DMRSEF

...ON TO ISEF



Six DMRSEF students competed at the Regeneron ISEF 2021! These students and 17 others represented the state of Colorado at the elite international event. Each year more than 1,800 ninth through twelfth graders earn the right to compete at Regeneron ISEF by winning a top prize at a Society-affiliated local, regional, state, or national science fair. 3 of our students took home prizes, including \$7,500 in cash awards and a full-tuition scholarship to the University of Arizona!

MEET THE STUDENTS



Reese Titensor

12th grade, Rock Canyon High School

"Effects of cannabidiol exposure on cortisol levels in *Danio rerio* embryos with heat induced stress"



Tyler Burt

12th grade, Wheat Ridge High School

"A Novel Mask Insert to Reduce Habitual Particle Transmission"



SPECIAL
AWARD

Aditi Avinash

9th grade, Rock Canyon High School

"Breakdown of Gluten Proteins using a Newly Identified Combination of Fruit Derived Enzymes to Alleviate Symptoms of Gluten Intolerance"



Rachel Christensen

12th grade, Evergreen High School

The Environmental Effect on Aquatic Ecosystems of Run-Off From Wildfires Where Fire Retardant Slurry Was Used



Matthew Anderson

11th grade, Cherry Creek High School

Early Diagnosis of Parkinsonism via a Smartphone Application



Emily Zhang

11th grade, Cherry Creek High School

Fusing LiDAR and Camera Data for Advanced Context Recognition in Autonomous Navigation Sensory Systems through Multi-Dimensional Neural Network Architectures

DMRSEF TEAM



Erin Golden, Ph.D. is the Director of the Denver Metro Regional Science & Engineering Fair as well as the Director of Undergraduate Research and Creative Activities at CU Denver. In both of these roles, her focus is on creating training opportunities for emerging scholars and helping them access the support and resources they need to jump-start their research careers. Dr. Golden earned her Ph.D. in Neuroscience from Johns Hopkins University in 2015 and spent over 12 years as an NIH-funded biomedical scientist before joining the world of academic administration. Erin is passionate about mentoring and credits her professional and personal successes to the mentors that helped guide her along the way. She is thrilled that in her two Director roles she gets to be a mentor full-time, helping middle school, high school, and college students build their scientific identities and fall in love with research.



Kayla Ahr is the Associate Director of the Denver Science Fair and has been with the fair since 2018. She is currently a first-year Graduate student at the University of Colorado Denver, studying Sociology. Kayla found her passion for academic and scientific outreach through her extensive experience in Problem Based Learning and strongly values cross-disciplinary research and the importance properly communicated science has in shaping our future. This appreciation has driven her career path in working to develop STEM pipeline programs to support future generations of socially informed researchers.



Samantha Sands the Outreach & Engagement Program Director for the Denver Metro Regional Science & Engineering Fair. Samantha earned her bachelor's in Environmental Geology at the University of Michigan and a Master's in Museum Studies from the University of Colorado Boulder. She was the lead earth and space science educator at the Denver Museum of Nature & Science from 2010-2019. Samantha has over 18 years of experience in science education and community engagement. She has been involved in the DMRSEF since 2011 as a judge and judge coordinator. Samantha enjoys working with the STEAM Team and DMRSEF community to inspire the next generation of scientists.



Mikayla Barr is a senior at CU Denver working towards her bachelor's in Social Justice. She is a member of the Students for Sustainability Club on campus and is hoping to establish tri-institutional composting in the coming years. While unsure of an exact career path post-graduation, Mikayla aims to dismantle systems of oppression and revolutionize human beings' relationship with the planet. In her free time, she enjoys catching up on sleep, reading voraciously, and spending time with her family.



Muhammad Hussain found a passion for computer science shortly before coming to CU Denver. He is now a student in the computer science program. When he's not studying, doing outreach with the STEAM Team, or working on personal software projects, he's usually napping or eating. He's also very happy that you took the time to read this paragraph.

2021-2022 FAIR

LOOKING FORWARD

While this year raised new challenges, it also presented new opportunities. These opportunities have inspired the DMRSEF team to continue to grow and diversify the DMRSEF community including students, mentors, judges, and alumni.

We are excited to announce two new committees: the **Student Advisory Council (SAC)** and the **Community Advisory Council (CAC)**. The SAC is comprised of current DMRSEF students and alumni. These students will serve as fair liaisons in their schools and community, as well as provide valuable input on how to make the fair accessible, relevant, and FUN for students. The CAC is comprised of community members, parents, alumni, CU Denver and CU Anschutz students, fair partners, and sponsors. This group will help to build and foster relationships with new communities and provide feedback and guidance about the fair program.

Thank you for your continued support of the DMRSEF; we look forward to continuing to work with you to foster and empower the next generation of science-literate students and STEAM leaders.

DMRSEF

—

THE 59TH ANNUAL COORSTREK DENVER METRO
REGIONAL SCIENCE AND ENGINEERING FAIR

FEBRUARY 25 & 26, 2022

This is what a scientist looks like

—

How to get involved:

Interested in joining a committee, volunteering as a judge, or donating to the fair?

Visit our website at: www.clas.ucdenver.edu/denversciencefair/

Or reach out to: denversciencefair@ucdenver.edu

THANK YOU FOR YOUR SUPPORT



COORSTEK



College of Liberal Arts and Sciences
UNIVERSITY OF COLORADO DENVER



DENVER MUSEUM OF
NATURE & SCIENCE



Denver Section



Organ & Tissue Donation



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Alan Cram
Alison Fernandez
Ama Ahmed
Amy Hopkins
Amy Morrissey
Andrew McDivitt
Andy Thomas
Angela Morrison
Anna Crawford
Anna Schroeder
Annie Greenaway
Anthony Linenberger
Anthony Mangan
Ashley Clutter
Ben Appleby
Ben Nathan
Bethany Veo
Bill Wemmert
Brian Brown
Brian Jackson
Brianna Federico
Brittani Swain
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Donny Roush
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Elizabeth Nugent
Elizabeth Ribble
Evan Shapiro
Greg Cocks
Hailey Dennis
Hanmant Gaikwad
Hannah Jones
Hannah Moran
Hendrick Lopez-Beltran
Hillary Moore
Hope Bartlett
Ian Hernandez-Campos
Ian Ridley
Ira Fleming
James Harper
James Roche
Jamie Niesz
Jeffrey Hokanson
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Maxwell McCabe
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