
Dongrun-Yau Science Awards in Mathematics

by Hongwei Xu and Jung-Kai Chen

Dongrun-Yau Science Awards in Mathematics

(Formerly known as the S.-T. Yau High School Mathematics Awards.)

Sponsored by Professor Shing-Tung Yau and Dongrun Foundation, the final selection for the Dongrun-Yau Science Awards in Mathematics took place on December 11 and 12, 2015. The awards ceremony was held in Beijing on December 12, 2015.

The Dongrun-Yau Science Awards in Mathematics (formerly known as the S.-T. Yau High School Mathematics Awards) were established in 2008 to encourage high school students worldwide to participate in project-based competitions in mathematical sciences. 2015 was the eighth year of the program. Following is the list of winners of 2015 Dongrun-Yau Science Awards in Mathematics.

Gold Awards

School: No. 2 Secondary School Attached to East China Normal University
Members: Zhenhua Liu
Adviser: Zhongyuan Dai
Title: An Asymptotic Formula in Number Theory

Silver Awards

School: High School Affiliated to Fudan University, Pudong Campus
Members: Zihong Chen
Adviser: Junjie Wen
Title: On the evaluation of some infinite series

School: High School Affiliated to Shanghai Jiao Tong University

Members: Deshu Chen

Adviser: Lei Hou

Title: Investigation on a Class of Infinite Number Sequences Which Satisfy Benford's Law

School: Neuqua Valley High School, USA

Members: Sarvasva Raghuvanshi

Adviser: Stephen S.-T. Yau

Title: A Proof of the Yau Geometric Conjecture in 6 Dimensions

Bronze Awards

School: Beijing National Day School

Members: Jianyou Wang

Adviser: Guoshuang Pan

Title: Estimate of the electric potential outside a bounded charged conductor

School: Beijing 101 Middle School

Members: Guangyuan Zhu

Adviser: Jianyu Liu

Title: Study on High-dimensional Extension of Pick's Theorem

School: Dongguan Middle School, SSL School

Members: Tao Li

Adviser: Dongsheng Wen

Title: Some New Littlewood-Type Inequalities

School: The Affiliated High School of SCNU

Members: Ziyuan Lv, Yuyu Guo

Adviser: Jizhu Wei

Title: Probability of an Acute Triangle in the Two-dimensional Spaces of Constant Curvature

School: Shenzhen High School

Members: Zhe Kong, Yilin Ye

Adviser: Wentao Zhang
Title: Three Generalizations of the Secretary Problem

School: Woodbridge High School, USA
Members: Spencer Sheen
Adviser: Hongkai Zhao
Title: A Coordinate Descent Method for Robust Matrix Factorization and Applications

Honorable Mention

School: No. 2 Secondary School Attached to East China Normal University
Members: Licheng Hua
Adviser: Zhongyuan Dai
Title: Further Research of Tianji Horse Racing

School: Nanjing Foreign Language School
Members: Chunyang Xie, Zicen Pan, Yuqi Zhang
Adviser: Yang Gao
Title: A Study on Prediction Algorithms for Yu'EBao Capital Flow

School: The Affiliated High School of Peking University
Members: Weichen Gao, Cheran Sun
Adviser: Zhichao Shan
Title: The Rationality of the Vertices of a Regular Simplex or Semiregular Simplex in R^n or LP-space over R^2

School: Han Dan No. 1 High School
Members: Yuxuan Yang
Adviser: Xinding Xi
Title: A Study of the Approximation of e

School: Dalian Jinzhou Senior High School
Members: Hengjia Zhang
Adviser: Jie Li
Title: Study on a Type of Geometric Iteration

School: Guangdong Experimental School
Members: Hongzheng Chen, Zhihan Li, Mingwei Chen
Adviser: Wanfeng Liang
Title: On Concurrent Lines Related to Miquel Points

School: Shenzhen High School
Members: Yuepeng Yang
Adviser: Wentao Zhang
Title: A Hypothesis Testing Method Based on Sample and Two Types of Errors

Dongrun-Yau Science Awards (Mathematics)

(Formerly known as the S.-T. Yau High School Mathematics Awards.)

Sponsored by Professor Shing-Tung Yau and Dongrun Foundation, the final selection for the Dongrun-

Yau Science Awards in Mathematics took place on December 16 and 17, 2016. The awards ceremony was held in Beijing on December 17, 2016.

The Dongrun-Yau Science Awards in Mathematics (formerly known as the S.-T. Yau High School Mathematics Awards) were established in 2008 to encourage high school students worldwide to participate in project-based competitions in mathematical sciences. 2016 was the ninth year of the program. Following is the list of winners of 2016 Dongrun-Yau Science Awards in Mathematics.

Gold Awards

School: Guangdong Experimental High School
Members: Shilun Li
Adviser: Yidong Wu
Title: A Class of Convex Curves Arising in Capillary Floating Problem

Silver Awards

School: Tsinghua University High School
Members: Zehan Hu, Zeyu Wang
Adviser: Qingming Yang and Xianfeng Gu
Title: Voronoi Diagrams on Line Networks and Their Applications

Bronze Awards

School: Shanghai high school
Members: Junhao Fan
Adviser: Bin Gu
Title: On the decomposition of sets of consecutive integers

School: Affiliated Middle School of South China Normal University
Members: Jianxiang Tan, Zhiyuan Zhang
Adviser: Xinghuai Li
Title: Brocard Conguration in q -period Loop Broken Line

School: International School of Boston, USA
Members: Bella Gu
Adviser: David Xianfeng Gu
Title: Geometric Compression Based on Ricci Flow and Monge-Ampere Equation

Honorable Mention

School: Affiliated Middle School of South China Normal University
Members: Wensen Wu
Adviser: Jingwei Ge
Title: Constructing Evans triangle with Pell equation

School: Tsinghua High School
Members: Zhiming Feng

Adviser: Jianchuan Zeng
Title: Counting the number of permutations with longest increasing subsequence of a certain length

School: Jinling High School
Members: Zichong Chen
Adviser: Yunbiao Liu
Title: The Number of Subtrees of Trees with Given Diameter

School: Tsinghua University High School
Members: Honglin Zhu, Jinyi Wang
Adviser: Qingming Yang
Title: The Extension of Euler's Formula and Its Applications

School: Hangzhou Foreign Languages School
Members: Yibin Zhang, Xiaoyang Sun, Zhiyuan Fan
Adviser: Dongbo Lu
Title: Acute Triangulation of Rectangles

Consolation Prize

School: High School Affiliated to Shanghai Jiaotong University
Members: Jianwen Luo
Adviser: Yunhe Chen
Title: Infinite-Dimensional Generalizations of Orthogonal Groups over Hilbert Spaces: Constructions and Properties

School: High School Affiliated to Zhejiang Normal University
Members: Chenxi Li
Adviser: Yudong Shen
Title: Virtual Magnifying Glass Based on Optimal Mass Transportation

School: Guangdong Experimental High School
Members: Leiyu Gong
Adviser: Junjie Zhang
Title: Lehmers Totient Problem over $Z/p^nZ[x]$

School: Chengdu Experimental Foreign Languages School
Members: Zihan Zhang
Adviser: Dongchun Han
Title: On Prime Elements in Arithmetic Progressions and Riemann Hypothesis over Function Fields

School: The Affiliated High School of Peking University
Members: Weichen Gao
Adviser: Shengjing Sang
Title: Motion in Quantum-Classical Transition via ODM

School: Tsinghua University High School
Members: Wentao Zeng, Yuhong Ning, Jiayu Ma
Adviser: Yachao Qi

Title: Establishment and Numerical Solution of Differential Equations for the Composition of Multiple Free Radical Copolymer

School: Danbury Math Academy
Members: Sarah Zhao
Adviser: Xiaodi Wang
Title: Color QR Code with Pseudo Quantum Steganography and M-band Wavelet and Patch Group Prior based Denoising

S-T. Yau High School Mathematics Awards in Taiwan

In the year 2009, Professor Shing-Tung Yau initiated to hold an annual mathematics competition for high school students in Taiwan, aiming to promote intellectual discovery and to stimulate scientific creativity among the youth of Taiwan. This idea was made possible thanks to the generous support from Dr. Fan-cheng Tseng, the Vice Chairman of TSMC. Each team shall consist of one student and shall be led by a teacher. Even though the student may receive some advice from the teacher, it is required for the student to perform an independent study. The topic can be any problem in pure or applied mathematics of any level. There is no limitation of the mathematical machinery involved in the research, however, the student must demonstrate his command of the tools that were exploited.

Among all teams, about eight to twelve teams was advanced into the final competition each year. There will be:

1. One Gold Award, which is NTD 60,000 for the student and NTD 30,000 for the teacher.
2. Up to three Silver Awards, which are NTD 40,000 for each student and NTD 20,000 for each teacher.
3. Honorable Mentions, which are NTD 20,000 for each student and NTD 10,000 for each teacher.
4. One Judge's Award, which is NTD 5,000 for each student.

A school will receive Excellent Group Award if there are more than two awardees from the same school and at least one of them is awarded Gold or Silver medal. The awardees of Gold Award and Silver Award will receive scholarship up to NTD 480,000 and NTD 240,000 respectively if they major in Mathematics or Applied Mathematics during their studies in university.

The award has stimulated young students for mathematical studies. Many of the awardees and participants chose to major in mathematics at the end. The Award also drew lots of attention from the society. For example, the touching story of the 2012 gold medalist Che-Kuan Su was on TV and the interesting

works of every year's gold medalist and silver medalists appeared in all major newspaper.

Gold Award, 2015

Prize not awarded.

Silver Awards, 2015

Title: Mora Evolution- use Recursive Series to Describe the Process of the Game

Member: Shao-Hong Yang

School: Taipei Municipal Chien-Kuo High School

Title: On the Geometrically Invariant Property of the Sum of the Ratios of the Directed Segments Ob-

tained by Connecting the Vertices of the n-Polygons and Polyhedrons with a Fixed Point

Member: You-Jun Chuang

School: National Lu Kang Senior High School

Gold Award, 2016

Title: On Sub-squares in Latin Squares

Member: Wei-Chun Kao

School: National Taichung First Senior High School

Silver Award, 2016

Title: Arithmetic Progresses in Thue-Morse Sequences

Member: Yuan-Rong Chuang

School: National Tainan Girl's Senior High School