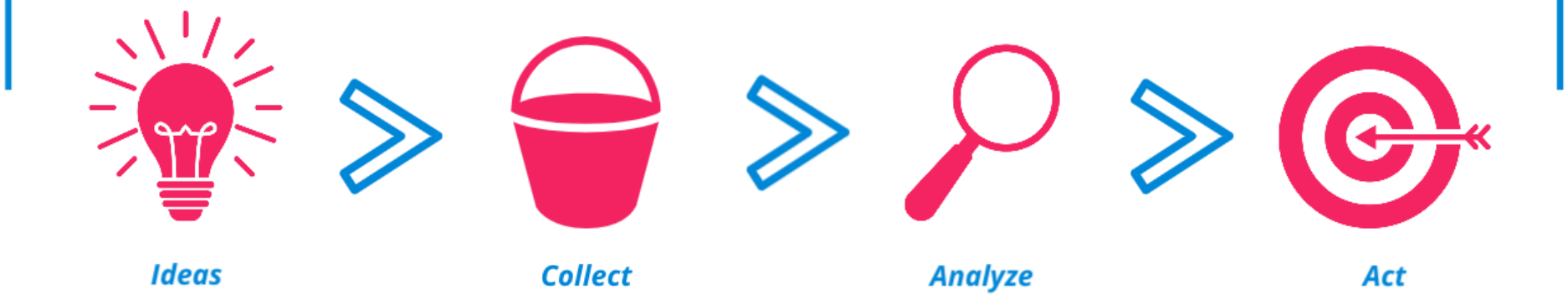
Ideation:
Coming up with workable business ideas

Can't really be taught…here is my feeble attempt

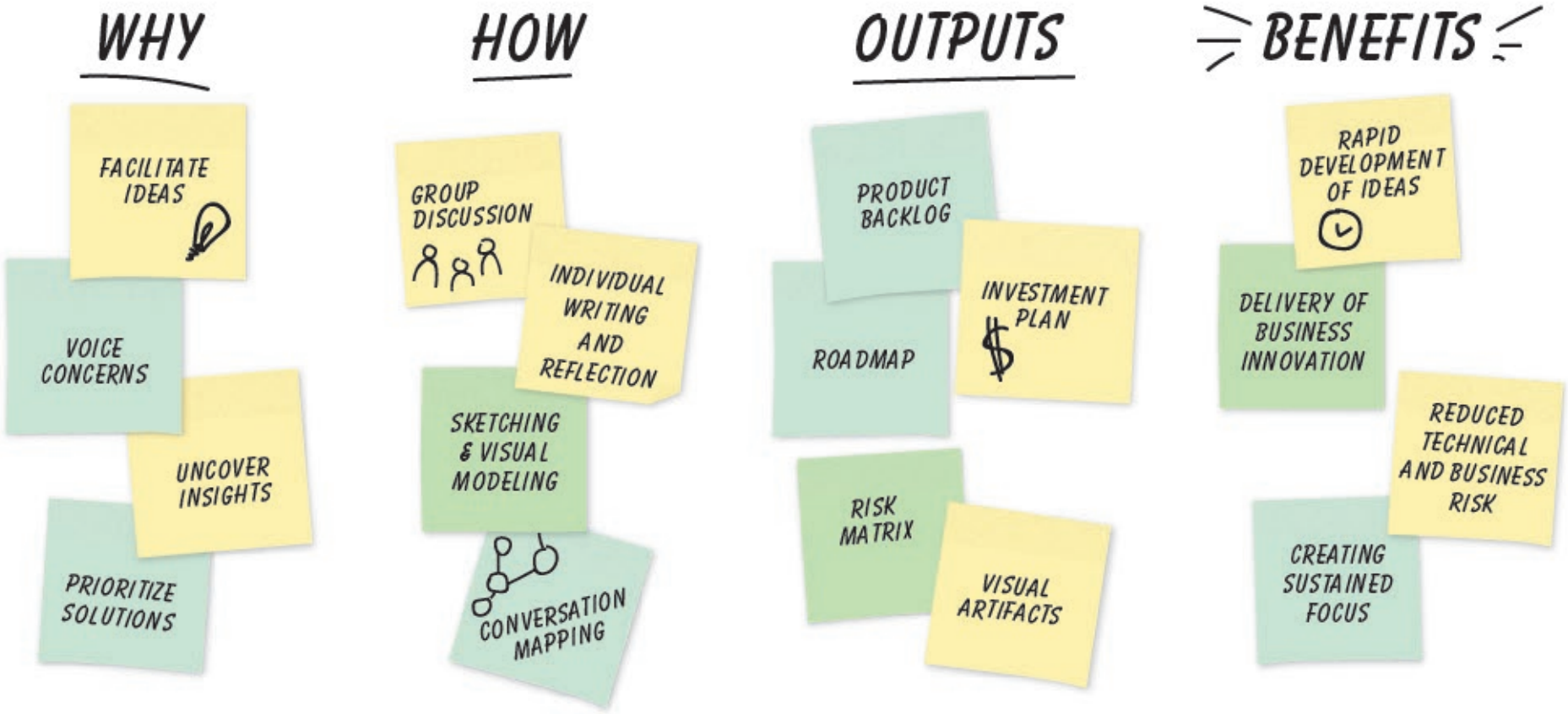
ENGR 4302/5302; EE 4302/5302

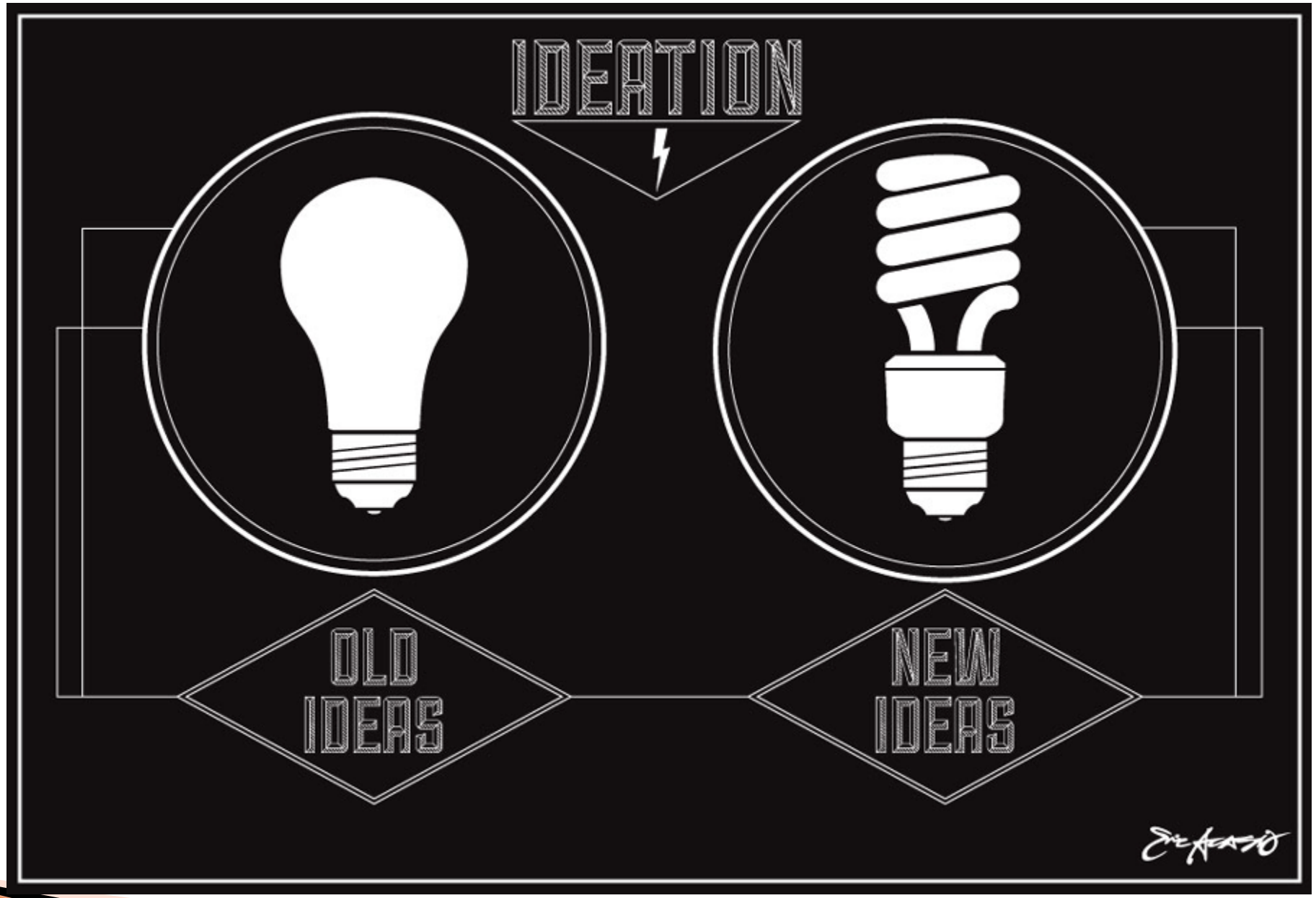
A WHOLE BUNCH OF INFO ON THE INTERNET---SEARCH

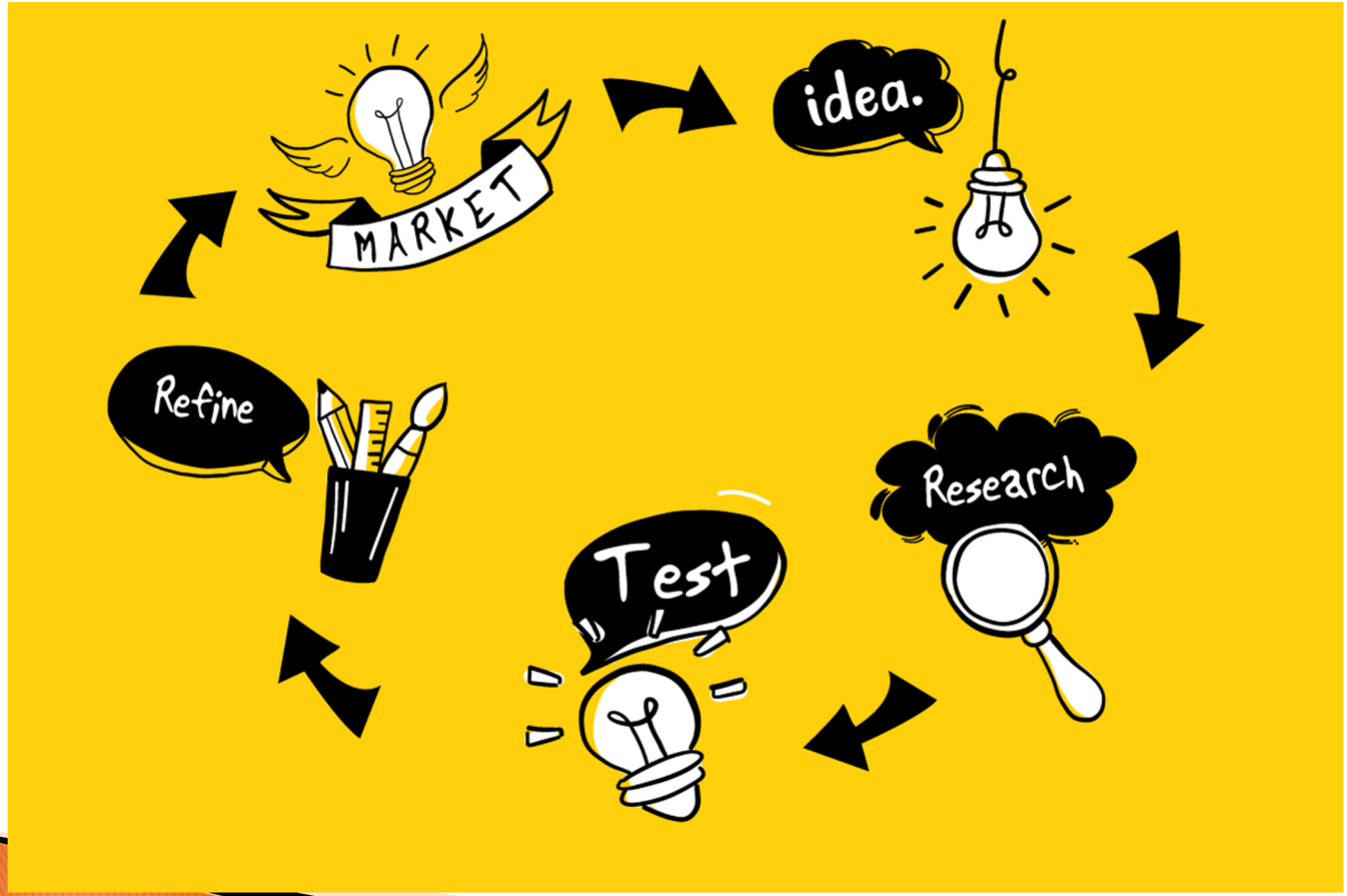
IDEATION



Ideation process example




IDEATION
OLD IDEAS
NEW IDEAS


idea.
Research
Test
Refine
MARKET

15 BEST NEW PRODUCTS YOU NEED TO KNOW ABOUT

ARTICLE by Nicole Martins Ferreira 26 Oct 2020

https://www.oberlo.com/blog/new-products

Updated for 2023…take a look…many nontechnical

Hidden cameras
Rainbow flatware
Biomagnetic ear stickers
Personal air cooler
Diamond-shaped ice cube tray
Reusable straws
Wooden alarm clock
Baby feather wings
Vintage light bulbs a la Edison
Hair removal epilator
Mini eye massage device
Essential oil diffuser w LED
Portable blenders
Cat self groomer
Dog treat launcher

SOME RANDOM COMMENTS

I have 40+ patents and some pending.
Basis for most ideas/inventions: Research
Most folks are not doing research all the time.

Aside: This connection of faculty with research is the cause of lots of university-initiated startups.

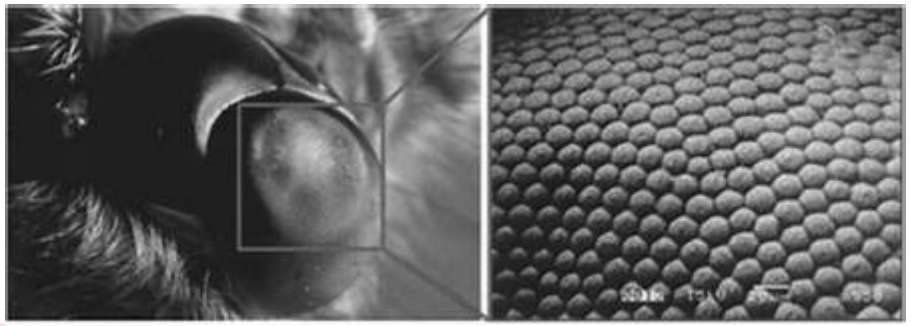
My approach: Attention to detail. Never gloss over unexplained occurrences in computation or experiment. Sometimes trivial but sometimes the beginning of something new.

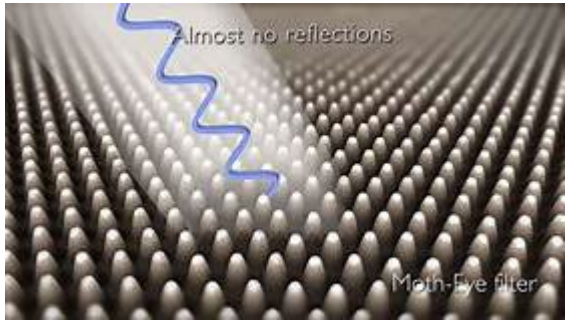
Always….. walking, jogging, blading, hiking, skiing, driving, watching TV, sleeping, etc…..connecting apparently unrelated things with what I know.

We all have a root base of knowledge/understanding---let the observed universe and all your experiences connect with and contextualize into that base! **What if…….?**

Unmet needs---what have you sometimes wished for?

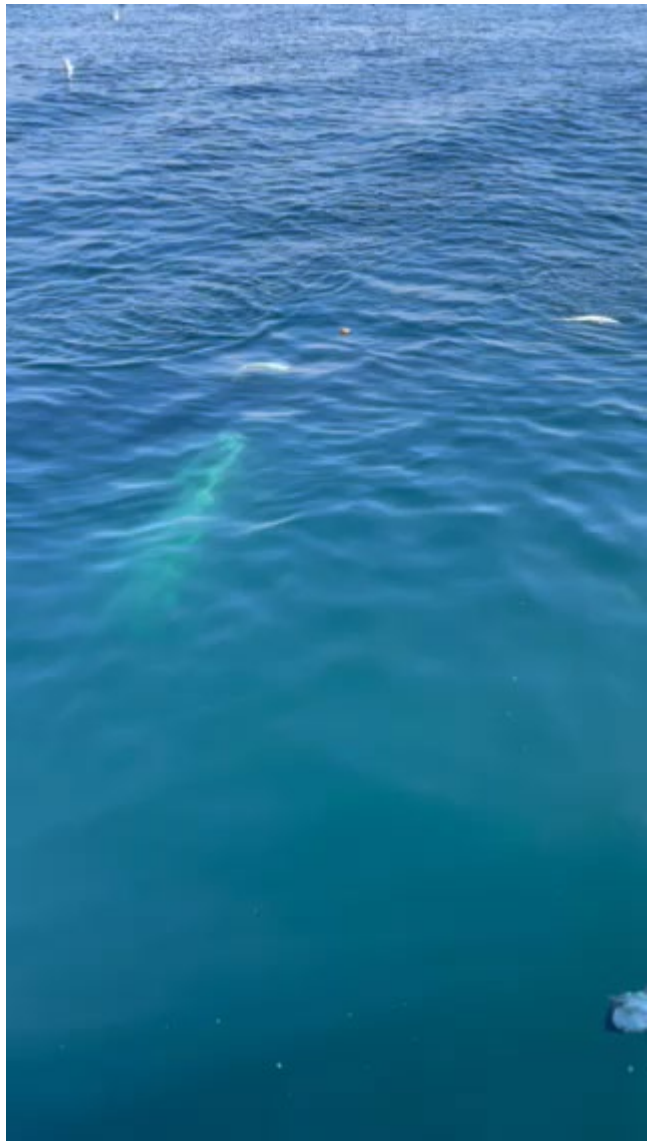
Take inspiration from nature…biomimetic



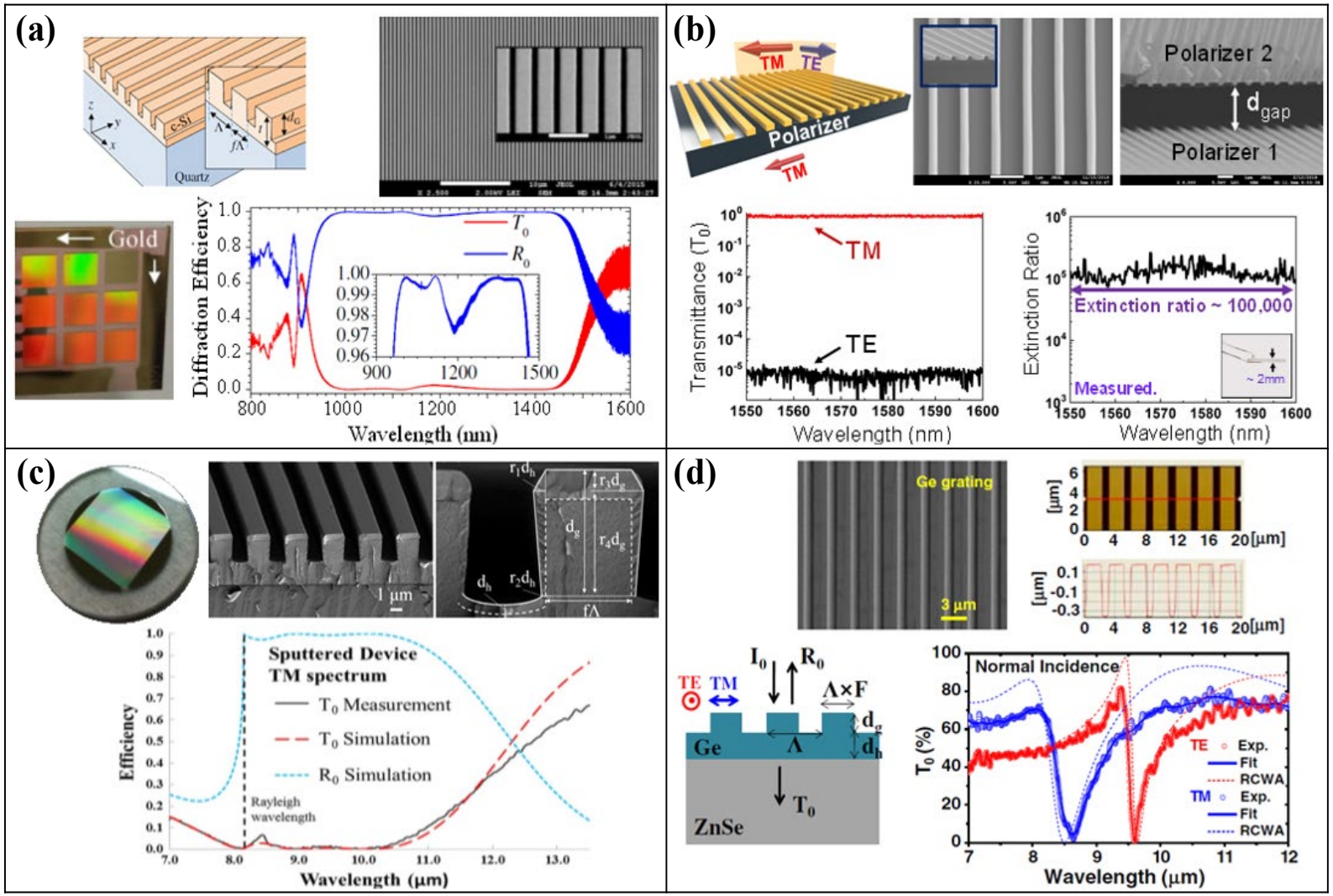


Take inspiration from nature…biomimetic

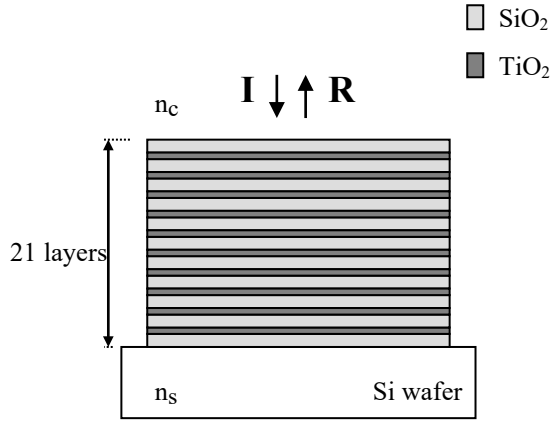
Take inspiration from nature…biomimetic

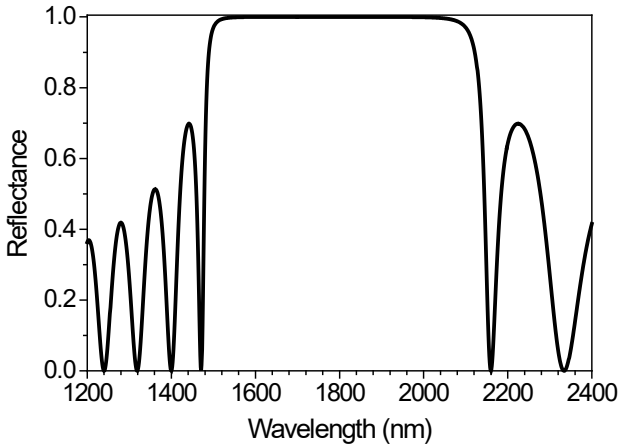


Our research…..nanophotonics/nanotech/sensors/etc.

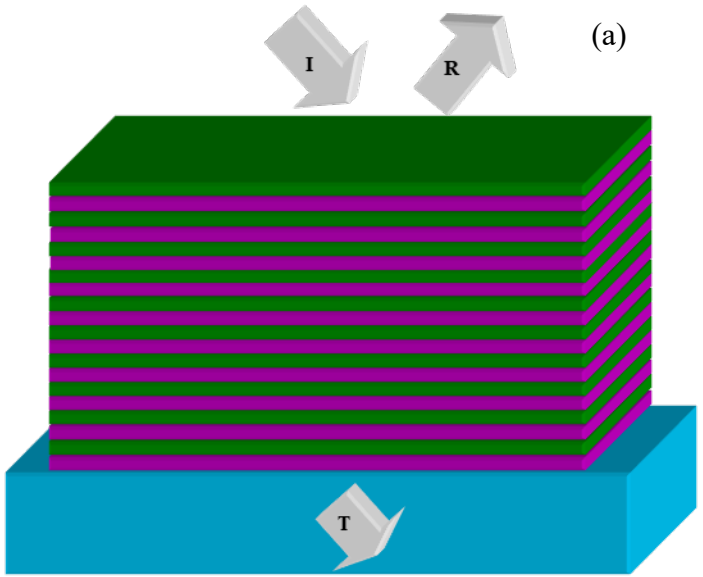


Our research…..nanophotonics/nanotech/sensors/etc.

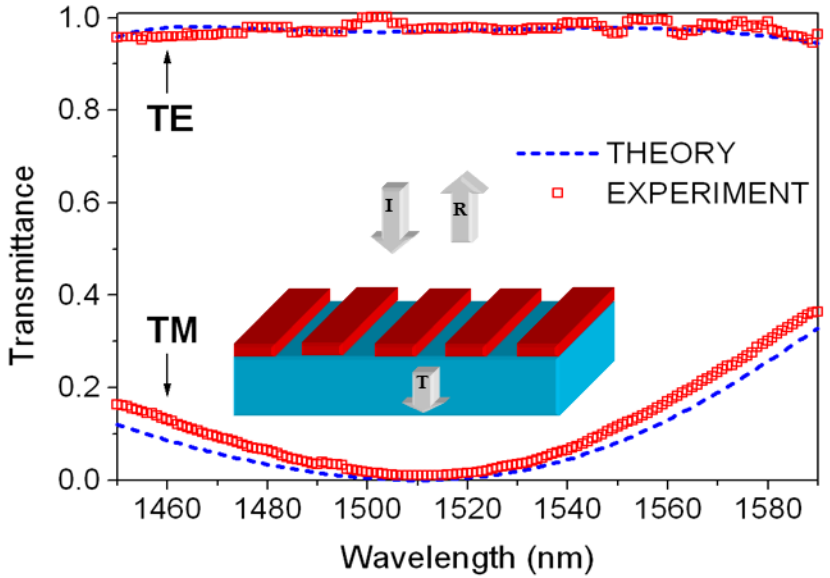




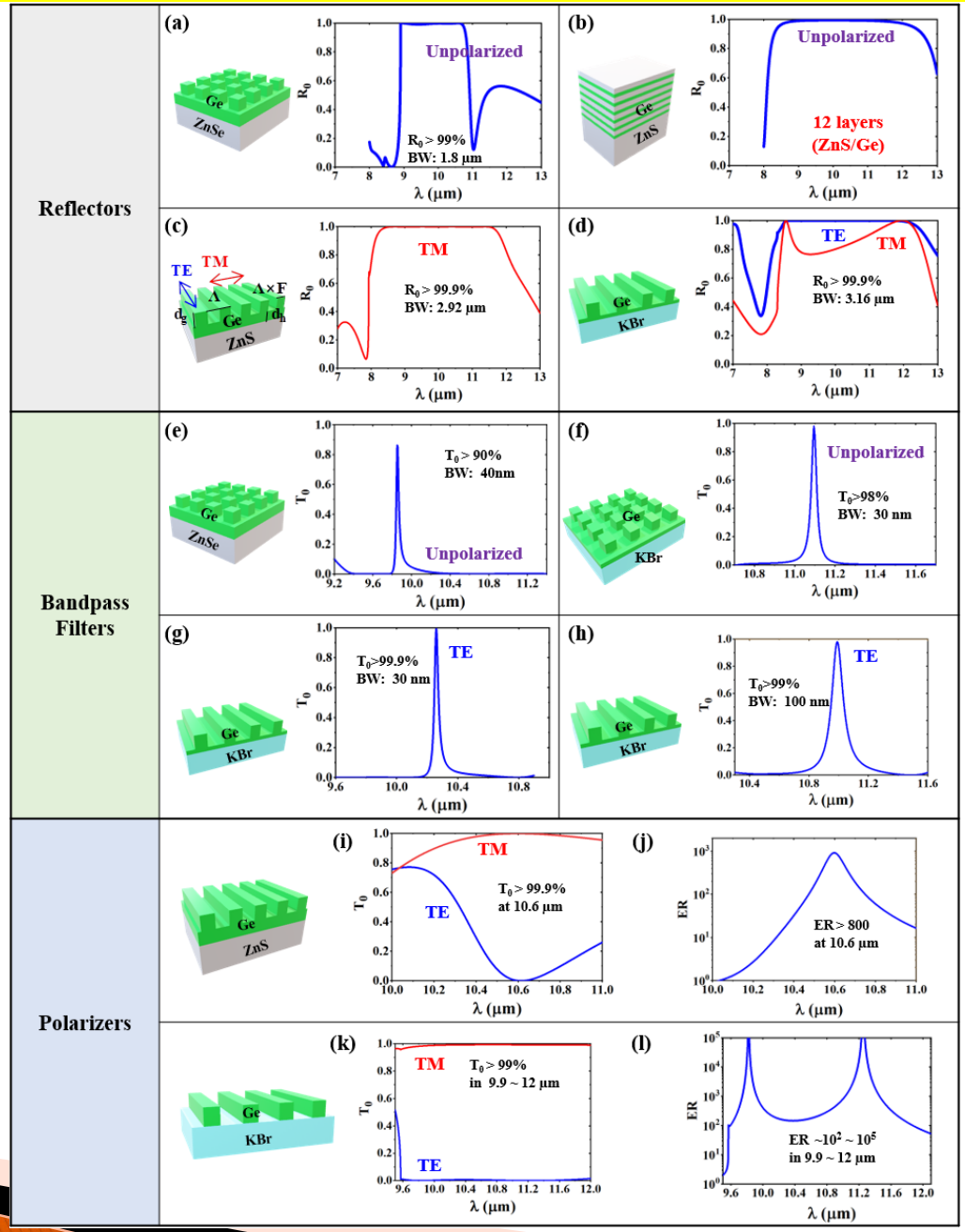
(a)



(b)



Tiwaz Technologies LLC--SBIR ideas--Funded 2023



Guided-mode resonance sensor technology

Commercialized by Resonant Sensors Incorporated
Technology invented/patented at UT Arlington

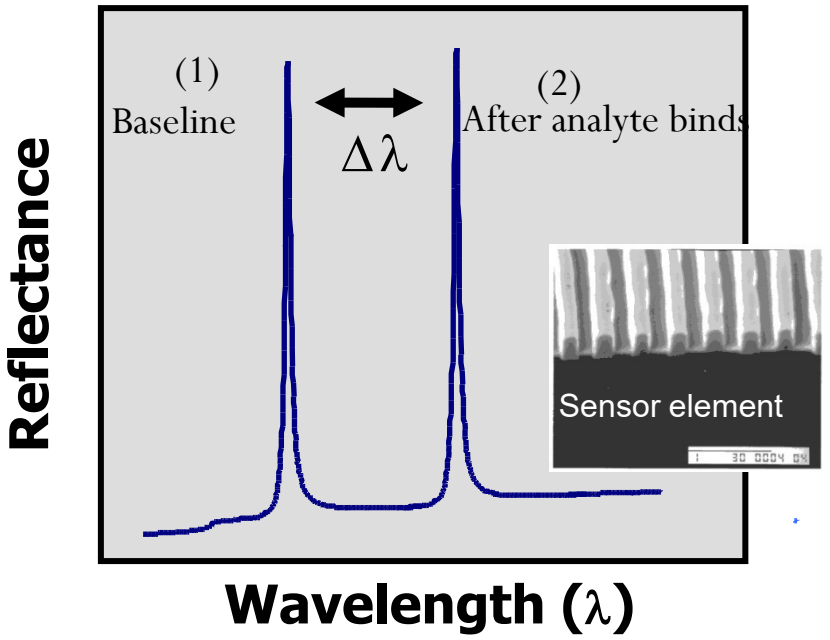
Advantages:

- ❑ Fast
- ❑ Outstanding accuracy
- ❑ High sensitivity
- ❑ High resolution
- ❑ Mass producible
- ❑ Time-effective
- ❑ Cost-effective

Multiple markets:

- ❑ Medical diagnostics
- ❑ Drug development
- ❑ Point of care, ready-to-use assay kits
- ❑ Biomarker discovery
- ❑ Veterinary medicine
- ❑ Military field use
- ❑ Personalized medicine
- ❑ Food safety
- ❑ Environmental monitoring

PHYSICAL PRINCIPLE:

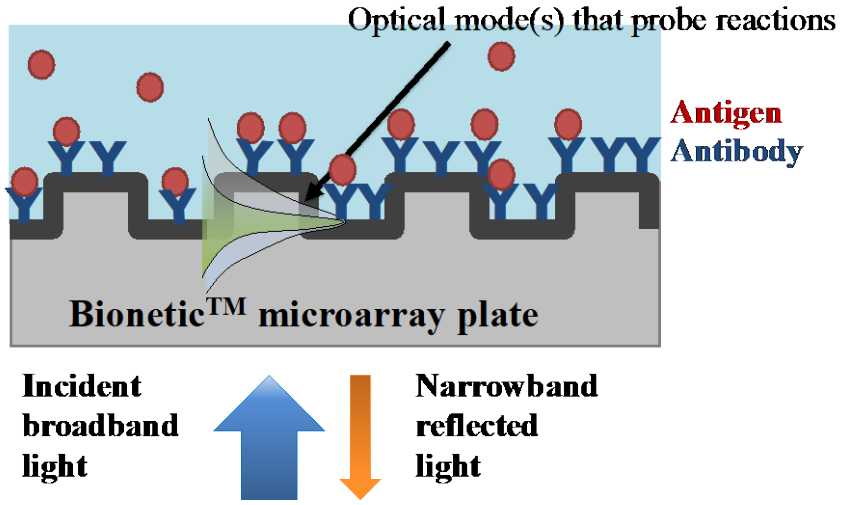


Captured biomolecules on nanopatterns

➔ Change in reflected color of light

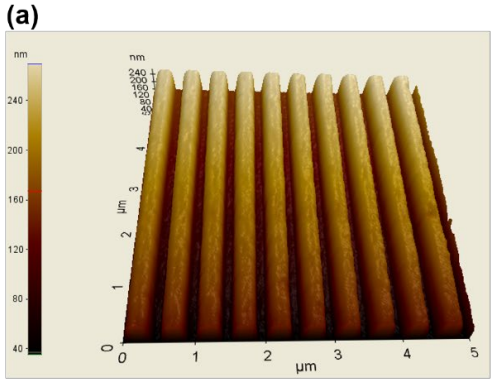
Commercial GMR sensor technology

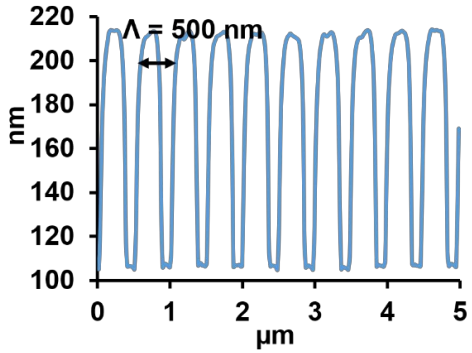
Set Your Label Free



Resonant Optics Incorporated (ROI)
Resonant Sensors Incorporated (RSI)
Resonant Sensor BioServices LLC

Founders: Debra Wawro, Robert Magnusson
Technology invented/patented at UT Arlington
1D, 2D, nonuniform sensors included
ROI licensed patent portfolio from UT Arlington
Many new patents filed



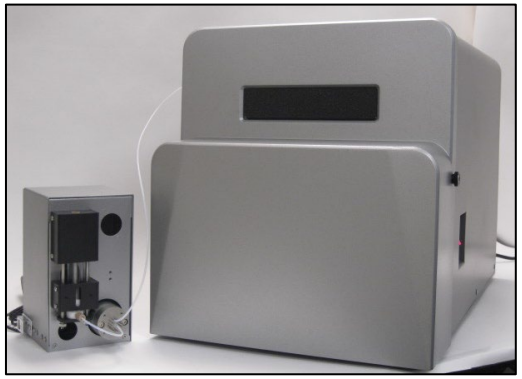


Commercial system used

Set Your Label Free

ResoSens™ system including ResoVu™ analysis software

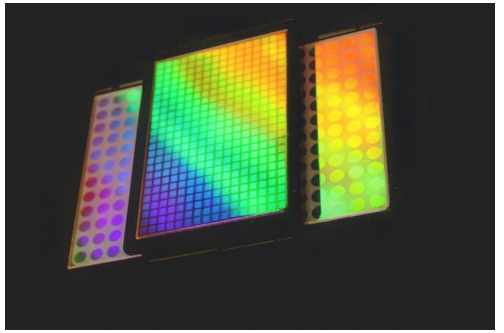
- Label-free operation in a microarray format
- Automation compatible
- Windows based, exportable CSV data files
- User selected plate layout and beam size



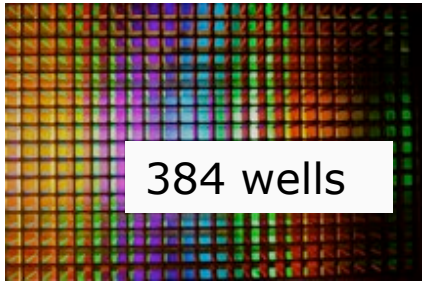
96- & 384-well microarray plates

- Bare and pre-activated
- Custom assay kits and/or reagents
- Method development and/or testing services
- Detect an array of analytes in a single well
  - custom multiplexed kits (4- or 8-plex)

Bionetic

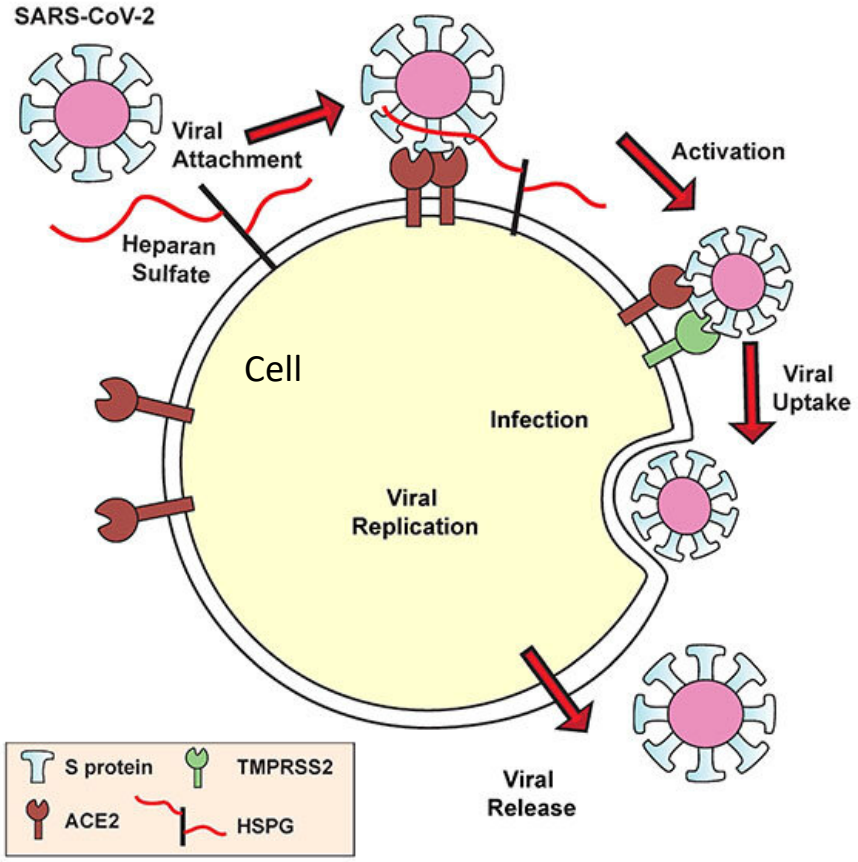


96 wells
Scan <20 sec



High-throughput ResoSens COVID-19 tests

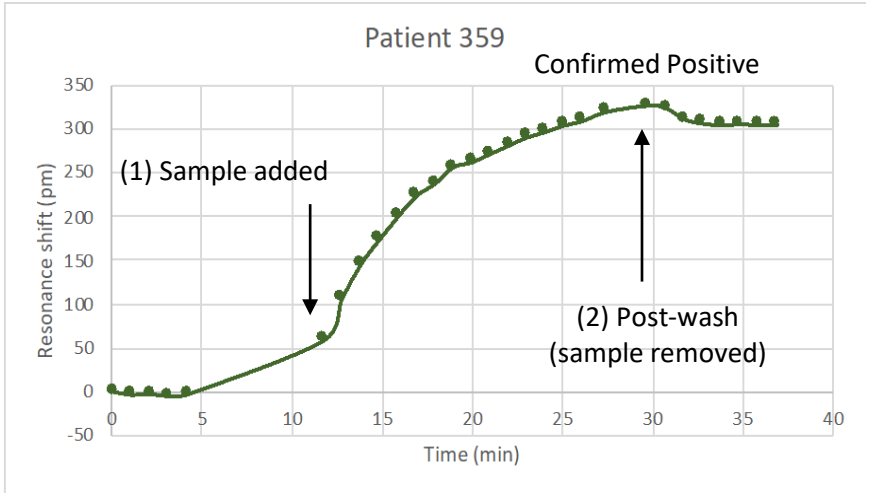
- **Patient serum/blood/saliva tests for antibodies against COVID-19 antigen**
- **Tests are performed using COVID-19 receptor binding domain (RBD) antigen.**

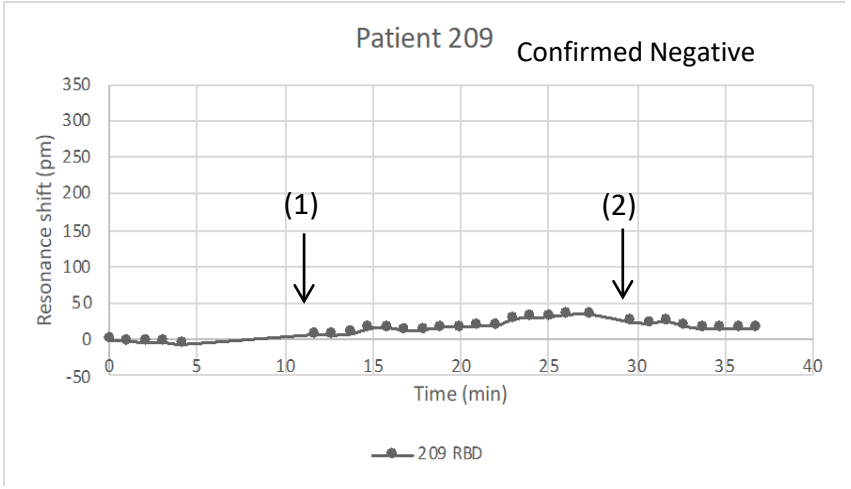


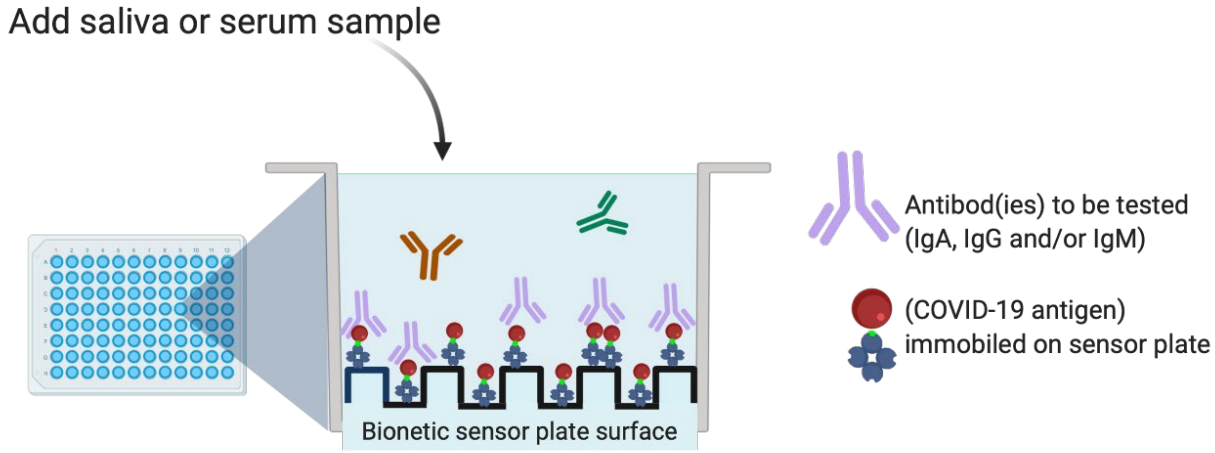
Scientists exploring how coronaviruses like COVID-19 infect human cells have shown that the **SARS-CoV-2 spike (S) glycoprotein binds to the cell membrane protein angiotensin-converting enzyme 2 (ACE2) to enter human cells.**

S-protein=Key
ACE2=Lock

Patient Serum Testing for Antibodies Against COVID-19 Antigen (RBD)







Results measured in quadruplicate and averaged.
Reference buffer subtracted from data.

4 wells/sample; 24 tests in a single run; ~30 minutes/run; <2 min/test

WORKS GREAT!

Serum sample diluted 1:10

Entrepreneurship Project

Gregory Turner, PhD – EE Dept, UTA

Youth Sports Management Application

This project is to develop a software database management system to be used by a youth sports organization.

A primary component of the system would create and organize teams/venues/schedules for a season of any sport. This would include matching up players with coaches as well as officials with venues to organize where and when teams would practice as well as play games.

A secondary component of the system will be a smartphone app that can be accessed and used by coaches and parents/guardians to communicate and share photos/videos. The app will also be accessed by game officials to report game results. Finally, the app will serve ads and coupons to teams that can be used after a game is finished. Local businesses can target teams with a coupon to get them to come in for after game meals or gatherings.

Database system to provide the following:

- Create teams and assign coaches
- Develop season schedule to allocate venue and official resources

Smartphone app to provide the following:

- Organization
  - Manage Teams
  - Adjust and Update Schedules and Previous Game Results/Statistics
  - Post and Control Coupons and Advertising
- Coaches
  - Ability to contact/message Team and individual players/guardians
- Officials/Scorekeepers
  - Ability to enter game results (scores/penalties/
- Parents/Guardians
  - View Schedule/Game Results (real-time)
  - Post pictures/videos

What are the important problems?

Environmental sustainability
Global warming
Water resources
Forest fires
Water contamination
Ocean health
Pollution---the big killer
Education
Population
Inequality
Political instability/wars
Transportation
Your input……

Top 10 Biggest Issues in the World Today | The Borgen Project **Do you want to solve/mitigate any of these?**

1.Poverty. More than 70 percent of the people in the world own less than $10,000 — or roughly 3 percent of total wealth in the world. Geographically, the story is similar. A lack of global emphasis on foreign aid, conflict and political factors have kept poverty as a driving factor. In the last two decades, however, things have started to improve. The "middle class" has doubled in size from seven to thirteen percent.

2.Religious Conflict & War. Political conflict has drastically increased over the years. Terrorism and the rise of religiously-motivated insurgent groups have forced the hand of several governments. As a result, defense spending around the world has risen steadily since 1995 to $1.7 trillion. While terrorism may be on the rise, the good news is that diplomacy and peace efforts have decreased the number of civil wars and intra-state conflicts around the world from 16 per 100,000 to about 1 per 100,000. But now there is the Russian invasion of Ukraine….!

3.Political Polarization. Political polarization has skyrocketed with the rise of social movements across the world. States have experienced internal strife from events such as BREXIT or the U.S. election of President Donald Trump. PEW claims that the U.S., specifically, has become more polarized than ever. Since 2004, the U.S. has reportedly seen a rise in political partisanship. Bi-partisan groups and organizations, such as the Bipartisan Policy Center, have been actively working to promote a more collaborative political arena.

4.Government Accountability. Throughout the world, political scandals have led to a distrust of government. Specifically, in the U.S., reports say only a third of Americans trust the government to "do what is right." Advancements in tech and China's new surveillance policy do not help. Skepticism on such issues has led to a rise in social movements which have been key in influencing policy.

5.Education. While education has significantly improved in the last century, there still remains a lot of work to be done. Inequality between genders in specific parts of the world has emerged as a large part of the question. The Malala Fund reports 130 million girls across the world lack proper access to schooling and actively addresses this issue through advocacy.

6. Food and Water. Currently, 1 in 9 people lack access to clean water across the world and the same ratio are malnourished. The emergence of new technology in agriculture and increased awareness, however, has improved conditions. Several organizations, such as the World Health Organization (WHO), are addressing the issue on the ground and through political influence.

7. Health in Developing Nations. Statistics has widely shown that aside from malnourishment, access to clean and affordable living conditions has lagged in the developed world. Life expectancy in developing nations is on average 14 years behind developed nations'. Overall health, however, has increased over the years, thanks to organizations such as WHO.

8. Credit Access. One of the driving factors in continued poverty is the lack of access to credit. Without stable financial services, it becomes difficult for developing nations to grow at a sustained rate economically. Studies show that access to credit can improve economic prospects.

9. Discrimination. Discrimination covers a wide breadth of issues and takes several forms. Recently, in light of new social movements, it has garnered more attention. Wage gap issues, income inequality, education wage premiums and other problems have appeared at the forefront of social movements. These movements have shown promise for change – the #MeToo movement has brought several employers to justice.

10. Physical fitness. Obesity has become a global issue. The lack of physical fitness programs and extra-curriculars have created significant issues that could affect future health. Recently, the number has exceeded 39 percent of individuals around the world being overweight and 13 percent being obese. Efforts by the government and even media have started to turn the tide. Professional organizations such as the NFL have implemented Play60 programs to emphasize nutrition and fitness from a young age.

There are entrepreneurial opportunities in solving some of these problems.

Additional data….

https://poetsandquants.com/2022/11/22/pitchbooks-top-universities-for-startup-founders/

https://www.colorado.edu/venturepartners/2023/05/18/internal-news/university-colorado-soars-top-five-launching-startups

https://www.hscnext.com/