

# actuarialREVIEW

VOL 50 / NO 2 / MARCH-APRIL 2023

PUBLISHED BY THE CASUALTY ACTUARIAL SOCIETY 

**The 2022  
CAS**

**Volunteer  
Awardees:**

**In  
Their**

**Own  
Words**

**Social Inflation and the  
Bornhuetter-Ferguson Method**



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Meet 10 exceptional volunteers who were honored at last year's Annual Meeting for their outstanding dedication to giving back to the CAS. Learn why they do it, what they enjoy most about it and what aspects stand out.

### Social Inflation and the Bornhuetter-Ferguson Method

Authors Jim Lynch and Dave Moore explain why actuaries should consider selecting link ratios from the most recent development year or consider extrapolating link ratios instead of selecting a multi-year average in an environment of increasing inflation.

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# actuarialREVIEW

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## editor'sNOTE By ELIZABETH A. SMITH, AR MANAGING EDITOR

### A Potpourri of Subjects

**B**ooks. The Caribbean. Inflation. Boats.

Believe it or not, we have managed to include all these disparate items in this *AR*.

*AR* Editor in Chief Grover Edie is in search of lost time to read books. Reading was something that he carved out time for but working and home maintenance have ransacked his stores of time. Read In My Opinion to learn how he is getting back into one of his favorite pastimes.

Some folks who have successfully carved out the time for reading are members of the CAS Leadership Development Committee. In the last few months, they formed a book club focused on business topics and now are opening the club to more members. See inside for more information on how to join.

President Mosley has been busy adding on to the construction of two pillars from the CAS Strategic Plan — in one issue! His President's Message focuses on Building Skills for the Future and his report from the Caribbean Actuarial Association's Annual Conference contributes to the pillar Expanding Globally.

We also continue our coverage of social inflation, a topic that is getting a lot of attention lately, with a special article from Jim Lynch and Dave Moore that updates their latest CAS Research Paper on the subject.

For the kid in you, we have a boat! Construct a paper boat out of the special Spring Meeting paper included in this issue. Instructions are on the postcard insert or, if you need some visuals, you can watch a video here <https://www.youtube.com/@CASwebmaster/videos> to see how it's done. I have made a few, including one I call the *SS Variance*.

Please enjoy this issue. ●



*Actuarial Review* welcomes story ideas from our readers. Please specify which department you intend for your item: Member News, Solve This, Professional Insight, Actuarial Expertise, etc.

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# How to Volunteer with the CAS



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Your CAS  
Credentials

## Step 3:

Access the  
Volunteer  
Interest and  
Participation  
(VIP) Survey

## Step 4:

**Personalize  
Your Volunteer  
Experience:**  
Identify Your  
Areas of Interest  
and Expertise

## Step 5:

Review the  
Open Volunteer  
Opportunities

## Step 6:

**Consider the  
Time of Year**

- Volunteer Opportunities are Posted Year-Round
- September is When Committees, Working Groups, and Task Forces Typically Recruit New Volunteers

## Step 7:

Select Your  
Volunteer  
Activities

## Step 8:

Submit!

## Step 9:

You will Be  
Contacted  
Regarding  
Next Steps

Thank you for your interest in volunteering with the CAS.  
Questions? Contact [Volunteer@casact.org](mailto:Volunteer@casact.org)!



## Building Skills for the Future to Ready for Tomorrow

In my first President's Message ([Actuarial Review, January/February 2023](#)), I expressed excitement about the opportunity to move the CAS Strategic Plan forward. In August 2022, the CAS Board of Directors met at our annual retreat, and after a day of in-depth discussion and reflection, reaffirmed our commitment to the Envisioned Future and strategic pillars outlined in the plan. If you have not had a chance to read the [Strategic Plan](#), I encourage you to review it.

The Envisioned Future that drives the Strategic Plan is as follows:

"CAS members are sought after globally for their insights and ability to apply analytics to solve insurance and risk management problems."

To achieve this Envisioned Future, three strategic pillars have been identified. In the next three President's Message columns, I will discuss each of the strategic pillars and how the CAS is progressing in these areas.

The first pillar is Building Skills for the Future. The goal of this pillar is to "Make CAS members sought after for their insights and ability to apply analytics to solve insurance and risk management problems." I don't have to convince you of the pace at which our world is changing. Things are moving at faster and faster speeds, and as a result, the landscape of risk and how to measure and manage it is changing just as fast. We live in a world where an increasing amount of technology is present in vehicles to assist drivers, protect occupants and entertain them. We live in homes that are more and more connected, enabling us to monitor, control and adjust

conditions from anywhere in the world. The increasing use of technology in the workplace continues to change the way we work and the way we balance work and life.

External influences continue to change the landscape of risk. The impacts of the COVID-19 pandemic, which began in 2020, created a shock to the system that was unlike anything any of us had ever seen, and we are still dealing with understanding the impacts on pricing and reserving. In addition to the initial shock, the lasting impact of COVID-19 on mobility, how we work, how we use our homes and how we transact business, among other things, will leave us with changes in risk trends that will persist for at least the foreseeable future. Natural catastrophes such as hurricanes, floods, derechos, wildfires and tornadoes have created challenges that have impacted the availability, affordability, and in some cases, even the viability of insurance.

On top of all of this, the proliferation of data resulting from technological advances presents both opportunities and challenges for understanding risk. Our vehicles are generating data, our homes and the devices connected in the home are generating data, the smartphones we carry with us everywhere are generating data and the devices we wear are generating data. Technology implemented by insurance companies is gathering data through telematics devices, the use of drones for underwriting and claims, and digital imagery solutions. And third-party data providers present a deluge of information that is being leveraged by the insurance industry for risk measurement and management.

All indications are this trend will not slow down anytime soon. If you need a real example of the things to come, check out ChatGPT. Many of you have heard of this — it is an artificial intelligence tool with startling (some would say scary) capabilities. I am typically skeptical of the hype of new technology, and thus I was wary of the true capability of this tool — that is, until I tried it. While like any AI tool it is not perfect, it is scary good. I challenge you to ask ChatGPT a question or have a conversation with it — you will be surprised at what you find.


This is the world we live in, and as fast as we got here, wherever the future is headed, we will get there even faster. Thus, it is imperative that we ensure our members are prepared to apply tried and true actuarial concepts to solve new problems with new information in new and innovative ways. This begins with transforming our admissions process. I know that it is challenging for those going through our admissions process to deal with change, and CAS leadership is very sensitive to that. The reality, however, is that if our members are not prepared for the changing world we live in, current users of our services will find alternative solutions. This is why we are launching our Admissions Transformation Plan: to make sure that users of actuarial services remain confident that we are the best at analyzing risk. The volunteers and staff have been working extremely hard and carefully at this to make sure we get it right. This effort involves making sure that we are including critical relevant topics (like predictive

*President's Message, page 8*



# DON'T STAY UP LATE SETTING RESERVES.

## (UNLESS THAT'S YOUR THING.)

A man in a dark shirt and glasses is sitting at a desk in a dark office, working on a computer. The office has large glass windows and a green exit sign is visible in the background. The scene is dimly lit, with the primary light source being the computer screen and some ambient office lights.

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## President's Message

from page 6

analytics) in our basic education and appropriately testing our candidates' mastery of this knowledge.

It is also important that our continuing professional education provides our members with the opportunity to build their skills for the future. The CAS recently launched the [Capability Model](#), which members can use to assess their level of knowledge in areas identified as important for the actuarial profession. The results of this competency assessment will provide the CAS with valuable information to help ensure we are providing the right continuing education opportunities for our members. The CAS has already provided many of these opportunities, including bootcamps, workshops and micro-learning opportunities, and we will continue to ensure that our members have every opportunity to increase their knowledge and skills.

And as we maintain relevant skills through our basic and continuing education programs, it will be critical

that we ensure that our stakeholders, the users of actuarial services, continue to recognize the value that actuaries bring. We will do this in multiple ways, including producing and marketing world class research. Examples of how we have done this successfully include recent research on wildfires, the impact of marijuana on auto accidents and the CAS Race and Insurance series. Making our research accessible to a broader audience will help drive demand for our services. As an example, the issue of bias and unfair discrimination in insurance remains a hot topic, and the CAS research series has been part of the reason that actuaries continue to be significant contributors to that deliberation. An example of where we need to sharpen our focus is in the area of climate risk, ensuring that we are on the forefront of analyzing this risk.

I do not know what the future will hold, but I am confident that our elite ability to apply data and analytics to solve business problems will keep us relevant no matter what lies ahead. And I look forward to seeing all the unique ways our members will solve these problems.

As we continue to work towards preparing our members for this future, we want to hear from you. As you read the Strategic Plan and think about the skills actuaries will need going forward, are we headed in the right direction? Are there other skills that should be considered? ●

## Dear Editor:

In response to the editorial by John Major and Stephen Mildenhall ("Exam Restructuring Proposal," *AR*, November-December 2022) that responded to my article "Proposed New Direction for the CAS Syllabus and Exams" (*AR*, September-October 2022), I would like to thank Major and Mildenhall for the kind comments and more importantly for suggesting an improvement to the proposal. When I wrote that article, I expected that there would be a wide range of responses to the proposals in it. If any of you find there is some part of the article that you disagree with, I would very much like to hear what part you disagree with and why and what you would do differently. I can be reached at [mikeplcact@gmail.com](mailto:mikeplcact@gmail.com). I view responses that disagree with the proposal as being similar to what I found when building models: One often learns more from diagnosing what went wrong and learning how to fix it than when everything works. Comments noting which items should be implemented are welcome too. In particular, I would like to hear from our CAS Admissions group on what they would change and why. To me, the "why" doesn't mean reporting that this is what the current method/Job Task Analysis tells us we should do. I would like to hear why the changes proposed in the article are sensible, given changing technology and analytical methods as well as the business environment in which we work.

—Michael R. Larsen, FCAS, MAAA

### ACTUARIAL REVIEW LETTERS POLICIES

*Letters to the editor may be sent to [ar@casact.org](mailto:ar@casact.org) or to the CAS Office address. Please include a telephone number with all letters. Actuarial Review reserves the right to edit all letters for length and clarity and cannot assure the publication of any letter. Please limit letters to 250 words. Under special circumstances, writers may request anonymity, but no letter will be printed if the author's identity is unknown to the editors. Event announcements will not be printed.*

## COMINGS AND GOINGS

**Sean Cooper, FCAS, MAAA**, a long-time leader in the workers' compensation industry, has been appointed executive vice president and deputy chief actuary at the Workers' Compensation Insurance Rating Bureau of California (WCIRB). Cooper has more than 30 years of experience as an actuary and leader in various P&C insurance roles. Most recently he served as practice leader and senior actuary for the National Council on Compensation Insurance (NCCI) where he led their legislative analysis area and was responsible for several strategic initiatives. His expertise includes ratemaking, reserving and research, and he is a frequent speaker at industry conferences. In his new role, Cooper will serve as a member of the WCIRB senior leadership team and will

be charged with leading the actuarial and research functions.

**Meyer Lehman, FCAS**, has been appointed as executive vice president and member of BITCO Insurance Companies' Office of the Chief Executive Officer. In this newly created role, Lehman will have direct oversight of underwriting, claims and operations. He joins BITCO with over 20 years of experience, including executive leadership of actuarial, underwriting and finance teams. ●

EMAIL "COMINGS AND GOINGS"  
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## IN REMEMBRANCE

*In Remembrance is an occasional column featuring short obituaries of CAS members who have recently passed away. These obituaries and sometimes longer versions are posted on the CAS website; search for "Obituaries."*

### Diana Currie (FCAS 1977)

1947-2023

Diana Currie of Lower Gwynedd, Pennsylvania, passed away suddenly at home on January 10, 2023. She is survived by her husband Ross A. Currie, their son Ross G. Currie (Jillian Ivey), her sister Susan Beath and her brother Alfred Childs Jr. Currie was a graduate of Penn State University and a member of the American Academy of Actuaries. She was one of many women in her profession who broke through the glass ceiling

and finished her career as senior vice president and chief actuary of the General Accident Insurance Company. After retiring she devoted herself to her family and her beloved golden retrievers. A 25-year member of Cedarbrook Country Club, she always made time for friends, golf, bowling, bridge and wine. Over the years she and her husband enjoyed seeing the world together, spending many memorable days traveling through the U.S., Europe, Asia and Australia. ●

## CALENDAR OF EVENTS

May 7-10, 2023

CAS Spring Meeting  
Boston, Massachusetts

June 5-6, 2023

Seminar on Reinsurance  
Philadelphia, Pennsylvania

September 11-13, 2023

Casualty Loss Reserve  
Seminar & Workshops  
Orlando, Florida

November 5-8, 2023

CAS Annual Meeting  
Los Angeles, California

Visit [casact.org](https://casact.org) for updates on meeting locations.

## IN MEMORIAM

Diana M. Currie (FCAS 1977)  
1947-2023

Arnold S. Mohnblatt (FCAS 1967)  
1931-2016



## CAS STAFF SPOTLIGHT

## Meet Kevin Hines, Certification Analyst

**W**elcome to the CAS Staff Spotlight, a column featuring members of the CAS staff. For this spotlight, we are proud to introduce you to

Kevin Hines.

- **What do you do at the CAS?**

I'm the certifications analyst here at the CAS. I do a lot of work around publishing exams, assisting with grading, and performing data analytics and research on the data that help us see how proposed and implemented changes are impacting our candidate base. I've been with the CAS full time since June of 2022 but was consulting prior, starting in 2021.

- **What inspires you in your job, and what do you most love about it?**

I love data and seeing how it can greatly impact projects. Every day I get to help the CAS find new and unique ways to benefit our members and candidates using data.

- **Describe your educational and professional background.**

I graduated with my Bachelor of Science in computer science from a local college in 2017 and went straight into grad school to study my other passion, economics. In 2021 I completed my master's in applied economics and predictive analytics. Throughout completion of my master's degree, I worked as

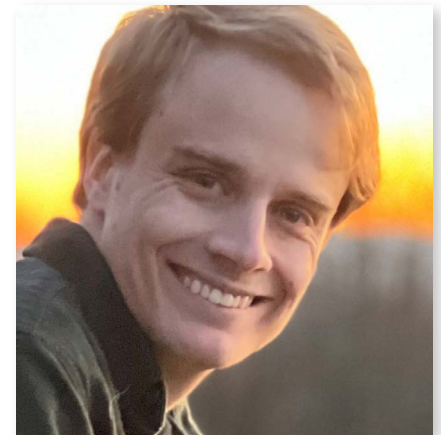
a data analyst/database administrator at an auto manufacturer but switched industries. I worked in contingent staffing for three years before finding the CAS and have been loving every second of it!

- **What is your favorite hobby outside of work?**

I love anything musical. I started playing piano in elementary school and then went on to pick up the guitar, bass, saxophone, mandolin, ukulele and several other instruments. In high school I played in multiple bands and toured with a jazz band throughout Europe. Since starting my professional career, most of my free time has been spent learning audio production and recording the music I create. Once the pandemic started, I branched out a bit, picking up some luthier skills and building guitars. Since starting that, I've built a few guitars and just wrapped up a full rebuild of my old bass guitar.

- **If you could visit any place in the world, where would you go and why?**

I would love to go to Iceland. One of my bucket list items is seeing the northern lights. Even though I live in an area that has a slight chance to see them when the timing and conditions are right, seeing the photos from certain parts of Iceland



Kevin Hines

where the sky is a completely different color looks beautiful and is something I want to see firsthand.

- **What would your colleagues find surprising about you?**

Some of my colleagues know that I like baseball, but I don't think any of them know how much I love the statistics side of baseball. Throughout my undergrad and graduate studies, when given the opportunity to do a specific analysis project somewhere in the realm of baseball, I would always jump on it. I have spent countless hours analyzing a pretty straightforward game into a more-complex-than-needed statistical goldmine of fun analysis.

- **How would your friends and family describe you?**

I like to think my creativity and fun side comes out a lot around my friends and family, but I also think that being an analytical person by nature peeks out a lot too. I love having fun exploring my area and finding new areas to hike and mountain bike, as well as staying in to play board games or read. ●



## EXPANDING GLOBALLY

# The CAS Hosts First-Ever China General Insurance Summit in Beijing

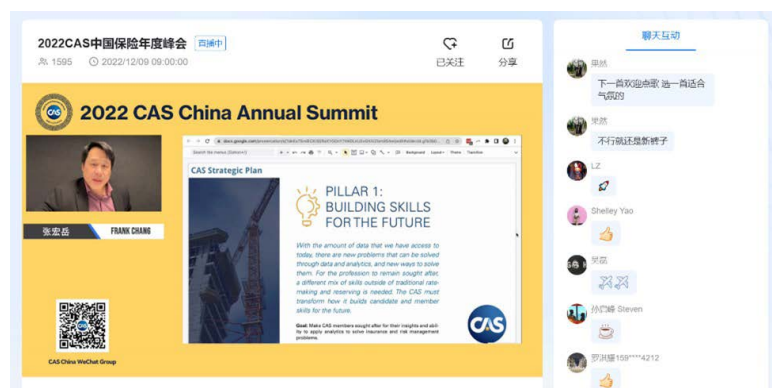
By RAN GUO, CAS COUNTRY MANAGER, CHINA, AND KATIE MULEMBE, CAS DIRECTOR OF INTERNATIONAL RELATIONS AND AFFAIRS

After several disruptions to plans, the CAS hosted a day-long

virtual summit on December 9, 2022, that covered a wide variety of topics important to actuaries practicing in China. The event proved to be of considerable interest, drawing participants from across the insurance industry in China and abroad, including members, candidates, academics and other insurance professionals. While China has the largest concentration of CAS members outside of North America, this is the first time the Society has hosted an event tailored for a Chinese audience and presented primarily in Mandarin.

Because plans for the 2021 event had to be canceled due to COVID-19, the summit was designed to be hybrid, giving people the option to attend in person or virtually. For the in-person event, the summit was supposed to take place at the iconic 798 Art District. However, the venue was closed due to COVID-19 control measures and protest activity in Beijing in the weeks leading up to the event. The CAS then decided to move the meeting to a fully virtual format.

The summit agenda included a dynamic lineup of 14 different speakers, covering a wide range of topics from regulatory updates on solvency to IFRS 17, as well as the impact of COVID-19



图表 Snapshot of CAS President-Elect Frank Chang in action. Chang was the key-note speaker for the 2022 CAS China Annual Summit.

Mr. Yi Dong 董轶 Ms. Zizhen Qiu 邱子真 Mr. Lei Wu 吴磊 Ms. YunXuan Yang 杨韵璇 Mr. XiaoRan Zhang 张隼然	Liberty Mutual 慕再思咨询 KPMG AIG Guy Carpenter	Mr. Fengyu Gao 高奉玉 Ms. JunYi Tang 唐君怡 Mr. YuPing Wu 吴雨平 Ms. Jin Zhang 张巾	复星国际 Swiss Re 国寿财 Deloitte	Ms. Xin Chang 常昕 Ms. Jue Su 苏珏 Ms. Qi Wu 吴琦 Ms. Yajie He 何雅洁 Ms. Ying Wang 王莹	永安 国泰 光博 人保再 Liberty Mutual
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图表 The list of new CAS Fellow and Associates residing in China who earned their designations in November 2022. A special ceremony was conducted for them at the summit.

on motor insurance in the U.S. and trends of mobility insurance related to the transport of goods and services in China. The afternoon session kicked off with a keynote presentation from CAS President-Elect Frank Chang, who talked about the significance of actuaries working in the tech industry. During a

celebration for new CAS Fellows and Associates in China, Chang demonstrated his Chinese language proficiency. The summit concluded with speakers from Swiss Re and Aon Benfield on the latest trends in ESG and reinsurance. ●

## EXPANDING GLOBALLY

## The CAS at the Caribbean Actuarial Association Conference

By ROOSEVELT MOSLEY, CAS PRESIDENT

In early December 2021, CAS Asia Ambassador Ron Kozlowski, FCAS, and I attended

the 32nd Caribbean

Actuarial Association (CAA) Conference in Barbados. The CAA covers all the Caribbean islands and has members from the Caribbean, Canada, United States, United Kingdom, France, The Netherlands and other countries who have links to the Caribbean. The CAS was a Silver Sponsor for this conference of over 200 attendees that covered many issues, including social security and pensions, climate change, sustainability, IFRS17, COVID19, inflation and sovereign credit risk, and banking.

A brunch with a Q&A session kicked off this three-day event. Conference participants posed questions on strategic direction and key initiatives



*CAS International Ambassador Ron Kozlowski (pictured center) talks with CAA conference attendees.*

to presidents of the CAA, Society of Actuaries, the CAS, Canadian Institute of Actuaries and International Association of Black Actuaries.

A professionalism session was held on the afternoon of the first day. Kozlowski and Marcus Brosland, who is a resident actuary at Colina Insur-

ance Limited in the Bahamas, hosted “Professionalism: A Deep Dive on the Code.” The session was based on the popular CAS professionalism session but adjusted for the CAA’s code of conduct. It included a discussion of when actuaries get themselves in trouble from the Actuarial Board for Counseling and





## Scenes from the 2022 Caribbean Actuarial Association Conference



Discipline (ABCD) 2021 Annual Report. The second session was presented by Michael Tichavera of Claxon Actuaries International, who spoke on professionalism challenges in banking.

Dave Oakden, FCAS, and Kyle Rudden, ACAS, FSA, participated in the session “The Role of the P&C Actuary in the Caribbean,” which covered potential approaches for increasing the use of P&C actuaries in the Caribbean and discussed requirements for P&C reserves

certification in Jamaica and Trinidad. Oakden chairs the Board of Commissioners for the Financial Services Commission of the Turks and Caicos Islands. Rudden, managing director and consulting actuary at KR Services, is the CAA immediate past president.

Nancy Watkins, FCAS, issued a rallying cry for actuaries to get more involved in climate change and sustainability issues in the presentation, “Actuaries and a Sustainable World.” Watkins

is a consulting actuary for Milliman.

The third pillar of the CAS Strategic Plan is to increase our influence in P&C actuarial work internationally. The CAS values our relationship with the CAA and looks forward to continued collaboration to lift the value of P&C actuaries in the Caribbean. If you are from the Caribbean or do work in the Caribbean and want to be involved in CAS/CAA relations, please contact Ron Kozlowski at [ron@rtkservices.com](mailto:ron@rtkservices.com). ●



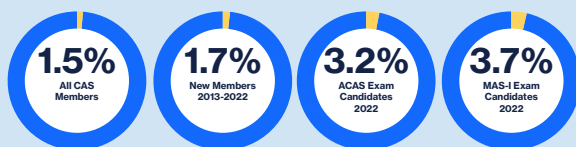
# CAS SPOTLIGHT ON DIVERSITY 2022

## BLACK COMMUNITY IN THE CAS

United States Membership and Candidate Data as of December 2022

The CAS is sharing demographic data of members and candidates to be transparent about our diversity efforts and to hold ourselves accountable.

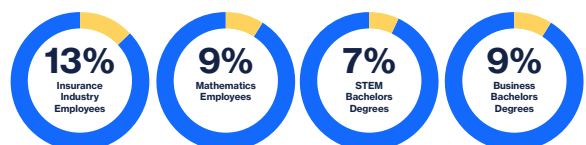
### CAS Community Today



78% of US members, 91% of US members in the last 10 years, 92% of US ACAS candidates in 2022, and 93% of US MAS-I candidates in 2022 voluntarily reported their race/ethnicity.

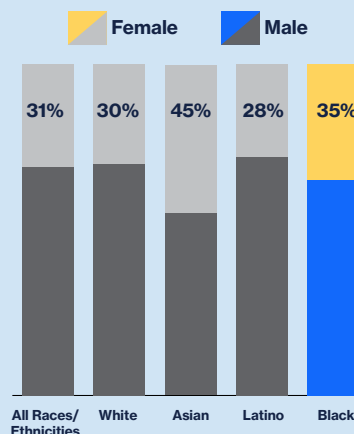
### Comparison to External Benchmarks

Black people make up 12% of the US population Ages 25 & Up



US population, Ages 25 and up, estimated for 2019 by US Census Bureau, Population Division.  
Insurance Industry Employees in 2021 based on Bureau of Labor Statistics Current Population Survey.  
Mathematics Employees from 2017-2019 based on Pew Research Center analysis of American Community Survey.  
Science, Technology, Engineering and Math (STEM) and Business Bachelors Degree Conferred in 2019-2020 based on National Center for Education Statistics Digest of Education Statistics.

### Gender Breakdown of Worldwide Black Members Compared to All Members



### Percent of Worldwide Black CAS Members in Leadership Roles



## GET INVOLVED



SUPPORT THE INTERNATIONAL ASSOCIATION OF BLACK ACTUARIES AT [BLACKACTUARIES.ORG](https://blackactuaries.org)



JOIN THE DIVERSITY IMPACT GROUP TO VOLUNTEER AND SHARE YOUR IDEAS AT [COMMUNITY.CASACT.ORG](https://community.casact.org)

If you want to make sure that your demographic information is included in these metrics, please log on to the CAS website and update your membership profile.



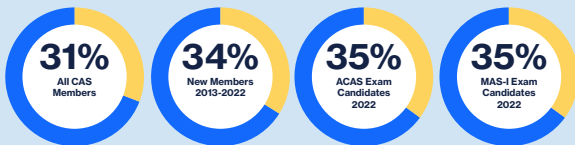
# CAS SPOTLIGHT ON DIVERSITY 2022

## WOMEN IN THE CAS

United States Membership and Candidate Data as of December 2022

The CAS is sharing demographic data of members and candidates to be transparent about our diversity efforts and to hold ourselves accountable.

### CAS Community Today



99% of US members and 98% of US ACAS candidates in 2022 voluntarily reported their gender.  
The CAS recognizes other gender identities besides male and female.

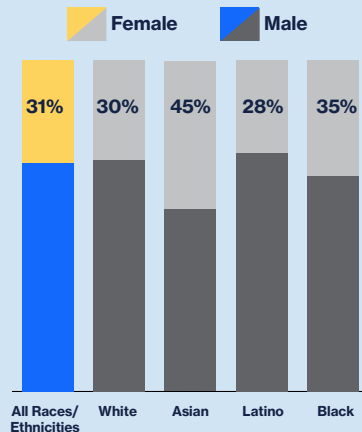
### Comparison to External Benchmarks

Women make up 52% of the US population Ages 25 & Up



US population, Ages 25 and up, estimated for 2019 by US Census Bureau, Population Division.  
Insurance Industry Employees in 2021 based on Bureau of Labor Statistics Current Population Survey.  
Mathematics Employees from 2017-2019 based on Pew Research Center analysis of American Community Survey.  
Science, Technology, Engineering and Math (STEM) and Business Bachelors Degree Conferred in 2019-2020 based on National Center for Education Statistics Digest of Education Statistics.

### Gender Breakdown of Worldwide CAS Members by Race/Ethnicity



### Percent of Worldwide Female CAS Members in Leadership Roles



## GET INVOLVED



SUPPORT THE NETWORK OF  
ACTUARIAL WOMEN AND ALLIES  
AT [NAWAACTUARIES.ORG](https://nawaactuaries.org)



JOIN THE DIVERSITY IMPACT GROUP TO  
VOLUNTEER AND SHARE YOUR IDEAS  
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If you want to make sure that your demographic information is included in these metrics, please log on to the CAS website and update your membership profile.

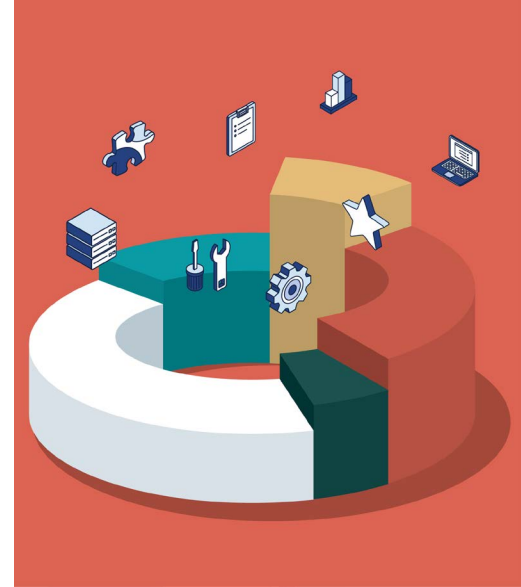
## A Template for Improvement: The CAS Releases Capability Model

The [CAS Capability Model](#) is a visual framework that articulates and provides guidance on the traits, skills and knowledge important for most P&C actuaries. It is now available through the CAS website.

CAS members and other stakeholders can use the model to self-assess the levels of their professional attributes in 18 different areas, which will assist them in identifying areas of opportunity

to learn and grow and in planning their professional development journeys.

The model is backed by extensive research and input gathered from a variety of stakeholders, including a CAS membership survey as well as the Employer Advisory Council, Candidate Advocate Working Group, Risk Management Committee, Member Advisory Panel and CAS Board of Directors. The model's development was managed by a task force of volunteers and staff.



“As we continue pursuing our Strategic Plan goals of supporting our members in building skills for the future, the CAS Capability Model will play an important role,” said CAS President Roosevelt Mosley, FCAS, CSPA. “The model serves as a resource for our professional education planning teams and will inform the development and continued relevance of our CE offerings.”

CAS members are encouraged to start their own self-paced journey through the model by exploring the attributes within the three areas of the model: Traits, Skills and Content Areas. Each attribute is organized into three increasing levels of proficiency. With an understanding of the model components, members can assess their proficiencies, and then identify continuing education opportunities to further develop their expertise.

“The CAS Capability Model is a strategic resource that demonstrates our commitment to continuing education, and I’m proud of the work of the volunteers and staff who, with significant input from a wide range of stakeholders, partnered to bring the model to life,” said CAS CEO Victor Carter-Bey, D.M.

As a dynamic tool that will evolve over time, feedback from practicing actuaries on the model is welcome and can be sent to CAS Strategy and Learning Partner Carrie Cross at [ccross@casact.org](mailto:ccross@casact.org).

### How to use the Capability Model

- 1) Review the Components of the Model – The first step is to review the capabilities important for most P&C actuaries and the levels of experience for each capability.

Each attribute is organized according to three levels of proficiency, with Level 1 being the most basic and Level 3 being the most advanced.

Level 1 individuals understand the *content knowledge* of the P&C actuarial profession; have the skills to apply this content knowledge to derive solutions and communicate results; and have the traits to work effectively both independently and as part of a team.

Level 2 individuals have a strong command of the content knowledge of the P&C actuarial profession; the skills to apply this content knowledge and integrate concepts across areas to address complex problems and communicate findings to a variety of stakeholders; and the traits to collaborate with others to drive decision making.

Level 3 individuals have an advanced level of specialized content knowledge of the P&C actuarial profession; the skills to design novel solutions to solve complex problems; and the traits to effectively lead multi-disciplinary teams within and across organizations.

- 2) Complete a Self-Assessment against the Model – Once you understand the components of the model, you can assess your experience against the attributes and levels of the model. While this self-assessment can be completed now, to further facilitate self-assessments the CAS is developing an online tool that will be launched later in 2023. In addition, based on your self-assessment, a custom learning plan will be provided, identifying CAS educational content that could assist you in moving from one level to the next.





International Actuarial Association  
Association Actuarielle Internationale



Actuaries  
Institute  
Australia

# 2023 INTERNATIONAL CONGRESS OF ACTUARIES

SYDNEY • 28 MAY - 1 JUNE 2023



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President, the Casualty  
Actuarial Society (CAS)



**Dame Inga Beale DBE**  
Portfolio Director &  
Former CEO of Lloyd's



**Jonathan Larsen**  
Chief Innovation Officer,  
Ping An Group



**Tan Suee Chieh**  
Past President, Institute  
and Faculty of Actuaries

IN-PERSON  
AND VIRTUAL  
REGISTRATION  
ON SALE NOW!

ICA2023 will shape  
the future of the  
actuarial profession.  
Be there when it  
happens.

Register now: [ica2023.org](https://ica2023.org)

## The CAS Offers Microlearning Opportunities

Following are some of the latest ways to earn CAS continuing education credit through microlearning.

### [2022 iCAS Predictive Analytics and Data Forum - Microlearning Series](#)

These bite-sized videos cover several hours of content from the 2022 iCAS Predictive Analytics and Data Forum held March 14, 2022. The topics cover

roundtable discussions, hyperparameter tuning tips and tricks, new data opportunities created in actuarial science by AI and machine learning, and an introduction to Git and Github for actuaries.

### [Social Inflation - 2022 In Focus Seminar - Microlearning Series](#)

These microlearning videos will help define social inflation, show how to find it in standard industry loss triangles and quantify its impact. Content will include

defining/identifying social inflation and approaches to implement social inflation into pricing. We've gathered experts to share their thoughts on how inflation and social inflation impact the P&C insurance industry. These videos have been taken from the 2022 In Focus Seminar held October 13, 2022.

Members can also enjoy our free microlearning library: <https://www.pathlms.com/cas/product-bundles/1721> ●

## Get Your Digital Badge Today!

Promote your actuarial career milestones on social media with a CAS-verified digital badge! It's official, and it's free!

We've partnered with the company Parchment to provide this new service to members and candidates that allows you to display your CAS creden-

tials and share your achievements with others along your journey.

All CAS members who would like to display an ACAS or FCAS badge are invited to complete [an online form](#) (<http://bit.ly/3k7sQl3>) to request their badges. ●



## CAS Readers Lead

Join CAS member leaders in an exciting literary adventure!

Earlier this year, the CAS Leadership Development Committee (LDC) launched its first-ever book club. The first discussion took place in March on Simon Sinek's *Start with Why: How Great Leaders Inspire Everyone to Take Action*.

There are many reasons to join the LDC Book Club. Here are just a few:

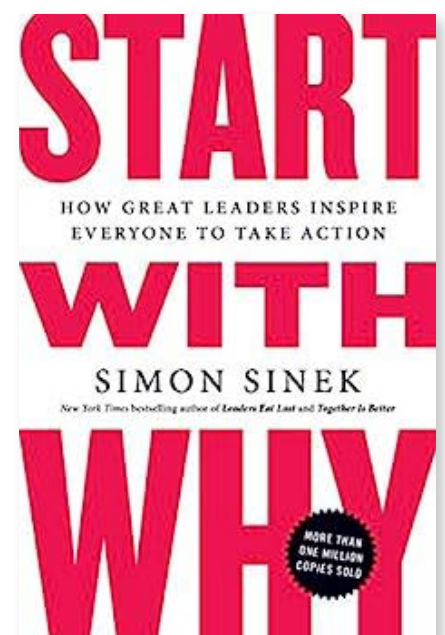
- Enhance your personal and professional development.
- Focus on various aspects of leader-

ship as we cover a new author each quarter.

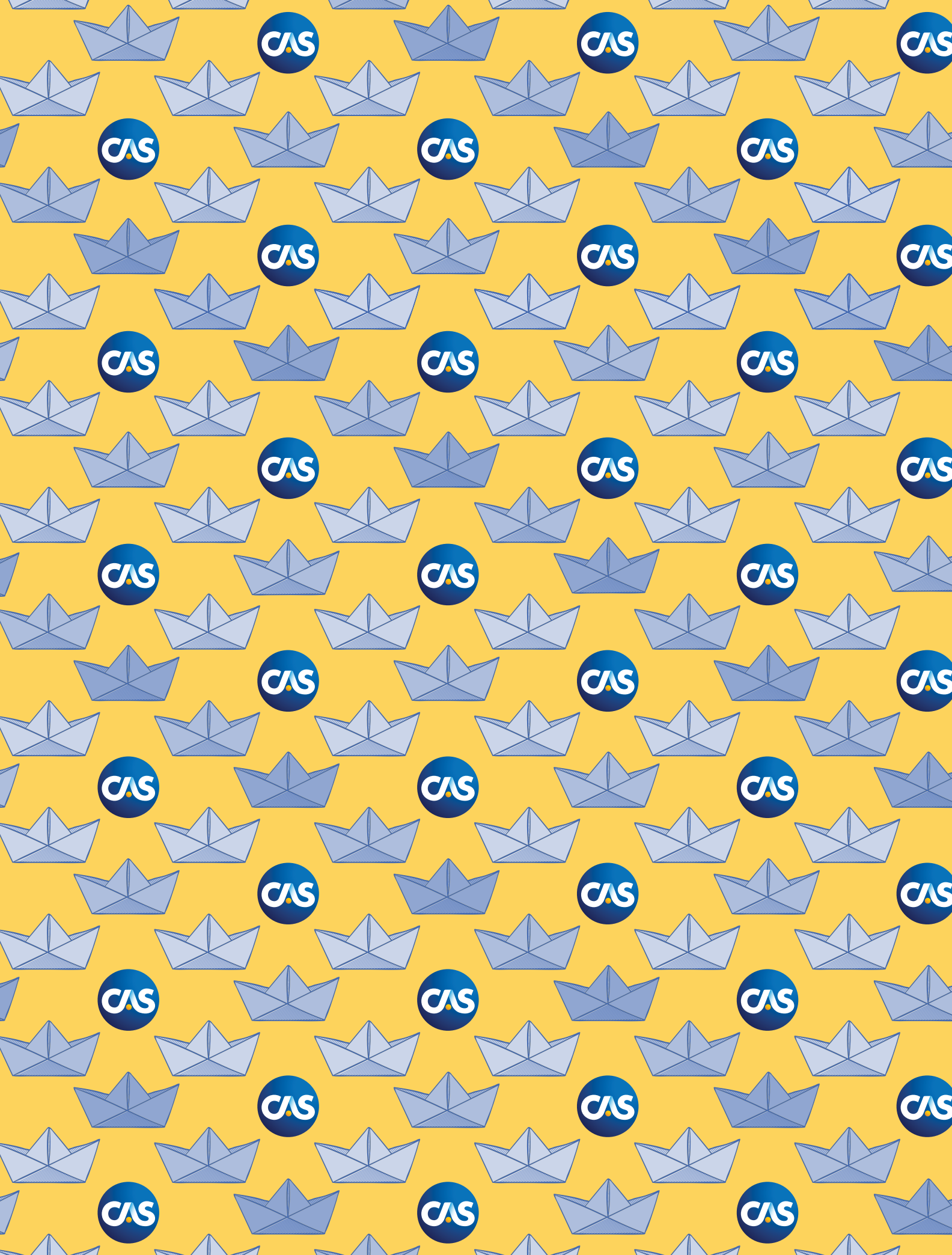
- Expand your network of colleagues while connecting through book club discussions.
- Earn up to 3 hours of CE credit.

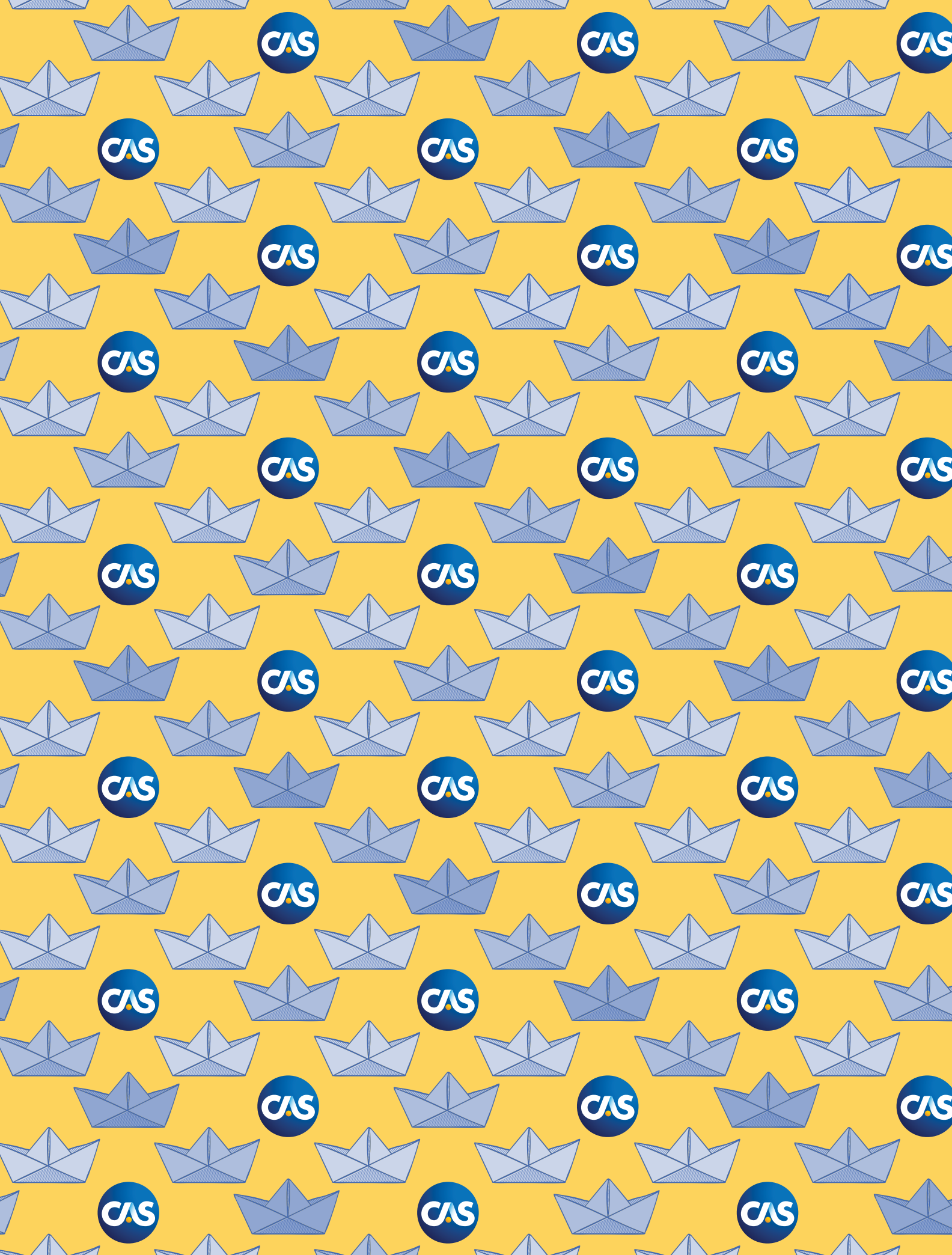
Join the LDC Book Club community by completing [an online application form](#) (<https://www.casact.org/form/cas-leadership-development-book>). If you'd like to volunteer as a discussion leader, indicate that on the form.

Please contact CAS Office at [office@casact.org](mailto:office@casact.org) with any questions. ●



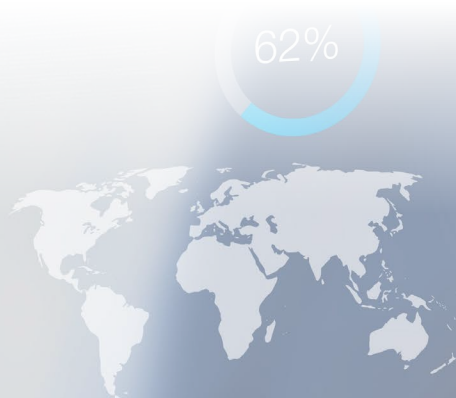








# Obtain Your Credentials in Predictive Analytics and Catastrophe Risk Management From The CAS Institute



## Certified Catastrophe Risk Management Professional (CCRMP) and Certified Specialist in Catastrophe Risk (CSCR)



The International Society of Catastrophe Managers (ISCM) and The CAS Institute (iCAS) have joined together to offer two credentials in catastrophe risk management. The Certified Catastrophe Risk Management Professional (CCRMP) credential is available to experienced practitioners in the field through an Experienced Industry Professional (EIP) pathway. The Certified Specialist in Catastrophe Risk (CSCR) credential is available both through an EIP pathway and an examination path.

Required assessments and courses for earning the CSCR include:

- Property Insurance Fundamentals
- Catastrophe Risk in the Insurance Industry
- Introduction to Catastrophe Modeling Methodologies
- The Cat Modeling Process
- Online Course on Ethics and Professionalism

Some exam waivers are available for specific prior courses and exams.

For more information,  
visit [CatRiskCredentials.org](http://CatRiskCredentials.org).

## Certified Specialist in Predictive Analytics (CSPA)



The CAS Institute's Certified Specialist in Predictive Analytics (CSPA) credential offers analytics professionals and their employers the opportunity to certify the analytics skills specifically as applied to property-casualty insurance. The program focuses on insurance as well as technical knowledge and includes a hands-on modeling project that challenges candidates to apply what they have learned throughout their studies to address a real-world scenario.

Required assessments and courses for earning the CSPA include:

- Property-Casualty Insurance Fundamentals
- Data Concepts and Visualization
- Predictive Modeling — Methods and Techniques
- Case Study Project
- Online Course on Ethics and Professionalism

Some exam waivers are available for specific prior courses and exams.

For more information,  
visit [TheCASInstitute.org](http://TheCASInstitute.org).



# Social Inflation and the Bornhuetter-Ferguson Method

By JIM LYNCH AND DAVE MOORE

**S**ocial inflation<sup>1</sup> continues to be on the minds of many actuaries.

We have learned this firsthand over the past year as we have spoken extensively about our paper, “[Social Inflation and Loss Development](#),” published jointly by the CAS and the Insurance Information Institute (III) early in 2022. The paper concluded that rising link ratios at the industry level were consistent with what most commentators called social inflation — an increase in claim severity that is much steeper than standard inflation measures would indicate.

We have received a lot of questions about adapting loss estimates to a social inflation environment. Using standard development methods and picking a three-year or five-year average while social inflation is accelerating will leave one’s cumulative development factors too low, which would leave the ultimate loss estimates too low. We suggest that actuaries should consider selecting link ratios from the most recent development year or consider extrapolating link ratios instead of selecting a multiyear average in an environment of increasing inflation.

At one talk, we received the logical follow up: “How would social inflation affect Bornhuetter-Ferguson (B-F) estimates?” The answer is easy to determine, but we thought it was a nice exercise in working from first principles.

First, the B-F formula, which most of us know by heart for accident year  $i$ , evaluated at age of maturity  $j$ :

B-F reserve <sub>$ij$</sub>  = a priori loss estimate <sub>$i$</sub>  \*  $(1 - 1/\text{CDF}_j)$ , where  $\text{CDF}_j$  is the cumulative loss development factor at age of maturity  $j$ .

There are two variables at work here. The first is the cumulative development factor that we previously discussed. If link ratios are affected by social inflation, selecting multiyear averages of link ratios will result in cumulative development factors that are too low. As we explained

in our paper: “If losses accelerate, age-to-age factors will increase from accident year to accident year. The process no longer has a stable mean.”

If one selects individual link ratios that are too low, then the CDF is too low. In turn,  $1/\text{CDF}$  is higher than it should be and  $1 - 1/\text{CDF}$  would be lower than it should be. So social inflation’s impact on the CDF makes the B-F estimate lower than it should be.

What about the a priori loss estimate? The situation there depends on the source of this loss estimate. The a priori loss is often estimated by multiplying a selected a priori loss ratio by the earned premium for the period being estimated. Every organization is different, but it is not unusual to use the loss ratio to which the book was priced as the a priori loss ratio for the first year or two. Then the organization moves to the loss ratio derived from the latest reserve review. How does that measure up?

Maybe not so great.

In our paper, we noted there was roughly a three-year lag between losses increasing and pricing increasing in the industry for commercial auto liability. We showed this by comparing both premium and losses to nominal gross domestic product. Nominal GDP is a reasonable exposure proxy at the industry level. The insurance industry is a mature one. It grows over the long term at about the same rate as the overall economy.

The pattern we saw is consistent with the typical narrative of the pricing cycle. It takes time to identify that inflation has increased and is likely to continue increasing. Once it is identified, it again takes time to implement pricing adjustments

in the market, including making rate filings, receiving approvals, implementing in systems and communicating to stakeholders. After all that, the actual losses have moved to a new place. If social inflation

is present, that place is likely higher than what the rate change anticipated.

**We have received a lot of questions about adapting loss estimates to a social inflation environment.**

<sup>1</sup> When we use the term “social inflation,” it can be thought of as shorthand for a confluence of many socioeconomic factors, any or all of which can increase claims costs faster than general inflation. We do not mean to imply that specific excesses are the result of any one individual civil court phenomena. Moreover, the conclusions, formulae and remedies do not rely on any particular cause.



So if a company does not make explicit adjustments in its a priori loss ratio in anticipation of increasing inflation, its a priori loss ratio will also be biased low.

In sum, both variables that drive the B-F estimate are likely to be biased low.

It's also worth looking at the alternative formula for the B-F, wherein the method is effectively a credibility-weighted average of the chain-ladder and the expected loss ratio methods. As a reminder, that formula is:

$B-F \text{ ultimate}_j = \text{losses}_i * CDF_j * (1/CDF_j) + \text{net earned premium}_i * \text{a priori loss ratio}_i * (1 - 1/CDF_j)$ . The term before the plus sign is the chain ladder method, weighted by  $1/CDF_j$ , which is the credibility complement of  $1 - 1/CDF_j$ .

A moment ago, we established that  $(1 - 1/CDF)$  is biased low when social inflation is present, as is the a priori loss ratio. The CDF would also be too low, meaning the chain-ladder method would also be biased low.

Clearly it is important to understand whether a book of business has something like social inflation baked into it.

The greater challenge is what to do about it. It's not a dif-

ficult exercise to pick separate, higher link ratios to increase the CDF or to adjust the a priori loss ratio based on anticipated trend and rate level changes. For practical as well as professional reasons, it would be important to communicate these changes to anyone using the estimates.

It will also be important to have performed an analysis that identifies the social inflation in the first place. Efforts to increase loss estimates, no matter how laudable, often are skeptically met. Showing that social inflation is affecting a portfolio is the first step toward addressing the issue.

*Editor's Note: The CAS recently published "Social Inflation and Loss Development — An Update," which is available on the CAS website at [https://www.casact.org/sites/default/files/2023-03/RP\\_Social\\_Inflation\\_Update.pdf](https://www.casact.org/sites/default/files/2023-03/RP_Social_Inflation_Update.pdf). ●*

*Jim Lynch, FCAS, MAAA, recently retired from his position as chief actuary at Triple-I and has his own consulting firm.*

*Dave Moore, FCAS, MAAA, CERA, is head of Moore Actuarial Consulting.*



**The 2022  
CAS**

**Volunteer  
Awardees:**

**In  
Their**

**Own  
Words**



about one-third of the CAS membership volunteers every year. Of that group, the CAS honored 10 exceptional volunteers during last year's Annual Meeting based on nominations from their peers. Some go above and beyond for a focused and finite project over the course of a year. Some are new to volunteering and to the CAS but have shown themselves to be outstanding leaders. Others are long-time volunteers who have devoted themselves throughout their careers to elevate and advance the actuarial profession. With National Volunteer Week beginning April 16 of this year, we thought it was the perfect time to honor these volunteers by giving them an opportunity to speak of their experiences volunteering with the CAS — why they do it, what they enjoy most about it and what aspect stands out.

### The New Members Award

*Recognizes volunteer contributions during an individual's first five years from their most recent credential.*

#### Sandy Lowe, FCAS

*Recognized for her work with the Network of Actuarial Women and Allies*  
Co-founding an organization was definitely not what came to mind when I first became a volunteer, but I am proud of myself for stepping out of my comfort zone. I am really proud of what we've accomplished so far with NAWA (Network of Actuarial Women and Allies). What started as an idea to connect and support women in the profession has turned into an organization with over 700 members and over 1,900 followers on LinkedIn in just a few short years. Starting NAWA was no small task, but given the



meaningful connections and conversations we have already started to facilitate, it has been well worth the effort. I am looking forward to what comes next for NAWA.

#### Sarah Manuel, FCAS

*Recognized for her work with the Candidate Advocate Working Group*

I enjoy meeting and getting to work with actuaries I wouldn't have otherwise gotten to know and working toward a common goal of making the profession better.

There are tons of volunteer opportunities within the CAS in all kinds of areas. If you're passionate about exams, start as a grader; but if you think event planning sounds like something you'd enjoy more, you could join a working group focused on that. I've found that my favorite volunteer experiences have been ones where I'm passionate about the subject, the work is engaging and I like the people I'm volunteering with. If the first volunteer opportunity you try doesn't work out that way, try something else.



#### Nicolas Vega, FCAS

*Recognized for his work with the Latin America Regional Working Group*

There are two main reasons I'm volunteering for the CAS. The first reason is giving back to the profession and the CAS. The second reason is that I see this as a way to contribute to Latin America's actuarial development. I strongly believe in the empowerment of becoming an actuary, especially via exams, and how the profession helps people find a way in life. The sense of belonging the CAS has as a professional organization is second to none.

The bond that holds the CAS is powerful; it all starts with the volunteers.



**Charles Zhu, FCAS**

*Recognized for his work with the University Engagement Advisory Working Group*

What I enjoy most about volunteering is the opportunity to talk with students through case competitions and other university events. I am passionate about being an actuary, and I enjoy being able to share my experiences with students to inspire them to choose the actuarial career as well.

I volunteer for the CAS in the University Engagement Advisory Working Group to help guide and support future generations of actuaries. As a student, I had the privilege of speaking to and learning from professional actuaries through case competitions and other events at my university. These experiences shaped my career as an actuary, and I would like to give back and support future actuaries.

**Above and Beyond Achievement Award**

*Recognizes outstanding volunteer contributions during the previous year.*

**Brett Jaros, FCAS**

*Recognized for his work with the University Engagement Advisory Working Group*

I have served on the CAS Trust Scholarship Task Force for 10 years, most recently as its chair for three years. The importance of volunteering to give back to our society and its future members stems from a particularly meaningful experience. I was a past winner of the CAS Trust Scholarship myself, while majoring in actuarial science in college. Having spent considerable time and effort in school to not only satisfy coursework but also pass actuarial exams, receiving the scholarship was most importantly an affirmation of the hard work and sacrifice required in those early years. Fast forward a few years, and I knew I wanted to be able to continue the cycle of passing on reward and encouragement to eager and hard-working college students on a similar pursuit.

The scholarship task force itself has changed in many ways over the past 10 years, but one of my favorite changes has been the engagement with which our task force con-



nected with the applicants in recent years. At the end of each season, our volunteers write individualized letters to every single student applicant, thanking the student for applying and encouraging the continuation of all their worthy efforts on the path to the CAS. I believe this additional outreach has and will continue to build an important bridge between those on the difficult journey towards credentials — especially for those who weren't fortunate to win a scholarship and those who have benefited from having completed it.

**Sherwin Li, FCAS**

*Recognized for his work with the Asia Regional Working Group*

After I got the FCAS designation, I always wanted to do some volunteer activities for the CAS, especially to aid the developing P&C industry in Asia. By chance I learned that there was a local CAS group established, the Asia Regional Working Group (ARWG), so I joined it. I helped to connect the CAS leadership with the actuarial organizations in Asia, and I facilitated the Course on Professionalism (COP) in Asia. When the term of the chairperson of the working group expired, she entrusted me to continue the operation of the CAS ARWG.

What I've enjoyed most about volunteering is the work I've done to connect the CAS and the local Asian P&C industry.

**Amber Rohde, FCAS**

*Recognized for her work with the International Member Services Task Force & Network of Actuarial Women and Allies*

There are two things I enjoy most about volunteering. First, its impact. It's helping to drive change and move things in a positive direction — whether that's with the international work I've done, or the work we're doing with the Network of Actuarial Women and Allies (NAWA). The second thing, which is what makes it so fun, is the connections made with people. I remember attending my first CAS meeting and feeling so shy — not knowing anyone except my coworkers. In those situations, I would become extremely introverted and stay close to those I knew. After over 10 years of volunteering, that shyness couldn't be farther from my experience. I now know so many





friendly faces, and a lot of that is through the connections I've made at the CAS. What I love is that everyone I meet has their own unique perspectives and experiences. From that, I have grown personally and professionally. Now I look forward to all the people I get to talk to or catch up with when I go to the meetings. Volunteering is a decision I have never regretted.

**Kevin Roll, FCAS**

*Recognized for his work with the Limited Attendance Seminar*

Something that stands out about our volunteering opportunities that I didn't realize when I was just taking exams is all the work that goes on to make our organization run. From writing and grading exams to organizing and delivering a large meeting, volunteering gives you that behind-the-scenes view to see the incredible work that our volunteers and CAS staff do.

One of the things I am most proud of in my volunteering history is giving the opportunity of being a leader or chair to a junior member. It was rewarding to offer the role, work with the individual and then see them excel. Passing the torch was something that I didn't anticipate as being all that meaningful at the time, but looking back now, it definitely stands out. The individual now has this experience under their belt to open doors elsewhere in the CAS if they choose to volunteer in other areas.



ously ever since because of the learning opportunities and the friends I've made among CAS members.

What I enjoy most is meeting and interacting with members from all walks of life. When you are exposed to many members outside your own company, you realize that the roles and responsibilities given to actuaries vary widely and that actuaries are very adaptable when it comes to learning new things and applying them to the jobs their companies give them or that are required for their volunteer roles. That makes you a much more confident person when faced with a new challenge.

**Karen Terry, FCAS**

*Recognized for over 33 years of volunteerism*

When I think back over my career and the time spent volunteering, what stands out most (other than the people I met and worked with) is the wide variety of those volunteer opportunities. Depending on the opportunity, my role may have drawn upon my subject matter expertise, my organizational skills, my leadership skills or any combination thereof. No matter the role, each one helped me improve my skill set and deepen my knowledge.



It's the people that always make the difference. Volunteering for the CAS brought so many opportunities to meet new people and gain so many different perspectives on the issues and challenges we face as professionals. Every opportunity brought new insights and expanded my knowledge and awareness both within and beyond the boundaries of my areas of expertise.

**The Matthew Rodermund Memorial Service Award**

*Acknowledges CAS members who have made considerable volunteer contributions to the actuarial profession over the course of their careers.*

**Arlie Proctor, FCAS**

*Recognized for over 28 years of volunteerism*

I did not start my CAS experience as a volunteer. It was actually mandatory for all new Fellows to join a CAS committee at my employer in the early 90's. I am, however, grateful to Dave Hafling and Gary Dean for "voluntelling" me. I think I've been in a volunteer role continu-



## ETHICAL ISSUES

### Well, What's to Be Done with It?

By KENNETH HSU AND MIKE SPEEDING, MEMBERS OF THE CAS PROFESSIONALISM EDUCATION WORKING GROUP

*The Professionalism Education Committee often gets asked to clarify whether the Code of Professional Conduct and the Actuarial Standards of Practice (ASOP) apply to various scenarios. We have also received comments that the focus of these articles is generally on actuaries practicing in the U.S. We plan to address some of these scenarios in a miniseries of articles in the Actuarial Review.*

*While the articles will be posing scenarios as they apply to credentialed actuaries, we feel that these could apply to anyone doing work of actuarial nature, regardless of whether they intend to become credentialed.*

*To make this truly a learning and professionalism experience, we want your feedback. You can send your comments and questions to [ar@casact.org](mailto:ar@casact.org).*

**G**andalf Financial Services, LLC (GFS) is a top-tier consulting company that specializes in mergers and acquisitions (M&A) due diligence. They employ teams of accountants, financial consultants, actuaries and other specialists to provide the most accurate and complete information to help their clients make good decisions regarding the purchase or sale of a company.

Oakenshield Capital has contracted with GFS to perform due diligence regarding the purchase of Lonely Mountain Insurance Company ("Lonely Mountain") from Smaug Plunder Investments.

News of proposed transactions and negotiations must be kept confidential until closing, or it could ruin the deal. Because of this, a confidentiality clause is included in every master service agreement and statement of work. Also, every employee at GFS working on the

independent analysis of Lonely Mountain's reserves. The first thing he notices is adverse development associated with a book of long-term insurance policies, all related to Lonely Mountain's mining operations. Bilbo's best guess is that Lonely Mountain has adopted a pay-as-

**Bilbo's first thought would be to discuss his findings with Gollum, but Gollum is not part of the transaction team and Bilbo cannot contact her without possibly breaching the NDA.**

M&A project has signed a non-disclosure and confidentiality agreement (NDA) related to this project.

Bilbo is a newly minted FCAS and has been with GFS for two years. He has been assigned to the Lonely Mountain M&A project. Like everyone else, he has signed an NDA.

Lonely Mountain has identified a senior management team for the proposed transaction and requires that all communications take place with that team to maintain confidentiality. However, Gollum, Lonely Mountain's chief actuary, is not a member of the transaction team.

Bilbo has received and reviewed a copy of the most recent Statement of Actuarial Opinion, Actuarial Opinion Summary and related actuarial reports for Lonely Mountain, all signed by Gollum. Bilbo has also performed an

you-go approach to liabilities for these policies, using current year premiums to cover prior-year IBNR. Also, Bilbo notices that Gollum relied on a single reserve method of her own design, which, according to various reports she issued, better fits the data and this line of business. This is counter to the use of multiple generally accepted, accident year, ultimate loss projection methods that Bilbo learned from all his years of professional and educational training.

Nevertheless, Bilbo decides to review some ASOPs and the Code of Professional Conduct.

ASOP No. 43, Section 2.1 defines an Actuarial Central Estimate as "an estimate that represents an expected value over the range of reasonably possible outcomes."

He notices material differences between his loss reserve and unearned

premium estimates compared to Lonely Mountain's estimates. The combination of these observations suggest to Bilbo that Lonely Mountain could be insolvent if Bilbo's estimates turn out to be more accurate.

Bilbo's first thought would be to discuss his findings with Gollum, but Gollum is not part of the transaction team and Bilbo cannot contact her without possibly breaching the NDA. Is this a simple misunderstanding of what is presented in the provided materials? Should he get permission to contact Gollum?

Precept 10: Courtesy & Cooperation states "an Actuary shall perform Actuarial Services with courtesy and professional respect and shall cooperate with others in the Principal's interest."

Gollum would have to cooperate to resolve questions from Bilbo if he reaches out. But are there other concerns?

Precept 7: Conflict of Interest states "an Actuary shall not knowingly perform Actuarial Services involving an actual or potential conflict of interest..."

Gollum might be conflicted if she is involved due to her stock ownership or executive benefit from the sale. In addition, she was excluded from the transaction team by Smaug Plunder Investments in the first place so that her opinion can continue to be unbiased as she continues to service the company and render actuarial opinions.

Bilbo recalls that Precept 1 applies to everything an actuary does in the course of their work. Did Gollum violate Precept 1?

Precept 1: An Actuary shall act honestly, with integrity and competence, and in a manner to fulfill

the profession's responsibility to the public and to uphold the reputation of the actuarial profession. Annotation 1-1: An Actuary shall perform Actuarial Services with skill and care.

What about Precept 4?

Precept 4: An Actuary who issues an Actuarial Communication shall take appropriate steps to ensure that the Actuarial Communication is clear and appropriate to the circumstances and its intended audience, and satisfies applicable standards of practice.

of the profession, except where the disclosure would be contrary to Law or would divulge Confidential Information.

Bilbo now realizes that he is also constrained by the Code.

Precept 9 states: An Actuary shall not disclose to another party any Confidential Information unless authorized to do so by the Principal or required to do so by Law.

What other precepts, ASOPs or actions should Bilbo consider before deciding what to do? Consider consulting the Code and your own intuition

## **Bilbo recalls that Precept 1 applies to everything an actuary does in the course of their work. Did Gollum violate Precept 1?**

Since he believes there are some material violations, he moves on to Precept 13.

Precept 13: An Actuary with knowledge of an apparent, unresolved, material violation of the Code by another Actuary should consider discussing the situation with the other Actuary and attempt to resolve the apparent violation.

But he can't discuss it with Gollum because she is not part of the transaction team.

Precept 13 continues: If such discussion is not attempted or is not successful, the Actuary shall disclose such violation to the appropriate counseling and discipline body

and experience as you think through the following questions. Perhaps consider having a discussion group with colleagues and comparing thoughts on this. This is a great way to complete some of the professionalism continuing education requirements!

- Should he complete his independent analysis and communicate his findings to Oakenshield?
  - Would the jurisdiction affect the results' interpretation and what Bilbo could do?
  - In what scenarios should Bilbo contact the ABCD or even a colleague?
- Let us know your thoughts by writing to [ar@casact.org](mailto:ar@casact.org). ●



## CAS/CIA Report Says Marijuana Decriminalization Not Associated with Notable Rise in Traffic Accidents

**R**egional changes in the legal rules on using marijuana have affected the insurance risks related to cars. A new report from the Canadian Institute of Actuaries (CIA) and the CAS analyzes the impact of marijuana decriminalization on the vehicular accident experience in Canada and the United States.

The study did not detect any statistically significant impacts of decriminalization on the car accident fatality rate, insurance claim frequency or average cost per claim, particularly over the long term.

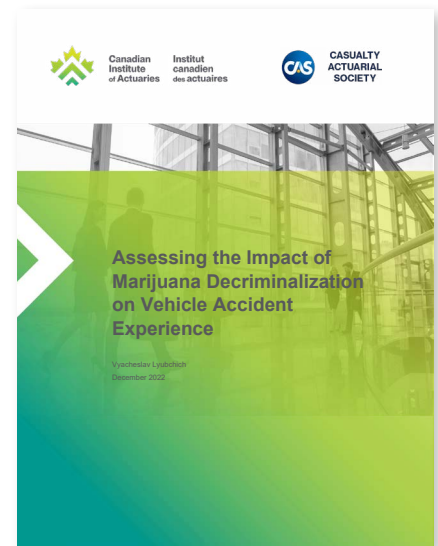
“Assessing the Impact of Marijuana Decriminalization on Vehicle Accident Experience” finds that there were no significant changes to the trend and seasonal variations in Canadian traffic accidents after the change in legal status. Similarly, the estimated state-wide effects of decriminalization in the U.S. do not show any consistent, significant results that would support a conclusion

that decriminalization led to an increase in road accidents or fatalities.

Temporal patterns of human activity (such as yearly, weekly and daily cycles) and inclement weather are much better predictors of the vehicle accident experience than marijuana decriminalization.

Canadian and U.S. data for 2016-2019 were used in the study, including official reports on collisions of private vehicles and losses in Canada, fatal accidents and weather factors in the U.S. For each data source, statistical and machine learning models were chosen to account for different sources of variability.

The analysis of 10 Canadian regions accounted for the regional differences and modeled a baseline linear trend that was also observed in the pre-legalization data alone. The analysis showed no statistically significant changes in the average cost per claim or claim frequency after marijuana legalization in Canada.

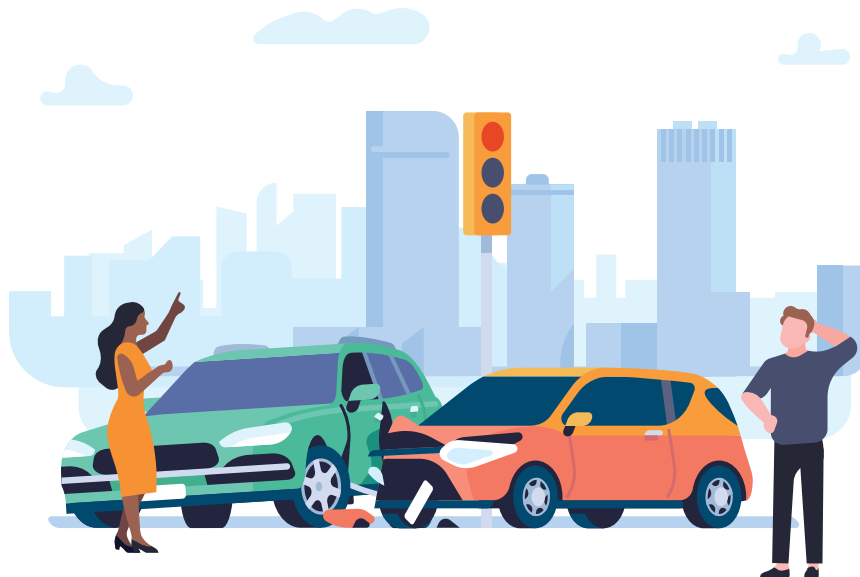


The quarterly data available for Québec led to similar findings.

The U.S. results varied by the state pair selected as the control in statistical comparisons. The tests for the decriminalization effect on fatalities failed to detect a statistically significant change. The machine learning techniques also allowed the author to account for other factors, including the weather and annual and weekly patterns of fatalities.

The study overcomes the limitations and disadvantages of earlier research on the effects of marijuana decriminalization by incorporating novel data-driven methodologies that do not rely on the linearity of relationships or parametric inference.

“The methods used in this research include improved statistical models, machine learning and other data science techniques. The models used high-resolution weather data to account for the effects of weather factors,” says the report author, Dr. Vyacheslav Lyubchich. ●





## Hacktuary Winners Build Novel Apps with Actuarial Know-How

Last September the CAS issued its members a challenge: Use your actuarial skills to develop novel risk engineering solutions. The CAS Hacktuary Challenge entrants had to create an end-user application that would be actuarially grounded but address relevant risk management problems for the typical consumer. Another requirement of the contest was that all application code be made publicly available on the [CAS's GitHub site](#).

Because the quality of the submissions was so outstanding, the selection panel chose to award the prize to two submitters, Caesar Balona and Michaël Bordeleau-Tassile, FCAS, who will split the cash prize of \$15,000 equally.

Balona's Risky Router allows users to enter start and destination points for a driving route that shows just how risky that path is. The estimate changes based on weather conditions, time of day, year of the car, whether the driver is impaired and other factors.

Bordeleau-Tassile's entry, Consumer Vehicle Toolkit, compares the insurance costs of cars by make, model, color and other aspects to help the user decide which car they should buy next. In addition, it shows the places in Toronto and Montréal with the highest likelihood of vehicle collision and theft. Finally, it illustrates the way that time of year, time of day, road surface and other considerations add to the risk of vehicular accidents.

CAS Research Actuary, Brian Fannin, ACAS, interviewed each of the winners to learn more. Also, see AR Web Exclusives for Fannin's talk with the winners and demonstrations of their apps.



*CAS Research Actuary, Brian Fannin, ACAS, interviews Caesar Balona (above right) and Michaël Bordeleau-Tassile, FCAS (below right), winners of the CAS Hacktuary Challenge. Check out their videos online in [AR Web Exclusives](https://ar.casact.org/topics/web-exclusives/) (<https://ar.casact.org/topics/web-exclusives/>).*

### **Brian Fannin: How did you come up with your idea for the app?**

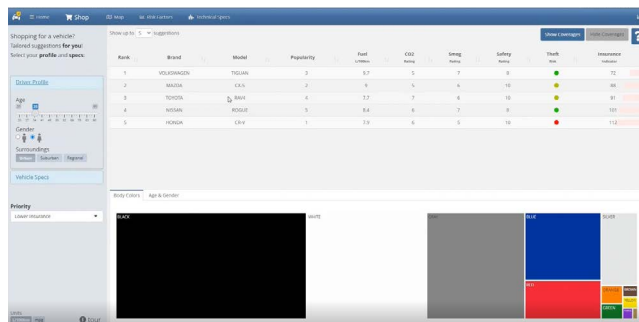
**Caesar Balona:** I had heard of a delivery company that developed their GPS routing software to prioritize left turns (when driving on left hand side) to reduce time spent waiting at traffic lights. The additional consequence of this was reduced vehicle accidents, as the vehicles were crossing oncoming traffic less. I liked the idea and thought, "what if we could extend this to avoid high frequency accident areas as well?" From there, I naturally extended the idea to include assessments of severity and the impact of other factors such as weather and

time of day.

### **Michaël Bordeleau-Tassile, FCAS:**

The challenge had a large scope — "Use open data, be interactive and be relevant to auto insurance." To be honest, I initially had a heavy blank page syndrome and felt caught up in a mental Catch-22. It's difficult to come up with an idea when you don't know what data is available. On the other hand, it's difficult to find relevant data when you don't know what your end goal is.

To get things rolling, I tackled both simultaneously for a couple of weeks, browsing the internet for data until I settled on this idea: to create an app that



Bordeleau-Tassile's Consumer Vehicle Toolkit.

would help the user along its vehicle relationship cycle, mainly the shopping and driving.

### Fannin: How do you hope that a consumer will use your app?

**Balona:** Initially I hope they will just use it to understand the risks of driving, which I think are often underestimated. We all think we are better than the average driver, but hopefully some cold hard stats can convince us otherwise. Consumers could use the app to convince themselves to alter their behavior by travelling at safer times, reducing speed in the rain or opting for safer transport. Outside of the general consumer, I hope the app generates thought and ideas on how to use data to improve road safety.

**Bordeleau-Tassile:** The shopping tool will help consumers consider vehicles that weren't on their shopping lists. It will help differentiate among various key elements. Who actually looks at insurance costs before purchasing a vehicle? It's not something that is readily available without filling out multiple insurance quotes. The driving tool will help consumers plan their itinerary and assess the various risks involved with driving and parking.

Either my app replaces Google Maps, or Google Maps gets inspired and integrates risk assessments as a layer.

Am I hearing royalties?

### Fannin: What do you want an actuary to learn from using your app?

**Balona:** I'd like to demonstrate how the power of programming

and other software skills can be used to enhance actuarial work and broaden our impact. Essentially the app takes an actuarial idea (frequency and severity of road accidents, typically used in insurance pricing) and couples it with modern ways of displaying and interacting with data. So, our pricing ideas are not only useful for understanding the

rhythms, I find that we often put in limited effort into integrating interactions. My shopping tool calculates vehicle affinity based on a broad population. Would affinity concepts perform well as an interaction proxy in a GLM? That's something I'd love to see results from.

On the itinerary risk assessment, the last decade has seen significant sophistication with the rise of telematics. However, I believe more can be done besides the standard braking, acceleration, speeding, etc. How about we integrate collision heat maps, road geometry, configuration, lighting, weather patterns?

### Fannin: Where did you learn the skills you used to create the app?

**Balona:** Outside of the actuarial knowledge, I learned programming, web development, web hosting and

**We all think we are better than the average driver, but hopefully some cold hard stats can convince us otherwise.**

**—Caesar Balona**

premium of a policy but can be used in other ways. I'd also like actuaries to learn to branch outside of Excel or traditional software. This type of analysis and app is simply not possible in Excel, and the data work would be extremely difficult and time consuming. Further, I hope the way I have structured the work, and the technologies used, can demonstrate how we should be structuring our work to maximize efficiency and reduce error. It is certainly not the best way to do it (given the time constraints), but it is one of many examples.

**Bordeleau-Tassile:** About generalized linear model (GLM) pricing algo-

deployment skills by working on many similar projects over several years. I would have an idea in my head, then I would research what I need to know to build it, then I would learn those skills. For example, to learn web development, I'd start with watching YouTube videos of someone developing a website, then I'd read a few books on the technologies they used, then I would start trying it out and building a website myself. That last part is the hardest part and where most of the magic sits. I'd spend countless hours building, encountering problems, researching how to solve them and then continuing. It is not quick or easy, but

that's how you learn to do it, by doing it.

**Bordeleau-Tassile:** For more than a decade, I had been working in home and auto insurance, using proprietary software for both data preparation (VBA/SAS) and modeling (Emblem). Being part of an R&D team, I was fascinated by my colleagues' various projects. In 2020 I embarked on a journey to self-learn the open-source R programming language and use machine learning algorithms.

The spark came from an insurance pricing competition hosted by aicrowd.com (similar to kaggle). I did finish in the top participants as a prize-winner. I then repeated my success story in a similar machine learning competition,

where the amount of manual work saves hours and reduces human error. This allows actuaries to focus on more important work. This naturally feeds into improved quality. How many times have you wanted to do some great, interesting, and valuable additional analysis, but there simply is no time because the data process is so time consuming and cumbersome? If you could take your data work from two

## Actuaries should use technology to better deliver results.

—Michaël Bordeleau-Tassile

related to detecting Alzheimer's disease. Both accomplishments were the result of my curiosity, ingenuity, love for innovation and strong self-taught capacities. Then came this Hacktuary challenge where I saw the opportunity to develop new skills.

As far as website building goes, I had basic HTML knowledge from the 1990s. (Is my GeoCities website still up? Ha ha!)

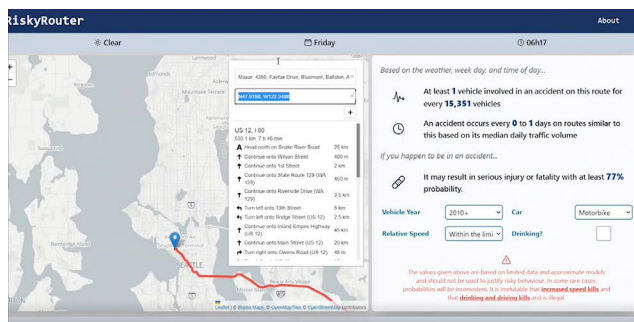
Throughout the challenge, I taught myself (lots of trial and error!) on Shiny [an R package] that can build interactive web apps straight from R.

### Fannin: What are some of the best ways that actuaries could use technology to improve their work product?

**Balona:** The most immediate benefits are increased efficiency and reduced errors. Writing scripts to perform repeti-

weeks to two hours, you now have two weeks extra to add value. These opportunities exist everywhere, and they become more apparent the more you apply technology. Further, if you find an error in your work the day before the deadline, with a well put together process using the right technologies, means you can run the full analysis again in hours, instead of having to find a sub-optimal workaround because the process is too time consuming to fix.

**Bordeleau-Tassile:** Actuaries should use technology to automate stuff. We all make mistakes, and manipulating spreadsheets might be the biggest source of mistakes. Actuaries should use technology to better deliver results. From interactive dashboards to enhanced model explainability, I find actuaries sometimes struggle when near the finish line of an analysis.



Caesar Balona's Risky Router app.

### Fannin: What barriers, if any, exist in the use of technology and what can actuaries and their employers do to overcome them?

**Balona:** I think the biggest barrier is time. Often actuaries simply don't have time to learn new technologies, especially students who are still balancing work with their primary studies. If employers could provide actuaries with uninhibited time to explore and learn these technologies, then I think we would see a lot more actuaries take them up. Few people have the luxury of having enough free time, or even energy, to pick up these skills after hours or on weekends, after a busy week of work, or after needing to care for families, or study, etc. Before I worked in a data science-focused role, all my learning was done at night and on weekends. As soon as data science became part of my role, the pace of my learning increased greatly. If employers can offer a percentage of each week to spend on learning new technologies, I think this will certainly help.

**Bordeleau-Tassile:** Actuaries are often met with a dismissal from IT security. The discussion should pivot into a dialogue where both parties understand the concerns of each other and have both parties work towards a common goal. ●



## IN MY OPINION By GROVER EDIE

## Reading is Continuing Education

By the time this magazine goes to press, we will be well into the year 2023. Many of us will have made New Year's resolutions, and likely some of us will have already broken some. I am sharing one of mine with you, and I'll update it with my progress just before this goes to press.

Hopefully, you completed and attested to the 30 hours of continuing education required to keep your actuarial credentials active. The hardest job for me is not getting the hours, it is making sure I enter them into TRACE. If you aren't using TRACE, I suggest you take a look at it for continuing education recordkeeping.

**History**

Recently, my grandson Antony and I were playing a card game. You draw a card, and it asks a question, like "What is your favorite song?" There is no winner or loser; the game is a way to get to know the other players better. When the card that read, "What did you used to do that you no longer do, that you would like to get back to doing?" came up, Anton answered, "I used to create a certain type of Lego structure/creature but haven't for a while." I answered, "I used to read a lot but haven't read much outside of work these days."

Business leaders are often known as prolific readers and often for the number of books they read. I regularly see on the web "the-10-books-some-famous-person-read-last-year-and-recommends-you-read-as-well" list. Many professions



require their credentialed members to attain a specified level of continuing education, ours included. But lately, I have only finished one or two books a year. I would like to get back to reading more books.

**Resolution**

What would be a reasonable number of books for me to read in a year? My wife Diane reads 30-50 books a year and has for many years. This is in addition to having read the Bible, in its entirety, for the past 38 or so years. Her level of reading is way beyond mine. Our two sons work and read about 35-45 books a year. That seemed more in the range I might eventually seek to attain. Eventually!

Finishing one book every other week seemed like a reachable challenge for me, so I went with that number. As a

test, I wanted to know how much time that would take.

The average book contains 50,000 to 100,000 words, per some searches on the internet. For comparison purposes, the Bible has over 783,000 words, but it is much larger than the typical book I would read in my book list. *Think and Grow Rich* by Napoleon Hill has about 44,000 words, and it seems to be on the lower end of word counts — it is a rather quick read. I did a quick estimate for *Against the Gods* by Peter L. Bernstein and came up with 136,000 words. *Passing It On* by Myles Munroe has about 87,500 words, per quick estimate. I picked 90,000 words for the typical book I will read this year, based (unscientifically) on the thickness of *Passing It On* and the thickness of other books already in my reading queue.



If I read at 250 words per minute, a 90,000-word book will take me about six hours to complete. Over a two-week period, that will require a commitment but would not be an undue burden. If I were to schedule 30 minutes a day to read, Monday through Saturday, I would have the needed six hours in two weeks. I think I can set aside 30 minutes a day to read.

For my initial year, I decided to go with 26 books. Knowing some weeks I could read more, other weeks less, that count of one every two weeks felt right.

### Categories

What I should read was harder to decide, so I started with classifications. I produced the following, all of which are separate from my professional continuing education requirements:

- Financial and financial forecasting.
- Political/social/current national and world events.
- Religious (excluding the Bible, which I read daily).
- General business.
- Classics.

Unlike our professional continuing ed, I haven't pre-assigned any number of hours or books for each category.

### Summaries

I usually highlight and underline most of my books. Years ago, I started transferring the highlighted and underlined portions of the books I read to a Word document. It is not a book report, just a copy of those phrases and sentences that were worth noting. Now I can read those papers to get the essence of the book without re-reading it.

Those papers have long languished, so I also started to organize and re-read them. I was surprised to find I have over

100 of these papers! My plan is to read one each weekday, allowing me to get through all of them in a year. I also plan to create such a document for most of the books I read this year.

### Another important category

One of the other cards my grandson drew in the game I mentioned before asked, "What are the most important subjects in school that will help you in life?" My grandson answered, "Math and English," an excellent response. I answered "recess" and explained: "Recess teaches how to get along with other people, how to play and communicate with them, and sometimes resolve conflicts." He thought about it for a few seconds and then his eyes lit up, and he said, "So, we are learning all the time we are at school after all!"

And so I added the category "getting along with and communicating with, others" to my list of book topics.

I went on to tell him that in my cur-

rent job, math and English are especially important, and I use them every day.

### Conclusion

Many professions require its practitioners to maintain their skills with continuing education. Stephen Covey, author of *The 7 Habits of Highly Successful People*, referred to it as "sharpening the saw."

We should also apply the concept of continuing education to business skills and other, non-professional aspects of our life.

### Update

January and February are very busy months for most consultants, and I am no exception. So far, I have only read two books and re-read no summaries, and I have not created summaries for the two books that I did read. I look forward to getting on track once things slow down at work. ●



## IT'S A PUZZLEMENT By JON EVANS

### Combining Squares

**Y**ou are given two squares with edge lengths  $a$  and  $b$ , such that  $a > b > 0$ . Describe exactly how you can cut the squares with two straight lines, allowing that a single line may cut both squares, so that the cut pieces can be reassembled into a single larger square with total area  $a^2 + b^2$ .

#### Picking a Trusted Fiduciary

Apologies to readers, as the wording of this puzzle had a flaw, pointed out by John Berglund and Jeff Subeck. Two of the conditions should have been:

- Excluding Delilah (rather than “Delilah says”), over half of the other candidates are truthful.
- Excluding Leni (rather than “Leni says”), fewer than half of the other candidates are truthful.

Jeff Subeck submitted the following solution for the corrected wording:

- Excluding Leni, there are at most four truthful.
- Excluding Delilah, there are at least five truthful.

Since adding Leni and removing Delilah increases the number of truthful



candidates, it must be that Leni is truthful and Delilah is not. Thus, Deckard picks Leni.

That is all that is needed to solve the puzzle, but it turns out that there are only two possibilities as to which candidates are truthful.

Due to the statements above, there are exactly four truthful, excluding Leni and Delilah.

- Since Irma says that Squeaky is truthful, either both are truthful or both are liars.
- Since Medea, Salome and Squeaky

are either all truthful or all liars, the same can be said for Medea, Salome, Squeaky and Irma.

Thus, the list of truthful candidates is either Leni, Irma, Squeaky, Medea and Salome or Leni, Eve, Gomer, Ilse and Jezebel.

Solutions were also submitted by Shyam Bihari Agarwal, John Berglund, Scott Brown and David Skurnick. ●



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Reinsurance firm is looking for a **SENIOR ACTUARIAL ANALYST** for Position 98576 to join a collaborative team in pricing treaties. Working with all lines of business the right candidate will have a strong desire to learn, grow, and take initiative. Must have passed 2+ exams and 2 years' experience. Hybrid schedule in **NJ** or **CHICAGO**.

Our **NORTHEAST** client is hiring a **PRODUCT MANAGEMENT/ANALYTICS LEAD ACTUARY** for Position 96802. Rapidly growing not-for-profit auto insurance company. Opportunity to improve pricing models. Leadership potential. ACAS-FCAS. 5+ years.

**REMOTE** opportunity for a **PRICING ACTUARY – E&S, Medical and Healthcare Liability** to build out the pricing function within a growing company for Position 98451. Partner with underwriters, identify areas of growth, and contribute to other strategic initiatives. Excellent communication and business acumen required. ACAS or FCAS.

Global firm specializing in customized actuarial services and strategic insight is looking to add an **ACTUARIAL CONSULTING MANAGER** to their growing, fast-paced **NORTHEAST** consulting practice for Position 98661 to develop client-oriented solutions. ACAS/FCAS with 10+ years property and casualty experience. Hybrid opportunity.

Large **NEW YORK** workers' compensation client seeks experienced FCAS or ACAS **DIRECTOR OF WORKERS COMPENSATION ACTUARIAL ANALYTICS** for Position 98799. Perform risk assessments and establish audit plans. Supervise staff. Monitor changes and trends in New York State agencies. Hybrid schedule.

Specialty lines insurer in **N. NJ** seeks an innovative **ACTUARIAL ASSOCIATE** to help define and build out robust reserving processes and analyses for Position 98476. Collaborate across the organization to transform and shape the business. Leadership potential. Hybrid schedule. nACAS-FCAS required, 5+ years.

Brokerage client looking to hire a **DIRECTOR OF ACTUARIAL & ANALYTICS** for Position 98874. This team works with large clients to manage their insurable property casualty risks. Looking for someone who can build a team or work well within the casualty team. Large account pricing is a must. 5 – 15 years' experience. ACAS-FCAS required. **MULTIPLE LOCATIONS** available.

**REINSURANCE TREATY PRICING ACTUARY** immediately sought by our **ILLINOIS** client for Position 97658. Hybrid opportunity to work at home part of every week. Recently-credentialed FCAS or ACAS preferred.

Our **NORTHEAST** client has an opportunity for an **ACAS ACTUARIAL CONSULTANT** with 2 years experience in ratemaking for Position 97685. Preferred background in commercial and/or personal auto and homeowner's insurance. Experience leading new product filings and integrating predictive models desired. Must have excellent communication skills.

**REMOTE** opportunity for an **INTERNAL CONSULTANT, ACTUARIAL ANALYTICS R&D** to lead a small team for Position 98842. Work with personal lines team and business partners to identify scope and specifications for projects, and create project plans. Provide interpretation of findings, provide solutions to the business, and provide guidance and support for regulatory reviews. ACAS or FCAS.

**ASSOCIATE CONSULTING ACTUARY** sought by our **ATLANTA** client for Position 97684. ACAS credentials preferred. Manage projects and train analysts.

**FCAS or ACAS** sought by multi-line insurer for their **TEXAS** office for Position 97094. Client is run by actuaries.

**PROPERTY ACTUARY** sought by our **FLORIDA** client for Position 97421. Experience with homeowners or commercial property ideal. ACAS or near-ACAS preferred. Prominent organization.

