

# 2021 Science Olympiad

## National Tournament

Arizona State University



**MAY** 17-24  
**2021**



A Year of  
**INNOVATION**

*Presented in Partnership with Arizona State University*



**Donation Drive**

**THE SOCIETY OF ST. VINCENT DE PAUL**

**TOGETHER WE CAN FIGHT HUNGER**

As a gesture of gratitude to the city that would have hosted our in-person 2021 National Tournament, Science Olympiad and Arizona State University are partnering with the St. Vincent de Paul Food Reclamation Center of Greater Phoenix to fight hunger. From May 17 to May 21, 2021, Science Olympiad teams, coaches, parents, officials, sponsors and volunteers will be invited to donate any amount. We are hoping to raise \$5,000 from the Science Olympiad community. Let's show our Science Olympiad spirit to those who need a hand. It's Good to be Smart, and Smart to be Good! Donations can be made at: [www.stvincentdepaul.net/ScienceOlympiad-ASU](http://www.stvincentdepaul.net/ScienceOlympiad-ASU)

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2021 SCIENCE OLYMPIAD

# WELCOME FROM THE

# NATIONAL SCIENCE OLYMPIAD



On behalf of the Science Olympiad Executive Board and Advisory Committee, I'd like to welcome you to the 37th Annual Science Olympiad National Tournament presented in partnership with our friends at Arizona State University.

The theme of this year's tournament is **Innovation** – and I can't think of a better group to exemplify the spirit of innovation more than our competitors. Despite the challenges of 2020, you persisted! Through Zoom practices with your team; masked-up meet ups with your build partners; socially distanced flights in a campus parking lot instead of field house; and YouTube awards ceremonies – you rolled with it! You learned how to adapt, how to improve, how to use your digital native skills and technological fluidity to not just make it work but make it better.

All year long I've been constantly impressed and amazed by the Science Olympiad community. New Ways to Play? Ok, cool. Satellite and mini SO formats? We're down. Learn online platforms to compete, from home? Got it. Major gratitude goes out to all the Science Olympiad State Directors, Event Supervisors and volunteers who saw that you wanted, even needed, this Science Olympiad season, and delivered. We all shifted away from an in-person model that's been consistent for 36 straight years, went out of our comfort zones, and said, hey digital, let's do this.

I've been at the table since Science Olympiad was founded in 1984, and I'm always balancing the promise of the future against the weight and history of the past. I think that 10 years from now, we'll look back at this season as an inflection point, and we'll remember a time when everything changed, but when we kept our program, our community and our Science Olympiad family together.

We couldn't have done this without you, and we're so glad that you're here for the 2021 Science Olympiad National Tournament. I wish you all the best, and I thank you for your enduring spirit.

**Let's go!**

**Jenny Kopach**

CEO  
Science Olympiad



# WELCOME FROM ARIZONA STATE UNIVERSITY



Dear Science Olympiad Participant:

On behalf of Arizona State University, I am pleased to welcome you to the 2021 Science Olympiad National Tournament.

ASU is honored to serve as the host institution for our nation's premiere science, technology, engineering and mathematics competition, and to have the special opportunity to share with you our comprehensive institutional commitment to simultaneous excellence, inclusion and impact.

Named the #1 most innovative school in the United States for six consecutive years by U.S. News and World Report, ASU is one of the largest public research universities in the country and home to the dynamic and pioneering Ira A. Fulton Schools of Engineering and The College of Liberal Arts and Sciences — the academic heart of our university. We are a knowledge enterprise dedicated to perpetual innovation on all fronts, and to advancing entrepreneurship in education, research and service at all levels. ASU is driven by use-inspired discovery and real-world problem solving that creates meaningful change for a better world.

Your demonstrated talent, perseverance and dedication in reaching this national tournament signals your shared commitment to the power of STEM and to the promise of what can be achieved through vision, creativity, hard work and drive. We are excited to have you join us for a week of competition, learning and exploration, and I hope we can welcome you for an in-person visit one day soon.

Until then, I congratulate you on your participation, and wish you the best of luck in the tournament and in the pursuit of your dreams

Sincerely,

A handwritten signature in black ink that reads "Michael Crow".

**Michael M. Crow**

PRESIDENT  
Arizona State University





# WELCOME FROM THE 2021 NATIONAL TOURNAMENT DIRECTOR



**Reina Gomez**  
Tournament Director

Greetings from Arizona and welcome to the 2021 Science Olympiad National Tournament. In partnership with Arizona State University, we are pleased to offer this virtual tournament with all we have gone through this past season. The Science Olympiad family and community has stepped up so that you may enjoy the things we are all passionate about. In a traditional tournament, I would be inviting you to enjoy our sunshine, great food, and friendly people. Instead, I invite you to enjoy the tournament virtually and hope to see you in person at the next competition.



# WELCOME FROM THE CITY OF TEMPE



May 14, 2021

City of Tempe  
P.O. Box 5002  
31 East Fifth Street  
Tempe, AZ 85280  
480-350-8225

Re: Letter from the City of Tempe City Council Office

Greetings!

Corey D. Woods  
Mayor

Randy Keating  
Vice Mayor

On behalf of the City of Tempe, welcome to the 37th annual Science Olympiad National Tournament! We are very excited to be home to Arizona State University, host of this year's conference. While this year does not follow the standard as previous years, we hope you take advantage of the virtual opportunities to explore ASU campus, meet the outstanding professors and extraordinary students. ASU has received the title of most innovative school in the nation for six consecutive years, thereby being a perfect setting for this tournament.

You all have shown perseverance, dedication, and ingenuity during a year of many challenges. Those are exactly the skills you will need as you tackle all of the exciting opportunities you have ahead of you to build a stronger tomorrow.

On behalf of the City of Tempe, welcome to 2021 Science Olympiad and enjoy participating in the many activities and challenges during the duration of the conference.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Corey Woods'.

Corey D. Woods

A handwritten signature in blue ink, appearing to read 'Randy Keating'.

Randy Keating  
Vice Mayor

# THE 2021 TOURNAMENT COMMITTEE LEADS



**Reina Gomez**

**Tournament Director**

Reina Gomez, the 2021 National Science Olympiad Tournament Director and Arizona State Director, has been a part of the Science Olympiad family since 2003. As a Head Coach, she led her team to win five consecutive State Championships and was able to represent Arizona at the National tournament. In 2016, as a co-founder, Arizona Science Olympiad received non-profit status and a partnership with Arizona State University was formed to host the combined middle school and high school State Science Olympiad tournament. Since 2015, Reina has been a national Event Supervisor.

Reina, a 30-year employee at Raytheon, is a data-driven, results oriented engineering team leader with a history of implementing process improvement projects across the enterprise. Reina is a Raytheon Certified Six Sigma Expert, an American Society for Quality Six Sigma Black Belt and holds a B.S. in Chemical Engineering from New Mexico State University.



**Marcelino Quiñonez**

**Director of Educational Outreach and Partnerships for Arizona State University**

Marcelino Quiñonez earned his B.A. and MFA in Theatre from Arizona State University. Marcelino has taught high school English and Drama at Espiritu NFL YET and Arizona School for the Arts, and as an adjunct theatre professor at Arizona State University and South Mountain Community College. Marcelino was elected to serve on the Roosevelt School District Governing Board from 2013-16 and currently serves on the Board of Directors for St Vincent de Paul. Marcelino is the Director of Educational Outreach and Partnerships for Arizona State University advancing Access ASU resources and programs.



**Christina Avila**

**Director with Access ASU at Arizona State University**

Christina is a Director with Access ASU at Arizona State University. A first generation college graduate herself, she now works with a team of staff who provide college readiness programs to students and families across Arizona. Since 2017, Christina has worked with Arizona Science Olympiad to host the state tournament at Arizona State University and has enjoyed seeing firsthand the impact STEM programming has on youth. Born and raised in Arizona, she enjoys exploring Arizona outdoors and can be found hiking or kayaking throughout the state.



# TOURNAMENT WEEK SCHEDULE

05  
17  
TO

05  
24

**17TH**

## MONDAY: Development

- » Team T-Shirt Award
- » Finding a Home in College Through SO Alumni video
- » **ASU** STEM Major Panel Discussion
- » Virtual Tour of **Arizona State University**



**18TH**

## TUESDAY: Teamwork

- » Ward's Kit Winners Announced
- » Behind the Scenes at ASU - Drones, Autonomous Vehicles and More!
- » Desert Wave Robotics team Q&A



**19TH**

## WEDNESDAY: Creativity

- » Expo Talks
  - **Hannah Bleeker** - "Wild Life: A Career Working With Animals"
  - **Emma McGorry** - "From Science Olympiad to Psychological Science"
  - **Danielle Benthem** - "Memory Formation"
  - **Miyo Sun** - "Success in Research Starts With an Open Mind"



**20TH**

## THURSDAY: Technology

- » Expo Talks
  - **Dr. Peter Neff** - "Teamwork and Understanding Ice on a Warming Earth"
  - **Dr. Robert Bruce** - "Seeing Eye to Eye: How the moth's eye helps show how we can find inspiration"
  - **Jordann Brandner** - "How I Use the Skills I Learned in Science Olympiad Every Day"
- » National Free Flight Society - Finding a passion for flight



**21ST**

## FRIDAY: Inspiration

- » Opening Ceremony



**22ND**

## SATURDAY

- » Online Competition on Scilympiad Platform

**24TH**

## MONDAY

- » Awards Ceremony

# KEYNOTE SPEAKER

## CHRISTOPHER CASSIDY

(Captain, U.S. Navy)  
NASA Astronaut

Christopher J. Cassidy was selected as an astronaut by NASA in 2004 and is a veteran of three space flights, STS-127, Expedition 35, and Expedition 63. During STS-127, Cassidy served as a Mission Specialist and was the 500th person in history to fly into space. This mission delivered the Japanese Experiment Module Exposed Facility (JEM-EF) and the Experiment Logistics Module Exposed Section (ELM-ES) to the station. For Expedition 35, Cassidy and the European Space Agency (ESA) astronaut Luca Parmitano had their unplanned spacewalk to replace a pump controller box cut short when Parmitano had cooling water leak into his helmet. Cassidy, a U.S. Navy SEAL, has been deployed twice to the Mediterranean and twice to Afghanistan. He has been the recipient of Bronze Star with combat 'V' and Presidential Unit Citation for leading a nine-day operation at the Zharwar Kili Cave on the Afghanistan/Pakistan border. Cassidy recently served as Commander on the International Space Station for Expedition 63.

# OPENING CEREMONY

**FRIDAY, MAY 21, 2021**

**7pm CT**

- » Welcome Remarks from Jenny Kopach, Science Olympiad CEO
- » University Welcome from Michael Crow, Arizona State University President
- » National Anthem rendition by Ty Cox
- » Parade of States Video
- » Japan Global Ambassador Team Welcome
- » Affirmation of Code of Ethics and Pledges
- » Keynote Speech from NASA Astronaut Chris Cassidy, Commander of the International Space Station, Navy SEAL
- » Announcement of \$50,000 Founders' Scholarships

# AWARDS CEREMONY

**MONDAY, MAY 24, 2021**

**7pm CT**

- » Welcome Remarks from Jenny Kopach, Science Olympiad CEO
- » Japan Global Ambassador Team Congratulations
- » Announcement of Lockheed Martin Spirit Awards
- » National Tournament Results for Individual Events in Places 1-6
- » National Tournament Results for Teams in Places 1-10
- » Announcement of 2022 National Tournament Host University

## CODE OF ETHICS

Student participants are expected to compete in tournament events with honest effort to follow the rules and the spirit of the competition. Team members are expected to be the builders of all the devices used in the events. The goal of competition is to give one's best effort while displaying honesty, integrity, and sportsmanship. Failure to show honesty and/or courtesy by a participant, coach or guest of the team may result in the disqualification of the team from that event, the entire tournament or future tournaments.

## STUDENT'S PLEDGE

I pledge to put forth my best effort in the Science Olympiad tournament and to uphold the principles of honest competition. In my events, I will compete with integrity, respect, and sportsmanship towards my fellow competitors. I will display courtesy towards Event Supervisors and Tournament Personnel. My actions will exemplify the proud spirit of my school, team, and state.

## COACH'S PLEDGE

On behalf of the coaches and assistants at this tournament, I pledge to encourage honesty and respect for tournament personnel, our fellow coaches, and other team members. We want our efforts to bring honor to our community and school.

## PARENT'S PLEDGE

On behalf of the parents and spectators I pledge to be an example for our children by:

- » Respecting the rules of Science Olympiad
- » Encouraging excellence in preparation and investigation
- » Supporting independence in design and production of all competition devices
- » Respecting the decisions of event supervisors and judges.

Our examples will promote the spirit of cooperation within and among all our participating teams.

## EVENT SUPERVISOR'S PLEDGE

On behalf of my fellow supervisors and tournament personnel, I pledge to run my event with fairness and respect for the participants and their coaches. Our actions will reflect the principles of the Science Olympiad program and display the pride we feel as representatives of our colleges, universities, companies, states or organizations.



# DEVELOPMENT

A black and white photograph of two students in a chemistry laboratory. The student on the left is wearing safety goggles and is carefully pouring liquid from a small vial into a larger beaker. The student on the right is also wearing safety goggles and is using a pipette to transfer liquid into a small container. They are surrounded by various laboratory glassware, including beakers, flasks, and a graduated cylinder. The scene is set in a lab with a dark background and a light-colored lab bench.

# DIVISION B EVENT DESCRIPTIONS

## COMPETITION EVENTS

**Anatomy & Physiology** – Participants will be assessed on their understanding of the anatomy and physiology for the human Integumentary, Skeletal, and Muscular systems.

**Circuit Lab** – Participants must complete tasks and answer questions about electricity and magnetism.

**Crime Busters** – Given a scenario, a collection of evidence, and possible suspects, students will perform a series of tests. The test results along with other evidence will be used to solve a crime.

**Density Lab** – Participants compete in activities and answer questions about mass, density, number density, area density, concentration, pressure, and buoyancy.

**Disease Detectives** – Participants will use their investigative skills in the scientific study of disease, inquiry, health, and disability in populations or groups of people.

**Dynamic Planet** – Teams will complete tasks related to physical and geological oceanography. Experimental Design – This event will determine the participant's ability to design, conduct, and report the findings of an experiment entirely on-site.

**Experimental Design** – This event will determine the participant's ability to design, conduct, and report the findings of an experiment entirely on-site.

**Food Science** – Participants will answer questions on food chemistry with a focus on fermentation and pickling. In addition, participants will build a salinometer/hydrometer capable of measuring salt compositions.

**Fossils** – Teams identify and classify fossils and demonstrate their knowledge of ancient life by completing tasks related to interpretation of past environments and ecosystems, adaptations and evolutionary relationships, and use of fossils in dating and correlating rock units.

**Game On** – This event will determine a team's ability to design and build an original computer game using the program Scratch incorporating the scientific theme provided to them by the Supervisor.

**Heredity** – Participants will solve problems and analyze data or diagrams using their knowledge of the basic principles of genetics.

**Machines** – Teams will complete a written test on simple machine concepts and construct a lever-based measuring device prior to the tournament to determine the ratio between two masses.

**Meteorology** - Teams will demonstrate their understanding of meteorological principles associated with severe weather by analyzing and interpreting meteorological data, graphs, charts and images.

**Ornithology** - Participants will be assessed on their knowledge of North American birds.

**Reach for the Stars** - Students will demonstrate an understanding of the properties and evolution of stars and galaxies as well as their observation using different portions of the electromagnetic spectrum (e.g. Radio, Infrared, Visible, Ultraviolet, X-Ray, Gamma Ray).

**Road Scholar** - Participants will answer interpretative questions that may use one or more state highway maps, USGS topographic maps, Internet-generated maps, a road atlas, or satellite/aerial images.

**Water Quality** - Participants will be assessed on their understanding and evaluation of marine and estuary aquatic environments.

**Write It Do It** - One participant will write a description of an object and how to build it. The other participant will attempt to construct the object from this description.

## **TRIAL EVENTS**

**Boomilever** - Teams will design and build a Boomilever meeting requirements to achieve the highest structural efficiency.

**Chiropterology** - Participants will be assessed on their knowledge of bats, with an emphasis on North American Bats, South American Microbats, and African MegaBats.

**Digital Structures** - Teams will design and test a Boomilever using SkyCiv structural analysis software that meets requirements specified in these rules to achieve the highest structural efficiency.

**Elastic Launched Glider** - Prior to the tournament teams design, construct, and test elastic-launched gliders to achieve the maximum time aloft.

**Mission Possible** - Prior to the competition, participants design, build, test, and document a Rube Goldberg-like Device that completes required Start and Final Actions through a series of specific actions.

**Mousetrap Vehicle** - Teams design, build, and test one Vehicle using one mousetrap as its sole means of propulsion to reach a target point as accurately as possible.

**Write It CAD It** - One participant will write a description of an object and how to build it. The other participant will attempt to construct the object in a computer-aided design (CAD) software from this description.

# DIVISION C EVENT DESCRIPTIONS

## COMPETITION EVENTS

**Anatomy & Physiology** - Participants will be assessed on their understanding of the anatomy and physiology for the human Integumentary, Skeletal, and Muscular systems.

**Astronomy** - Teams will demonstrate an understanding of star and galaxy formation and evolution.

**Chemistry Lab** - Teams will complete one or more tasks and answer a series of questions involving the science process of chemistry focused on the areas of Aqueous Solutions and Acids and Bases.

**Circuit Lab** - Participants must complete tasks and answer questions about electricity and magnetism.

**Codebusters** - Teams will cryptanalyze and decode encrypted messages using cryptanalysis techniques for historical and modern advanced ciphers.

**Designer Genes** - Participants will solve problems and analyze data or diagrams using their knowledge of the basic principles of genetics, molecular genetics and biotechnology.

**Disease Detectives** - Participants will use their investigative skills in the scientific study of disease, inquiry, health, and disability in populations or groups of people.

**Dynamic Planet** - Teams will complete tasks related to physical and geological oceanography.

**Experimental Design** - This event will determine the participant's ability to design, conduct and report the findings of an experiment entirely on-site.

**Forensics** - Given a scenario and some possible suspects, students will perform a series of tests. These tests, along with other evidence or test results, will be used to solve a crime.

**Fossils** - Teams identify and classify fossils and demonstrate their knowledge of ancient life by completing tasks related to interpretation of past environments and ecosystems, adaptations and evolutionary relationships, and use of fossils in dating and correlating rock units.

**Geologic Mapping** - Teams will demonstrate understanding in the construction and use of topographic maps, geologic maps, and cross sections, and their use in forming interpretations regarding subsurface structures and past depositional environments.

**Machines** - Teams will complete a written test on compound machine concepts and construct a lever-based measuring device prior to the tournament to determine the ratio between two masses.



**Ornithology** - Participants will be assessed on their knowledge of North American birds.

**Protein Modeling** - Participants will use computer visualization and online resources to construct a physical model of a protein that is being used with CRISPR Cas9 to edit plant and animal genomes. This year's event will focus on modifications to Cas9 that make it useful for base-editing.

**Sounds of Music** - Teams must construct and tune one device prior to the tournament based on a two-octave 12-tone equal tempered scale and complete a write test on the physics of sound and music concepts.

**Water Quality** - Participants will be assessed on their understanding evaluation of marine and estuary aquatic environments.

**Write It Do It** - One participant will write a description of an object and how to build it. The other participant will attempt to construct the object from this description.

## **TRIAL EVENTS**

**Boomilever** - Teams will design and build a Boomilever meeting requirements specified in these rules to achieve the highest structural efficiency.

**Chiropterology** - Participants will be assessed on their knowledge of bats, with an emphasis on North American Bats, South American Microbats, and African MegaBats.

**Detector Building** - Teams will build a durable temperature-sensing Device that will accurately measure, and display temperatures between 0 degrees Celsius to 75 degrees Celsius to determine the temperature of four different water samples.

**Digital Structures** - Teams will design and test a Boomilever using SkyCiv structural analysis software that meets requirements specified in these rules to achieve the highest structural efficiency.

**Gravity Vehicle** - Teams design, build, and test one Vehicle and Ramp that uses the Vehicle's gravitational potential energy as its sole means of propulsion to reach a target as accurately as possible.

**Wright Stuff** - Prior to the tournament teams design, construct, and test free flight rubber-powered monoplanes or biplanes to achieve maximum time aloft.

**Write It CAD It** - One participant will write a description of an object and how to build it. The other participant will attempt to construct the object in a computer-aided design (CAD) software from this description.

# DIVISION B PARTICIPATING SCHOOLS

State	Team Number	School Name	Coach
Alabama	B58	Liberty Middle School	Lori Shrode
Arizona	B42	BASIS Mesa	Felecia Scanlan
Arkansas	B52	LISA West Charter Middle School	Sherry Washington
California	B1 B2	Jeffrey Trail Middle School Kennedy Middle School	Todd Munoz Queen-lee Foo
Colorado	B38	Homeschool Science Colorado	Cindy Puhek
Connecticut	B41	Bedford Middle School	Daniel Cortright
Delaware	B34	Conrad Schools of Science	Justine Wood
District of Columbia	B59	Basis DC	Walker Timme
Florida	B23 B24	American Heritage School Markham Woods Middle School	Jennifer Page Rachna Gupta
Georgia	B33	Fulton Science Academy	Pam Walsh
Hawaii	B60	Highlands Intermediate School	Kathy Lin
Idaho	B53	Treasure Valley Homeschool	Kim Wilson
Illinois	B9 B10	Daniel Wright Junior High School Science & Arts Academy	Eric Rexer Darrin Bonecutter
Indiana	B27 B50	Thomas Jefferson Middle School Raymond Park Intmd and Middle School	Carol Haller Luke Gobel
Iowa	B43	Ames Middle School	Kerri Marsh
Kansas	B31	Pleasant Ridge Middle School	David Spieker
Kentucky	B45	Meyzeek Middle School	Bradley Fowler
Louisiana	B48	Glasgow Middle School	Kelly McFatter
Maryland	B25 B26	Tilden Middle School Burleigh Manor Middle School	Adam Atwood Wenge Ni-Meister
Massachusetts	B36	William Diamond Middle School	Annabel Stoler
Michigan	B5 B6	Slauson Middle School Smith Middle School	Mangesh Bhide Sachin Prabhu
Missouri	B17 B18	Ladue Middle School Pembroke Hill Middle School	Martin Long Mary Maxson

<b>State</b>	<b>Team Number</b>	<b>School Name</b>	<b>Coach</b>
Montana	B39	Helena Area Christian Home Educators	Dianna Harmon
Nebraska	B35	McMillan Magnet Center	John Huber
Nevada	B56	Davidson Academy	Media Labbauf
New Hampshire	B57	Merrimack Middle School	Susan Heimberg
New Jersey	B29	Community Middle School	Lisa Sacca
New Mexico	B37	Albuquerque Academy	Kiran Manne
New York	B3 B4	Paul J. Gelinas Junior H.S. Robert Cushman Murphy Junior H. S.	Nicolette DeMartino Sue McGuire
North Carolina	B7 B8	Piedmont IB Middle School Fred J Carnage Magnet Middle School	Corina Mota Pat Weber
North Dakota	B30	Wachter Middle School	Wade Curren
Ohio	B11 B12	Solon Middle School Hudson Middle School	David Brewer Jordan Renna
Oklahoma	B40	Casady Middle School	Aric Sappington
Oregon	B55	Stoller Middle School	Hitendra Babaria
Pennsylvania	B13 B14	Springhouse Middle School Harlan Rowe Middle School	Vivek Borkar John Slocum
Rhode Island	B46	Barrington Middle School	Steve Gaurin
South Carolina	B49	GREEN Charter School	Bhumika Chhabra
South Dakota	B51	Mickelson Middle School	Marci Green
Tennessee	B28 B54	Ross N. Robinson Middle School Cedar Springs Homeschool	Marsha Buck Meryl van der Merwe
Texas	B19 B20	Beckendorff Junior High Kealing Middle School	Belisa Dias Pramod Yenamandra
Utah	B47	Fairfield Junior High	Anna McFadden
Virginia	B15 B16	Longfellow Middle School Cooper Middle School	Julie Cox Lisa Walsh
Washington	B21 B22	Timberline Middle School Redmond Middle School	Swati Shastri Subeka Chhabra
Wisconsin	B32	Hamilton Middle School	Katheren Venturini
Wyoming	B44	Twin Spruce Junior High	Hannah Kienzle

# DIVISION C PARTICIPATING SCHOOLS

State	Team Number	School Name	Coach
Alabama	C57	Auburn High School	Jacque Middleton
Alaska	C59	Mat-Su Career and Technical High School	Greg Danner
Arizona	C37	Catalina Foothills High School	Terry Fortunato
Arkansas	C51	Little Rock Central High School	Melissa Donham
California	C1 C2	Troy High School Mountain View High School	Justin Kim Punam Gollamudi
Colorado	C34	Homeschool Science Colorado	Cindy Puhek
Connecticut	C32	Farmington High School	Eric Tucker
Delaware	C29	The Charter School of Wilmington	Gregory Darone
District of Columbia	C58	Basis DC	Nathaniel Green
Florida	C13 C14	James S. Rickards High School Archimedean Upper Conservatory	Dr. Paula Hall Kalaiselvi Panneerselvam
Georgia	C19	Chattahoochee High School	Jessica Cooper
Hawaii	C60	Iolani School	Narayan Raja
Idaho	C54	Treasure Valley Homeschool	Carol Wells
Illinois	C7 C8	Adlai E. Stevenson High School New Trier High School	Amerigo Carnazzola Alex Howe
Indiana	C28	Carmel High School	Cyndy Henry
Iowa	C38	Ames High School	Emma Knopf
Kansas	C33	Blue Valley West High School	Heather Hall
Kentucky	C35	duPont Manual High School	Belinda Hafell
Louisiana	C49	Baton Rouge Magnet High School	Benjamin Stacy
Maine	C46	Waterville Senior High School	Jon Ramgren
Maryland	C24	Centennial High School	Meenakshi Sodhi
Massachusetts	C27	Acton-Boxborough Regional H.S.	Brian Dempsey
Michigan	C9 C10	Northville High School Pioneer High School	Lakshmi Rudraraju Jenni Wilkening
Minnesota	C30	Eden Prairie High School	Katharine Foley
Mississippi	C50	Northwest Rankin High School	Kimberly Phillips
Missouri	C26	Ladue Horton Watkins H.S.	Mark Biernbaum



State	Team Number	School Name	Coach
Montana	C39	Hamilton High School	Dietrich Perchy
Nebraska	C36	Lincoln Southwest High School	Greg Cooper
Nevada	C47	Ed W. Clark High School	James Miller
New Hampshire	C48	Phillips Exeter Academy	Alison Hobbie
New Jersey	C22	West Windsor Plainsboro South	Meenakshi Bhattacharya
New Mexico	C41	La Cueva High School	Tammy Lara
New York	C3 C4	Great Neck South High School Townsend Harris High School	James Truglio Sarah Loew
North Carolina	C5 C6	William G. Enloe High School North Carolina School of Science and Mathematics	Samantha Chambers Jacob Brown
North Dakota	C31	Legacy High School	Savannah Elkins
Ohio	C15 C16	Mason High School Solon High School	Aimee Hansen Cherese Fiorina
Oklahoma	C45	Norman North High School	John White
Oregon	C43	Westview High School	Taylor Lee-Rouille
Pennsylvania	C11 C12	Lower Merion High School Harriton High School	Kim Arleth Brian Gauvin
Rhode Island	C44	Barrington High School	Kara West
South Carolina	C42	Clinton High School	Terri O'Shields
South Dakota	C56	Brookings High School	Jessica Blocker
Tennessee	C25	White Station High School	George Richardson
Texas	C17 C18	Seven Lakes High School LASA High School	Julie Irving David Walker
Utah	C40	West High School	Crystal King
Vermont	C52	Saint Johnsbury Academy	Edwin Eckel
Virginia	C20	Thomas Jefferson H.S. for Science and Technology	Aubrie Holman
Washington	C23	Camas High School	Matthew Chase
West Virginia	C55	Cabell Midland High School	Brian McNeel
Wisconsin	C21	Marquette University High School	Nicole Williams
Wyoming	C53	Thunder Basin High School	Erin Fulton
Japan	C61	Rakuhoku High School	Tomoki Sakaguchi

# TOURNAMENT DAY SCHEDULE – DIVISION B

## SATURDAY, MAY 22

BLOCK EVENTS	HST	AKDT	PDT/MST	MDT	CDT	EDT
Density Lab, Fossils, Water Quality	5:00 AM	7:00 AM	8:00 AM 1 - 59	9:00 AM 1 - 59	10:00 AM 1 - 59	11:00 AM 1 - 59
Dynamic Planet, Heredity, Machines	6:10 AM	8:10 AM 1-59	9:10 AM 1-59	10:10 AM 1-59	11:10 AM 1-59	12:10 AM 1-59
Anatomy & Physiology, Circuit Lab, Road Scholar	7:20 AM	9:20 AM 1-59	10:20 AM 1-59	11:20 AM 1-59	12:20 AM 1-59	1:20 PM 1-59
Crime Busters, Experimental Design, Ornithology	8:30 AM All Teams	10:30 AM All Teams	11:30 PM All Teams	12:30 PM All Teams	1:30 PM All Teams	2:30 PM All Teams
Disease Detectives, Meteorology, Write It Do It	9:40 AM All Teams	11:40 PM All Teams	12:40 PM All Teams	1:40 PM All Teams	2:40 PM All Teams	3:40 PM All Teams
Food Science, Game On, Reach for the Stars	10:50 AM All Teams	12:50 PM All Teams	1:50 PM All Teams	2:50 PM All Teams	3:50 PM All Teams	4:50 PM All Teams
Density Lab, Fossils, Water Quality	12:00 PM Team 60	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Dynamic Planet, Heredity, Machines	1:10 PM Team 60	3:10 PM	4:10 PM	5:10 PM	6:10 PM	7:10 PM
Anatomy & Physiology, Circuit Lab, Road Scholar	2:20 PM Team 60	4:20 PM	5:20 PM	6:20 PM	7:20 PM	8:20 PM
Times shown in blue are for Event Supervisor reference only. Teams will not compete in any of the above events.						

SELF SCHEDULED EVENTS	HST	AKDT	PDT/MST	MDT	CDT	EDT
	5:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM
Self Scheduled Trial Events (Live): Boomilever, Mission Possible	Available Event Slots start @ 8:00 AM (PDT/MST) time.					
Self Scheduled Trial Events (Video): Elastic Launched Gilder, Mousetrap Vehicle	Deadline for Video Submittals: Wednesday, May 19th by 11:59 PM PDT/MST					

STEM SHOWDOWN TRIAL EVENTS	HST	AKDT	PDT/MST	MDT	CDT	EDT
Chiropterology, Digital Structures, Write it CAD it	9:00 AM All Teams	11:00 AM All Teams	12:00 PM All Teams	1:00 PM All Teams	2:00 PM All Teams	3:00 PM All Teams

# TOURNAMENT DAY SCHEDULE - DIVISION C

## SATURDAY, MAY 22

BLOCK EVENTS	HST	AKDT	PDT/MST	MDT	CDT	EDT
Anatomy & Physiology, Astronomy, Circuit Lab	5:00 AM	7:00 AM	8:00 AM 1 - 58	9:00 AM 1 - 58	10:00 AM 1 - 58	11:00 AM 1 - 58
Codebusters, Disease Detectives, Ornithology	6:10 AM	8:10 AM 1-59	9:10 AM 1-59	10:10 AM 1-59	11:10 AM 1-59	12:10 AM 1-59
Machines, Protein Modeling, Water Quality	7:20 AM All Teams	9:20 AM All Teams	10:20 AM All Teams	11:20 AM All Teams	12:20 AM All Teams	1:20 PM All Teams
Detector Building, Forensics, Fossils, Write It Do It	8:30 AM All Teams	10:30 AM All Teams	11:30 PM All Teams	12:30 PM All Teams	1:30 PM All Teams	2:30 PM All Teams
Experimental Design, Geologic Mapping, Sounds of Music	9:40 AM All Teams	11:40 PM All Teams	12:40 PM All Teams	1:40 PM All Teams	2:40 PM All Teams	3:40 PM All Teams
Chem Lab, Dynamic Planet, Designer Genes	10:50 AM All Teams	12:50 PM All Teams	1:50 PM All Teams	2:50 PM All Teams	3:50 PM All Teams	4:50 PM All Teams
Anatomy & Physiology, Astronomy, Circuit Lab	12:00 PM Teams 59-60	2:00 PM Teams 59-60	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Codebusters, Disease Detectives, Ornithology	1:10 PM Team 60	3:10 PM	4:10 PM	5:10 PM	6:10 PM	7:10 PM
Times shown in blue are for Event Supervisor reference only. Teams will not compete in any of the above events.						

SELF SCHEDULED EVENTS	HST	AKDT	PDT/MST	MDT	CDT	EDT
	5:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM
Self Scheduled Trial Events (Live): Boomilever	Available Event Slots start @ 8:00 AM (PDT/MST) time.					
Self Scheduled Trial Events (Video): Detector Building, Gravity Vehicle, Wright Stuff	Deadline for Video Submittals: Wednesday, May 19th by 11:59 PM PDT/MST					

STEM SHOWDOWN TRIAL EVENTS	HST	AKDT	PDT/MST	MDT	CDT	EDT
Chiropterology, Digital Structures, Write it CAD it	9:00 AM All Teams	11:00 AM All Teams	12:00 PM All Teams	1:00 PM All Teams	2:00 PM All Teams	3:00 PM All Teams

A black and white photograph of a chemistry laboratory. In the foreground, a male student wearing safety goggles and a white lab coat is holding a test tube with liquid inside. He is looking down at it. To his right, another male student, also in a lab coat and safety goggles, is looking down at a piece of paper. In the background, a female student is partially visible, also wearing a lab coat and safety goggles. The lab bench is cluttered with various glassware, including test tubes in a rack, beakers, and a graduated cylinder. The overall atmosphere is one of focused scientific work.

# TEAM WORK



# GLOBAL AMBASSADOR TEAM FROM JAPAN

In 2009, Board Members Dr. Gerard Putz and Jim Woodland traveled to Tokyo, Japan, to present Science Olympiad concepts to Japanese education officials from the Ministry of Education (MEXT) and the Japan Science and Technology Agency (JST) at "Science Agora." A partnership between Science Olympiad and JST was born, founded on a shared passion for making science competition fun and exciting for all students. In March 2021, JST hosted its 10th Annual Japan High School Science Championships (JHSSC), where the Grand Prize for Rakuhoku High School in the Kyoto Prefecture is a chance to participate in the first-ever, all-virtual 2021 Science Olympiad National Tournament presented in partnership with Arizona State University. As they did at the 2012-2019 National Tournaments, Japanese students will join their American peers online in tests, march in the virtual Parade of States and participate as unranked guests in selected Science Olympiad events.

**Please welcome the 2021 JHSSC Winners and Coach from Rakuhoku High School in Japan, in front of their beautiful cherry blossoms!**



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**Chris Gooch**  
Alaska

**Reina Gomez**  
Arizona

**Dr. Eric Kaufmann**  
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Northern California

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**Dr. Robert Bruce**  
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Massachusetts - B

**Dr. Robert Goldstein**  
Massachusetts - C

**Paul Voydanoff**  
Michigan

**Brandi Gordon**  
Minnesota - B

**Katie Foley**  
Minnesota - C

**Dr. Allison Downing**  
Mississippi

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**Dr. Sachiko McBride**  
West Virginia

**Dr. Forrest Schultz**  
Wisconsin

**Dr. Paul Marquard**  
Wyoming

# NATIONAL EVENT SUPERVISORS

## DIVISION B EVENT SUPERVISORS

Event	Lead Supervisor	Event	Lead Supervisor
Anatomy & Physiology	Ashwin Ghadiyaram	Heredity	Annika Gomez
Boomilever	Greg Marconnet	Machines	Karen Emmons
	Jay Ralph		Ian Emmons
	Steve Dean	Meteorology	Stacie Bender
Chiropterology	Geneva Baker		Kayla do Couto
Circuit Lab	Russ Burleson	Mission Possible	Patrick Chalker
Crime Busters	Allen Leung		Manley Midgett
Density Lab	Paul Voydanoff		Conen Morgan
Digital Structures	George Sun	Mousetrap Vehicle	Dennis Papesh
Disease Detectives	Sujata Sarkar	Ornithology	Scott Cole
Dynamic Planet	Anand Gnanadesikan	Reach for the Stars	Connor Todd
Elastic Launch Glider	Jeff Anderson	Road Scholar	Brendan Herlihy
Experimental Design	Kirsten Jaster	Water Quality	Robyn Fischer
Food Science	Forrest Schultz	Write It CAD It	Ashka Patel
Fossils	Paul Randazzo	Write It Do It	Shelly Fitzgerald
Game On	Jeremy Long		Elena Gomez

## DIVISION C EVENT SUPERVISORS

Event	Lead Supervisor	Event	Lead Supervisor
Anatomy & Physiology	Matt Kramer	Experimental Design	Andy Hamm
Astronomy	Donna Young	Forensics	Linda Wozniowski
Boomilever	Chuck Stachovic	Fossils	Gary Vorwald
	Ross LaCombe	Geologic Mapping	Amanda Baker
	Saleh Tafesh	Gravity Vehicle	Brother Nigel Pratt
Chem Lab	John Aros	Machines	Alex Dewalle
Chiropterology	Geneva Baker		Scott Vessalo
Circuit Lab	Wayne Lu	Ornithology	Kathy Hartley
Codebusters	John Toebes	Protein Modeling	Heather Ryan
Designer Genes	Greg Palmer	Sounds of Music	Dave Moyer
Detector Building	Kevin Kha	Water Quality	Dan Hartley
	Mike Smith		Charles Rolsky
	Julie Newman	Wright Stuff	Tom Sanders
Digital Structures	Albert Kyi	Write It CAD It	Melinda Skinner
Disease Detectives	Ralph Cordell	Write It Do It	Audrey Carlson
Dynamic Planet	Enrica Quartini		Miri Park

# NATIONAL EVENT SUPERVISOR ASSISTANTS

## DIVISION B EVENT ASSISTANTS

### Event

Anatomy & Physiology  
Chiropterology  
Circuit Lab  
Crime Busters  
Density Lab  
Digital Structures  
Dynamic Planet  
Experimental Design  
Food Science  
Fossils  
Game On  
Heredity  
Meteorology  
Mission Possible  
Mousetrap Vehicle  
Ornithology  
Reach for the Stars

Road Scholar  
Water Quality  
Write It CAD It  
Write It Do It

### Assistants

Surya Tumbapura, Daniel Safi Soliman  
Kelly Powers  
Charles Epstein  
Jenny Leung, Joshua Leung, Elizabeth Leung  
Matt Weiker, Joseph Slivka  
Robert Lee  
Kabir Mohammed  
Susan Woodmansee, Megan Hill, Tim Jaster  
Nicole Dallman, Madee Sorensen  
Matt Friedman, Stephanie Sang  
Luke Matulewicz, Hector Cossyleon  
Winnie Ho  
Mark Kramer, Jacqueline Nugent  
Jeremy Gerber, Rob Diamond, Jerry Glass, Ryan Mayden  
Brian Hoffman, Peter Rado, Madeleine Bender  
Anupa Doraiswami  
Aditya Shah, Ruhi Doshi, Jeff Xie, Eris He, Asher Noel, Andrea Lin, Yonatan Sklansky, Antonio Frigo  
Dan Haggarty, Paul Jacobson, Mark Kramer  
Benjamin Brophy, Rachael Losee  
Peter Cao, Jason Chang  
Beth Heger

## DIVISION C EVENT ASSISTANTS

### Event

Astronomy  
  
Chiropterology  
Circuit Lab  
Codebusters  
Designer Genes  
Digital Structures  
Dynamic Planet  
Experimental Design  
Fossils  
  
Geologic Mapping  
Gravity Vehicle  
Machines  
Protein Modeling  
Sounds of Music  
Wright Stuff  
Write It CAD It  
Write It Do It

### Assistants

Tad Komacek, Jim Ciccarelli, Adam Rubinstein, Dhruva Karkada  
Sahil Pontula, April Cheng, Robert Lee, Pranit Mohnot  
Kelly Powers  
Gordon Lipsky, Bright Lu, Kevin Hao, Jason Skatz  
Randy Labaza, Sean McDonald  
Rob Mersereau, Nima Veiseh, Jacque Peacock  
Shivam Misra  
Araneesh Pratap, Brian Amaro  
Amy Zingsheim, Jasmine Windsor, Hansi Bartle  
Scott Maurer, Emerson Lai, William Sun, Ryan Anselm, Varun  
Sudunagunta, Omar Karzi  
Anya Hess, Brian Amaro, Emily Miaou  
John Beauregard  
Isaac Robinovitz, Claire Liang, Gary Zhang  
Tim Herman, Mark Hoelzer, Shuchi Dutta  
Aidan York, Colin Barber  
Mary Sanders  
Nancy Wang, Meredith Kossof  
Tom Carlson, Tristan Carlson



# 2021 NATIONAL TOURNAMENT PLANNING COMMITTEE

## ARIZONA SCIENCE OLYMPIAD STEERING COMMITTEE

Reina Gomez	Kathy Hartley
Geneva Baker	Elena Gomez
Ashka Patel	Daniel Reinhart
Kelly Powers	Jaime Gomez
Rita M. Merrill	Peter Hung

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Thuan Duong  
Zoom Duong

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Dr. Mark Searle	<i>Provost</i>	Edmundo Hidalgo
Dr. Nancy Gonzales	<i>Provost Pro Tempore</i>	

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Brad Baertsch

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Mark Adaoag		

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Dr. Aviral Shrivastava	<i>Faculty</i>
David Wahls	
Kaely Graham	
Michael McBride	
Jessica Hochreiter	

### Student Leaders

Alejandro Ramos  
Sai Krishna Deeduvanu  
Rachel Shantz  
Mia Spanyers  
Kathryn Dzisuk  
Yujia Wang  
David Vogel  
Desert Wave Robotics  
Ty Cox     *National Anthem Performer*



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---

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<b>Sharon Putz</b>	<i>Co-Founder &amp; Senior Advisor</i>
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<b>Dr. Kelly Price</b>	STEM Educator, Florida
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<b>Dan Nichols</b>	Inquiry & Nature of Science

## NATIONAL ALUMNI TASK FORCE

---

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<b>Stephanie Sang</b>	Co-Chair, University of Chicago
<b>Claire Burch</b>	Harvard University
<b>Katie Shade</b>	Facebook
<b>Luke Matulewicz</b>	University of Dayton
<b>Joy Li</b>	University of Oklahoma
<b>Kevin Hao</b>	University of Florida
<b>Annika Gomez</b>	Massachusetts Institute of Technology

## NATIONAL INNOVATION TASK FORCE

---

<b>Dr. Alan Chalker</b>	Chair, Ohio Supercomputer Center
<b>Sam Carigliano</b>	CEO, SkyCiv, Australia
<b>Paul Carff</b>	Field Automation Deployment Engineering Manager, Google
<b>Mary Edly-Allen</b>	Educator and Illinois State Representative

## NATIONAL OFFICE STAFF

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<b>Sharon Putz</b>	Science Olympiad Co-Founder & Senior Advisor
<b>Jenny Kopach</b>	CEO, Senior Vice President - Marketing Communications
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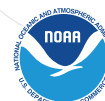
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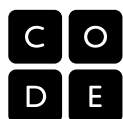
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undergraduate majors	schools and departments	research centers and institutes

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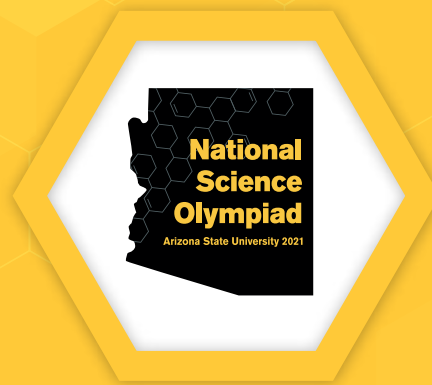


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— U.S. News & World Report, 5 years, 2016–2021





# 2021 Science Olympiad National Tournament



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