

MSEF

Massachusetts Science
+ Engineering Fair

HIGH SCHOOL FAIR 2026

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High School Award Winners

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Sanofi Grand Award

**Kornkanya
Charoensiddhi**

Wellesley Senior
High School

*Phospholipid Deletion Alters Lipid Metabolism, Growth, and
Stress Response in Mycobacterium smegmatis*

MathWorks First Place Award

Hanna Suzuki

Bedford High

*Audio Augmented Reality for the Night Sky: A Music-
theoretic and Spatial Sonification Approach*

First Place Awards

**Jayaratna
Deshamouni**

Shrewsbury Sr High

*Novel Programmable Metal-Organic Frameworks Synthesis for
Airborne Neurotropic Viruses and Antiviral Immune Pathogenic
Resistance in Caenorhabditis elegans using Vitelline Membranes*

Kevin Sun

Andover High

*Printing 2D MXene-Based Chipless Radio Frequency
Identification Tags to Enable Plastic Waste Sorting for Recycling*

Jerry Xu

Lexington High

*A Unified Protein Embedding Model with Local and Global
Structural Sensitivity*

Khadeja Mukassabi	Southeastern Regional Vocational Technical	<i>Say Goodbye to Pests and Pesticides: Exploring the Effects of Potassium Soil Levels on Druse Idioblasts Containing Calcium Oxalate Crystals in Spinacia Oleracea</i>
Jessica Wu	Deerfield Academy	<i>Protein Conformational Transitions: Pathway Modeling Using Nudged Elastic Band and Linear Interpolation and Its Application to Methane Mitigation</i>
Jinwoo Park	Concord Academy	<i>Uncertainty-Aware Adaptive Huber-Loss Federated Distillation for Thermal Anomaly Detection in UAV Networks</i>
Katie Kim	Deerfield Academy	<i>POEM-KD: Persona-Oriented Efficient Model for Poetry Rewriting with Knowledge Distillation</i>
Yaejoon Jung	Phillips Academy	<i>SmartBlink: Real-Time AI-Driven Adaptive Pedestrian Traffic System for Enhancing Perceived Pedestrian Safety and Traffic Efficiency</i>
Finnegan Sommer & Olutayo Oyewusi	Southeastern Regional Vocational Technical	<i>TheraBee</i>
Laiba Khan	Lexington High	<i>VoxNeuro: A Low-Cost, Accessible Multimodal System Integrating Wearable Gait Monitoring and Grassmannian Subspace Analysis of Speech for Parkinson's Screening</i>
Cindy Ren	Tabor Academy	<i>"BehavioSync": Matricaria chamomilla Extract Attenuates Depressive-like Behaviors and Neurocognitive Impairment in Zebrafish via Neuroinflammatory Modulation</i>
Caitlin Stimpson & Lasya Muthyala	Littleton High School	<i>Evaluating Environmental Pollutants Using a Biodegradable Algae-Based Enzyme Biosensor</i>
Omar Graia	Acton-Boxborough Regional High	<i>High-Efficiency Geometric Adaptation (Hega): A Geometry-Aware First-Order Optimizer With Strong Nonconvex Performance</i>
Ethan Yan	Groton School	<i>Expanding Access to Hematologic Diagnostics with HEMAger: An AI-Powered 3D-Printed Microscopy Platform With Blood Smear Preparation Pipeline for Resource-Limited Settings</i>
Hollis Oliver	Falmouth Academy	<i>Enzymatic Degradation of Colored PET by Ideonella sakaiensis</i>

Lucia Nanda	Billerica Memorial High School	<i>TEMPO: A Novel Hybrid Neuromorphic Framework for Efficient and Interpretable Integration of Multi-Omic High-Dimensional Oncology Data</i>
Daniel Korkin	Westborough High	<i>Repurposing FDA Approved Drugs to Fight Neglected Tropical Diseases Using Deep Learning</i>
Elise Roggie	Belchertown High	<i>Mindset Over Mistakes: Measuring the Impact of Mindset Training on Gymnasts' Confidence and Performance</i>

Second Place Awards

Nuoyi Cao	Weston High	<i>A Lightweight, Durable Exoskeleton for Patients With Muscle Tremors</i>
Ananth Gomatam	Massachusetts Academy of Math and Science at WPI	<i>Researching the Effects of Indian Carnatic Music on the Behavior of <i>Drosophila melanogaster</i> in an Autism Spectrum Disorder Model</i>
Matthew Wang	Andover High	<i>SIGNBOT: An Assistive AI-Based Robot for Sign Language Communication and Learning</i>
Vansh Mookim	Mansfield High	<i>The Smart Irrigation System</i>
Sian Che	Dana Hall School	<i>Esterified Tea Waste Hard Carbon for Sodium-Ion Batteries</i>
Sanvi Venkayala	Massachusetts Academy of Math and Science at WPI	<i>Designing a Robot to Measure Soil Hydrophobicity and Optimize Tilling for Hydration</i>
Rajarshi Mandal	Lexington High	<i>Malaria Transmission Dynamics Modeling for Optimized Insecticide-Treated Net Allocation</i>
Valerie Lindh	Southeastern Regional Vocational Technical	<i>Topical Soil Transplantation: A Novel PGPM Fertilization Strategy for <i>V. radiata</i></i>

Kushal Patil	Lincoln-Sudbury Regional High	<i>A Hybrid Quantum-Classical Computational Study of Energetic and Conformational Differences in Amyloid-β variants</i>
Charlotte Corbin	Massachusetts Academy of Math and Science at WPI	<i>Intelligent Impact-Sensing Liner for Youth Female Athlete Safety</i>
Arushi Vora	Westborough High	<i>Using Senolytics to Rescue Cognitive Function in a Mouse Model of Alzheimer's Disease Through Selective Cell-Type Targeting</i>
Suhrit Ghosh	Massachusetts Academy of Math and Science at WPI	<i>Fusion-Based Driver State Monitoring: A Multimodal Approach to Drowsiness Mitigation</i>
Aditya Naravane & Rishabh Mathukiya	Franklin High, North Attleboro	<i>Electronic Nose for Pheromone Detection of <i>Plutella Xylostella</i> using a Custom Machine Learning Model</i>
Emmett Chen	Noble And Greenough School	<i>HandSplatter: Automated Digital Goniometry Using Neural Rendering</i>
Aishani Ghosh	Massachusetts Academy of Math and Science at WPI	<i>Modeling Annihilator to Sensitizer Ratios for Optimal Light Intensity in TTA Upconversion</i>
Alex Ning	Milton Academy	<i>Machine Learning Powered Corneal Topographer for Disease Detection</i>
Kathy Lin	Buckingham Browne Nichols School	<i>Vision-Language Object Detection for Drone-Based Natural Disaster Monitoring and Damage Assessment</i>
Junwoo Lim	Berkshire School	<i>From EEG to Spectrogram Images: Using Image Generation Models to Reconstruct Sound Stimuli from EEGs</i>
Anika Gosukonda	Littleton High School	<i>Non-Invasive Iron Deficiency Detector to Improve Early Detection of Iron Deficiency without Anemia Utilizing the Properties of Zinc Proportion Fluorescence</i>
David Guo	Buckingham Browne Nichols School	<i>DermaSpectra DeepVision: A Multispectral Imaging System for Enhanced Dermatologic Diagnosis Powered by a Novel CNN-Transformer-LLM Framework</i>

Ronita Shukla	Acton-Boxborough Regional High	<i>Novel Method for Remediation of Microplastics and Nanoplastics by Enzymatic Degradation</i>
Sophie Zhixuan Qiao	Concord Academy	<i>Aluminum Trichloride Induced AD Model in Zebrafish Larvae Exhibits Neurological Impairment</i>
Ishan Kasam	Massachusetts Academy of Math and Science at WPI	<i>Improving Airfoil Efficiency Using Deployable Vortex Generators with Surrogate-Based Control</i>

Third Place Awards

Changyao Hu	Roxbury Latin School	<i>Keeping Balance: Adaptive Anti-Fall Control for Robots Inspired by Biomimetic Lizard Tails and Reinforcement Learning</i>
Zijia Li	Concord Academy	<i>SRPK1 Modulates Survival Signaling Pathways in Parkinson's Disease: Evidence from Integrative Transcriptomics and Cellular Validation</i>
Mihir Jain, Tanay Apte & Varvara Karenski	Ashland High	<i>Optmizing Collector Electrode Geometry for Electrohydrodynamic Propulsion Systems</i>
Ryan Prendergast	Massachusetts Academy of Math and Science at WPI	<i>Developing a Mobile Thermal Disposal System for On-Site Construction Wood Waste</i>
Vikram Hiranandani	Westborough High	<i>Acoustic On-Demand Fishing Gear Release System</i>
Anvi Sarmah	Sharon High	<i>Insights into KMT2D Mutations in Colorectal Cancer: Implications for Immunotherapy Response and Targeted Therapeutic Strategies</i>
Yubo Liu	Concord Academy	<i>Unraveling J/ψ Production Mechanism: Extraction of J/ψ NRQCD Long Distance Matrix Elements through Bayesian inference</i>
Akshata Serikar	North Attleboro High	<i>Low Earth Orbit Active Debris Removal System using a CNN</i>
Neha Nagireddy	Shrewsbury Sr High	<i>ENDO-EC: An Automated Early Esophageal Cancer Detection System via Image Classification and Lesion Segmentation</i>

William Zhang	Shrewsbury Sr High	<i>From Material to Intelligence: Using Conductive Hydrogels as Smart Skin for Robotic Devices</i>
Rory Hu	Groton School	<i>HARMONIQ: A Novel Deep Learning Pipeline for the Discovery of Small Molecule Inhibitors of MAO-B as Therapies for Alzheimer's Disease</i>
Fariba Khan	Lincoln-Sudbury Regional High	<i>From Detection to Prescription: A Frugal, On-Device Multimodal AI System for Real-Time Plant Disease Diagnosis and Management</i>
Maxwell Costa & Yatharth Rajakumar	Amherst Regional High	<i>MOPP: Mosquito and Organism Purification Project</i>
Mia Zhao	Westborough High	<i>Edge AI based Multimodal Detection of Health-Related Emergencies in a Household Environment</i>
Ava Aquino	Mansfield High	<i>Analysis of the Hyperextension of the Tibia Relative to the Femur to Indicate the Laxity of the Anterior Cruciate Ligament within the Human Knee.</i>
Frank Nguyen	Northfield Mount Hermon School	<i>UV Protection and Antimicrobial Hydrogel of Sodium Alginate/ Nano Silica-Zinc Hydroxide and Its Biodegradable Nanocomposite Film</i>
Austin Li	Lexington High	<i>Pathway-Level Machine Learning Analysis of Breast Cancer Gene Expression Data for siRNA Target Prioritization</i>
Kirpal Singh Rayat	Saint John's High School	<i>Uncertainty-Aware Storm-Time Thermospheric Density Forecasting for Satellite Collision Risk Reduction</i>
Veronika Wang	Dover-Sherborn Regional High	<i>Rescue Reach: A Modular AI-Enabled Robotic System for Disaster Search and Rescue</i>
Anna Mahoney	Wachusett Regional High	<i>A Recipe for Success: The Effect of Variation in Bioplastics Recipes on the Tensile Strength of the Bioplastics</i>
Pranav Kollipara	Dover-Sherborn Regional High	<i>Testing Miro Milton Embryonic Impact on Myonuclear Spacing in Drosophila Melanogaster</i>

Derek Li	Commonwealth School	<i>Self-Supervised Permutation and Interpolation Based Noise2Noise Denoiser (SPIN) for Voltage Imaging</i>
Sophie Barriault	Billerica Memorial High School	<i>Electric Eel-Inspired Batteries For Implantable Medical Devices</i>
Anirudh Pulugurtha	Acton-Boxborough Regional High	<i>BioBeacon: A Low-Cost, Insect-Inspired, Stigmergic Swarm of Sensorized Robots for Accelerated Autonomous Disaster Response</i>

Honorable Mention

Parnika Mysore	Lexington High	<i>Rewriting the Epigenome: The Effect of Stress-Related Psychiatric Disorders on Genome-Wide H3K4me3 Patterns</i>
Yuxi Zhou	Tabor Academy	<i>Design of Passive and Actively Transmitted Elastic Structures for Humanoid Robotic Limbs</i>
Mingyang Sun	The Governor's Academy	<i>Unlocking Response: Targeting the FTO-Dependent m6A Demethylation to Restore anti-PD-1 Efficacy in NSCLC</i>
Anray Sheng	Noble And Greenough School	<i>Low-Cost Robotic Arms Cooperative Knot Tying Using Whole-Arm Manipulation</i>
Aru Sharma	North Attleboro High	<i>Machine Learning–Based Prediction of Phage–Host Interactions and Coverage Optimization Using Genomic Receptor and Defense Features Against the Escherichia Genus</i>
Sahana Chaubal	Worcester Academy	<i>Dose-Dependent Transfer of PFAS from Irrigation Water to Edible Tissues of Radish and Lettuce and Evaluation of Activated Carbon Filtration as a Mitigation Strategy</i>
Boran Jayden Zhao	The Governor's Academy	<i>Development of a Modular Biomimetic Spinal Snow Rescue Robot</i>
Atharv Joshi	Massachusetts Academy of Math and Science at WPI	<i>Neuroprotective Effects of Insulin Signaling Modulation in an Alzheimer's Model</i>

Mahima Ganesan	Amherst Regional High	<i>Engineering Enzymatic Plastic Digestion: Developing a High-Throughput Assay for the Kinetic Analysis of PET Degradation</i>
Cecilia McKeigue	Newton Country Day School	<i>Adaptive iPad Mount and Case for Individuals with Motor Disabilities</i>
Anwita Wadekar	Worcester Academy	<i>Beyond Food and Fitness: Highlighting the Role of Adverse Childhood Experiences in Youth Obesity</i>
Catelyn Hickey & Johanna Jane-Leonardis	Newton Country Day School	<i>Buffering the Burn: Optimizing Sodium Bicarbonate Supplementation to Mitigate Exercise-induced Acidosis</i>
Andrew Wu	Acton-Boxborough Regional High	<i>Satellite Analysis and Visualization of Nitrogen Dioxide Columns during Cuba's October 2024 Blackout</i>
Hanwen Tang & Haoyang Gao	Acton-Boxborough Regional High	<i>Creating HASS: a Hyper Adaptive Synergistic Scaling for AI Optimizers</i>
Andrea Lo	Tabor Academy	<i>Investigating Spirulina Platensis Potential as a Therapeutics to Chronic NF-κB's dysregulation in Neurodegenerative Disease (Animal Science)</i>
Jacob Wu, Rudra Pachori & Yulhee Kwon	Hopkinton High	<i>Noninvasive Inference of Presymptomatic Plant Stress from Latent Electrophysiological Dynamics via Action Potential-Based Hybrid LR-CNN Fusion Model</i>
Anna Li, Elmeria Cheung & Michelle Chen	North Quincy High	<i>The Effect of Different Materials for Water Contamination Filtration</i>
ZiHua Mai	O'Bryant School of Math & Science	<i>How Does Changing the PWM Duty Cycle Affect the Magnetic Field Strength and Core Saturation Behavior of an Electromagnet with and without a Soft Iron Core?</i>
Celina Wang	Milton Academy	<i>Prediction of Cystoid Macular Edema from Retinal Vasculitis Fluorescein Angiography Images Using Convolutional Neural Network</i>
Amelia Pratt, Asish Sahoo & Mia Tiernan	Littleton High School	<i>Evaluating the Impact of Sodium Benzoate on the Effectiveness of Over-the-Counter Oral Contraceptive Norgestrel using <i>Brachionus manjavacas</i></i>

Jeyson Guerra, Julissa Ortiz & Mehdi Ayed	East Boston High	<i>How safe is our waters?</i>
Mira Xu	Lexington High	<i>Bridging Sleep Instability and Brain Criticality Using the Ising Model</i>
Shichen Wei	Tabor Academy	<i>Composite Modular Power Generation System for Extending the Endurance of Underwater ROVs</i>
Yifan Ding	Boston Latin School	<i>Identifying a Receptor for a Newly Discovered Gene Therapy Vector</i>
Youran Zhang	Phillips Academy	<i>Liquid-metal Electronic Skin Helps Modular Continuum Robot Realizing Self-sensing</i>
Emily Ward	Sturgis East Charter Public School	<i>Chlorella vulgaris in Conjunction with Nitrogen Fixing Bacteria as an Aid to Plant Health and Synthetic Fertilizer Replacement</i>

Category Excellence Awards

AMD Engineering Excellence Award

Kevin Sun	Andover High	<i>Printing 2D MXene-Based Chipless Radio Frequency Identification Tags to Enable Plastic Waste Sorting for Recycling</i>
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Alnylam Bioscience Excellence Award

Jayaratna Deshamouni	Shrewsbury Sr High	<i>Novel Programmable Metal-Organic Frameworks Synthesis for Airborne Neurotropic Viruses and Antiviral Immune Pathogenic Resistance in Caenorhabditis elegans using Vitelline Membranes</i>
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MCTA Chemistry Excellence Award

Sian Che	Dana Hall School	<i>Esterified Tea Waste Hard Carbon for Sodium-Ion Batteries</i>
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Special Awards

Eversource Sustainability Award

Jinwoo Park

Concord Academy

*Uncertainty-Aware Adaptive Huber-Loss
Federated Distillation for Thermal Anomaly
Detection in UAV Networks*

Massachusetts Life Science Center Trailblazer Award

**Finnegan Sommer &
Olutayo Oyewusi**

Southeastern Regional
Vocational Technical

TheraBee

American Society of Microbiology, Northeast Branch Microbiology Award

**Caitlin Stimpson &
Lasya Muthyala**

Littleton High School

*Evaluating Environmental Pollutants Using a
Biodegradable Algae-Based Enzyme Biosensor*

Citadel Securities Innovation Prize

Yaejoon Jung

Phillips Academy

*SmartBlink: Real-Time AI-Driven Adaptive Pedestrian Traffic
System for Enhancing Perceived Pedestrian Safety
and Traffic Efficiency*

Regeneron Biomedical Science Award

Laiba Khan

Lexington High

*VoxNeuro: A Low-Cost, Accessible Multimodal System
Integrating Wearable Gait Monitoring and
Grassmannian Subspace Analysis of Speech for
Parkinson's Screening*

Shark Ninja G.R.I.T Award

**Bryan Ayala Angulo
& Zach Saccardo**

East Boston High

*Detecting Microplastics in East Boston Beach
Sediments Using Methylene Blue*

Fish & Richardson G.R.I.T. Award

Emily Carter Bristol-Plymouth Vocational Technical *From Hair to Habitat: Breaking Down Cosmetic Pollution*

ISEF 2024 Cohort Spark Award

Anika Gosukonda Littleton High School *Non-Invasive Iron Deficiency Detector to Improve Early Detection of Iron Deficiency without Anemia Utilizing the Properties of Zinc Proportion Fluorescence*

American Society of Safety Professionals Award

Charlotte Corbin Massachusetts Academy of Math and Science at WPI *Intelligent Impact-Sensing Liner for Youth Female Athlete Safety*

Pauline J. LaMarche Memorial Award

**Anna Li,
Elmeria Cheung &
Michelle Chen** North Quincy High *The Effect of Different Materials for Water Contamination Filtration*

Ben Eisenstadt Memorial Award

Ananth Gomatam Massachusetts Academy of Math and Science at WPI *Researching the Effects of Indian Carnatic Music on the Behavior of *Drosophila melanogaster* in an Autism Spectrum Disorder Model*

ISEF Delegates

Kornkanya Charoensiddhi Wellesley Sr High
Hanna Suzuki Bedford High
Jayaratna Deshamouni Shrewsbury Sr High
Kevin Sun Andover High
Jerry Xu Lexington High
Khadeja Mukassabi Southeastern Regional Vocational Technical

Jessica Wu	<i>Deerfield Academy</i>
Jinwoo Park	<i>Concord Academy</i>
Katie Kim	<i>Deerfield Academy</i>
Yaejoon Jung	<i>Phillips Academy</i>
Finnegan Sommer & Olutayo Oyewusi	<i>Southeastern Regional Vocational Technical</i>
Laiba Khan	<i>Lexington High</i>
ZiHua Mai	<i>O'Bryant School of Math & Science</i>
Kelly Mills	<i>Wachusett Regional High</i>
Emily Carter	<i>Bristol-Plymouth Vocational Technical</i>

High School Teacher Awards

**Learning Connections
Award**

Kevin Crowthers

*Massachusetts Academy of Math and
Science*

**Student Support
Award**

Kristen Styspeck

Westfield Technical Academy

**Program Leadership
Award**

Alex Hatzberger

North Attleboro High School