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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ACS Career Navigator: Your Home for Career Services

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.

We have a collection of career resources to support you during this global pandemic:

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

Visit [www.ACS.org/COVID19-Network](http://www.ACS.org/COVID19-Network) to learn more!
A Career Planning Tool For Chemical Scientists

ChemIDP is an Individual Development Plan designed specifically for graduate students and postdoctoral scholars in the chemical sciences. Through immersive, self-paced activities, users explore potential careers, determine specific skills needed for success, and develop plans to achieve professional goals. ChemIDP tracks user progress and input, providing tips and strategies to complete goals and guide career exploration.

https://chemidp.acs.org
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Advancing ACS’s Core Value of Diversity, Inclusion & Respect

We believe in the strength of diversity in all its forms, because inclusion of and respect for diverse people, experiences, and ideas lead to superior solutions to world challenges and advances chemistry as a global, multidisciplinary science.

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We focus on the essentials that actualize chemistry’s solutions - like management, safety, regulations, sales and marketing - everything inside and outside the laboratory that develops and produces products that improve our lives and make the world better.

Find out more [bmgt.org](bmgt.org)
Chemistry & the Economy Series

Every 6 months we are joined by our resident expert economist, Paul Hodges for a survey of the chemical industry. Take a look back at the rises and falls in the economy and gain an understanding of what underlying forces are driving the market.

Chemistry and the Economy: 2020 Mid-Year Update
Paul Hodges of International eChem and Bill Carroll of Carroll Applied Science have their bi-annual discourse regarding the chemical market and what companies can do to adapt in these difficult times including COVID-19.

Chemistry and the Economy: 2020 Outlook
Join Paul Hodges of International eChem and Bill Carroll of Carroll Applied Science for an update of what has been affecting the chemical market and what might be coming down the pipeline in 2020.

Chemistry and the Economy: 2019 Mid-Year Update
Paul Hodges of International eChem and Bill Carroll of Carroll Applied Science share an update of what has been affecting the chemical market and what companies can do to adapt to this changing world in 2019.

Chemistry & the Economy: 2019 Outlook
Paul Hodges of International eChem and Bill Carroll of Carroll Applied Science will provide an update of what has been affecting the chemical market and what companies can do to adapt to this changing world in 2019.

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ACS Webinars

How to Recognize and Respond to Microaggressions
Date: Wednesday, June 9, 2021 @ 2-3pm ET
Speaker: Patrina Davis, Shari Geiss Out
Moderator: Paula Christopher, American Chemical Society

Bioinspired Nanomaterials From Discovery to Market Pipeline
Date: Thursday, June 10, 2021 @ 2-3pm ET
Speakers: Siddharth Patwardhan, The University of Sheffield (UK)
Moderator: David Combelle, American Chemical Society

Lithium-ion Batteries The Road to Sustainable Energy Storage
Date: Friday, June 11, 2021 @ 1-2pm ET
Speakers: Amy Picket, Colorado State University and Pivots Battery, Inc and H.N. Cheng, ACS President
Moderator: Young Shin Jun, Washington University in St. Louis

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Chemistry and the Economy: Supply Chain Woes and is Industry “Sprouting” Green?

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

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This ACS Webinar is co-produced with the ACS Industry Member Programs and ACS Division of Business Development and Management.
Our consulting work focuses on the major paradigm shifts taking place in the global economy as a result of today’s ageing populations.

DEMAND PATTERNS: The lockdowns have broken down the inertia surrounding work and home-based routines. Travel, leisure, construction, real estate and other industries will likely see major change as a result.

RESHORING SUPPLY CHAINS: Global supply chains have proved very fragile during the pandemic. They have collapsed not only because of the uncoordinated nature of the lockdowns around the world, but also due to volatility in demand patterns.

ENERGY ABUNDANCE: Q2 2020 provided a taste of the world to come. The issue is that it now makes economic sense in some regions to ‘scrap and build’ – scrap older, fossil fuel-based infrastructure and replace it with modern renewable-based power sources.

CIRCULAR ECONOMY: The need to reshore supply chains in a world of potential energy abundance suggests that moves towards a circular economy will accelerate. We need new business models to be created, covering the entire value chain from collection to resale.

ADVANCED MANUFACTURING: Many manufacturing operations still operate as they would have done 50 years ago. It makes no sense to reshore using centuries-old equipment when digital, continuous & biotech-enabled technology is safer, greener, faster and cheaper.

Paul Hodges is a trusted adviser to major companies and investors. He publishes The pH Report, and serves as chairman of NiTech Solutions and of the Advisory Board of Infinity Recycling. He is a Global Expert with the World Economic Forum and a regular speaker at international conferences, and appears regularly on Real Vision and other leading media.

The 1946-70 Western BabyBoom saw a major rise in births, creating the largest & wealthiest generation that has ever lived.

- This SuperCycle led to unbroken growth of GDP & chemical demand as the Boomers moved into the Wealth Creator 25 – 54 cohort
- Outsourcing to emerging economies became essential
- Since 2001, Boomers are becoming the Perennials 55+ cohort
- Older people are essentially a replacement economy - Perennials spend less and save more - Emerging economies re-focus on domestic demand
- Business model/technical innovation is essential
Welcome to the New Normal

- What’s happening in the global economy and the implications for the US and other countries
- The need for businesses to take a more holistic view of the environment in which they operate
- Refocusing in response to changes in consumer demand and moves to a greener economy

Supply-chain bottlenecks are giving the impression of US demand surge

Global Capacity Utilisation has rebounded to post-2008 highs

The US has seen a double-dip

US auto ownership is in slow decline
**Welcome to the New Normal**

- What’s happening in the global economy and the implications for the US and other countries
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**US hit by ‘double whammy’ of parts/product shortages; CO2 concerns**

New car inventories = 316k; used car prices up 50% over past 12 months; Climate change/CO2

“It’s shocking to me how much I’ve learned about the supply base in Q1.”

Jim Farley, Ford CEO, 5 May 2021

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**Globalisation provided “stuff” for babyboomers: Sustainability is service-led and provides “solutions”**

- Mobility
- Health
- Shelter
- Water
- Food

**GM**
- Aspires to eliminate tailpipe emissions from new light-duty vehicles
- Commits to 100% renewable energy for electricity to power global facilities
- Aspires to be carbon neutral in global products and operations
Protectionism and trade wars are here to stay - Biden has continued Trump’s policy without the rhetoric

- The current trade wars are symptoms of the end of the BabyBoom in the west
- The easy growth of the past is no longer needed, so people see no value and only threats in globalization
- America continues to worry about the threat from Chinese technology
- America views China’s manufacturing dominance as a national security threat

**Audience Survey Question**

ANSWER THE QUESTION ON BLUE SCREEN IN ONE MOMENT

What is the estimated overcapacity for ethylene by the end of 2020?

- 1 megaton (1 million tons)
- 1 kiloton (1 thousand tons)
- 37 megatons (37 million tons)
- 73 kilotons (73 thousands tons)
- 1 gigaton (1 billion tons)
Carbon Tracker warns the petchems industry faces “continued low process and stranded assets”

Welcome to the New Normal

- What’s happening in the global economy and the implications for the US and other countries

- The need for businesses to take a more holistic view of the environment in which they operate

- Refocusing in response to changes in consumer demand and moves to a greener economy
Transition can happen very quickly – Easter Parade, New York

1900  Spot the car?  1913  Spot the horse?

Incumbents are extremely bad at forecasting disruption

Solar Costs Are Decades Ahead of Forecasts

Actual Costs

IEA 2010 Forecast  IEA 2014 Forecast
Global (BNEF)  Global (IRENA)
Global (IEA)  USA (Lazard)
China (IRENA)  India (IRENA)

Source: Year Made

IEA 2010
IEA 2014

Ramez Naam - rameznaam.com
The circular economy – the new Vision for oil & petchems

The plastics industry faces pressure from two directions to move quickly to using recycled plastic as a feedstock:

- The growth of Electric Vehicles means refineries will close. Shell plan to have just 6 major refineries by 2025

- A new Nova Institute report for Unilever notes that “Contrary to energy, it is not possible to decarbonise chemicals and products. The renewable carbon family is the only pathway to a sustainable future.”

Nova expect recycling to account for 2/3rds of plastics production by 2050, with bio and CO2-based sources providing the rest:

“This paradigm shift creates the opportunity for the “biggest transformation of the chemical sector since the industrial revolution”

Collaboration needs to intensify amongst the key partners
China is currently just ahead of EU in terms of EV market share, but USA is set to catch up very quickly in its core market segments

China is clearly leading the pack, but focused on the cheap end

EU is close behind and pushing out Tesla: Ford’s F-150 EV took 45k orders in 48 hours
Conventional drivetrains for cars (components that deliver power to the driving wheels) have around 2,000 parts. In comparison, how many parts do drivetrains for electric cars contain?

- About 1,500 parts
- About 1,000 parts
- About 100 parts
- About 20 parts
- 1 part

Electric vehicles change auto manufacturing

Electric drivetrains can have fewer than 20 moving parts, whilst conventional drivetrains have as many as 2,000. Fully electric cars don’t have multi-speed transmissions, radiators, fuel injectors, gas tanks, valvetrains or exhaust systems. Most individual components used in Internal Combustion Engines will disappear, as will much of the chemical demand currently under the bonnet.

Companies need to develop more service-based business models, where the supplier is focused on providing solutions rather than products. Fleet management services are an obvious opportunity, with more services likely to develop as autonomous vehicles arrive.
Most aspects of the personal auto market will be transformed by 2040

The new ecosystem will focus on providing software-driven mobility

The pandemic has acted as a catalyst to accelerate key paradigm shifts

The “15-minute” city puts people at the centre of the planning process instead of cars, with shops, entertainment, education, healthcare (& work) all within 15 minutes by foot or bike.

The C40 Group of major global cities is closely linked to the new Green Deals, as much of the money will be spent locally, by city mayors – and transport is a key area for change.

GM-backed Cruise starts delivering 4000 autonomous taxis to Dubai in 2023 – the aim is for 25% of all road trips to be driverless by 2030
Critical Success Factors are Transforming

The Boomer SuperCycle
Supply-driven, product focused

The New Normal
Demand-led, solution-oriented

Globalisation provided “stuff” for babyboomers: Sustainability is service-led and provides “solutions”
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Chemistry and the Economy

Supply Chain Woes and is Industry “Sprouting” Green?

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Chemistry and the Economy: Supply Chain Woes and is Industry “Sprouting” Green?

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How to Recognize and Respond to Microaggressions

Date: Wednesday, June 9, 2021 @ 2-3pm ET
Speaker: Katrina Daniel-Kitt, Senior Geeks Out
Moderator: Paula Christopher, American Chemical Society

What You Will Learn:
- What a microaggression is, looks like, and how it manifests
- How to respond to microaggressions if you experienced one or how to respond to someone who has shared that they have been offended by something you did or said
- How to respond to a microaggression if you witnessed one, but were not an active participant

Co-produced with: ACS Office of Diversity, Equity, Inclusion & Respect and ACS Diversity, Equity, Inclusion & Respect Advisory Board

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Bioinspired Nanomaterials From Discovery to Market Pipeline

Date: Thursday, June 10, 2021 @ 2-3pm ET
Speaker: Siddharta Patwardhan, The University of Sheffield, UK
Moderator: David Constable, American Chemical Society

What You Will Learn:
- Why the understanding bio-nano interface is a powerful basis for designing bioinspired syntheses of functional nanomaterials
- How careful design of bioinspired nanomaterials can provide commercially relevant products
- Why process chemistry, scale-up and downstream processing are equally important in reaching the markets

Co-produced with: ACS Green Chemistry Institute

www.acs.org/acswinbinars

Lithium-ion Batteries The Road to Sustainable Energy Storage

Date: Friday, June 11, 2021 @ 1-2pm ET
Speaker: Amy Pratt, Colorado State University and Prime Battery, Inc. and H.N. Chang, ACS President
Moderator: Young-Shin Jun, Washington University in St. Louis

What You Will Learn:
- Why battery chemistry is complex and interdisciplinary
- How the iteration of synthesis, characterization, and modeling is key for accelerating discovery
- Why there is no one perfect battery for every application

Co-produced with: ACS Committee on Science

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