conference.program

3.31.16

9am

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| Title | Presenter Notes |

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| **PDR 1 + 2** | with Emily Zhang | |
| Understanding the Twin Paradox Through Relativity | Jessica Pointing 014 \* | |
| Minimax - How to Use Randomness to Make Decisions | Connor Sell 115 \* | |
| What Makes a Rainbow? | | Ethan DiNinno 14 \* |
| Quantum Mechanics: The Cool Thing To Do | | Justin Xiao 14 \* |
| How to Win at Strategy Games | Kevin Wen 016 \* | |
| **Twenty Chimneys** | with Professor Muriel Medard | |
| Reading Our Genes: Sequencing DNA | Bryce Hwang 02 \* | |
| Zoom vs Distance | Ivan-Tadeu Ferreira-Antunes-Fil 02 \* | |
| Lies, Damned Lies, and Bayesian Probability | | Benny Zhang 2 \* |
| How To Throw An Unforgettable Party | Antoine Nasr 02 \* | |
| The Hodgkin-Huxley Model and Making Friends | Anita Liu 02 \* | |

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| **Mezzanine Lounge** | | with Francis Chen |
| Netflix & Filtering: Recommender Problems | Sitara Persad 117 \* | |
| Animate Cloth and Hair Realistically | | Jared Counts 17 \* |
| How Does Facebook Work? | | Matthew Guthmiller 17 \* |
| How your password stays secret (when your computer is stolen!) | | Max Justicz 14 \* |
| HOX Genes: How to Reverse Engineer a Dinosaur from a Chicken | | Kamilla Tekiela 14 \* |

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| **Coffeehouse Lounge** | with Alex Chumbley & Dr. Jason Miller | |
| The human ear & radio: what they have in common | Eric Fegan 11 \* | |
| Approximating Pi Using Toothpicks: The Buffon Needle Problem | | Sarah Shader 11 \* |
| How Devices on the Internet Communicate: Finding Paths through a Complex Network | Francesca Cicileo 12 \* | |
| How to Get to Space: Rockets, Engines, and Staging | Nicholas McCoy 013 \* | |
| (no title) | Angel Carvajal 010 \* | |

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| **PDR 4** | with Virginia Chiu | |
| One Bit Two Bit, Red Bit Qubit: Understanding Quantum Computers | | Matt Basile 12 \* |
| Saving Time with Shortest Path Algorithms | | Antonio Rivera 13 \* |
| Cashing Cache: A Computer's Short Term Memory | | Emily Benz 13 \* |
| Public-Key Cryptography: Sending Secrets the Hard Way | | Kevin Kusch 12 \* |
| Passing Messages Over the Internet | | Asya Bergal 012 \* |

10am

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| Title | Presenter Notes |

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| **PDR 1 + 2** | with Professor Tim Lu |
| How to kick your friends off the Internet: DDoS ins and outs | Everardo Rosales 3 \* |
| Image processing - standing out against the background | Rebekah Cha 3 \* |
| How Not to Gamble | Or Oppenheimer 3 \* |
| How to work well with friends | Hongyi Shi 3 \* |
| (no title) | Alexander Stewart 3 \* |

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| **Twenty Chimneys** | with Professor Muriel Medard |
| How Light Enters the Brain | Amanda Liu 07 \* |
| How Computers Talk | Emily Armstrong 07 \* |
| (no title) | Kevin Kwok 07 \* |
| (no title) | Kevin Li 07 \* |
| What is the fastest way to get around town? | Adrian Mora 07 \* |

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| **Mezzanine Lounge** | | with Francis Chen |
| Why We Can't See Through Walls | | Devin Morgan 7 \* |
| Electric Motors: Turning Electricity into Motion | | Aaron Rose 7 \* |
| (no title) | | Thomas Harris 17 \* |
| Making The Unknown Known | | Kathleen Johnson 17 \* |
| Interrupts: Ways to Manage Different Hats | | David Kang 17 \* |
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| **Coffeehouse Lounge** | with Alex Chumbley | |
| Keeping Things In Control | Sara Sinback 1 \* | |
| Where am I?: Determining Your Location with Your Phone | Andrew Titus 3 \* | |
| How Do Airplanes Fly? | Alice Zielinski 3 \* | |
| Ordering Pizza and Reliable Communication | Sen Chang 11 \* | |
| Fuzz Testing: Using Monkeys to Find Problems | Lynda Tang 11 \* | |
| **PDR 4** | with Professor Sangeeta Bhatia | |
| (no title) | Camilo Ruiz 1 \* | |
| Predicting the Future: Markov Chains | John Brown 1 \* | |
| Light Switches and Cheat Codes: One Step at a Time | Timothy Higgins 1 \* | |
| Be Proactive in Dating: The Mating Algorithm Says So | Eric Lau 1 \* | |
| How to Turn Atoms into an Atomic Clock | | Catherine Medlock 1 \* |
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11am

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| **PDR 1 + 2** | with Professor Tim Lu |
| Words as vectors: analogies for computers! | Hairuo Guo 4 \* |
| How Drugs Work: What Goes on Inside the Brain | Jasmeet Arora 4 \* |
| Magnets, How do They Work? | Kevin Chan 4 \* |
| Can you see my heart beating? Understanding Electrocardiogram | Heejo Keum 4 \* |
| Cycle Detection: Am I Walking in Circles? | Heeyoon Kim 4 \* |

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| **Twenty Chimneys** | with Professor Muriel Medard |
| Sharing is Caring: Torrents Demystified | Julia Guo 08 \* |
| Turning the real world into 1's and 0's | Amelia Becker 08 \* |
| Principles of 2D Printing | Tucker Cheyne 08 \* |
| Tricking users into unintentionally displaying your website. | Will Haack 08 \* |
| (no title) | Hau Lian 08 \* |

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| **Mezzanine Lounge** | | | with Nick Uhlenhuth\* |
| How the Duck does Autocorrect Work? | | | Tilly Taylor 13 \* |
| Fitting More Music on your iPod Using Fourier Transforms | | | Stephanie Pavlick 8 \* |
| Not All Infinities Are Created Equal | | | Gerrod Voigt 16 \* |
| Hard problems are hard | | | José Velarde 16 \* |
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| **Coffeehouse Lounge** | with Alex Chumbley | | |
| Springy Thingies Turned Digital: Cloth Simulation in Computer Graphics | Emily Van Belleghem 4 \* | | |
| How to Make a "Stupid" Proof | Cristina Mata 4 \* | | |
| Coding and Cooking | Phillip Ai 12 \* | | |
| Radio Jamming and how to Protect Against it | Alex Huang 11 \* | | |
| How Does the Internet Know You Are Human? | Roberto Soto 12 \* | | |

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| **PDR 4** | with Professor Luís Velásquez-García |
| Quantum Tunneling | Mahmoud Ghulman 10 \* |
| Zero-Knowledge Proof: A Proof without The Real Proof | Laponchai Jirachuphun 10 \* |
| How to Hide Your Identity Online | Victor Lopez 16 \* |
| PID Controllers: boat steering and moon landing | Vahid Fazel-Rezai 15 \* |
| Bézier Curves: How a Simple Plan Wins | Kenny Friedman 15 \* |

12pm

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| **PDR 1 + 2** | with Professor Tim Lu |
| Gravitational Waves - Ripples in Spacetime | Jason Liang 5 \* |
| Teach computers to filter spam: a mathematical approach | Blake Elias 5 \* |
| Candy Queues: Explaining Internet Access with a Candy Factory | Jeremy Ellison 5 \* |
| Curing Cancer with Living Drugs | Margaret Guo 5 \* |
| How your fitness trackers find your Heart Rate | Zixi Liu 5 \* |

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| **Twenty Chimneys** | with Professor Muriel Medard | |
| The Button Gmail's Missing: "Compress It" | | Nichole Clarke 09 \* |
| MergeSort: putting everything in its place | | Lee Gavrin 9 \* |
| Rockets! | | Joe Kusters 9 \* |
| The Surreal Numbers | | Kevin Phillips 09 \* |
| How tuning a radio works | | Allan Sadun 09 \* |

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| **Mezzanine Lounge** | with Professor Luís Velásquez-García | |
| CRISPR: How we can edit our DNA | | Arturo Campos0 15 \* |
| Bloom Filters. Easily remember something you have seen before. | | Donald Little 0 9 \* |
| An Inside Look at Counting Cards in Blackjack | | Jeremy Bogle0 15 \* |
| The Pigeonhole Principle, Why Perfect File Compression Is Impossible | | Deanna Heer0 14 \* |
| Preventing Race Conditions in Concurrent Programming | | Matthew Kalinowski 15 > |

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| **Coffeehouse Lounge** | with Alex Chumbley |
| Quantum Superposition: When guessing is good enough | Dencil Wilmot 05 \* |
| What the future sounded like | Alex Souvannakhot 05 \* |
| How to stream Netflix, FaceTime, and go on Facebook all at the same time | Tamar Weseley 05 \* |
| CRISPR/Cas9 | Colin McDonnell 015 \* |
| How to End the World | Gabrielle Rivera 09 \* |

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| **PDR 4** | with Virginia Chiu |
| Through the Galactic Looking Glass: How We Can See 13 Billion Years Into the Past and Why That Matters for the GPS in Your Phone | Lily Zhou 13 \* |
| The Transistor | Daniel Moon 13 \* |
| Real Life Mind Control | Michaela Ennis 13 \* |
| Prisoner's Dilemma: To Tell or Not to Tell | Morgan O’Brien 13 \* |
| Max Flow: The Secret to Plumbing and Warfare | Devin Neal 11 > |

1pm

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| **PDR 1 + 2** | with Emily Zhang |
| How to Build a Supercar | Liza Gaylord 14 \* |
| Over and Over Again: Fractals and Their Applications | Akshay Ravikumar 17 \* |
| Who should be in charge? Leader election in a distributed network | Barbara Duckworth 15 \* |
| Counting to Infinity | Weilian Chu 14 \* |
| Designing Randomness in Video Games | Logan Martin 10 \* |
| (no title) | Andre Mroz \* |

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| **Twenty Chimneys** | with Dr. Jason Miller & Nikhil |
| Don't Jump to Conclusions: Good Statistics Can Lead to Bogus Conclusions | Victoria Xia 11 \* |
| Getting Close Enough to the Point | Emmanuel Fasil 012 \* |
| Buck Converters | Andre Walker 10 \* |
| Writing Better Computer Programs, Automatically | Zachary Neely 010 \* |
| Hijacking the Immune System | Maria Karelina 10 \* |

Special thanks to:

      Katherine Touafek (School to Careers Partnership)  
        Alison Langsdorf (Weston)  
         David Case (Madison Park)  
         MIT CAC  
         Emily Zhang (MIT)