# First Place Winners

## Fairfax County Regional Science and Engineering Fair

**March 22, 2015**

### Animal Sciences

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Student(s)</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Regenerative Ability of Planarians</td>
<td>Jonathan Montenegro</td>
<td>Oakton High School</td>
</tr>
<tr>
<td>Punicalagin's Effect on Planarian Memory and Locomotion</td>
<td>Malvika Venkataraman</td>
<td>Oakton High School</td>
</tr>
<tr>
<td>Cell Type Specific Neural Manipulation in Feeding Behavior</td>
<td>Prerana Katiyar</td>
<td>Thomas Jefferson HS for Science and Technology</td>
</tr>
<tr>
<td>Collagen I’s Effect on Regeneration</td>
<td>Andrew Cowen</td>
<td>Marshall High School</td>
</tr>
<tr>
<td>Effects of Sugar Water on Lasting Color Preference of Butterflies</td>
<td>Catherine Berry, Alleigha Johnson</td>
<td>South County Secondary School</td>
</tr>
<tr>
<td>The Effect of Chlorine on the Heart Rate of Daphnia Magna</td>
<td>Joey Welsh, Jacob Han</td>
<td>Marshall High School</td>
</tr>
<tr>
<td>The Strength of Your Web</td>
<td>Hyung Bin Joo, Ian Rector</td>
<td>Woodson High School</td>
</tr>
</tbody>
</table>

### Behavioral and Social Sciences

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Student(s)</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neural Correlates of Gesture Comprehension in Natural Communication</td>
<td>Annie Abraham</td>
<td>Thomas Jefferson HS for Science and Technology</td>
</tr>
<tr>
<td>Towards Rapid Diagnosis of Mild Traumatic Brain Injury</td>
<td>Pooja Chandrashekar</td>
<td>Thomas Jefferson HS for Science and Technology</td>
</tr>
</tbody>
</table>

### Biochemistry

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Student(s)</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receptive Fields of Mechanosensory Neurons</td>
<td>Shruti Anant</td>
<td>Thomas Jefferson HS for Science and Technology</td>
</tr>
<tr>
<td>Exploring the Role of Triclosan on Embryonic Development Disruption</td>
<td>Vaishnavi Madhavan</td>
<td>Chantilly High School</td>
</tr>
<tr>
<td>Metabolic Analysis of Cell Populations Responding to Chemotherapy</td>
<td>Linda Allworth</td>
<td>Thomas Jefferson HS for Science and Technology</td>
</tr>
<tr>
<td>Advanced Aptsensor Capable of Rapidly Diagnosing Prostate Cancer</td>
<td>Timothy Cha</td>
<td>Thomas Jefferson HS for Science and Technology</td>
</tr>
<tr>
<td>Biosensor for Quantifying Food-borne Pathogens</td>
<td>Daniel Kim, Juna Khang</td>
<td>Langley High School</td>
</tr>
<tr>
<td>Development of a Novel Near-Infrared Fluorescent Theranostic Anti-Cancer Agent</td>
<td>John Han, Jake Cui, Lily Li</td>
<td>Madison High School</td>
</tr>
</tbody>
</table>

### Biomedical and Health Sciences

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Student(s)</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Purification Removal of Harmful Microorganisms</td>
<td>Hyeong Park</td>
<td>McLean High School</td>
</tr>
<tr>
<td>Electrolyte Drinks and Effect on Conductance</td>
<td>Carenienia Opem</td>
<td>McLean High School</td>
</tr>
<tr>
<td>Defining a Community Based Drug Resistance Index (DRI)</td>
<td>Tarun Kamath</td>
<td>Thomas Jefferson HS for Science and Technology</td>
</tr>
<tr>
<td>Coupling of Hydrogel Nanoparticles with Lateral Flow Immunoassay: A Novel Tuberculosis Test</td>
<td>Thaovy Van</td>
<td>South County Secondary School</td>
</tr>
<tr>
<td>Targeting the Beclin 1 Pathway</td>
<td>Annika Kim</td>
<td>Thomas Jefferson HS for Science and Technology</td>
</tr>
<tr>
<td>A Cluster-Based Determination of Traumatic Brain Injury Subcategories</td>
<td>Eduard Danalache</td>
<td>Thomas Jefferson HS for Science and Technology</td>
</tr>
</tbody>
</table>
First Place Winners
Fairfax County Regional
Science and Engineering Fair
March 22, 2015

Cellular and Molecular Biology

Sorting Nexin 27, A Novel Target Gene to Prevent Tumor Metastasis in Highly Aggressive Breast Cancer Cells
Kendy Li
Langley High School

An Epigenetic Approach to Osteosarcoma
Eryney Marrogi
Langley High School

Movement of Binding Immunoglobulin Protein Under ER Stress
Sojung Park
Thomas Jefferson HS for Science and Technology

Chemistry

Chemical Surfactant Effect on Water Surface Tension
Claire Dozier
McLean High School

Making a Better Rocket Fuel at Home
James Burton
Fairfax High School

A Comparison of Procion Dye vs Acid Dye Using Silk as a Textile
Heather Secrest
Westfield High School

Synthesis of PtAu Nanoparticle Catalysts for Ethanol Fuel Cells
Janice Ong
Thomas Jefferson HS for Science and Technology

A Crystal Engineering Tool for the Assembly of Ln Molecular Materials
Adrien Bernard
Thomas Jefferson HS for Science and Technology

Triple Quadruplex Biosensor for Monitoring Cardiovascular Diseases
Jennie Kim, Yoonsun Kim
Langley High School

Development of Quantum Dot Ink for Counterfeit Document Detection
Ashley Rochford, Darcy Newmark
Woodson High School

Computational Biology and Bioinformatics

A Novel Approach to Gene Expression Analysis of Ethnicities
Prathik Naidu
Thomas Jefferson HS for Science and Technology

Suppression of Complex Collective Dynamics in a Theta Neuron Network
Lucas Lin
Thomas Jefferson HS for Science and Technology

Promising Nanomaterials for Curing Spinal Cord Injuries
William Kodama, Neeraj Prasad, Eric Wei
McLean High School

Dimensionality Reduction Techniques for Molecular Structure Analysis
Rohan Pandit, Pranay Singh
Thomas Jefferson HS for Science and Technology

Earth and Environmental Sciences

Nitrogen Composition in the Ionosphere: RAIDS Data Analysis
Timothy Lucas Makinen
West Potomac High School

Optimization of Transport & Interaction Parameters in Porous Media
Akhil Waghmare
Thomas Jefferson HS for Science and Technology

Using Impact Events to Refine the Age of Nuvvuagittuq Rocks
Charlene Franke
Thomas Jefferson HS for Science and Technology

The Effect of Oysters on the Nitrite Level in an Aquatic Ecosystem
Jacob Shapero, Brendan Lohmar
Langley High School

Embedded Systems

Android Controlled Greenhouse
Alon Bendelac
Chantilly High School

A Real-Time Orthogonal Frequency Division Multiplexing System
Matthew Kramer
Thomas Jefferson HS for Science and Technology
# First Place Winners

**Fairfax County Regional Science and Engineering Fair**

**March 22, 2015**

## Energy: Chemical
- **Cobalt Catalyst: Improving Electrochemical Cell Efficiency**
  - Sarah Bresnahan, Westfield High School
- **Effect of Fuel Type on Voltage Produced in an MFC**
  - Daniel Mitchell, Chantilly High School
- **Engineering a Soil-based Microbial Fuel Cell**
  - Hongyi Guan, Seung Ha Lee, Julian Vallyeason, Thomas Jefferson HS for Science and Technology
- **Effect of Bacteria Type on Electrical Output**
  - Joey Clement, Chloe Ramich, Chantilly High School

## Energy: Physical
- **Making Your Everyday Solar Panel a More Realistic Source of Energy**
  - Brenden Duffy, Lake Braddock Secondary School
- **Improving Solar Bottle Light Efficiency Using Parabolic Reflectors**
  - Paolo Fermin, Rogelio Lozano, West Potomac High School

## Engineering Mechanics
- **Animatronic Digit Device**
  - William Makinen, West Potomac High School
- **Developing a Semiautonomous Payload Retrieval System**
  - Christopher Jones, West Potomac High School
- **The Effect of Different Physical Interfaces on the Efficiency of a GUI**
  - Jaspreet Ranjit, Westfield High School
- **A Cheap Alternative to Remotely Controlled Surveillance Aircraft**
  - Donald Lobeda, Woodson High School
- **Get a Grip!**
  - Kaela Wilbur, Michelle Martin, McLean High School
- **Automating Your Home With RFID**
  - Alan Liu, Kenneth Le, Fairfax High School
- **The Effect of Hydroxide Gas on the Efficiency of an I.C.E.**
  - Bovly Yassa, Peter Bishay, Mina Shawky, Centreville High School

## Environmental Engineering
- **Correspondence of Ground Temperature with Thermal Lift at Altitude**
  - John Moses, Falls Church High School
- **The Effect of UV Purifier Using Filter and Unfiltered Water**
  - Sarah Wasinger, Sujin (Jinny) Kwon, Fairfax High School

## Materials Science
- **Quantum Wells with Enhanced Hole Mobilities**
  - Satvika Kumar, Thomas Jefferson HS for Science and Technology
- **Oxide Supported Platinum Nanocatalysts in Selective Isomerization**
  - Terri Hahn, Madison High School
- **Self-Assembly & Characterization of Films Composed of Gold Nanospheres**
  - Devashis Das, Robinson Secondary School
- **Pressure-Assisted Microwave Sintering Production of Transparent Spinel**
  - Richard Oh, Thomas Jefferson HS for Science and Technology
- **Optimizing Carbon Nanofiber Dispersion with Polymer Wraps**
  - Matthew Barbano, Winston Ou, Thomas Jefferson HS for Science and Technology
# First Place Winners

**Fairfax County Regional Science and Engineering Fair**  
March 22, 2015

<table>
<thead>
<tr>
<th>Category</th>
<th>Title</th>
<th>Winner(s)</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mathematical Science</strong></td>
<td>3D RGB Cloud by Triangulation</td>
<td>Stephanie Mui</td>
<td>Oakton High School</td>
</tr>
<tr>
<td></td>
<td>Connected Matchings in Graphs with Independence Number 2</td>
<td>Jung Yoon Kim</td>
<td>Thomas Jefferson HS for Science and Technology</td>
</tr>
<tr>
<td></td>
<td>The Effect of Dissolved Oxygen on Bioluminescence</td>
<td>Shannen Prindle</td>
<td>Oakton High School</td>
</tr>
<tr>
<td></td>
<td>Invigorating Quorum Sensing in Vibrio fischeri</td>
<td>Ravi Suresh</td>
<td>Madison High School</td>
</tr>
<tr>
<td></td>
<td>How Light Affects the Intelligence of Physarum polycephalum</td>
<td>Hallie Cain</td>
<td>Langley High School</td>
</tr>
<tr>
<td></td>
<td>Quinolone Resistance Genetic Elements in Enterobacteriaceae Isolates</td>
<td>Daniel Chae</td>
<td>Thomas Jefferson HS for Science and Technology</td>
</tr>
<tr>
<td></td>
<td>Imaging of Antibiotic Function on Bacterial Growth and Metabolism</td>
<td>Pranav Balan</td>
<td>Thomas Jefferson HS for Science and Technology</td>
</tr>
<tr>
<td></td>
<td>Multi-Antigen Specific T cells from Seronegative Donors</td>
<td>Aiswarya Nugooru</td>
<td>Chantilly High School</td>
</tr>
<tr>
<td></td>
<td>Lassa Virus Sequence Diversity &amp; Distribution in Sierra Leone</td>
<td>Matthew Park</td>
<td>Thomas Jefferson HS for Science and Technology</td>
</tr>
<tr>
<td></td>
<td>Brewer's Yeast Resistance to X-Ray Radiation</td>
<td>Alexander An, Sharabesh Ramesh</td>
<td>Robinson Secondary School</td>
</tr>
<tr>
<td></td>
<td>Is It Worth It to Buy Pre-washed, Organic Spinach?</td>
<td>Abigail Zellmer, Twyla Lee</td>
<td>Woodson High School</td>
</tr>
<tr>
<td><strong>Physics and Astronomy</strong></td>
<td>Transition to Chaos in a Double Pendulum</td>
<td>Benjamin Brown</td>
<td>Centreville High School</td>
</tr>
<tr>
<td></td>
<td>Resonance Coupling and Wireless Power Transmission</td>
<td>Matt Genberg</td>
<td>Madison High School</td>
</tr>
<tr>
<td></td>
<td>Current Speed Effects on Electromagnet Strength</td>
<td>Max van Buskirk</td>
<td>McLean High School</td>
</tr>
<tr>
<td></td>
<td>The Effect of Temperature on the Speed of Sound</td>
<td>Madeleine Cochrane</td>
<td>South Lakes High School</td>
</tr>
<tr>
<td></td>
<td>The Effect of Distance and Bulb Quantity on Illuminance</td>
<td>Kathryn Noone</td>
<td>Marshall High School</td>
</tr>
<tr>
<td></td>
<td>The Effect of Shape on the Reflection of Light Waves</td>
<td>Cole McCranie, Avery Gibson</td>
<td>Centreville High School</td>
</tr>
<tr>
<td></td>
<td>Spin To Win</td>
<td>Max Heiche, Elijah Rapallo, Samuel Mosquera</td>
<td>Fairfax High School</td>
</tr>
<tr>
<td></td>
<td>The Effect of Sugar Content on the Index of Refraction</td>
<td>Madeleine Rumingan, Calvin Zubaly</td>
<td>Falls Church High School</td>
</tr>
<tr>
<td></td>
<td>The Effect of Geomagnetic Storms on GPS Location Accuracy</td>
<td>Medha Uppal, Lara Kornblut</td>
<td>Langley High School</td>
</tr>
<tr>
<td></td>
<td>The Effect of Conditions on the Throw of a Lacrosse Stick</td>
<td>Jordan Radoll, Alex Gomez</td>
<td>Fairfax High School</td>
</tr>
<tr>
<td></td>
<td>Bubble Oscillation in Vessels and Its Implication on Marine Mammals</td>
<td>Michael You, Andrew Charbonneau</td>
<td>Thomas Jefferson HS for Science and Technology</td>
</tr>
</tbody>
</table>

First Place Winners
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**March 22, 2015**

### Plant Sciences

- **The Effect of Frequencies on Plant Growth**  
  Olivia Updike  
  Oakton High School

- **Effect of Salicylic Acid on Alkaloid Synthesis of Withania somnifera**  
  Abigail McShane  
  Marshall High School

- **The Growth Rate of Algae in Different Levels of Carbonation**  
  Sarah Sheehan, Mary Cheney  
  South County Secondary School

### Robotics and Intelligent Machines

- **Brain-Actuated Robotics: Controlling & Programming a Humanoid Using EEG**  
  Ava Lakmazaheri  
  Thomas Jefferson HS for Science and Technology

### Systems Software

- **The Effect of Temperature on Data Retention in Volatile RAM**  
  Adam Batori  
  Chantilly High School

- **Self Driving Cars and Intersections**  
  Neal Agarwal  
  Chantilly High School

- **An Algorithm to Analyze the Single-Molecule Manipulations of DNA**  
  Vishal Mummareddy  
  Oakton High School

- **Gathering and Analyzing Twitter Data to Predict Stock Returns**  
  Dhruv Gupta, Srijith Poduval  
  Thomas Jefferson HS for Science and Technology

- **A Contact Tracing System Utilizing Intercellular Proximities**  
  Rohan Suri, Clarissa Scoggins  
  Thomas Jefferson HS for Science and Technology