Texas A & M University

DR. MATTHEW A. ’82 & PATRICIA J. HARTHCOCK
PROFESSIONAL DEVELOPMENT SYMPOSIUM

# CHEMISTRY CAREERS


MATTHEW A. HARTHCOCK, Ph.D. ’82

Founder & CEO
Solutions by Harthcock Associates


May 16, 2022

CHEMISTRY
TEXAS A&M UNIVERSITY

*DR. MATTHEW ‘82 AND PATRICIA HARTHCOCK PROFESSIONAL DEVELOPMENT INAUGURAL SYMPOSIUM MAY 2018*

INTRODUCTION

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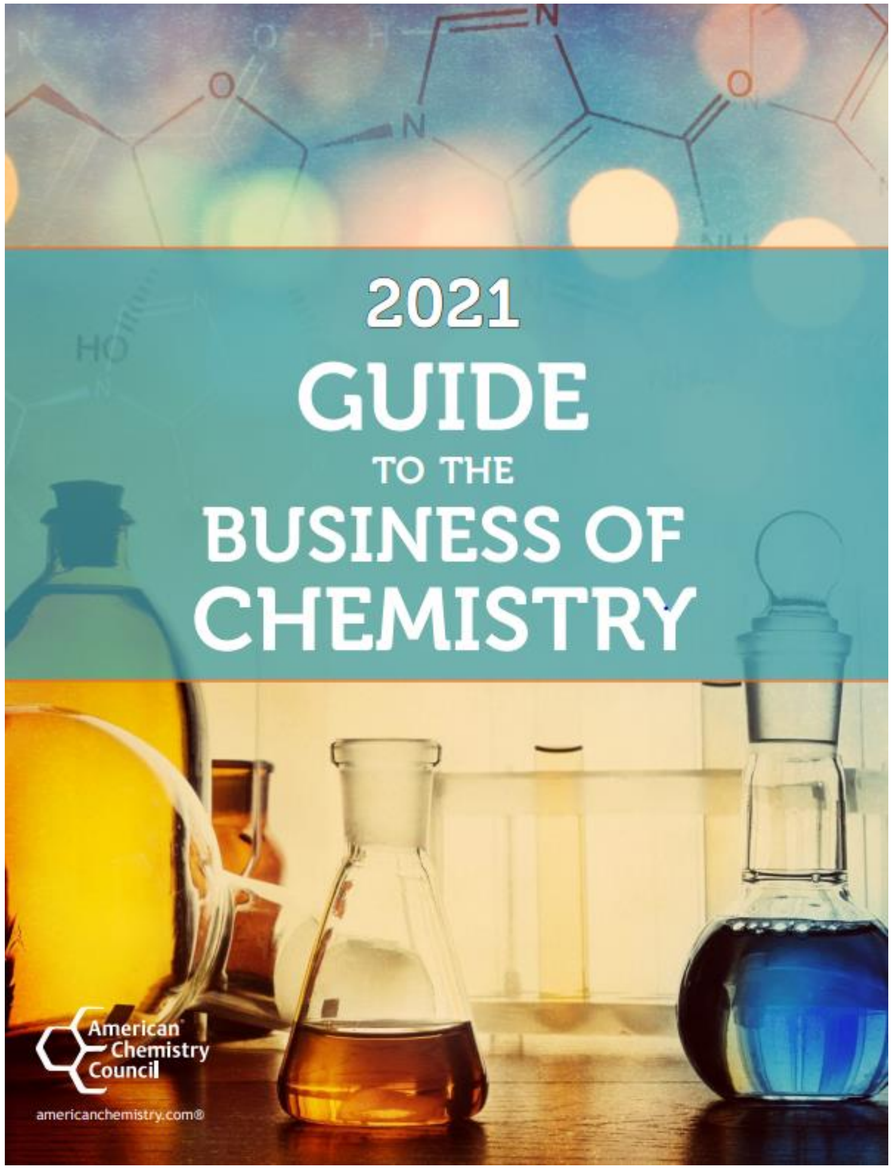


*2021 Guide to the Business of Chemistry (American Chemistry Council)*

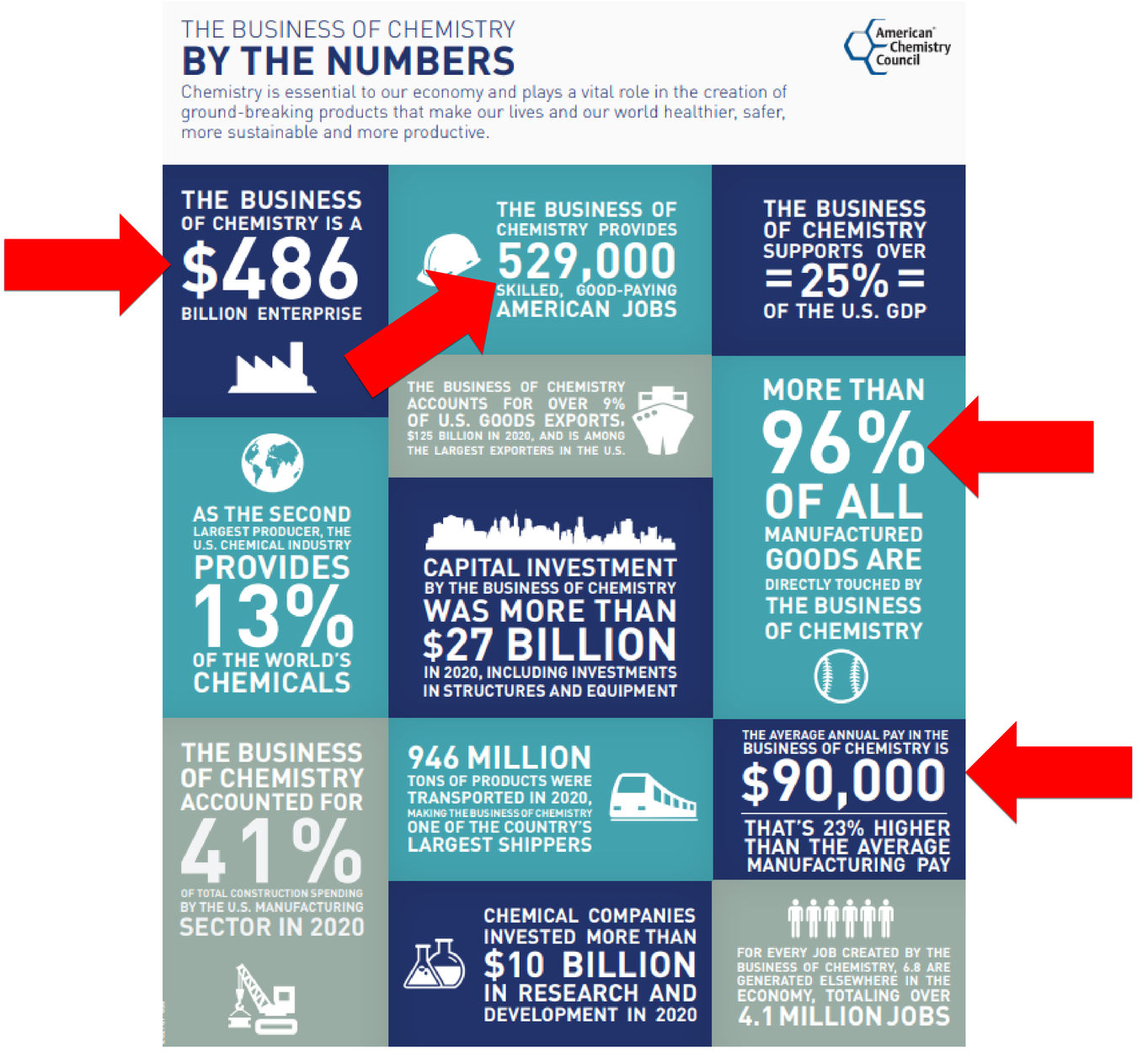


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**Figure 1.1 - U.S. Business of Chemistry Flow Chart, 2020 (in billions)**

Intra-industry sales $122.8

**Sales to consuming sectors $334.6**

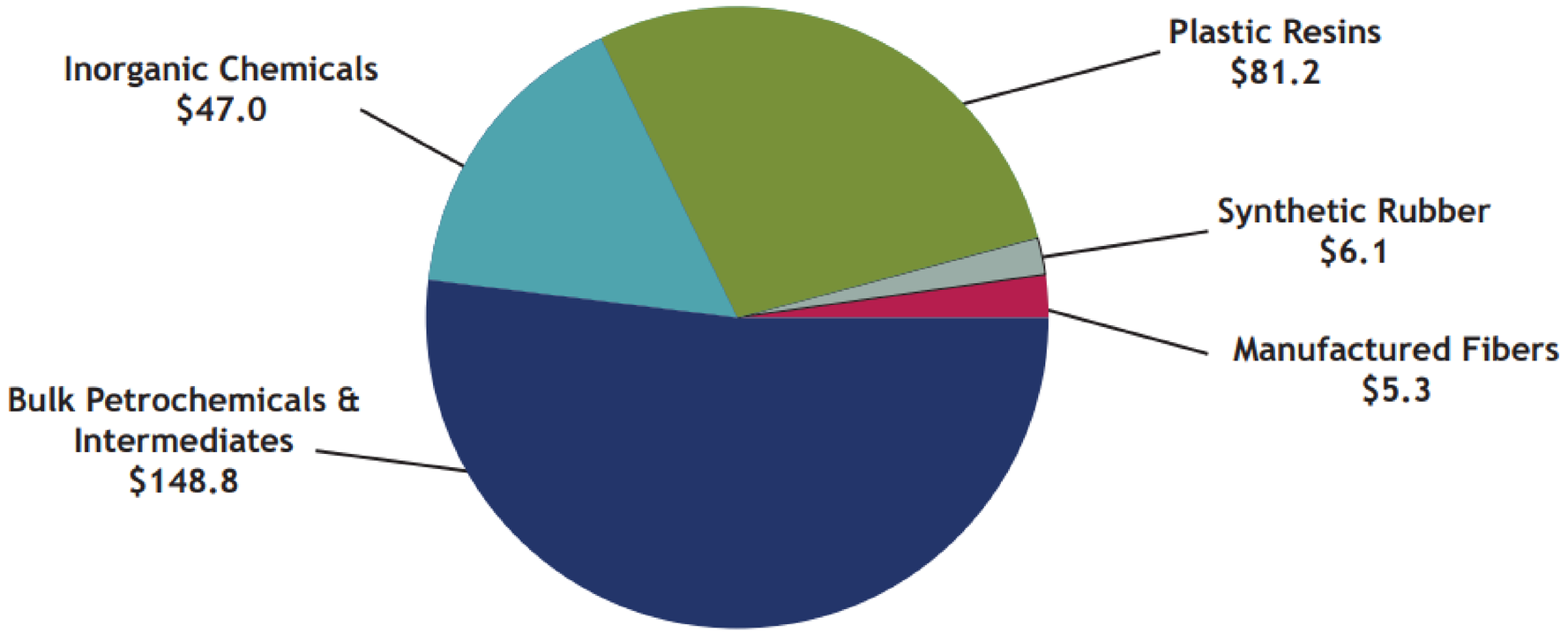
| | | | |
|---|---|---|---|
| Rubber & Plastic | $60.2 | Transportation Equipment | $10.2 |
| Other Manufacturing | $55.0 | Fabricated Metals | $10.1 |
| Health Care | $39.0 | Construction | $10.1 |
| Pharmaceuticals | $35.4 | Food & Beverage | $6.6 |
| Paper & Printing | $16.9 | Machinery | $5.0 |
| Agriculture | $16.8 | Oil and Gas | $4.9 |
| Computers and Electronics | $14.0 | Electrical Equipment | $2.3 |
| Textiles & Apparel | $10.6 | Other Industries | $37.3 |

Source: ACC analysis based on data from the Bureau of the Census, and the IMPLAN model.

[1]IMPLAN is used by government agencies include the Army Corp of Engineers, U.S. Department of Defense, U.S. Environmental Protection Agency, and over 20 others, and by over 250 colleges and universities, local governments, non-profits, consulting companies, and other private sector companies.

*Indirect uses of chemicals incorporated into the outputs of other industries are not included. For example, these data do not reflect the motor vehicle sector's purchase of tires from the rubber and plastics products industry, which purchases synthetic rubber to make tires. The value of this synthetic rubber is not included in the figure for motor vehicles. Thus, on a final demand basis, the total value of chemistry used in products produced by the motor vehicle industry is actually several times larger than indicated in Figure 1.1.*

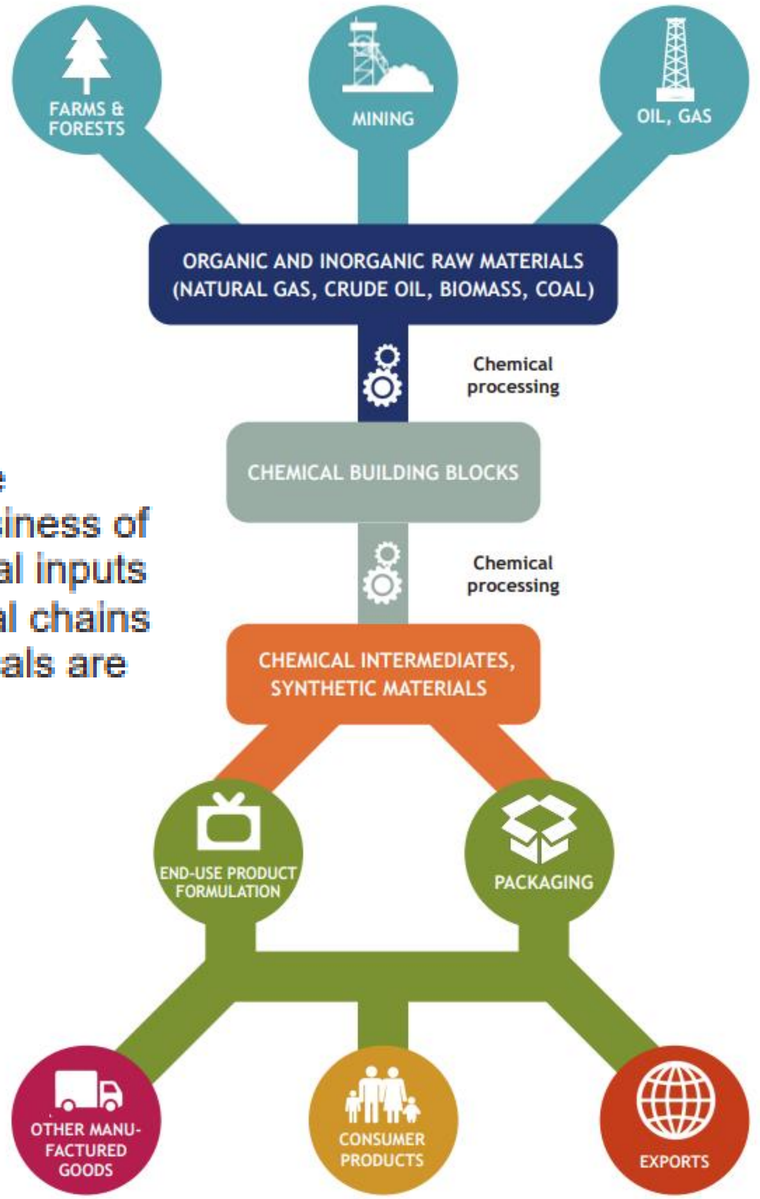
## Figure 3.1 - Basic Chemicals Shipments, 2020 (billions)




Source: Bureau of the Census (from the ASM-1 report)

+ Specialty Chemicals + Agricultural Chemicals + Consumer Products + Pharmaceuticals

Figure 3.2 - Business of Chemistry Chemical Chain




A simplified overview of the production chain of the business of chemistry, from raw material inputs to valued outputs. Chemical chains for select individual chemicals are in the appendices.



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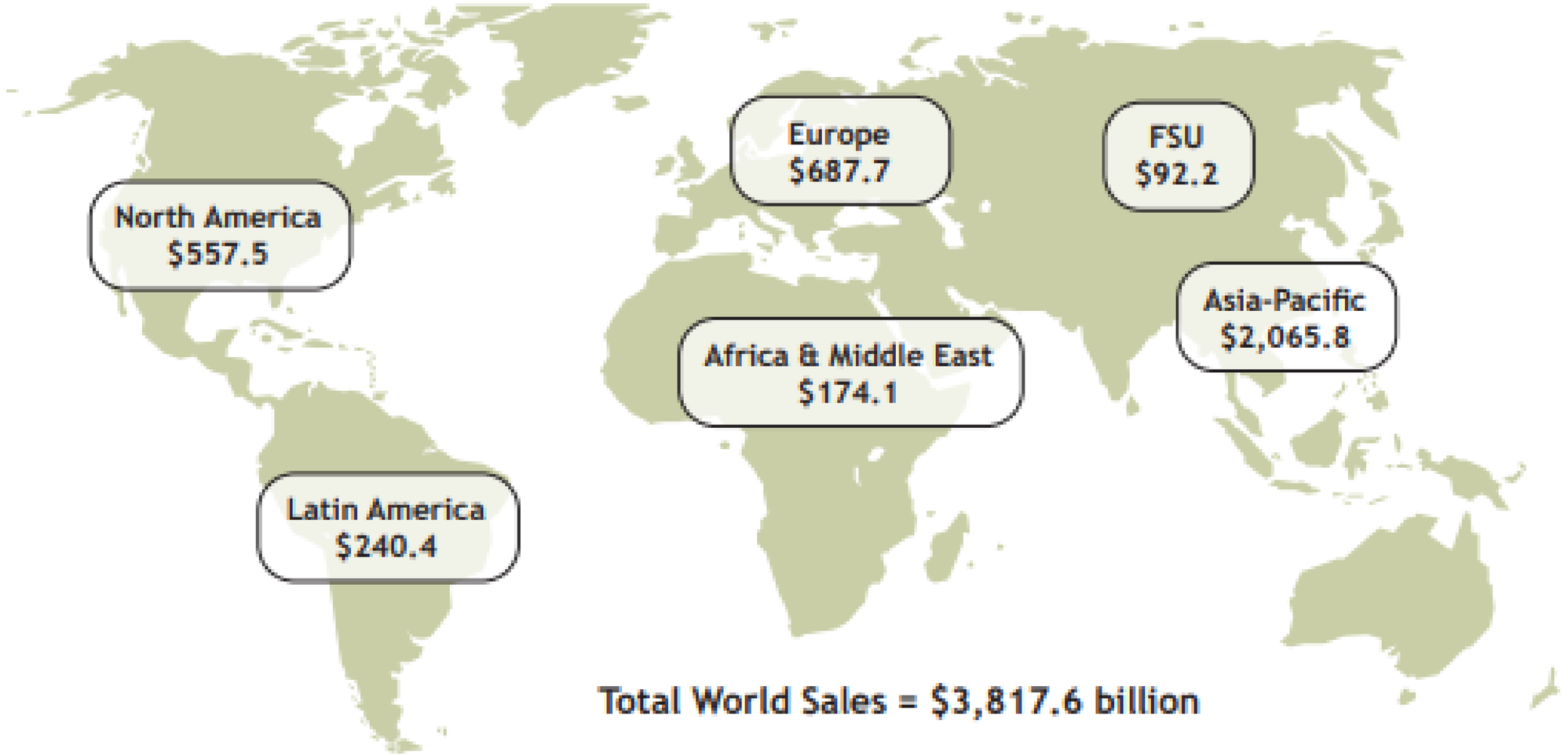
## Figure 5.1 - Global Chemical Domestic Sales by Region, 2020 (billions)




Note: Sales data is derived by subtracting shipments from exports and adding imports; it is equivalent to apparent consumption.



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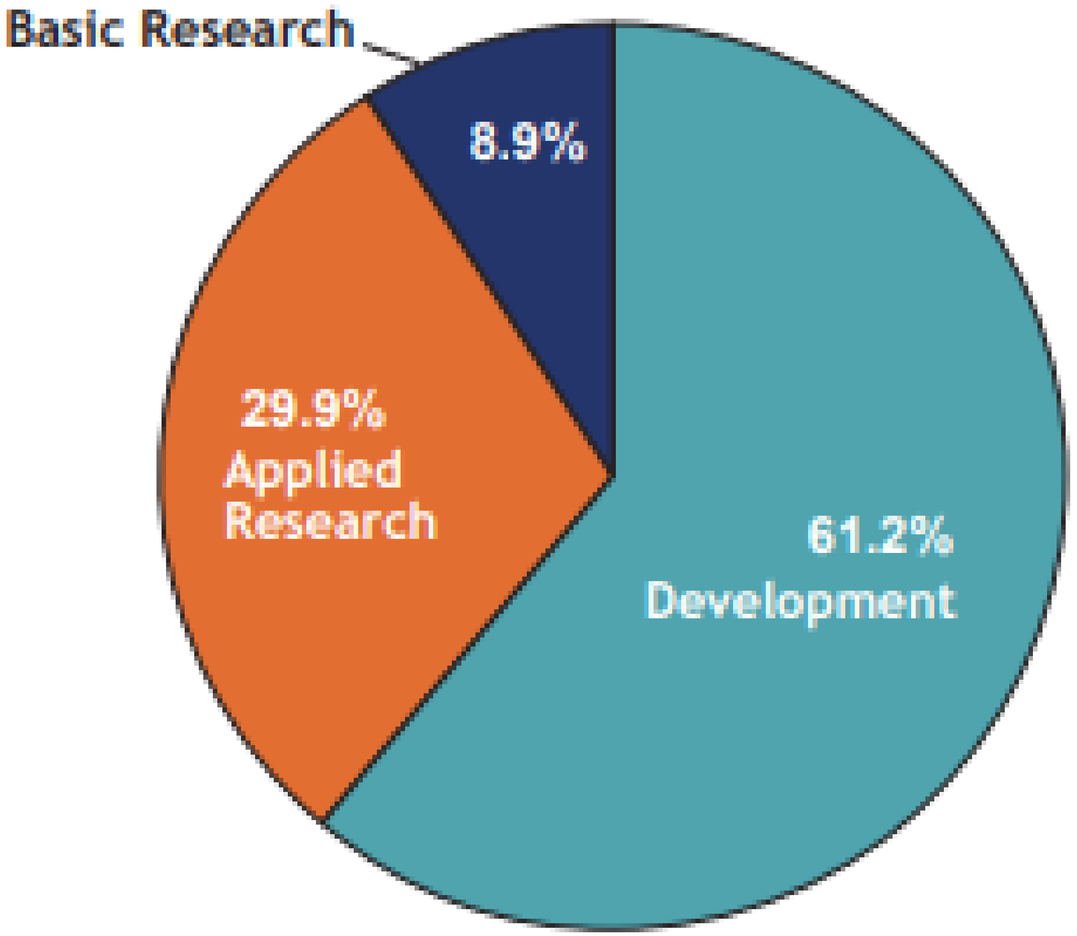
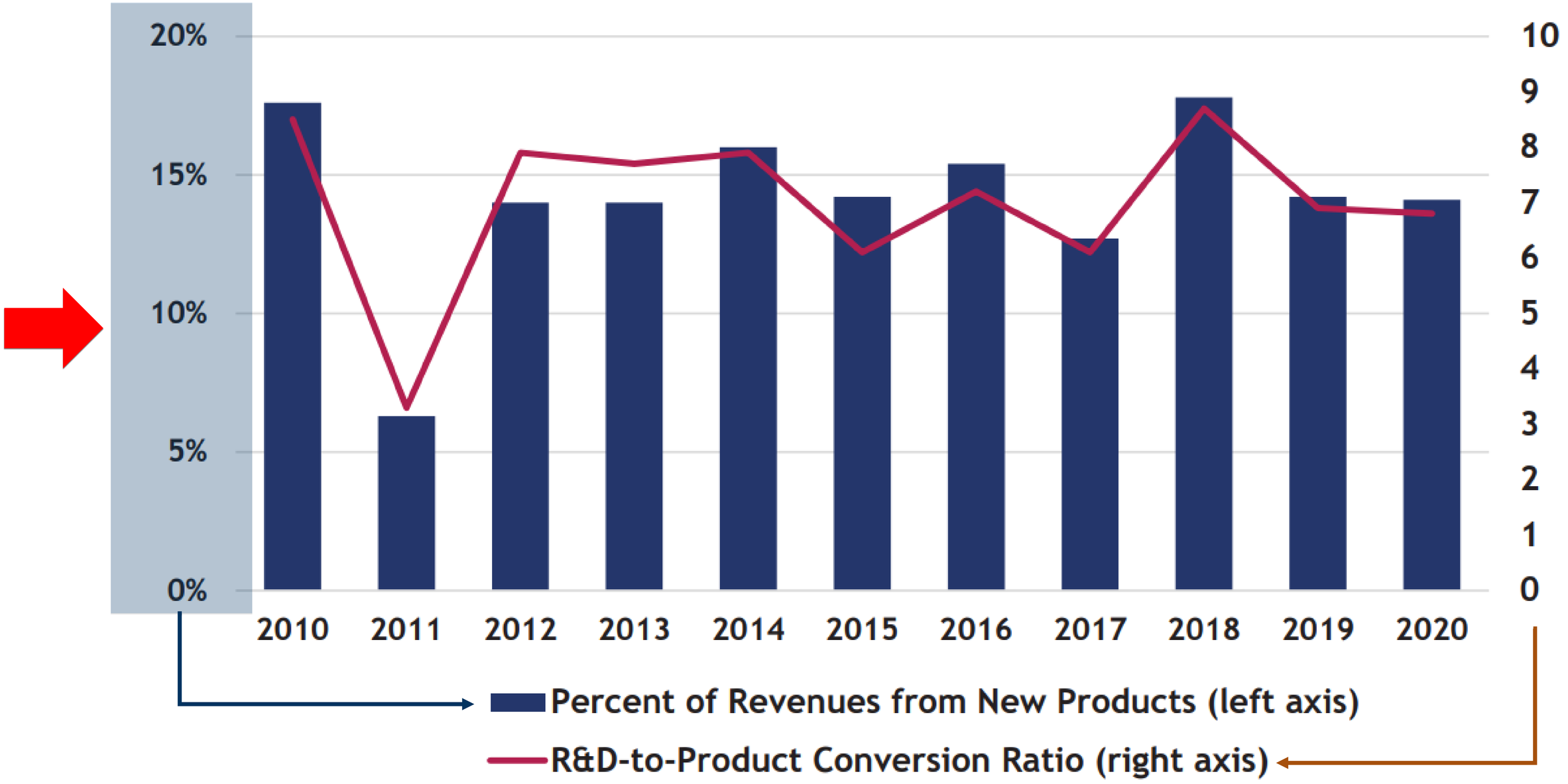
## Figure 6.1 - Basic and Specialty Chemical Companies' R&D Spending by Type, 2020




Source: National Science Foundation, ACC

## Figure 6.3 - Share of Revenues from New Products



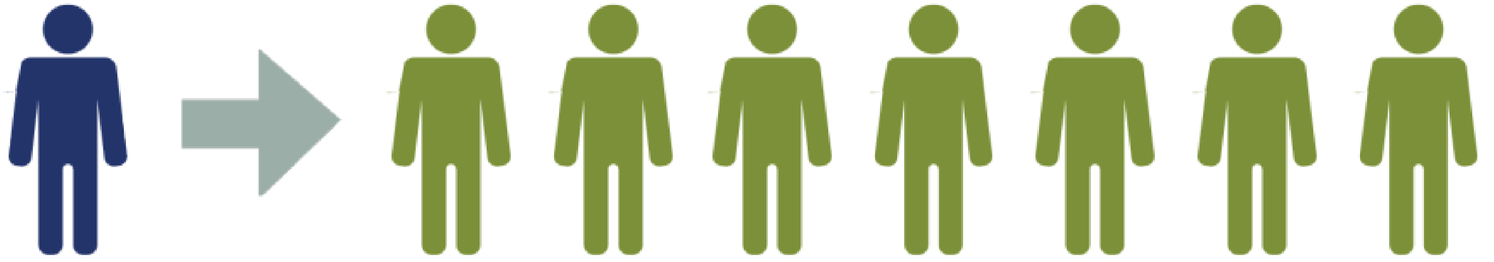



*2021 Guide to the Business of Chemistry (American Chemistry Council)*

## Table 8.1 - Employment in the Business of Chemistry, 2016-2020

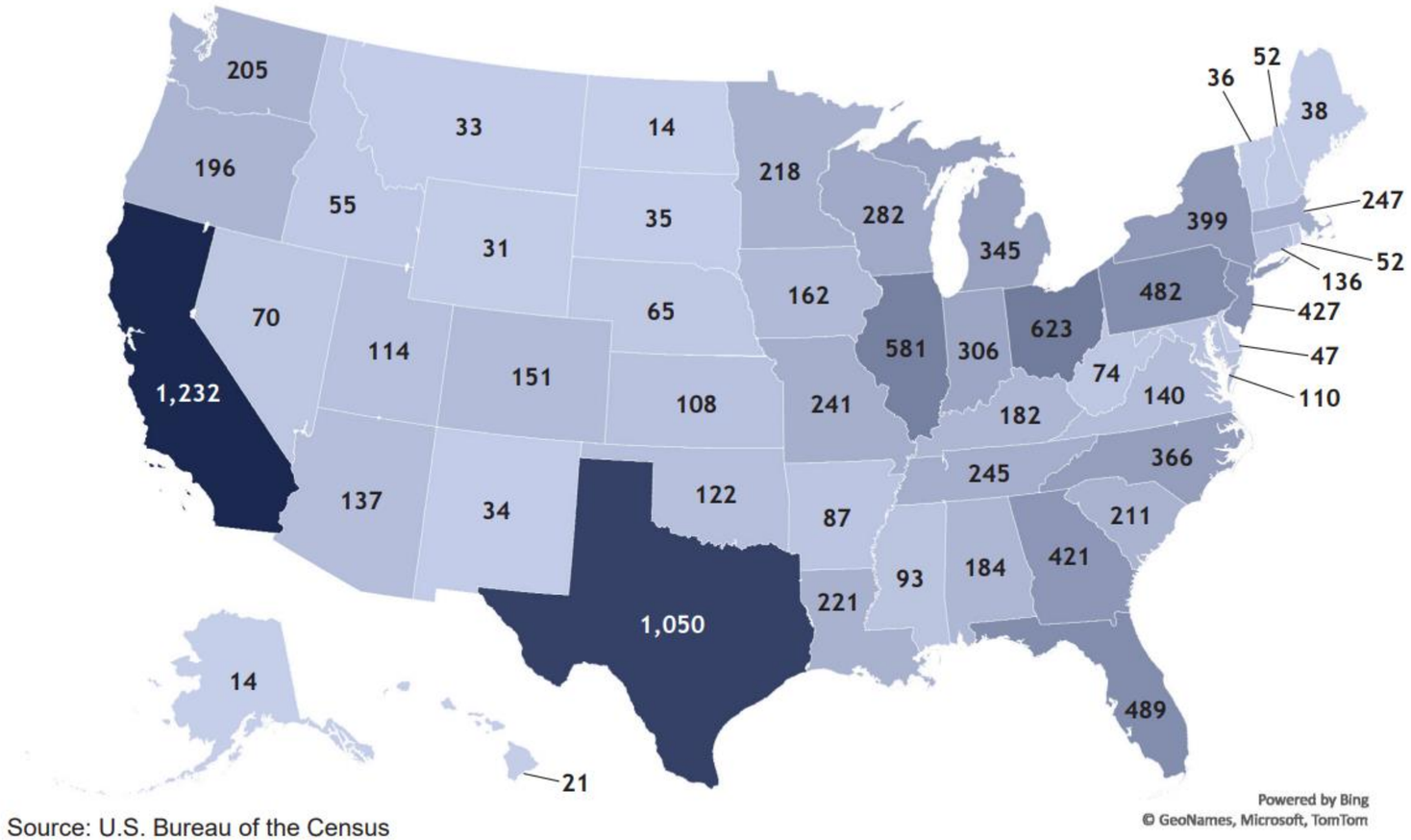
| | 2016 | 2017 | 2018 | 2019 | 2020 |
|---|---|---|---|---|---|
| | thousands of people | | | | |
| **Employees** | 525.8 | 531.3 | 538.4 | 543.8 | 529.0 |
| **By Occupation** | | | | | |
| Production Workers | 341.9 | 341.8 | 349.9 | 359.3 | 336.0 |
| Other | 183.9 | 189.5 | 188.5 | 184.5 | 193.0 |
| **By Sex** | | | | | |
| Female | 128.0 | 131.2 | 137.4 | 144.3 | 145.1 |
| Male | 397.3 | 400.1 | 401.0 | 399.5 | 383.9 |
| Median Age of Workers (years) | 46.1 | 46.0 | 43.9 | 44.6 | 45.9 |
| Average Wages and Salaries/Employee | $81,677 | $84,066 | $85,559 | $87,457 | $90,125 |

Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, National Science Foundation, ACC analysis.



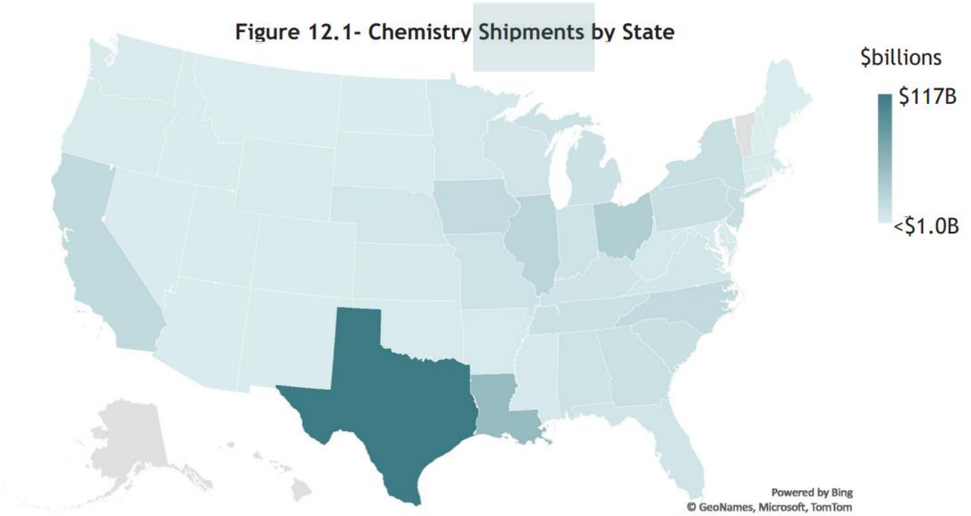
**EACH JOB IN THE CHEMICAL INDUSTRY GENERATES AN ADDITIONAL 6.8 JOBS IN OTHER SECTORS OF THE ECONOMY.**

Figure 12.2 - Number of Business of Chemistry Establishments by State




Source: U.S. Bureau of the Census

Figure 12.1- Chemistry Shipments by State



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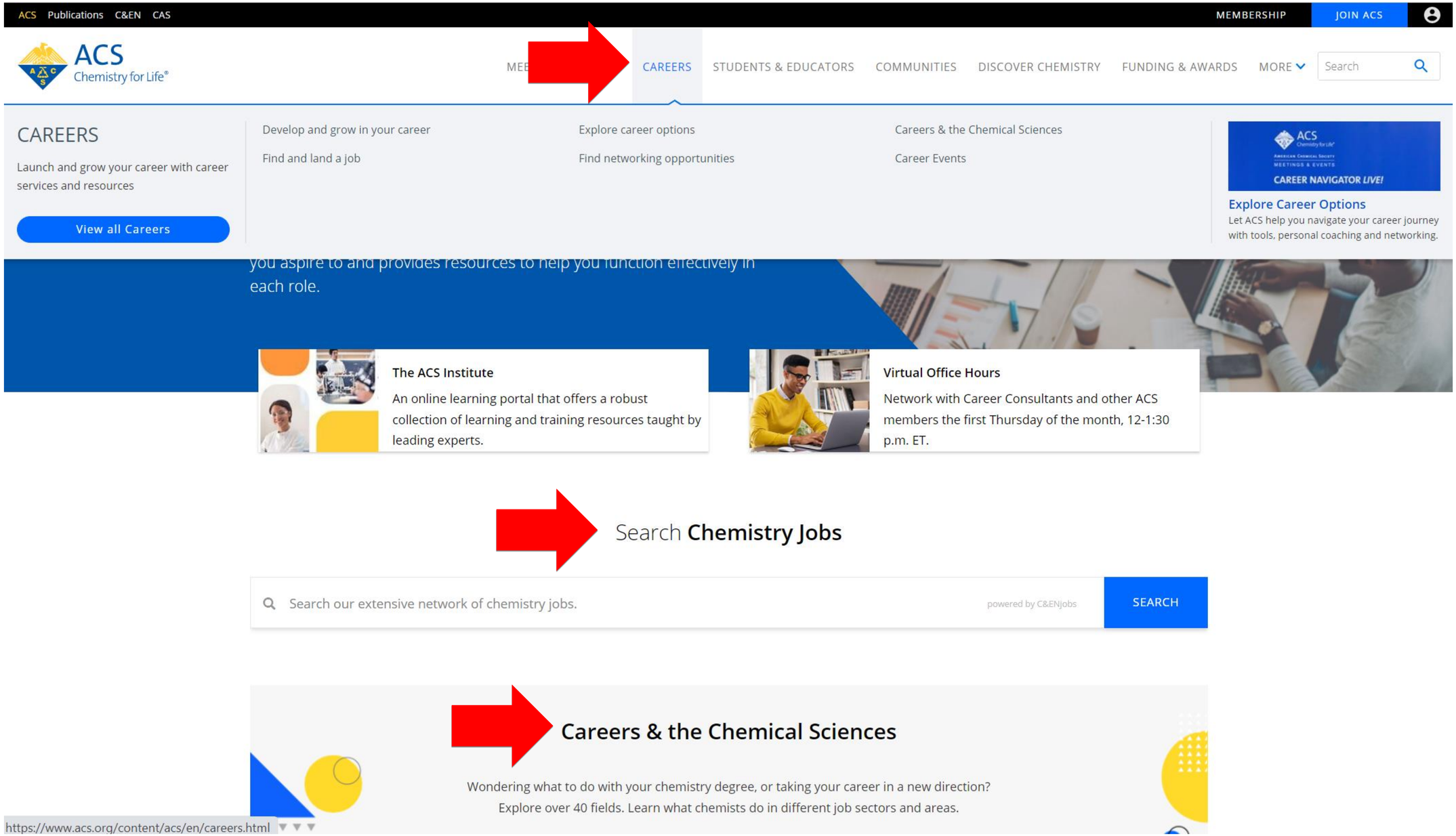
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# Browse All Profiles

Showing results 1 to 9 of 107

**FILTERS**

Job Sector

- ☐ Academia (23)
- ☐ Government (20)
- ☐ Industry (50)
- ☐ Nonprofit (13)

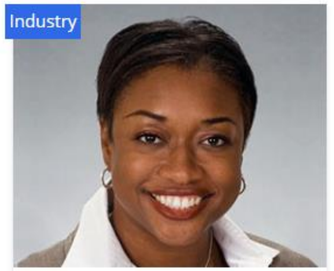
Area of Chemistry

- ☐ Analytical (26)
- ☐ Biochemistry (22)
- ☐ Chemical Engineering (7)
- ☐ Inorganic (15)
- ☐ Organic (32)
- ☐ Physical (18)

Degree

- ☐ Associate (1)
- ☐ Bachelor (12)
- ☐ Master (21)
- ☐ Doctorate (72)

Industry



**Tashica Williams Amirgholizadeh, Ph.D./J.D.**
Corporate Counsel, Intellectual Property Gilead Sciences, Inc.

Industry

**David Armstrong, Ph.D.**
Research Manager, Baker Hughes

Academia

**Oluwatoyin Asojo, Ph.D.**
Associate Professor of Pediatrics-Tropical Medicine, Baylor College of Medicine

Government

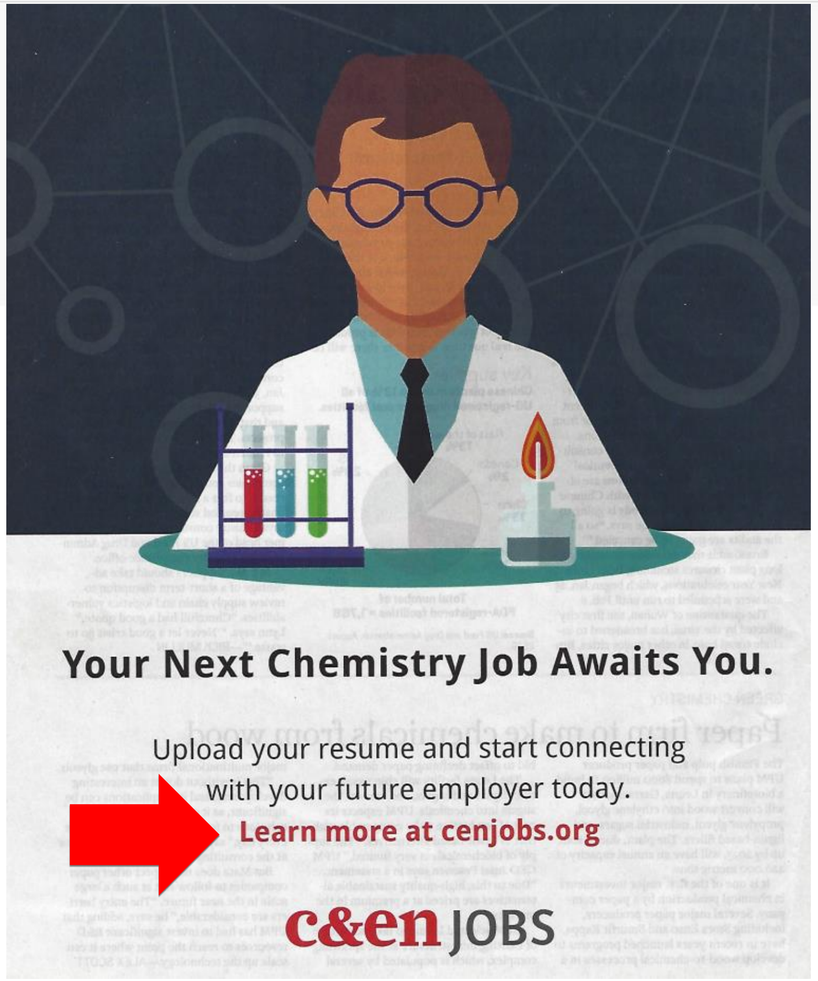
**Bryan Balazs, Ph.D.**

Industry

**Lisa Balbes, Ph.D.**

Industry

**Alexander Bayden, Ph.D.**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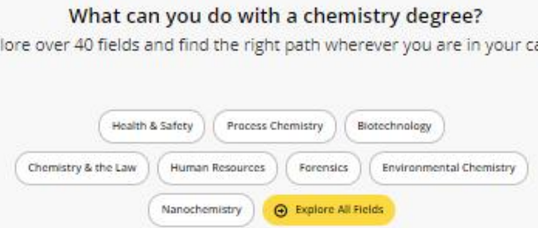
Job Sectors
Areas of Chemistry
Fields of Specialization
Profiles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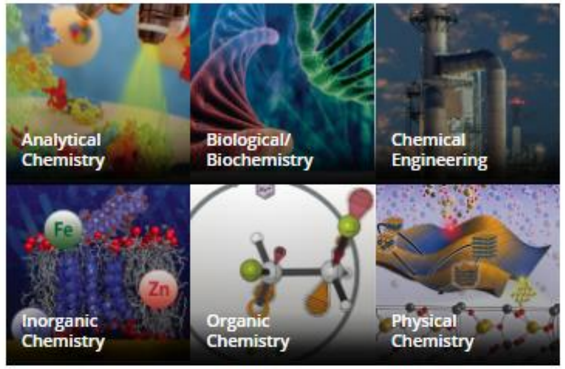
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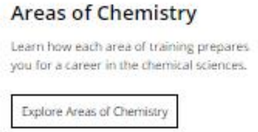
Chemical Engineering
Inorganic Chemistry
Organic Chemistry
Physical Chemistry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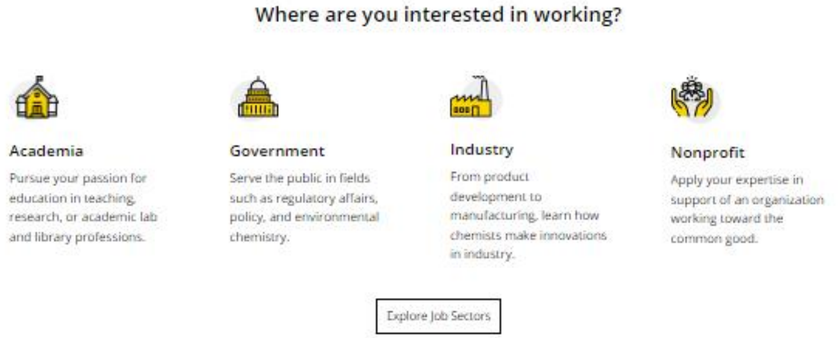
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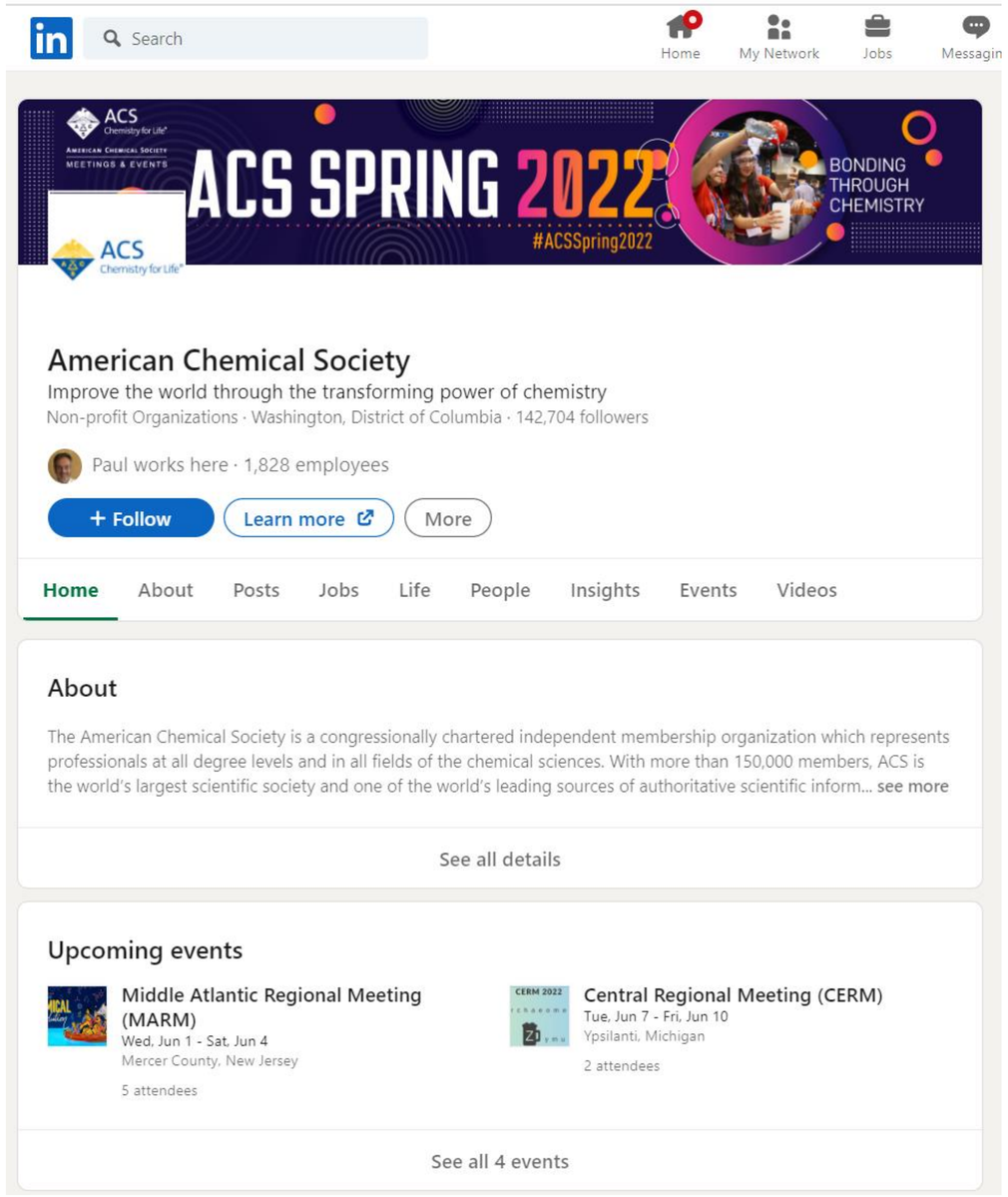

READING

# INVESTING IN YOURSELF – 12 SUGGESTED READING OPTIONS

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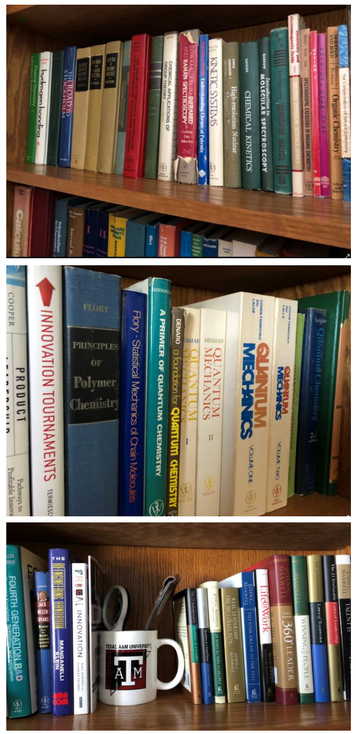


LEARNING – KNOWLEDGE
ATTITUDE DEVELOPMENT

3805

$219.21



“FOR SUCCESS, ATTITUDE IS EQUALLY AS IMPORTANT AS ABILITY.”……SIR WALTER SCOTT

READING

# INVESTING IN YOURSELF – 12 SUGGESTED READING OPTIONS

**FROM GRADUATE STUDENT TO INDUSTRIAL/BUSINESS PROFESSIONAL - SKILLS FOR SUCCESS**

**(12 suggested reading options from Dr. Matthew Harthcock '82)**

| Book Title | Author (year) | # pages | Price* |
|---|---|---|---|
| **Business Fundamentals** | | | |
| The Personal MBA - Master the Art of Business | Josh Kaufman (2012) | 464 | $16.59 |
| **Interpersonal Skills / TeamWork / Communications** | | | |
| The 7 Habits of Highly Effective People - Powerful Lessons in Personal Change | Stephen R. Covey (1989/2013) | 432 | $12.44 |
| The Five Dysfunctions of a Team - A Leadership Fable | Patrick Lancioni (2002) | 229 | $19.62 |
| **Project Management** | | | |
| Fundamentals of Project Management | Joseph Heagney (2016) | 240 | $14.89 |
| **New Product Development / Innovation** | | | |
| Winning at New Products - Accelerating the Processs from Idea to Launch or Creating Value Through Innovation | Robert Cooper (1993/2017) | 448 | $24.99 |
| Ten Types of Innovation - The Discipline of Building Breakthroughs | Larry Keeley, Ryan Pikkel, Brian Quinn, Helen Walters (2013) | 257 | $18.15 |
| **Intellectual Property - Patents** | | | |
| Navigating the Patent System - Learn the WHYS of the fundamentals and strategies to protect your invention | James Yang (2017) | 262 | $9.99 |
| **Problem Solving** | | | |
| Root Cause Analysis- The Core of Problem Solving and Corrective Action | Duke Okes (2009) | 200 | $52.49 |
| The Five Elements of Effective Thinking | Edward B. Burger (2012) | 168 | $12.80 |
| **Quality** | | | |
| Lean Six Sigma Pocket Toolbook | Michael L. George, David Rowlands, Mark Price, John Maxey (2005) | 225 | $13.94 |
| **Daily Inspiration & Development** | | | |
| The Daily Drucker - 365 Days of Insight and Motivation for Getting the Right Things Done | Peter F. Drucker (2004) | 448 | $11.91 |
| or | | | |
| The Maxwell Daily Reader - 365 Days of Insight to Develop the Leader Within You and Influence Those Around You | John C. Maxwell (2007) | 432 | $11.40 |
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- **INTERPERSONAL SKILLS / TEAMWORK / COMMUNICATIONS**
- **PROJECT MANAGEMENT**
- **NEW PRODUCT DEVELOPMENT**
- **INTELLECTUAL PROPERTY - PATENTS**
- **PROBLEM SOLVING**
- **QUALITY**
- **DAILY INSPIRATION & DEVELOPMENT**

READING

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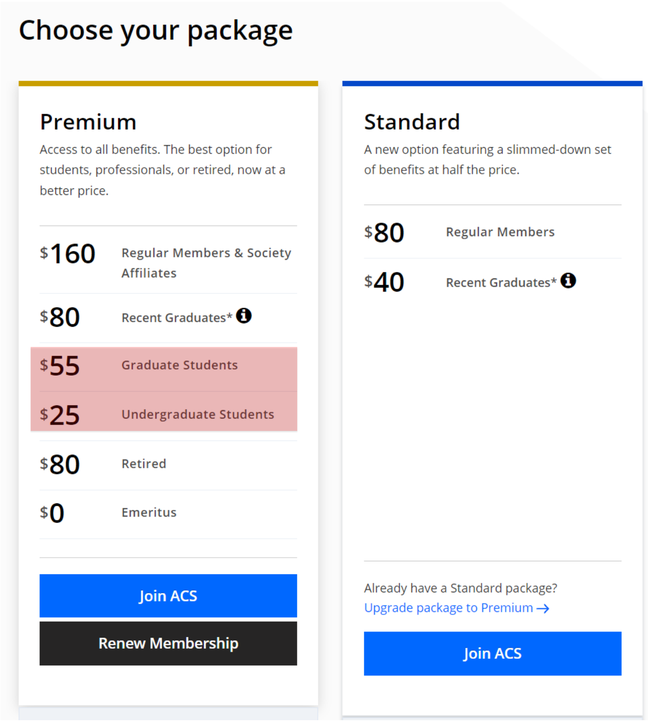


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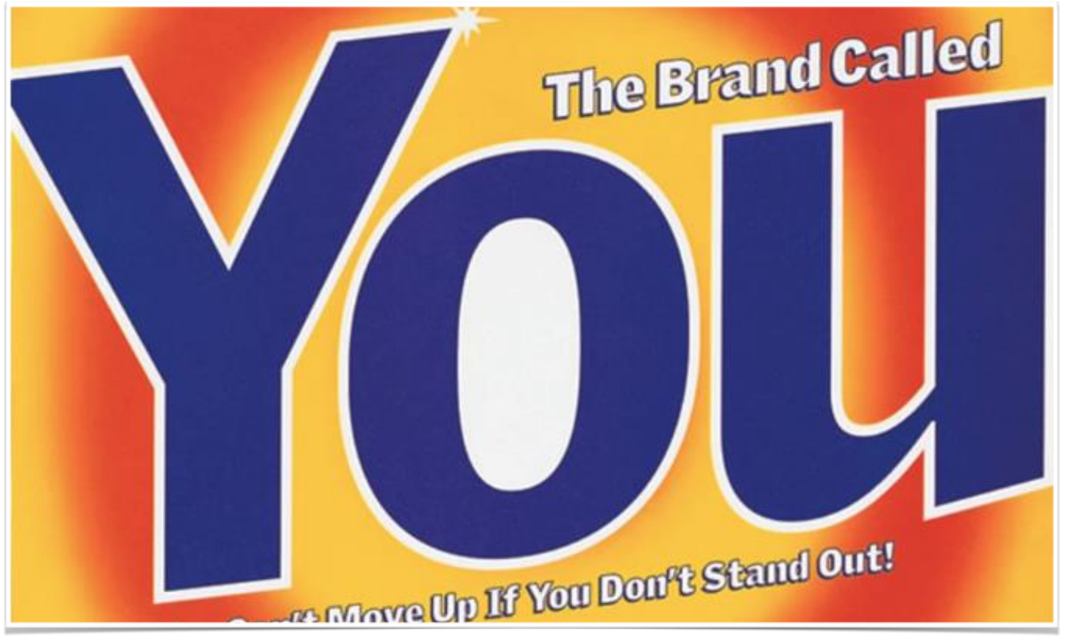
BRANDING

# THE TERM “PERSONAL BRANDING”

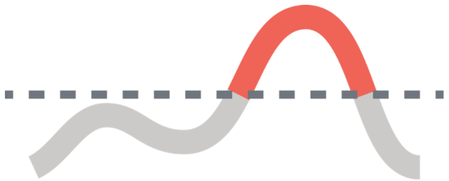
***The Brand Called You***

1996 Article By Tom Peters



BRANDING

# WHAT IS YOUR “BRAND”



Where are you “above” average

What are your “feature and benefits”

Avoid over used descriptors

BRANDING

# WHERE TO START

## What makes you “YOU”

Summarize your meaningful accomplishments

What do others find interesting about you?

What do you enjoy most?

What is most important to you?

What do you want to be known for?

What are your current and future goals?

BRANDING

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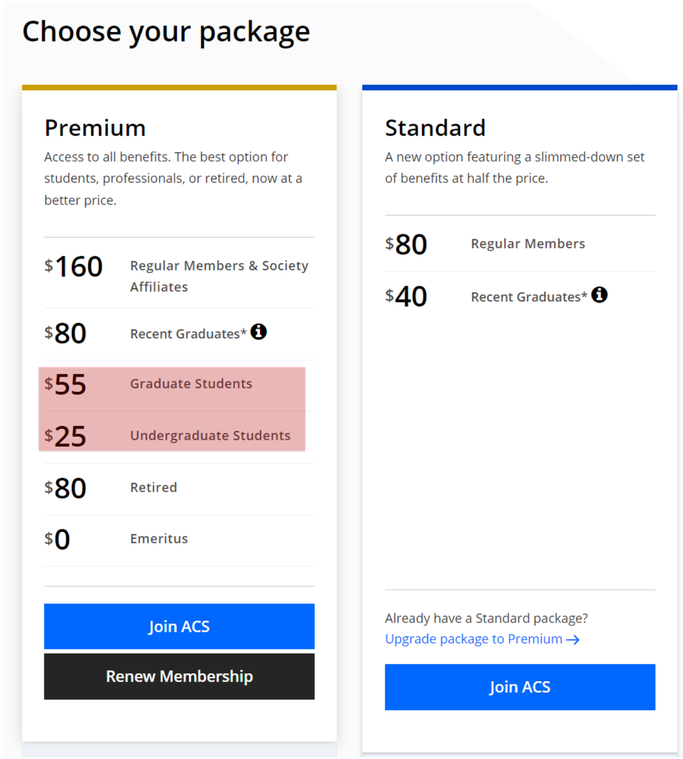
www.acs.org

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FEEDBACK

# PERSONAL ASSESSMENTS CAN HELP

Communication Styles

Personal Motivators

Soft Skills/Competencies

World and Self View

# THANK YOU
# &
# BEST WISHES!

## Q&A