

# Welcome

The students of Abby Brown's Calculus C, Calculus D, Linear Algebra and Advanced Topics classes have had the unique opportunity to explore advanced mathematical concepts through a joint program with San Diego State University. Each class is taught with the rigor and discipline expected of college-level math courses, with a particular emphasis on projects and presentations, which are showcased today.

Students have extended applications of algebra, geometry, trigonometry, and calculus across a broad spectrum of topics, including physics, biology, chemistry, music and games. The large variety of projects on display is the result of months of exploration and academic growth, and tonight is a celebration of everything we have learned.

PLEASE ENJOY YOUR VISIT

## projects (cont).

**Kiya Klopfenstein & Minha Kim**  
Cracking the Matrix  
Linear Transformations and Cryptography

**Lauren Scheg & Vanessa Beeler**  
A MASSively Useful Application  
Triple Integrals

**Nicole Martindale & Solana Garcia**  
Astronomical Activity  
Kepler's Laws

**Nikhil Dutt & Sahil Ahuja**  
Keeping you Warm  
Max./Min. Values

**Rachel Lian & Erica Hwang**  
The Design of Billiards  
Curve of Intersection

**Richard Li & Russell Chiang**  
Disease Detectives  
Double Integrals and Differential Equations

**Ryan Lin & Thomas Freedman**  
Fourier Follows Function  
Fourier Series

**Sage Templeton & Skylar Jung**  
(not-so) Basic Colors  
RGB Colors

**Shayla Parthasarathy & Stacy Hu**  
Don't Be a Boron  
Matrix Algebra

## A Special Thanks To:

Torrey Pines High School  
Associated Student Body  
National Honor Society  
Administration Team  
Custodial Staff  
TPHS Teachers

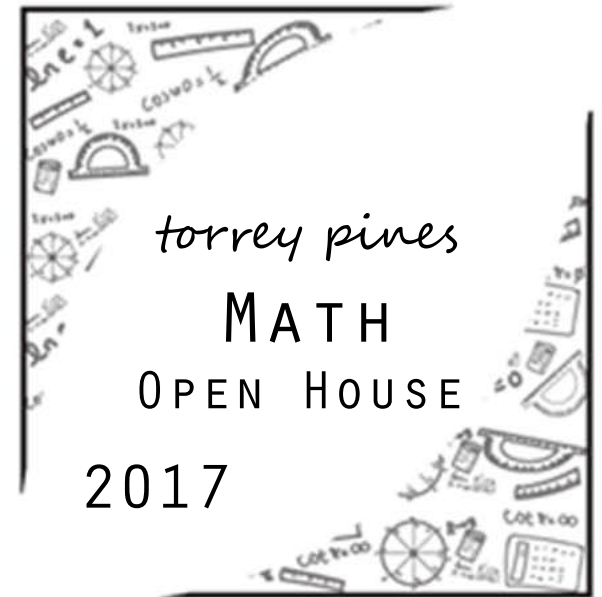
SDSU Professors

Family, Friends, and  
Community Members

Our teacher, Ms. Abby Brown

**Event Coordinators:**  
Lauren Oh  
Carine You

**Graphic Designers:**  
Daniel Kluzner  
Jodie Hoh



TUESDAY, MAY.30.2017  
6.30 TO 8.00 PM  
TORREY PINES HIGH SCHOOL

*projects by*  
Calculus C/D  
Calculus D/Linear Algebra  
Advanced Topics

# projects

**Alexander Weyant**  
Plane of Water  
Inner Products &  $du/dv$   
Maps

**Alice Jin**  
People Multiplication  
Population Growth

**Amy Yu**  
Starry Night  
Turbulence in Art

**Ananth Rao**  
Volume of a Frustum  
Polar Triple Integrals

**Andrea Moore**  
Hungry Cow  
Area Under Parametric  
Curves

**Andrew Miller**  
Volumes of Hyperspheres  
Multiple Integrals

**Anisha Tyagi**  
Carbon Chaos  
Environmental Science

**Benjamin Singer**  
Predicting Stock Prices  
Black Schoels Model

**Carine You**  
In Tune with  
Mathematica  
Musical Analysis

**Caroline Zhang**  
Exo-cellent Exoplanets  
Exoplanet Detection

**Daniel Kluzner**  
Gravity Defying Motion  
Velocity and Acceleration  
Vectors

**Derek Fu**  
Big fish, Small fish  
Differential Equation

**Dimei Wu**  
Wrong  
Information Graphics

**Emily Hou**  
Fitting In  
Regression Analysis

**Esha Madhekar**  
PiMatic  
Raspberry Pi Car Control

**Evan Martin**  
Tennis Ball Trajectories  
Projectile Motion

**Geffen Cooper**  
Center of Mass  
Double Integrals

**George Zhang**  
Bounce With the Bungee  
Differential Equations

**Halton Pi**  
A Brain, but not  
Neural Networks

**Ian Kirk**  
Dice Dice Dice!  
Platonic Solids

**Ivy Huang**  
Binary Phase Diagrams  
Materials Science

**Jenny Li**  
The Walkman  
2D Animation

**Jeremy Lin**  
Between the Planes  
Vectors and Planes

**June Kim**  
League of Legends  
Double Integral in Polar  
Coordinates

**Kevin Lin**  
Spiraling into Chaos  
Spirals/Mandelbrot  
Sets/AreaCalculator

**Kien Le**  
LEGO  
Geometry/3D Printing

**Kimberly Madsen**  
Lagrange Launch  
Lagrange Multipliers

**Kyle Xiao**  
Applications of Second  
Order Differential  
Equations  
Differential Equations

**Lauren Oh**  
Steadying the Stars: The  
Orbit-Stabilizer Theorem  
3D Polyhedra

**Longinus Pun**  
Lights Out  
Lights Out Game

**Luke Jung**  
Google Home  
Mathematica  
Mathematica API

**Madeline Song**  
The Gene Machine  
Bioengineering

**Mary Maas**  
The Calculus and Physics  
of Rain  
Differential Equations

**Matthew Rosenfield**  
Fixing Shaq's Free Throw  
Arc Length & Projectile  
Motion

**Mei Adachi**  
Bloody Calculus  
Integration

**Michelle Hsiao**  
Insane in the MemBrain  
Biology and Neuroscience

**Neil Bhattacharjee**  
Title  
Subject

**Nishanth Krishnan**  
DNA Scissors  
3D Modeling, Biology

**Patricia Ouyang**  
Buzzer Demonstration  
Physics

**Peter Cha**  
Machine Learning with  
Rap  
Machine Learning

**Raymond Wang**  
Calculating Biodiversity  
Diversity Indices

**Reagan Kan**  
Multiple Applications of  
Multiple Integrals  
Integral Applications

**Richard Ni**  
Music Improvisor  
Advanced Topics

**Robin Kong**  
The Physics in Music  
Acoustics, Music

**Sagar Gollamudi**  
Circuit Analysis  
Advanced Topics

**Shishir Reddy**  
Note Detection and  
Noise Reduction  
Signal Processing

**Shyama Yallapragada**  
Doubles on the Court  
Double Integrals

**Stacy Kong**  
Laser Shoot  
Optics

**Sungjin Park**  
Jumpman Jumpman  
Game Design

**Sydney Poh**  
Special Relativity  
Physics

**Will Nute**  
Fast and Furious  
Cycloids and the  
Brachistochrone

**Aditya Guru & Rohith  
Kodukula**  
Doppler Effect  
Chain Rule

**Alan Edmonds & Robert  
Bartsch**  
Echo-nomics  
Infinite Geometric Series

**Alderik van der Heyde  
& Elijah Gross-Sable**  
Disastrous Derivatives  
Directional Derivatives

**Alicia Moore &  
Christina Patricia**  
Destruction? Saved!  
Gradients

**Amanda Yuan &  
Jonathan Kuo**  
SIR Modeling: Disease  
Differential Equations

**Amy Jeon & Marya Rana**  
Illusion Confusion  
Optical Illusions

**Ananya Krishnan & Ezra  
Bisom-Rapp**  
This Project is Trash  
Optimization

**Annie Zhou & Julia  
Zhou**  
A Limit on Extrema  
Extrema/Gradients

**Anvitha Soordelu &  
Ye Rin You**  
C [hill]ing with Bill  
Gradients and Partial  
Derivatives

**Brian Kang & Seong Cho**  
Stokes' Syrup  
Stokes' Theorem

**Brittany Jiang & Maya  
Kota**  
Bee-Yonce  
Gradients, Vectors,  
Directional Derivatives

**Cathy Lu & Derek Xiao**  
Spin Spin Chop Chop  
Wind Power

**Deepthi Gangiredla &  
Neelakshi Patne**  
Caffeinated Calculus  
Triple Integrals

**Eitan Myron & Elyas  
Sarwary**  
The Change in Volume of  
an Ideal Gas  
Chain Rule

**Elane Moon & Frank  
Lee**  
Language Lines  
Linguistics

**Ethan Valdes & Kathy  
Wang**  
B-Positive! :-)  
Partial Derivatives

**Evan Pasko & Ryan  
Zhou**  
Volleyball Vectors  
Vector Valued Functions

**Frank Liao & Jonathan  
Wang**  
Music Machine  
Music

**Gitanjali Multani &  
Priyanka Multani**  
Fight like a Girl  
Biomedical Applications

**Grace Lee & Jessica  
Schwabach**  
Star Power!  
Vectors and Forces

**Ilana Mereminsky  
& Jake Garcia**  
Finding Rates with  
Ohm's Law  
Related Rates

**Isaac Gelman  
& Simon Kim**  
The Roller Derby  
Moments of Inertia

**Jacalyn Li & Patrick  
Zhuang**  
The Power of  
Imagination  
Complex Numbers

**Jing Cheung & John Hsu**  
CSI 101  
DNA Testing

**Jodie Hoh & Kevin Ren**  
Origami Algorithm  
Geometry

**John Bae & Ryan Reed**  
Math! Lasers! Math  
Lasers!  
Level Curves

**Jonathan Farmer &  
Trent Greenman**  
Triple Coordination  
Triple Integrals

**Kalyani Ramadurgam &  
Mihika Nadig**  
Eigenfaces in  
Mathematica  
Image Processing

**Kalyn Klimek &  
Kathleen Chang**  
StarBurst  
Infinite Series

**Karina Camp & Mona  
Roshan**  
Dynamic Donut Duo  
Related Rates

**Kevin Hu & Peter Liu**  
Koch, not even once  
Infinite Series

**Kiara McNulty & Sophia  
LeRose**  
Sporting Calculus  
Vector-Valued Functions