MASSACHUSETTS INSTITUTE OF TECHNOLOGY

6.UAT High School Conference

Program

Tuesday, October 30, 2018

9 AM-3 PM

Special Thanks To:

Katherine Touafek (School to Careers Partnership)

David Case, Jennifer Hardy (Worcester Tech)

Yuri Petriv (Somerville)

Laura Pang (MIT)

Jurgen Michel (MIT)

Last updated Oct. 29

*: slide collector, (n): section number, ((n): first half presenter, (n)): second half presenter

9 AM

34-301 — Jurgen

Optical Tweezers: How nanoscale tug-of-war won the Nobel Prize	Taylor Sorenson* (10)
Buffer Overflow attacks for controlling a program	Sam Nguyen (10)
charRNN: looking at your past to predict what you will write in the future	Nadya Balanbanska (10)
That's Music to My Ears	Bryan Chen (10)

34-302 — Laura

Nash Equilibrium: Betrayal and its Consequences	Meryl Wang ((24)
Finding Best Case Traffic	Jessica Zhu* (24)
Designing a City using Minimum Spanning Trees	Crystal Wang (24)
How much can a plumber pump before the max flow pops	Edmund Williams (30)
How Calculus Helps Us Get To Class On Time	Danny Gelman (24)

34-303 — Alex

Railroad Bombing Strategies in the Cold War: Flow Networks and Max Flow	John Murphy ((22)
Probability vs Human Brain: how do we make decisions in life?	Kalyn Bowen* (5)
BGP Hijacking: How to Break the Internet	Marcin Jackymiak (5)
The Road to Recovery: Gradient Decent	Steven Timberman (5)
Protein Mass Spectrometry	Seung Lee (5)

34-304 — Luis

How to Find the Optimal Move in 2-Player Board Games	Cynthia Zhou* (26)
Learn how to Do Faster with Caching!	Oluwafemi Oladipupo (26)
How to get through a corn maze	Jing Lin (26)
Let's Get Logical: Understanding Digital Systems	Sarah Flanagan (25)
How to secretly and privately browse even the most hidden corners of the Internet	Andres Fabrega (24)

24-307 — Leslie

How Using Thousands of Computers can Solve Complex Problems	James Gordon* (7)
Reinforcement Learning: Teach your computer with a familiar framework	Ricardo Lopez (7)
Bayes Theorem	Suman Nepal (7)
Changing code at the source, and beneath it: binary patching intuition	Grant Prater (7)

24-310 — Martha

Predicting Fortnite Wins Using Bayes' Theorem	Jacob Gasparich* (1)
The Floor is Lava for a Robot with a Camera	Katharina Gschwind (1)
Counting Jelly Beans and Multiplying Polynomials	Eva Hu (1)
Why machine learning models can fail	Anna Kazlauskas (1)

*: slide collector, (n): section number, ((n): first half presenter, (n)): second half presenter

9 AM (cont.)

24-317	**Kenny**
Karger's Algorithm: The Fast Way to Break Up Groups	Chungmin Lee* (5)
Ultrasound: How To See Your Organs	Henry Cheung (5)
Graphs, Coloring, and Secrets: The Probabilistic Method	Livio Fetahu (6)
Predicting with Perceptron: How computers can help us see the future	Sarah Pohorecky (6)
24-319	**Long**
Curing Cancer and Winning Basketball Games: Smith-Waterman Algorithm	Tamar Grey* (7)
Max-heaps: Maximize your payload, minimize your work	Anelise Newman (7)
The Water Pipes That Power Your Computer: MOSFETS	Aaron Wubshet (7)
Using your body to fight cancer, CAR-T cell therapy explained	Dallace Francis (10)
24-321	**Rajeev**
From Finches to Functions: solving problems by mimicking evolution	Caleb Noble* (14)
Breaking Down and Building Up Waves with Fourier Transforms	Sanjeev Murty (14)
	Andrew Antonitis (14)
How Sites Know What Content You'll Love	Agni Kumar (14)
Geography in Your Genes: How To Simplify and Analyze Complex Data	Rishabh Chandra (6)
24-323	**David**
Raytracing: How Computers Make Animated Movies	Jared DiCarlo ((26)
Top picks for you: How to make good recommendations.	Kara Luo* (1)
The Pancake Function	Samira Okudo (1)
How To Know If Your Teacher Reads Your Essays	Claire Nord (25)
How to sort records efficiently and uuh, waste space	Raveen Nzilani (25)

10 AM

34-301	**Jurgen**
How to be a good prom matchmaker	Yun Boyer ((26)
Reliable Data Transportation	Carlos Garcia* (8)
Making Distance Irrelevant with Quantum Physics	Tim Cardona (8)
Get More Done, Faster: The Principle of Concurrent Programming	Matthew Beveridge (10)
Bus Route Assignment with Ford Fulkerson	Paula Lahera (10)
34-302	**Laura**
Making a smart toaster smarter with data augmentation	Jeffrey Li* (23)
How to choose the best moves in a game	Tiffany Pan (23)
Sending Information through Fiber Optical Cables	Wings Yeung (23)
Fourier Transforms: Escaping the Time Domain	Andrew Chen (23)
Share Candies Like a Pro using MapReduce	Abishkar Chhetri (23)
34-303	**Alex**
Play to win: how to minimize your maximum loss	Carissa Gadson* (22)
Keeping your backups afloat with RAFT	Kundan Chintamaneni (22)
Intro to Hash Functions: Space, Speed, Security	Karim Karimi (13)
Just Flow With It - Getting the Most Out of a Network	Guillermo Diaz (13))
How to compare almost anything	Alexander Katz (13))

*: slide collector, (n): section number, ((n): first half presenter, (n)): second half presenter

10 AM (cont.)

34-304 — Luis

DDoS: Taking Down Networks with Computer Zombies	Allen Lee* (23)
Counting to Infinity with One-to-one Maps	Tony Ding (23)
Heating up with solar thermal: a clean energy solution	Wilbur Li (23)
The Mystery Behind Mind-blowing Special Effects in Movies	Janak Agrawal (24)
How to Decode Messages Sent through Space	Liam Green (25)

24-307 — Christie

Counting Sort: How to quickly sort a deck of cards	Jason Paulos* (15)
Solve problems faster with Dynamic Programming	Austin Parker (15)
How Byzantine Generals are Relevant to Blockchain	Kristy Carpenter (15)
SIFT: The Secret To Making Panoramic Photos	Bailee Margolis (15)
The Illusions Behind our Phone Screens	Brandon Fountain (15)

24-308 — Joel

Pipe down, we're just improving throughput!	Jasmin Miguel* (15)
The Computational Gold Rush	Gohar Khan (15)
What's the Buzz: Bee Communication and Understanding of the World	Gwen Edgar (15)
Binary Search: the fast way to find a number	Anthony Rosario (18)
Insertion Sort: The Tradeoff Between Simplicity and Efficiency	Bamlak Gessessew (18)

24-310 — Martha

Git: Making collaboration easy	XingLiang Zhao* (2)
Ctrl-F for Experts	Lauren Clayberg (2)
Get Things in Order Super Fast: Merge Sort	Amir Farhat (2)
Blockchain and You	Christopher Madrigal (2)
How to make a website	Emmanuel Mengistab (2)

24-317 — Kenny

How Natural Selection Inspires Programming	Cowboy Lynk* (8)
Word Embeddings: How Computers Understand the Meanings of Words	Matthew Huggins (8)
Preventing wrong bank information using Locks	Matthew Woicik (8)
Making Monsters: A lesson on CRISPr and Gene Editing	Madison Darmofal (8)
Hilbert's Paradox of the Infinite Hotel	Katherine Yang (8)

24-319 — George

Design the Cheapest Flight Network to Connect Different Cities	Anna Song* (18)
Making Flexible Electronics: Micro fabrication of Personal Health Monitors	Farita Tasnim (30)
Regression Discontinuity: How To Tell If Test Prep Programs Actually Work	Kevin Li (30)
Increasing your Phone Storage: Data Compression	Xiaoyi Wang (10))

*: slide collector, (n): section number, ((n): first half presenter, (n)): second half presenter

10 AM (cont.)

24-321	Rajeev
The Death of a Gambler	Tiancheng Qin* (14)
	Avery Nortonsmith (14)
From Music to MP3	Emily Hu (14)
If time were money: how Cache saves you Cash	Lucy Li (13)
How Many Primes Are There and How Do We Know?	Dylan Modesitt (13)

24-323	David
When to Keep Going and When to Call it Quits: Optimal Stopping	Janice Lee* (26)
How To Download Movies Easily	Ruben Merenfeld (2)
Technicolor: Early Movie Magic	Holly Rieping (2)
Parsing: How computers read	Kacie Bawiec (6)
How Computers See Pictures	Andrew Wong (6))

11 AM

24-115	Collin
Reliable Data Transportation	Juan Garcia* (19)
Verifying DNA Constructs using Gel Electrophoresis	Riker Bixby (19)
No more spamming! Into to Proof of Work	Nicholas Guo (19)
How to compare almost anything	Alexander Lynch (19)
How to Automatically Fix Errors	Max Murin (19)
Posing With Skeletons: How Pixar Builds a Character	Christopher Wang (19)

24-307	Linda / Christie
ID Trees: Learning to Ask the Right Questions	Virginia Sun* (3)
TCP: how YouTube videos arrive at the click of a button	Jueun Lee (3)
Who's Attracting the Cockroaches–A Bayesian Nonparametric Approach	Menghua Wu (3)
DNS: The Internet's Address Book	Rebecca Weinberger (16)
PageRank: Ordering Websites by Importance	Santiago Munoz (16)

24-308	Joel
How to detect plagiarism: Adventures in string searching	Lawrence Li* (16)
How do you distribute a large file to your classmates?	Jintao Chen (16)
Solving the Cosmic Ray Problem	Istvan Chung (16)
LDA: How to teach a computer to summarize a book for you!	Allison Fu (16)
How To Win a Game Show	Zoe Gong (16)
Huffman Encoding: Smart Strategies for Computer Storage	Alexandra Martirosian (16)

*: slide collector, (n): section number, ((n): first half presenter, (n)): second half presenter

11 AM (cont.)

24-310 — Martha

Discover how your devices are able to use the internet for powerful things!	Luis Gutierrez* (3)
How to Predict Your Exam Results Using Perceptron	Amy Apostol (3)
How to Quickly Find a Word in a Text: Skip Unnecessary Comparisons	Rares-Darius Buhai (3)
Compilers: transforming code by kneading dough	Ajay Jain (3)
RSA: Keeping Your $$$ Safe!	Daniel Whatley (3)

24-317 — Kenny

How to Prove Your Point and Not Get Scammed	Priscilla Wu* (9)
The Making of a Madlib: Grammar for Computers	Jessica Yu (9)
Preventing race conditions & how this can save you $50	Alyssa Weiss (9)
How to make a robot see	Lucas Novak (1)
Steps to Solving a Genetic Mystery!	Meredith Loy (30)

24-319 — George

How to Take Advantage Of Memory You Didn't Know You Had	Jackie Bredenberg* (27)
Laziness: Why Procrastination is the Best Way to do your Work	Josh Brunner (27)
When to give up? An adventure in complexity theory	Arturo Chavez-Gehrig (27)
How to minimize your overall travel costs	Sabina Chen (27)
Coloring With a Handful of Crayons: The 5-Color Theorem	Maya Sankar (27)

24-321 — Leslie

The Electrical Switch	Savannah Inglin* (9)
How to Flip a Coin With Someone You Don't Trust	Theodore Katz (9)
Group Theory: Reducing 2 Centuries of Rubik's Cube Solving to 30 Seconds	Dain Kim (9)
Particle Filter Localization: How Robots Find Themselves	Josh Rosenkranz (9)
Netflix's Key to Success: Collaborative Filtering	Yasmin Siahpoosh (9)

24-323 — David / Anu

Turning Pictures into Maps using Graphs	Edward Nguyen* (19)
Monte Carlo Magic	Alexis Slattery (19)
How a Star is Born	Rishi Sundaresan (27)
Why 12 Notes in a Musical Scale?	Jason Ye (27)
Why People Can't Agree When There Are Too Many Trolls	Luke Sciarappa (27)

12 PM

34-101 — Linda

Quantifying the Value of Information	Sophia McGowan* (4)
Adding Intuition to AI: Baye's Rule	Temitope Olabinjo (4)
Never Lose Again! Using AI to Win Board Games	Alan Chen (6)
Keeping Order Without Lists: An Introduction to Binary Trees	Kwabena Ofori-Atta (5)
P vs. NP: Cracking Codes with Ease	Matthew Marquez (6)
Memory Allocators: Reusing Space	Jason Priest (5)

*: slide collector, (n): section number, ((n): first half presenter, (n)): second half presenter

12 PM (cont.)

24-115	**Collin**
The Fight Against Spam	Jason Seibel* (22)
Circuits and Lightning Machines	Matthew Burns (20)
The FUNdamentals of Insertion Sort	Yianni Giannaris (20)
The Secret of the Aromas and Colors in the Grill	Chung-Yueh Lin (20)
A Schnorr-y for online authentication	James Lovejoy (20)
Understanding Gravitational Waves and its Use for Space Exploration	Vedaant Kudadia (22))
24-308	**Anu**
The Prisoner's Dilemma: Does teamwork make the dream work?	Erica Zhou* (20)
Reinforcement Learning: How to make your computer a very good boi	Raja Rajcic (20)
Boosting: How to Boost Decision Making Based on Data	Steven Salvas (20)
Getting Technical with Televisions: is OLED the future?	Christopher Mauck (20)
Visualizing complex data using non-linear transformations	Ileana Rugina (18)
Hidden in Plain Sight: How to Send a Secret Message in a Picture	Felipe Hofmann (18))
24-310	**Martha**
How the Infinite Can Become Finite	Allan Gelman* (4)
	Jada Griffith (4)
Do you guys still use Facebook? They do some merging there	Fernando Herrera (4)
How the Internet Promises to Accurately Send Your Messages	Christina Lee (4)
How to win $1,000,000 every time!	Stephanie Li (4)
Understanding the Building Blocks of Code	Tyler Moroso (4)
24-317	**Kenny**
Train your body to fight disease: the power of vaccination	Meenakshi Chakraborty* (11)
Multithreading: Getting the Most Out of Your Applications	James Rodriguez (11)
How to make sure all of your friends have a date for prom	Samantha Sappenfield (11)
It's Not Just For Piracy! BitTorrent: What Is It and How Does it Work?	Chris Xue (26)
How to Determine Whether You Will Win a Gamble	Neha Prasad (11)
24-319	**George**
Feedback Controls	Walaa Alkhanaizi* (28)
How Gamecube Controllers Communicate at 60fps	Zachary Pitcher (28)
How classifying information can save time… and lives	Eric Bradford (28)
Laziness as a (programmer's) Virtue	Timothy Ngotiaoco (28)
CRISPR-Cas9: How to Fix Typos in Your Body	Kunyi Li (30)
24-321	**Rajeev**
Hashing: How Companies Like Google Find Your Data Quickly	Michael Arrington* (11)
More than Meets the Eye: Matching Color Representation	Brian Chen (11)
How to Minimize the Chance of Getting Wiretapped	Tossaporn Saengja (14)
Think Like a Machine: How (Many) Machines Make Decisions	Candace Okumko (13)
What are feedback systems and how to control them?	Amir Cohen (11)

*: slide collector, (n): section number, ((n): first half presenter, (n)): second half presenter

12 PM (cont.)

24-323 — David

Multicore computing: how computers work together (and why that's hard)	Edward Fan* (28)
How to Divvy Up a Secret	Kevin Zhao (28)
A Day in the Life of Your Internet Service Provider	Brandon Wang (28)
Cliques	Rui Li (28)
MapReduce, Halloween Edition: How to efficiently count candy via parallelization	Angela Lin (26)

1 PM

24-115 — Collin

How to Find Your Missing Cell Phone	Adam Gumbardo* (21)
How computers see	Rawn Henry (21)
What can no computer ever compute?	Jackson Kearl (21)
Model an alarm to protect your stuff with Finite State Machines	Zoe Klawans (21)
Hourglasses and Truckers: It's All About the Bottleneck	Isabel Quispe (21)
How to locate moving things when you can't see them	Michelle Tan (21)

24-308 — Anu / Mitchell

How to (actually) slow down time	Yueyang Ying* (21)
Printing Itself Out: A Sketch of How Programs Can "Reproduce" Themselves	Robert Vasen (21)
How to survive under an evil jail warden	James Allen (25)
Why can we trust Bitcoin?	Elorm Koto (17)
Finding Intersecting Lines Using Laziness and Organization	Martin Schneider (17)
Digital Computation: How to do math with only switches	Jeremy Sogo (18)

24-317 — Laura

Viterbi Decoding: How we can talk across the solar system	Luis Torres* (12)
Tor: The Onion Router	Serena Do (12)
The Power of Polynomials: Counting by Encoding & Computing	Diane Zhou (29)
Nuclear Fusion: Generating Energy by Creating a Mini-Sun on Earth	Mira Partha (29)
The Birthday Problem: why is our intuition wrong?	Charleen Wang (24)
Auto-corset *Auto-correct	Jeet Mohapatra (6)

24-319 — George

Maximizing Traffic Across Fragile Bridges	Andy Kuang* (29)
To Bits and Back: Efficient Data Compression Using Huffman Encoding	Rebecca Agustin (29)
Finding the Best Route with Dijkstra's	Shannon Duffy (29)
Use the Bars and Stars Method to count M&Ms	Rachel Levy (29)
Reading Hearts With Vectors	David Mejorado (29)
Finding Your Way In the Dark: Online Algorithms	Claudia Wu (29)

*: slide collector, (n): section number, ((n): first half presenter, (n)): second half presenter

1 PM (cont.)

24-321 — Rajeev

Sorting Trees with Tree Sort	Benjamin Rowley* (12)
How to use large numbers to secretly send messages	Ashley Kim (12)
Strategic decision making: How to read your competitor's mind	Audace Nakeshimana (12)
Infinity: How big can it really get?	Carina Quiroz (12)
Your computer knows what you want better than you do!	Elijah Rivera (12)
How to Find a New Earth!	Evan Tey (12)

24-323 — Joel

How to use your laundry to get more done in the same amount of time	Margaret Sands* (17)
How to Teach Computers to Read	Robert Delaus (17)
How Does Google Work: The PageRank Algorithm	Jack Dulsky (17)
How to make sure your friends aren't cheating – Cryptography schemes	Michael Gump (17)
Why computers make 3D files out of triangles	Nina Lutz (17)
How Computers Can Fake Real Life -- And Get Away With It	Pramoda Karnati (17)

2 PM

24-308 — Mitchell

Creating Anonymity Through Layers of Non-Anonymous Communication	Frances Hartwell (22)

*: slide collector, (n): section number, ((n): first half presenter, (n)): second half presenter