



LRSEF

LOUISVILLE REGIONAL SCIENCE & ENGINEERING FAIR

MARCH 3, 2018 AT KENTUCKY SCIENCE CENTER
727 WEST MAIN STREET, LOUISVILLE KENTUCKY 40202

lrsef.org

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mission statement

"The mission of the LRSEF is to awaken, promote, and recognize science and engineering talent among our area's youth and act as a catalyst to promote science and engineering throughout Kentucky."

LRSEF hosts its annual regional competition to encourage and recognize middle and high school students who have demonstrated outstanding originality in the creation of a scientific, mathematical or engineering project.

THE GATTON
ACADEMY 
of Mathematics and Science

The 2018 LRSEF printed program is sponsored by:
The Carol Martin Gatton Academy of Science and Mathematics, Western KY University



schedule

Kentucky Science Center opens for the general public from 9:30 am-9 pm. LRSEF families and families of registered Judges are admitted free for this day only. Theater tickets are at an extra fee. The LRSEF Family/Teacher Lounge will be open in the Classroom Wing at 7th & Main from 9:30am-3 pm.

2018 LRSEF STUDENT & JUDGE SCHEDULE (all times EST) **Saturday, March 3 or on weather date of Sunday, March 4**

8 - 9:00 am	Kentucky Science Center Opens for LRSEF ONLY Drop-off and Sign-in Student at Classroom Entrance at 7th & Main Judges enter at 727 West Main Entrance: sign-in on 4th floor
8:15 am	Morning Judge Orientation begins - 4th floor
9 - 11:30 am	Morning Judging in Progress on 2nd & 3rd floors
10:30 - 12:15 pm	Student Lunches served on Lower Level , take steps around pendulum. LRSEF students dismissed for lunch as morning judging is complete.
11:45 am - 12:15 pm	Afternoon Judges sign-in on 4th floor, via Main Elevator
12:15 pm	Afternoon Judge Orientation begins on 4th floor
12:30 - 3 pm	Afternoon Judging in Progress on 2nd & 3rd floors
3- 3:15 pm	Judging is complete. Students are released by LRSEF as each category is complete. Students may take projects to their cars and return for awards or depart for the day.

SENIOR AWARDS CEREMONY Theater, 3rd floor at 4-4:50 pm

3:50 pm	Guests begin seating, use Theater Elevator/stairs from Front Lobby
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JUNIOR AWARDS CEREMONY Riverview 4th floor at 4:15-5:15 pm

4 pm	Guests begin seating, use Main Elevator
5:30 pm	LRSEF concluded, all projects & materials must be removed from KSC.



in-kind partners

"LRSEF thanks our community partners for their leadership, enthusiasm and priceless partnership in hosting LRSEF 2018 and providing countless volunteer efforts in STEM outreach for Kentucky students and teachers! "

Ben Murr, LRSEF President 2017/2018



GE APPLIANCES
a Haier Company



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Asian Pacific American Forum



**KENTUCKY
SCIENCE CENTER**



junior projects

Animal Sciences

Alice Beatty	Sound in Hermit Crab Learning
Ella Diehl	Exploring Noise Pollution Stress in Lady beetle Larvae
Jack English	City Versus Country: Comparing parasite loads
Khawlah Estes	GPS Tracker
Molly Faley	Population size impact on Apple snail learning and memory
Simon Geary	Dog ID Project
Hansel Kim	Smile Again Mr. Lincoln!
Alaijah Kinnard	Unique Prints
Aly McBride	Anxious V. Non-Anxious Canines Responses to Human Emotions

Behavioral & Social Sciences

Miranda Bilodeau	Does perception of food affect flavor?
Ian Bowman	Homemade Lie Detector
Lucy Doyle	The Impact of Parenting Styles on Resilience in Children
Baraa Elamir, Amaan Nafil	Stroop Effect
Alanna Haddow	Does Entertainment Impact ADHD Symptoms
Kelsey Johnson	Does music help memory?
Sophie Jones	Exploring Contagious Yawning; Connection to Empathy
Sarah Khochtali	Driving with both legs
Laiken Kirby	Perceived parenting styles and response to stress
zahara mohamedou	Coding speed test
Enjy Mostafa	Nerve sensitivity
Annemarie Murr	Exploring Cognitive Dissonance in Young Meat Eaters
Tyler Orne	The Mandela Effect
Xishan Ritchie	The Mozart Effect
Ella Spriggs-Dial	Does Social Media Usage Impact Emotional Recognitions

Biochemistry

Lily Berry	Everyday beverages affect on calcium bioavailability
Weston Corak	Exploring Amylase and Aspirin Interactions
Mark Kenney	Watching and Watching
Chase Lynn	Are Non-caloric Artificial Sweeteners Containing Sucralose Safe Alternatives to Natural Sugar?
Rosemary Peters	Sweet or Deadly? Inhibiting Fructose Glycation
George Sikes	Dirty Laundry
Kenneth Smith	Which renewable energy is the best?

Biomedical & Health Sciences

Liv Ashley	Exploring the Possible Impact of Antidepressants on Developing Brains
Madison Burlet	Does Smell Affect the Taste of a Food?
Landon England	What drink can produce the most stomach gas
Qaysia Gaddy	Multiple Sclerosis Project
Avery Ramsey, Nico Sanchez	Exploring the Effects of Titanium Dioxide on Health
Tess Schrenger	Hidden Home Hazard: Could Stain Resistant Carpets Impact Human Health?
SWETHA SENTHIL, A NATHAN	How do the genes affect the drug response?
Jaimie Stevens, McBride	What drinks to avoid to maintain white teeth
paxson stodghill	Fruit Extracts' Impact on UV Sensitivity of Cells

Biomedical Engineering

john baldwin	Thermal Glove: a device to assist thermally empowered people
Seth McAfee	Improving Effectiveness of IVC Filters
Jack McFarland	Maximizing Solar Power
Henry Doyle	Sound Pollution: Sound kills Algae
Katie Quinn	Exploring Atrazine's Neurotoxicity as a Possible Cause of Parkinson's Disease
Avery Ramsey	The Impacts of Flame Retardants on Stem Cell Behavior

Cellular & Molecular Biology

Henry Doyle	Sound Pollution: Sound kills Algae
Simon Petruska	Testing Protein Similarities across Species
Katie Quinn	Exploring Atrazine's Neurotoxicity as a Possible Cause of Parkinson's Disease
Avery Ramsey	The Impacts of Flame Retardants on Stem Cell Behavior

Chemistry

Sponsored by Ashland Specialty Ingredients

Kaitlin Calvery	Exploring Dye Sensitized Solar Cells
Oliver Carmack	Improving Hydrophobicity In Bioplastics
Jarell Clax	Which liquid evaporates first
Catherine Goodlett	How Stain Removers Work On Different Stains?
Jonathan Green	All Dried Up
Calvin Kent	Exploring Vitamin C Content in Smoothies
Samira Mohamed	How much sugra

Chemistry, cont.

Jack Mulvihill	Creating Pawpaw Bioplastics
Jocelyn Palafox	Does fabric affect flammability of clothing
Cate Scales	Cooking Methods That Affect Vitamin C Content In Broccoli

Computational Biology & Bioinformatics

Sponsored by Shield Environmental Associates

vedha Balamurugan	Type 2 diabetes in Children: A new trend affecting kids
Woody Schoenbachler	Exploring Indexing to Discover Novel Genes and Proteins
Amy Suo	The Association of the SNPs in ADAM33 to Asthma

Earth & Environmental Sciences

Sponsored by Kentuckiana Chapter of Hazardous Materials Managers (KCHMM)

Georgia Armstrong	Noise Pollution Impacts Mussel Filtration Rates
Nour Elamir, Muhais Noor, Saad Iqbal	The Effect Of Chemical Weathering
Michael Gardner	Exploring the Effects of Biosolid on Soil Metals
Nathan Green	The Environmental Impact Of Algae
Krish Gupta	Dangers of Cloud Seeding: Studying the Effects of the Accumulation of Silver Iodide (AgI) on Aquatic Biota
Sanjana Komarina	Towers
Sahil Krishnani	Silicon-Perovskite Tandems: Making Solar the Next Buzzword
Maia Kuehne-Seeber	Exploring Roof Runoff and Rain Barrel Toxicity
Jasmin Logan	Crystal Formation in Geodes
Enid McDonald	Christmas Tree Experiment
Matthew McGuire	Chirp Chompers; The Remediation of Plastic by Crickets
Henry Mumaw	Does Color of Pill Affect Taking?
Yousef Qaissi	What environment prevents mold from growing on bread
Lauren Riddell	Air Is Dangerous?
Aiden White	Playground Poison

Embedded Systems

Will Ballantine	Sleep siren: a sudden infant death syndrome alert system.
Henry Murr	Noninvasive Drug Testing via Image Processing

Energy: Chemical

Sponsored by KY Chapter of Air & Waste Management Association

Hannah Arnold	Sparkling Cents
Fiona Gallagher	Trash to Treasure: Converting School Lunchroom Waste Milk to Ethanol
Bhanusri Satyavolu	Evaluation of Hemp and Kenaf bast fiber separation methods
Erin Senn	Inflation Creation
Christopher Smyth	The Power of Line-X
Cullen Walsh	Exploring the use of lunch room waste in biogas production

Energy: Physical

Sponsored by Marafiki wa LRSEF "Friends of LRSEF"

Halima Awale	which battery lasts the longest
Carson Hall	Convection Air Generator
Kelsey House	How does temperature affect an arrow's flight?
Adrian Morris	Wasted Wind: Designing Highway Wind Turbines
Greta Nelson	Friction Facts
Sophia Schindler	Capturing Ambulatory Energy

Engineering Mechanics

Ian Bischoff	Lessons in Flight
Hannah Bynum	Does Bat Technology Really Help?
Brandon Halstead	The whole possibility of hulls
Jenna Mullins	Hover my Hamster
Leo Osborne	Fuel Preheating in Combustion Engines
David Renz	sound barriers impact pollution placement
Raymond Salinas	Unscrambled
Nicola Schindler	Exploring the Impact of Pipe Configuration on Heat Transfer
Joshua Walker	Paper Perfection
Jacob Weizel	Cells To The Street
William Marti	Free Air Conditioning : Exploring Adiabatic Cooling
Jayden Butorac	Silent and Swift Submarine Hull Design

Environmental Engineering

Sponsored by AECOM

Sophie Bouldin	Remediating Waste Dye Water with Algae
Grayson Doninger	Using Benthic Macro-Invertebrates to Study a Winter Stream
Keanna Hale	Is there a way to charge you phone in a natural disaster
noah harned	Brownfields Affect Microclimates
Joslyn Koch-Serrano	Atrazine Remediation with Crumb Rubber

Environmental Engineering, cont.

Colin Loveless	Exploring the Effect of Acid Mine Drainage (AMD) on the Environment and Ecosystem and Designing a Filter for Remediation Techniques
Michael Schoenbachler	Exploring Atrazine Mobility in Soil
Micah Steineker	Is it possible to use neodymium magnets to separate water from salt water?
Tyler Tribble	Flood Control

Materials Science

Sponsored by Lubrizol Advanced Materials

Lilia Biagi	Strong then gone; creating an Eco-friendly fishing line
Gus Dillon	Kentucky Fibers: A Novel Concrete Product
Samuel Flynn	Solving Traffic Problems with Novel Self-Healing Asphalt
George Harris	The testing of how different surfaces affect the height of the bounce of a basketball
Jayla Miller-Palacio	UV Alert Strips
Christopher Ran	Lead Light
Patrick Snider	Which Parachute Should You Choose?
Jacob Stroud	New old Plastics: Creating more effective Galalith
JD Wiegand	Dropping Science

Mathematics

isabella cristobal	Mathematical Analysis of Crown Shyness Tree: The Tipuana Tipus
Fitsum Garredew	How does a Helium ball compare to a normal ball when dropped from a certain height?
Brooke Logsdon	Math Flash! Exploring Math Patterns in Lightning
Douglas Loveless	The Effect of the Mean of Gaussian Distributions and the Mean of Random Data on Accuracy
Jillian Wallshield	M & M Math

Microbiology

Annabel Bryant triloba	Exploring The Potential Anti-microbial Abilities Of Asimina
Charlotte Doninger	Water VS. Sediment: The Impact of CSOs of Bacterial Loads
Dylan Karem	what is dirtier- a toilet seat or the bottom of your shoe
Sarah Kwasny	A New Health Hazard: Food Flavorings and the Gut Microbiome
Kelechi Onyiri	Is Bacteria Abundance on Human Home Surfaces Influenced by the Intermediate Disturbance Hypothesis
Sarai Rhodes	Which Disinfectant Inhibits Bacterial Growth the best?

Microbiology, cont.

Mary Claire Stukenborg	Not So Sweet: Could Sucralose Impact the Gut Microbiome
Olivia Thomas	Exploring the Effect of Static Magnetic Fields on Bacteria
daniela zerquera	the 5 seconds rule

Physics & Astronomy

Sponsored by Rivergreen Water Recycling

Anas Ali, Zamzam Mohamed, Omar Ahmed	Electromagnetic Induction
Tanner Aslan	When do bananas become bad for your health?
Daniel Ballard	Effects of Friction on Objects in Motion
Hayden Harned	Modeling Real World Conditions in Droplet Placement
Teklu HEMME	Exploring the Impact of Sound Frequency on Freezing
John Kehdy	Magnet Gun
Frank Leezer	Exploring Rocketry Physics
Darby Lenning	Exploring Phase Changing Materials
Conne Pike	Bouncing of Different Balls
Kyle Sanderfer	Exploring Muon Path Alteration

Plant Sciences

Sponsored by Arkema

Jadyn Balsamo	Exploring Drought Communication in Allelopathic vs. Companion Plants
Lucia Brian	Does Wifi energy affect plant growth?
Chloe Clark	What's Growing in the Window
Mattie Diehl	Kudzu Killer: Using Alleopathy to Control an Invasive Plant
Gabe Henderson	Exploring Seed Stress Drought Resistant Plants
krish patel	Do scented oils affect pH of soap?
Daisha White	magic flower

Robotics & Intelligent Machines

Mahasen Alsaadi	5eBoard
Pete Ansert	Designing A Soft Robotic Gripping Appendages
Tylon Flanagan	How to Motorize a Robotic Hand?

Systems Software

Mehek Gupta	eToll: Easy & Efficient Toll Paying System
Brent Merrigan	Programming a Mock Blog to Monitor Inappropriate Content

Transitional Medical Sciences

Sophia Bryant	Exploring the Potential Anti-Cancer Abilities of Native KY Fruit
Mackenzie Engle	Human Blind Spots
Camden Lane	Can Sodas Stain Your Teeth
Abigail Livingston	Old Into New: Exploring the Use of Acetaminophen as an Anti-Cancer Agent
Brooklyn Pizzonia	Nepenthes Pincher Plant: a Novel solution for Gluten Intolerance
Rhys Taylor	Electrolyte Challenge
Eva Treacy	Flames and Extinguishing

Projects and student names are listed for those registered through LRSEF Stemwizard by 5 pm on 2/21/2018. Check lrsef.org after March 10 to see the final list of competitors and winners. We regret any errors or omissions.

senior projects

Animal Sciences

Ibrahim Ashraf	What Color Light are Fish More Attracted to?
Brittany Box	Differences Between C-Sections
Jacoda Carr	Are Fingerprint Patterns Inherited?
Trisha Eedarapalli	The Effect of Canine Saliva on Bacteria
Rachel McIntyre	How does music effect a horses' emotions
Dujuan Vega	THE EFFECT ON GUINIE PIGS IF DIET IS CHANGED

Behavioral & Social Sciences

Destiny Baldrige	Eating Disorders and OCD
Joshua Berry	Are teens invincible?
Alex Bonza,	
Rebekah Shafer	Vaping vs Stimulants that do not agitate the lungs
Sarah Cecil	How Reliable Are Eyewitness Testimonies?
Alyssa Couri,	
Ashton Beasley	The Placebo Effect
Heather Davis	CTE: The Positions Behind the Disease
Kariya Edwards	Childhood Environments Associated with Adult Behavior
Kevin Germany	The Impact Online Learning Has on Social Interactions
Isabella Hall	Does personality type effect memory
Jason Ho	Education in a 3-D Technological Environment
Emily Hynes	Sexes and Music's' Affect on Test Scores
Anaiyah Lacy	"Mental Minds Misunderstood "
Lydia Pack	Mental Illness; The Problem and Effects
Jada Peden	Physiological effects prisons have on people who are or have been incarcerated
Khalida Raheem	The Relationship between People and Laughter
Tamara Stroud,	
Kaya Coldiron	CHNOPS - Are looks more important than behavior in business?
Kassidy Waldrige,	
Patrick Dumire	Music and Mood

Biochemistry

Sponsored by McCoy & McCoy Laboratories, Inc.

Kunik Dhawan, Joshua Eddings,	
Giovanni Axibal	Which plants work best with enzymes for decomposition into biofuels
William Dolan	Effectiveness of Trifolium and Wildflower Honey as Antibacterial Agents

Biochemistry (cont.)

Taylor Keen,

Briaunna Anglin

Dissolving Pain Killers in the Stomach

Mariann Sleimat

Do teens that have or had caries take more time for pH to go back to normal than the teens that don't have caries

Biomedical & Health Sciences

Storm Chernecke

The Short Term Effects of Sugar Intake on Energy Level

Gabrielle Farrell

Still working on name...

Annette Garcia Morrison,

Zahria Nettles,

Gabrielle Farrell

Which recovery drink will provide the best nourishment for band participants

Eliana Head

Does Short-term Aerobic Exercise Positively Affect Memory Recall Ability in Young Adults

Chandrahaas Kona

Identification of Novel IGHV Alleles for Antibody Variation using Novel long-read sequencing and assembly approaches

Darian Neal

Whitening Your Teeth

Emma Ottersbach

Types of diabetes

Savannah Saunders,

Marley Wiljanen

Can Your Body Temperature Determine What Time of Day It Is?

Isabel Wolf

The Balance of Dancers vs Non-dancers

Biomedical Engineering

Sponsored by Dinsmore & Shohl

Claire Duck,

Heather Sweet,

Eliza Coulter

Can Cocoa be a preservative

Hannah Martin

Does Gender Play A Role In Risk For A Total Joint Replacement?

Cellular & Molecular Biology

Sponsored by Stites & Harbison

Tamiah Boston

Vitamins and herbal supplements vs medicine- Can vitamins provide the same healing properties compared to aspirin?

Kavisca Kuruparanantha

Circumvallate taste bud volume does not predict innervation volume defined by phox2b

Shivani Nellore

Some Cancer-Associated K-Ras Mutants can have Gain of Function Even When Bound to GDP

Edward Zhong

Can Yeast Help Boost the Immune Response to Cancer

Chemistry

Sponsored by Waste Management

Daniah Elathamna	Comparing the sweetness of sugar and sugar substitutes
Flor Hernandez, Alaisha Jenkins, Asha husseini	The Effects of Ammonium Thioglycolate
Kenny Morgan	Quick Relief Bio-Availability of Pain Relievers
Alex Phelps	Boiling Points
Madelyn Steineker	How much fluoride is absorbed in the mouth from drinking water?
Mason Steineker	To what extent can techniques be combined to kill fecal matter in pool water?
Alli Wood	Cheap vs Expensive: Which has More Lead in It?
noah wood, Ethan Coury, Emma mcgaughey	CHNOPS- which recovery drink produced the best results to accomplish presidential athletic award

Computational Biology & Bioinformatics

Satvik Adlakha	Are GMO based foods getting better at reducing allergies during human consumption? Organic food products are too expensive to feed the global population
Vishaal Balamurugan	Why my Bioengineered Human Islets Cures Diabetes: Bioinformatics and Biochemical approaches to identify mechanism.
Jawad Saleem	Structure Activity Relationship Models for Hepatotoxicity
Emma Valsted	Which Techniques Are the Most Accurate At Predicting the Weather Compared to an Actual Weather Forecast?

Earth & Environmental Sciences

Sponsored by Linebach Funkhouser, Inc.

Delaney Ballard	The Impact of Dog Fecal Coliform on Nearby Waterways
Kaden Grant	Reducing Pollution from Light Fixtures through Efficiency and Shielding
Christopher Kemper	Arduino Alcohol Sensor
Carlos Montalvo	Climate Change is associated with carbon dioxide, so where are the highest levels in Louisville?
Raymond Pfeiffer IV	Investigation of the Health Risks for Restaurant Employees
cristian rodriguez pena	Population to movement

Embedded Systems

Giancarlos Malave
Trevor Clark,
tre'dotson

IBM TJ Bot vs Amazon Echo Can coding improve human interaction with computers?

Andrew Martindale
Resistance?

Does Temperature Have an Effect on Conductivity and

Emily Richardson

How Is Sound Produced From Vinyl Records?

Micah Robinson

The Effects of Lightning on AM Radios

Patrick Yopp

Smart Pipes

Energy: Chemical

Sponsored by Michelin

Naomi Frempong

Which battery works best with solar power?

Shirlin Kingston

Can The Efficiency Of Hydrogen Gas Production By Electrolysis Be Increased?

Jayanshi Pathak

Microbial Fuel Cells

Gabriel Skaggs

Chemical energy from Mud

Energy: Physical

Adam Abayev

Charge Funneling

Collin Kemper

Essential Features of Hyperloop Systems

Arya Pallavarapu

Solar powered charger

Engineering Mechanics

Sponsored by Republic Services

Ayden Ellis

Wind Powered Turbines

Joshua Jacob

Development of a Hybrid Direct Write 3D Printer: a Novel One-Step Approach to Fabricating Multi-Layer Functional Devices and Flexible Electronics Through Reactive Inkjet Printing

Owen Phillips

Which type of wood constructs the strongest bridge?

Avery Smith

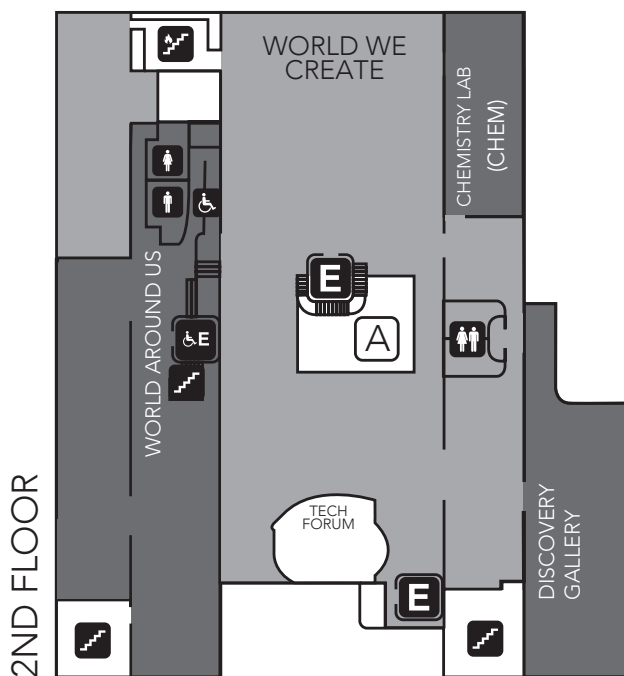
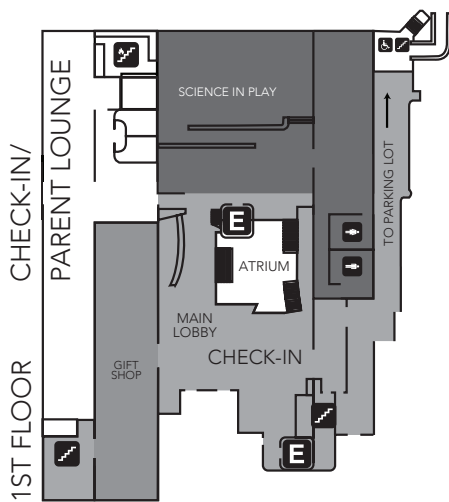
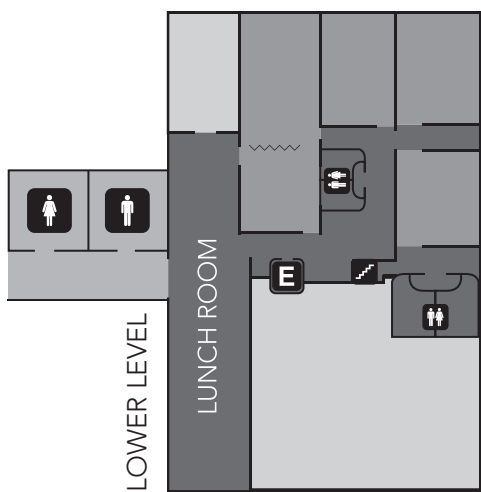
Wind Resistance on a Mock Skyscraper

Rachel Spaulding

Solar Updraft Tower-Wind Turbine Hybrid: Optimizing Power Generation in Multifarious Climatic Conditions Using Computational Fluid Dynamics Analysis

Nathan Waring

How to charge a phone using a windmill?



MAP

RESTROOMS



ELEVATOR



STAIRS



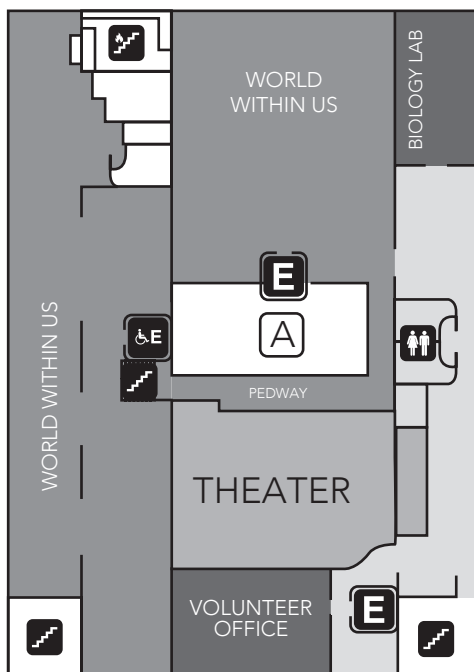
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ENTRANCE



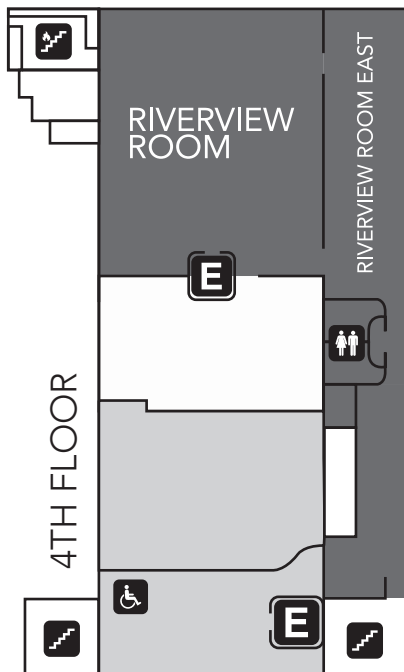
FIRE EXIT



3RD FLOOR



4TH FLOOR



Environmental Engineering

Sponsored by Dow Chemical

Katie Bollinger	Comparing Biodegradation of Wipes Marketed as “Flushable”
Hadley Jostsons	The effect of water filtration systems on levels of Copper and Manganese in water.
Aiden Villegas	The Viability of Alternative Energy in the Indian Ocean

Materials Science

Sponsored by KY Chapter of Air & Waste Management Association

Elizabeth Jessie	An Investigation of the Effect of Curing Temperature of Epoxy on Torsional Strength
Allison Ogle	Which Field Hockey Stick Construction Causes the Field Hockey Ball to Travel Farther?

Mathematics

Jada Graham	Tic-Tac-Toe Analysis
Abe Sgro	To Study Or Not To Study
Jedidiah Tillman	The Strengths of Electromagnets
Cassidy Whited	Graphing Our Paths

Microbiology

Sponsored by Bingham Greenbaum Doll LLP

Jewels Burk	Musical Bacteria
Lauren Cail	Musical Pathogens
Aiden Jones	The Effect of Various Mouthwashes on Oral Bacteria
William Wiley	Does Antibacterial Soap Work Better than Normal Soap?
Yafet Zewdie	Can Nanotechnology clean oil spills

Physics & Astronomy

Sponsored by Sigma Xi, The Scientific Research Honor Society

Katherine Cho	Do Sun cycles influence computer climate prediction models?
Jack Federico	Mitigation of Wingtip Vortices with Scimitar-like Device Could Increase Airport Efficiency
PJ Perry	Life on Other Planets
Forever Reed, Kayla Jones, Kennedy Edison	Splat! There's Blood
Eli Schramko	The Effect of Temperature on a Tennis Ball
Ryan Valsted	The Effect of Lighting on the Dynamic Range and Texture of a Photo

Plant Sciences

Sponsored by QRS Recycling

Charlotte Brown,
Melissa Flores,
Andrea Gullens

How Does Cigarette Smoke Affect Plant Growth?

Courtney Dichoso

Which Light Source is Better for Hydroponic Plants

Maddie Greenbaum

The Effect of Hormones on Plant Growth

Kaci McCarthy

Electricity vs No Electricity: Lima Bean Plant Growth

Kjersten Nelson

The Effects of Natural and Chemical Fertilizer Nutrients on Sunflower Plants

Tryphena Sithu

Symbiosis of *Azospirillum brasilense* and Three Selected Crops in a Hydroponic System

Madie Trent

Halogen vs LED, Which light source for hydroponic plants?

Robotics & Intelligent Machines

Sasmi Heellage

Building a Sensor Based Automated Irrigation System

Zadie Kennedy,
Andrew Delaney,
Jacob Brown

The Bot

Systems Software

Vishnupriya Ramasamy

Voice Technology For Speech or Hearing Impaired

Makayla Young,
Diana Zivkovic

VVIC

Transitional Medical Sciences

Vaitheesh Jaganathan

CAN TENDER COCONUT WATER INHIBIT THE GROWTH OF DIFFERENT TYPES OF CANCER CELLS

Gregory olds,
Joseph Thompson,
James Thompson

Nighttime food consumption producing childhood obesity vs methods to prevent over eating at night

Projects and student names are listed for those registered through LRSEF Stemwizard by 5 pm on 2/21/2018. Check lrsef.org after March 10 to see the final list of competitors and winners. We regret any errors or omissions.

A Brief History of the Louisville Regional Science & Engineering Fair (LRSEF)

By Gertrude Weller, Betty W. Long, Janine Rhodes Mura, Lawrence Gittleman, and Theresa H. Mattei

The Louisville Regional Science & Engineering Fair (LRSEF) is open to all middle school and high school students in Jefferson County and the 51 surrounding counties in Kentucky. Each year about 300 projects are accepted at this event. The Kentucky Science Center hosts LRSEF in downtown Louisville on the first Saturday in March.

Awards include ribbons, cash prizes and trophies for student projects and schools, as well as special awards presented by LRSEF sponsoring corporations as well as local and national professional organizations. Teachers and others with extensive past experience in science project preparation and the judging process are available to assist parents, teachers and their students who are new to the LRSEF competition.

Top category winners from the 2018 LRSEF will represent our region in the Kentucky Science and Engineering Fair (KY-SEF), to be held at Eastern Kentucky University in Richmond on March 23 - 24, 2018.

High school finalists will also represent Kentucky in the annual Intel International Science and Engineering Fair (ISEF) in Pittsburgh PA on May 13-18, 2018. Drawing from over 7 million science projects worldwide, more than over 1800 students from 75 countries compete for over \$4 million in scholarships, grants, scientific equipment and travel grants. Find more at <https://student.societyforscience.org/intel-isef>.

Science fair activities in Louisville began in 1959 at a time when science education in the USA was challenged by the Soviet Union's launch of its Sputnik satellite. The fair was known then as the Louisville and Jefferson County Science Fair, and was sponsored by The Louisville Engineering and Scientific Societies Council with the support of teachers in the public, parochial, and private schools. The local event affiliated with the International Science and Engineering Fair (ISEF), sponsored by Science Service, in 1965. Science Service changed its name to Society for Science & the Public in 2008.

Past Fair Directors have been Edward H. Roberts 1964-'69, Robert E. Seward '70, Dale C. McKissick '71-'72, Edgar L. Marvin, Sr., '73, Wayne L.R. Henderson '74-'79, Curtis H. Hannum '80-'97, Dr. Thomas H. Crawford '97-'04, Frank Lovell, Jr. '05-'07, Joel Gittelsohn '05-'09, Matt Kittell '09-'11, Dr. Tina Gibson '12-13, Ronda Fields and Fred Whitaker 2014 - 2017, Fred Whitaker is the current LRSEF Fair Director.

From simple beginnings with a few dozen high school students exhibiting in a school gymnasium, LRSEF has grown to include hundreds of students from fifty-two counties, using facilities at the Kentucky State Fairgrounds, the Commonwealth Convention Center, the University of Louisville Swain Student Activities Center, and at the Kentucky Science Center since 2015.

The Downtown Louisville, St. Matthews, Highlands, and Hurstbourne Kiwanis Clubs jointly sponsored the Fair in 1969, and then other Kiwanis Clubs in Kentucky's Division 12 added their support. The Kiwanis Clubs were the sole sponsors in 1980-81 and are still active today. The Louisville Regional Science Fair (LRSF) was registered as a 501(c)(3) non-profit corporation in 1982.

At the suggestion of Ann Ballard Korando of Science Service, the LRSF formed a committee in 1994 to attract the International Science & Engineering Fair. Working with Jennifer Barnett of the Convention Bureau, and the offices of Governor Paul Patton and Mayor Jerry Abramson, Kentucky hosted the Intel ISEF in May 1997. Lawrence Gettleman and Charles E. Allen organized the effort, Thomas H. Crawford, Nancy Keck chaired the host committee, and Orville Threlkeld presided over the host organization, conducting the best ISEF in its then 48-year history. The event attracted six Nobel Laureates for the first time. Because of this success, the Kentucky Science Fair Endowment, Inc., was established to provide partial financial support to all regional fairs and to the state science fair in the Commonwealth of Kentucky. The Intel ISEF returned to Louisville in 2002.

The LRSF doubled its support of science education from 1997-2011, becoming two fairs, one for physical sciences and one for life sciences projects, until rules were changed by ISEF. In 2010, through a grant from the Gheens Foundation, LRSF and the duPont Manual Fair joined with the Kentucky Science Center and hired a part-time coordinator to interface with prospective schools and their student research programs for two years. For many years, the LRSF shared its fair on the same day and in the same facility with the duPont Manual High School Regional Fair, culminating in co-hosting a 50th anniversary event in 2014.

LRSF changed its name to the Louisville Regional Science & Engineering Fair (LRSEF) in 2015 and expanded to serve 52 counties, when the western and southern Kentucky fairs ceased operations. LRSEF then moved its annual event to the Kentucky Science Center.

All five Kentucky science and engineering fairs affiliated with the Society for Science & the Public (LRSEF, duPont Manual, Central, Northern and State) will send individual finalists, team category winners, and their teachers to the 67th Intel International Science & Engineering Fair to be held May 13 -18, 2018 in Pittsburgh PA. The Best in Category winners of the Intel ISEF receive \$75,000 or \$50,000 and all prizes total more than \$4 million. Other winners, if at least 18 years of age, travel to Stockholm, Sweden the following year to attend the Stockholm International Youth Science Seminar and attend the Nobel Prize ceremonies.

Managed by an all-volunteer Board of Directors, LRSEF awards prizes to students from public, private, and parochial schools and raises funds from dozens of regional corporations and grant-making organizations. Since 2014, the TITLE SPONSOR of LRSEF has been GE Appliances. In honor of our 50th anniversary, Mr. Kevin Nolan of GE Appliances donated \$25,000 to sponsor a ten-year program of Best of Fair Cash Awards for the top high and middle school winning projects. And in 2015, LRSEF was selected for a STEM volunteer outreach partnership by the GE Asia Pacific American Forum (APAF). This support continues today with GE Appliances, a Haier Company. LRSEF also has an ongoing collaboration with the Science and Policy Outreach Group at the University of Louisville (SPOG), a dedicated team of graduate students in STEM fields who support our mission and outreach efforts.

The mission of the Louisville Regional Science & Engineering Fair is to awaken, promote, and recognize science and engineering talent among our area's youth and act as a catalyst to promote science and engineering throughout Kentucky. LRSEF its annual regional competition to encourage and recognize middle and high school students who have demonstrated outstanding originality in the creation of a scientific, mathematical or engineering project.

2017 - 2018 LRSEF Officers and Members of the Board of Directors

Ben Murr - *President*, Senior Vice President & Chief Technology Officer, Churchill Downs Inc.

Andrew J. Spence - *VP Education & STEM Advocacy*, KY Science Center, Senior Manager

Marque G. Carey - *Vice President for Business & Legal Affairs*, Attorney

Terry Roach - *Secretary/ Chief Technology Officer*, Utility Engineer at Carrollton Utilities

Theresa H. Mattei - *Treasurer*, Community Volunteer

Frederick J. Whittaker - *Fair Director* - Science Teacher, St. Francis of Assisi School, (Archdiocese of Louisville)

2017 - 2018 Directors:

(Jefferson County resident, unless noted)

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Mark Garman - Kiwanis Clubs Representative

Dr. Lawrence Gittleman - Professor Emeritus (semi-retired) Lecturer, University of Louisville School of Dentistry

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Isreal Hodges, Jr., PE, CHMM - Corporate Environmental Engineer, ZEON Chemicals, LP

Derrick Little - Engineering & Process & Documentation Leader, GE Appliances, a Haier Company

John E. Mays, MBA, CAPM, FMP - Manager Restaurant Strategies, YUM Brands, KFC-US

Keri Meador - High School Science Teacher, Central High School, Jefferson County Public Schools

Kaya A. K. Muller - Assoc. Prof. of Chemistry, KCTCS/Jefferson Community & Technical Coll., SW

Michael Moreland - Chemistry Teacher & Dir. of Science Competitions, Kentucky Country Day School

Senthil Nathan - CAE/Applied Technology Mgr. & Asia Pacific American Forum, GE Appliances, a Haier Company

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Dr. Stuart Williams - Associate Prof. Mechanical Engineering, Speed School, U of L (Oldham Co.)

David Zhou - Design Engineer /Co-Chair of APAF at GE Appliances, a Haier Company

Advisory Member - Analisa Conway - Assumption High School, 2017 ISEF delegate from LRSEF

LRSEF Emeritus Members Board of Directors (2018)

Thomas Beard - Retired from Jefferson County Public Schools

Keith Cole - Retired from Dover Corporation, former Kiwanis Clubs Representative

Dr. Thomas H. Crawford - Retired from University of Louisville, Professor of Chemistry, Provost, former LRSEF Fair Director

Ronda K Fields - Retired Science Educator from Jefferson County Public Schools & former LRSEF Fair Director, currently - Instructor JCTCS

Joel Gittelson - Retired Engineer from General Electric Appliances, former LRSEF Fair Director

Dr. Nancy Keck - Retired CEO from New Directions Unlimited LLC

George McNair - Retired from Radio Sound Inc., Vice President of Manufacturing

Deborah Shwab - Retired Science Educator from Jefferson County Public Schools

John Gary Spanyer - Evergreen Environmental, Professional Engineer (PE)

Martha Threlkeld - Retired from National City Bank

Our hosts at the Kentucky Science Center, KSC CEO Joanna E. Haas & Andrew Spence LRSEF Vice President and KY SCIENCE Center Senior Manager, have a very special treat for the LRSEF students this year!

You will meet our VIP special online guest during the AWARDS ceremonies: NASA engineer & Kentucky native Dr. Tracie Prater!

Dr. Tracie Prater is an aerospace engineer in the materials and processes laboratory at NASA Marshall Space Flight Center in Huntsville, Alabama. She serves as the technical integration lead for NASA's In-Space Manufacturing Project, which is focused on developing the manufacturing systems that will be needed on deep space exploration missions.

To date, the project has overseen development of the first 3D printer onboard the International Space Station (flown in 2014) and a recycling payload that will be operational on space station later this year. She is also a subject matter expert on manufacturing for Centennial Challenges, NASA's public prize competition program.

Originally from Kentucky, she has a B.S. in Physics from Eastern Kentucky University and an M.S. and Ph.D. in Mechanical Engineering from Vanderbilt University.



LRSEF volunteer judges

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Achille Biagi	Didier Guicherd	Enoch Mensah	Kaitlyn Shields
Amanda Boggs	Casey Hagan	Caroline Miller	Maggie Silliman
Albert Bolander	John Halfacre	Nandan Mondal	Goutam Singh
Michael Book	Pu Han	Michael Moreland	Parul Singh
Ashley Book	Christopher Harding	Samantha Morrissey	Jennifer Slaton
Larry Bozulic	James Herman	Kaya Muller	Serban Smadici
Tiffany Brandt	Jane Herndon	Rachel Nally	Mark Sneve
Ellen Brehob	Jaime Hiddinga	Norma Nangju	Nathan Soley
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Travis Brown	Isreal Hodges	David Neal	Darren Stephan
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Brian Carson	Matthew Hunter	Akber Pasha	Raman Subrayan
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Amed Feria	Swathi Kuppireddy	Sara Ruiz Esparza Morales	Glenn Zwanzig

2018 NATIONAL AWARDS at LRSEF

(Awards confirmed by February 15, 2018)

Attendance at Intel International Science & Engineering Fair
Four Best of Fair Project Awards- Senior Level- Sponsored by LRSEF

American Meteorological Society

American Psychological Association

Association for Women Geoscientist

ASU Walton Sustainability Solutions Initiatives

Broadcom MASTERS

INTEL Excellence in Computer Science

Regeneron Science Talent Search

Mu Alpha Theta, The Honorary Mathematics Society

NASA Earth Systems Science Award

National Oceanic and Atmospheric Association (NOAA)

Office of Naval Research (U.S. Navy / U.S. Marine Corps)

Ricoh Americas Corporation

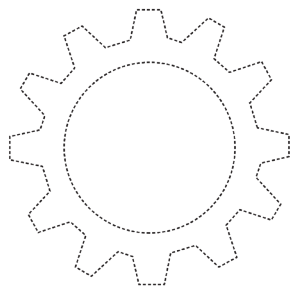
Society for In-Vitro Biology

Stockholm Junior Water Prize

U.S. Air Force

U.S. Metric Association

Yale Science & Engineering Association



LRSEF thanks our local organizations funding SPECIAL AWARDS:

(Awards confirmed by February 15, 2018)

School Awards for top three Junior & Senior Schools sponsored by LRSEF

American Chemical Society

American Society of Civil Engineers/ Kentucky Section

APAF- Asia Pacific American Forum of GE Appliances, a Haier Company

Azland Risk Management, LLC

Bluegrass Section — Food Technologists Institute

BC Plumbing Company

Churchill Downs Inc.

Delta Kappa Gamma

GE Best of Fair Awards

Gibson Family Award

Hexion, Inc.

Jefferson County Conservation District

Kentucky Chapter of Air & Waste Management Association (KY-AWMA)

Kentucky Chapter of Certified Hazardous Materials Managers (KCHMM)

KFC

Kentucky Gas Association

Kentucky Science Center

Kentucky Society of Professional Engineers

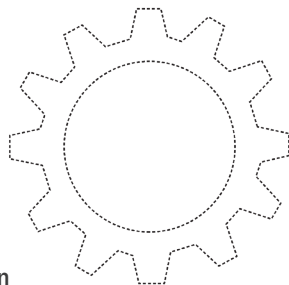
Louisville Chapter of the Society for Neuroscience

Louisville Water Company

Mercedes-Benz Club of America, Bluegrass Stars Section

US Fish & Wildlife Service

Women Environmental Leaders of Louisville (WELL)

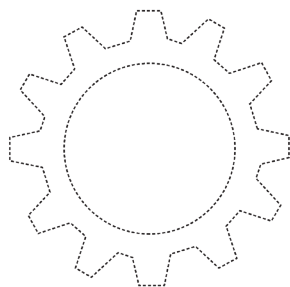




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Kyle Whyland
Stuart Williams
David Zhou



We thank you!

Louisville Regional Science & Engineering Fair (LRSEF)
c/o Kentucky Science Center
727 West Main Street
Louisville, Kentucky 40202 -2633
info@lrsef.org • lrsef.org

Affiliations



The Louisville Regional Science & Engineering Fair (LRSEF) is a 501(c) (3) nonprofit organization serving all students in grades 6-12 living 52 Kentucky counties by hosting an annual Intel International Science & Engineering Fair (ISEF) affiliated regional fair. The 2018 event is scheduled at the Kentucky Science Center for Saturday, March 3, 2018.

LRSEF has been affiliated with the Society for Science and the Public (SSP) since 1964. Competitions exist in nearly every state in the USA and in over 70 other countries, regions and territories. To compete in the annual Intel International Science & Engineering Fair (ISEF) a student in grades 9-12 must first qualify by participating in a science & engineering fair affiliated with SSP and also must observe the International Rules for Pre-College Science Research. LRSEF raises funds to sponsor our designated high school winners, teachers & chaperones to ISEF. The 2018 event will be held in Pittsburgh, Pennsylvania from May 13-18, 2018.

LRSEF sends top winners from grades 6-12 to the annual Kentucky State Science & Engineering Fair (KY-SEF) held at Eastern Kentucky University. KY-SEF will be held March 23 and 24, 2018.

LRSEF is affiliated with Broadcom M.A.S.T.E.R.S. (Math, Applied Science, Technology and Engineering for Rising Stars) a national middle school program supported by Broadcom Foundation are LRSEF is eligible to name the top 10% of their prior year total of 6th-8th grade participants as Broadcom MASTERS nominees. Students enter their projects in June; finalists are announced in September of each year. Each year 300 students are selected to win a trip to Washington D.C.

Counties served

LRSEF serves Allen, Anderson, Ballard, Barren, Boyle, Breckinridge, Bullitt, Butler, Caldwell, Calloway, Carlisle, Christian, Crittenden, Daviess, Edmondson, Fulton, Graves, Grayson, Green, Hardin, Hart, Hancock, Henderson, Hickman, Hopkins, Jefferson*, Larue, Livingston, Logan, Lyon, Marion, Marshall, McCracken, McLean, Meade, Mercer, Metcalf, Monroe, Muhlenberg, Nelson, Ohio, Oldham, Shelby, Simpson, Spencer, Taylor, Todd, Trigg, Union, Warren, Washington and Webster counties.

*Two Jefferson Co. Public Magnet Schools DuPont Manual High & Meyzeek Middle host their own combined fair, affiliated with ISEF.

LRSEF 2018 Category Award Sponsors

(Sponsors received as of February 19, 2018)

LRSEF thanks those companies and organizations listed below for supporting the cash award prizes in the following categories for 2018. LRSEF welcomes sponsors for all 22 Categories for both Junior & Senior Awards and with your help we hope to increase our prize amounts for LRSEF 2019. **If your company or organization would like to donate for LRSEF 2019 consider donating online to LRSEF GIVE FOR GOOD LOUISVILLE – September 13, 2018. All donations are 100% tax deductible and go directly to students.**

Junior Sponsors (\$135) First Prize \$60, Second Prize \$45, Third Prize \$30

Chemistry – Ashland Specialty Ingredients

Computational Biology and Bioinformatics – Shield Environmental Associates

Earth & Environmental Sciences – Kentuckiana Chapter of Hazardous Materials Managers (KCHMM)

Energy: Chemical – KY Chapter of Air & Waste Management Association

Energy: Physical – Marafiki wa LRSEF “Friends of LRSEF”

Environmental Engineering – AECOM

Materials Sciences – Lubrizol Advanced Materials

Physics & Astronomy – Rivergreen Water Recycling

Plant Sciences – Arkema

Senior Sponsors (\$180) First Prize \$75, Second Prize \$60, Third Prize \$45

Biochemistry – McCoy & McCoy Laboratories, Inc.

Biomedical Engineering – Dinsmore & Shohl

Chemistry – Waste Management

Cellular & Molecular Biology – Stites & Harbison

Earth & Environmental Sciences – Linebach Funkhouser, Inc.

Chemical Energy – Michelin

Engineering Mechanics – Republic Services

Environmental Engineering – Dow Chemical

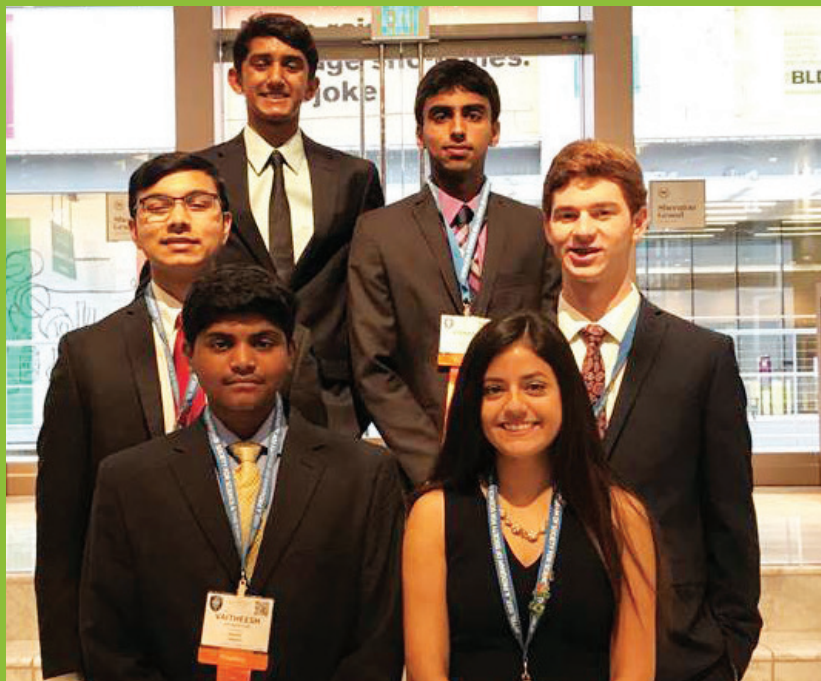
Materials Sciences – KY Chapter of Air & Waste Management Association

Microbiology – Bingham Greenbaum Doll LLP

Physics & Astronomy – Sigma Xi, The Scientific Research Honor Society

Plant Sciences – QRS Recycling

Congratulations to these LRSEF winners on your success at ISEF in Los Angeles CA in May 2017!



- 1) **Vishaal Balamurugan LRSEF & (KY-SEF)** - Bioengineering Islet Cells using 3D-Bio Printing Technology for the Treatment of Type One Diabetes (*North Oldham High School*) won 2nd in Biochemistry and won \$1000 from the American Physiological Society.
- 2) **Analisa Conway** – New Home Health Hazard: Exploring Flexible Flooring Cytotoxicity. (*Assumption High School*)
- 3) **Joshua Jacob LRSEF & (KY-SEF)** - Development of a Hybrid Direct Ink Writing 3D Printer: a Novel Approach to 3D Printing Multi-material Functional Devices and Flexible Electronics (*Saint Xavier High School*) won 2nd in Engineering Mechanics and won a \$10,000 scholarship from Naval Research.
- 4) **Vaitheesh Jaganathan** – Can Tender Coconut Water Inhibit the Growth of HepG2 Liver Cancer Cells? (*Ballard High School*)
- 5) **Kairav Kukkala** – Surfactant Additives to Improve Paint Stain Resistance (*Ballard High School*) won 4th in Chemistry.
- 6) **Sriram Satyavolu**– Optimization of Storage Capacity using Activated Carbon Fibers from Sustainable Agricultural Sources for Hydrogen. (*Kentucky Country Day*)
See Irsef.org to read interviews with these students.



2018 sponsors



GE APPLIANCES
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Asian Pacific American Forum



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CHURCHILL DOWNS



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APAF Asia Pacific American Forum • Diwali Fundraiser & Chinese New Year Fundraiser

GE Appliances, a Haier Company • Leadership Fund for Best of Fair Awards • Kentucky Science Fair Endowment Grant
GIVE for GOOD Bonus Funds 2017 - Community Foundation • Kiwanis Club of Louisville Foundation, Inc.

Society of American Military Engineers • Churchill Downs, Inc. • LG&E and KU Energy LLC

GE Appliances, a Haier Company Employee Giving Campaign • Kentucky Gas Association • Carbide Industries, LLC
Groger Community Awards Program • Amazon SMILE • S&K Automotive

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Anonymous Donors (4), Ashley Best, Stephen Beville, Brigid L. Blocker,

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*Stuart & Sara Williams Family, *F. Joseph Whittaker, *David Zhou

HONORARY AND MEMORIAL GIFTS

In honor of Ben Murr, 2018 LRSEF President: Harry Rotheberger

In memory of Janine Mura, dedicated volunteer and former member of the LRSEF Board:

*Joel & Charlotte Gittelton, *Theresa H. Mattei, GE Foundation

In memory of Thomas Wolfe Shwab, Jr., dedicated volunteer and husband
of LRSEF Board member Deborah Shwab: *Theresa & Mike Mattei, Debbie Shwab

2018 IN-KIND SPONSORS

GE Appliances, a Haier Company APAF Asia Pacific American Forum • Glow Touch/STEM Wizard

Hillerich & Bradsby/Louisville Slugger • Kentucky Science Center • KFC • Louisville Water Company

Rent & Rave • *Jennifer Slaton • Social Justice Committee of St. Xavier High School

SPOG: Science & Policy Outreach Group at University of Louisville • St. Francis of Assisi School Science Program

Subway at Kentucky Science Center • The Gatton Academy of Mathematics and Science

University of Louisville School of Dentistry, courtesy of Dr. Lee S. Mayer • USA Images 