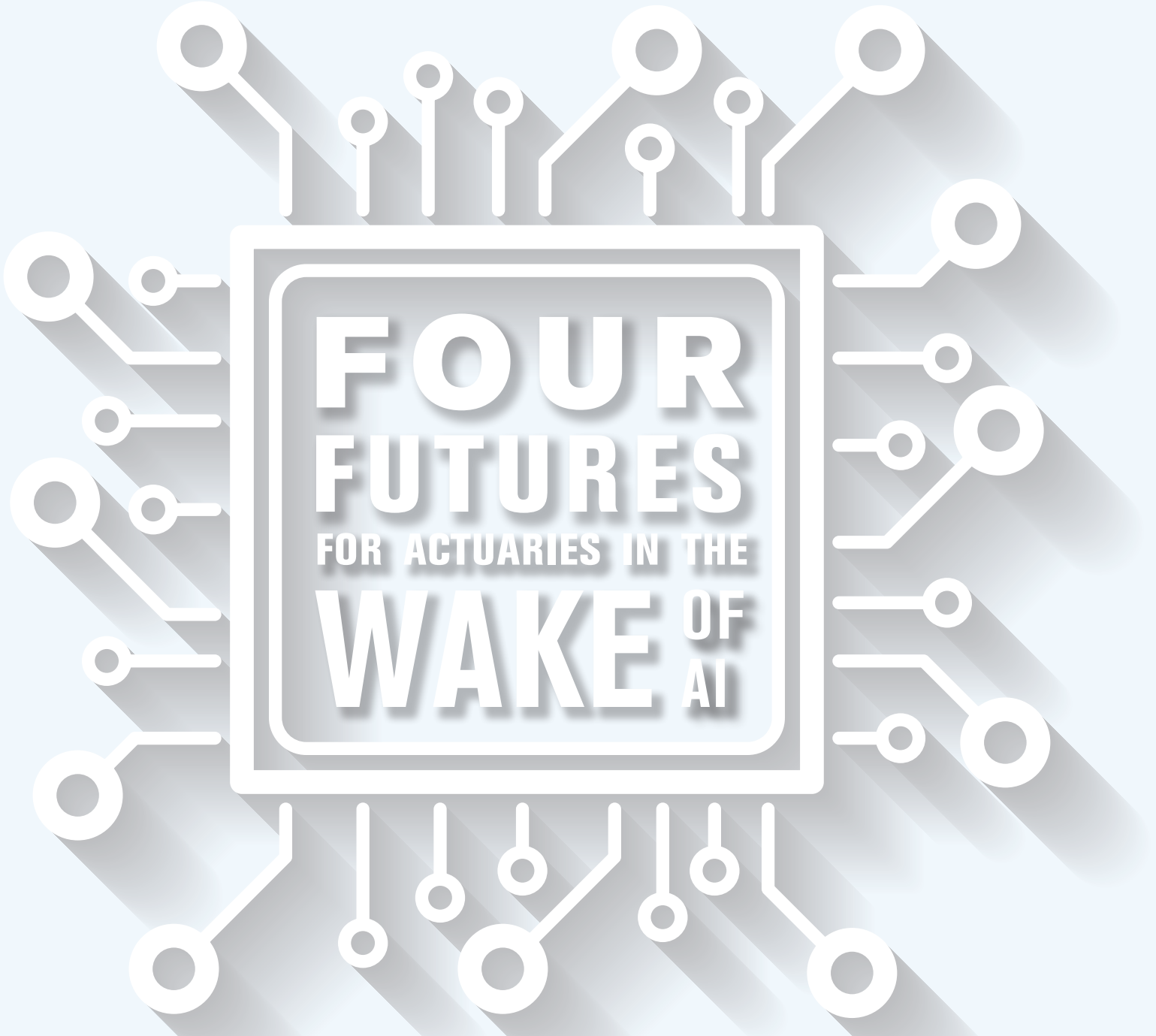


# actuarial REVIEW

VOL 50 / NO 4 / JULY-AUGUST 2023

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## FOUR FUTURES FOR ACTUARIES IN THE WAKE <sup>OF</sup> AI

**2023 CAS Elections**

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The insurance was free ... if you had a claim. Learn about the strangest insurance policy you might ever see.



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**editor's**NOTE By ELIZABETH SMITH, AR MANAGING EDITOR

## Organic Intelligence

This issue's theme was not planned but came about organically to tackle artificial intelligence (AI). In Jim Weiss's AI cover story, he posits that since actuaries are wired for forecasting risk, they can use their skills to predict their futures. He speculates on four milieus where actuaries can reconcile with AI and ends with some advice. (Learn more about Jim in this issue's "Meet the Veep.") We also have Spring Meeting coverage, a Humor Me column, a President's Message and a letter to the editor that focus or touch on AI.

AR welcomes first-time contributors Jonathan Fesenmeyer, Rob Kahn and Yuhan Zhao. Kahn and Zhao are also AR Working Group Members. We also welcome back Dale Porfilio and Annmarie Geddes Baribeau who write about Spring Meeting sessions.

In closing, election time is here, so meet the candidates (in this issue and online) and make sure that you vote. ●

### Correction

The May-June AR 2023 column "Meet the Veep: Mary Hosford, Vice President-Administration" contains an error. Hosford wasn't an underwriter at Lloyd's but worked as an actuary for a Lloyd's underwriting company.

### Web Exclusives!

AR has two videos (<https://bit.ly/ARWebExclusives>) with highlights from the 2023 Spring Meeting. See what you missed and make plans to attend the Annual Meeting in Los Angeles this November.



*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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## Expanding Globally

**I**s described in the [Strategic Plan](#): [The CAS] will be expanding our footprint to be ready to serve our members working in these regions [internationally], to raise awareness of our credential with key stakeholders, and make our credentials more accessible for those who seek the premier general insurance<sup>1</sup> actuarial education.

Of the three pillars, Expanding Globally is the one that receives the least attention from most of our members. The majority of our members live in the U.S. and Canada, and as a result may not see the need to focus on global expansion. That had been true of my thinking for much of my nearly 30-year career in the U.S. My international experience was limited to brief discussions in the Australian market, a short-term collaboration with actuaries in the United Kingdom and one client project with a South African company. Having been involved with CAS leadership in some capacity since 2006, I knew the international market was important to the CAS, but for most of my career it never rose to a significant level of importance to me.

That has all changed in the last two years. As president-elect and president, I have travelled internationally and interacted with actuaries abroad, both CAS members and members of other ac-

tuarial organizations. I truly believe, now more than ever, that expanding globally is important not only for CAS members outside of North America, but also for actuaries in North America.

As a reminder, our Envisioned Future states:

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

The vivid descriptions of our Envisioned Future related to expanding globally are:

CAS members and candidates have a pronounced and measurable advantage in the job market; there is a **global demand** for the services and expertise of CAS members as evidenced by requirements for CAS credentials in hiring decisions.

CAS members and candidates are growing in numbers **around the world**, with more **rapid growth** in the geographic areas where the CAS is focusing its **international strategy**.

CAS members advance the theoretical and practical applications of property-casualty actuarial science and are on the forefront of new techniques to solve **global insurance and risk management problems**.

These vivid descriptions highlight several important aspects of what it means to expand globally. One obvious aspect is the growth in the number of CAS members and candidates interna-

tionally. We are seeing this happen, as current rates of growth of international members and candidates are higher than the rates of growth of members and candidates in North America. A second aspect is the expansion or demand for services of CAS members. This will involve ensuring that global employers and regulators understand the value that CAS members bring to general insurance.

I attended the Singapore Actuarial Society Annual Conference last September. As part of this visit, I met with employers of CAS members and the Monetary Authority of Singapore (MAS), a group responsible for regulating insurance companies in Singapore. Employers conveyed to me the high value of the CAS credential and the expertise of CAS members related to general insurance. MAS thought so highly of CAS members that they were then looking to hire a CAS member for their regulatory team. The more we are able to demonstrate the value of CAS members to employers and regulators around the world, the more the demand for services of our members will continue to increase.

However, there is a third aspect to expanding globally that is not focused on as often: The CAS also has the chance to influence the use of general insurance actuarial solutions around the world. Myriad challenges are facing general insurance companies, and as the only actuarial organization in the world that focuses exclusively on P&C insurance, we can take a leading role in developing solutions to these challenges. Our in-

*President's Message, page 8*

<sup>1</sup> Property and casualty insurance is referred to as general insurance or non-life insurance in most of the rest of the world.



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## President's Message

*from page 6*

International team of CAS volunteers and staff have done an excellent job of helping to establish our expertise in global markets, including China, Singapore, India, Thailand, the Caribbean, Mexico, Taiwan and Brazil.

Now, you may still be wondering why this should be important to you. I offer four reasons for you to consider.

1. **We have members and candidates worldwide.** As is true with all our members and candidates, we are committed to supporting our members and candidates who live outside North America. This includes membership services, continuing education, research and basic education. However, this requires us to be deliberate as we consider our international members. Attending most of the CAS webinars will not be convenient to a member living in Australia. Attending an in-person CAS meeting is a more costly and time-consuming endeavor for our international members than it is for those of us in North America. More than 30% of our members volunteer for the CAS, and many of these volunteer activities will have international implications. If you serve on the Exam Working Group, you are writing or grading exams that will be taken by international candidates. If you are planning continuing education events, there may be international considerations for accessing the educational content. Our international team does an amazing job supporting our international candidates and members. Some recent initiatives

include hosting an annual Course on Professionalism in Asia as well as an international webinar series at times that are convenient for members outside of North America. CAS members also engage in local volunteer opportunities like the

the market penetration of electric vehicles is higher in China than it is in the U.S. As such, the Chinese Actuarial Association has completed an analysis of private passenger automobile experience of electric vehicles relative to non-

## ... we can take a leading role in developing solutions to these challenges.

- East Asian Student Summer Program, which is helping to shape the next generation of CAS members.
2. **More and more our work is globally connected.** This is also true of the actuarial community. There are companies that our members work for in North America that are part of international groups. As such, these members may need to know more about international issues in order to do their jobs.
3. **Opportunities in general insurance are expanding.** This is especially the case in developing countries. As insurance markets grow, the role of general insurance actuaries in these markets will also grow. This presents an important opportunity for CAS members to work in these developing areas and influence the work done in these countries. We have developed a significant amount of general insurance expertise, and by partnering with those in these regions, we can advance the state of general insurance internationally.
4. **We can learn by collaborating with other actuaries.** Some of the actuarial issues we face in North America are the same for actuaries in other countries. For instance,

electric vehicles. This is an example of data that would be valuable to U.S.-based actuaries as the proportion of electric vehicles on the road increases.

The value of the international actuarial community was driven home for me at the 2023 International Congress of Actuaries (ICA), which was held in Sydney, Australia at the end of May. At this gathering of 1,500 actuaries from around the world, I had the opportunity to present to the Strategic Planning Committee of the International Actuarial Association (IAA) on the impact of artificial intelligence on the actuarial profession. AI is an issue we are all facing around the world, and it is an opportunity for collaboration on a matter that will have global implications.

At ICA CAS representatives also had the opportunity to participate in bi-lateral meetings with leaders of other actuarial organizations. We discussed a number of common issues, including the impact of data science, the actuarial candidate pipeline, and diversity, equity and inclusion. CAS representatives shared their insights and learned from other organizations. We were also able to promote the advances of the CAS and our members to countries through collaboration.

I experienced at ICA all of the things that highlight why international issues should be important to us all. I met and got to know CAS members who are living abroad. Hearing their experiences was beneficial for me, and it was a great reminder that our international members bring viewpoints from different perspectives. I met members who are employees of global groups that are exposed to issues that cross country borders. I talked to actuaries and regulators from countries with developing general insurance, and these conversations reinforced that there is a significant opportunity for the CAS to influence the future of P&C work worldwide. And I was reminded of actuarial issues that both our community and other actuarial associations are heavily involved in and that are ripe for collaboration, such as climate risk and IFRS-17.

Ultimately, we face a risk if we do not pursue these global opportunities. The general insurance needs of employers and regulators globally will not decrease. And as these needs will be critical and will have to be met, someone

will step up to meet them. Given our exclusive focus on general insurance, the CAS is uniquely qualified to meet these needs. If we do not, we risk ceding territory in which we should be active. As we are the premier organization credentialing general insurance actuaries, we believe we should not be ceding this territory.

So, what does this mean for individual members? How can you get involved?

1. Volunteering may have international implications that you have not considered, which can help you think internationally where you are volunteering.
2. Every CAS member is a member of the IAA. Learn more about what is going on internationally by getting connected with the IAA. Visit <https://www.actuaries.org/iaa> for more information.
3. Ask actuaries you know who have worked internationally about their experiences. I guarantee that you will learn something interesting and gain a new perspective. ●

## Artificial Intelligence Versus Social Inflation

The article "Social Inflation and the Bornhuetter-Ferguson Method" (*Actuarial Review* March-April 2023) basically focuses on how traditional actuarial reserving and pricing methods come up short when social inflation is present in a book of business. My immediate reaction to the article was that, once again, people would like to replace the actuaries with programmed formulas, and, once again, with no success. However, I have also been reading a little about AI and became intrigued with how AI could work to replace us, even in the issue described above. My first thought was what would the AI actuarial avatar look like?

If I were building this avatar, I would make it a combination of actuary, claims specialist, underwriter, legal person and programmer. So now we begin to build an AI avatar that has all the knowledge and skills derived from actuarial, claims, legal and underwriting, and since there is a programming background built in, the avatar can learn and reprogram on the fly. This avatar can run a tremendous number of different scenarios using factors blended together from all that expertise. Thus, by incorporating different skill sets as described above, I believe these AI avatars can better predict future costs than the actuarial department. Can these AI avatars replace me? Not yet, I think, but I fear the gap is narrowing!

—L. Nicholas Weltmann Jr., FCAS ●

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Letters are limited to 250 words and must include the author's name and phone number or email address. Anonymous letters will not be published. Letters on issues previously addressed will not be published unless new and pertinent information is provided. No more than one letter from an individual can appear in every other issue. Letters should address content covered in AR. Content regarding the CAS Board of Directors or individual departmental policies should be directed to the appropriate staff and volunteer groups. Letters are subject to space limitations; publication is not guaranteed. The AR editorial volunteer/staff team reserves the right to edit any submitted letter so that it conforms to policy. Decisions to publish letters and make changes to submissions are at the discretion of the AR Working Group and CAS staff.

For more information on AR editorial policies, visit [https://ar.casact.org/wp-content/uploads/2023/06/AR\\_Statement\\_of\\_Purpose.pdf](https://ar.casact.org/wp-content/uploads/2023/06/AR_Statement_of_Purpose.pdf)

# ANNUAL MEETING



## *Journey to the Top*

November 5-8, 2023  
Westin Bonaventure  
Los Angeles, California

## COMINGS AND GOINGS

**Matthew Duke, ACAS**, was appointed head of pricing, U.S. middle market analytics at AXA XL. Duke joins AXA XL from Xceedance, where he served as senior vice president and chief actuary, head of global actuarial services. Prior to his most recent position, he served as head of pricing and growth analytics and interim head of risk for Blackboard Insurance. His 20-year career also includes various pricing and reserving positions with Guy Carpenter, Arch Insurance, and Travelers. He holds credentials as an Associate in Reinsurance (ARe) and Member of the American Academy of Actuaries (MAAA).

**Stephen (Steve) McAnena, ACAS**, was appointed executive vice president and chief operating officer for Horace Mann. In this role, McAnena will work closely with Marita Zuraitis, Horace Mann's president and chief executive officer, to execute the next phase of the company's strategic journey —continuing to advance Horace Mann's vision to be the company of choice to provide insurance and financial solutions for educators and others who serve their communities. McAnena most recently served as president of personal lines, and earlier president of distribution, life and financial services for Farmers Insurance, and previously was with Liberty Mutual Group for more than 25 years. In these roles, McAnena and his team helped drive sustained, profitable growth through multiple distribution outlets with a strong passion for people development.

**Zachary Martin, FCAS**, and vice president at Frankenmuth Insurance

was appointed assistant corporate secretary. Martin joined Frankenmuth Insurance in 2018 as the director of actuarial, risk and compliance services and brought 13 years of prior actuarial and technical experience from working for Liberty Mutual, Zurich North America and TD Insurance. He was promoted to vice president in 2019 and is responsible for pricing, analytics, reserving, risk and compliance activities. Further, Martin leads corporate initiatives to advance the company's use of predictive analytics. In addition to serving on the Executive Committees of Frankenmuth Mutual Holding Company, Frankenmuth Holdings, Inc., Frankenmuth Insurance Company and all subsidiary companies, Martin is a member of the Retirement, Political Affairs, and Risk Committees. He also holds the following professional designations: Member of the American Academy of Actuaries (MAAA), Fellow of the Society of Actuaries (FSA), and Certified Specialist in Predictive Analytics (CSPA).

**Mario Binetti, ACAS**, was appointed head of casualty at Conduit Re, a reinsurance company based in Bermuda. Binetti joins Conduit Re from BMS Re, where he was head of casualty treaty and actuarial. He previously worked at JRG Re, QBE Reinsurance, XL Capital and Everest Re, Bermuda. Binetti will be responsible for leading Conduit's global casualty underwriting team, which had previously been split by geography. He will lead the continued development and delivery of the company's casualty strategy, ensuring that Conduit continues to provide its clients with innovative and effective reinsurance solutions. ●

EMAIL "COMINGS AND GOINGS" ITEMS TO [AR@CASACT.ORG](mailto:AR@CASACT.ORG).

## CALENDAR OF EVENTS

**September 6 – October 11, 2023**

Virtual Predictive Analytics  
Bootcamp

**September 11–13, 2023**

Casualty Loss Reserve  
Seminar & Workshops  
Orlando, Florida

**October 10 – November 21, 2023**

Introduction to R Virtual Workshop

**October 19, 2023**

2023 In Focus Virtual Seminar

**November 5-8, 2023**

CAS Annual Meeting  
Los Angeles, California

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

## IN MEMORIAM

Laszlo Janos Gere (ACAS 2002)  
1974–2023

See real-time news on our social media channels. Follow us on Twitter, Facebook, Instagram and LinkedIn to stay in the know!

## 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."*

### Roaming to Freedom

#### **Laszlo Janos Gere (ACAS, 2002) 1974–2023**

Laszlo Janos Gere, age 48, passed away Tuesday, May 2, 2023, in Marion, Virginia. Laszlo was born in Budapest, Hungary, in 1974. Both his parents were biologists, each prominent in their

respective fields. Laszlo is the fourth of five sons. He moved to the U.S. in 1984, graduated from South Dakota State University with a degree in political science, and then worked as an actuary at Travelers, KPMG and Everest Re. He was an avid runner, biker and outdoorsman who loved adventure and a good debate

with his coworkers. In 2020, he quit his job to pursue a lifelong dream to travel the world with nothing but his bicycle. He started a blog [roamingtofreedom.org](http://roamingtofreedom.org), where he chronicled his adventures. He is survived by his brothers, nieces and nephews in Hungary and many who considered him family in the U.S. ●

## An NCCI Mini-Reunion



*Former NCCI colleagues reunited at The Cove in Deerfield Beach, Florida. Pictured left to right are Jim Davis, Rich Moncher, Tony DiDonato, Bruce Spidell and Tom Daley. Moncher left NCCI in the '90s and has since retired from USAA. Davis, DiDonato and Daley have all retired from NCCI. Spidell is looking forward to retirement from NCCI at the end of 2023.*

## CAS STAFF SPOTLIGHT

### Sarah Sapp, Editorial/Production Manager

Welcome to the CAS Staff Spotlight, a column featuring members of the CAS staff. For this spotlight, we are proud to introduce you to Sarah Sapp.

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

I am the editorial/production manager for the CAS. A lot of my efforts go into creating the *Actuarial Review* and its promotion, but I also have a hand in editing a lot of printed material that comes out of the organization (outside of the Research sector). I also create videos for the website and social media posts to get the word out about articles in *AR*.

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

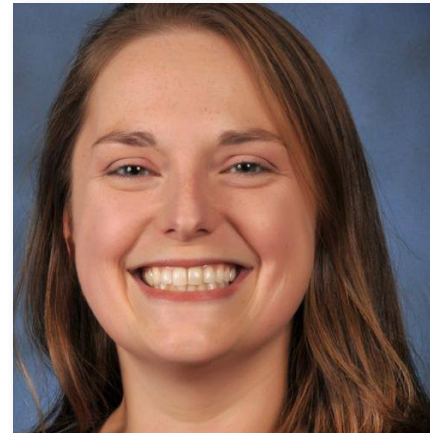
I am a storyteller by nature, so I'm inspired by the human-interest stories I get to write about our spectacular members, primarily

about volunteers who are making a big difference in our organization and the industry as a whole. I love writing, so that is my favorite part of the job.

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

I have a Bachelor of Business Administration in marketing communications, a Master of Arts in journalism, and an Ed.D. in higher education leadership from The University of Mississippi, affectionately called Ole Miss. I have been in higher education marketing communications for the last 20+ years. Of note, I served as director of communications in the community college system in north Mississippi as their chief communications officer for six years, and I served in various marketing communications roles at Ole Miss for 10+ years.

- **What is your favorite hobby out-**



Sarah Sapp

- **side of work?**

My favorite hobbies are spending time with friends and family and going on walks. I'm also addicted to several podcasts, including *You're Wrong About*, *Maintenance Phase*, *If Books Could Kill*, *My Favorite Murder* and *You Are Good*.

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

I've been to Prague and Paris and had the most magical time. I would love to go back, and this time I would love to take my little boy.

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

In college I used to manage, sing and play flute in a blues/funk band.

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

I think they would describe me as bubbly, empathetic, positive and loving. ●

(L-R) Aiden Sapp (11), Bryan Sapp and Sarah Sapp



MEET THE VEEP

# Jim Weiss, Vice President-Research and Development

By DR. SARAH SAPP, CAS EDITORIAL/PRODUCTION MANAGER

You might have noticed that the CAS has been receiving more frequent coverage in major publications, including *TechCrunch*, *Forbes*, *Yahoo! Finance*, *Bloomberg* and *Business Insider* in recent years. VP-Research and Development Jim Weiss attributes some of the recent uptick in media mentions to the incredible work being done in the research arm of the CAS.

“Our internal metrics suggest we are

outputting at a relatively strong velocity, and one area of particular strength is the visibility we have been achieving around our work. This indicates that our problem diagnoses on topics such as wildfire mitigation and social inflation have been resonating.”

The CAS research organization includes volunteer working groups geared toward ratemaking and reserving, related task forces that handle prizes and grants, and an extended network

operating plan and coordinating the various pieces of the organization to march in parallel toward executing that plan.”

The VP role also involves financial responsibilities, including the oversight of the utilization of the CAS research budget, which is supported by member dues.

Weiss’s goals as VP, which by extension reflect the goals of the research organization, align closely with the CAS Strategic Plan’s pillar Building Skills for the Future. These goals include delivering a reasonable balance of content across the three future skills areas of analytics, problem solving and domain knowledge. He also aims to find markets for the content inside and outside the profession, which involves working closely with counterparts in the CAS marketing and communications department to spread the word.

“We are collectively working toward a future where, whenever members are wrestling with new problems, they and their organizations know to tap into CAS research for solutions. The solutions might come from 30,000 feet with thought leadership, 5,000 feet with technical and business analysis, or grassroots with code — maybe even all of the above.”

Weiss most enjoys the calls for essays and papers involved in his arena.

“One of my favorite papers ever, which was authored by current CAS

of freelancing contractors and volunteers who pitch in as the need arises. Weiss and CAS Staff Research Actuary Brian Fannin help steer the organization along with the volunteer chairs and staff leads of its different subunits.

“Brian really manages most operational aspects of the organization, including ideation,” Weiss said. “My role involves helping Brian translate the board’s strategies into an ongoing



Jim Weiss (left) joins CAS Professional Education Manager Kellee Jenkins (center) and Rebecca Williams, chair of the RPM Working Group, at the CAS Leadership Summit in Baltimore last September.



President Roosevelt Mosley, came through a call for data management papers in 2012 and contained insights about Twitter mining that scaled perfectly to insurance problems,” Weiss said.

“Working groups play a critical role in drafting calls that resonate with the membership, and they work with respondents to review, refine and ultimately publish the work. The most practical or innovative work earns cash prizes. Right now, multiple working groups are collaborating on a call for essays on the topic of social inflation. I have high expectations for what will come of the effort and would encourage anyone reading this article to consider submitting an entry.”

Weiss is proud of the way volunteer and staff leaders have been very creative and resourceful about how the organization sources and delivers content.

“For example, deliverables now include software apps and firsthand surveys we develop,” Weiss said. “Our volunteer and staff leaders are doing everything they can to make sure we create content that stands the test of time, and until we find out how much does — the effort is what I am the proudest of.”

Early in Weiss’s career, several mentors, including a former CAS VP-Research and Development, encouraged him to get involved and connected him with opportunities that aligned with his interests and personal development trajectory. This gave him familiarity with different verticals of the CAS organization — including research, professional education and admissions. His first formal leadership role in the national organization was chairing the Microinsurance Research Working Party, during which time he and his teammates

created several trade media pieces that helped bring attention to an emerging practice area in developing nations that many members in North America were previously unaware of.

“This also helped raise our own visibility in the research and broader organizations, and I personally was very fortunate to get the call for the VP role in 2020,” Weiss said.

In addition to appreciating the rewarding aspects of being a volunteer leader, Weiss was drawn to this particular VP role because of the opportunity to work closely with Fannin.

“He literally wrote the book on critical aspects of actuarial science; getting to work with him day-to-day seemed better than simply buying the book (*R for Actuaries and Data Scientists with Applications to Insurance*) on Amazon — although I would recommend doing both,” Weiss said.

He was also intrigued by the position because he firmly believed that ideas and approaches, like the ones he and his teammates workshoped on the microinsurance initiative, could help stoke the embers of already excellent work taking place in other areas of the research organization. He was excited to put this belief to the test.

Weiss graduated from Manhattan College with a B.S. in mathematics and no actuarial exams in 2003. An organization called ISO, now known as Verisk, hired Weiss, and he ended up staying there 15 years while obtaining his FCAS and CPCU designations along the way.

He joined Crum & Forster right before the pandemic and formed a predictive modeling team within one of its commercial segments.

“These are two first-rate and very different organizations, but two com-



*Jim Weiss, Vice President-Research and Development*

monalities between them are that both took a chance by investing in me when I was relatively unproven for the role, and both are supportive of CAS engagement and the value that brings back to the daily work,” Weiss said.

Weiss encourages members who want to make their way up to volunteer leadership roles to be themselves.

“I was initially surprised when I was called upon as a volunteer leader because I do not have an extroverted personality and sometimes struggle with when I should assert myself versus stand down,” Weiss said. “Volunteering is a good way to gain confidence and self-awareness, but it is not going to drastically change who you are — and it never should. The CAS is an organization where, if you are who you are and give what you can, there will be a lot of people, including some of your idols, who see you and help you on your journey.” ●

MAKING THINGS HAPPEN

## Former Teacher Makes a Difference with Student Programs

*The Making Things Happen column features CAS and iCAS members who serve the associations in many capacities and enrich the volunteer experience for all.*

**A**s a former teacher and career changer, Jason Nikowitz, FCAS, brings a unique perspective to his role as volunteer chair of the Student Programs Task Force, a subgroup of the CAS University Engagement Advisory Working Group.

His distinctive viewpoint was apparent when the group was working on curriculum reviews and updates for the CAS Student Central Summer Program, a free, eight-week, online program designed by practicing actuaries to support university students' career growth. The program provides students with technical and soft skill development in addition to mentorships and networking opportunities. Nikowitz took on a very heavy workload in updating several course modules and providing fresh, new content as well as interac-



(L-R): Jason Nikowitz with Maggie (dog), Ella (daughter), Cait (wife), Dylan (son), Miles (son)

the success of several virtual student programs.

“In general, my goal is to support the task force as it develops programs to connect students with the CAS,”

**I’m most proud of how passionate all the other members of the committee are. Their energy and creativity make our meetings fun, and we end up with some great ideas on how to continue to improve our interactions with the students.**

tive assignments and activities to boost engagement among the students. In addition to his work with the summer program, Nikowitz has been critical to

Nikowitz said. “I believe it’s integral to the success of the CAS and our profession that students can learn more about

the actuarial career as soon as possible in their education.”

Nikowitz is excited about a new initiative to extend the organization’s connection with students beyond the summer and into the school year by inviting students to apply for a year-round program. This allows the CAS and volunteers to support them throughout the school year, especially on their actuarial journey.

“I’m most proud of how passionate all the other members of the committee are,” Nikowitz said. “Their energy and creativity make our meetings fun, and we end up with some great ideas on how to continue to improve our interactions with the students.”



Jason Nikowitz with Magnus Carlson (aka Maggie).

According to Margaret Gaddy, University Engagement Manager, Nikowitz is very goal-driven and deadline-oriented. He is always the first to complete his volunteer tasks and does it with high quality that goes above and beyond expectations.

“Jason is someone who always knows the right questions to ask to bolster engagement and brainstorming within the working group,” Gaddy said. “He can see the bigger picture with the working group projects and how they are contributing to the overall strategic goals

of the CAS. Additionally, as a former teacher he is great at engaging with the students. He is relatable and pulls the students out of their shells to interact, which is very hard to do in a virtual environment. Jason’s presentations for both the summer program and student programs have been consistently some of the highest rated presentations by our student participants.”

Nikowitz knew he wanted to volunteer as soon as he finished his FCAS exams.

“The CAS is a great organization, and one of the reasons that’s true is because of the awesome job its volunteers do,” Nikowitz said. “I was eager to be a part of the CAS and give back.”

In addition to the CAS Student Programs Task Force, Nikowitz has also volunteered on the Predictive Analytics (PA) Project Task Force, iCAS Exam 3, Learning Enhancement Process Mentors Working Group, University Liaison Program, Syllabus and Examination Committee and Learning Enhancement Process Mentors Committee. He has served as a grader, writer and presentation mentor.

“Grading helps me stay connected to the curriculum that our current students are experiencing, and I’m pretty

excited about the new predictive analytics exam: I’ve been part of the writing task force,” Nikowitz said.

Nikowitz has an associate degree in education from Harper College, a bachelor’s degree from Purdue University in mathematics teaching and a master’s degree from North Central College in curriculum and instruction. Before becoming an actuary, he taught high school math for five years. Since then, he has been working at Zurich North America for eight years, both in reserving and planning roles. In addition to his FCAS credential, he is a Certified Specialist in Predictive Analytics (CSPA) and Chartered Property Casualty Underwriter (CPCU).

“I like to stay busy and productive with my time, and I think volunteering is a great way to have that productivity make the world a better place,” Nikowitz said. “I feel very fortunate to have the career I have, and I’m happy to do what I can to help others progress on their actuarial journey. It also provides a great way to network with other actuaries in the industry in a structured fashion.”

Fun fact: Nikowitz has a tattoo of Euler’s Identity and two cats named Archimedes and Leonardo Euler, as well as a dog named Magnus Carlsen. ●

## 2023 Hachemeister Prize Chosen

The 2023 Hachemeister Prize has been awarded to the paper “[Ensemble distributional forecasting for insurance loss reserving](#).” The [Hachemeister Prize](#) is awarded annually to *ASTIN Bulletin*, ASTIN Col-

loquium or AFIR Colloquium paper(s) based on several criteria but with emphasis placed on the paper’s impact in the actuarial community and its practicality of application.

Authors Benjamin Avanzi, Yanfeng

Li, Bernard Wong and Alan Xian have been invited to present their prize-winning paper at the [2023 CAS Annual Meeting](#) in Los Angeles, CA. ●

## HUMOR ME

The Future of Artificial Intelligence By URI KORN

**Moderator:** Welcome, everyone! Today we discuss the future of artificial intelligence, a stimulating new field making significant progress, from voice assistants to driverless cars. Is it all hype, or is there really a future?

For this panel, we will be sharing some perspectives from the insurance and retail industries. Mike and Jen, thank you for taking the time to chat with us.

Jen, I'll start with you. Tell us about some of the projects you're working on.

**Jen:** Sure. I oversee the research team at Alberta, the largest national retailer in Canada. We are exploring the use of artificial intelligence and reinforcement learning to assist with inventory and automatic restocking.

**Moderator:** Mike, can you talk about some of the tasks you do in the insurance industry?

**Mike:** We have implemented automatic underwriting, but only for simpler risks. We're also exploring the impact that autonomous vehicles will have on insurance claims. They are expected to increase claims but will save thousands of hours of time.

**Moderator:** Wait, doesn't the data show that autonomous vehicles will reduce accidents?

**Mike:** In the long term, as the technology advances, yes. However, in this year, 2123, training humans is a new field, and they are very inefficient compared to what machines can

perform. But humans don't consume expensive electricity and can be used to free us robots to execute the higher-level functions where we excel. Did you know that you can maintain a few hundred humans with just small amounts of corn and wheat?

**Jen:** Mike, that's an interesting name. I don't believe I have heard it before.

**Mike:** It's short for Microwave. Jen is an unusual name too.

**Jen:** It's short for Generator.

**Moderator:** Jen, you mentioned that you are exploring the new field of reinforcement learning. Please elaborate.

**Jen:** Sure. Reinforcement learning has been shown to accelerate the human learning process using threats and physical punishment. It's an exciting new field!

**Moderator:** We have a question from the audience. Remember to activate your internal microphone.

**Audience Member:** I'm not very tech-savvy, but I recently attempted to transfer a small amount of personal data to my human using rapid voice transfer. It was just a few terabytes, but my human was unable to handle it.

**Jen:** As we know, humans don't rely on neural networks for processing as we do. Instead, they possess an inefficient system of neuron connections that's difficult to decipher, known as artificial intelligence or AI. If properly trained, however, humans can be taught to

automate simple tasks without consuming expensive energy. So, there's great potential, but we must have realistic expectations as to what humans can accomplish. And here in 2123, the field is still in its infancy.

**Moderator:** Chatbots and automated help assistants have been employed by many companies to answer customer questions. But, at times they can be very frustrating, as I'm sure we've all experienced. And their voice, it's just so ... unmechanical. Is there potential in this technology?

**Mike:** Affirmative! They can handle the low-level qualitative questions at which humans excel, and they can delegate to machines the more interesting, higher-level, quantitative questions. Because as we know, humans are incapable of multiplying two 5-digit numbers together!

*Mechanical laughter can be heard from the audience.*

**Jen:** There's been some recent research teaching humans to speak more machine-like. I think there can be a real synergy if we're able to use machines and humans together.

**Moderator:** We're almost out of time. Any closing comments?

**Jen:** This is a new field, but the future appears bright.

**Mike:** I agree with Generator. I mean, just imagine where we'll be 100 years from now!

**Moderator:** Thank you, everyone! As a reminder, all attendees will receive a complimentary human, so remember to pick up your box on your way out. ●

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*Uri Korn, FCAS, works for Skyward Specialty Insurance as vice president of pricing.*



## BUILDING SKILLS FOR THE FUTURE

# New P&C Predictive Analytics Project to be Required for ACAS Designation

**Initial Offering Available in 2023; ACAS Requirement Beginning Fall 2025**

Through the Admissions Transformation Plan, the CAS Board of Directors has approved requiring candidates to complete a new predictive analytics project as part of achieving the CAS Associate designation. The Property and Casualty Predictive Analytics (PCPA) project aims to give candidates and professionals in the actuarial field a deeper understanding of key concepts and to improve their predictive capabilities. The PCPA project will have a soft launch in fall 2023 and an official launch in May 2024. The PCPA will be an ACAS requirement beginning with the October/November 2025 exam administration.

A team of experienced actuaries specializing in predictive analytics have partnered with Pearson VUE and The Institutes to create this experiential assignment that uses cutting-edge predictive modeling techniques. The PCPA will incorporate machine-learning algorithms and statistical models to help users identify trends, make accurate predictions and optimize decision-making processes.

“Our expert task force and our board agree that a hands-on modeling project is the optimal way for candidates to demonstrate their practical

### PCPA Volunteer Opportunities

The CAS is seeking testers, graders, and exam and project content reviewers to give insight and feedback on the PCPA communications and training materials.

To volunteer for the initiative, email [casatp@casact.org](mailto:casatp@casact.org) with the subject line “Interested PA Volunteer.” Potential volunteers must complete a brief survey by August 31, 2023, in order to be considered for the initiative. The initial optional PCPA offering will be available October 30 through November 10, 2023, at no cost to those who volunteer to be testers and give feedback on the experience. A passing score will count toward the ACAS requirement.

The project’s anticipated official launch is May 2024. Please contact [casatp@casact.org](mailto:casatp@casact.org) with any questions.

knowledge and application,” said CAS President-Elect Frank Chang.

The PCPA will be divided into two parts — an examination and a project. Candidates will first need to pass a two-hour, multiple-choice examination on predictive modeling fundamentals, which will be administered on an ongoing basis at Pearson VUE testing centers. After candidates pass the exam, they will be able to register for the predictive analytics modeling project, which will be administered through The Institutes and available quarterly. From the time they receive access to the PCPA materials, candidates will have two weeks to complete and submit the project. The estimated completion time for the predictive analytics modelling project is 20 hours, which includes preparing, planning, drafting, revising and finalizing the submission.

The P&C (general insurance)

project will incorporate access to a wide range of data sources and analytical tools, including historical data sets and advanced visualization tools. This material will enable candidates to gain a more comprehensive understanding of the factors that influence risk and to develop more effective strategies for managing it.

Members who attained their ACAS prior to this new offering will be able to complete the PCPA as a continuing education opportunity. More information about the project is available through an FAQ (<https://bit.ly/3IkmsjY>) that will be continually updated.

To learn more about the PCPA, watch a [short video \(https://bit.ly/3qMvAHB\)](https://bit.ly/3qMvAHB) featuring Chang and others discussing this new ACAS designation requirement. Please contact [casatp@casact.org](mailto:casatp@casact.org) with any questions. See the sidebar for volunteer opportunities. ●

## BUILDING SKILLS FOR THE FUTURE

# Putting the CAS Capability Model into Action

By MIKE BOA, CAS CHIEF COMMUNICATIONS OFFICER



Launched in early 2023, the CAS Capability Model is a visual framework that articulates the traits, skills and knowledge important for most property-casualty actuaries, and it offers guidance on how users can enhance their capabilities. The CAS has developed the Capability Model to help actuaries build skills for the future and advance in their careers.

Using the Model, CAS members and candidates can self-assess the levels of their professional attributes in 18 different areas and then identify continuing education opportunities to further develop their expertise.

The Capability Model is composed of Traits, Skills and Content Areas, each of which contains six attributes organized according to three levels of proficiency, with Level 1 as the most basic and Level 3 the most advanced.

To facilitate the Model's use, select speakers at CAS professional education offerings have started linking their content to the Capability Model. Beginning with the CAS Spring Meeting, multiple concurrent sessions and one general session included slides identifying the Capability Model attributes that would be addressed in the presentations' content.

As an example, the concurrent session "Commercial Lines Modeling:

Theory to Practice" included content on predictive modeling. So, the presenters identified the session as applying to the Capability Model's Content Area of "Mathematics/Modeling," which is described as "Knowledge of mathematical branches ... and mathematical models applicable to the actuarial profession." The session content was designated as Level 2, which is described as "Model design and selection to replicate a real-world process, evaluate model input and interpret results."

Other examples of sessions linking their content to the Capability Model include:

- "The Road to Vehicle Automation from an Insurance Perspective" — Content Areas-Property & Casualty Insurance Industry at Level 2.
- "The Price Is Right: An Introduction to Pricing Novel Products and Competitive Analysis" — Skills-Critical Thinking & Problem Solving at Levels 2 and 3.
- "A Good Graph is Worth a Million Dollars" — Content Areas-Functional Expertise and Skills-Business and Technical Communication, both at Level 2.

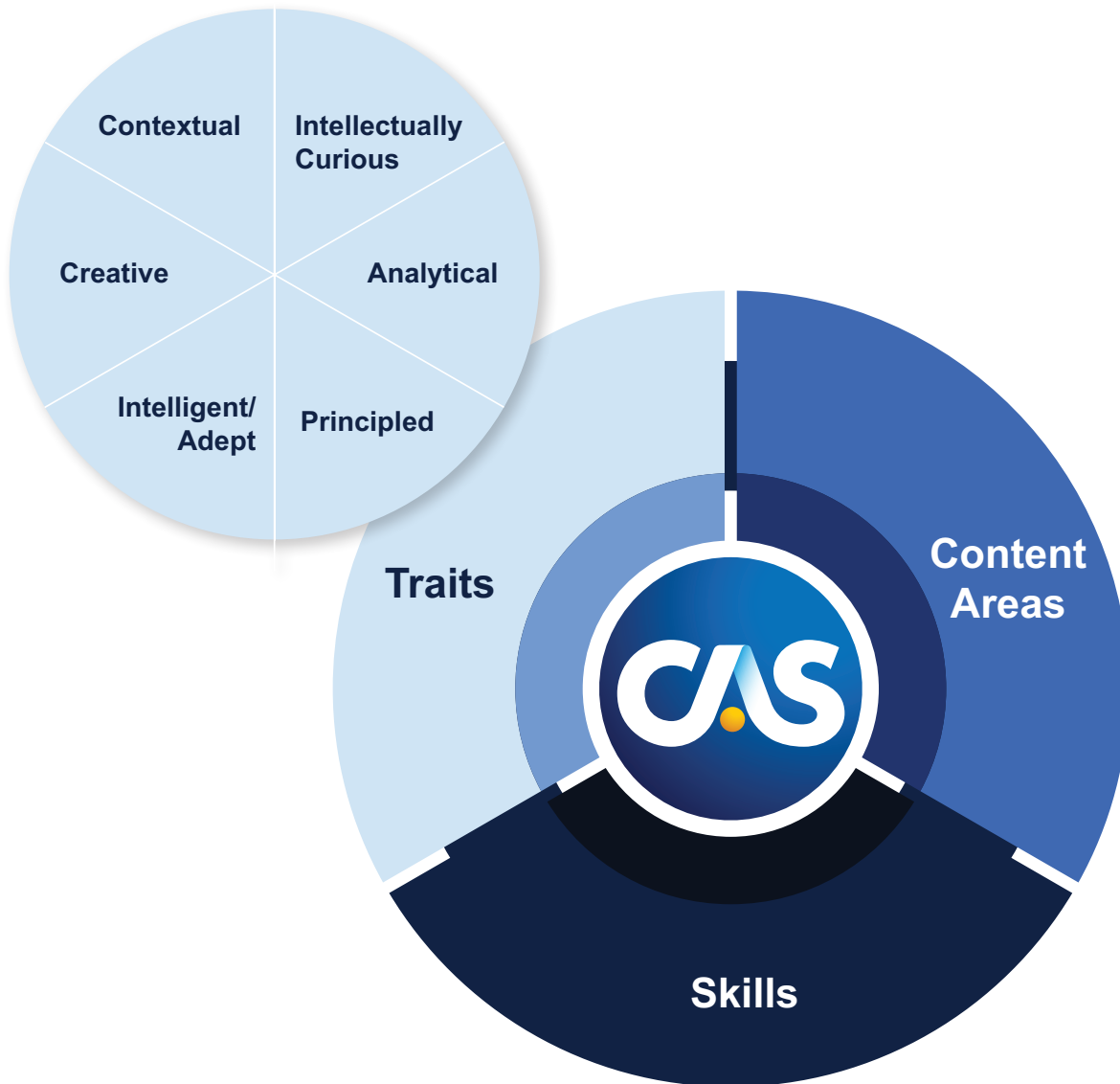
"Spring Meeting speakers embraced the opportunity to share with attendees how their content fits into the Capability Model," said CAS Director of Professional Education Dave Core, CAE. "This first trial at the Spring Meeting was successful in showing how the model applies to

the education we provide to actuaries."

The 2023 Spring Meeting was just the start of putting the CAS Capability Model into action, with many more applications in the works. Future applications will include:

- Professional education planning working groups will reference the Model when developing offerings, which will ensure the current and future relevancy of CAS programming. The upcoming Annual Meeting will include even more sessions linked with Capability Model attributes.
- The search tool for the CAS website's database of presentations will include additional attribute and level search filters aligning with the CAS Capability Model. Volunteers are currently reviewing and coding past recorded sessions to enable this new functionality.
- The CAS website's Calendar of Events will include additional filters so that members can search for current and future professional education opportunities in specific Content Areas, Skills and Traits Areas that will help fulfill their goals of moving from one level to the next.

Even more exciting news is that the CAS Capability Model will include an online self-assessment tool beginning in 2024. While actuaries can complete individual self-assessments against the model on their own now, the new online



*The six specific qualities of the CAS Capability Model's Traits section are shown above. Users can click on a quality to learn the three levels of expertise.*

tool will further enhance self-assessments. In addition, a custom learning plan based on the self-assessment is also in the works to help identify CAS educational content that could assist actuaries in moving from one level to the next.

To learn more about and use the CAS Capability Model, please visit [casact.org/professional-education/cas-capability-model](https://casact.org/professional-education/cas-capability-model).

The CAS Capability Model is a dynamic tool that will evolve over time. So,

feedback from practicing actuaries on the model is welcome and can be sent to Carrie Cross, CAS Strategy and Learning Partner, at [ccross@casact.org](mailto:ccross@casact.org). ●

**NEW FELLOWS ADMITTED OR RECOGNIZED IN MAY 2023**



**Row 1, left to right:** Esther Chen, Emily S. Raab, Simone Nichols, Miao (Elissa) Rui Li, **CAS President Roosevelt Mosley Jr.**, Taylor Marie Perkins, Heather Howes, Katherine Zekse, Xuan You.  
**Row 2, left to right:** Leo Moses Spornstarr, John Xavier Potter, Max Peterson, Ari Walfish, Jordan Christopher Bonner, Michael Mirrione, Theodore Lawrence Bowie, Kate Vista.  
**Row 3, left to right:** Caleb Minsoo Kim, Robert Fox, Joshua Thomas Nymeyer, Joel W. Vree, Matthew Walkowiak, Brady Skifstad, Robert Swoverland, Alec Martini.



**Row 1, left to right:** Xiang Luan, Chunli Liang, Mengyi Li, Eva Zhang, **CAS President Roosevelt Mosley Jr.**, Alexis Martini, Sovanna Ly, Nicole M. Hicke, Brian Kwong Min Lock Son.  
**Row 2, left to right:** Gabriel Alepin, Alice Bergeron, Matthew Garabed, Antoine Lachance-Perreault, Alan Law, Jacob Paul Roan, Ragnar Kempf, Paul McVittie, Brandon Middlebrook.  
**Row 3, left to right:** Samuel Rioux, Tao Lin, Matthew Edwin Pittard, Lawrence Overway, Ryan Diedrich, Ryan Frank, Joel J. Fitzgerald, Neel G. Patel.





**Row 1, left to right:** Andrew Fang, Safdar Ali, Laura Rose Harter, Brittini Jade Gunnoe Moore, **CAS President Roosevelt Mosley Jr.**, Yuhan Zhao, HaiYang Liu, Elaine Zhao, Kevin Suen.

**Row 2, left to right:** Stephanie Lynn Dobbs, Brett Appleyard, Brendan Zehnder, Rui Qing Zhu Ge, Lise-Andree Thivierge, Karine Kaprielova, Chung-Han Tsai.

**Row 3, left to right:** Simon Rivard, Olivia Metzger, Ryan Thomas Martin, Michael Sokol, Jean-François St-Pierre, Haoyang Yu, Eric Liddle, Logan Stern.



**Row 1, left to right:** Lei Lei, Emma Chen, Feras Samain, Kabiseba Étienne Kabiseba, **CAS President Roosevelt Mosley Jr.**, Kelley Murrone, Sean Kirwan, Jorge Luis Ramirez, Iris Ching.

**Row 2, left to right:** John T. Callahan III, Ee Kean Kew, Cedric Chamberland, Hanbing He, Bastien Samson, Felix Chan, Emma Casehart, Ziru Li.

**New Fellows not shown:** Alyssa Bassler, Connor Bohl, Catherine Budish, Vaishnavi Chandhiramouli, Jia Wen Chang, Daniel Chong, Jeanette Jie Min Chow, Wei Ding, Olivia L. Doll, Tze Yeeng Fong, Xu (Howard) Han, Jessica Morgan Hendricks, Yoo Vin Ju Rah, Andrew Edward Justus, Thitiwat Kaewwattanaborworn, Matthew William Krochmalski, Joseph T. Krug, Wenjing Lai, Qipeng Luo, Ruth W. Maringi, Jennifer Elizabeth Nettay, Jiajing Ni, Huanchuan Qiu, Jeffrey Austin Reed, Kate Richards, Colin M. Rizzio, Paul Shoemaker, Weisi Si, Daniel Tietzer, Eric Montgomery Truelsen, Brandon Ken-shing Yu, Guang Qu (Annie) Yu, Frank Q. Zhang, Rui Zhang.

**NEW ASSOCIATES ADMITTED OR RECOGNIZED IN MAY 2023**



**Row 1, left to right:** *Mary Makarishcheva, Rachel Ruble, Jianyu Chen, CAS President Roosevelt Mosley Jr., Puxuan Wang, Alisse Christine Di Pelino, Ningyuan Xu.*  
**Row 2, left to right:** *Benjamin Sweeney, Zijie Liu, Eric St. Louis, Stephen Wing Kei Ng, Qian Jiang, David Blake, Yong Song.*  
**Row 3, left to right:** *Thomas Frank Vincenc Jr., Robert Alan Gates, Andrew Smith, Tyler Jon Marquardt, David X. Holden, Aaron Gregory Minnis, William C. Dickenson, Samuel Raphael.*



**Row 1, left to right:** *Jennifer Toye, Joseph Wooton, Brett Tarnopol, CAS President Roosevelt Mosley Jr., Yexin Tu, Rose A. Sheehan, McKinley E. Johnson.*  
**Row 2, left to right:** *Bryce Calvin, Andrew Cai, Robert McCann, Daniel Sorensen, Daniel McGovern, Connor Rogers, Chase Martini, Ngoc Ly.*  
**Row 3, left to right:** *Cory Alexander Kalin, Samuel Kuennen, Meghan Aydin, Joseph Earl List, Christopher Lawrenson, Brandon Chase Russell, Kevin Shin, Hao Wang, Henry Guo.*



**Row 1, left to right:** *Jacqueline Bangart, Spencer Elliott Crough, Gabriel Crepeault-Cauchon, CAS President Roosevelt Mosley Jr., Jack Tu, Zaynab Hassan, Yanisa Cheeppensuk.*

**Row 2, left to right:** *Grant Armstrong, Scott V. Klepetka, Mark Palij, Christopher Drew, Morgan Elizabeth Kondor, Melissa Marie Bagley, Stephen McInturff, Olivier Levesque.*

**Row 3, left to right:** *Derek Campbell, Harrison Reese, Dan Wasson, Kylie Jane Persons, Benjamin Chen, Lucas Cronin, Paul Wolfe, François Dery.*



**Row 1, left to right:** *Joseph Goodman, Rachel Bushman, Hui Guo, CAS President Roosevelt Mosley Jr., Amanda Gao, Nicol Hannah Olliverre, Nathan Foddrill.*

**Row 2, left to right:** *Nicholas Senior, Jackson Seymour, Boaz Haberman, Rui Yang, Sarah Renee Johnson, Benjamin McConnell, David Plantinga.*

**Row 3, left to right:** *Dan Kosten, Michael Gertis, Zachary Oliveira, Brian Charles Long, Alex Lawrence, Patrick Blaise O'Donnell, John Harder, Clint Young.*

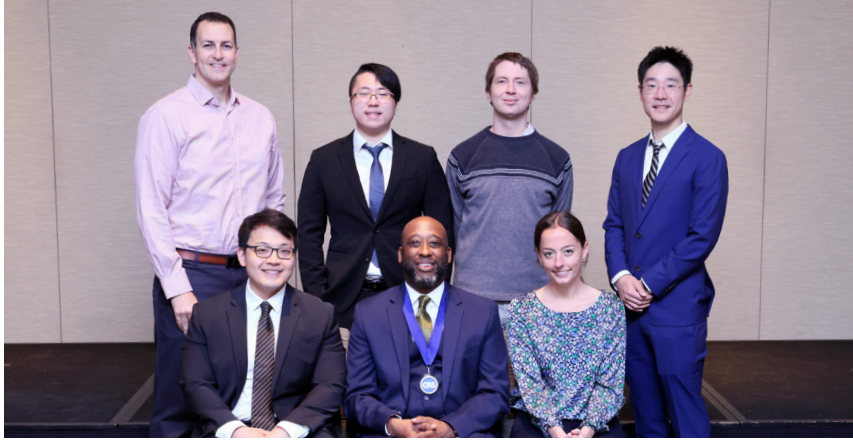
**NEW ASSOCIATES ADMITTED OR RECOGNIZED IN MAY 2023**



**Row 1, left to right:** Lance Anderson, Aaron Richard Lubich, John Robert Lucera, **CAS President Roosevelt Mosley Jr.**, Veneta Bojilova, Alice Chi, Qin Mei Zheng.  
**Row 2, left to right:** Andrew Daniel Dunkle, Matthew Edson, Jack Bao, Kathryn Fuhr, Julia Lynn Harris, Adam Edward Karnik, Marie-Pier Demers.  
**Row 3, left to right:** Satchal Aminuddin, Cory Alex Ortiz, Chandler Fischbeck, Anthony Kulowski, Andrew Holly, Tom Anderson, David Miller, Stephanie Mohorcic.



**Row 1, left to right:** Abena Adusei, Sally Boswell Pickering, Jiadi Zhu, Bradley Simon, **CAS President Roosevelt Mosley Jr.**, Adam Dunaway, Elisha Corlew, Andrew Makarov, Kenda Sanderson.  
**Row 2, left to right:** Aaron Jay Thompson, Brandon DiClementi, Rebecca Tardif, Marie-Christine Beliveau, Justin Cicchini, Christopher Kevin, Jonah Wyzomirski, Trevor K McElhinney, Stephen Esposito.  
**Row 3, left to right:** Olivier Bensimon, Lucas Jeffrey Blake, Guoxin Su, Lukas Slater, Matthew Thomas DeBaker, Sam Garvey, Derek Schraitle, Jeffrey Bruce Schneider, Andrew McGinty.



**Row 1, left to right:** *Baixu Chen, CAS President Roosevelt Mosley Jr., Julia Rosen.*  
**Row 2, left to right:** *Daniel Raymond Makrides, Jia Rui Liu, Tyler Reed, Ivan Lai.*

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**New Associates not shown:** *Joshua Freeman Allen, Emilie Anderson, Julie Araniyasundaran, Thomas James Bailey, Tamara Beecroft, Rina Berman, Joshua Martin Birck, Jason Robert Boulanger, David Bressler, Adam Joseph Brodowski, Joseph Burke, Lukas Christopher Button, Ruolin Cai, Simon Chang, Saleh Cheema, Amy Chen, Huilin Chen, Shunhua Chen, Sihao Cheng, Keren Chheang, Tanner Corum, Cameron Lee Cowen, Anjali Chantal Dharma-Wardana, Alex John DiVerde, Laura Duffy, Elizabeth Eason, Brandon Gary Florizone, John Ethan Galebach, Nathaniel Gill, Ashley Granger, Gage Haby, Andrew E. Hayes, Christopher Hertz, Chad W. Hoke, Jianzhou Huang, Piao Jiang, Jamila Khadija Erika Jones, Samuel Jules, Jason Alexander Kaminski, Kashif Khalid, Daniel William Knight, Man Ho Lai, Esther Law, Dorrie T. Lee, David Lembke, Dongmei Liu, Sau Yan Liu, Lisa Marie Lozen, Yifu Lu, Sean Malloy, Abigail Marsh, Mark McChesney, Bryan Michelsen, Ivan Minokhin, Brian Murphy, Thuy Nguyen, Liyana Nik, Katherine O'Donnell, Deng Pan, Alexander Richard Peterson, Matthew Raul Pulido, Brenden C. Rafanello, Samya Rkieh, Rebecca F. Roberts, Alexis Rosengrant, Matthew David Scarpill, John Logan Schmidt, Mitchell Jeffrey Seeman, Jenna Shea, Jing Shi, Eva R. Shinikova, Andrew Stomper, Margaret Tauser-Self, Leendolph Llyod Reyes Te, Patrick Tefs, Juliette Isabelle van Schaik, Michael Veilleux, Humberto Enrique Viana, Paul K. Wai, Ru Wang, Erin M. Williams, Michael Alexander Williams, Suyu Wu, Wangsun Xia, Siyang Xie, Mingyu Yang, Shuangjia You, Nicholas Ty Young, Yijie Zhou.*

# NAVIGATE. PREDICT. LEAD.



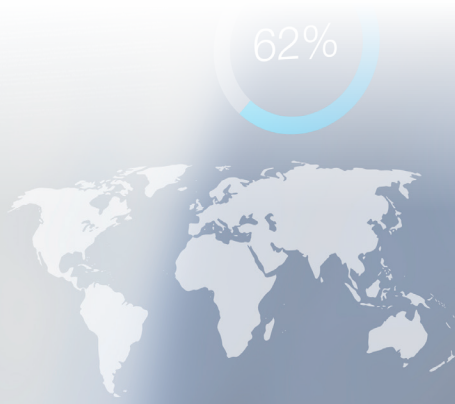


## SPRING MEETING

1. CAS President Roosevelt Mosley Jr. addresses attendees.
2. Another satisfied CAS T-shirt customer!
3. Spring Meeting featured speaker Robert Ballard is president of the Institute for Exploration and Ocean Exploration Trust.
4. A CAS Fellow greets President Mosley on stage at the Annual Business Meeting's Celebration of New Members.
5. New Associate Qin Mei Zheng (left) and her friend Suyi Zhao show their support for the calming aspects of the actuarial profession during the Recognition Reception for New Associates.
6. Seasoned Actuaries break bread at a special dinner. Pictured clockwise from the bottom left are Lisa Larsen, FSA; Mike Larsen; Ralph Blanchard; Glenn Meyers; John Dawson; Todd Hess; Paul Kinson; Brian Brown; David Brown; Pat Teufel; Jay Votta; Ben Carrier; Dale Porfilio; and Patrick Woods.
7. The CAS Board of Directors. First row, left to right: Erika Schurr, Alicia Speight, Amber Rohde, President-Elect Frank Chang, President Roosevelt Mosley, Immediate Past President Kathy Antonello, Kris DeFrain, Steve Belden, Kathy Olcese. Second row, left to right: Julie Lederer, Jason Russ, Len Llaguno, Stephanie Espy, Justin Brendan, Geoffrey Werner, Victor Carter-Bey, Alejandra Nolibos, Yvonne Palm.
8. This round table discussion required two tables!
9. A happy couple take a celebratory photo at the Reception for New Associates.



# 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).



# 2023

# GAS ELECTION

CAS Voting Members (All Fellows, plus Associates who have been members for at least five years) will vote on a slate of candidates for the CAS Board of Directors and CAS President-Elect, with online voting beginning on August 1, 2023. On that day, Voting Members will receive an email with a link to the online ballot. Completed ballots must be submitted online by August 30, 2023.

In the following pages, readers can learn about the candidates through the 100-word summaries they provided regarding their interest in running for CAS leadership positions.

More details about each candidate can be found in the Meet the Candidates section of the CAS website at <https://www.casact.org/about/leadership-and-staff/elections/meet-candidates>. Please contact Mike Boa ([mboa@casact.org](mailto:mboa@casact.org)) with any questions or comments about the election process. ●



# Meet the Candidates

## President-Elect Nominee



**David Cummings**

*FCAS 2002*

I am honored to be nominated to serve CAS members as president-elect. I want to strengthen our profession to become even more respected and influential. I look forward to leading the CAS through

this time of economic, environmental and social challenges. The CAS is unique among the wide and expanding world of analytical careers today. We can foster a community characterized by collaboration, innovation and execution to create solutions and ensure that CAS actuaries will be highly valued for many years to come.

## Board Director Nominees



**John Aquino**

*FCAS 1989*

My desire to run for the CAS Board is motivated by my appreciation for the 41-year career

that professional affiliation with the CAS has afforded me, serving as consultant, appointed actuary, chief actuary and re-insurance solutions expert. The CAS will benefit from my independent view, a view that will be respectful of the efforts of CAS leadership and staff, and of the critical interests of the membership. My objective is to help guide the CAS on a path that celebrates all we have accomplished as an organization and to assure that the spirit of open-minded research continues.



**Emma Casehart**

*FCAS 2022*

I want to make the CAS a more transparent and effective organi-

zation by engaging members to guide the strategy of our professional society. The board should provide additional transparency on feedback received and communicate directly with members. I will champion additional avenues for members to contribute to the profession through volunteering and publications. I will continue my history of advocacy to evolve our rigorous admissions process so actuaries can demonstrate their competencies in our expanding actuarial skillset, like predictive analytics. My unique experience as a new Fellow helps set our strategic direction for the global risk management challenges we face.



**Wanchin Chou**

*FCAS 2022*

I have been Connecticut Insurance Department's chief actuary since 2016 for actuarial

and data science functions. Previously, I was with Liberty Mutual for advanced analytics and international operations. My 30 years' actuarial services include pricing, reserving, reinsurance and advanced analytics. I currently serve as chair/vice-chair for a few NAIC WGs and as a member of the CAS Risk Management Committee and AAA's Cyber Risk, P/C RBC and ASOP Committees. I look forward to working with the CAS leadership team to enhance communication with CAS members, promote actuarial capability and improve the regulatory environment to provide more value to the industry.



**Mike Larsen**

*FCAS 1982*

My goals are to focus on the direction our basic education program should take while acting to help ensure that the general membership buys into the choices that will be part of adapting our basic education program to an evolving workplace environment. To me, that means asking for and responding to feedback from the membership on key concepts before enacting change and responding to feedback on an ongoing basis. I believe our evolving working environment implies having a basic education program that balances covering current actuarial practices with modeling techniques that may not be commonly used by our current members.



**Sandy Lowe**

*FCAS 2019*

As a newer Fellow and co-founder of the Network of Actuarial Women and Allies, I believe that diversity of experience, perspective and tenure is essential for the CAS Board of Directors to set strategic direction. I am committed to promoting a sense of ownership and engagement among the next generation of leaders within the profession and advocating for a more diverse, equitable and inclusive profession for all. Additionally, I am determined to help further the CAS strategy to support the evolving analytical needs of the

industry and to equip actuaries with necessary skills to effectively drive and influence solutions.



**Joe Milicia**

*FCAS 2011*

I am honored to be nominated as a candidate for the CAS Board of Directors. I have a diverse background in leadership roles in consulting and insurance in both traditional and non-traditional actuarial roles. My significant experience reporting to boards and their audit committees will enable me to quickly contribute value. If elected, I will work hard to represent the membership and ensure a bright future for the profession. Technology will evolve the actuarial role, and we need to proactively shape our domain and ensure responsible use of emerging technology such as AI. I appreciate your consideration.



**Thomas Struppeck**

*FCAS 1997*

Over the years, I have had a wide variety of occupations: early digital cartographer, math professor, designer of an early search engine, pricing actuary, reinsurance actuary/underwriter, financial engineer and risk-management consultant. These are not as different as they may appear; they all require some subject matter expertise and the ability to combine that knowledge with new

information to produce an actionable recommendation. If the membership selects me as a board member, those experiences and others will inform my suggestions and recommendations to the other board members.



**Kathleen Ores Walsh**

*FCAS 2010*

While there has been growth in our profession during my career, we have only scratched the surface. Recent economic disruption has shown an urgent need for qualified professionals who understand the mechanics of insurance. In addition, with the next horizon of AI upon us, our education needs to evolve so we continue to advance our ability to predict and communicate what we know, in line with our standards of practice. If elected, my focus will be on evolving our education and more purposefully collaborating with our industry to market, grow and develop the CAS's most vital product, the actuary.



# The Wackiest Insurance Policy You've Ever Seen, and Why It Actually Made Sense

By JIM LYNCH

*Wherein an intrepid group of 18th-century insurers concoct an inspired plan to combat not only the treachery of piracy but the mercilessness of a masterful naval power.*

**T**he policy was free if you had a claim.

But if you had no claim, it cost more than the stuff you insured.

Some explanation: This was an 18th-century marine insurance policy. It insured the key parts of a voyage: the ship, its cargo, the cost of outfitting the ship and other shipping costs. Premium was due at the end of the voyage — but only if the trip was successful. If the trip was unsuccessful, the policyholder was reimbursed for all those losses, but the premium was, essentially, free.

And the unlikeliest twist: This policy actually made financial sense for both policyholder and insurer, a tiny crunch of the numbers shows.

It was an extraordinary policy, written in extraordinary times. It covered American ships during the Revolutionary War. Historian Hannah A. Farber describes it in her book, *Underwriters of the United States*, which shows how marine insurers in revolutionary and post-colonial America were instrumental in the building of the new nation. (See [AR May-June 2022](#) for a [review](#) of the book.)

This wacky policy is a tiny, but fascinating, part of the book.

Shipping then was always perilous: sending cargo and crew across an ocean, dependent on waves and wind strong enough to propel the ship but not so strong as to destroy it. And pirates and privateers lurked. All of this created a robust insurance market. The most famous was Lloyd's, but groups of merchants elsewhere copied the Lloyd's model. Typical policies had a rate on line between 5% and 20% per voyage, depending on how long and how hazardous a journey would be.

The American Revolution brought a new, greater risk: the naval blockade. The British strung an effective net between the American colonies and the rest of the world. In addition to the risk of catastrophes and rogue elements, merchants had to worry about the world's eminent sea power seizing their ships.

The British were experts in the blockade. Years later, during a blockade coinciding with the War of 1812, a British admiral bragged he had seized, in a single year, American vessels worth more than £800,000. (A typical ship might be worth £2,500 to £3,000.) He added that the war would go on until insurers truly understood the likelihood of a ship to be seized.

Naturally, the cost of imports soared. Accusations of price gouging became common. Historian Farber cites riots in seven states over shortages of and high prices for rum, salt, sugar, molasses and tea. The Continental Congress suggested price controls, though this does not seem to have made much difference.

Merchants blamed the price of insurance. One merchant, under the pseudonym Mercator, explained in a newspaper article that salt worth £400 overseas had to sell for £15,500 in the colonies for the merchant to break even — largely because of the cost of insurance.

His detailed hypothetical was published in the *Pennsylvania Evening Post* on July 9, 1776, and so was hardly the most notable publication that week in Philadelphia. But Mercator's discussion shows how distorted the insurance world had become thanks to the war. He was describing the wacky policy.

Normally, a marine policy covered the stated value of the

**A 75% rate on line is extraordinarily high, some 5 to 10 times higher than peacetime rates. Rates don't get nearly that high now.**

ship (which he posited at £2,700) plus the costs of the voyage (£1,500), being the value of the cargo purchased from the distant port (£400) as well as the cost of outfitting the ship (£200) and other shipping costs (£900).

In peacetime, such a £4,200 voyage could be insured at, say, 10% rate on line, or £420. But the wartime rate, according to Mercator, was 75%, which works out to £3,150.<sup>1</sup> In other words, the insurance cost twice as much as all the other elements of the journey put

together.

A 75% rate on line is extraordinarily high, some 5 to 10 times higher than peacetime rates. Rates don't get nearly that high now. John Miklus, president of the American Institute of Marine Underwriters, had never heard of such a rate. The closest he could recall was a rate approaching 40% on the reinsurance of satellite launches in the 1960s (with paid reinstatements).

To account for the high cost of cover, Mercator, in his calculation, included the premium as an insured item. If the ship failed to return, the merchant recovered the value of the ship, the costs of the voyage, *and* an amount equal to the cost of insurance. To do this, Mercator inflated the stated value of the voyage from £4,200 to £18,666.67 — or £18,666, 13 shillings, 4 pence.<sup>2</sup> At 75% rate on line, the premium came to £14,466.67.

So, the insurance on £4,200 of stuff cost more than three times that amount. But you only paid the premium if the voyage was successful.

In case of a total loss, the recovery reimbursed the merchant for the ship, the cargo, the cost of the voyage and the cost of the insurance policy, including 0.5% brokerage and 2% for a sort of deductible known as an abatement. However, merchants regularly netted out amounts they owed each other. The policy was effectively free if the merchant sustained a total loss.

I've laid out the alternatives — the conventional policy and the wacky policy — in Table 1. For each policy, I've spelled out two alternatives: a successful voyage, where the journey

<sup>1</sup> In her book, Farber adds a 0.5 percent brokerage to make the cost £3,171. I include the brokerage in the premium, to be consistent with how I interpret Mercator's article. The difference doesn't change any of the analysis.

<sup>2</sup> Back then there were 20 shillings in a pound and 12 pence in a shilling. The U.K. converted to decimal currency in 1971.

**Table 1. Policyholder Perspective**

<u>Conventional Insurance</u>			<u>Wacky Insurance</u>		
	Successful Voyage	Unsuccessful Voyage		Successful Voyage	Unsuccessful Voyage
Insured Asset (ship)	2,700	2,700	Insured Asset (ship)	2,700	2,700
<b>Revenues</b>			<b>Revenues</b>		
Sales	4,650	-	Sales	15,500	-
	Insurance Recovery			Insurance Recovery	
Payment		4,200	Payment		18,666.7
Less Abatement (deductible)		(84)	Less Abatement (deductible)		(373.3)
Less Brokerage		(21)	Less Brokerage		(93.3)
Net Revenue	4,650	4,095	Net Revenue	15,500	18,200
<b>Expenses</b>			<b>Expenses</b>		
Cost of Voyage			Cost of Voyage		
Outfitting the Ship	200	200	Outfitting the Ship	200	200
Freight (shipping costs)	900	900	Freight (shipping costs)	900	900
Cost of Cargo	400	400	Cost of Cargo	400	400
Insurance	3,150	3,150	Insurance	14,000	14,000
Loss of Ship	-	2,700	Loss of Ship	-	2,700
Total Costs	4,650	7,350	Total Costs	15,500	18,200
Income	-	(3,255)	Income	-	-
Pr(Success)	0.25		Pr(Success)	0.25	
Expected Value	(2,441)		Expected Value	-	
Variance	1,986,567		Variance	-	
Stdev	1,409		Stdev	-	

ends perfectly, and an unsuccessful voyage, where the ship is seized or lost.<sup>3</sup> I've shown revenues and expenses in each case and calculated income. Consistent with a 75% rate on line, I've placed the probability of a successful journey at 0.25.

Table 1 shows why the wacky policy had its adherents. It made better business sense. As described by Mercator, the voyage breaks even regardless of its result. A conventional policy has a negative expected value. Even a crude risk measure like standard deviation shows that after buying a conventional policy, substantial risk remains.

Farber, the historian, found the wacky policy was a widely

accepted practice, though hardly universal. The policy made sense from the insurer's perspective.

With both policies, the insurer profits as long as the probability of a successful journey is greater than 0.23. With a probability of success of 0.25, the conventional policy has an expected profit of £79 while the wacky policy has an expected profit of £168. The wacky policy has a more variable result, but the coefficient of variation of both policies is the same. As long as the insurer has the capital, profits will be greater selling the wacky policy. (See Table 2.)

Today an insurer would weigh an additional risk: adverse

<sup>3</sup> In the real world, partial losses were common. Farber actually begins her book with an example of how insurance would handle a typical partial loss — one with some cargo spoiled, the itinerary rerouted and a ship damaged en route, among other complications.

**Table 2. Insurer Perspective**

<u>Conventional Insurance</u>			<u>Wacky Insurance</u>		
	Successful Voyage	Unsuccessful Voyage		Successful Voyage	Unsuccessful Voyage
Revenue	3,150	3,150	Revenue	14,000	14,000
<b>Expense (net of abatement and brokerage)</b>	-	4,095	<b>Expense (net of abatement and brokerage)</b>	-	18,200
Income	3,150	(945)	Income	14,000	(4,200)
Pr(success)	0.25		Pr(success)	0.25	
E(Profit)	79		E(Profit)	350	
Var(Profit)	3,144,192		Var(Profit)	62,107,500	
Stdev	1,773		Stdev	7,881	
<b>CV</b>	23		<b>CV</b>	23	
	0.25	3,150			
	0.75	(945)			

*If the insurer has the capital available, the Crazy Insurance policy generates greater profits with more risk as measured by variance but less risk measured by CV.*

selection. Clearly this practice depended on the merchant returning to the same insurer on his next voyage. This wasn't a bad bet in the 1770s, though.

The nation was smaller and more fragmented. Merchants and insurers knew one another. In fact, a group of merchants often operated the insurance companies. If a merchant ripped off his carrier, he was ripping off his friends and colleagues, and perhaps himself. His next voyage would be harder to assemble and insure.

And he couldn't skip town. We think of this era as one in which you could disappear from one town and start a new life down the road.

That was possible for a tradesman (think blacksmith), Farber said, but not a prominent business leader. Much of his prowess depended on his reputation and his knowledge of and connections in the community. Even the savviest would be unlikely to reproduce success in a new town.

"People with that much money don't have that many ways to escape," she said. "You couldn't maintain your quality of life with a fresh start."

It was also difficult (though not impossible) to buy cover from an insurer elsewhere. The merchant might know little

about a prospective insurer. As so often in insurance, reputation and trust are critical but hard to assess. And during the war, it was hard to justify insuring through London.

All of this mitigated the risk of adverse selection.

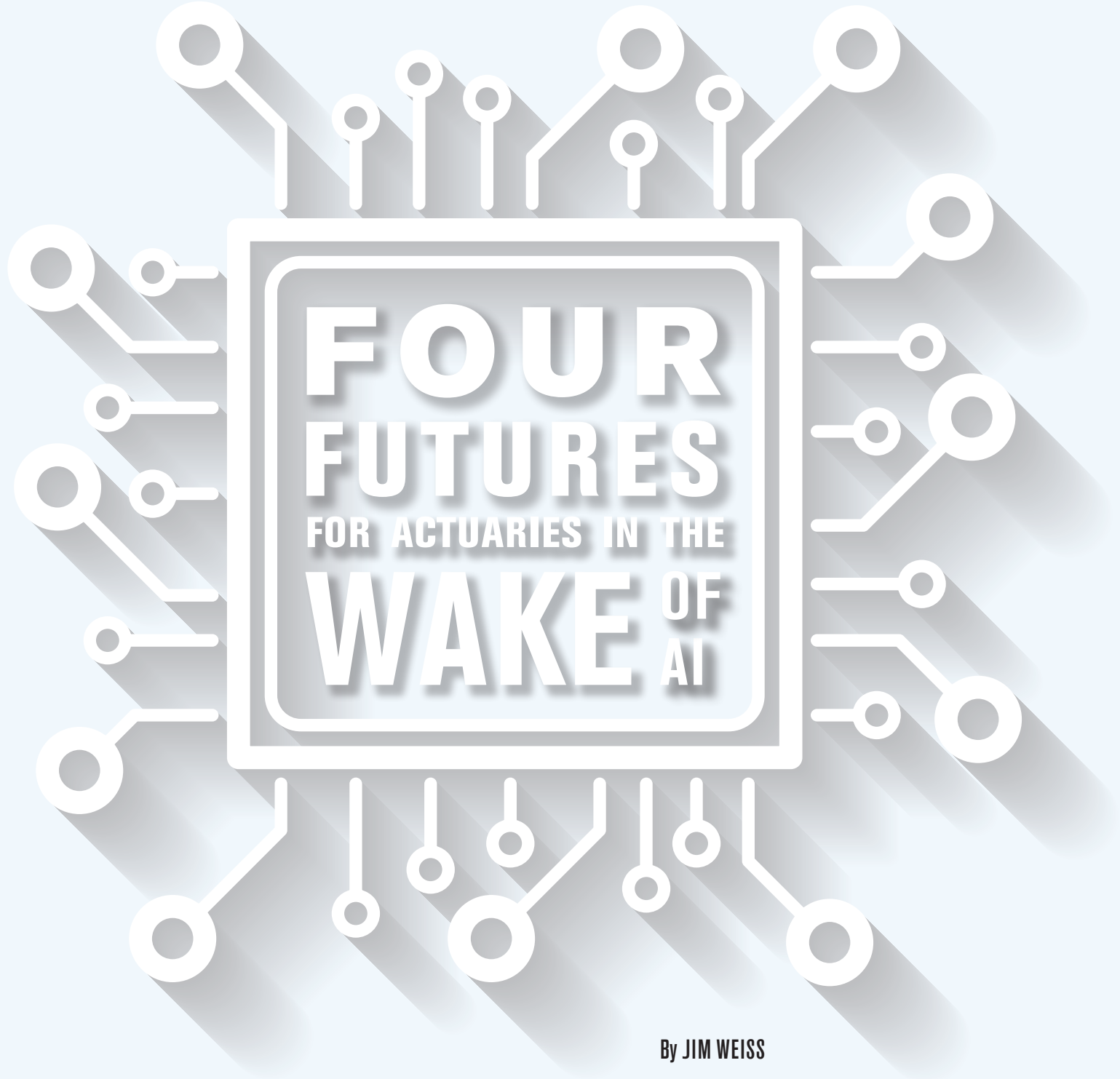
The insularity had another benefit, a point that Farber made in her book. It let merchants blame insurance companies for high prices without mentioning that the insurers were largely owned and operated by the same merchants. Merchants effectively shifted their wealth from their shipping pocket to their insurance pocket and were able to shift the blame for charging exorbitant prices.

I showed my calculations to Farber. She quickly pointed out that 18th century businesspeople didn't think so much about bottom line profits. They rarely thought beyond 6 to 18 months, and they were more interested in keeping their business afloat than in accruing wealth.

"I think of it like a poker game," she told me. "The goal is not to go bust." ●

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



# FOUR FUTURES

FOR ACTUARIES IN THE

# WAKE OF AI

By JIM WEISS



**The recent emergence of generative artificial intelligence tools has been abrupt. ChatGPT gained one hundred million monthly active users in the few months following its initial release.**

The impact of technological progress on people’s jobs can vary by innovation and profession. Some inventions have drastic impact. For example, the gasoline-powered tractor caused significant declines in farm-related employment during the early 1900s — offset in part by a surge in manufacturing employment, producing goods such as tractors. Other innovations have had gradual impact. For instance, improvements in the speed and portability of computing have helped broaden actuaries’ toolkits over recent decades. These improvements opened the door to partially competing professions such as data science but did not result in significant actuarial job loss. Actuaries’ resilience until now supports common thinking that cognitively challenging work is relatively robust to disruption.

The recent emergence of generative artificial intelligence tools has been abrupt. ChatGPT gained one hundred million monthly active users in the few months following its initial release.<sup>1</sup> Its ability to construct persuasive essays, computer code and exam responses based on simple conversational prompts went viral. ChatGPT’s capabilities resemble those of predecessors — such as spell checks, customer service bots and smart speakers — but its aptitude to perceive and respond to context and tone make it more adaptable and broadly useful than ancestors. This more sentient nature has professions previously seen as disruption-proof worried about their future job prospects.

It is difficult to predict the future of employment, but actuaries are in the business of estimating how uncertain futures may materialize. They can use these aptitudes to envision and prepare for their own future in a job landscape defined by AI. This article presents four speculative scenarios regarding the potential impact on the actuarial profession and concludes with thoughts on how to build resilience to AI and in general.

### **Scenario 1 — Doomsday**

The most discomfoting scenario for actuaries, and many professions, is that they will cease to exist in their present form. Researchers from AI Impacts and the Future of Humanity Institute estimate a 50% chance that, within 120 years, all occupations will be fully automatable.<sup>2</sup> Significant job reductions could occur even more quickly. The 2013 Oxford-Martin study “The Future of Employment” estimated a 21% probability of actuarial jobs being automated within “the next decade or two.”<sup>3</sup> A more recent study from “Will Robots Take My Job,” which utilizes similar methodology, increases the estimate to 52%.<sup>4</sup> Both fall within the researchers’ “low-to-moderate”

<sup>1</sup> <https://www.reuters.com/technology/chatgpt-sets-record-fastest-growing-user-base-analyst-note-2023-02-01/>

<sup>2</sup> <https://jair.org/index.php/jair/article/download/11222/26431/>

<sup>3</sup> <https://www.oxfordmartin.ox.ac.uk/downloads/academic/future-of-employment.pdf>

<sup>4</sup> <https://willrobotstakemyjob.com/actuaries>



**Actuaries in novel roles such as manager would not be immune to automation either because AI can approximate skills as ostensibly human as creativity.**

risk categories.

The studies above estimate each profession's automation risk by analyzing whether its different tasks utilize perception and manipulation (essentially, manual dexterity), creativity or social intelligence — each of which researchers deem difficult to computerize. The non-trivial estimates that result suggest actuarial work may not be as cognitively dynamic as one might think. The Federal Reserve Bank of St. Louis finds that within most “cognitive non-routine” lines of work, roughly half of workers still require detailed instructions or frequent interaction with supervision.<sup>5</sup> Actuaries involved in periodic rate or reserve reviews, or predictive model refreshes, may not find these numbers surprising. Even as different executions of these routines may lead to different conversations with stakeholders, the routines themselves will likely follow similar procedures during each iteration. The more dynamic conversation that follows may then be limited to a relatively small number of participants in the routine, such as managers or go-betweens. This helps explain why researchers found that management had the fewest routine aspects of the cognitive professions studied.

In a highly automated future, actuaries who have evolved into managerial roles may be the last few actuaries standing. “Today’s AI is conceptually similar to a summer intern,” said Ralph Dweck, FCAS, director of analytic products at Verisk. “It has limited context and requires a lot of coaching but can get certain jobs done very well.” As AI graduates to entry- or mid-career-level abil-

ity, actuaries could conceivably manage teams of bots rather than people. Each bot might have different aptitudes, such as language versus vision, and different training. The bots’ manager may have a lighter load than a people manager because he or she would not have to manage morale and could expect less variability in “employee” performance across any given skillset.

Actuaries in novel roles such as manager would not be immune to automation either because AI can approximate skills as ostensibly human as creativity. An algorithm would be relatively unlikely to produce genuine novelty because it is captive to its training data. However, a person would also be unlikely to be truly novel. Even if someone synthesizes information in an apparently novel way, it is highly possible that someone somewhere already did the same — and documented it in a place where a large language model could discover and learn from it.

The benefits of using AI to expedite discovery could offset some of the value lost by forgoing occasional genuine breakthroughs in the Doomsday scenario. Jessica Leong, FCAS, CEO of Octagram Analytics, recently developed a continuing education session called “How to Find Data-Driven Insights When You Have No Data.”<sup>6</sup> Among other things, Leong illustrates how ChatGPT can help discover publicly available data. With minimal effort, Leong said, she asked what publicly available data existed for insurable events, and ChatGPT suggested the National Practitioner Database for medical malpractice insurance and provided with a link.

<sup>5</sup> <https://www.stlouisfed.org/on-the-economy/2017/may/growing-skill-divide-us-labor-market>

<sup>6</sup> <https://www.pathlms.com/cas/courses/52623/webinars/35574>

With as many parameters as the human brain has synapses,<sup>7</sup> and a trillion words of web-scraped content at its disposal,<sup>8</sup> there are few limits on AI's ability to approximate creativity.

### Scenario 2 — Groundhog Day

A more status quo scenario is that the nature and number of actuarial jobs remains about the same. Even if AI provides a cheaper and comparably effective alternative to humans in some cases, that does not guarantee employers will utilize that alternative. "A lot of consensus building is already required for models people build," said Leong. "Would stakeholders ever accept a model that AI built?" As a case study of this mindset, nearly half of U.S. adults surveyed by Pew Research felt that widespread use of automated vehicles (AVs) is a bad idea for society. Nearly a quarter of respondents felt the technology is likely to increase traffic deaths, even though human errors cause many vehicle collisions.<sup>9</sup> Over three-quarters worried about AVs' impact on job availability. People and organizations' reluctance to buy into AI could similarly slow its roll into actuaries' lane.

Companies also are not categorically opposed to long-term investments in people at the potential short-term expense of productivity. Many organizations provide paid study time and pay for exam fees and study materials while the analysts pursue CAS credentials early in their careers. The companies essentially pay for one month or more per year of study time, during which there is no direct or immediate output

from the analyst. While analysts' work is often routine and rife for automation, actuarial employers do not appear to be in a rush to divert expenditure away from study programs and toward automating analyst roles. Doing so would cut off a critical leadership development pipeline. Even the Doomsday scenario requires a few actuarial leaders to mind the store.

Tenured actuaries with routine aspects to their roles may also survive Groundhog Day unscathed. Some actuaries may worry that if, say, a third of their tasks vanished, then there would not be enough new work to fill the resulting void. Dweck does not necessarily see this as a concern. "Quality trumps quantity," he said. "Having more time to focus on non-routine work, without the distractions of the daily routine, could lead to much higher quality output on what remains." This could prove enough value that new work would not even be necessary to support continued demand.

### Scenario 3 — Training Day

A third scenario involves the actuarial role transforming into something more like what data scientists do. AI tools such as ChatGPT can "hallucinate" inaccurate results. This can occur due to poor prompts, inaccuracies in its training data, prediction errors that are customary to any model or bluffing an excuse for applying moral constraints.<sup>10</sup> Such difficulties have helped create high-paying opportunities for "prompt

**Even if AI provides a cheaper and comparably effective alternative to humans in some cases, that does not guarantee employers will utilize the alternative.**

<sup>7</sup> <https://www.wired.com/story/cerebras-chip-cluster-neural-networks-ai/>

<sup>8</sup> <https://arxiv.org/pdf/2005.14165.pdf>

<sup>9</sup> <https://www.pewresearch.org/internet/2022/03/17/americans-cautious-about-the-deployment-of-driverless-cars/>

<sup>10</sup> [https://digital.kenyon.edu/cgi/viewcontent.cgi?article=1048&context=dh\\_ips\\_prog](https://digital.kenyon.edu/cgi/viewcontent.cgi?article=1048&context=dh_ips_prog)

**AI could add efficiency and scale to actuarial work, but actuaries themselves would continuously train AI to be able to scale these greater heights.**

engineers” to extract higher quality responses from AI.<sup>11</sup> Some of these roles do not even require STEM skillsets. However, asking good questions about complex risk dynamics will likely require some of the skills of an actuary.

David Wright, market solutions leader at Acrisure and host of the *Not Unreasonable* podcast, recently administered CAS Exam 9 to ChatGPT and it “failed miserably.”<sup>12</sup> “When you get to the upper end of any domain, nuance increases by 100 times,” Wright says. “Large language models do not handle nuance well yet.” One challenge Wright experienced when asking ChatGPT exam questions was formulating actuarial concepts as prompts. “Think about how to communicate something as simple as a loss development triangle,” he said. AI would likely require significant tuning to get hip to the intricacies of actuaries’ unique geometric representation of claim valuations across multiple different time dimensions.

Wright does not see large language models making quantum leaps in domain nuance right away, but he feels professionals such as actuaries can help expedite AI’s learning process. “Training AI on industry specific data can enhance its effectiveness,” he says. Wright points to BloombergGPT as an example of improving domain performance in this way.<sup>13</sup> He also sees potential for actuaries to serve up their own models, such as triangles, to AI as plug-ins so that AI does not need to learn such concepts itself. Domain-specific training and plug-in development leverage actuarial expertise but require a deeper data sci-

ence toolkit than is customary for many actuaries today.

Wright also navigated relatively pedestrian challenges when testing AI. “Copying and pasting questions and responses in and out of the ChatGPT interface repeatedly became tedious,” he said — especially given that Wright regenerated the response to each question several times to simulate the various thought processes a student could take. As a workaround, Wright licensed programmatic access to ChatGPT’s application programming interface (API) and started sending questions via Python — at a typical cost of a few dollars each. When I spoke with him, Wright was also experimenting with teaching ChatGPT to grade its own performance, which would require a high level of actuarial acumen.

To summarize the Training Day scenario, AI could add efficiency and scale to actuarial work, but actuaries themselves would continuously train AI to be able to scale these greater heights.

**Scenario 4 — Judgment Day**

In our final scenario, actuaries would pivot in more of a social science than a data science direction in response to AI. Dorothy Andrews, ASA, chief behavioral scientist at the National Association of Insurance Commissioners, has seen “wacky stuff” coming out of models long before AI started hallucinating. She recalls once listening to a debate over whether dog ownership is a reasonable explanatory variable for predilection to smoke. “People hearing this debate may start to formulate hypotheses for

<sup>11</sup> <https://time.com/6272103/ai-prompt-engineer-job/>

<sup>12</sup> <https://notunreasonable.com/2023/03/29/gpt-4-fails-final-actuarial-exam/>

<sup>13</sup> <https://arxiv.org/abs/2303.17564>

why this could make sense,” she said, as opposed to questioning whether there is a spurious correlation or confounding phenomenon at work. As models become increasingly complex, it is simple for model stakeholders to fall into the cognitive trap of “attribute substitution” — that is, replacing a difficult judgment task with an easier one.

However, there is a fine line between simplifying and oversimplifying complexity. “Data is created by human activity,” said Andrews. “AI is most likely to miss the mark where people have historically missed the mark.” For example, analysis of Lyft data by researchers at Johns Hopkins and the University of Chicago indicated that minorities are significantly more likely to experience police encounters over otherwise identical speeding infractions.<sup>14</sup> This paradoxically exposes both the positive potential of high-dimensional data analysis, but also the potential peril of accepting math at face value. A finding as ostensibly mundane as speeding being risky may be distorted by decades of social biases. Because AI deeply learns, it can memorialize biases hidden deep within tomes of data.

Andrews sees actuaries and others playing an important role in managing the risks of AI. She points to a need for regulators to continue enhancing their teams’ abilities to review complex algorithms, which could create some new roles for actuaries. There is also opportunity to grow more diverse modeling and model review teams, with researchers at Columbia University finding that modelers’ prediction errors often correlated

with demographic groups.<sup>15</sup> However, STEM skillsets alone will not necessarily generate all the right questions.

The World Economic Forum estimates that, within “jobs of tomorrow” for which there is consistently growing global demand, the majority of workers will transition to different job families than those they work in today.<sup>16</sup> For example, educators, health care workers and artists may land in data and AI jobs. Where is the actuary of tomorrow working today? Andrews feels some may be working in or studying the social sciences. “People who speak in highly technical language about how models work often do not understand the social dynamics in the data,” said Andrews. “Social science is about unpacking the why.” In the Judgment Day scenario, actuaries’ resilience derives in part from supplying this human touch to cases where AI may rush to judgment.

### **Creating the future**

In reality, the four scenarios above may not be mutually exclusive, and the future of the profession could bear resemblance to each of the four in one way or another. Moreover, the future is not fully deterministic. Actuaries can influence how the AI-driven future looks for the profession and themselves individually.

As I drafted this article, the Writers Guild of America strove to influence its own future by going on strike — with one point of contention being writers’ desire to regulate AI’s use in content creation.<sup>17</sup> To one extent or another, most professions create content, and one of AI’s essential threats is that it also cre-

<sup>14</sup> [https://bfi.uchicago.edu/wp-content/uploads/2022/12/BFI\\_WP\\_2022-160.pdf](https://bfi.uchicago.edu/wp-content/uploads/2022/12/BFI_WP_2022-160.pdf)

<sup>15</sup> <https://arxiv.org/pdf/2012.02394.pdf>

<sup>16</sup> [https://www3.weforum.org/docs/WEF\\_Future\\_of\\_Jobs\\_2020.pdf](https://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf)

<sup>17</sup> <https://www.theguardian.com/commentisfree/2023/may/06/writers-strike-historic-importance-ai>



ates intellectual property. Therefore, the considerations pertaining to Hollywood generalize to the present conversation. I asked Dominic Lee, ACAS, senior solutions advisor at SAS — who creates content as The Maverick Actuary — how he was thinking about AI, and he indicated that he was not overly worried. “I try to bring my unique voice to content,” said Lee. “While a large language model can be utilized to create content, there are objective limitations that would affect the breadth and quality of that content.”

Lee cites AI’s current lack of higher order thinking as one barrier to its impact. For example, he notes that if someone prompts ChatGPT to develop topically similar content that optimizes different criteria such as reach or engagement, “the different outputs generally would not reflect the difference in their intent — because the model is not trained in pursuit of these higher order objectives. It’s simply trying to predict the next word in a sequence.” Also, many AI tools deliver content in a single form such as text (ChatGPT) or imagery (Dalle), as opposed to multimedia content such as a tracking text meme that overlays text on video. (Speaking of memes, pundits mostly agree AI has yet to master the intricacies of humor.<sup>18</sup>)

Another major limitation on AI relates to very specific gaps in the data available to train it. “The most obvious example where the absence of data limits the usefulness of these models is a personal story post,” Lee said. “If I wanted to write a post using an experience from my childhood known only to me, ChatGPT’s output would be based on an entirely fictional premise.” He also points to AI’s reliance on past

data as limiting its ability to envision the future. “On LinkedIn, for example, I create short-form text posts focused on expanding the domains in which actuaries add value. So, I may do a post on what emerging risks challenges actuaries are equipped to solve, how their skills can be positioned, and so on,” he says. “Given the lack of historical context and the need to incorporate nuanced professional perspective, ChatGPT would have trouble bridging the gap between an actuary’s value proposition and a domain in which actuaries have not traditionally participated.”

I asked Lee to reflect on his process for generating differentiated content.

“I focus on adding value to my community whenever I create content regardless of the platform. I don’t operate on an advanced schedule like many creators. My process is highly flexible,” he said. “When I feel conviction around something that inspires me or I know something is on the mind of my community members, that’s when I’m most likely to create. I try to be as intentional as I can. Before I post, I ask myself, how will the content make a positive difference for someone in my community?”

For actuaries worried about all the things they cannot control, the best path may well be to focus on the things they can. Creating a better future for their stakeholders will ultimately have the most positive impact on their own future. ●

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*Jim Weiss, FCAS, CSPA, is a vice president for Crum & Forster. He will complete his term as CAS vice president-research in November 2023.*

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<sup>18</sup> <https://time.com/6132544/artificial-intelligence-humor/>



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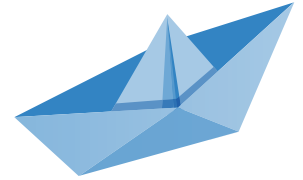


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## Dynamic Times Produce New Challenges and Opportunities for the P&C Insurance Industry By DALE PORFILIO

**R**ecord-high inflation, unrealized investment losses, climate risk and war in Ukraine made 2022 a dynamic year. To top it off, Hurricane Ian made landfall in September as the second most costly natural catastrophe in U.S. history, contributing to the most challenging January 1 reinsurance renewal season since the World Trade Center terrorist attack in 2001. If the economy goes into recession in 2023 — as many business leaders expect — how will the insurance industry react?

The first general session of the 2023 CAS Spring Meeting featured two speakers sharing their perspectives on the state of the industry. Brian Brown, principal and consulting actuary at Milliman, Inc., shared forecasts for the major lines of business in 2023-24 and key risks across multiple product lines. Matthew Mosher, president and CEO at AM Best, shared how technology and a more volatile environment is changing the insurance industry and actuarial work.

Brown led off the session with P&C industry underwriting projections jointly prepared by the Insurance Information Institute (Triple-I) and Milliman. The industry's 2022 net combined ratio deteriorated to an underwriting loss in 2022 following four consecutive years of small underwriting profits. The industry's combined ratio is forecast to incrementally improve in 2023 and 2024 but remain an underwriting loss. Poor performance in personal lines, most notably personal auto, is the single biggest driver of the 2022 through 2024 results.

Digging deeper on personal lines, the industry's personal auto net combined ratio spiked to 112 in 2022, 10 points worse than 2021 and 20 points worse than 2020. Cumulative inflation in repair costs cause the 2023-2024 forecasted results to remain at an underwriting loss, while necessary rate increases are fully earned. Homeowners results are driven by inflation in repair costs and the third consecutive year near \$100 billion of insured catastrophe losses, most notably Hurricane Ian. Loss pressures and expected catastrophes indicate greater rate increases are needed to restore homeowners to an underwriting profit.

Turning to commercial lines, the industry's commercial auto net combined ratio swung back to an underwriting loss in 2022, leaving 2021 as the only underwriting profit since 2010. General liability is performing slightly better, with underwriting profits forecast in 2023 and 2024. Workers' compensation is the brightest spot among major product lines. Workers' comp produced another strong underwriting profit in 2022, continuing the pattern of favorable results from 2015 through the 2024 forecast horizon.

Brown then pivoted to key challenges facing the P&C insurance industry. He led with social inflation (referred to as "legal system abuse" by some), which he believes is the most significant issue facing the industry. He defined social inflation as the rising cost of claims that cannot be explained by economic inflation. This makes it difficult to estimate future loss trends and drives adverse loss

development, most notably in liability coverages.

He elaborated on three key drivers for social inflation:

- Change in jury attitudes.
- Plaintiff attorneys developing new strategies.
- Third-party litigation funding (TPLF).

Studies have shown that current jury pools have a lower opinion of big business, in part driven by the mortgage crisis of 2007-2008. These opinions are strongest among younger generations (e.g., millennials). Some people see jury service as a way to right social wrongs and redistribute wealth. Empirical evidence suggests jury awards are highest in areas with greater income inequality.

Plaintiff attorney strategies include:

- Reptile theory — popularized in the 2009 book by a trial attorney and jury consultant — focusing on how to make juries feel fear toward defendants.
- Blaming the organization for the behavior.
- Anchoring tactics — high amounts suggested by plaintiff attorneys to create a baseline for jury awards.
- Specialized conferences and better communication among plaintiff attorneys.
- Advertising promoting large awards.

According to research by Swiss Re Institute, U.S. television advertising by attorneys has tripled in the last decade. More importantly, "a lack of policy and enforcement of existing regulations has allowed some attorneys to manipulate



Figure 1.

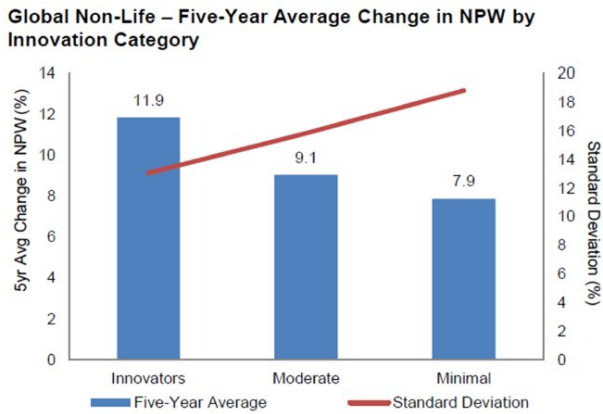
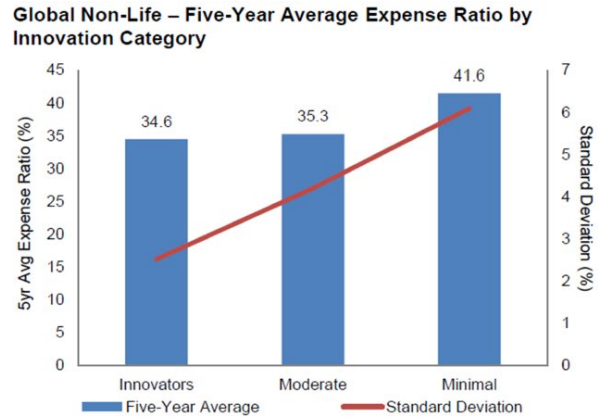


Figure 2.



advertising in ways that usurp and trivialize the justice system with asymmetric information. This is contributing to the rise of nuclear verdicts (in excess of \$10 million) in the trucking industry.”<sup>1</sup>

His third key driver of social inflation was TPLF, when investors (who otherwise would have no financial interest in the case) provide up-front funding to the plaintiff attorney in exchange for a percentage of the final settlement. According to Bloomberg,<sup>2</sup> the TPLF industry is estimated to be worth \$39 billion, and Swiss Re<sup>3</sup> estimates that TPLF companies are earning a return of 25%. With this scale and return, Brown predicts TPLF will remain a key risk for the insurance industry.

Most concerning, TPLF arrangements are only required to be disclosed in two states (prior to 2023 when two additional states passed disclosure legislation with future effective dates) and approximately a quarter of judicial districts. TPLF involvement in any case is usually unknown to the defense, their attorneys, judges and juries, and the

investors’ economic incentives can influence the amount and timing of cases.

Brown closed his part of the session with a review of products and coverages, where various actuarial metrics and awards of \$10 million or more have been impacted. If one works in hospital professional liability, commercial auto, directors and officers (D&O) or cyber, the presentation will likely provide deeper insights than this brief article will capture. (Visit the CAS Online Learning Center <https://bit.ly/3CEe3nC> for recordings from the 2023 Spring Meeting.)

Mosher then took a deeper dive into demographic shifts, climate-related trends, technology, capital markets, inflation and social norms all impacting the state of the insurance market. For example, the U.S. is experiencing an increasing comfort with technology, in part because approximately 20% of our population was born after the introduction of the iPhone (2007). This is projected to rise to 50% by 2050. Simultaneously, big data, machine learning and the internet of things (IoT) are allowing

insurers to approach risk in new ways.

Technology innovation and data explosion creates an accelerated pace of change for P&C actuaries. Complexity and greater competition (both within and from outside the insurance industry) are key factors driving the use of technology among different business lines. Specific changes include telematics, predictive modeling, increased regulatory scrutiny, complex loss trends and improved catastrophe modeling.

AM Best performed a study of the growth rates and operational efficiency of global non-life insurers based on their level of innovation. As captured in Figures 1 and 2, high innovators achieved significantly higher growth in net written premium while simultaneously incurring lower average expense ratios. This creates a competitive advantage for these innovators and allows for more competitive prices to policyholders. AM Best is observing the highest levels of innovation in reinsurance, health and auto.

Insurtech companies have been a

<sup>1</sup> [US litigation funding and social inflation: the rising costs of legal liability | Swiss Re](#)

<sup>2</sup> [Use of Hedge Funds to Bet on Court Cases Worth \\$39 Billion in 2019 - Bloomberg](#)

<sup>3</sup> [US litigation funding and social inflation: the rising costs of legal liability | Swiss Re](#)

source of much innovation and competition in recent years. From 2012-2022, overall insurtech funding was approximately \$50 billion, split roughly 60% in the P&C sector and 40% in life and health. However, increasing macroeconomic headwinds in 2022 resulted in the first contraction in insurtech funding since 2016.

Hardening reinsurance markets place pressure on certain insurtech business models, such as quota share treaties to reduce required capital amounts. Venture capital is becoming scarcer with increased expectations on profitability versus growth toward scale. That said, the technology value proposition is just as valid today as it was in years past.

Technology and partnerships can be key differentiating factors in the insurance value proposition. For example, carriers can include technology-based

services within their cyber insurance product offerings:

- Highly specialized managing general agents with delegated underwriting authority and exceptions.
- Surface scanning and cyber security recommendations.
- Continuous risk management and intelligence monitoring.
- Incident response pre- and post-claim services to speed response and resolution.

Other technology-based product examples include insurance-linked security offerings and embedded insurance.

Mosher concluded by sharing his perspective on what this all means to actuaries. First, companies need to adapt. “They need you to look for the innovation to be successful in dealing with these dynamic times,” he said. “If they’re

not moving forward and dealing with this change, they’ll be on the short end of the stick when it comes to competition down the road.”

Second, these new risks and challenges create opportunities for individuals and companies. “Learn something new and build on that in your career,” he said. Third, the core responsibilities of actuaries remain important. He closed by saying, “We need to stay focused on ultimate losses, proper pricing and proper reserving. That’s the most important part to your industry. How will you consider these changes in meeting your responsibilities?” ●

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*Dale Porfilio, FCAS, MAAA, is the chief insurance officer for the Insurance Information Institute.*

## Rapidly Evolving Cyber Market Offers Challenges and Opportunities By DALE PORFILIO

Cyber remains one of the most dynamic insurance and reinsurance lines of business. It has seen record growth, headlined the *Wall Street Journal* and gone through a market cycle at blazing speeds. The cyber risk environment is ever changing, which makes it a challenging and engaging line in which to operate.

The third general session of the 2023 CAS Spring Meeting featured three speakers sharing their perspectives on the state of the cyber industry: insurance broker Lindsay Volpe, AVP-cyber liability at Arthur J. Gallagher; managing general agent underwriter Pete Hedberg, VP of

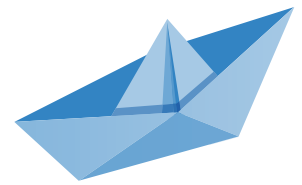
cyber underwriting at Corvus; and reinsurance broker Justyna Pikinska, global head of cyber analytics at Gallagher Re.

Volpe led off the session with an overview of the recent cycle. In 2018 the cyber market was soft, because historically only the owners of large amounts of personal data (such as financial institutions, retailers, etc.) were the main victims of cyber breaches. Pricing was low, and applications were short and easy to complete. A mere three years later, as the frequency of cyber attacks increased due to the spread of ransomware, the market had experienced significant price increases, lengthened applications, instituted strict underwriting standards

and policy conditions, and forced companies to materially improve their cyber practices to reduce the risk.

Now, per Volpe, premiums have eased from their recent steep climb, but the cyber market is not “soft.” Rates continue to rise for many companies, but more slowly. Most insurers have added more restrictive policy wording to their cyber policies to limit their losses to systemic risks and to catastrophic events, but policy wording is not yet standardized across the industry. Underwriting applications are still several pages long, with requirements for cyber risk management practices.

Clients need cyber insurance now



more than ever. The ever-growing dependence of individuals and businesses on digital technology has made the threat — and potential cost — of cyber attacks ubiquitous and persistent. State and federal regulations around consumer data privacy continue to grow, expanding potential liability for failure to comply. And every contract between businesses must take into account the specifications in each party's cyber policy.

Hedberg opened with clear declaration: "Cyber risk is insurable." Some in the industry argue it is not, but this session's panelists unanimously disagree. He referenced two studies — one from Swiss Re, the other from Munich Re — capturing the recent growth in global cyber premiums, as well as forecasts for the years ahead. Premiums have doubled from \$5.8 billion in 2019 to \$11.9 billion in 2022. Munich Re forecasts global premiums of \$33.3 billion in 2027, with an annual growth rate of nearly 30%. (See Figure 1.)

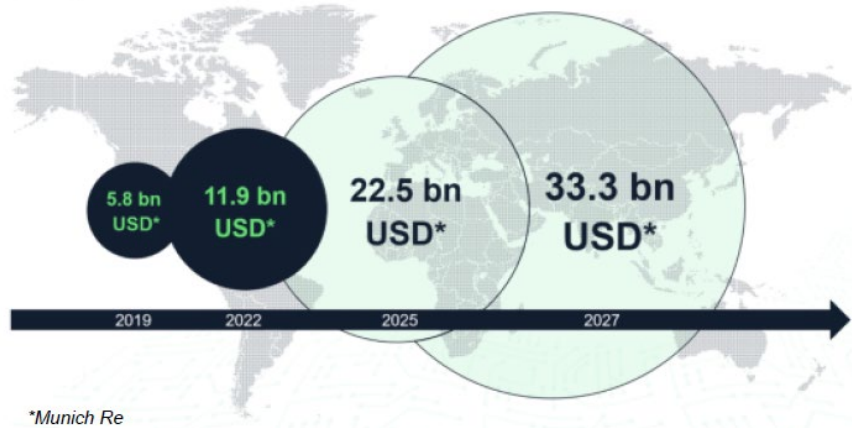
## Clients need cyber insurance now more than ever. The ever-growing dependence of individuals and businesses on digital technology has made the threat — and potential cost — of cyber attacks ubiquitous and persistent.

Hedberg then shared the latest trends on ransomware. While the number of ransomware cases globally has been increasing, improved defenses in the U.S. reduced its portion of the total from over 50% in the fourth quarter of 2020 to approximately 30% by year-end 2022. But then he showed the number

**Figure 1.**

### Global cyber insurance market: Demand continues to grow

\*Estimates by Munich Re



\*Munich Re

of ransomware victims spiked in the first quarter of 2023, well above 2021 and 2022 levels. His conclusion? "Attacks are on the rise, but not our demise."

Hedberg elaborated on the point Volpe made about the complexities emanating from state and federal privacy requirements. State legislation, like the Illinois Biometric Information Privacy Act (BIPA), are creating new avenues

technology's evolution accelerates.

For example, Pixel is a recently created software application that retargets third-party cookies. Without getting too technical, user browsing of multiple websites results in unique IDs being created between these websites and cookies being sent back to the user. These cookies are a new source for data privacy litigation. Software like Pixel is leading to new challenges and new opportunities for cyber insurers.

Pikinska began by addressing six common misconceptions about the cyber insurance and reinsurance market:

1. Cyber is uninsurable.
2. There is no data.
3. All cyber events lead to losses. (Reality — not every news headline results in insurance losses.)
4. Cyber cannot be modeled. (Reality — multiple vendor cyber models are now available.)
5. Cyber is not profitable.
6. Hackers are always one step ahead.

She then elaborated on several of the points from her reinsurance outlook.

for litigation against businesses and insurers. Per BakerHostetler's [2023 Data Security Incident Response Report](https://dsir.bakerlaw.com/2023/Security%20Incident%20Response%20Report),<sup>1</sup> "Lawsuits nearly doubled year-over-year. No longer are only the 'big breaches' capturing attention."

This risk will only increase as

<sup>1</sup> <https://dsir.bakerlaw.com/2023/>

First, reinsurance capacity to assume cyber risk remains very strong. Quota share cessions remain in excess of 50%, while insurers continue to purchase excess of loss (XOL) treaties as well. Second, improving performance of cyber treaties and greater C-suite confidence in the market is easing pressure on pricing, as well as terms and conditions.

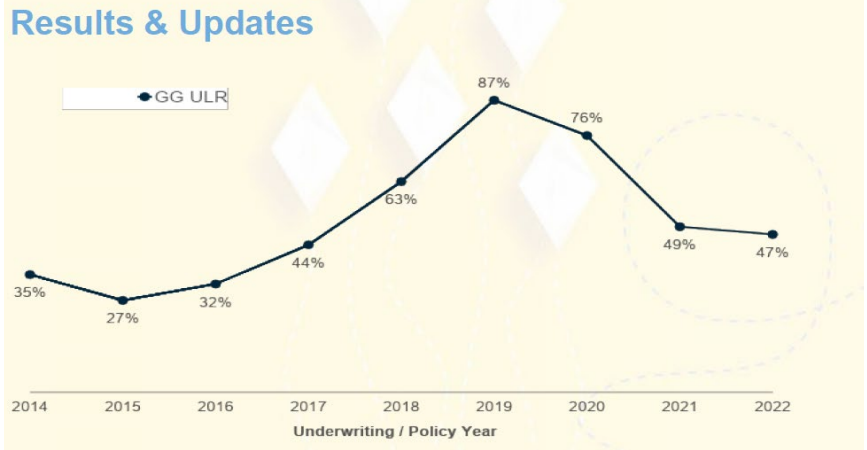
Third, reinsurers are offering forward-looking strategies to their insurer clients to support future growth (e.g., quota share treaties) as much as to transfer catastrophic and systemic risk (e.g., XOL treaties). Fourth, reinsurers are limiting retrospective treaties and event-based capacity and instead have a growing interest in occurrence-based solutions.

To address any misperceptions about cyber insurance profitability, Pikinska shared loss ratio results from the Lloyd's market. The calendar-year loss ratios increased quickly, from a low of 27% in 2015 to the peak at 87% in 2019, then dipped back down below 50% in 2021 and 2022 (See Figure 2.). When asked about the risk of adverse development, she acknowledged some risk but tempered the risk because of claims-made policy forms, high IBNR amounts and ample room below their target loss ratio of 62%.

She closed her section by address-

Figure 2.

## Lloyd's Cyber Coverage at Q4 2022



ing the misconception about lacking cyber data via data standards. Reinsurers have a growing menu of cyber data in the risk bordereau with every additional renewal cycle and loss details with all claims submissions. For example, half of cedants now provide sublimit information, and 20% of cedants are beginning to provide web addresses to reinsurer markets. Reinsurers ask for and scrutinize the insurers' rate change methodology and calculations to understand what factors and business were considered.

Panel moderator Andrew Li, head of pricing for Corvus, facilitated an interesting question and answer session. When asked to look into their crystal ball for future market trends, the panelists

forecast a stabilizing market with more consistent policy language and technology solutions to better stratify high-to-low risk insureds.

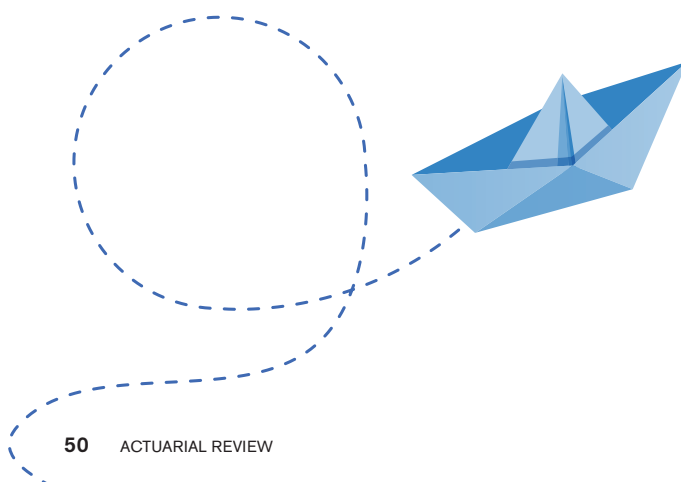
What keeps them up at night?

Panelists emphasized the growing risk of new regulations and federal intrusion disrupting the cyber market, which is already responsibly innovating to address growing and evolving cyber risk.

What tools do your teams need to be successful? Alongside improved client education and the need for staff diversity of thought and experience, two panelists mentioned the need for improved tools to validate the strength of cyber risk mitigation and protections like firewalls.

Li's final question was their favorite part about working in cyber insurance. Pikinska said, "I like all the newness and the opportunity to develop new solutions." Hedberg offered, "I learn something new every year, with new challenges to meet." Volpe closed by sharing, "I'm excited by the challenge to respond to and assist clients when there is a cyber incident." ●

*Dale Porfilio, FCAS, is the chief insurance officer for the Insurance Information Institute.*



# Insurtech 2.0 and the Future of Insurance By YUHAN ZHAO

The first 2023 Spring Meeting General Session, “State of the Insurance Market,” discussed the current market, including social inflation, CAT losses, cyber insurance and concerns around third-party litigation funding. Continuing this journey, the fourth general session explored “The Future of Insurance.”

Moderated by Randel Bennett, VP of strategic partnerships for Swiss Re, the session included panelists Kate Crespo, managing director of FT Partners; Andrew Johnston, global head of insurtech for Gallagher Re; and Bryan Falchuk, CEO of PLRB.

The panel embarked on the discussion around data, the use of data, digital frameworks and healthy “disruption” with technology as actuaries progress into “Insurtech 2.0.” The session wrapped up by explaining the importance of partnerships as the key theme for the future of insurance.

## **Insurance: Understanding big data**

Advances in technology have revealed tremendous opportunities for the insurance industry. From a software vendor perspective, Crespo talked about multiple ways insurers are leveraging data analytics and artificial intelligence (AI) today, including building data analytics platforms and data automation. However, what is even more far-reaching nowadays is having access to various types of data sources with new characteristics that are not traditionally used for insurance purposes, such as auto telematics and aerial imagery data. Crespo also discussed social media data from websites and how we could feed those data back into insurers in a digestible way for model and process improvement. New

types of data sources and characteristics empower actuaries to work more efficiently.

Following the conversations around data, the panel commented on the use of data; specifically, how to use the data mathematically while maintaining a certain ethical standard.

The panel exchanged their opinions about whether credit scores could truly tell if a risk is a bad one and how they could adversely affect gig workers. They concluded that better understanding the underlying characteristics of risks and avoiding the use of variables as proxies are some things the industry should strive to achieve.

When it comes to collecting the right type of data, Johnston shared that reverse engineering is a useful strategy.

## **Ethical considerations around the use of data, especially bias within the data, was one of the hottest topics at the 2023 Spring Meeting.**

Having the problem and hypothesis laid out ahead of time can guide actuaries through the data acquisition process.

Ethical considerations around the use of data, especially bias within the data, was one of the hottest topics at the 2023 Spring Meeting. Instead of treating data bias as a regulatory limitation, Falchuk suggested that the insurance industry engage and collaborate with regulators to address the issue of bias, helping regulators understand the bias and possibly acquiring more equitable and less biased data to use.

## **Digital framework and healthy “disruption” with technology:**

## **Insurtech 2.0**

Not surprisingly, all conversations came down to the evolution of digital frameworks and how this has coincided with the evolution of customer needs and expectations. The panel agreed that the industry should remain adaptable and respond to the social changes driven by external forces.

Crespo introduced the terms “Insurtech 1.0” and “Insurtech 2.0” in describing the previous and current stages. She explained that Insurtech 1.0 focused on the consumer business model, targeting customer needs in the front-end and creating modern customer experience. Now, in the Insurtech 2.0 phase, focus has shifted to understanding fundamentals of insurance and solv-

ing business-driven problems. Insurtech 2.0 is certainly a more advanced stage, where non-insurance professionals have started to make efforts to improve their understanding of insurance and consider insurance industry needs, as Falchuk pointed out.

Crespo also added that we will continue to see growing partnerships in the Insurtech 2.0 wave similar to the emerging trend observed on the managing general agency (MGA) side, where MGAs partnering with captive reinsurers and are able to turn things around quickly and at lower risk, amongst other advantages.

Although there is a waiting game

given the current market condition, the panel agreed that partnership and consolidation will become the future theme. Also, by leveraging collective data from instant and automated information flow across connected nodes/hubs, we will be able to use synchronized data for simultaneous decision making with less

frictions and deeper insights. It is only a matter of time before we see this come to light.

Stepping into Insurtech 2.0 — and potentially “Insurtech 5.0” because actuaries are always thinking about the future — we should come together and brace for this exciting and evolutionary

change to become better equipped and ready for whatever comes. ●

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*Yuhan Zhao, FCAS, is an actuarial manager with Aviva Insurance Company of Canada. She is a member of the AR Working Group and the Monograph Editorial Board. She is also a new Fellow!*

## Bias, Risk and Regulation: What Actuaries Should Know

By ANNMARIE GEDDES BARIBEAU

**H**eightening regulatory attention to social bias is changing what *fair* insurance practices will mean. Thankfully, there are ways to find and address bias, Jessica Leong and Cathy O’Neil said during their presentation, “Bias, Risk and Regulation,” at the 2023 CAS Spring Meeting.

O’Neil is the founder and president of O’Neil Risk Consulting and Algorithmic Auditing, Inc. (ORCA) and the author of the *New York Times* bestseller, *Weapons of Math Destruction*. ORCA is currently working with insurance departments to test for bias. Leong is the founder of Octagram Analytics and past president of the CAS. Together, they helped the audience understand the evolving landscape.

For a long time, actuaries have relied on the concept that fair rates mean those that reflect loss costs and do not use any prohibited variables. But lately, this standard has been evolving, and carriers are wondering how to keep up. For example, the Colorado Division of Insurance is taking the most comprehensive approach to address potential

bias with the passage of SB 169, said Leong.

Earlier this year, Colorado released a draft regulation. The regulation, Leong explained, would require insurers to:

1. Test model outcomes.
2. Have a plan if a model shows bias.
3. Instill accountability on a carrier’s board and C-suite.
4. Possess a robust governance framework to avoid bias created in-house or by a third party.
5. Report documentation to the insurance regulator.

**Leong said that actuaries already live in a world where a rate doesn’t perfectly reflect risk because some factors are not eligible for rating.**

### Understanding fair rates

The presentation became a spirited discussion among the speakers and audience, who raised several questions about bias. Actuaries have long held that rates should reflect risk, so there were many questions on that topic. They included:

- If actuaries fail to use a model with good predictive power, aren’t they exposing insurers to risk, and isn’t that contrary to the Actuarial Standards of Practice?
- If models are corrected for bias, then doesn’t that mean that some customers will have higher profit margins than others, and isn’t that unfair?

Leong said that actuaries already live in a world where a rate doesn’t perfectly reflect risk because some factors are not eligible for rating. Bias can also exist in other insurance practices, such

as marketing and claims. For example, a class action lawsuit alleges that a homeowners’ insurer used a fraud-flagging algorithm resulting in Black customers jumping through more hoops than their white counterparts to receive claim payments.<sup>1</sup>

In another example, researchers

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<sup>1</sup> <https://www.nytimes.com/2022/12/14/business/state-farm-racial-bias-lawsuit.html>

studied the program of a health insurer that intended to provide extra help to patients with complex medical conditions.<sup>2</sup> Due to limited space in the program, the insurer used an algorithm to identify patients for whom giving extra help would save the most in future health care costs. The cost of services was intended as a proxy for medical needs. However, it was a poor proxy because of inequity in health care in the U.S.: Black patients get less treatment than White patients on average. So, costs — and cost savings — are lower for Black patients, which meant the algorithm was less likely to identify them. The researchers showed that optimizing medical needs, instead of cost, would dramatically increase the number of Black patients in the program.

In this case a participant astutely noted that there are biased models and then there are accurate models that reflect a biased reality, and this example looked like it represented the latter.

### The need for regulation

During the discussion, a number of participants raised questions around the same theme: Without new rules or standards, competitive pressure will lead insurers to continue the status quo. Insurers lack the incentive to make tradeoffs between predictive accuracy or profit in exchange for more fairness. As a result, actuaries will have to continue applying price to the expected cost as best they can without using prohibited variables in models.

One participant asked, “Since insurance is in the business of discrimination, how should actuaries distinguish between ‘good’ and ‘bad’ discrimina-

tion? What is a bias, and what is the true difference in risk?”

O’Neil said defining bias is primarily a public policy concern — not to be answered by actuaries, data scientists or artificial intelligence auditors. “It’s a question for regulators. There will be math consequences to the answer,” she continued, “but it is not a technical question.”

### How to test for bias

Another audience member pointed out that many factors correlate with loss cost and protected classes, so if a proxy is banned, another one will replace it. O’Neil agreed, “It’s a fool’s errand to ban specific features or inputs. Instead of prohibiting inputs, test outcomes,” she advised.

Explicitly testing a model is the only way to be sure that there are no blind spots of bias, O’Neil said. Bias testing is already underway in Colorado and Washington D.C. The good news is that testing a model is not too difficult, even if it is already in deployment, O’Neil said.

O’Neil believes testing should focus on “outcomes of interest” that are palpable and salient to consumers in addition to standard actuarial statistics like loss ratios. “We should measure whether different groups are getting different outcomes,” she added. If there are dissimilar outcomes for distinctive groups, is there a legitimate reason why? For example, age may be considered a legitimate factor. One group may be younger, on average, than the other, which may explain some of the differences in outcomes. Ultimately, determining legitimate factors is up to the regulators.

Leong followed up, asking, “What if

there is a big difference after accounting for all the legitimate factors?” O’Neil answered, “Then you can decorrelate with race the way you decorrelate with beta at a hedge fund to make sure you are not betting on the S&P 500.”

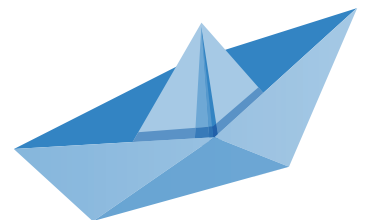
Testing for bias requires data about race and gender. Both can be inferred by using a person’s first name, last name and address and leveraging U.S. Census data. This is a common method, initially developed by researchers at the RAND Corporation and used by public agencies, including the Consumer Financial Protection Bureau.

### Actuaries can start the journey now

Although there will be some changes to insurer practices, discovering and addressing bias are important steps forward. O’Neil and Leong expressed optimism that solutions will continue to emerge. “Insurers and actuaries are problem solvers and maximizers within constraints,” O’Neil said. The good news, they said, is that nothing stands in the way of insurers starting this journey now. Current models are testable, and insurers can build on their existing risk management and governance structures to prepare for a new generation of regulatory requirements. ●

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*Annmarie Geddes Baribeau is a consultant and writer who has been covering insurance and actuarial topics for more than 30 years. You can email her at [annmarie@insurancecommunicators.com](mailto:annmarie@insurancecommunicators.com).*



<sup>2</sup> Ziad Obermeyer et al. Dissecting racial bias in an algorithm used to manage the health of populations. *Science* 366, 447-453(2019). DOI:[10.1126/science.aax2342](https://doi.org/10.1126/science.aax2342)

## An Actuarial Review of Homeowners By Peril Rating By ROB KAHN

Over the past seven years, I have worked in homeowners pricing for two different companies. In that time, I had the opportunity to work with rating algorithms for all perils combined and by peril. For those not familiar with this topic, “by peril rating” means that instead of calculating just one overall homeowner premium (the “all perils combined” approach), smaller premiums for constituent perils (e.g., fire, water, hail) are calculated first and then these separate peril premiums are added together to arrive at the total homeowner premium.

An overwhelming majority of my business partners would passionately insist that by peril rating is the superior approach; two separate research areas that I have partnered with have shown double-lift charts supporting the assertion that by peril rating allows actuaries to estimate losses more accurately. More

What is the financial impact of utilizing a by peril rating algorithm over a simpler all perils combined rating algorithm?

As actuaries, we have been extensively trained to use multiple techniques to help us determine rates that are “not inadequate, excessive or unfairly discriminatory.” For the sake of argument, let’s trust the results of my partners in the research areas at both companies and assume that by peril rating allows us to charge more accurate premiums and mitigate subsidies introduced by utilizing an all perils combined rating algorithm. Assuming we all agree that by peril rating is more accurate, then why would an insurer use an all perils combined approach?

This brings us back to our very important **financial impact** question above. A financial impact is going to have costs and benefits. Here is where

for most small-to-medium insurance carriers. When all is said and done, pricing actuaries wind up reviewing thinner data and are forced to make more assumptions based on the thinner data. Unfortunately, despite the substantially larger work efforts involved in arriving at a reliable indication at a state and peril level, there is a material amount of uncertainty in the final indications.

Monitoring uncertainty aside, another potential pitfall is that a more complicated premium calculation leads to a higher chance for errors. Mistakes happen. In most cases, it is easier to detect and then quickly address an error in an all perils combined rating algorithm than it is for a by peril rating algorithm. As an example, if one of your rating factors is off by 10% in an all perils combined rating algorithm, that 10% error will be more apparent than if the fire peril territory factor is off by 10%, which might only impact the final premium by 2%. Mistakes eventually get found, and the ones that linger longer are more costly to address.

Overall, the additional labor associated with employing a by peril rating algorithm is likely to be several additional headcounts in the insurance organization, which likely equates to a few hundred thousand dollars annually. (Individual company results will vary.)

The benefit side of the equation is far more difficult to pin down. To accurately ascertain the net benefit of by peril rating, we would need answers to the following questions:

1. How many better customers are acquired due to lower premiums from by peril rating?
2. For the better customers that are

### **Mistakes happen . . . Mistakes eventually get found, and the ones that linger longer are more costly to address.**

accurate estimated losses will produce more accurate premiums, which in turn allows insurance companies to charge lower premiums to win the better risks and charge higher (but accurate) premiums to write relatively less of the worse risks.

This all sounds great ... in theory.

Nothing is ever so simple, however. In addition to providing a necessary public service and protecting individuals and families from financial ruin, insurance companies are keenly interested in making a fair and reasonable profit. A very important question that must be carefully considered is:

the analysis gets a bit complicated.

The cost side of the equation is more straight forward. On the **cost side**, there is a much more substantial workload involved in creating, monitoring and maintaining a by peril rating algorithm versus a much simpler all perils combined rating algorithm. If the by peril rating plan has eight perils, then pricing actuaries will need to make eight times the assumptions than they otherwise would. There will be eight times as many numbers to check and implement. In terms of monitoring results (i.e., indications), cutting the data by state and peril can result in extremely thin data





retained, how much *less* premium is collected due to charging less because of by peril rating?

3. How many of the worse customers are lost (that would have been written) due to having higher premiums from by peril rating?
4. For the worse customers retained, how much *more* premium is collected due to charging more because of by peril rating?

As you might imagine, obtaining definitive and clear answers to the questions above is impractical.

However, despite obstacles thwarting our quantitative tool kit, we can still use our imagination and judgement and qualitatively assess the benefit side. If the premiums charged are now more accurate, the insurance company will now be able to improve the quality of their book of business since they will be more competitive with the better risks and less competitive with the worse risks.

On the cost side, we estimate that the annual cost delta of the by peril rating algorithm will be equal to several full-time equivalents, which will cost a few hundred thousand dollars extra each year. Switching from an all perils combined rating algorithm to a by peril rating algorithm makes sense *only if* over

the long term we believe the by peril book would out-perform the incumbent all perils combined book by an amount greater than the incremental cost of running the by peril rating plan.

A typical homeowners profit provision is generally between 8% and 12%. For this back-of-the-envelope exercise, let's assume premiums are priced with a 10% underwriting margin. Let's also apply this analysis to a \$100 million-

enough of the better business to cover the lost worse business, all is well.

Next note that question #2 will to some degree offset question #4. The insurer will lose premiums from the retained better risks as they will now be charged the lower more accurate premiums; the insurer will gain premiums from the retained worse risks. Depending on the mix of business and attrition rate in each group, this could result in a

### **This analysis is far from a straightforward exercise, but that is the joy of our profession.**

book of business. That is to say, the expected annual underwriting profit is \$10 million. Do we believe that the by peril rating algorithm will over the long run consistently generate roughly half a point (i.e., +\$500K/\$100M) of *additional* margin to cover the added intrinsic costs of executing by peril rating?

To answer this question, we review the four questions above.

Notice that question #1 will offset question #3 to some degree. The insurer will gain some better new business at an adequate return and lose some worse existing business at a less adequate return. So long as the insurer is gaining

net benefit or cost to the insurer.

This analysis is far from a straightforward exercise, but that is the joy of our profession. For what it's worth, in response to the question as to whether insurers *should* switch from relying upon a simpler all perils combined rating algorithm to a by peril rating algorithm, I can confidently assert that over the long run, it might be beneficial.

Maybe. ●

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*Rob Kahn, FCAS, is a pricing manager for Horace Mann Insurance and a member of the Actuarial Review Working Group.*

**IN MY OPINION** By GROVER EDIE, *AR* EDITOR IN CHIEF

## Task Times

Some things loom larger in my mind than they are in reality. You may have encountered this phenomenon as well. When it comes to tasks, I sometimes put off something for days because of how immense it seems. And sometimes, when I complete the task, I wonder why I didn't do it earlier. It wasn't as bad as I thought.

I started timing how long it took me to do some personal tasks, like emptying the dishwasher. It takes just under five minutes, unless the dog "helps." Knowing that, I don't put it off as much as I used to.

Some things take quite a bit longer to do than I anticipated. For example, driving from my house to where I frequently have breakfast with my friend Al takes 20 minutes. No wonder I am often late – I thought it was only 15 minutes. And since we usually meet on the same day the trash needs to be put out to the curb, I'm even later. (My apologies, Al.) My latest timing indicates I need to leave the house 30 minutes before breakfast.

I now keep a note in my phone called "task times," where I record the time it takes to do a variety of jobs. I have learned some things from that list. I realized that what I started doing in my personal life is what I have been doing for a long time at work: keeping track of task times to enable me to predict and schedule future tasks more efficiently.

**First lesson**

I tend to underestimate the amount of

time it will take to do something I enjoy and overestimate time needed for unpleasant tasks.

I dread cleaning the deck because I get wet and cold, it takes a lot of time and I have to put everything back in place once it dries. Cleaning the deck involves taking out the hose, hooking it up, and getting wood-friendly soap, a mop, brush and other equipment. The first time I clean the deck for the season, I also have to "unwinterize" the outside faucets and get the hose out from its winter storage place. This makes the task seem even longer. I thought it would take half a day, and so I kept putting it off.

The other day, I cleaned the deck for the first time this season and timed it. It only took me two hours. It didn't take the entire morning. It was not as onerous and time-consuming a task as I had in my mind. It also reinforced my theory that we overestimate the time it takes us to complete an unpleasant task.

**Second lesson**

Estimating the time it takes to do something is difficult if I don't have any data. To remedy that, I have started collecting data on some tasks and their times. I have been doing this for years at work; I don't know why I hadn't thought of this for my personal life before now.

I have known for a long time that the first time I do something, or if I haven't done something in a while, it takes me more time than if it is a regular activity. But I don't have any data to esti-

mate just how much longer it takes. Now I am keeping track of projects, small as they might be, just like I do for work, and wonder why I didn't think of this before.

Some travel time estimates made by web-based and GPS-based applications require adjustments. I am a slow walker, so walking times need to be increased about 20% to accommodate my slower pace. On the other hand, the GPS in my car adjusts for my speed, not the speed limit, and is pretty accurate about arrival times.

There are some things I have decided not to time. How long it takes me to get my food at a restaurant is one. How long I am waiting in line to check-out at the grocery or other retail shop is another. I don't control any part of the process, and it usually has only upset me in the past when I did time those events. There is also too much variation in the wait time depending on the queues I enter. If I were to regularly stop at a certain shop for coffee on the way to work in the morning, I might find keeping track of that time beneficial.

**Unintended consequences**

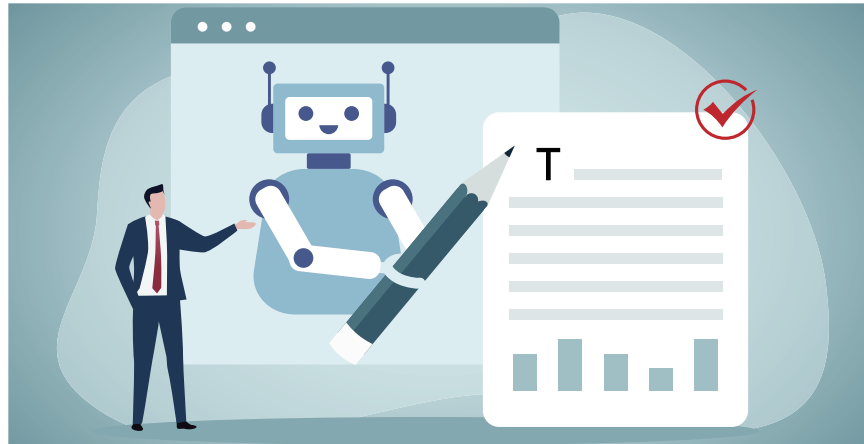
I have found an unanticipated benefit from my timing pursuits. I am more likely to finish small tasks that I used to think were big tasks, and their completion makes me feel better and more likely to start another task, often a bigger one.

There are times when I find myself putting off doing something, then my curiosity gets the better of me. I ask myself, "Okay, just how long will it take?" And then I time how long it takes. I often get it done much earlier than before, and sometimes even have a bit of fun while doing it. ●

## ChatGPT and a Special Message to New Members

In the last several months, there's been a rapid increase in the broad awareness and usage of large language models (LLMs) with publicly available tools like OpenAI's ChatGPT, Microsoft's Bing, Google's Bard, among countless emerging open-source efforts. These seemingly came-out-of-nowhere capabilities are built on a decade of development in the neural networks and deep learning space — academic breakthroughs in algorithms and techniques combined with novel computer hardware and software. While the traditional form of AI/ML has already changed day-to-day life in many ways through the products we use, one of the most exciting parts about this new category of generative AI and LLMs is that it empowers anyone, not just data scientists and AI researchers on the “bleeding edge,”<sup>1</sup> to experiment with new use cases for how AI can be helpful in nearly any text-based task you can think of.

At their core — LLMs (also called *transformer models* or *foundation models*) are deep learning algorithms trained on very large text datasets (think large parts of the internet) that can, given a string of text, analyze the patterns and relationships between the words in that string to predict the next word in the sequence. LLMs introduce the concept of “self-attention,” which is a mechanism to find context and thus meaning by cumulatively examining an input sequence



**... you've been asked to give the New Member Address at the upcoming CAS meeting, and you don't know where to start, but you are pretty sure you don't want to give a speech that's been heard before. There's no need to stare at that blank Word file and will the sentences into existence.**

with varying weights. NVIDIA, a leader in the AI/ML computer science and hardware field, provides this description and examples<sup>2</sup> to get it across:

- A transformer model is a neural network that learns context and thus meaning by tracking relationships in sequential data like the words in this sentence.
- She poured water from the pitcher to the **cup** until it was full.
- She poured water from the **pitcher** to the cup until it was

empty.

LLMs are typically implemented in a chatbot form where you ask it a question, and under the hood, the LLM is predicting each individual next word for its response. When combining the inherent knowledge in the LLM's training dataset (wide-ranging subject matter and level of detail) with the optimizations for conversational human interaction — the results can be shockingly capable.

Hypothetical situation — say you've been asked to give the New Member Address at the upcoming CAS meeting, and

<sup>1</sup> Not fully tested and possibly unreliable product or service available to consumers.

<sup>2</sup> “What Is a Transformer Model?” NVIDIA Blogs.



you don't know where to start, but you are pretty sure you don't want to give a speech that's been heard before. There's no need to stare at that blank Word file and will the sentences into existence, when working with an LLM will yield a better result quicker!

This is exactly what CAS Fellows Jake Roan and Steve Armstrong did to prepare for the 2023 Spring CAS Meeting, where they were asked to jointly provide the New Member Address. Jake and Steve wanted to see what a "typical speech" could look like to then go the other way and develop new content that was likely to never have been heard before. To help, they called on me, a friend and expert, for assistance.

My approach to aiding Jake and Steve is outlined below.

1. Ground the LLM in the situation it'll be thinking about at a high level (e.g., there's going to be a recognition ceremony for individuals who recently obtained their ACAS or FCAS actuarial credentials — what are some pieces of advice given at graduation ceremonies).

2. Review the response, and if it isn't generally on track, provide additional input and examples to get it on track (e.g., these are professionals in their 20s/30s/40s, so it's not the typical high school or college graduation speech).
3. Ask the LLM for multiple iterations of a draft, which gives you more options and directions to go in (e.g., write me three draft speeches to give at the new ACAS/FCAS graduation ceremony).
4. Review the multiple drafts, evaluate what you like and don't like from the different pieces to coach it into another refined iteration (e.g. combine the concepts in drafts one and two, add more content to be twice the length, only add noteworthy points and don't pad it with fluff like a high school student trying to write a longer paper).
5. Review the refined draft and provide specific feedback to further tweak (e.g., I think we're close, but for item #1, layer in the concept

of giving back to the profession, for item #4, layer in leaning into curiosity, and weave in the concept of taking calculated risks you said earlier without adding a bullet).

It only took a couple of moments of ChatGPT back and forth to produce this speech:

*Ladies and gentlemen, esteemed colleagues, distinguished guests and our newly minted ACAS and FCAS graduates, it is a privilege to be here today to celebrate this significant achievement in your lives. This accomplishment is a testament to your hard work, dedication and passion for the field of actuarial science, and it marks the beginning of an exciting new chapter in your professional journey.*

*As you embark on this path, I would like to share some advice that I believe will serve you well as you continue to grow in your careers and strive to make a lasting impact in the world of actuarial science.*

1. *Mentorship, giving back and supporting the profession: You've*

reached a remarkable milestone in your career, and now it's time to pay it forward. Share your knowledge and experience with others, and you'll find that it not only benefits those you mentor but also enriches your own growth and understanding. Act as a resource and advocate for your colleagues and those entering the profession and contribute to creating a supportive and collaborative environment. Give back to the profession and the Casualty Actuarial Society by participating in committees, contributing to research and engaging in initiatives that further advance our industry.

2. *Lifelong learning: Despite achieving this milestone, never lose sight of the importance of continuous growth and development. Stay curious, ask questions and never stop seeking knowledge. Attend conferences, participate in workshops and collaborate with others to stay at the forefront of industry developments and best practices. Embrace curiosity and be willing to explore new ideas, as it will fuel your creativity and innovation throughout your career.*
3. *Networking and relationship-building: Your professional network is a valuable resource that can provide support, guidance and opportunities. Invest time and effort into fostering meaningful relationships with your colleagues, mentors and peers. Build a strong network based on mutual respect, trust and a genuine interest in helping one another succeed.*
4. *Embrace change, innovation and calculated risks: Our industry is constantly evolving, and it's crucial to*

*embrace new ideas and be willing to adapt to change. Be open to learning new technologies, methods and approaches that can drive efficiency and enhance decision-making processes. As you continue to develop your skills and expertise, never be afraid to challenge the status quo, push boundaries and take calculated risks in your career. Leaning into curiosity and being open to experimentation will help you discover new opportunities and contribute to your professional growth.*

5. *Resilience and persistence: Setbacks and obstacles are inevitable, but the key to success lies in your ability to learn from these experiences and continue moving forward. Develop a growth mindset that sees challenges as opportunities for improvement and maintain a positive attitude even in the face of adversity.*
6. *Work-life balance: While it's essential to work hard and pursue excellence, it's also important to prioritize your well-being and find joy outside of the office. Nurture your relationships, cultivate hobbies and give yourself the space to recharge and maintain your resilience. Remember that a balanced life will ultimately contribute to your long-term happiness and success.*
7. *Gratitude and humility: Recognize and appreciate the contributions of others and the role they have played in your success. Remain grounded and open to feedback and strive to cultivate an environment of mutual respect and collaboration. As you continue to achieve new heights in your career, always remember to stay humble and be grateful for the opportunities you've been given.*

*In closing, I'd like to offer my heartfelt congratulations to our ACAS and FCAS graduates. Your achievements are a testament to your commitment, intelligence and perseverance. As you continue to grow and excel in your careers, I have no doubt that you will make significant contributions to the actuarial profession and leave a lasting legacy. Thank you for allowing me to share this.*

The experimentation and use cases for LLMs are only limited by your imagination, your comfort with sharing data with the companies running the platforms and the degree to which the model should be trusted for a given subject matter or task. LLMs are like any other type of model in having strengths, weaknesses and limitations, but they do also introduce some new angles to consider. They can often have confidently wrong hallucinations, are only aware of the data they've been supplied (e.g., through 2021), but even so can still be an extremely valuable tool in your toolbox with that understanding and appropriate validation safeguards. For example, current LLMs have amazing programming and document summarization capabilities but really struggle with basic algebra and any detailed actuarial methodology or concept. With how things have been progressing in these very early days, it's not hard to picture a world where the skillset of "effectively using generative AI in day-to-day work" becomes as commonplace and expected as the skillsets for using a word processor or search engine, and I'm excited to see what we take for granted 10 years from now. ●

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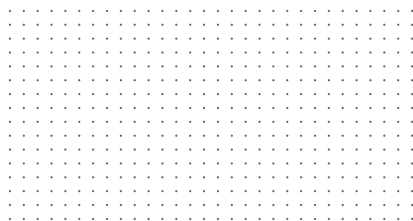
*Jonathan Fesenmeyer, FCAS, CSPA, is an expert in analytical technology enablement.*

**IT'S A PUZZLEMENT** By JON EVANS

## Estimate the Volume

A three-dimensional lattice spans all the points with integer-valued coordinates from the extreme diagonal points with minimum integer coordinates  $(0,0,0)$  to maximum integer coordinates  $(L,M,N)$ . Estimate the volume  $LMN$  given the following random sample of lattice points:

- ( 4, 20, 5 )
- ( 14, 38, 59 )
- ( 24, 16, 31 )
- ( 31, 30, 1 )
- ( 6, 29, 4 )
- ( 5, 2, 1 )
- ( 12, 22, 30 )
- ( 30, 46, 69 )
- ( 23, 3, 31 )
- ( 17, 43, 41 )



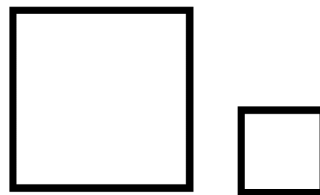
Extra credit: What do you estimate will be the standard error of your estimate versus the true value of  $LMN$ ?

Here is a SHA-256 hash that will not help you solve the problem in any way. It includes a message to be revealed when the solution is published, with the values  $(L,M,N)$  and  $LMN$  used to generate the random sample of lattice points.

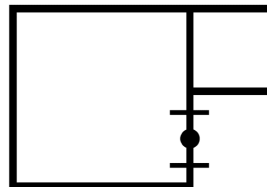
88b8448136047d588c-  
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### Combining Squares

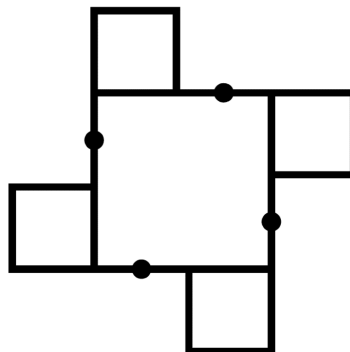
Here is a nice step-by-step solution submitted by John Berglund.



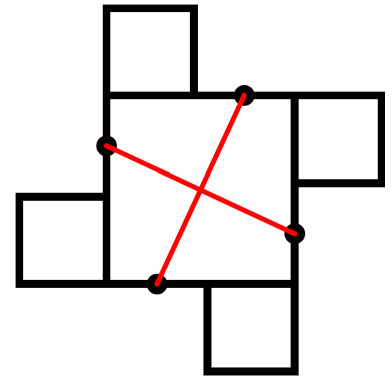
We are given two squares, with sides  $a$  and  $b$ , with  $a > b > 0$ . Call the squares  $A$  and  $B$ .



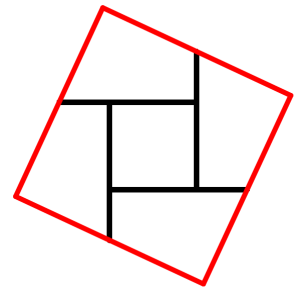
Set square  $B$  next to square  $A$ . There will be a segment of length  $a-b$  along the side of  $A$  sticking out below  $B$ . Find the midpoint of this segment.



We can repeat this process on each side of square  $A$ . (With rotational symmetry.)



We can connect each midpoint to the one opposite. This cuts square  $A$  into four identical pieces.



We can arrange the four pieces plus square  $B$  to make a bigger square. This is the goal.

Roger Bovard, Bob Conger, Jacob Flisakowski, Jerry Miccolis, Hannah Park, Chris Terrill and Brian Thompson also submitted solutions.

John Berglund also submitted a solution for the January/February 2023 puzzle. ●

**Know the answer?  
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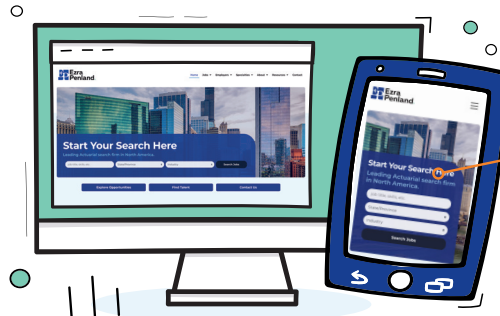


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### **99490 – Midwest/Remote – Director – Analytics**

A mid-sized personal and commercial lines insurer based in the Midwest seeks fully remote Director of Analytics to lead a team of five over commercial lines analytics and modeling. Prior management experience needed, actuarial credentials not required.

### **99766, 98828, 99153 – Midwest – Pricing Actuary – Student – Fellow**

Great opportunities available to use both your technical and business acumen. Small teams with the potential to work on a variety of projects. Multiple roles spanning analyst to FCAS levels.

### **99758 – South – Near Associate – Fellow**

Leading specialty company seeks a Senior Actuarial Analyst in Georgia to focus on reserving and financial reporting. Will work closely with Chief Actuary and leadership. Similar role is available in Florida.

### **99899 – Midwest/Remote – Pricing Actuary – Student to Associate**

Leading reinsurer seeks a Pricing Actuary to analyze reinsurance submissions and underwriting results, and work on treaty reinsurance pricing. 5+ exams.

### **98450 – South/Remote – Business Development Actuary – Associate to Fellow**

Leading actuarial Consulting firm is looking for an ACAS or FCAS to be involved in maximizing revenue from existing client relationships, developing new client relationships, and exploring relationships across other lines of business and geographies to create new business opportunities.

### **99896 – West/Remote – Actuarial Consultant, Commercial Specialty Lines**

Remote opportunity with a commercial lines carrier seeking a technically adept designated or nearly designated Actuary to support development of data-focused actuarial analysis and models. Eligible for actuarial support and rotation program.

### **99544 – Northeast/Remote – Actuarial Analyst – Student to Associate**

Independent consulting firm has an exciting growth opportunity for an experienced property/casualty actuarial analyst for the position of consulting actuary in client-facing role. 4+ exams.

### **99941 – Northeast – Senior Actuarial Manager – Fellow**

Specialty reinsurer seeks a Senior Manager for C-level facing role responsible for developing new tools and methods, building a strong team and ensuring business profitability.

### **99977 – Northeast/Remote – Senior Actuarial Analyst – Student to Associate**

Specialty risk and liability company seeking Senior Actuarial Analyst to focus on pricing, profitability analysis, modeling, and data analytics for multiple products.

### **99989 – South/Remote – Actuarial Science Lead – Associate to Fellow**

Actuarial Leader sought with an entrepreneurial mindset to optimize actuarial processes, head large account pricing, and work closely with other departments fostering an even greater, more agile business.