conference.program

11.1.16

9am

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| Title | Presenter Notes |

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| **Mezzanine Lounge** | with Prof. Lou Braida | | | |
| How Accurate is a Drug Test? | Maria Messick 0 1 \* | | | |
| Depth First Search: Using Computers to Intelligently Solve Mazes | | | Aritro Biswas 1 1 \* | |
| Origami Folding Algorithms: Unveiling the Mystery Behind Folded Structures | | | | Lisa Deng 1 \* | | |
| Prisoner’s Dilemma: Beating out your competition | Elizabeth Eastman 1 \* | | | |
| Counting Cards: How Google Analyzes a Billion People’s Data | | Hunter Gatewood 0 1 \* | | | |
| **Twenty Chimneys** | with Emily Zhang | | | |
| Let’s Make Things Spin! How Electric Motors Work | Priya Kikani 01 \* | | | |
| (no title) | Nicholas Matthews 01 \* | | | |
| Callbacks in Computer Science: Stop Waiting Around! | Sean Soni 1 \* | | | |
| (no title) | Alexander Smith 07 \* | | | |
| (no title) | Christopher Desnoyers 07 \* | | | |

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| **PDR 1** | with Professor Leslie Kolodziejski | |
| PageRank: How Important is Your Website? | | Michelle Lauer 1 9 \* | |
| Optimizing an algorithm (Fibonacci) | | Sharon Kipruto 9 \* | |
| Operating Systems | | Rachel Lathe 9 \* | |
| How the Internet Works | | Ruth Park 9 \* | |
| How do we convey the glass without touching surface? | | Taeyoung Yoon 9 \* | |

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| **Lobdell Balcony** | with Remi Mirkat | |
| Dealing with a heap of money like a computer scientist | John La 8 < | |
| How to Win at Poker: Counting Strategies | | Suri Bandler 7 < |
| How to get Obama’s email | Luana Lopes Lara 9 \* | |
| How Hacking a Computer is Just Like Robbing a House | Andrew Montanez 07 \* | |

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| **Coffeehouse Lounge** | with Professor Collin Stultz and Phoebe Tse | | |
| The Universe: How we got to Now | | Christian Cardozo Aviles 17 \* | |
| Copy/Paste, Counterpoint, and Classical Music | | | Alexander Campillanos 17 \* |
| Thanks for the Memory ft. Dynamic Programming | | | Kelsey Chan 17 \* |
| How does the Internet seem to always keep you online? | | | Dayanna Espinoza-Silva 17 \* |
| Onion Routing: Maintaining Anonymity on the Internet | | | Henry Tareque 17 \* |

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| **PDR 2** | with Professor Dirk Englund | | | |
| How to Bet on Anything | | Jerry Wu 28 \* | | |
| The Physics of the MOSFET | | | Joshua Sloane 27 \* | |
| Introduction to K-Means Clustering | | | Aasavari Phanse 27 \* | |
| RSA Encryption (Or how to pass secret notes in class!) | | | Abigail Russell 28 \* | |
| Trains and Tumors: Understanding the Genes that Cause Cancer | | | | Evan Crane 027 \* |

10am

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| Title | Presenter Notes |

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| **Coffeehouse Lounge** | with Professor Collin Stultz |
| Strobe Photography: Capturing the Instantaneous | David Houle 18 \* |
| Organizing Your Music Library | Ziad Baaklini 18 \* |
| How to Get Through a Corn Maze | Connie Siu 18 \* |
| How Computers Learn Words Without Being Taught | Zygimantas Straznickas 18 \* |
| Evolution of Encryption | Ryan Stuntz 18 \* |

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| **Lobdell Balcony** | with Phoebe Tse and Remi Mirkat | |
| Bitcoin Trading with Bayesian Regression | Anvita Pandit 18 \* | |
| Things we know we can’t know | Trevor Henderson 08 \* | |
| How to Create Panoramic Images Using Computer Vision | Jose Zuniga 18 \* | |
| WARNING! Race Conditions May Result in Unpredictable Programs | | Nicole OBrien 10 \* |
| How Your Favorite iPhone and Web Apps are Built | Kevin Shum 10 \* | |
| Matter and Space | Brindha Kannan 18 \* | |

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| **PDR 1** | | with Professor Leslie Kolodziejski | | | | | | |
| Space-time and Baseball | | | | | Zachary Hulcher 10 \* | | | |
| (no title) | | | | | Geoffrey Gilmore 10 \* | | | |
| Sending Secret Messages Using Simple Ciphers | | | | | Karleigh Moore 10 \* | | | |
| Putting Everything in Order – How Computers Sort Things | | | | | Jade Philipoom 10 \* | | | |
| (no title) | | | | | William Roddenberry 10 \* | | | |
| Letting Computers Diagnose Your Illness: Intro to Rule-Based Systems | | | | | | | Laura Ting 10 \* | |
| **Mezzanine Louge** | | | with Professor Lou Braida | | | | | |
| Qubits: A New Way to Compute | | | Bennett Amodio 2 \* | | | | | |
| Ray Tracing: Generating Realistic Images by Taking Photos in Reverse | | | | | | | Nathan Gutierrez 2 \* | |
| RAFT: Helping Your Mars Rovers Communicate | | | Carlos Henriquez 2 \* | | | | | |
| Kolmogorov Complexity: Why most sequences can’t be easily described | | | | | | | | Lisa Zahray 2 \* |
| (no title) | | | Annie Phan 2 \* | | | | | |
| **Twenty Chimneys** | with Emily Zhang and Robert Ramirez | | | | | | | |
| Strobes – Making Objects Stand Still | | | Elaine Lin 2 < | | | | | |
| How your computer gets Google’s IP Address | | | Zachery Miranda 2 \* | | | | | |
| How to Keep Track of Spare Parts | | | Will Reyes 2 \* | | | | | |
| Language from a Machine’s Perspective | | | Justine Jang 22 \* | | | | | |
| How to Move Video Game Characters | | | | | | John Stephens 22 \* | | |
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| **PDR 2** | | | | with Professor Tomas Palacios | | | | |
| How to Win a Game Show | | | | | | Arezu Esmaili 22 \* | | |
| Breaking Down Words with Friends | | | | | | Garron Charles 22 \* | | |
| Molecular self-assembly: how to easily design nanoparticles  Network Flow: What Rivers and Baseball Playoffs Have in Common  Finding the Signal Recipe: The Basics of the Fourier Transform  Complexity: Knowing How Fast Your Code Is…. Before You Write It | | | | | | Anastasia Dosca 22 \*  Theron Nipson 22 \*  Sienna Ramos 22 \*  Jose Salazar 22 \* | | |
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11am

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| Title | Presenter Notes |

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| **PDR 2** | with Professor Tomas Palacios | | |
| Word Scoring: How Autocorrect Chooses the Right Match | | Jacqueline Liu 23 \* | |
| How does it feel to be in charge of an airline? Solving airline scheduling with flow networks | | Suyash Fulay 23 \* | |
| BitHacks: Tweaking the Nuts & Bolts of a Computer Program | | Isaac Garza 23 \* | |
| Hierarchical Modeling: How Computers Transform Bodies in Animation | | | Selina Leung 23 \* |
| Shining a Light on Solar Panels  Infinite Money: The Two Envelope Paradox | | Elizabeth Schell 23 \*  Katie Sedlar 23 \* | |

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| **PDR 1** | with Professor Leslie Kolodziejski | |
| The Tower of Hanoi Puzzle | | Nadia Lucas 11 \* |
| (no title) | | Kathy Camenzind 11 \* |
| How DNA Sequencing Works | | Isabel Chien 11 \* |
| From Points to Curves: How Computers Draw Art | | Catherine Li 11 \* |
| (no title) | | Dora Tzeng 11 \* |

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| **Lobdell Balcony** | with Phoebe Tse and Emily Zhang | | | |
| How Feedback Helps You Cruise Across the Country | | | | Wei Low 23 \* |
| Drawing with Bezier Curves: The Math Behind Pixar | | | | Christina Sun 23 \* |
| How to Communicate Quickly and Efficiently: For top secret missions or just loading Facebook | | | | Marisa Rozzi 11 \* |
| How computers see images | | | | Vickie Ye 11 \* |
| Git Version Control  K-Means: From data to knowledge | | | | Megan Gebhard 7 \*  David Mayo 28 \* |
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| **Mezzanine Lounge** | | with Professor Lou Braida | | |
| (no title) | | Yanqi Chen 3 \* | | |
| LZW Compression: How to Say More with Less | | Xuan Bui 3 \* | | |
| How to Make a Pixar Movie | | Evan Denmark 3 \* | | |
| Onion Routing: How to Cleverly Communicate Covertly | | Michael Feffer 3 \* | | |
| Classification Trees: WHAT ARE THOOOSE? | | Daniel Lerner 3 \* | | |

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| **PDR 4** | with Jason Tong and Yola Katsargyri | |
| Subtle Bragging: Multi-party Computation and How it Works | Daniel Shaar 3 \* | |
| How to Simulate the Universe | Ethan Witt 3 \* | |
| Market Making: Easy Money? | Brian Saavedra 3 \* | |
| Minimax: How Computers Beat Grandmasters at Chess | David Zheng 13 \* | |
| Using Bayes’ Rule to Model How Humans and Robots Think | | Madeleine Severance 13 \* |

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| **Twenty Chimneys** | with Professor Joe Steinmeyer |
| Simultaneous Localization and Mapping | Mubarik Mohamoud 13 \* |
| Cyberspying without code | Corey Cleveland 13 \* |
| Virtual Memory: Stop Apps from FIghting | Julian Delerme 13 \* |
| Network Centralities: Who is important? | Alex Luh 13 \* |
| Fiber Optics: Connecting the World with Light  How to catch a Pokémon? | Alan Medina 13 \*  Sudhanshu Mishra 13 \* |

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| **Coffeehouse Lounge** | with Professor Collin Stultz | |
| Dealing with a Noisy World: Fourier Transforms and Filters | David Gomez 19 \* | |
| Let it Crash: Handling the unpredictable in computer programs | | Aneesh Agrawal 19 \* |
| The Future of Wireless Charging | Oscar Guevara 19 \* | |
| Strategies for Two Player Games | Steven Hao 19 \* | |
| How to Share Nuclear Launch Codes (and Other Secrets) | Linda Liu 19 \* | |
| (no title) | Julia Wu 19 \*  \* | |

12pm

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| Title | Presenter Notes |

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| **Coffeehouse Lounge** | with Professor Collin Stultz | | | |
| (no title) | Christina Martinez-Acha 20 \* | | | |
| How to Make Your Car Fast and Furious | | | Rita Ainane 20 \* | |
| The Vector Space Model (Or What You Should Watch Next on Netflix) | | | | Rebekah Bell 20 \* |
| Singular Value Decomposition: Capturing the essence of a picture | | Osmany Corteguera 20 | | |
| Understanding Radix Sort | | | Chandani Doshi 20 \* | |
| Simpson’s Paradox: Who gets more dates: Me or Brad Pitt? | | | Fernando Varela 20 \* | |

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| **PDR 1** | with Robert Ramirez and Emily Zhang | |
| Git-ting Smart With Your Files: How to Rage At Your Computer Just A Little Less | | Gregory Young 08 < |
| Size Matters | | Kevin Ng 24 \* |
| Mathematical Multitasking: In Pursuit of Better Graphics | | Andrew Reilley 24 \* |
| Conditional Probability and the Monty Hall Problem | | Jessica Fang 19 \* |
| Prisoner’s Dilemma: Why you should never trust your partner | | Mesert Kebed 08 > |

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| **Twenty Chimneys** | with Professor Joe Steinmeyer | | |
| Saving Society with Semaphores | | Anne Kelley0 14 \* | |
| (no title) | | Samantha Fierro 014 \* | |
| The Monty Hall Problem | | Cavin Mozarmi0 14 \* | |
| (no title) | | Nischal Nadhamuni0 14 \* | |
| Quantum Mechanics and You | | Narindra Peaks 14 \* | |
| The Pigeonhole Principle & Beyond: Proofs About Socks, Oranges, & Hair | | | Elysa Kohrs 14 \* |

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| **PDR 4** | with Yola Katsargyri and Jason Tong |
| How Do Bots Move So Fast? | Michael Shum 04 \* |
| Cross Site Scripting Attack | John Mikhail 04 \* |
| In Bitcoin We Trust | Nchinda Nchinda 04 \* |
| How Video Game AI Works | Raoul Khouri 014 \* |
| Handling Concurrent Conversations with CDMA | George Liang 14 \* |

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| **Mezzanine Lounge** | with Professor Lou Braida | |
| The Pirate Game: Distributing Treasure | Stuart Finney 4 \* | |
| As Fast as a Speeding Bullet | Travis Herbanek 4 \* | |
| Divide and Conquer: Solving Hard Problems by Solving Easy Ones | | Alex Huang 4 \* |
| How can multiple people share the same communication medium? | | Alex Latham 14 \* |
| Data Buffers, or How Your Youtube Videos Load | Yuge Ji 14 > | |

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| **PDR 2** | with Professor Tomas Palacios | | |
| The FPGA: a million computers in one | Angus MacMullen 24 \* | | |
| Keeping Track of a Computer’s Kids | Famien Koko 24 \* | | |
| Count to infinity and beyond | Cheuk Lee 24 \* | | |
| How computers efficiently store different versions of your To-Do lists | | | Bristy Sikder 24 \* |
| Error Correcting Codes: Conveying Info with Greater Accuracy | | Kevin Yang 24 \* | |
| Scaling: Solving large problems one step at a time | Sagnik Saha 24 \* | | |

1pm

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| Title | Presenter Notes |

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| **Mezzanine Lounge** | with Professor Dirk Englund | |
| Editing DNA with CRISPR Scissors | | Helen Abadiotakis 25 \* |
| AlphaGod: How the Machine beat the Man | | Kai Aichholz 25 \* |
| Shortest-Path Finding | | Benjamin Lin 27 \* |
| Detecting Fake Data: Benford’s Law | | Tomas Calderon 28 \* |
| Grocery Shopping: The Bin-Packing Problem | | Kai Xiao 28 \* |
| How to win a billion bucks | | Alfredo Yanez 28 > |

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| **PDR 4** | with Yola Katsargyri |
| How Concepts Help Us Understand Data Storage | Kayode Ezike 25 \* |
| Quantum Cryptography: The Unbreakable Cipher | Brandon Sanchez 025 \* |
| Making Multiplication Faster with the Karatsuba Algorithm | Jennifer Tylock 25 \* |
| Using Your Cache Wisely | Douglas Kogut 025 \* |
| Why our planet is doomed: A look into Game Theory | Julian Ranz 25 \* |
| Magnetic Circuits | Tianye Chen 25 \* |

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| **PDR 2** | with Tomas Palacios | |
| Bitcoin: Magical Digital Money | Natalie Coleman 21 \* | |
| Compression: More information: less space | Joren Lauwers 021 \* | |
| Binary Search Explained: As Easy as Finding Words in a Dictionary | | Gustavo Montalvo 021 \* |
| AJAX: Stronger Than Long Load Times | Chris Womack 21 \* | |
| First-Order Circuit Filters | Juan De Jesus 21 \* | |

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| **Coffeehouse Lounge** | with Professor Kimberle Koile |
| Reverse Engineering Smoothies with Math | Phillip Cherner 5 \* |
| How to Control Almost Anything | Douglas Chambers 0 5 \* |
| Why Wheels Do Strange Things On Camera | Israel Donato-Ridgley 5 \* |
| (no title) | Jakob Weisblat 0 8 \* |
| Hash Functions: Speedy Searches for Quicker Computers | Harrison Okun 5 \* |

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| **PDR 3** | with Sarah Tortorici and Robert Ramirez | |
| Efficiently Find That Thing You’re Looking For | | Katie Marlowe 5 \* |
| How to get from Stanford to MIT as quickly as possible | | Rachel Rotteveel 0 5 \* |
| Reduced Size Without Reduced Detail: Reduced Repitition | | Daniel Solomon 5 \* |
| Particle Systems: Wow, that Water Looks Real! | | Reece Tamashiro 0 5 \* |
| Time Travel with Special Relativity | | David Campeau 21 \* |
| Adversarial Search: How Computers Play Games | | Jeremy Wright 21 \* |

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| **Twenty Chimneys** | with Professor Joe Steinmeyer |
| How Brain Cells Communicate – Why we laugh, learn, and love | Runpeng Liu 16 < |
| How can we measure a car’s speed using an on-board camera? | Banti Gheneti 15 \* |
| How to Send Secret Information | Lotta Blumberg 015 \* |
| How to Share a Secret | Brandon Carter 15 \* |
| Image Filtering Made Easy | Sara Stiklickas 015 \* |

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| **PDR 1** | with Jason Tong | |
| The New Password: Your Eyes | Joanna Han 15 \* | |
| Is Time Actually Money? | Nicole Lu 015 \* | |
| What is Pipelining? Do Laundry Faster and Make Netflix Load More Quickly | | Lorenzo Vigano 15 \* |
| Computer Vision for Dummies | Pravina Samaratunga 016 \* | |
| How to count Skittles quickly with MapReduce | Dang Pham 16 \* | |

2pm

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| Title | Presenter Notes |

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| **Mezzanine Lounge** | with Professor Dirk Englund | |
| (no title) | | Tyler Finkelstein 26 \* |
| Understand and Fix Your Slow Wifi | | Reo Baird 26 \* |
| (no title) | | William Navarre 28 \* |
| Rule-based systems: A sneak peek into Artificial Intelligence | | Adarsh Jeewajee 27 \* |
| Skip Lists – Express Trains for Lists | | Botong Ma 27 > |

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| **PDR 4** | with Yola Katsargyri | |
| Long Distance Radio Communications or How Do Our Satellites Phone Home? | Alex Sloboda 26 \* | |
| Collect Data Lazily, Get Away With It | Descartes Holland 026 \* | |
| Tell a Lie Often Enough… | Arman Rahman 26 \* | |
| Collisions in Storage: How Pigeonhole Principle Shows they are Inevitable | | Tim Zhong 026 \* |
| Parkinson’s Evil Twin | Michael Castano 26 \* | |

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| **Twenty Chimneys** | with Professor Leslie Kolodziejski | | |
| (no title) | | Ismael Gomez 12 \* | |
| (no title) | | Diego Cornejo 012 \* | |
| Number of Paths on the NYC Grid | | Amber Guo 12 \* | |
| How to be a Better Decision Maker | | Willow Jarvis 012 \* | |
| Understanding Circuits and Why Electrical Plugs Have Three Prongs | | | Michelle Qiu 12 \* |

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| **PDR 2** | with Phoebe Tse | |
| How to be an Efficient Doctor – The Viterbi Algorithm | Aofei Liu 28 < | |
| Friendship Paradox – Why Your friends have more friends than you | | Joy Yu 012 \* |
| How to organize your fat stacks of cash really quickly using Mergesort | Jonatan Yucra Rodriguez 12 \* | |
| Li Ion Battery Management Systems | Eric Ponce 027 > | |
| Threads and Locking, Find the Race Condition Win a Prize | Kenny Gea 27 > | |

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| **Coffeehouse Lounge** | with Professor Kimberle Koile | | |
| Drawing Lines for Fun, Profit, and Classification (aka the joys of linear separators | | Lei Ding 7 \* | |
| Finding a moment in a videostack | | Ali-Amir Aldan 0 6 \* | |
| Hacking Passwords 101 | | Nikita Kodali 8 \* | |
| The Halting Problem A.K.A. Will Grandma Ever Stop Talking? | | Vincent Anioke 0 7 > | |
| How to Make Your Computer Play (and win!) the Game of 20 Questions | | | Spencer Bard 7 > |
| (no title) | | Damien Martin 8 > | |

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| **PDR 3** | with Sarah Tortorici |
| Winning Board Games without any Real Skill | Keith Galli 6 \* |
| Mr. Steal Your Prom Date | Sravya Bhamidipati 0 6 \* |
| How to be a Particularly Good Finder | Jackie Liu 6 \* |
| How to make superbabies | Crystal Pan 0 6 \* |
| How to prove things certainly exist, by only proving that they probably exist | Michael Wallace 6 \* |

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| **PDR 1** | with Jason Tong |
| How to Share Secrets With Your Friends | Edward Park 16 < |
| Your computer perceiving the world. Why you and your computer both trip-up on the McGurk effect. | Alexander List 016 < |
| How Computers Remember Your Cat Videos | Leopoldo Calderas 16 \* |
| Traveling for Cheap: How to Find the Cheapest Flight Paths Around the World! | Danielle Penney 016 \* |
| Solving mazes with Depth First Search | Gregory Hui 16 \* |

Special thanks to:

Katherine Touafek (School to Careers Partners)

Dave Medvitz (Pingree)  
Benadette Manning (Fenway)

Michele Goe (O’Bryant)  
Bob Hall (Newman)  
Jason Tong (MIT)

my.notes

Dear High School Student,

We hope you enjoyed your visit to MIT! We’d like some feedback to improve the experience for future conference attendees like yourselves. Please answer all of the following questions:

**About You** Please circle the best answer(s):

I am a high school: { freshman sophomore junior senior } I am: { male female }

I’ve taken: { AP math AP chem AP physics AP bio programming }

In general, I found the talks { too hard just right too easy } to understand

In general, I understood { all most some a few none } of them.

I am considering a technical career (in science, engineering, math, technology, etc) { yes no }

**About Your Day**

For each hour, write the name of the room moderator, and the title/presenter of the best talk of that hour.

|  |  |  |
| --- | --- | --- |
| **Timeslot** | **Room** | **Best Presenter in Room during this Timeslot** |
| 9:00 am – 10:00 am |  |  |
| 10:00 am – 11:00 am |  |  |
| 11:00 am – 12:00 pm |  |  |
| 12:00 pm – 1:00 pm  1:00pm – 2:00pm |  |  |

What did you learn or like about it? (You can use the back of this sheet!)

Any feedback you want to relay to any of the presentations you heard? (You can use the back of this sheet!)

Turn in this form for a piece of candy!