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.
Join us in our efforts to increase the diversity of chemistry.

Valued donors like you have sustained ACS educational programs that are welcoming students from diverse backgrounds into our profession.

www.acs.org/donate

ACS Office of Philanthropy
Chemistry for Life®

Fostering a diverse talent pipeline by providing college scholarships and mentoring to accomplished Black/African American, Latinx and American Indian students.

www.acs.org/scholars
ACS Scholar Adunoluwa Obisesan
BS, Massachusetts Institute of Technology, June 2021
(Chemical-biological Engineering, Computer Science & Molecular Biology)

“The ACS Scholars Program provided me with monetary support as well as a valuable network of peers and mentors who have transformed my life and will help me in my future endeavors. The program enabled me to achieve more than I could have ever dreamed. Thank you so much!”

Support the next generation of chemical scientists

GIVE TO THE
ACS SCHOLARS PROGRAM

Donate today at www.donate.acs.org/scholars
Share your experiences, inspire a student, advocate for chemistry!

The ACS Committee on Senior Chemists encourages engagement and collaboration across the Society with ACS groups and within the community. The Committee’s objectives are to:

• **Improve communication among senior chemists**

• **Increase the number of senior chemists’ groups and the level of their engagement within local sections**

• **Encourage the involvement of senior chemists in programs focused on K-12 education, undergraduate networking, and mentoring**

If you have questions, or would like to get involved with the committee’s activities, please send an email to [seniorchemists@acs.org](mailto:seniorchemists@acs.org).

You can make a difference!

There are many ways to get involved through your local section or local community. Share a lifetime of experiences and help the next generation of chemists.

**Science Coaches**
Lend your expertise as a coach and help a teacher advance science education.

**National Chemistry Week**
Organize or participate in events in your community to promote the value of chemistry in everyday life.

**ACS Career Consultants**
Help an emerging chemist with career advice.

Local Section Senior Chemists Committees

Senior Chemists Committees can be created in any ACS Local Section with a focus on creating opportunities, representing the needs of, and offering programming and services for senior chemists in a particular geographical area. In addition, senior chemists are in a unique position to share a lifetime of experiences with students, young chemists, and the public.

Socialize With Peers  Stay Active After Retirement  Advocate for Chemistry Through Community Outreach

Find out more about the benefits of participating!  www.acs.org/seniorchemists

Virtual Networking Ice Cream Event with Chemistry Professionals & Undergraduates
Sunday, September 12 from 2:00 – 3:30 p.m. EDT

Kelley Callin  United States Army Combat Capabilities Development Command Armaments Center (Government)
Tejas Shah  Research Investigator Corteva Agriscience (Industry)
Barry Streusand  Owner, Applied Analytical, Inc. (Small Chemical Business)
Dominique Williams  Biochemistry, University of Richmond (Academia)

For more information on registration, please send an email to seniorchemists@acs.org. The first 25 registrants will receive a special treat!
THE POST-COVID CHEMISTRY ECONOMY & DEIR PROGRAM UPDATES

FREE Webinar | TODAY at 1pm ET
WELCOME TO TODAY’S WEBINAR, SAY HELLO IN THE QUESTIONS WINDOW!

The Post-COVID Chemistry Economy & DEIR Program Updates

Presentation slides are available now! The edited recording will be made available as soon as possible.

www.acs.org/acswebinars

This ACS Webinar is co-produced with the ACS Senior Chemists Committee and the ACS Office of Philanthropy.
Goal 5

Embrace and Advance Inclusion in Chemistry

Promote diversity, equity, inclusion, and respect (DEIR); identify and dismantle barriers to success; and create a welcoming and supportive environment so that all ACS members, employees, and volunteers can thrive.

The Office of DEIR is the central hub...

...DEIR is the work of all of us.
ACS of the Future

We can make these future characteristic statements a reality:

- An environment where all have a sense of belonging across every level of the Society.
- Leaders at all levels are prepared, ready, and accountable for displaying DEIR.
- Rewards and recognitions are reflective of inclusivity and the involvement of new members.
- Communication is transparent, accessible and consistent to promote awareness of resources, policies and opportunities throughout the Society.

Where do we start?

- Promote the Office of DEIR as the centralized reference point for DEIR resources.
- Validate the future characteristic statements with larger cross-section of the organization.
- Develop a robust communication plan to ensure that all members and stakeholders are aware, and engaged and involved.
Calls to Action

How can you help?

• Contact the Office of DEIR at:
(QR code also leads to contact form)
• Check out www.acs.org/deir for resources
• Review ACS Volunteer and ACS National Meeting Code of Conduct

Looking Forward

• Communication is essential.
• The Office of DEIR will provide regular updates to ACS governance and membership.
  – Next update will happen at ACS Spring 2022 Meeting
**Senior Chemists in action!**

A July 2020, SCC webinar considered ways that senior chemists could impact systemic racism.

https://register.gotowebinar.com/recording/5402310053734352646

**SCC has responded with three programs:**

- Great Connections classroom visits
- Mini-grants to senior chemists in technical divisions and international chapters
- Campaign for ACS Scholars funding

*The July 9, 2020 webinar identified potential actions to advance DEIR.*
Great Connections

- Seniors visit classrooms with underrepresented students
- National Chemistry Week Activities have been selected
- Seniors will receive a script, NCW brochures, and supplies
- Pilot visits will occur in Fall 2021, and scale up is planned in spring 2022
- Glow stick chemistry!

Questions: Contact seniorchemists@acs.org

DEIR Senior Chemists Mini-grant

- Seniors with creative ideas can apply for up to $500 to use in 2021 or 2022
- Partnership with technical divisions, international chapters or other official ACS entities is required for funds management
- Seminars, virtual speakers, activity days, or anything!
- Local Sections should apply for Local Section DEIR grants
- Deadline October 29, 2021

Questions: Contact seniorchemists@acs.org
Campaign for ACS Scholars funding

- The Senior Chemists Committee internal campaign in late 2020 had overwhelming support by the committee
- In May 2021, SCC initiated a broader campaign with advertisement in a number of newsletters
- We will hear now from **Trinity Horton Hale**, an ACS Scholars Alumna

Questions:
- Contact seniorchemists@acs.org or
- The ACS Office of Philanthropy
CHEMISTRY AND THE ECONOMY: NEARLY POST-PANDEMIC EDITION

William F. Carroll, Jr., Ph.D.
ACS President, 2005; Board Chair 2012-2014

ISSUES FOR TODAY

• Supply Chain Constraints
• Plastics Recycling
• Inflation
• Academe
**Texas Ice Follies:** February 12-18

- Everything failed: Gas lines froze (delivery -50%), thermal offline, >30% demand beyond forecast
- No one expected the magnitude of this cold snap, not people or energy companies and not chemicals either

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**Gulf Coast Intermediate Chemical Prices Surge with Plants Offline**

- Houston HDPE
- Ethylene
- Ethane

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**Texas Ice Follies:** February 12-18

- Everything failed: Gas lines froze (delivery -50%), thermal offline, +40% forecasted demand
- No one expected the magnitude of this cold snap, not energy and not chemicals either
- Taking plants down and bringing them back up is a tricky process that takes time
SUPPLY CHAIN: ALL THIS STIMULUS MONEY AND NOTHING TO BUY

- **Texas Ice Follies:** February 12-18
  - Everything failed: Gas lines froze (delivery -50%), thermal offline, +40% forecasted demand
  - No one expected the magnitude of this freeze, not energy and not chemicals either
  - It’s a lot easier to shut stuff down than it is to start it back up

- **Bio-Lab Fire**, Summer 2020
  - Major producer of pool chemicals
  - 2021 Price Increases and shortages
  - [Link](https://www.wafb.com/2020/08/27/fire-chemical-plant-following-laura/)

**Personal Anecdote:** I ordered and paid for a refrigerator in May. They’re saying maybe look for it in November.

**Carroll Applied Science, LLC**
THE CASCADE EFFECT: MICROPROCESSORS AND RENTAL CARS

- When COVID hit, travel plummeted
- Rental car companies, all nearly bankrupt, sold cars into a hot used car market to raise cash
- Used car market was hot because microprocessors used to make new cars were short
- Microprocessors were short because manufacturers panicked and cancelled orders
- Taiwan Semiconductor Manufacturing Company accounts for half the made-to-order chips
- You can’t buy a new car and neither can the rental companies
- Taiwan has become a critical part of our supply chain

“It’s shocking to me how much I’ve learned about the supply base in Q1.”
Jim Farley, Ford CEO, 5 May 2021

WHERE ARE WE NOW

- Global capacity utilization for chemicals nearly back to pre-COVID levels
- Continuing concern regarding overcapacity in the US for ethylene as China continues to build out its own capacity
- Uncertainty about the staying power of the recovery in the US as well as in China
  - Latest ACC economic stats show growth appears to have peaked
- More open jobs than unemployed people—with a geographic mismatch and continuing fear of virus
  - Same situation in the UK—more jobs than people
  - China: Fewer migrant workers, hiring difficulties in factories, glut of white-collar applicants
  - Global supply chains unlikely to normalize in the short term
- Think of this as a system operating far from equilibrium
- What about energy?
FIRST, NATURAL GAS

Henry Hub natural gas price and NYMEX confidence intervals

Weekly total rig count

Carroll Applied Science, LLC 33

...NOW OIL

Carroll Applied Science, LLC 34
PRESSURE ON PLASTICS PACKAGING

- Deposits
- Bans
- Extended Producer Responsibility
  - Product Take-Back
  - Advance Disposal Fees
- Minimum Recycled Content—Up to 30% proposed in some states
  - Connecticut, Maine, Washington, California and others

THREE KINDS OF PLASTICS RECYCLING

- Mechanical Recycling
  - Traditional collect, separate, grind, wash, remelt, remold into product
  - Works reasonably well with homogeneous large volume streams (milk bottles, soda bottles, laundry bottles)
  - Limited upside for mixed, contaminated, poorly defined material
- Solvent Refining
  - Dissolve separated plastic type
  - Filter solids, precipitate, purify and recycle solvent
- Chemical or Advanced Recycling
  - Depolymerization or Pyrolysis to raw materials, crude oil analog or synthesis gas (CO + H₂)
  - Processing to make usable polymer raw material (distillation or cracking)
  - Polymerization
WHY THIS IS AN ENORMOUS PROBLEM

- About 35% of plastics production (19 MM t/yr) is packaging, dispersed over 3 MM sq mi; about 10% recycled, about 10% incinerated. At 30% recycled content, need 6 MM clean tons
- About 73% of population with curbside recycling, split between automatic and opt-in; about 40% of theoretical recovery of 19 MM t—about 5.5 MM dirty tons
- Impossible to mechanically recycle the diverse streams explicitly
- Only way to keep running crackers and polymerization units at current rates is to turn waste packaging into liquid feedstock
- Capital needed for processing plants at $1000/t annual capacity
- 300,000-400,000 intermodal containerloads of baled garbage

INFLATION

- Alex, I’ll take Inflation for $1010. And the answer is…

- Supply constraints in first half drove inflation up
- Moderated some in July; retail sales down 1.1%
- Services rather than goods
- Gradual decrease back to ca. 2% by 2Q22 on supply/demand rebalance
- Bond market does not seem to be pricing in high inflation
RISKS TO ACADEME

- Entering a “baby bust” period: fewer traditional students
- Decreasing yield values: cheap and easy to apply to schools
- Increasing discount rate at privates: now about 50%
- Resistance to pricy off-campus learning
- Fewer men entering college
- Indications of increasing M & A activity on smalls

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