

<https://entrepreneurship.engineering.columbia.edu/discover/for-undergraduate-students/fast-pitch/>

FAST PITCH — PART 2

[Discover](#) → [For Undergraduate Students](#) → Fast Pitch

APPH E4901 and APPH E4903

Applied Physics Seminar

Fast Pitch Competition:
Thursday, November 21 · 5:30 – 9:30pm

Today

- Classroom discussion
- One or more “business plans” to pitch



[Ivy Schultz](#), Director of Entrepreneurship Programs at Columbia's SEAS

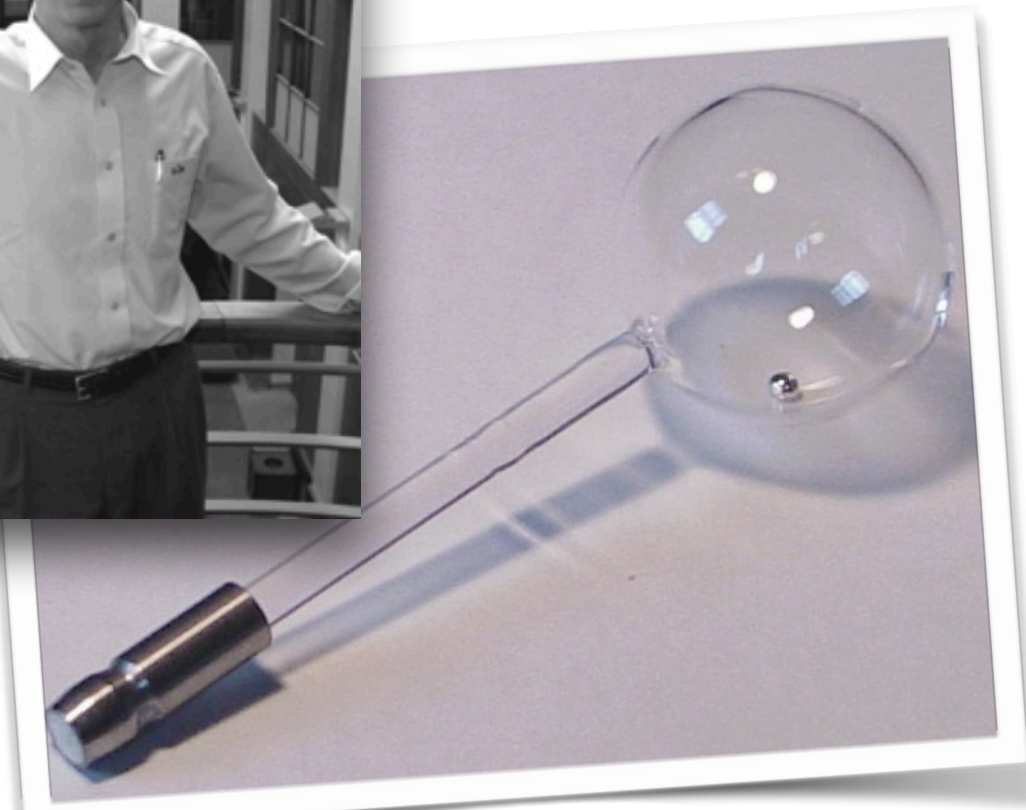
Perfect Your Elevator Pitch

- **An “elevator” pitch is intended to be a concise, compelling introduction to your business. You should be able to slightly modify your elevator pitch depending on whether you are pitching to prospective investors, customers, employees, or partners.**
- Here are a few tips for developing and delivering a great elevator pitch:
 - Start out strong.
 - Be positive and enthusiastic in your delivery.
 - Remember that practice makes perfect.
 - Keep it to 60 seconds in length.
 - Avoid using industry jargon.
 - Convey why your business is unique.
 - Pitch the problem you are solving.
 - Invite participation or interruption by the listener—this shows they are interested and engaged.

Applied Physics Examples: Photons

On-chip Quantum Optics

The Nobel Prize in Physics
2014



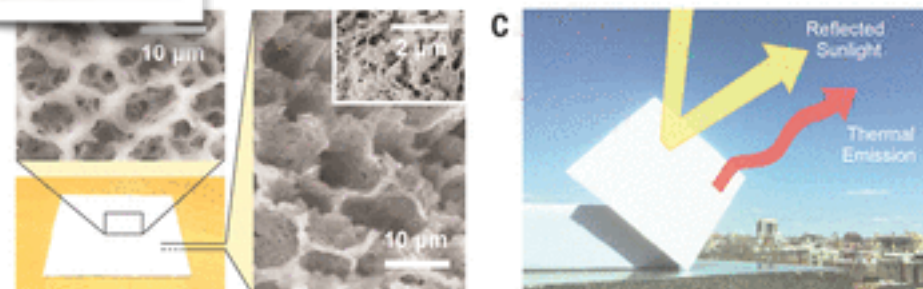
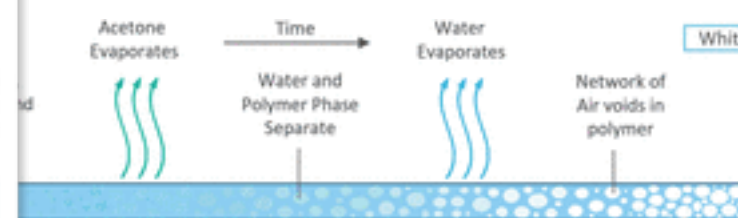
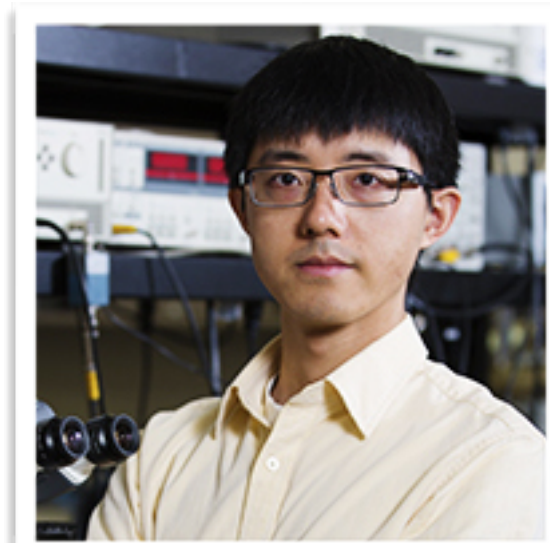
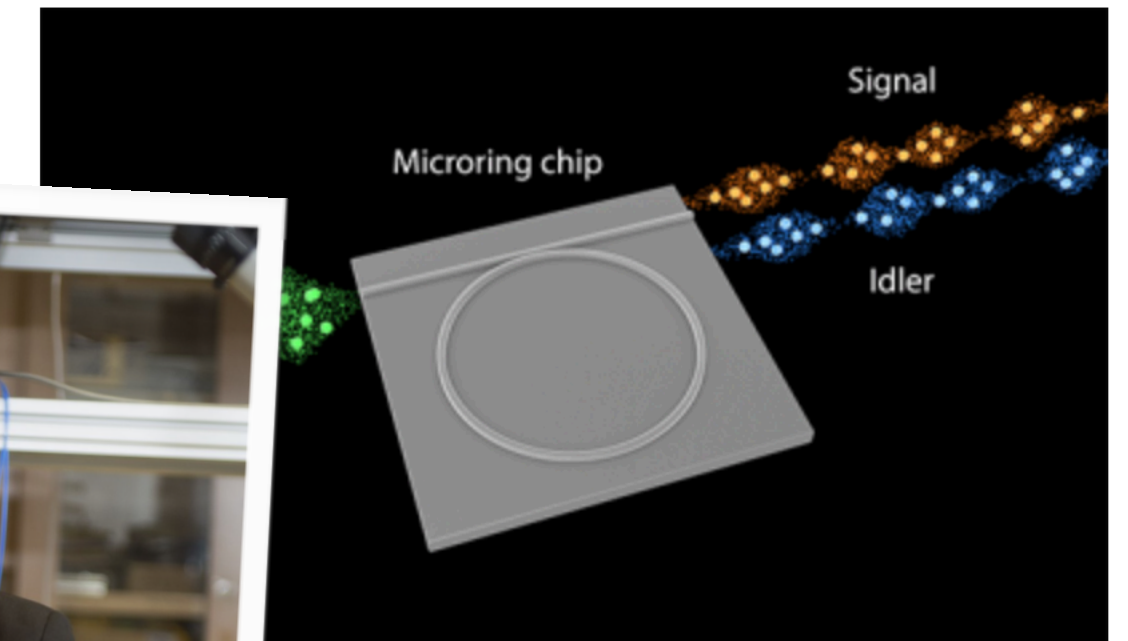
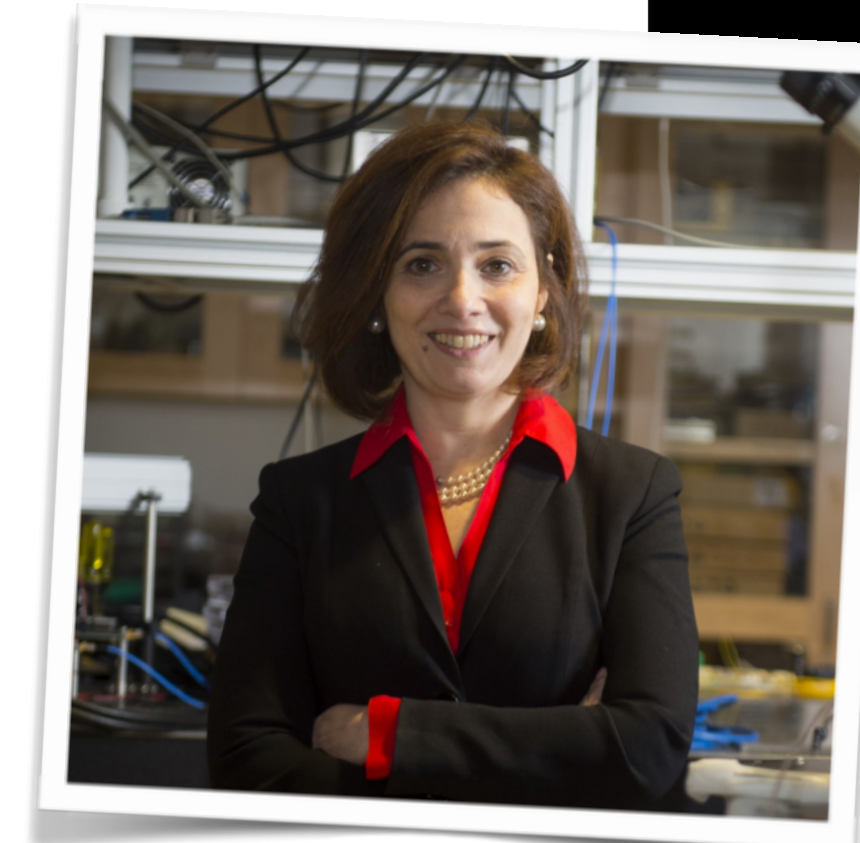
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Isamu Akasaki
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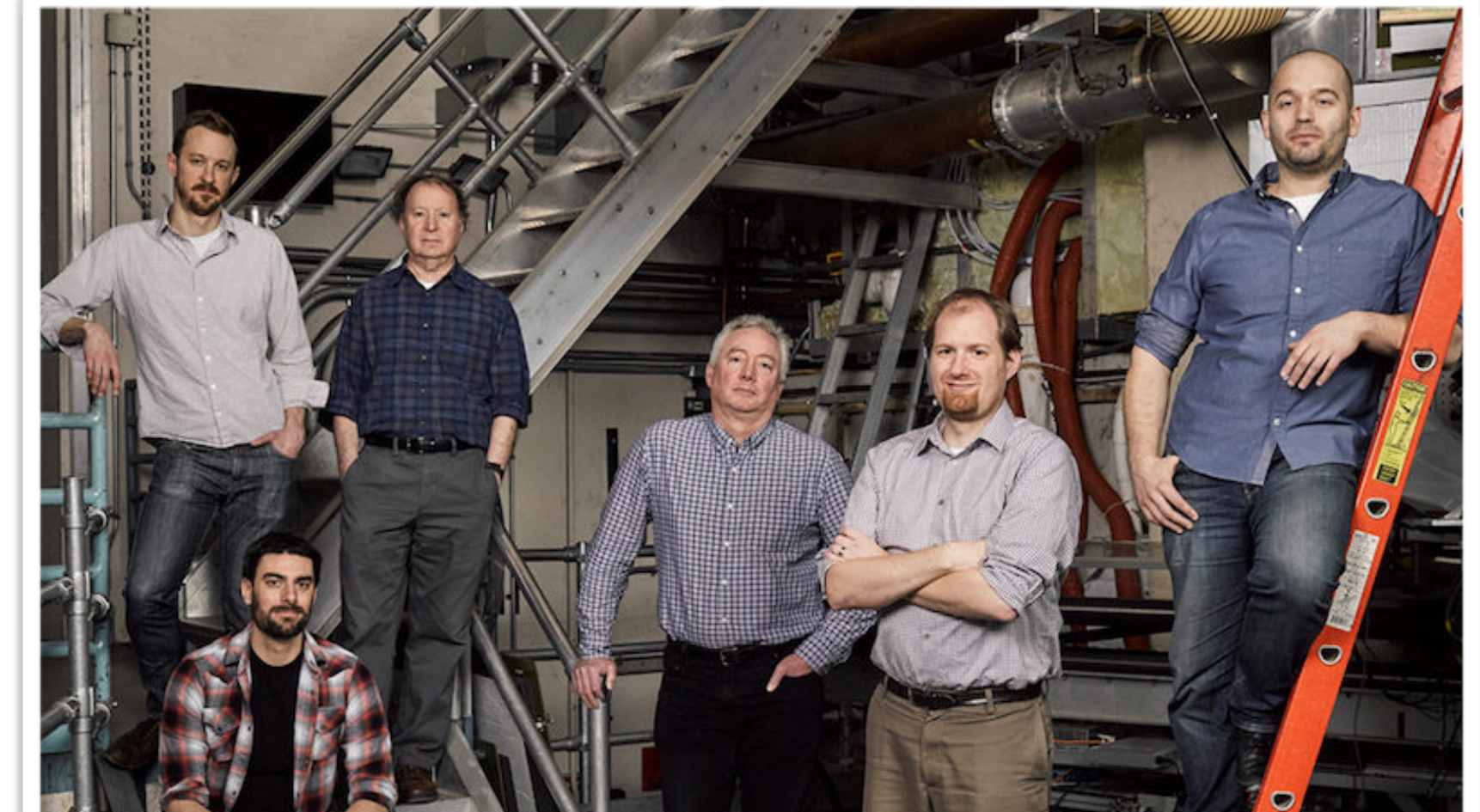
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Applied Physics Examples: Plasmas



DESIGNLINES | INDUSTRIAL CONTROL DESIGNLINE

MKS acquires ASTeX for \$300 million

MKS acquires ASTeX for \$300 million

By EE Times, 10.02.00  0

ANDOVER, Mass. -- MKS Instruments Inc. here today announced that it has entered into a definitive agreement to acquire Applied Science and Technology Inc. (ASTeX), a supplier of sputtering equipment and other products, for \$300 million in stock.

With the acquisition of ASTeX, based in Wilmington, Mass., MKS will gain a quick entry into the sputtering equipment, gas generator, RF and microwave power source, and other gas-reactive systems markets.

It will also give customers a one-stop shop of products in these markets. ASTeX makes subsystems and sputtering tools for the semiconductor industry, while MKS is a leading supplier of process control instruments for OEMs, such as Applied Materials Inc. and other equipment makers.



Commonwealth Fusion Systems
501 Massachusetts Avenue
Cambridge, MA
02139

More push than pull

Meeting the demands of the market is usually vital to any new business.

But tech-based firms have it much harder as there ***might not yet be a market pull*** for the ***technology they are trying to push***.

Examples:

- (1975) Digital watch by Texas Instruments
- (1970's) Digital camera by Kodak
- (1940's) Transistor at Bell Labs
- (1987) Apple's Newton
- (2001) Apple's iPod

*“Coming up with an idea, prototype or product **is the relatively easy part – much harder is spotting a market opportunity** for it **and also having appropriate infrastructure** to make the product with the right volume, cost and performance.”*

*“The challenge of translating science into practice needs to be guided our best innovators towards the market need **as it emerges**.”*

How to Craft your “Fast Pitch”...

- Summarize the challenge/problem/issue in one sentence. Explain why it matters.
- Describe two or three most interesting parts of the concept/business. Explain why it is innovative/cool/attractive.
- Name two of three biggest impacts of the business plan. Explain why your customers will care.

May of 1970, 36-year-old John Bergey, head of research and development at Hamilton Watch Co., in Lancaster, PA, was a guest on The Tonight Show with Johnny Carson. He was there to show Johnny not just a new watch that Hamilton had created, but a new kind of watch. Called the Pulsar Time Computer, it was the world's first digital watch.

The watch was too weird for Carson. To Bergey's horror, he declared, "This will never put Mickey Mouse out of business," and tossed the gold timepiece over his shoulder.



Pulsar, on the other hand, was a hit and the most famous watch of its (admittedly brief) time. It had a number of claims to fame:

- It was revolutionary in its space-age design and solid state (i.e., no moving parts) technology.
- It was a pioneer of a new watch category that brought scores of American electronics firms into the watch business.
- It was hailed in American business and media circles as the leader of a trend that would make America a watchmaking power again.

On April 4, 1972, the wrist computer was on sale. “A completely new way to tell time, modestly priced at \$2,100.” (\$12,000 today.)

Apparently, the watch was worth the wait.

Pulsar prepared 400 watches for sale, and all 400 sold in three days.

New from Pulsar

HE BIG TIME



BIGGER FACE
BOLDER LOOK
BRAWNY NEW BAND

Pulsar Big Time \$295. Other models very modestly priced from \$285 to \$2750.

of your wrist

es the time

One—the new Pulsar

face with the bolder
a fast grasp of the
get it without lifting a
flick of your wrist and
the time.
ke all of today's Pulsar

Time Computer models, this one has all its buttons. One for time to the split-second. The other for the month and date.

But this is merely the beginning . . .

The real pleasure of owning a Pulsar Big Time continues to grow long after the initial excitement of its unique new features. That is when you discover how superbly trouble free and accurate it is, month after month, year after year. There are many reasons for this incredible reliability. For instance . . .

- The little solid-state lamps that flash the time and date are made to shine brightly for 100 years of continuous use.
- The switches that turn the lights on should work at least one million times before wearing out.
- Impact 2500 times the force of gravity does not harm Pulsar in tests.
- Tempered glass of ruby red time screen is scratch resistant

and next door to unbreakable.

- High IQ calendar knows difference between a 30 and 31-day month and makes the change automatically.
- No moving parts to wear out. No routine maintenance, oiling or cleaning is needed.
- Every Pulsar is individually tested at least one week before it is released for sale.

Inspect all the new Pulsar models at the fine store nearest you. You'll feel a justifiable new pride in American craftsmanship and technology.

FREE: Write Time Computer, Inc., subsidiary of HMW Industries, Inc., Dept. SI-105, Box 1707, Lancaster, Pa. 17604 for handsome brochure illustrated in color. In Canada: Henry Birks & Sons, Ltd.

PULSAR
THE TIME COMPUTER®
Proud product of U.S.A.

Consumer demand for digitals began to grow in **1974**, when National Semiconductor announced that it would sell an LED watch at \$125, about half the prevailing price.

Immediately afterward, Litronix, Texas Instruments and Fairchild Camera and Instrument – all manufacturers of integrated circuits – introduced their own LED watches. Each firm invested in high volume, fully automated watch manufacturing plants.

In **1975**, the LED was America's hottest watch. As more and more watch companies introduced new models, prices fell below \$100, stimulating even more demand.

In **1978**, Commodore introduced a collection of 15 LCD watches priced from \$7.95 to \$19.95. They were sold in blister packs in department stores, grocery stores, drugstores, and electronics shops.





Early 1991, on an airplane, Michael Tchao pitched the idea for the Newton to Apple's CEO, John Sculley.

The company would announce it the following year, and the first product in the Newton Line, the MessagePad 100 went on sale in August of 1993.

It was Apple's handheld PDA, a term Apple coined.



<https://www.youtube.com/watch?v=QwL8eYdqasM>



[***https://www.youtube.com/watch?v=kN0SVBCJqLs***](https://www.youtube.com/watch?v=kN0SVBCJqLs)

How to Craft your “Fast Pitch”...

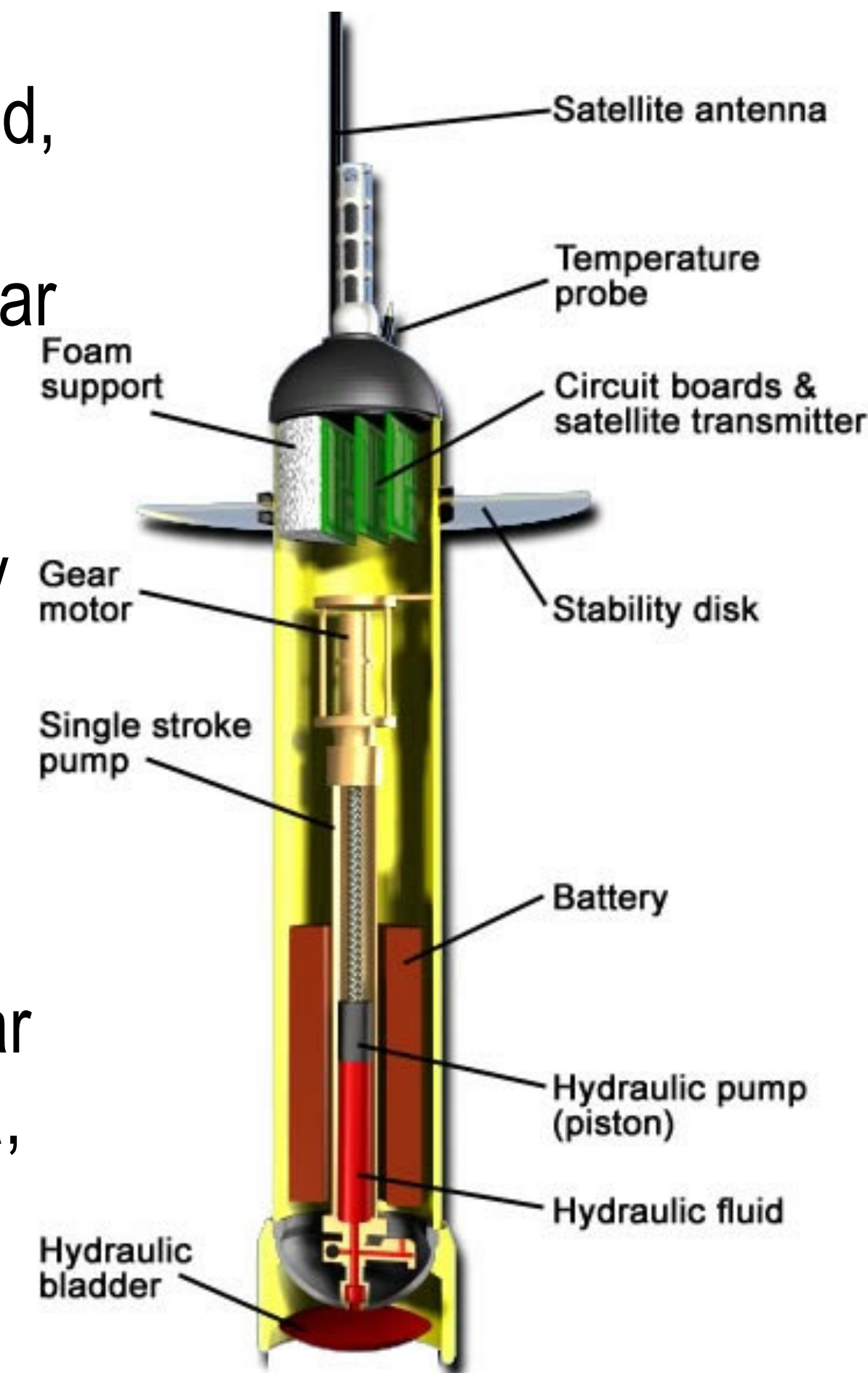
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Smaller Floats for Inexpensive and Accurate Ocean Floor Mapping

Alex Herron

- According to NOAA's Ocean Service, more than 80% of the ocean's floor remains "unmapped, unobserved, and unexplored." Currently, it's too expensive to map the ocean floor, because most ocean floor mapping is done by larger-scale research vessels, using high powered sonar that can sweep out 30 degrees in either direction.
- Smaller, more numerous Argo floats, fitted with sonar, can accurately, efficiently, and cheaply map the ocean floor. Other Argo floats are now used to dive down and collect data such as salinity, density, and temperature. Our smaller floats would be fitted with sonar in order to record the depths below them.
- Thousands of Argo floats already cover vast areas of the ocean, and could make progress far faster than single research vessels. This data found from Argo floats, alongside satellite data, and industrial vessel depth recordings, could be used to construct an accurate map of the ocean floor the likes of which has never been seen. This data could be sold to fishers, deep sea drillers, navies, universities interested in studying the ocean, and plenty of others.

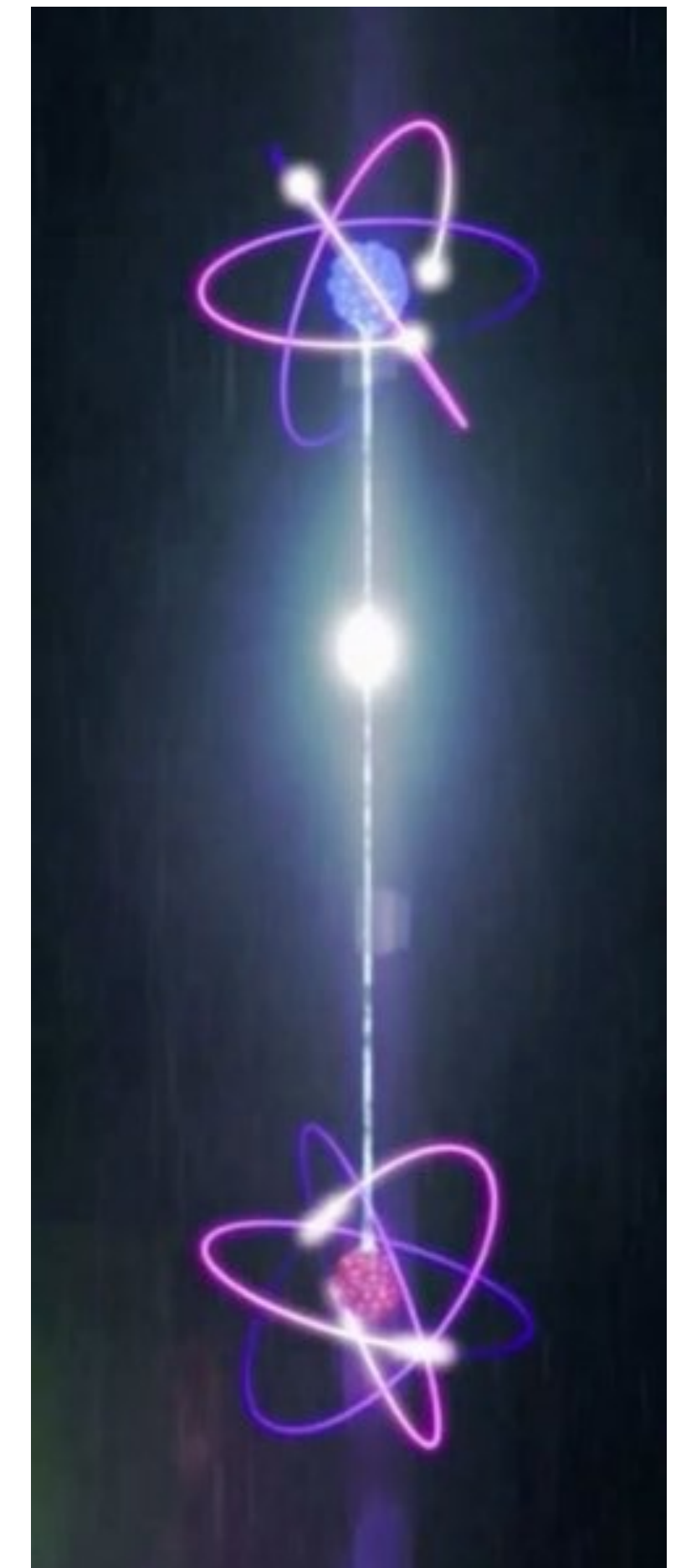




Quantum Entanglement for Fast Secure Trading

Joseph Lee

- High frequency trading (HFT) has become a major player in the financial industry. Statistics show that, within 1 second of a trade, an HFT platform can have about 99.5% accuracy within the actual price of a commodity or stock. While these numbers seem extremely great, being off by 0.5% can lead to substantial losses for HFT traders, and within 1 second the price could fluctuate by a nontrivial amount.
- The limiting factor in this system is the speed that traders receive data securely. Our business aims to increase these speeds by transmitting quantum entangled photons at the speed of light. Building from a recent paper to generate entangled photons from Cesium atoms, we propose to overcome challenges of generating and entangling coherent photons.
- Our encrypted data transmission system will be invaluable to HFT traders.





Xuxin Zhang

A “Smart” Shinai for Kendo Competition and Training

- Kendo is a form of martial art, which simply involves hitting your opponents in the head with Shinai (a bamboo sword). However, due to the properties of bamboo, the bamboo sword quickly becomes loose and the whole Shinai need to be replaced.
- A “smart” Shinai would be built from modern 21st century materials materials, the new Shinai can also contain some basic acceleration sensors and gyroscopes, which can be connected to a mobile app via Bluetooth for motion analysis and training. Remarkably, no such a product has been made in the current market.
- Member of kendo clubs around the world would benefit from better training and longer-life Shinai.





Sunand Raghupathi

Portable, Lightweight Computer with Augmented Reality Glasses

- Modern consumers need access to the full range of computing from work to entertainment. Laptops have the power to meet these needs, but they're too heavy and hard to carry. iPads and tablets are easier to carry, but don't provide nearly as many features as a laptop.
- A new, highly portable full-fledged computer, in the form of a very small lightweight device, can now be built using Augmented Reality glasses. This device would come equipped with a keyboard and mouse, but, instead of a screen, we use AR glasses.
- This will allow people to carry the same capability as a laptop, but with a device that fits in their pockets.





Zicheng Liu

Safe All-Scenario Shooting Range System using Virtual Reality

- Safe and realistic shooting range scenarios are needed for professionals and citizens to practice outdoor combat scenarios, and indoor close-quarter-combat scenarios.
- The VR system can be powered by either Oculus or SteamVR. The scenarios will be powered by Unreal Engine, with a realistic physics model that calculates the ballistics by taking into account the wind speed, the MOA (minute-of-angle, a measurement of firearms accuracy), the muzzle velocity of bullets, and various other physical parameters that could impact the ballistics. The software (the “game”) builds on existing platforms such as Steam or Oculus.
- Designed for military and law enforcement but also available for the general public, this safe simulation system can be used as an alternative solution for tactical training, self-defense training, or simply the purpose of learning and practicing shooting skills.





Drones with Water and Snow Depth Sensors for Accurate Water Management

Isaac Ruble

- One of the most important needs for water resource engineering is predicting how much water can be expected from snow melt and making reservoir volume adjustments accordingly. This task is complicated because the means of measuring snow mass are rudimentary. Only the snow height is measured at just a few places in the basin, and much more accurate data need need to be acquired.
- Drones can emit and receive EM sounding waves, tuned to a water resonance frequency, and measure depth and density of snow in a given area. With a few tweaks, this system could also be used to estimate water volume in a reservoir.
- More accurate data would correspond to better water resource management decisions, which would directly benefit local property owners, local farmers, local government, water resource engineering firms, and national programs like NOAA.





“Ball ‘o Energy” for Stress-Relieving Battery Charging

James Borovilas

- Have you ever had a stressful day at the office when, of all things, your phone runs out of battery? What if I told you there is a brilliant new way to (literally) recharge and decompress during those hard days at work?
- The Ball ‘o Energy is the only stress ball that uses groundbreaking piezoelectric generator technology to convert the pressure into electric energy that can be stored and later used recharge handheld devices.
- Say "goodbye" to the days when, on top of your busy schedule, you have to worry about your phone's battery dying. Be the first to invest in the Ball 'o Energy, a brand-new tech that can make everybody's lives better!





Unique Divine

Self-Driving Lawn Mowers

- Home and property owners spend thousands every year to mow their lawns.
- Reasonably priced lawnmowers, with an easy-to-use calibration process and GPS to stay within the boundaries of property, have several sensors around the edges to survey for grass that needs cutting. Besides mowing lawns, they would also survey for walls, rocks, people and animals, or anything that it shouldn't run over. As lawn mowers, they do not have to go through the more rigorous safety testing of self-driving cars.
- Using inexpensive and reliable self-driving lawn mowers, people will no longer have to use time or money to cut the grass.





Unique Divine

Plastic Scavenger Hunter to Clean Oceans

- About ~8 million tons of plastic enter the oceans each year where it then absorbs toxins that are harmful to people and sea life alike. The large majority (~97%) of this plastic is buoyant plastic that is within just a few meters of the ocean surface.
- A new robotic device would swim along the surface and retrieve waste in a cost-efficient manner and allow us to clean the ocean and recycle it.
- Clean oceans and recycled plastic!

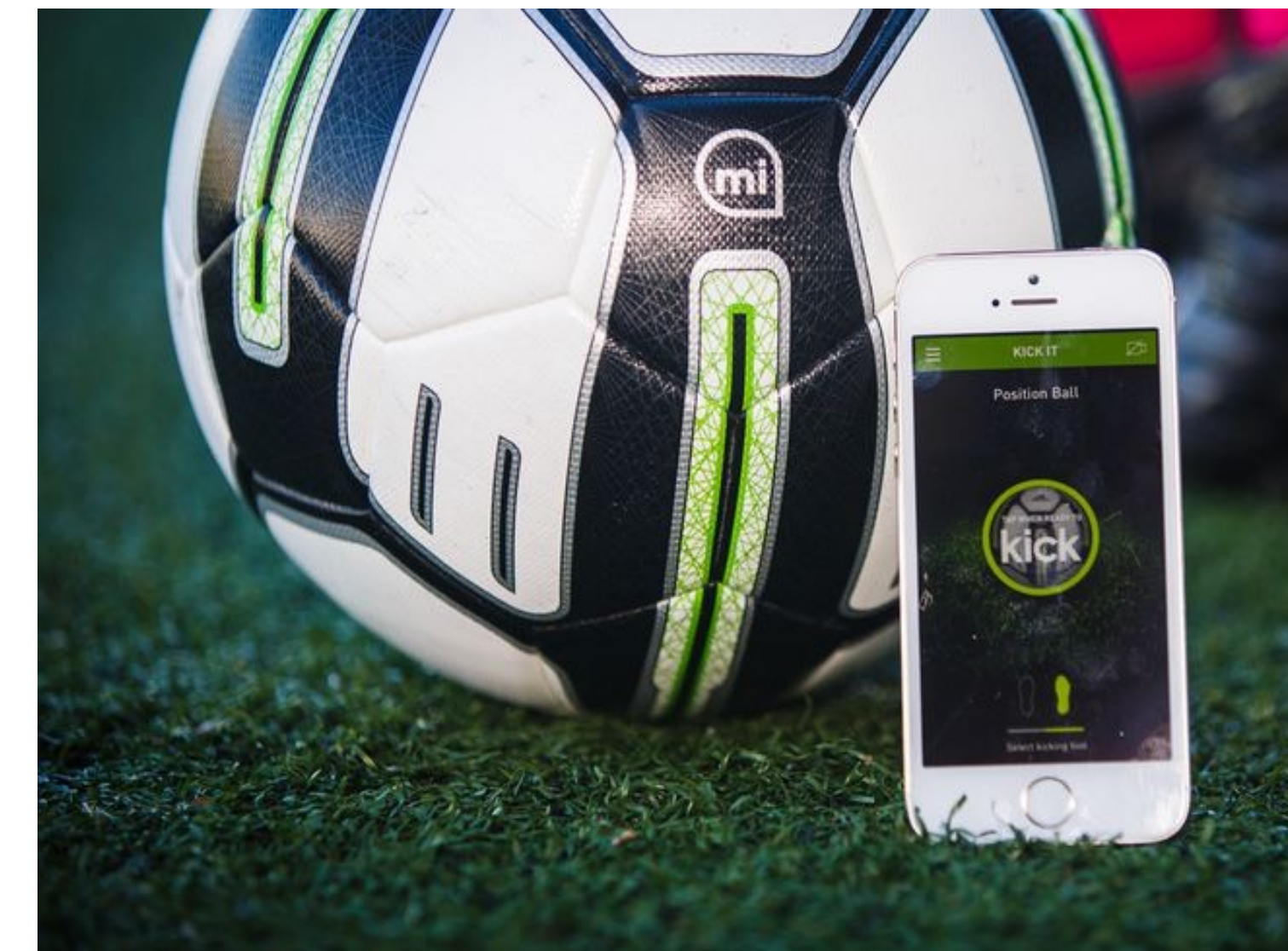




Kick Flow: Real-time free kick flow analysis

Marco Andres Miller

- Soccer players at all skill levels need to know how to kick the ball exactly where we want it. Sure, a large part of it is skill. But, the way the ball travels through the wind, specifically the fluid dynamics between the ball and the fluid medium is not insignificant.
- New real-time CFD software help soccer players understand the motion of the ball as it soars through the air. More importantly, it will allow players to modify the way they kick the ball so that it follows their desired path through the air towards the goal. The software collects data about the environment to find the density of air and parameters affecting the viscosity of air on that specific day. Although CFD analyses of sports is not uncommon, this is done using previously recorded data. This software, however, would perform real-time calculations, in a portable mobile device, that would be useful to a team during training.
- Professional soccer teams looking for solutions to allow for real-time improvement of techniques for free-kicks. Soccer is the favorite sport of many around the world. Soccer teams are always looking for ways to get an edge over the competition, and given the a software like this is the perfect way to do so.



Next Week

- Monday: GRE Practice
- Wednesday: Dr. Richard Post



Dr. Richard Post (Columbia PhD Applied Physics 1973) co-founded and served as CEO of Applied Science and Technology - Astex and founded and served as CEO of NEXX Systems.

Read [MKS acquires ASTeX](#), EE Times, (October 2000).