Type them into questions box!

“Why am I muted?”
Don’t worry. Everyone is muted except the presenter and host.
Thank you and enjoy the show.

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Browse [ACS Resources](http://www.acs.org) and [Initiatives](http://www.acs.org)!

Visit [www.acs.org/covid-19](http://www.acs.org/covid-19) to learn more!

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Whether you are just starting your journey, transitioning jobs, or looking to brush up or learn new skills, the ACS Career Navigator has the resources to point you in the right direction.

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- ACS Leadership Development System
- Career Navigator LIVE!
- ChemIDP
- College to Career
- ACS Webinars
- Virtual Classrooms

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ACS Scholars Endowment Founder Joe Vacca, retired Vice President of Chemistry, Merck & Co, meets with his 2018 ACS Scholar Johanna Masterson, now a grad student at Princeton University.

“Chemistry has been good to me...so I wanted to make a significant gift to provide that opportunity to others.”
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Can Wearable Devices Detect Health Abnormalities?

Thursday, July 16, 2020 at 2:30pm ET
Speaker: Lawrence Silverman, University of Virginia
Moderator: Heather Clark, Northeastern University

What You Will Learn
- What are the common devices and what metrics do they provide
- What is the science behind these metrics
- What does the scientific literature report regarding these claims

Co-produced with: Partnership for Clean Competition and ACS Sensors

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An Evolutionary Mystery

Friday, July 17, 2020 at 2:30pm ET
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What You Will Learn
- What is the impact of homochirality on biology and chemical evolution
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Enhancing Online Laboratory Experiences

Wednesday, July 22, 2020 at 2:30pm ET
Speakers: Marie Gardella-Wilkins, North Carolina State University / Kyle Grice, DePaul University / Michael Seely, University of Edinburgh
Moderator: Stacey Lowery Bresl, Miami University

What You Will Learn
- Various goals and outcomes for online undergraduate laboratory experiences
- Examples of how laboratory goals and outcomes are being fulfilled
- Approaches for planning and assessing online laboratory experiences

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This ACS Webinar Will Begin Shortly...
Grateful for Chemistry

Mark Jones  
Executive External Strategy and Communications Fellow, Dow Chemical

Matt Grandbois  
Strategic Market Manager, DuPont Electronics & Imaging

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modified Coronavirus 3D model by Teliri on Sketchfab

Hydrogen peroxide

Dodesylbenzenesulfonic acid  Ammonium bicarbonate  Hypochlorous acid
Peroxyacetic acid  Ammonium carbonate  Isopropanol
Octanoic acid  Ethanol  L-Lactic acid  Citric acid
Quaternary ammonium  Silver ion  Sodium chlorite
Sodium dichloroisocyanurate  Sodium hypochlorite
**NUCLEIC ACID TESTS**

Nucleic acid tests detect the virus’s genetic material to confirm that a person is currently infected with the virus.

**HOW DO THE TESTS WORK?**

Viral RNA is extracted from a nose or throat swab. An enzyme called a reverse transcriptase converts the RNA to DNA.

Copying

Transcribed DNA

Probes

In some tests, polymerase chain reaction makes millions of copies of the transcribed DNA. Short, virus-specific oligonucleotide probes with a fluorophore on one end bind to the copies. An enzyme cleaves the probe, causing fluorescence and confirming infection.

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**ANTIGEN TESTS**

Antigen tests look for fragments of viral proteins to confirm that a person is currently infected with the virus.

**HOW DO THE TESTS WORK?**

Antigen tests can be carried out in a variety of ways. Most use a sample collected on a swab, though some use blood samples.

Sample

Viral proteins

Fluorescent antibodies

Virus in a collected sample is chemically broken up in solution and added to a slide coated in antibodies. The antibodies bind to the viral proteins. Then, fluorescent antibodies are added, which attach to confirm a positive result.

*Created by Andy Byrinn for Chemical & Engineering News*
ANTIBODY TESTS

Antibody tests identify if a person has antibodies to the virus. If they do, they had an infection in the past.

HOW DO THE TESTS WORK?

Many types of antibody tests are available. They all aim to detect antibodies in a person’s blood, serum, or plasma sample.

Most antibody tests work by mixing a person’s sample with viral proteins or protein fragments. Any antibodies the person generated will bind to these. Then a reporter molecule, such as a fluorescent antibody, is added to detect past infection.
Remdesivir

Dexamethasone
more than 90 vaccines under development using 8 different strategies – 4 very chemical

**NUCLEIC-ACID VACCINES**

DNA vaccine

- Electroporation
- Coronavirus spike gene
- A process called electroporation creates pores in membranes to increase uptake of DNA into a cell

RNA vaccine

- RNA is often encased in a lipid coat so it can enter cells
- Coronavirus spike peptide
- RNA- and DNA-based vaccines are safe and easy to develop: to produce them involves making genetic material only, not the virus. But they are unproven: no licensed vaccines use this technology.


**PROTEIN-BASED VACCINES**

Protein subunits

Twenty-eight teams are working on vaccines with viral protein subunits — most are focusing on the virus’s spike protein or a key part of it called the receptor binding domain. Similar vaccines against the SARS virus protected monkeys against infection but haven’t been tested in people. To work, these vaccines might require adjuvants — immune-stimulating molecules delivered alongside the vaccine — as well as multiple doses.

Spike protein

M protein

Coronavirus peptide

Immune response

more than 90 vaccines under development using 8 different strategies – 4 very chemical

Virus-like particles
Empty virus shells mimic the coronavirus structure, but aren’t infectious because they lack genetic material. Five teams are working on ‘virus-like particle’ (VLP) vaccines, which can trigger a strong immune response, but can be difficult to manufacture.


2020 estimates for U.S. chemical production predict declines. What sector is the red bar?

- Basic petrochemicals and organic chemicals
- Manufactured fibers
- Inorganics
- Synthetic rubber

Audience Challenge Question
ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT
ACC 2020 Estimates For Basic Chemicals Volume

<table>
<thead>
<tr>
<th>Category</th>
<th>% Change Year-over-year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufactured Fibers</td>
<td></td>
</tr>
<tr>
<td>Synthetic Rubber</td>
<td></td>
</tr>
<tr>
<td>Plastic Resin</td>
<td>-5.6%</td>
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<tr>
<td>Inorganic Chemicals</td>
<td></td>
</tr>
<tr>
<td>Bulk Petrochemicals and Organics</td>
<td></td>
</tr>
<tr>
<td>Total Chemicals</td>
<td>-9.3%</td>
</tr>
</tbody>
</table>

June 2020 American Chemistry Council Mid-year Situation & Outlook
3D visualization of COVID-19 surface released for researchers


www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2-covid-19
How much has Zoom daily user count increased since the pandemic forced workers to stay at home?

- 57%
- 182%
- 378%
- 466%

* If your answer differs greatly from the choices above tell us in the chat!

WFH policies have placed an unprecedented demand on global digital communications infrastructure:

- Working from home has meant more virtual meetings via Zoom, Skype, Teams, etc....

- Internet usage has dramatically increased globally, yet we have not yet “broke the internet”...Why??

- Chemistry has enabled the proliferation of digital communication

https://twitter.com/wreckitralph
Moore’s Law has been abled through development of countless chemical innovations.

- Fabrication of electronic semiconductor devices utilize chemical mechanical planarization, photoresists, antireflective coatings, ultrapure cleaners and removers, controlled metallization, thermal insulation materials......

Societal infrastructure exists with unprecedented willingness to listen, share, and take action in response to escalation atmosphere of social unrest.
As “dog days” of summer come, I am grateful for the relative attenuation of commonly found sunscreens.

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Friday Rebroadcast
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Moderator: Ryan Fortune, University of Kentucky
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Co-produced with: ACS Astrochemistry Subdivision

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Wednesday, July 22, 2020 at 3:00pm ET
Speaker: Maria Garland-Williams, North Carolina State University / Kyle Gorse, DeVilbiss University / Michael Setty, University of Edinburgh
Moderator: Stacey Lowery Brez, Miami University
What You Will Learn
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