

Pop Science Symposium

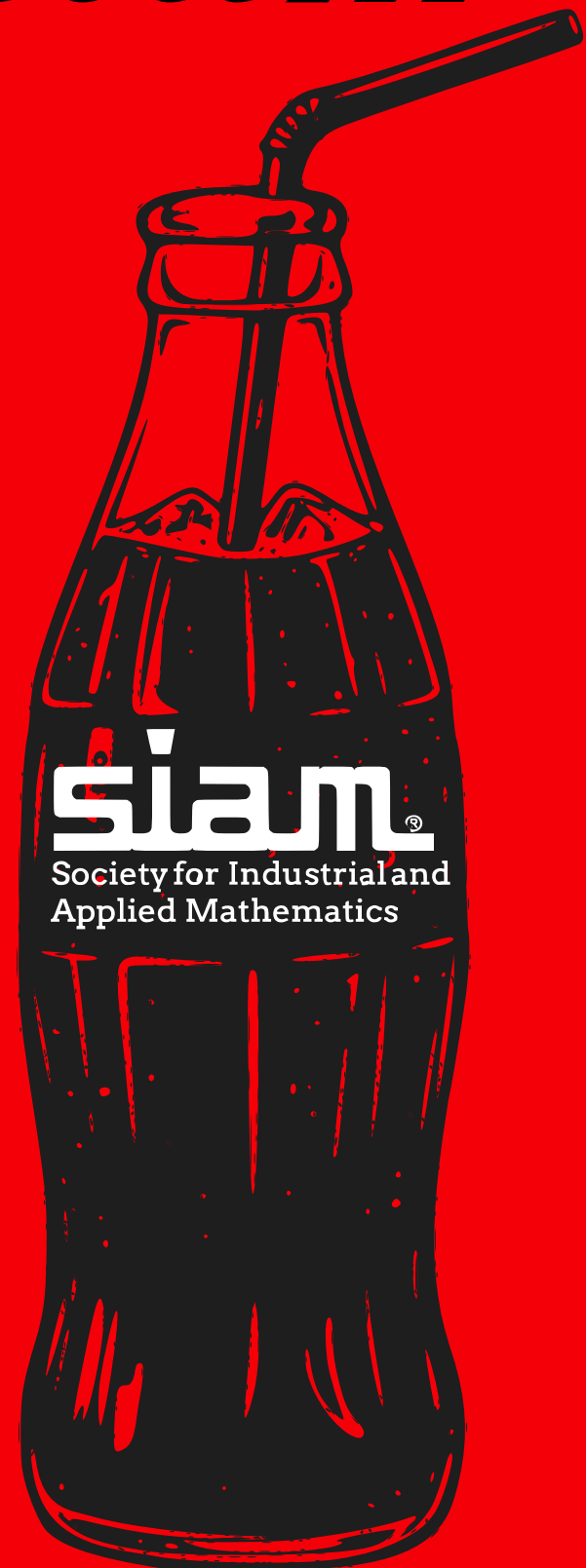
**SOLVING SUDOKU WITH
QUANTUM COMPUTING**

**A BRIEF HISTORY
OF MEASUREMENT**

**TOP 5 INNOVATIONS
IN STATISTICS**

TRAVEL IN THE FUTURE

**FIGHTING IMPOSTER
SYNDROME WITH MATH**



THE TOP FIVE INNOVATIONS IN STATISTICS

ANDY COOPER - STATISTICS

What are the GOATs of Statistics? I don't mean people who do or did Statistics (that's a different list), nor do I mean livestock (that's also a different list). I mean what are the most important discoveries/ideas/"things" in Stats that people rely on in their everyday lives (even if they don't know it)? I'll go through a brief history and overview of five of these in my talk.

A BRIEF HISTORY OF MEASUREMENT

TIM SCHOLTZ - COMPUTER ENGINEERING

Where does measurement come from? To understand modern measurements like inches, we need to start with the biology of how brains count without numbers. Then we look at the first use of numbers and measurements in ancient Uruk. From there we skip a few millennia to revolutionary France (don't lose your head) to see how out of chaos we get the metric system. And lastly we see how the metric system is the backbone of the modern system of measurement, and why the inch itself is actually metric with a few more steps.

SOLVING SUDOKU USING QUANTUM COMPUTING

WENDI GAO - MATHEMATICS

Quantum algorithms are known to reduce the complexity of classical problems. For the standard search problem on a classical computer, the complexity is $O(n)$ where n is the size of the search space. Grover's algorithm is able to reduce the complexity to $O(\sqrt{n})$ using superposition of qubits. In this presentation, I will talk about how the algorithm works (hint: a bunch of linear algebra), and I will show an application of Grover's algorithm to solve sudoku puzzles. Lastly, I will demonstrate the implementation of the sudoku solver in Qiskit (think Python for quantum algorithms.)

THE ANATOMY OF TRAVEL IN THE FUTURE

**SUDARSANA NERELLA - AEROSPACE
ENGINEERING**

Aviation moves 5 billion passengers a year on margins of a few dollars per ticket, burns 100 billion gallons of jet fuel doing it, and accounts for roughly 2.5% of global CO₂ emissions. The industry now faces a portfolio of expensive bets: sustainable fuels at two to five times the price of kerosene, hydrogen aircraft requiring trillion-dollar infrastructure, and clean-sheet designs costing \$15 billion before the first paying passenger boards. This talk examines the numbers; cost per seat, fuel as a quarter of operating costs, fleet cycles measured in decades and asks which of these bets the physics and the spreadsheets actually support. The future of flight is not a technology but an arithmetic problem, and the arithmetic is unforgiving.

FIGHTING IMPOSTER SYNDROME WITH MATH

ADITYA KHANNA - MATHEMATICS

Most of us have felt, or still feel, like impostors at a university. This feeling stems from the undue comparisons we make of ourselves with other people. This is where I come in, as a "self-help motivational guru", to dispel your impostor syndrome with the power of discrete math, linear algebra and statistics!