

actuarial REVIEW

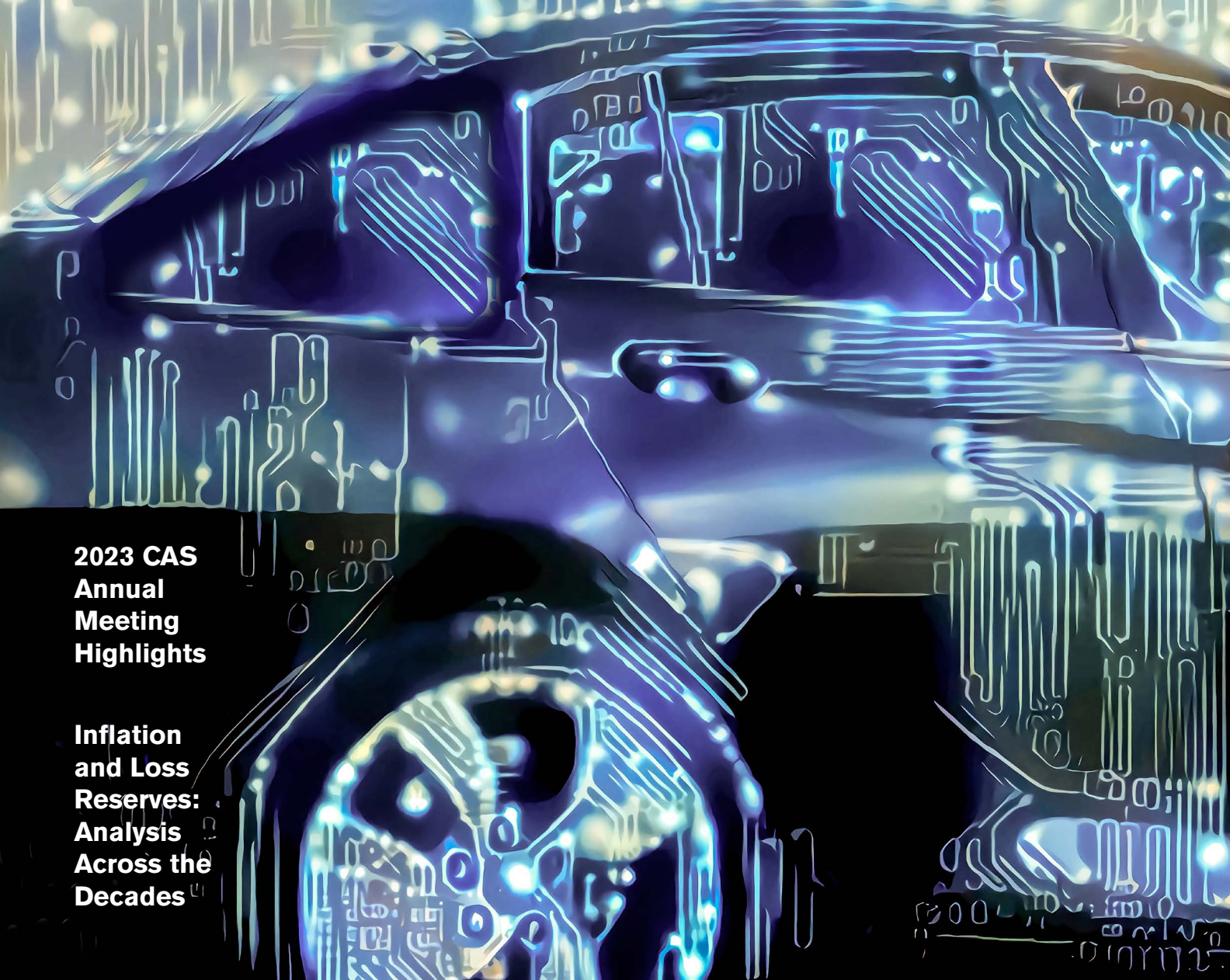
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THE TECH IN OUR CARS

**2023 CAS
Annual
Meeting
Highlights**

**Inflation
and Loss
Reserves:
Analysis
Across the
Decades**





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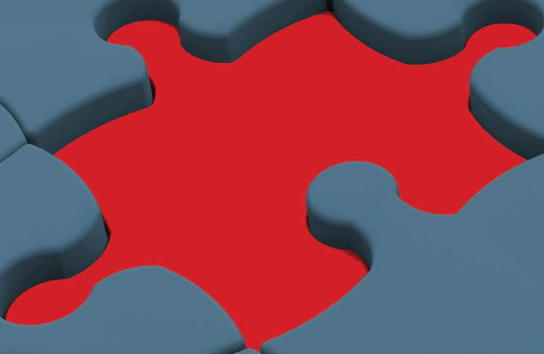
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January-February 2024



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By ANNMARIE GEDDES BARIBEAU

Technology makes cars safer and more convenient to drive but also introduces higher repair costs and new risks.



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AI, impacts of earthquakes, floods and wildfire, and California's unique risks and insurance market dynamics were just some of the hot topics covered in Professional Insight.

Inflation and Loss Reserves: Analysis Across the Decades

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By JIM LYNCH

When inflation hits, management wants to know: How much inflation is baked into reserves; and how much could future inflation cost us? Actuaries across the decades respond.

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editor'sNOTE By JIM WEISS, AR EDITOR IN CHIEF

By Members and For Members

Last month I accepted the *Actuarial Review* editor-in-chief baton from my predecessor, Grover Edie, after many years of volunteering as a copyeditor and occasional author. This transition motivated me to reflect a bit on the story of our magazine. I refer to as “our magazine” because — with its member newsletter origin and its evolution into a respected trade publication — *AR* is a powerful voice for CAS members to communicate with each other and the world beyond our profession.

In the age of a 24-hour news cycle, the recession of print media and the explosion of citizen journalism, *AR* has been consistently ahead of its time. *AR* delivers a beautiful glossy magazine (with specifically commissioned cover art) to members’ mailboxes and has developed a snappy website. Produced by volunteer authors and editors in partnership with top-flight CAS staff, it draws upon the most effective aspects of citizen and conventional journalism. Its bi-monthly news cycle allows time for our actuaries to dissect the complex issues of our industry and time — accentuating magazines’ structural preference (compared to more real-time media) for having the decisive say over the first or

most biting take.

Our magazine is a way for us to get to know our 10,000 plus and growing member base (See an upcoming article on Bob Conger) and our professional staff sidekicks (Ashley Givens in Staff Spotlight). It takes us to places in the actuarial world we may not see every day (like CE audits or Latin American exam sittings). It celebrates our successes (like awards for CAS research) and lays bare our challenges (see cover story, “The Tech in Our Cars”). It is a reflection on our past (features on inflation across the decades), present (our volunteers’ extensive coverage of the Annual Meeting) and future (outgoing CAS President Roosevelt Mosley’s poignant reflections in Random Sampler about his confidence in the actuaries of tomorrow).

When I was young, I would often wait by the mailbox for the latest *Sports Illustrated* or *Rolling Stone*, or skulk around Borders paging through *Time* and *Popular Science*. Our world looks very different today, but I never lost that excitement to get lost in a good magazine. Our committed volunteer working group, professional staff, and I will strive to deliver you that exhilaration one issue at a time. ●

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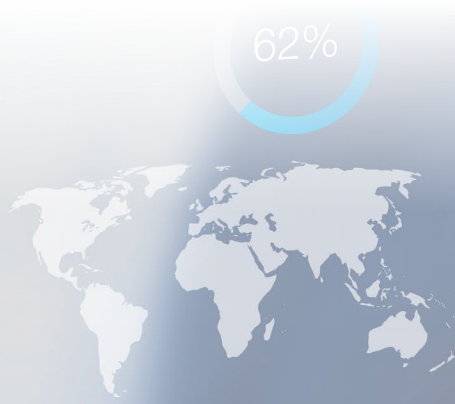
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Obtain Your Credentials in Predictive Analytics and Catastrophe Risk Management From The CAS Institute



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.

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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.

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A Glimpse at the Past, a Look Toward the Future

Last year, we [accomplished a lot and hit a lot of milestones](#). I'd like to thank Roosevelt Mosley, Kathy Antonello and Victor Carter-Bey for their leadership as well as the volunteers, staff and leaders who contributed to these accomplishments. We ended the year with a very memorable Annual Meeting in Los Angeles: celebrating milestones (#CAS10k), welcoming new Associates and Fellows, engaging future actuaries (#CASStudentCentral) and gathering as friends and colleagues. Discussions at the Annual Meeting were some of the most enriching, involved and polite debates spanning differing views, such as how consumers, regulators or insurers viewed California risk or whether exams today are more difficult than years past. The meeting ended with a panel of California industry leaders sharing very different perspectives — punctuated by hearty applause from the crowd.

Take [the Property Casualty Predictive Analytics \(PCPA\) requirement](#), for example. For years, there was interest in putting together a basic education requirement that would address, in a hands-on way, what modern actuaries need to know. However, the number of diverse views on requirements multiplied by the number of discussions needed to move forward stymied any significant progress. It took conscious collaboration — including teamwork, trust and mutual respect — to get a working group to focus on the core product and critical issues, like the candidate experience and value to employers, and to enable the working group to move forward faster and announce the PCPA requirement.

The PCPA is a win, however, we have faced some challenges. We've seen efforts falter because input was not broadly sought; those who were involved collaborated but did not have the benefit of critical feedback from important and diverse stakeholders. But we learn from our past and carry on striving to improve.

Two of the key themes of the coming year for me are collaboration and diversity. Both must be present for us to continue to succeed.

Two of the key themes of the coming year for me are collaboration and diversity. Both must be present for us to continue to succeed.

The accomplishments in 2023 give us great momentum to move closer to our envisioned future where “CAS members are sought after globally for their insights and ability to apply analytics to solve insurance and risk management problems.”

Here are a few of my priorities as we move into 2024.

First, we need to update the CAS Strategic Plan. The current plan consists of three pillars:

- Pillar 1. Building Skills for the Future.
- Pillar 2: Diversifying the Pipeline.
- Pillar 3. Expanding Globally.

These pillars helped guide the CAS for the three years from 2021 through 2023, inspiring multi-year efforts like the [Admissions Transformation Plan](#). We've extended the Strategic Plan through 2024, giving us time to thoughtfully update the plan for 2025 through 2027.

In addition, we'll be able to leverage member input from the Quinquennial Survey, as well as feedback that we've received during the years our Strategic Plan has been active.

Second, we need to ensure a smooth launch for the PCPA and begin planning the next set of admissions and educational initiatives. To help guide our planning, we'll be undertaking an Actuarial Professional Analysis (APA). The APA seeks to describe our profession through essential standards and require-

ments for practice that can be translated into a weighted set of content areas for assessment and can incorporate skills needed for future actuaries. This ambitious undertaking will be led by staff and volunteer actuaries, including a panel of actuarial subject matter experts and will incorporate feedback from a wide range of stakeholders, including candidates, practicing actuaries, employers (current and prospective) and regulators. This feedback will be useful, in particular, as we think about training an actuary who is prepared for the future.

Third, we need to implement the recommendations made by our Governance Task Force with input from a governance consultant. In addition to advising on governance best practices, this task force has been hard at work researching current processes, policies and procedures, and identifying opportunities to improve, document and

communicate them. Some best practice improvements are already in flight, and executing the task force recommendations will be a priority for the CAS Board, leadership and Executive Council.

Finally, there are three other tactical areas that we need to work on in the coming year. First, we have to strengthen sourcing actuarial students — our early pipeline. Second, we should continue to focus on volunteer satisfaction and member engagement. The culture and existence of the CAS relies on volunteers, and our community is formed by engaged members — who else, for example, will ask hard questions at our Town Halls with CAS Leaders? Finally, we need to connect with our members working internationally as well as peer actuarial organizations. There’s much we can learn about actuaries abroad, including how our profession should be involved in issues like climate and banking.

There’s plenty to do. However, we have great momentum and a group of dedicated leaders, volunteers and staff. In addition, we are all teaming up for the benefit of the CAS, our members and our community. If any of the work above resonates with you, there are many ways to get involved. I’m optimistic that, in a year, we’ll look back and once again be proud of the milestones we’ve achieved.

Finally, I’m grateful for the opportunity to serve as your president and look forward to our many accomplishments together. Go CAS! ●

E-Forum Volunteers Wanted
 Volunteers are needed as copy editors for upcoming CAS research call papers/essays and independent and sponsored research. Please email esmith@casact.org to volunteer and to learn more.

An Expanding Line of Business

I enjoyed Michael Walters [In My Opinion](#) column on individual health insurance. Succinct, with many interesting ideas! On his comment “individual health policies will not have the catastrophe or tort system problems that homeowners and auto insurers have,” there are innovative treatments that are very expensive at first; there are possible mass tort claims; and there is innovative gene research that has the possibility to diagnose medical conditions before they occur. There is a cost of developing new treatments, which may be vitally important but affect only a handful of people. I am grateful he wrote this article, and I hope the CAS will take up the challenge of setting up a task force!

Arthur Schwartz, FCAS

The Insurance New Business Paradox

I recently reviewed the [Back of the Envelope article](#) (AR, November-December 2023), and much like the author's account of first hearing of this “new business paradox,” I too found it to be “borderline outlandish.” However, I did not come to the same conclusion as the author upon reviewing the calculations provided in the article. In particular, the calculations assume that there are no additional fixed expenses associated with writing new business policies. Fixed expenses are typically associated with things like employee salaries, office buildings and maintenance on those buildings, technology costs, and some portion of policy acquisition costs like TV advertising. By allocating \$0 fixed expenses to new business, the article

implies that the insurer could grow substantially (in fact, it would be infinitely scalable) without having to hire any additional employees to service those policies, buildings to host those additional employees, or having to spend any advertising money to attract those new policies in the first place. While there may be some rare and unique cases where this assumption would hold, in most cases it would not be true, and this would invalidate the examples provided in the article.

*Josh Taub, FCAS
 Director of CAS Exams
 Instructor for CAS Exams 5 & 8*

Author Rob Kahn, FCAS, responds:

Thanks for the feedback! You are absolutely correct that an insurer cannot grow infinitely without incurring additional fixed expenses. However, an insurer could certainly grow modestly, and any additional fixed expenses incurred would, in most cases, not invalidate any of the arguments. In the examples provided, the new business was less than 10% of the total book. Growing a book of business by ~10% will probably not necessitate additional headcount, but to your point — it might. As with anything, it will depend on a myriad of factors. As you correctly point out, the very existence of additional new business may increase fixed expenses. With that in mind, it would be more precise to state that: “New business adds value when the new business premium covers the cost of all loss and expenses specifically attributable to the new business, so it can then pitch in and help shoulder the burden of the larger fixed expense pool.” (Or something to that effect.) Thanks for keeping me honest.

COMINGS AND GOINGS

Phil Brodeur, FCAS, has been promoted to vice president, risk services at RLI, assuming leadership and oversight for RLI's pricing, reservations, risk management, reinsurance and due diligence functions. Brodeur joined RLI in 2007 as an intern and last served as associate vice president of risk services.

Temar Richards, ACAS, has been appointed vice president, actuary at Bermudian-based Relm Insurance. Richards will contribute to the execution of Relm's strategic vision as well as optimizing the company's pricing, reserving, product development and risk management strategies. He was previously lead actuary at Nayms, the island-based crypto native reinsurance marketplace.

Logan Jaklin, FCAS, has been promoted to vice president-actuarial services at SECURA Insurance. Jaklin joined SECURA in 2013 as an actuarial analyst. He became the director of actuarial services in 2020.

Scott Jean, FCAS, president and CEO at EMC Insurance Cos. in Des Moines, received the Distinguished Alumni Award from Iowa State's department of mathematics during a ceremony earlier this month in Ames. The award recognizes distinguished alumni and friends from the department. Jean began his career with EMC Insurance as an intern in 1991 and joined full time after graduating college. He became president and CEO in March 2020. Jean serves as the chairman and CEO of EMC National Life, an EMC affiliate that offers life insurance products.

Peter Ott, FCAS, MAAA; Monica Shokrai, FCAS, MAAA; and Samuel J.Y. Tashima, FCAS, MAAA, were recently recognized by the American Academy of Actuaries as part of the organization's [Rising Actuary Awards](#). The awards recognize young actuarial leaders —

Comings and Goings, page 9

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Letters shall not contain personal attacks or statements directly or implicitly denigrating the characters of individuals or particular groups; false or unsubstantiated claims; or political rhetoric. Letters should be no more than 250 words and must include the author's name and phone number or email address, so the editorial staff can confirm the author. Anonymous letters will not be published. There shall be no recurrence of topics; issues previously addressed will not be the subject of continued letters to the editor, 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 (e.g., board, working groups, committees, task forces or councils) instead of AR. No letter that attempts to use AR as a platform for an ulterior purpose will be published. Letters are subject to space limitations and are not guaranteed to be published. The AR editorial volunteer and staff team reserves the right to edit any submitted letter so that it conforms to this policy. Decisions to publish letters and make changes to submissions shall be made 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

CALENDAR OF EVENTS

March 17–20, 2024

Ratemaking, Product and Modeling Seminar and Workshops
New Orleans, Louisiana

May 5–8, 2024

CAS Spring Meeting
Atlanta, Georgia

June 3–4, 2024

Seminar on Reinsurance
Boston, Massachusetts

September 9–11, 2024

Casualty Loss Reserve Seminar
San Francisco, California

November 3–6, 2024

CAS Annual Meeting
Phoenix, Arizona

Visit casact.org for updates on meeting locations.

IN MEMORIAM

John K. Knapstein (ACAS 2007)
1969–2023

Comings and Goings

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35 years and younger or credentialed 10 years or less — who are making an impact in the actuarial profession. Ott is a senior pricing officer for property at Swiss Re, Shokrai is the head of actuarial, analytics and systems in business risk and insurance at Google, and Tashima is the director and actuary, head of cyber risk consulting and analytics for Aon, North America.

Lisa Slotznick, FCAS, began a one-year term as president of the American Academy of Actuaries in November 2023. Slotznick has been a member of the CAS since 1987 and has served on both the Syllabus and Examination Committee and the Financial Reporting and Analysis Committee. Slotznick has served in many volunteer roles at the Academy, including as vice president of casualty, as chairperson of the Climate Change Joint Committee and of the Committee on Property and Liability Fi-

nancial Reporting, and as vice chairperson of the Committee on Qualifications. She is currently retired with 43 years as a practicing actuary. ●

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and LinkedIn.

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.”

Mentor and Musician with a Love for Jokes

Robert George Evers (FCAS 1973)
1937-2022

Robert George Evers passed away in October 2022, in Venice, Florida. Born in Oshkosh, Wisconsin, to George and Helen (Faust) Evers, he was a man who loved God and put that love into action every day. Evers was deeply devoted to his wife Barbara (Blodgett), with whom he celebrated 59 years of marriage until her passing four years before Evers. Together they were a shining example of love and faith to their four children, 16 grandchildren and 10 great-grandchildren. Evers graduated from St. Lawrence

Seminary in Mt. Calvary, Wisconsin, where he entered the 7th grade to study for priesthood. Despite not continuing to become a priest, he remained very active in the Catholic Church all his life through music ministry, parish council, teaching, small church community, Knights of Columbus and monetary support. He was known for his sharp mind and warm folksy humor. He was a trusted advisor to many. Evers earned a bachelor’s degree in mathematics at Wisconsin State College and a master’s in business at The Ohio State University. He started his career as a data analyst at Sentry Insurance in Stevens Point, Wisconsin, was an actuary for Aetna

Insurance in Hartford, Connecticut, and for JC Penney Property and Casualty Insurance in Westerville, Ohio, where he also served as senior vice president. He finished his actuarial career with KPMG Peat Marwick and Rector & Assoc. Evers loved music and played the guitar, piano and violin. Later in life, he composed his own songs, which he was able to record in a studio. After moving to Florida, Evers loved to go to the beach, play golf and observe the alligators and birds living on the golf course right behind his home. He always had a joke in hand and could always find some way to bring light to any situation. ●

CE Requirements and Compliance: What You Need to Know

By MICHAEL SPEEDLING ON BEHALF OF THE PROFESSIONAL EDUCATION AND CE COMPLIANCE WORKING GROUPS

It is that time of year again. You just attested that you are in compliance with the U.S. Qualification Standards (USQS) or some other standards on the CAS website. It's time to start accumulating Continuing Education (CE) credits for the new year. But wait! You have heard that some CAS members had their CE credits from last year reviewed to ensure that they were in compliance with the USQS as they attested.

Let's assume that you've already met your Basic Education (the exam process) and Experience requirements. What do you need to know about CE? The USQS requires 30 total hours of "relevant CE" per calendar year. At least three of these hours must be professionalism related, and at least six hours need to be from organized activities. Also, one hour must be bias related, and no more than three hours of CE can be related to general business instruction, like management training, communication or business writing sessions. What if you are selected for review?

What is the CE review process?

Like most things, there is a beginning and an end. The review process starts in February when all members of the CAS who are subject to CE requirements are notified of the review process and are informed that they may be selected for a review of their CE activities.

Who is reviewed? The CAS picks a semi-random sample of 1% of certifying members each year.

Who is exempt? Only credentialed actuaries who either did not certify at year-end or did not pay CAS dues (i.e., nonmembers) are exempt.

Who is eligible? Some actuaries are automatically chosen for review: 1) CAS Board members in their first term, and 2) any member reviewed the prior year who was recommended for a follow-up review. Every other CAS member is fair game, although members who sign NAIC statements of actuarial opinion do have a greater chance of being selected for review.

What happens in the CE compliance review process?

1. Members selected for review (reviewees) are notified that they have been selected for the review and are requested to provide supporting documentation through a software application within four weeks of the notification date. Each reviewee is assigned a unique number and any identifying information is redacted from the submitted documentation.
2. Reminders are sent to the member two weeks prior to the documentation due date. Reviewees who do not respond or fail to provide supporting documents are contacted by CAS staff. If the reviewee still fails to submit the required documentation, a registered letter shall be sent indicating that the member is not in compliance with the CE requirements and their status on the CAS website will be changed to "Has not complied."
3. After all submitted documentation is received and sanitized, members of the CE Compliance Working Group (CEC) (reviewers) begin their review. Each reviewer is assigned a unique number to

maintain anonymity.

4. The reviewers will discuss with the other CEC members any questions or issues for which they request input. Reviewers will post questions or issues to the reviewee through the software application in an attempt to resolve unclear or incomplete documentation.
 5. After all reviews are complete, the CEC finalizes their pass/fail recommendations. Any outstanding issues or concerns stemming from the requests for additional information are discussed in an attempt to resolve, and anything that cannot be resolved by the committee is sent to the Executive Committee (EC) for their next meeting.
 6. The EC Meeting Chair presents any records still in question to the EC for their input and response. The CEC then debriefs the results and feedback from the EC meeting and decides on the action to take.
 7. Once all additional documentation has been submitted and accepted by the CEC, the CAS Volunteer & Committee Coordinator contacts the reviewees with their results and thanks them for their cooperation in the review. This ends the CE review process. Members who have questions regarding the review process may contact the CAS Volunteer & Working Group Coordinator or the Chairperson of the CEC.
- Reviewers note common problems, good and bad examples of logs, etc., to provide feedback to the reviewees and to add to the knowledge base of the CEC.

Here are some examples of common problems with submitted CE documentation.

1. **Lack of adequate description** of the CE. For example, an “internal actuarial meeting” does not provide sufficient information on what topics were covered or the time devoted to a topic. Was the entire meeting relevant CE? Was there time devoted to nonrelevant topics like upcoming rate plans that would be considered part of the job?
2. **Lack of documentation** supporting CE. Documentation should at a minimum include date of CE, who sponsored the CE (e.g., CAS, Regional Affiliate), how many CE hours are credited (50 minutes = 1 CE hour), the subject of the CE (e.g., reserving with AI), and area of practice, if relevant (e.g., reserving, pricing). The CE should also be associated with any category that applies: Specific Qualification Standard, Organized Activity, Professionalism, Bias Topic and Business Skills.
3. **Bulk coding** of multi-session events. Going to the CAS Annual Meeting and booking 12 CE hours under that description is not acceptable. Each session within a meeting should be recorded separately with all the pertinent information.
4. **Duplicate entries** with the same description. For example, an internal pricing seminar listed for three separate sessions does not indicate if this was repeated in error or if there were three distinct sessions during the seminar that qualified for CE.

5. Lack of information on how to determine if specific events should be considered relevant and/or “organized.” Events like internal-meetings, company-required training could be either organized, partially organized or not organized depending on who is presenting or in attendance. For example, the entry “Training session by analytics department on deploying non-linear modelling techniques into model validations” clearly defines CE relevance but “Pricing presentation on upcoming rate change” doesn’t distinguish a business meeting from CE relevance. Also, some sessions of an internal event may qualify as “organized” because they are both relevant and include parties outside of your company. CAS webinars, for example, are an organized activity if attended “live,” but they are not an organized activity if you view the recording.
6. Counting CAS Town Hall meetings, a company’s quarterly earnings call, or vaguely described CE (e.g., “I read the *WSJ* every day”) without describing how it is relevant and the CE time devoted to the relevant topic(s). It is your responsibility to **determine and justify how a session is relevant to you.**
7. Relying on the **prior year’s CE** units to support this year’s attestation but not documenting the calculation and which prior year’s units are being carried forward. If prior year’s units are being used, then a worksheet of the prior year’s CE highlighting which excess credits are being used should also be provided. The USQS allows for one year

of carryover CE units.

8. **Insufficient hours** in one or more subcategories. This past year, there were a number of instances where there was no CE specified as bias training. When the reviewee was asked if they had completed bias training but not recorded it, some said they were unaware of the requirement. It also helps reviewers if you show totals for each category and overall so they can quickly determine if the submitted log is complete.

The best way to keep adequate documentation is to keep a log for each calendar year, updating new CEs as you earn them. The USQS provides a sample format in Appendix 5. (https://www.actuary.org/sites/default/files/2021-11/USQS_2021.pdf)

There is also an application called TRACE on the Academy’s website if you don’t want to build your own. (<https://www.actuary.org/trace>).

You can’t avoid having your CE reviewed for compliance if you are selected, but you can be adequately prepared.

1. Keep good documentation of CE units you are claiming.
2. Be prepared to show relevance of the CE units.
3. Have adequate hours in all categories.
4. Exceed minimum requirements, if possible, in case some of your CE is viewed as not qualifying.
5. Refer to the USQS and USQS FAQs if you have questions.

As always, please feel free to send any questions or comments to ar@casact.org. ●

CAS STAFF SPOTLIGHT

Meet Ashley Givens, ACS Representative

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

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

I am one of the Administrative and Customer Support (ACS) representatives here at the CAS. I am most likely one of the first people that members and candidates will talk to when they contact us. First impressions are important, so I want to make sure that people know they are in good hands and that the CAS has their best interests at heart. ACS supports not only candidates and members — we support the entire staff with whatever they need.

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

The people I work with — the CAS is the best work environment I have ever had. When I first started, everyone on the team was super helpful and patient with me. There are endless possibilities with the training offered that gives my position more depth and allows me to gain more skills in my position. You should be fully comfortable in the position you are in and the organization that you work for. I love that our team gets together monthly for social events, giving us the opportunity to catch up on what is going on with each other and share stories

of our families and important life events. I look forward for this culture to continue and cannot wait to see what the years bring.

- **Describe your educational and professional background. What do you bring to the organization?**

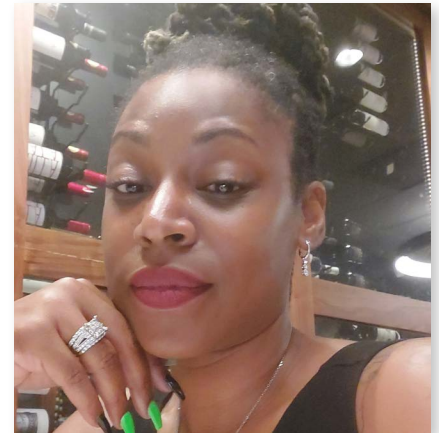
I have been working since I was 14 years old, starting my first job as a camp counselor. After high school, my career path led me to full-time positions at a law firm, a travel agency and Maryland’s Prince Georges County. Customer service was the first skill that I ever learned, and I believe it is a very important one. You learn to have patience with others and empathize with different situations whether they be good or bad. I feel that I bring a kind of positivity to the CAS that is unbiased and accepting. I’m grateful that as a child, I was able to meet and interact with people of all different backgrounds and walks of life. This taught me to accept people for who they are. I always want to treat people how I would want to be treated. That is one of my life’s mottos.

- **What is your favorite hobby?**

I love to spend time with my friends and family. I also like to bake and make resin art. It is therapy for me.

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

I am proud to say that my grandmother, Nannie Mae Hawkins, has



Ashley Givens

her name in gold as a memorial to her at the National Harbor in the Oxon Hill/Fort Washington, Maryland. This makes her the first and only African American to be honored at National Harbor. She came up with the idea for developing the National Harbor and worked with Prince Georges County council members and the landowner, Milt Peterson. National Harbor is home to the MGM Hotel and Casino, the Capital Wheel, Gaylord Resort and other fine establishments. I am proud to be a part of that legacy. Also, CAS Graphic Designer Sonja Uyenco and I graduated together from Oxon Hill High.

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

They would describe me as a crazy ball of loving energy who is always honest, takes her relationships very seriously and who absolutely loves love! I want everyone to be happy and know that they are important and they matter. My friends and family know I will always have their backs and treat them with respect. ●

Employers Ramp Up Exam Support for Latin American Students

By RAFAEL COSTA, FCAS, CHAIR OF THE LATIN AMERICA REGIONAL WORKING GROUP

We all know that taking and passing actuarial exams is difficult, requiring immense discipline and effort by candidates. In the U.S., employers commonly provide valuable support to their actuarial staff, including study hours, reimbursement of exam fees and materials, and financial rewards for achieving designations. Even with strong support and incentives, going through all the exams is a long and challenging process.

Now imagine going through the exams without any support from your employer. That was the reality throughout Latin America — until recently when some employers created CAS exam support programs for their actuarial staff. I interviewed two actuarial leaders who championed the creation of programs in insurance carriers in Brazil and Colombia, to learn about their motivations and the early results of their initiatives.

Alejandra Zaparolli, ACAS, is vice president and senior pricing actuary at Swiss Re Corporate Solutions. Zaparolli is based in New York and leads a growing team of actuaries based in Brazil.

Juan Moreno is head of reserving at Seguros Confianza, which is majority-owned by Swiss Re Corporate Solutions. Moreno is based in Bogotá, Colombia, and leads a team of reserving actuaries.

I was curious to understand what motivated Zaparolli and Moreno to champion the creation of CAS exam study programs within their organizations. Zaparolli mentioned that her employer already had study programs for actuaries in other regions, and in

Latin America there was a program for reinsurance actuaries taking Society of Actuaries (SOA) exams. She identified the gap and supported the expansion of the program to P&C actuaries interested in taking CAS exams. Moreno saw an opportunity to enhance the skill set of actuaries, to ensure that there is a strong talent pipeline that is prepared for future leadership roles.

With these programs being nascent in the region, I would have imagined that any support would be limited when compared to what employers have been offering to actuarial candidates in the U.S. for decades. However, I was pleasantly surprised when Zaparolli told me that the program in Latin America mirrors the benefits offered in other regions — including study hours and financial support for study material and exam fees. Financial rewards upon attainment of Associate and Fellow designations are offered as well, varying by region. Moreno added that he is also a proponent of strong mentorship to help students set clear goals with regular check-ins to overcome difficulties together — especially as Moreno is also currently taking exams. That enables the team to create mutual accountability and peer support, both in terms of learning syllabus material and in helping each other through the day-to-day responsibilities of their team.

Despite the expectation that these investments in talent will come to fruition in the long-term, when candidates achieve their CAS designations, both Zaparolli and Moreno said that the benefits are already emerging.



Alejandra Zaparolli



Juan Moreno

Moreno said that his team recently developed a risk transfer model for surety, where they had the opportunity to apply concepts that they learned in initial actuarial exams. The model went through a smooth approval with their regulator. Zaparolli mentioned that the study program has helped attract talent and is also the key to developing actuarial leaders, which is beneficial not only to the Latin American region, but to their global operations.

Zaparolli's and Moreno's efforts are extremely valuable, as they helped remove major obstacles that students in Latin America currently face when they consider pursuing their designations. We look forward to welcoming their co-workers in the region as CAS members soon! ●

CAS Hosts Second Annual China Summit By SHARON BURNS

The Casualty Actuarial Society (CAS) held a successful, day-long China Summit on November 17, 2023, in Beijing, China, with virtual attendance also available.

The summit addressed a wide range of topics relevant to actuaries practicing in China, attracting participants from across the insurance industry in China and abroad, including CAS members, candidates, academics and other insurance professionals.

This event, tailored for a Chinese audience and conducted primarily in Mandarin, marks the second time the CAS has hosted the event. Despite being at capacity for in-person attendees, the summit drew a substantial virtual audience.

The Summit agenda featured a dynamic lineup of speakers that covered a diverse range of topics, including the latest trends in electric vehicle insurance, autonomous driving and its impact to P&C insurance, how P&C insurers are coping with a government-sponsored health program, climate-related scenarios and cyber insurance. The Summit

that are to be implemented by January 2026.

The morning session commenced with welcome remarks and a message from CAS President-Elect David Cummings, who emphasized the growing importance of actuaries in an increasingly dynamic marketplace. The program included four hours of continuing

This event, tailored for a Chinese audience and conducted primarily in Mandarin, marks the second time the CAS has hosted the China event.

featured an IFRS 17 panel discussion with partners from PwC, Deloitte, KPMG and EY, who considered how to prepare for the adoption of new accounting rules

education credits for CAS members.

In addition to informative speakers, the event also included a celebration of new members, recognizing the 10 new



Ran Guo, FCAS, China Country Manager for the CAS, speaks passionately to the group about the CAS's Envisioned Future.



Delvin Cai, FCAS (partner at PwC) and Bin Yuan, FCAS (chiefactuary at Yellow River Insurance) look over the names of all past FCAS and ACAS designees from China.

Kelly Peng, FCAS, a host of the Summit, checks in for the event.



Left to right, Delvin Cai, FCAS (PwC), Winnie Sun, Ph.D. (Deloitte), Jeff Yao, FIA (EY), and Holly Ou (FIAA) in a panel discussion on IFRS 17. Moderator Ran Guo is at the podium on the right.

Associates and 13 new Fellows who earned their CAS credentials in 2023.

"The gross written premium of the China Property and Casualty insurance market was CNY 1,487.6 billion (\$209.1 billion) in 2022 and is expected to achieve a CAGR of more than 7% during 2021-2026," said Ran Guo, FCAS, China

country manager for the CAS. "The Zero COVID Policy, quick rise of the electric vehicle on the road, extreme weather, as well as adaptation of IFRS 17, are all new challenges faced by P&C insurers," said Guo. "The CAS is excited to host our first-ever, in-person event to address some of these issues."

Recordings of the China Summit sessions will be available in UCAS in January 2024. For any inquiries regarding this event, please contact the CAS International staff. ●

Sharon Burns is an independent consultant and writer living in Oakton, VA.

ANNUAL MEETING

Journey to the Top





1. CAS President Roosevelt Mosley bestows the presidential medal upon incoming CAS President Frank Chang.
2. Outgoing CAS VP-International Kendra Felisky (left) accepts a gift presented by CAS Chief Business Officer Joyce Warner on behalf of the CAS International Council.
3. Attendees enjoy the welcome reception in L.A.
4. The Annual Meeting Exhibit Hall always draws a crowd.
5. New Associate Natalie Marie Jacobsen strikes a pose at the CAS step and repeat.
6. President Mosley (right) Poses with new Fellow Simone Renee Beauford-Walker and her children, from left to right, Xander, Soleil and Xavier Walker.
7. From left to right, President Mosley, Dalesa Bady, President-Elect Chang, Zoe Rico and CAS President-Elect Dave Cummings make up the panel for the session "Town Hall with CAS Leaders: The Actuary of the Future."
8. A group of friends celebrate earning their designations. Left to right are Ilya Silik, ACAS; Rebecca Tardif, FCAS; Justine Cantin, ACAS; and Marie Vermette-Laforme.
9. Roosevelt Mosley stands with some of the recipients of the 2023 CAS Trust Scholarship. From left to right are Kevin Konop (University of Wisconsin-Madison), Daniel Polites (University of Illinois-Urbana-Champaign), President Mosley and Aimee Xu (UCLA).

NEW FELLOWS ADMITTED OR RECOGNIZED IN NOVEMBER 2023



Row 1, left to right: Colin Closson, Patrick Desjardins, Erica Wong, Amanda M. Wolfgang, **CAS President Roosevelt Mosley**, Lily Faye Cook, Kate Richards, Madison Bemis, Joshua B. Young.

Row 2, left to right: Rohan Ajay Bhale, Erik Millstine, Jie Xiao You, Stephanie Xi, Jacob Burns, Amanda Gao, Ningyuan Xu, Unidentified Fellow, Stephen Kane.

Row 3, left to right: Michael Olczyk, Rabi Ibrahim, Puneet Varier, Carter Burns, Jessica Hendricks, Daniel Muckenhirn, Mark C. Woods, Vincent Edward Anderson, Ryne Logan Dolney.



Row 1, left to right: Hannah Kramlik, Courtney Brooke Cote, Courtney Ward, Matthew James Imoehl, **CAS President Roosevelt Mosley**, Zachary Kevin Poole, Brian Patrick O'Connor, Molly Rachel Rozran, Kayleigh Donnelly.

Row 2, left to right: Mitchell Jeffrey Seeman, Jack Pipa, Ziwei Jiang, Xiaowen Feng, Puxuan Wang, Kevin Jacob Perlitsh, Rebecca Tardif, Jiande Li, Yeshaya Rosner.

Row 3, left to right: Sean Michael Murray, Alessandro Markovic, Robert Ryan Riesenber, Joshua Meyers, Emmanuel Davis, Justin Kwok, Marie-Christine Beliveau, James Martin Ang Uy, Benjamin Paul Bradley.



Row 1, left to right: Jean-Philippe Bergeron, Jennifer Jung, Meredyth Gwynn Hurlbert, Rachel Mallory Merrill, **CAS President Roosevelt Mosley**, Shira E. Stolarsky, Lei Huang, Veronica Chan, Clara Yam.
Row 2, left to right: Matthew Mark Moser, Daniela Paykin, Danielle Nantais, Joel Christopher Moseman, Erik Douglas Carlson, Kevin Boren Zhu, Jonathan Lim, Ke Zhang, Andrew Sena.
Row 3, left to right: Bradley Charles Koenen, Alvin Liu, Nicholas Edward Graves, Rhys P. Leonard, Sampson Lanier Eason, Daniel Gong, Xu (Howard) Han, Dalton Cowan, Bradley Hazelwood.



Row 1, left to right: Kelsey McGowan, Celeste Helene Bremen, Juhyun Shin, Brittany LaRocque, **CAS President Roosevelt Mosley**, Julia Caitlin Stella, Joseph Eichorn, Alexandra Walker, Jennifer Lynn Shah.
Row 2, left to right: Ernest Lin, Nitai Jagdip Patel, Jessica Rebischke, Erin M. Sharkey, Karla L. Jeggler, Tova Baharlias, Ildiko Ban, Laura Ann Saucier.
Row 3, left to right: Fan Feng, Nicholas E. Vogl, Kenneth G. Smart, Grant Armstrong, Jeffrey Reed, Ronald Wai-Hin Tsang, Arnav Vashishth, Andrew Michael Lear, Jeffrey Spahl.

NEW FELLOWS ADMITTED OR RECOGNIZED IN NOVEMBER 2023



Row 1, left to right: Nicholas Andrew Anderson, Jiajing (Jean) Ni, Joyce Wang, Vaishnavi Chandhiramouli, **CAS President Roosevelt Mosley**, Viviane Huynh, Xuan Chen, Catherine Chen, Matthew Arthur Garfield.
Row 2, left to right: Ryne Yamada, Taylor Williams Marrs, Thomas Michael Duncan, Megan Lynn Brown, Salvatore John Neglia, Otto Sung, Ying He, Kasey Ka-Chuen Ng.
Row 3, left to right: Erik Brandon Yost, Russell James Harmening, Simone Renee Beauford-Walker, Nicole Diana Harrington, David Allen Savoia, Luke Dale Merchant, Chingun Ganbold.



Row 1, left to right: Katherine Ann Curran, Lauren Caputo, Jennifert Nettnay, Olivia Anne Raymond, **CAS President Roosevelt Mosley**, Julia Giefer, Yiqun Liu, Weisi Si, Amber Munderville.
Row 2, left to right: Philip Warner, Arena Glenn Govier, Alison Wilkman, Jimmy Yu, Hsuan Wei Chang, Etienne-Olivier Dubord, Neli Tomova, Shuang Zhao, Frederick Andrew Bucher.
Row 3, left to right: Anthony Dery, Seth Shively, Sungwon Yeo, Francis Proulx, Matthew Kulczak, Colin N. Finch, Benjamin Carani.



Row 1, left to right: Cameron Zaisser Salter, Bryanna Seefeldt, Chun Wai Tsang, Roberto J. Perez, **CAS President Roosevelt Mosley**, Sarah L. Burns, Brittney Sheldon, Kaitlyn Cantrell, Catharine Grace Wadkins.

Row 2, left to right: Bruno M. Blanchette, Michael D. Brahm, Erik Allen Hostetter, Brent Anthony Hanson, Matthew D. Miles, Taylor Quinn Mitchell, Jessica N. Dumont.

Row 3, left to right: Saul Reuben Warhaft, Seong Won Jang, Andrew Justus, Patrick Alan Underhill, Frank George Desmond, Braeden Hamm, Kyle Casalla, Skylar Nicol.



Row 1, left to right: Lyndon Paul Wong, Allan Ouyang, Tianqi Yu, Joseph Anthony Sveda, **CAS President Roosevelt Mosley**, Joseph Drennan, Tommy Maltais-Lemelin, Elizabeth Mary Johnson, Zhuoxi Li, Catherine Budish.

Row 2, left to right: David Hu, Timothy Cheng, Chaofan Xu, James Matthew Carraher, Spencer D. Adams, Kristen Flens, Chipo Runesu, Lisa McSharry Lueling, Shayla Marie Carey, Raleigh Rebecca Miller.

Row 3, left to right: Joseph Tyler Krug, Jordan Ronald Paszek, Matthew Shockley, Paul Richard Davis, Kevin Morrison, Eric Brian Zange, Zachary Paul Westermeyer, Timothy David Benham, Nicholas Iwan, Rocco Joseph Bavuso.

New Fellows not shown: Nicholas Araujo, Talal I. Arimah, John Thomas Baier, Gregory Joseph Breda, James Vincent Chun-yen Chan, Wei Chen, Sen Yun Chin, Desmond Chong, Christian Costa, Onesime David Deha, Matthew Eliseo, Zhe Han, Andrew Hancock, Si Yuan He, James A. Henry, Jun Hu, Gen Bi Jin, Huiying Kang, John J. Klodnicki, Man Ho Lai, Jennifer Bishoff Leach, Dong Gil Lee, G. Ping Lee, Jake Ruben Levinson, Chen Li, Jianhua Liang, Lester Jongha Lim, Yun Ling, Dongdong Liu, Xiaoxia Liu, Ronni Luftig, Jing Jing Ma, Eric Matych, Cole William Meixner, Esti Hauptfleisch Melville, William George Melville, Nigel L. Millick, Varun Mulavineth, Jovana Thy Nguyen, Andrew R. Orlando, Robert Anthony Patronaggio, Vijay T. Persaud, Christopher A. Petty, Justine Power, Kethan Reddy, Quinn Bradley Saner, Megan Schlosser, Yanjun Shen, John Michael Soltys, Wei Sun, Khai Swen Tan, Wee Yen Kevin Tan, Shu Lei Tenh, Heather Renee Thompson, Erich Tjiawi, David I. Towne, Julie Tse, Jianqi Wang, Victor Wen Qi Wang, Mitchell Owen Wiemer, Qi Wu, Yue Xi, Weilan Xue, Mingyu Yang, Xiaoxi Yang, Jikai Yao, Man Fun Daniel Yeung, Woosuk Yoo, Fengzhu Zhang.

NEW ASSOCIATES ADMITTED OR RECOGNIZED IN NOVEMBER 2023



Row 1, left to right: Molly M. Ruhlman, Melanie McFaul, Jeremy Hirsch, John Ethan Galebach, **CAS President Roosevelt Mosley**, Melissa Epstein, Leah D'Astolfo, Lisa Marie Cannizzaro, Julie Cornett.
Row 2, left to right: Kord Campbell, Kwang Woo Kim, Tanner Downs, Joseph Burke, Justin R. Wood, Jean-Philippe Bergeron, Austin Bettle, Joshua Allen, Mallory Beard.
Row 3, left to right: Joshua Harrington, Brett Russell Howe, Daniel Burgess, Matthew Anderson, Jacob Alexander Arndt, Timothy Doyle, Benjamin T. Fisher, Isabel Block, Mason LaRock.



Row 1, left to right: Rohan Ajay Bhale, Evelyn Monica Leonardi, Michelle Lau, Yokey Zhiying Li, **CAS President Roosevelt Mosley**, Vincent Mark Yavorek, Briana Lynn Reed, Lauren Frick, Jeremy McGroder.
Row 2, left to right: Kashif Khalid, Tyler Mosher, Jeremie Lafortune, James Zixin Weng, Katrina Tanasovich Sonka, Weitao You, Sonil Gurbaksh Tappia, Danielle E. H. Dust, Keshav Pawan Mittoo.
Row 3, left to right: Montgomery Stenroos, Michael Schwab, Vincent Romero, Matthew A. McKenney, Keren Chheang, Vinson Chen, Mitchell Wasowski, John (Jack) Schmidt, Pujan Shah.



Row 1, left to right: Jeffrey Tam, Steven Willke, Bradley Arthur Waller, Megan Towne, **CAS President Roosevelt Mosley**, Esther Huah Wang, Juliette Isabelle Fraser, Alexander Peterson, Natalie Marie Jacobsen.

Row 2, left to right: Joshua Birck, Bradley Kent Wolfenbarger, Rebecca Roberts, Lei Guo, Gregory Aaron Dreyfus, Thomas Spankroy, Joseph Robert Michels, Alyssa Grove, Kathryn O'Connell.

Row 3, left to right: Matthew Beine, Ryan Todd Meade, Jaewoo Kim, Mark Ariel Karmiy, Roman Bryan Miller, Derek Howard Bock, Eric John Lee, Mark J. Larson, Paul Winslow Henning.



Row 1, left to right: Lawrence Toh, Adam Brudowski, Samya Rkieh, Ru Wang, **CAS President Roosevelt Mosley**, Esther Law, Di Wu, Andrew Kegel, Manushi Dhiren Patadia.

Row 2, left to right: Anthony Mele, Anna M. Schmidt, Jonathan Chen, William Paul-Bryant Harvey, Riley Jones, Tamara Beecroft, Charles Robinson, Tyler Jenkins, Daniel Joel Bloom.

Row 3, left to right: Keenan Allen, Douglas Hung, Daniel Knight, Atharv Ranjit Gupte, Benjamin Phelon, Ziqing Zhang, Jacob James Prasch, Chad Hoke, Grant Randall Steffen, Kevin Hoang Nguyen.

NEW ASSOCIATES ADMITTED OR RECOGNIZED IN NOVEMBER 2023



Row 1, left to right: Xiaoli Wang, Abby Marsh, Jessie Huang, Carolyn Amber Schwartz, **CAS President Roosevelt Mosley**, Nathaniel Luke, Nick Inkrais Witrans, Huilin Chen, Harry II Suk Hong.
Row 2, left to right: Jeremy Thomas Gensel, Maazuddin Ahmed, Raza Pervaiz, Katherine (Katie) O'Donnell, Honglin Li, Gina Ferolito, Qianqian Wang, Nechama Florans, Jamila Jones.
Row 3, left to right: Dylan Robert Blake, Jesse Marass, Andrew Craig, Lexi Rosengrant, Daniel Polhamus, Justin Young, Ryan Lebens, Lukas Button, Saleh Cheema.



Row 1, left to right: Sarah Saulcy, Rismika Malhotra-Dhir, Erin Williams, Sharon Eileen Repine Sakorafos, **CAS President Roosevelt Mosley**, Paige Bailey, Yifan Zhang, Christina L. Cuff, Emily Kyler.
Row 2, left to right: Justin Choi, Christine Hovermale, Frankie Tang Logan, James Kroll, Alex DiVerde, Preston Kavanagh, Andrew Hayes, Joseph David Van Engen.
Row 3, left to right: Austin Souza, Jonathan Harwood, Brent Garrett Weaver, Terrance Timothy Chang, Justine Cantin, Ilya Silik, Tyler Eugene Ruger, Kaelan M. McPeek, Samuel Jules.



Row 1, left to right: Miaoqi Liu, Jing Shi, Amanda Ruth Bruder, Julie Araniyasundaran, **CAS President Roosevelt Mosley**, Thuy Nguyen, Shuangjia You, Munhee Kim, Humberto Viana.
Row 2, left to right: Thomas Lavoie, Camille Simard, Alexander Gia An Phung, Taylor Deacon, Cheng-Yen Lu, Dara Lakin, Justin DeLuzio, Francis Richard Baccare, Anhtuan Tran, Julia Kosta.
Row 3, left to right: Jacob Shea, Luke Robert Musgrave, Navin Haresh Vigneswaren, Nathaniel Leo DeRousse, Deng Pan, Calloway Henry Skwerski, Jose Joaquin Camara, Jianzhen Jenny Wang, Lauren Morell.



Row 1, left to right: Mital Sivananthan, Enyan Joann Yu, Nan Wang, Xiang Li, **CAS President Roosevelt Mosley**, Ruolin Cai, Jenna Shea, Norah Diane Bacho, Zuqin Chen.
Row 2, left to right: Arpita Shah, Elizabeth Greco, Chloe Cheung, Hailey Young, Maria Tsyarkin, Diego Alejandro Rodriguez, Cullen Zimmer, Eli Aberbach.
Row 3, left to right: Andrew Han, Mark Khaimov, Simon Geist, Jack Richards, Nathan Engelhardt, Brandon Florizone, Nils Drew Mollenkamp, Paul Song.

NEW ASSOCIATES ADMITTED OR RECOGNIZED IN NOVEMBER 2023



Left to right: *Joshua Anderson, Ellie Nicole Greiber, Emilie Anderson, CAS President Roosevelt Mosley, Suyu Wu, Jacopo Marchesan, Nadeem Shivi.*



Left to right: *Alan Joseph Tatro, Eva Shinikova, Benjamin Lawyer, CAS President Roosevelt Mosley, Evan Dean Resuali, Morgan Twardowski Frisch.*

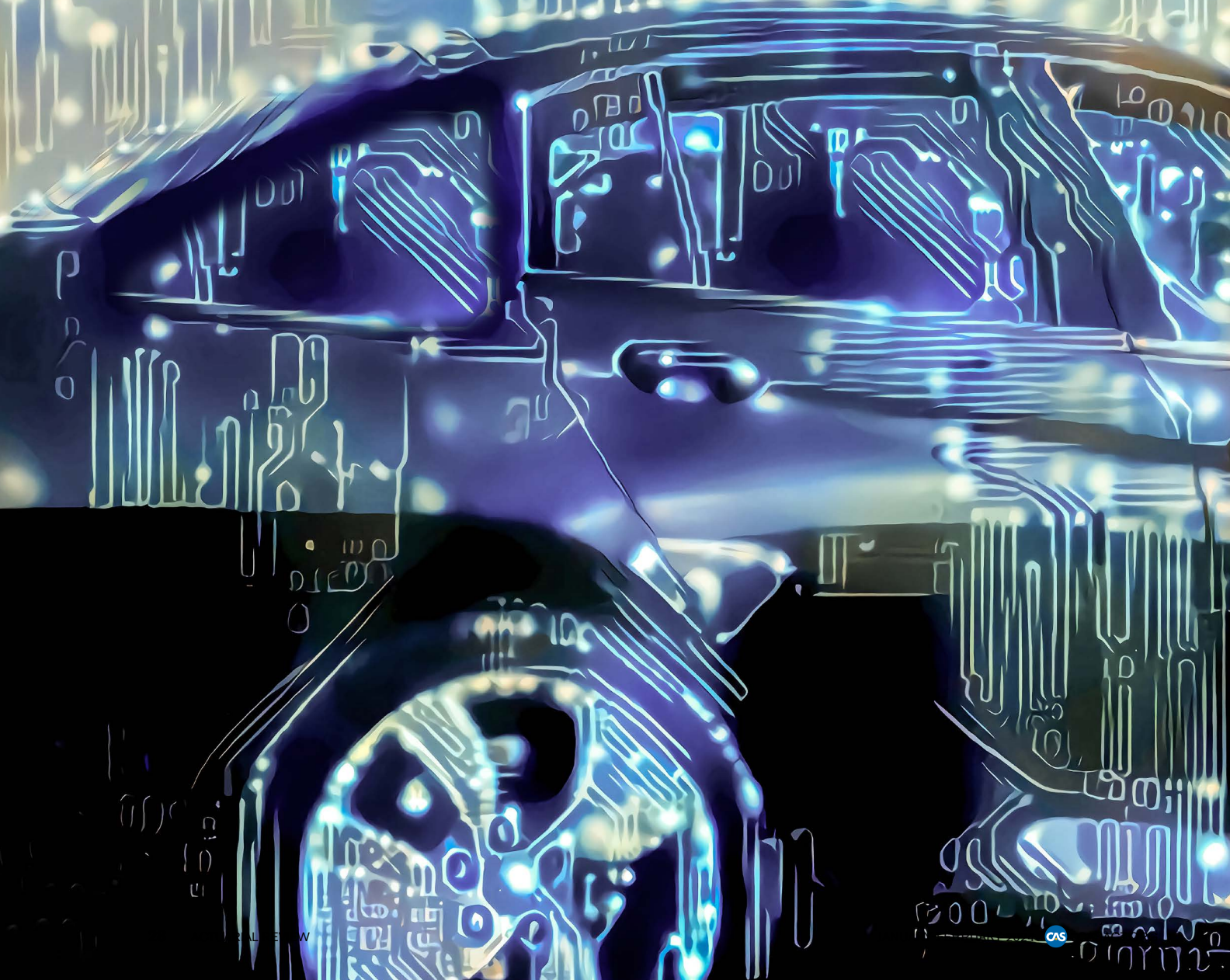


Left to right: Valeriya Konovalov, **CAS President Roosevelt Mosley**, Sabrina Chalab, Yun Ya Xiao.

New Associates not shown: Robert E. Allen, Meenu Arora, Joycelyn Aryeetey, Ahmed Bin Asad, Jan Milan Bakaj, Eric Joseph Bayer, Kwabena Boateng, Zachary Boaz, Tim Bonner, Nan Bottolfsen, Nicholas Bragman, Naomi Brehm, Cullen Joseph Brownson, Xu Chen, Nigel Cheung, William Conover, Le Deng, Samantha DeQuarto, Meiting Du, John Filippini, Jason Friedlaender, Kyle Genteman, Yong Sen Goh, Kongpot Hannirunkoor, Angelina Marguerite Harm, Steven Heinichen, Harrison Hott, Mengxuan Hou, Junfei Hu, Yinran Huang, Muhammad Humza, Daniel Michael Imperato, Ayesha Khan, Dung Nguyen Hanh Kieu, Brandon Kleinmann, Eric Larson, Thien Quang Le, Daniel Lee, Geyijie Li, Patrick J. Linn, Binjie Liu, Hon Ho Liu, Pak Ho Alex Lun, Thomas Lorenzo Lydston, Jenna Markovic, Katie Elizabeth Mason, Jarrod Mikolajczyk, Robert Daniel Moser, Andrew Muelleman, Martin Munoz, Evelyn Vanessa Mutagaywa, Sier R. Nie, Shannon Osterfeld, Chirag Patel, Neel Patel, Lanlan Peng, Yik Shen Pui, John W. Richards, Gavin Roswarski, Shariq Sadiq, Adiel Sanchez, Myung Won Seo, Zachary Shapiro, Alexander Shepard, Tristan Shute, Zhangzhida Song, Wee Yen Kevin Tan, Emma Taylor, Ashley Lauren Thompson, Jason Wang, Kan Wang, Chaunse Athaus Willis, Po-Hung Wu, Soo Gin Yap, Hayeon Park Young, Lingxiang Yuan, Li Zhang, Chunhua Zhi, Misbah Zuberi.

THE TECH IN OUR CARS

By ANNMARIE GEDDES BARIBEAU



Technology makes cars safer and more convenient to drive but also introduces higher repair costs and new risks.

Oh, the promise of technology! Car enthusiasts and consumers alike appreciate technology's shiny attributes. Whether offering better safety, convenience or just plain fun, car technology can also introduce unintended consequences, tipping the risk equation for better or worse.

For years, auto manufacturers have continually transitioned cars from mechanical machines to computers on wheels. The smarter the vehicles, the more expensive they can be to fix.

Auto repair costs were already climbing before the COVID-19 pandemic. Early in the pandemic, the lockdowns significantly reduced frequency, but claim severity escalated for many reasons (*AR* November/December 2023). As Americans log more miles on the roads, claims frequency will likely climb, and along with continuing high severity costs, will pressure losses.

Such developments are not promising when the personal auto line's direct incurred loss ratio continues to climb. For 2022 and 2023, the dominant trend indicator of industry losses was in the 1970s, according to A.M. Best. Double-digit rate increases have helped tame the combined ratio. Still, more consumers are reducing coverage or dropping it altogether, increasing the population of underinsured and uninsured motorists.

While addressing this currently unpredictable line, actuaries must also look ahead as technology moves forward faster than ever. "We know tech has been improving, but we do not know where and how it is going to change," said Jonathan Charak, vice president and emerging solutions director of sustainability underwriting at Zurich North America.

The next 10 years will be like no other in auto insurance history, Martin Ellingsworth, president of Salt Creek Analytics, predicted. "New vehicles are more expensive and have materials and technologies that will require additional people, processes and technology to service, maintain and repair. That will keep the pressure higher on the insurance markets to

solve for future claims cost drivers."

This article is part two of a two-part series examining the conditions impacting the personal auto insurance industry. The first article explored how the line moved from healthy to unprofitable (*AR* November/December 2023). Here, *Actuarial Review* takes a deeper dive into the potential impact of automobile technology along with insurance affordability.

Repair ramifications

Experts agree that car repair expenses are significantly pressuring losses. Car repair costs rose by more than 5% from calendar year 2019 to 2020, escalating to double digits during 2021 and 2022, according to CCC Intelligence Solutions (CCC).

There is also a glimmer of relief. Although the average cost of repairing a car during the first half of 2023 is the highest ever at about \$4,400, the rate of change from 2022 to the first half of 2023 declined by 4.8%. (See Figure 1.)

However, the contributors to higher repair costs, especially for technology, are expected to pressure premiums, experts agree. "Greater vehicle complexity plays a significant factor in the rising cost of repairs," said Kyle Krumlauf, director of industry analytics at CCC. "The average vehicle today is equipped with 1,400 semiconductors and dozens, if not hundreds, of sensors and cameras," he explained. Costs are also associated with the level of sophistication of parts, such as headlamps, and the integration of ADAS technologies.

Generally, cars with the most tech — whether they operate with internal combustion engines (ICE), electric motors (EVs) or have many advanced driver assistance systems (ADAS) features — tend to be luxury models that are more expensive to repair, said Xiaohui Lu, vice president of global business development for LexisNexis Risk Solutions.

ADAS to the rescue?

According to studies by the Insurance Institute on Highway Safety (IIHS), ADAS parts that the organization calls "collision avoidance technologies" can significantly reduce accidents and claims.

Despite promising results, there is not enough ADAS

on the road to significantly reduce accidents, said Matt Moore, senior vice president at Highway Loss Data Institute (HLDI), IIHS's sister organization. "The Advanced Driver Assistance Systems currently deployed in the fleet, while shown to reduce insurance losses, are not enough to compensate for the factors putting upward pressure on claim frequency when looking at all crashes (and) claims," he added. Depending on the ADAS, it will take nearly a decade to a generation before the safety systems reach 95% of registered vehicles in the United States, according to HLDI research.

While recognizing the value of ADAS for reducing accidents and frequency, Roosevelt C. Mosley, principal for Pinnacle Actuarial Resources, said actuaries and insurers are asking the same question: "Does the decrease in accidents offset claims severity when a claim does happen?"

Everyone acknowledges the safety benefit for humanity, he said. "However, if ADAS costs insurers more, then you can argue it will not meet consumers' expectations that as vehicle safety increases, insurance premiums should decrease. If ADAS costs insurers more, consumers will pay for it."

Unfortunately, Mosley said, "safety devices were not designed with ease of repairability in mind." However, there are some preliminary discussions with auto manufacturers to change that, he added, but it will take years before those changes will be in new cars.

Calibration also is necessary to ensure ADAS is working to its potential. Based on the higher incidence of post-repair issues, auto repair workers struggle with calibration, according to an IIHS study. About half of the vehicle owners with at least one of their ADAS applications repaired indicated system issues after job completion.

Autonomous ADAS

The quest for auto autonomy

The quest for auto autonomy is contributing to different results than what was promised about 10 years ago.

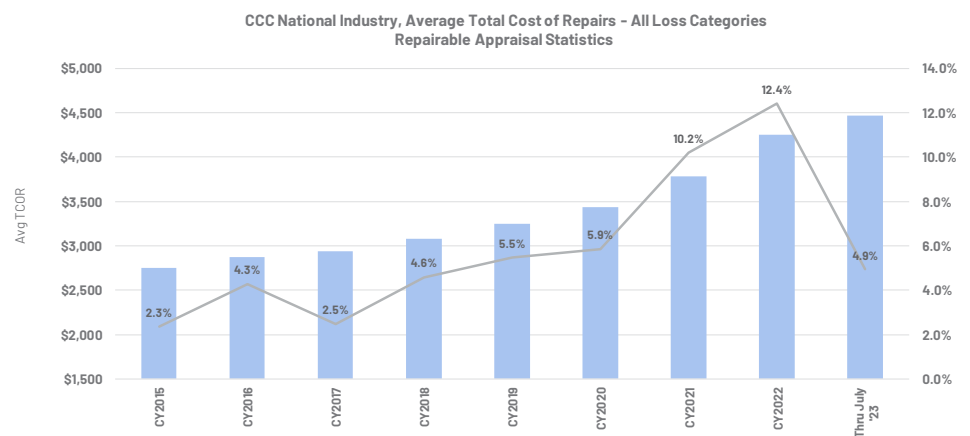
is contributing to different results than what was promised about 10 years ago. Back then, public policymakers and the general public were often told that 90% to 93% of accidents were due to human error and that automated vehicles would reduce auto accidents. (AR Driverless Utopia, May/June 2018) The Casualty Actuaries Society's autonomous vehicle task force refuted aspects of the claim in 2014.

Some cars feature automated ADAS, which the Society of Automotive Engineers categorizes as Level 2 for vehicles that can simultaneously control steering, acceleration and deceleration. Adaptive cruise control and lane centering features create a partially automated driving experience.

So far, there is little if any evidence that these Level 2 systems improve safety, but they can introduce new risks. "The problem is the better that the systems get, the more likely people will rely on the system, and the overreliance will lead to additional crashes," said Greg Brannon, director of automotive research at AAA. "The challenge for insurers is to think about how to deal with this," he added.

The more cars become automated, the more difficult it is to determine who — or what — is driving. "This uncovers a whole new set of issues," Brannon said. Lane-keeping assistance, for example, introduces risk, he observed, because

Figure 1.





it can fight drivers for vehicle control and confuse who has responsibility for driving.

Partial automation encourages motorists to drive faster and engage in more distracting behaviors, David Harkey, president of IIHS and HLDI, told members of Congress on March 2023.

Meanwhile, there is concern that some manufacturers may have oversold the capabilities of their automated systems, misleading drivers to believe that the car can drive independently without assistance. Two specific examples are Tesla's "Autopilot" feature and General Motors' "Supercruise." In response, IIHS is developing a rating system that measures the effectiveness of safeguards to ensure drivers are keeping their eyes on the road and their hands are either on the wheel or ready to grab it.

The National Highway Traffic Safety Administration (NHTSA) is also tracking the safety of automated systems, Brannon said. The federal agency published a new standing general order in 2023 that calls on specific automakers to report crashes if Level 2 ADAS was used within 30 seconds of a collision under circumstances such as accidents causing fatalities or requiring medical treatment.

Because the driver must intervene with automated systems, manufacturers urge customers to keep their hands on the steering wheel and pay attention. Before the introduction of partial autonomy in vehicles, it probably would not have occurred to drivers to let go of the wheel in the first place.

"We do not believe in the promise of technology to replace drivers completely and for the vehicle to assume all responsibility for vehicle operations," Harkey told Congress because the cars cannot and might not be able to handle every situation that arises.

Cars closer to being fully autonomous may not be ready for prime time either. Last summer, a fleet of Chevy Cruisers was introduced in San Francisco as a public transportation

option. After several mishaps, the pilot program was canceled in October after a Cruiser hit a female pedestrian and dragged her 20 feet across the road.

EVs charging forward

Promising to improve the environment, electric vehicles (EVs) are growing in popularity. Besides attracting the interest of environmentally conscious consumers, public policymakers are encouraging automakers to put more EVs on the market.

As of second quarter 2023, there are about 3.7 million EVs in the United States, according to the Alliance for Automotive Innovation. More than half of EVs are luxury cars with more safety-enhancing ADAS features, said Lu of LexisNexis Risk Solutions. In contrast, China has 16 million EVs. The majority of them would be considered economy cars in the U.S. market.

More affordable EVs could be coming into the U.S. market within the next couple of years from both domestic and international automakers. NIO is just one Chinese auto manufacturer that plans to sell their vehicles in the United States.

EVs introduce new unknown factors and risks. The powerful torque instantly delivered by EV motors, for example, makes the cars accelerate faster when starting and could lead to parking lot accidents and speeding, Lu said. Drivers new to EVs need to retrain their muscle memory and become more accustomed to the different handling of the cars, due to factors that include regenerative braking, higher weight, and more powerful torque, he added.

In China, EVs have much higher risk than new ICE vehicles, and it takes about three years for the risk gap between EVs and ICE vehicles to narrow out gradually, he added. The latest research by LexisNexis shows a 31% higher paid claims cost for new EVs in the U.S. market.

Economy EVs in China have less powerful torque and shorter ranges, resulting in fewer accidents and less expensive repairs, Lu said. EVs are also vulnerable to battery damage

because the batteries are bulky and make up much of the bottom of the vehicles, Lu added. Even a scratch of the packaging could allow water to get inside the battery packs and short them.

Then there are the fire hazards. A National Transportation Safety Board study reported that firefighters risk electric shock when putting out blazes caused by lithium-ion batteries. Besides being a concern for auto insurance, EV batteries are also a property risk, Charak of Zurich said. “There is also a (fire) risk of charging stations at office buildings and homes,” he added, asking, “How does it change the risks of those locations?”

What is known about electric vehicles is that they generally cost more to fix than conventional, or ICE, vehicles. Mosley said that most of the auto insurance industry's knowledge about EVs stems from Tesla data. He added that there are not enough electric vehicles from other manufacturers to provide the best price coverage for EVs.

Even Telsa, which offers insurance in five states, “realizes that insurers were not crazy when they were not discounting insurance premium for Tesla cars as much as the auto manufacturer thought it should be,” Mosley said.

Electric parts of EVs are likely integrated into high-level assembly, Lu explained, making it difficult to fix individual parts and more likely that parts will be replaced as a whole, leading to expensive repairs. On the other hand, EVs in the Chinese market have similar claim severity as ICE vehicles, suggesting that design differences matter in repair costs and physical damage/property damage liability severity.

How quickly Americans will switch to electric cars remains to be seen. “Manufacturers are reducing or delaying production of EVs due to lack of demand,” said Louise Francis, president of Francis Analytics.

Despite subsidization, many Americans consider EVs to be unaffordable (see sidebar). “Moreover, the efficiency of charging electric vehicles is far below that of gas powered or hybrid vehicles. Even at fast-charging stations, a full charge takes at least half an hour and can take a lot longer depending on the type of charger, how fast the car is capable of charging and the length of the wait at the charging station,” she added.

Conclusion

Although insurers can deploy cost containment measures, the reality is that barring an unforeseen disruption, insurers and consumers will likely continue to bear much of the cost of

Affordability concerns

Realizing more safety ADAS and transitioning to EVs into the U.S. fleet largely depends on the willingness and ability of consumers to purchase vehicles with more technology.

However, Americans are holding on to their cars nearly four years longer than they did a generation ago. In 2023, the average car age was 13.6 years, up from 9.9 years in 2003, according to S&P Global Mobility.

Experts offer several macro trends to explain why Americans hold on to their cars, but one rarely mentioned explanation is personal finance. Car ownership is becoming increasingly expensive and unaffordable for many Americans.

According to a study by AAA, the average annual cost to own and operate a new car in 2023 is \$12,182 — compared to \$9,666 in 2021. Consider that in 2022, the median household income declined by 2.3% to \$74,580, and the average cost of a used car was \$26,213, according to Kelley Blue Book. New economy cars can range anywhere from \$40,000 and up, and the price tag for luxury vehicles is at least \$60,000.

Meanwhile, consumers feel the pinch of rising premiums for personal auto coverage and repairing cars. During the first half of 2023, 12 states reported a 30% or more increase in the share of uninsured drivers compared with the second half of 2022, J.D. Power reported in September. However, in five states, uninsured drivers decreased by more than 30%.

According to a survey by Jerry released in August, 23% of respondents indicated they settled for less coverage than they thought needed. About one in five chose a higher deductible in the past 12 months. Repairing and maintaining cars is also getting more difficult for consumers. Respondents in a survey by FinanceBuzz said the median availability of money to fix their cars was \$765.

continual technological evolution in vehicles and other factors pressuring insurance costs. ●

Annamarie Geddes Baribeau wrote this article as an insurance consultant. She is now the research manager at the CAS.



CAS University Recognition Program

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The AI Cheat Code: How ChatGPT (and AI Tools) Will (and Won't) Forever Alter Human Work

By NICK WITRAS

Alex Salkever — co-author of the books *Your Happiness Was Hacked: Why Tech is Winning the Battle to Control Your Brain* — *And How to Fight Back* and *The Driver in the Driverless Car: How Our Technology Choices Can Change the Future* — was the featured speaker at the CAS 2023 Annual Meeting.

In these books and in dozens of articles published online, he explores exponentially advancing technologies such as robotics, genomics, renewable energy, quantum computing, artificial intelligence, open-source software, drones and driverless cars.

Salkever served as a technology editor at BusinessWeek.com and as a guest researcher at the Duke University Pratt School of Engineering.

He opened his remarks by presenting the background behind the rapid growth of artificial intelligence (AI). Throughout history, technological growth has always been exponential. He presented examples starting with the invention of electricity, followed by the radio and mobile phones. The latest technology is AI, the most familiar example of which, ChatGPT, amassed 200 million users in just three months.

He attributed this rapid growth to four factors that are all constantly being improved every year: computing power, networks, sensors and data. Over time, technologies that were once cost-prohibitive are now affordable. Salkever cited gyrometers as an example; once bulky and expensive, now anyone can buy one for a few dollars. As a result, the

volume of data available for machine learning has soared.

He noted the increasing number of jobs in which AI performs better than do humans. However, we do not need to worry just yet. Salkever presented the three stages of human work that AI attempts to perform:

- **Basic** work entails writing emails, blogs, basic research, creating Excel formulas, writing computer code and creating images, videos and text.
- **Medium** work involves creating business plans, performing detailed research, writing simple computer programs and building websites.
- **Advanced** work includes negotiating among multiple parties, writing entire computer programs, autonomously creating businesses, navigating complicated systems and conducting original research.

Despite news of AI doing hard math optimization and passing difficult tests such as bar exams and medical licensing exams, Salkever asserted that AI technology today can only do basic work and has a long way to go before it can perform more complicated tasks.

He used the calculator as an example. Did it replace accountants? Actuaries? Of course not. On the contrary, he shared two illustrative use cases for how AI would help us at our work:

- With more free time, we can do more work.
- AI helps less-experienced workers to learn their jobs.

Despite these benefits, Salkever re-

minded us of the risks and limitations of AI systems. Just like any other algorithm, AI is only as good as the data it is given. Any bias in the output reflects the bias already present in the input. He said, “AI does not understand people, gender and physics” and can sometimes produce nonsensical results.

AI misuse is also rampant, and Salkever pointed to the example of Cigna using AI to deny hundreds of thousands of claims without any second-level human review. Further, he emphasized that AI does not understand the concept of truth, and therefore does not filter lies.

Salkever cautioned against over-reliance on AI — it is dangerous and can lead to the loss of repositories of public knowledge. He used navigation as an example: When was the last time you drove anywhere without the GPS?

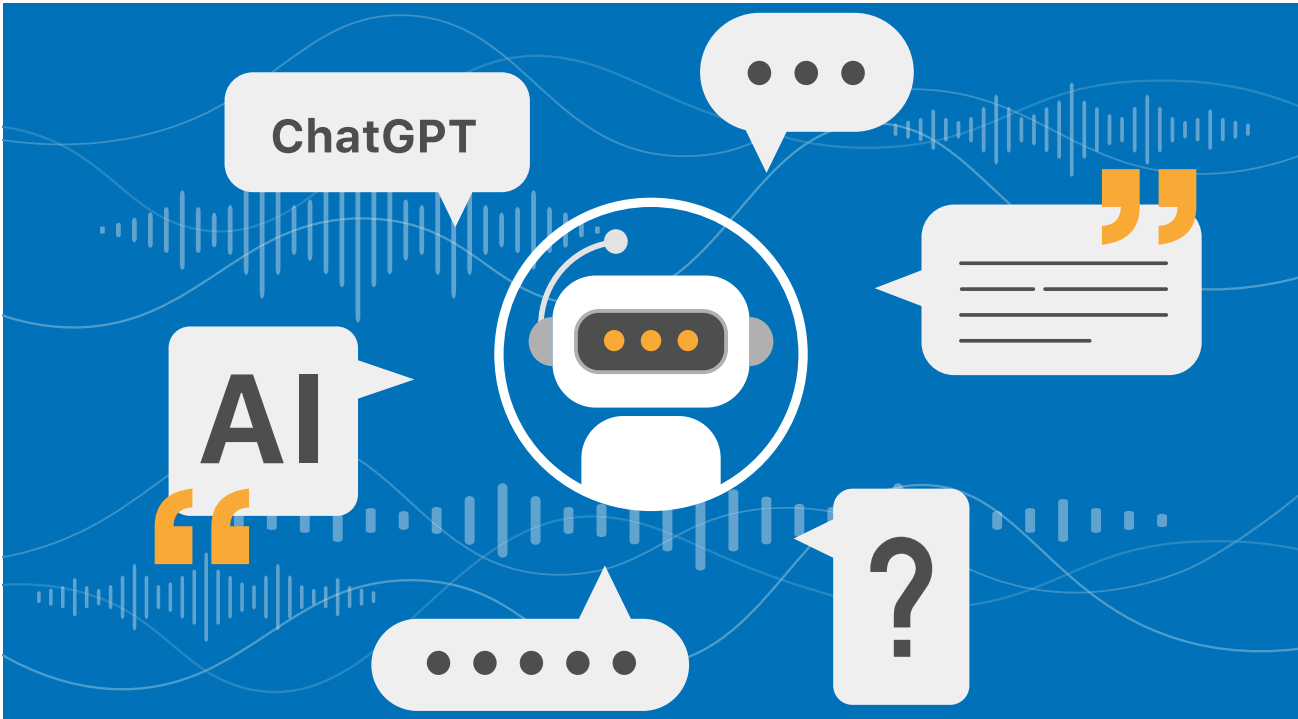
He closed by sharing several ways AI is already in use today, such as:

- Transcribing meetings.
- Analyzing long documents.
- Conducting initial business research.
- Business writing.
- Infrared inspecting of vegetation through satellite scan when power lines are knocked down.
- Creating better risk models (e.g., Kettle).

At the end of the session, there was a Q&A that has been paraphrased below for brevity.

Q: What insurance problems do you think AI will solve?

A: Mitigating climate risk, health insur-



ance assessment and microinsurance.

Q: Are AI training sets mostly in English? If yes, would bias exist?

A: Yes, this is a known problem. Most of the dataset is from the West. An example of how this bias is addressed is in China, where Chinese citizens are portrayed as equals without a class system. Another approach is textbook learning with smaller large language models, such as the one Microsoft is using.

Q: What are your thoughts about adding quantum computing to AI?

A: It is too early; the applications are limited for now. When it happens, it will turbocharge AI. We will have much faster problem solving, leading to new problems we have not even thought about. The problems of the future are going to be some version of, “What questions should I ask?” instead of, “How can I solve this?”

Q: What are your thoughts on data protection with respect to using AI for personal versus business use?

A: I am skeptical of disclaimers. While it is hard to pull private data, AI could, given the right prompts, theoretically still do it. For now, be cautious with private data, and definitely do not enter it in public AI systems.

Q: Would over reliance on AI make our skills weaker?

A: Definitely. There are studies that show how the section of the brain responsible for geospatial navigation gets atrophied because everyone uses the GPS even for driving short distances nowadays. Therefore, outsourcing swaths of our core knowledge is bad.

Q: Has there been an increase in gatekeeping information from AI?

A: 100%. Big organizations are getting their data scraped by GPT, and it is now

a battle royale for data. Many of the existing problems with AI are caused by it being trained on social media — a sub-optimal training source.

Q: Are there intellectual property issues related to the use of AI, such as copyright/trademark infringement?

A: There are. However, the providers of AI such as Microsoft, Adobe, etc. have clauses that will indemnify you in the event you are sued for using their AI. The question now is: What constitutes fair use? ●

Nick Witrás, ACAS, MAAA, is a member of the Actuarial Review Working Group. Witrás is a senior actuarial analyst for Chubb. Witrás is a radar expert, crypto enthusiast and automation innovator.

Dream or Nightmare? California’s Earthquakes, Floods and Wildfire

By DALE PORFILIO

Taking a cue from its Los Angeles location, the CAS 2023 Annual Meeting included two general sessions focused on California’s market. The Tuesday morning’s session, “California Dreaming: Earthquakes, Wildfire and Floods,” focused on the three highest-profile perils in the state: earthquakes, floods and wildfire. California is the largest insurance market in the U.S., and these three perils are all low-frequency, high-severity events. This contributes to the challenges of adequately pricing and underwriting insurance to cover these risks.

The Federal Emergency Management Agency (FEMA) designed and built the [National Risk Index \(NRI\)](#) for 18 natural hazards. Per the [FEMA website](#), “The NRI is an easy-to-use, interactive tool that shows which communities are most at risk to natural hazards. It includes data about the expected annual losses to individual natural hazards, social vulnerability and community resilience, available at county- and Census-tract levels.” In short, FEMA has created a powerful resource for anyone involved in any aspect of catastrophe management.

The general session moderator and speakers used the NRI as the framework for their presentations. Session Moderator Carl Ashenbrenner, FCAS, of Milliman, Inc., opened with an overview of the NRI that included several maps highlighting the significant amount of exposure value and expected annual losses (EAL) in California for all hazards. He then introduced the three speakers: Shawna Ackerman, FCAS, from the

California Earthquake Authority (CEA); Andy Neal from Aon; and Sheri Scott, FCAS, CSPA, from Milliman, Inc. Each speaker focused on one of the perils.

Ackerman led off with a deep dive on earthquakes. The NRI includes EAL modeled using Hazus 6.0. Two-thirds of the U.S. earthquake EAL occurs in California, and 78% in the combined Pacific Rim states of California, Washington and Oregon. She highlighted the notorious San Andreas fault running east of L.A. and a network of over 100 other faults across the region. Based on return periods from prior events, Southern California is overdue for a major earthquake.

With that background, Ackerman then segued into the insurance aspects of this unique peril. Most importantly, mortgage lenders do not require homeowners to purchase earthquake coverage. So, the “take-up rate” on earthquake insurance, which primarily covers losses caused by shaking, has hovered between 10%-15% from 2002-2022 after peaking above 30% following the Northridge earthquake in 1994. (See

Figure 1.) Note that fire losses following an earthquake are covered by traditional all-perils homeowners policies, and tsunami losses are covered by flood policies.

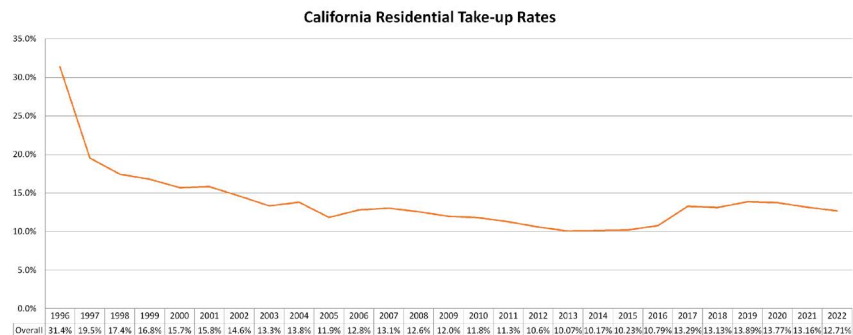
She concluded her presentation by recounting the public policy and insurance industry responses after major California quakes, which are of particular interest for students of history. The timeline started from the great 1906 San Francisco earthquake, which spawned the state’s first monitoring program, and ran through the 1994 Northridge event, which led to an availability crisis and creation of the CEA as a public-private partnership. Today, the CEA provides two-thirds of the residential earthquake insurance policies sold in California.

Neal then shifted the conversation to flood risk, given his experience at FEMA and involvement in the creation of the NRI. In contrast to earthquake and wildfire perils, riverine flood EAL in the NRI is based on historical data instead of a prospective risk model, which can lead to an understated view of risk in areas

Figure 1.

Earthquake Insurance Coverage

“Take-up” is the number of earthquake policies / number of residential insurance policies



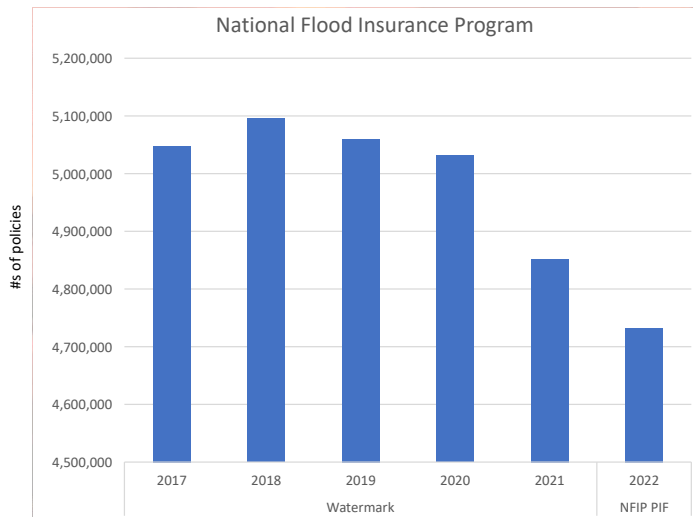
where the historical record lacks representation of larger, less frequent flooding. That said, the recently implemented Risk Rating 2.0 was FEMA's attempt to bring actuarially sound risk-based pricing to the National Flood Insurance Program (NFIP) using prospective private sector and public sector risk models.

His brief history of flood risk emphasized key events following severe river floods or major hurricanes. For example, an 1862 river flooding led to the nation investing in significant levees around major waterways. Flood risk in California derives most prominently from its many rivers, most notably in the central valley, so levees were built around much of the state with mixed results. After the 1927 Great Mississippi River flood, the nation began to adopt a more holistic approach, including floodplain management and structural [retrofitting](#) for mitigation.

After major southern hurricanes in 1962 and 1963 led to an insurance availability crisis, the Federal Flood Insurance Act of 1968 led to the creation of the NFIP. For the next 50 years, the NFIP was the primary U.S. insurer of flood risk, although take-up rates nationally were very low. Homeowners in designated flood zones were required to purchase the coverage, but the take-up rate even in these zones was still not universal. As captured in Figures 2 and 3, the private market for flood coverage has grown in the last five years, while the NFIP's market share has declined. The growth of the private market may account for some of the NFIP's decline.

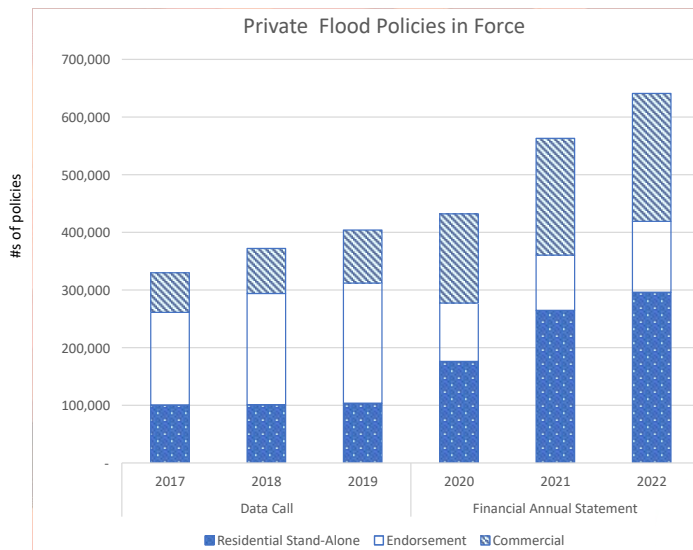
Scott then delved into the complexities of wildfire risk. California has the highest wildfire EAL of any state. The number of severe wildfires is increasing with climate change, more

Figure 2.



Source: NFIP Watermark Statements <https://www.fema.gov/flood-insurance/work-with-nfip/watermark-financial-statements> and NFIP Policies in Force (PIF) Rolling History as of 9/30/2023 Force <https://nfipservices.floodsmart.gov/reports-flood-insurance-data>.

Figure 3.



Source: NAIC Private Flood Insurance Data Call https://content.naic.org/industry_private_flood_data_call.htm 2020 through 2022 from Policies In Force end of CY from Financial Annual Statement Data, 2018-2019 from Policies in Force end of CY Data Call, 2017 from Policies in Force end of PY Data Call

residences being built in the wildland urban interface (WUI) and increases in the replacement costs of homes. Relying on historical data solely will underestimate the statewide prospective risk and over- or understate the prospective risk

of individual structures, depending on whether or not they have been in the footprint of prior events.

Unlike earthquake and flood, wildfire is covered by standard all-peril homeowners' insurance policies. This

requires every insurer writing this coverage to invest in the expertise to appropriately price and underwrite wildfire risk along with other, largely unrelated perils. Wildfire risk contributors include:

- Territorial considerations, including location and proximity to wildlands.
- Property-specific characteristics, including slope, fuel, access, precipitation and winds.
- Structural considerations, including roofing, eaves, vents and windows.

Scott described how the current state of California’s insurance market has been impacted by the following public policy events:

- The 1968 establishment of the California FAIR¹ Plan to address availability challenges after a series of fires in Southern California.
- Passage of Proposition 103² in 1988, which required admitted property insurance rates to go through a prior approval process with the California Department of Insurance, with provisions deeming the rates approved after 60 or 180 days, depending on details laid out in [the legislation](#).
- California Code of Regulations (Regulations) which required catastrophe rates to be developed using 20 years of an insurance company’s historical catastrophe losses and which did not allow the insurer to recover the net cost of reinsurance in catastrophe rates. These Regulations allow earthquake and fire

following earthquake rates, but not wildfire rates, to be developed using catastrophe models and to consider reinsurance costs.³

Scott suggested updating these outdated Regulations as part of the solution to the California property insurance availability crisis, which was created as a result of insurers not being able to keep up with the cost of providing wildfire insurance. However, the outdated Regulations are only part of the problem.

Even with updated Regulations that allow insurers to use catastrophe models to recognize the wildfire exposure more accurately and give insurers the ability to include the net cost of reinsurance in wildfire rates, there is little relief to insurers being able to charge adequate rates if they can’t get the rates approved.

Even with updated Regulations that allow insurers to use catastrophe models to recognize the wildfire exposure more accurately and give insurers the ability to include the net cost of reinsurance in wildfire rates, there is little relief to insurers being able to charge adequate rates if they can’t get the rates approved. It has taken over a year, on average, to get a rate filing approved, making it difficult to keep up with the double-digit annual increase in cost to rebuild over the past three years.

The recent implementation of Regulation 2644.9 gives property owners incentives to implement wildfire mitiga-

tion measures to receive a reduction in rate on their insurance. However, more education is required for property owners to understand that the cost to mitigate damages to a property, whether it be from wildfire, earthquake or flood, will always be greater than the annual insurance discount, which represents the reduction in average annual expected insured loss cost per property. While a wildfire may not impact a property for many years, if ever, the mitigation may

only nominally reduce the expected loss cost each year. The benefit of mitigation, however, is not just insurance discounts that make a marginal contribution to offset the cost, but more importantly that chances increase for the property to survive a catastrophe and more than just possessions — memories and loved ones — may be spared. There is an impact to consumers and society that goes beyond reduction in insurance premiums.

Regulation 2644.9 is a step in the right direction, but not without increased costs to insurers. These costs can include implementing new consumer notifications and keeping up with

¹ Fair Access to Insurance Requirements

² https://leginfo.ca.gov/faces/codes_displayText.xhtml?lawCode=INS&division=1.&title=&part=2.&chapter=9.&article=10.

³ California Code of Regulations, Title 10, Section 2644.5 – Catastrophe Adjustment, “the catastrophic losses for any one accident year in the recorded period are replaced by a loading based on a multi-year, long term average of catastrophe claims. The number of years over which the average shall be calculated shall be at least 20 years for homeowners multiple peril fire.” In summary, Regulation 2644.5 requires the use of 20 years of historical catastrophe data for admitted insurance property ratemaking and Regulation 2644.4(e) provides an exception that allows earthquake and fire following earthquake ratemaking to use catastrophe models and more modern methods recommended by Actuarial Standards of Practice. Regulation 2644.25 allows admitted earthquake insurance rates to include net cost of reinsurance, but not wildfire.

inspections, such as through licensing aerial imagery to confirm that mitigation measures have been met and are being maintained. For some insurers struggling to maintain adequate rate level, implementing wildfire mitigation discounts without the ability to increase their rates to account for these additional costs wasn't an option, further contributing to the availability crisis.

Another regulatory update to recognize wildfires is the risk-based capital (RBC) model that the National Association of Insurance Commissioners (NAIC) task force has updated to

consider wildfires in a similar manner as it considers hurricanes and earthquakes. The new, more robust RBC model is required to be submitted as information only with the 2023 year-end financial statement RBC model submission so that the regulators can understand the impact before they finalize the changes to the RBC model.

Moderator Ashenbrenner closed this general session by identifying some themes that cut across the three major perils in California. He attributed the stability of the state's earthquake market to a high level of consumer awareness,

strong building codes, the development of a risk-mitigation culture and the availability of advanced risk-management tools. Wildfire and flood insurance markets should stabilize if and when these same benefits are embraced for these perils. In particular, a culture of mitigation to help reduce losses and reliance on actuarial ratemaking techniques have worked towards improving insurance availability. ●

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

Professionalizing Artificial Intelligence: Lessons from Actuarial Science

By ERIN OLSON

James Guszczka became an actuary because he wanted to do data science work, even though that field didn't exactly exist. Data science was evolving, so it didn't have a name yet. In this Annual Meeting session, "Professionalizing Artificial Intelligence: Lessons from Actuarial Science," Guszczka looks at the diverse skills and perspectives that actuaries apply to a wide variety of business problems and presents us with a framework for what he proposes is another new job category: hybrid intelligence.

Artificial intelligence (AI) can be viewed from three perspectives, which are not as diametrically opposed as they may at first appear:

1. AI is the new electricity, meaning it is a general-purpose technology.
2. AI is an "intellectual wildcard," meaning an all-encompassing term for any kind of emerging technology, beyond the boundaries of scope and consequences.

3. AI is an ideology, meaning the application of machine learning can advance a wider goal to benefit humanity.

The third perspective is rooted in the history of AI. The founding fathers of AI first gathered at the 1956 Dartmouth Conference. They thought they could

Effective and ethical AI needs human-centered design.

solve intelligence by 2001. This timeline assumed that human intelligence was doing calculations and drawing logical conclusions. This is what is considered today to be First Wave AI. Second Wave AI is based on machine learning, statistical pattern recognition in large data sets and especially deep learning.

We often hear concerns that AI will evolve into something beyond human control — perhaps the type of fears portrayed in a science fiction movie. This is often driven by the sloppy language that we wrap around the technology and

can lead to "artificial stupidity." Guszczka proposes that we break artificial stupidity into two problems:

1. The first mile problem: Training data isn't given; it must be designed. Train an algorithm on only one type of risk and it won't recognize others. Additionally, some-

times there are not enough edge cases in the data to allow the algorithm to adequately predict these possibilities. Next, you must create a proxy variable for the outcome being predicted. But certain social constructions do not have objective definitions — race, gender, "healthy patient," "good employee," etc. What one person considers to be a "good employee" may be very different from another person's definition.

2. The last mile problem: We care about outcomes, not algorithmic

outputs. A model can perform very well and accurately segment good risks from bad risks, but one must recognize the human element of implementation. If underwriters are only discounting the good risks but not surcharging the risks that the model identifies as bad risks, the modeling effort has not achieved its goal. The key is to build good models and integrate them into smart workflows, recognizing the importance of both the algorithmic output as well as the human element.

Effective and ethical AI needs human-centered design. Guszczka recalled a quote from Richard Nesbett and Lee Ross, psychologists at Stanford: “Human judges are not merely worse than optimal regression equations. They are worse than almost any regression equation.” The places most susceptible to human bias are where algorithms can reduce bias. And yet, today’s algorithms

can’t replace experts. The first mile problem tells us that humans must make the decision about what data should be used to train the model because only humans can tell the difference between appearance and reality. The second mile problem tells us that the implementation of any modeling solution will rely on an interaction with a human element. Humans working together with AI creates something Guszczka refers to as a “diversity bonus” or a “collective intelligence” in which the outcome is superior to that which would be produced by either on their own.

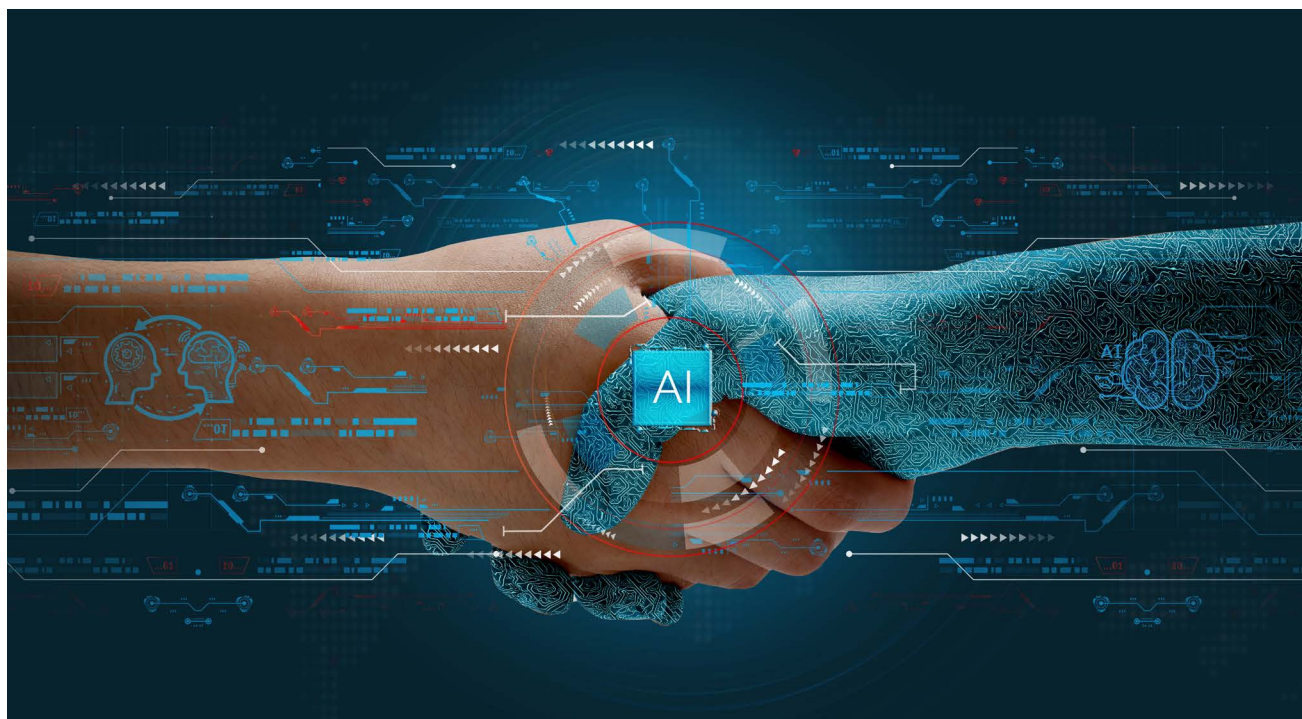
Hybrid intelligence development is the intersection of the following fields:

- Statistics and machine learning — grounded in computation and statistics.
- Participatory design — multiple stakeholders and domain experts providing important context and facilitating ethical deliberations.
- Behavioral sciences — recogni-

tion of human behavior, change management, and organizational design.

Guszczka does not consider actuarial science to be “applied math,” just as he would not call hybrid intelligence development “applied computer science.” But rather, he says, each can be viewed as “computational social sciences.” This field, comprised of learned professionals, can optimize how humans interact with algorithms to achieve optimal societal outcomes that cannot be achieved through regulation alone. Designing the human-machine interaction processes is an essential component. ●

Erin Olson, FCAS, is a member of the Actuarial Review Working Group and the new CAS VP-Marketing Communications. With 21 years in the actuarial field, Olson currently leads a group of decision science analysts, supporting property claims at USAA.



ETHICAL ISSUES

The American Academy of Actuaries' Applicability Guidelines Puzzle Solution

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

The CAS Professionalism Education Working Group designed a puzzle for the Casualty practice area, and specifically Product Development / Ratemaking / Pricing. Published in [AR November/December 2023](#), the puzzle includes ASOPs 1, 7, 11, 12, 13, 20, 23, 25, 29, 30, 38, 39, 41, 53, and 56. Following is the puzzle solution. ●

	M	E	A	S	U	R	E												
						U		E	C	O	N	O	M	I	C			E	
T	R	E	N	D	I	N	G					B						X	
				E								J						P	
				R				H	O	M	O	G	E	N	E	I	T	Y	E
F	I	N	D	I	N	G						C						N	
				V				C	A	T	A	S	T	R	O	P	H	E	S
				A		S						I			R			E	
				T		U						V		M	O	D	E	L	S
				I		F						E			P				
				V		F						L			R	A	T	E	
		C	R	E	D	I	B	I	L	I	T	Y			I				
						C									E				
C	O	N	T	A	G	I	O	N							T				
O						E				L	E	V	E	R	A	G	E		
D	O	C	U	M	E	N	T								R				
E						T									Y				

Inflation and Loss Reserves: Analysis Across the Decades By JIM LYNCH

When inflation hits, management wants to know: How much inflation is baked into reserves; and how much could future inflation cost us? Actuaries across the decades respond.

Sir Issac Newton once said that he saw further because he stood on the shoulders of giants.¹

Here is an actuaries-on-shoulders story with professionals across three decades addressing a topic that again has the profession’s attention: inflation.

Whenever inflation arises, actuaries hear two questions:

- How much inflation is baked into current reserves?
- How much will future inflation increase reserves?

William F. Richards sought answers in the late 1970s, when inflation regularly topped 6% a year. The result: [“Evaluating the Impact of Inflation on Loss Reserves,”](#) published as a discussion paper in 1981.

His approach was simple:

- Create a payout pattern of each accident year’s losses. (“Squaring the triangle”)
- Discount those losses back to present value.
- Project the losses back to their future values at the projected inflation rate.

Richards works an example with a hypothetical book of auto bodily injury losses. He discounts reserves, then inflates them by between 5% and 15% annually. He is left with a table of

reserve values at various inflation rates. He compares the actual reserve to the values in that table and determines the current reserves have baked-in inflation between 7% and 8%. And the values in the table show how future inflation will change those reserves.

One nice result: The method develops a single inflation rate across all years in the portfolio. That is easier to explain to management than a table of numbers that might vary considerably from year to year.

Two devils lie in the details, though:

Devil No. 1: How do you create an inflation index appropriate for an insurance portfolio?

Devil No. 2: Over what period does inflation act on a claim? Workers’ compensation shows some of the possibilities:²

Here is an actuaries-on-shoulders story with professionals across three decades addressing a topic that again has the profession’s attention: inflation.

- A death benefit. In most U.S. states, the heirs of a worker killed on the job receive a fixed death benefit, set by law. **Inflation has no direct effect on the benefit.** It only rises if lawmakers or regulators decide it should.
- An indemnity claim. Compensation depends on the worker’s weekly wage, which rises with inflation until the date the worker is injured. **Inflation affects the benefit until the accident date.**

- A medical claim. Payment depends on what is charged for treatment. **Inflation affects the benefit until payment date.**

In theory, the author’s model should handle each type of claim differently. The medical claims should be handled as Richards does. The death benefits should remain untouched. The indemnity claims should be handled in some manner in between.

Richards acknowledges both issues. For Devil No. 1 (an inflation index), he suggests figuring out the share of loss costs attributable to factors such as medical costs, legal fees, wages and so on. Then finding an inflation index that tracks each factor. Weight the indexes appropriately, and you have an index that lets you credibly discount the reserves.

Richards uses an index for auto bodily injury claims that is 60% from the Consumer Price Index for medical care and 40% from the CPI for hourly earnings of private non-farm production workers.

As far as I could tell, Richards was silent on how to address Devil No. 2 (does inflation affect claims through accident date, closed date or in between). His work can be remembered as the shoulders that actuaries Richard G. Woll, Michelle Morrow and Timothy Conrad

¹ Wikipedia tells me Newton’s famous statement itself stood on the shoulders of Bernard of Chartres, a 12th Century philosopher. So noted.

² Robert Butsic grappled with this topic in a paper I discussed in an [earlier Actuarial Review](#).

Auto Bodily Injury Losses

In his paper, “Evaluating the Impact of Inflation on Loss Reserves,” author William F. Richards looks at auto bodily injury losses from accident year 1972 to 1979 as of the end of 1979 (See Table 1). He projects losses through 1986. Some simple math shows the total reserve is 459.

Table 1.

Accident Year	Development Period							
	1	2	3	4	5	6	7	8
1972	37	107	143	164	175	181	183	185
1973	41	112	157	177	186	192	195	197
1974	42	130	172	193	207	215	219	221
1975	56	149	193	219	234	242	246	248
1976	53	137	183	208	221	229	232	235
1977	56	150	207	235	251	259	263	265
1978	53	157	211	240	255	264	268	270
1979	63	175	236	268	285	294	299	302

He expresses all payments in 1972 dollars by discounting with this table. Data through 1979 come from a weighted index: 60% Consumer Price Index for medical care and 40% Index of hourly earnings of production workers — Total Private Non-farm (See Table 2).

Table 2.

Year	Index
1972	100
1973	105
1974	114
1975	126
1976	137
1977	149
1978	161
1979	176

Table 3 contains the discounted values.

In his final step, Richards inflates projected values by 10 percent annually. He states the projections along with the actual losses from the original triangle. Under this scenario, the total reserve grows to 481 (See Table 4).

His ultimate exhibit shows the actual reserve in a simple table of inflation scenarios (See Table 5). Current reserves have inflation of 7% to 8% baked in. Changes in the inflation rate would change the reserve as indicated.

Table 3.

Accident Year	Development Period							
	1	2	3	4	5	6	7	8
1972	37	103	135	152	159	163	165	166
1973	39	101	136	151	157	161	163	164
1974	37	106	137	151	159	164	166	167
1975	44	112	141	157	166	170	172	173
1976	39	95	123	137	145	148	150	151
1977	38	96	128	143	151	154	156	157
1978	33	92	120	134	141	145	147	147
1979	36	95	124	139	146	150	151	152

Table 4.

Accident Year	Development Period							
	1	2	3	4	5	6	7	8
1972	37	107	143	164	175	181	183	185
1973	41	112	157	177	186	192	195	197
1974	42	130	172	193	207	215	219	222
1975	56	149	193	219	234	242	247	249
1976	53	137	183	208	222	230	234	236
1977	56	150	207	236	252	261	266	269
1978	53	157	212	242	258	267	272	275
1979	63	177	240	274	293	303	309	312

Table 5.

Future Rate of Inflation	Reserve
5%	440
6%	448
7%	456
Current Reserve	459
8%	464
9%	472
10%	481
11%	490
12%	499
13%	508
14%	517
15%	526

¹ All amounts are in millions of dollars.



stood upon.

Woll was a contemporary of Richards. Morrow and Conrad arrived nearly three decades later, when inflation seemed ready to surge.

Woll’s commentary accompanied Richards’ piece. He noticed different types of claims settle at different rates. Using the workers’ compensation example, in any given accident year, the medical bills will likely be paid first; indemnity settlements will follow. A proper index would need more weight on a medical index early and more weight on indemnity payments late.

That means to properly deflate losses, every accident year within a calendar year would need its own weighting. For a given calendar year, Accident Year X would weight medical and indemnity

claims at certain percentages. Accident Year X+1 would weight them differently.

Iterate through all the calendar years, and you end up with an Accident Year by Calendar Year matrix. Woll created such a matrix from actual workers’ compensation data.

But on Devil No. 2 – does inflation affect claims through accident date, closed date or in between – Woll kicks

Woll’s commentary accompanied Richards’ piece. He noticed different types of claims settle at different rates.

the can. He suggests populating another Accident Year-Calendar Year matrix “judgmentally or through research.” How to judge or what to research is left to the reader.

CAS Fellows Michelle Morrow and

Timothy Conrad attacked the matter in “Practical Considerations in Assessing the Impact of Inflation on Carried Reserves.” It was published in the CAS Forum in 2010.

Inflation then was certainly lower than today, but there were real inflation fears. In 2009, federal officials pumped money into the economy in response to the beginning of the Great Recession.

Fear of inflation ran high. Economist Arthur Laffer wrote in the Wall Street Journal: “We can expect rapidly rising prices and much, much higher interest rates over the next four or five years, and a concomitant deleterious

impact on output and employment not unlike the late 1970s.”³

That didn’t happen, of course, but insurance management, like executives everywhere, worried it might. The two

They struggled to find indices that did a good job of tracking the severity trends for a line of business. The failure that distressed them most: auto liability.

Their suggestion: Deflate the

rise in inflation/loss trend would increase industry reserves by \$41.7 billion – or 7.2% of stated reserves.⁶

I also allocated the losses by line of business. Workers’ compensation was most vulnerable, homeowners least.

My answer wasn’t the most sophisticated. But it made an important point: Insurers can’t neglect rising loss trends.

Not all managers will accept my offer of just one answer. To deal with those, actuaries should find firm footing on the shoulders of Richards, Woll, Morrow and Conrad. ●

They found that claim severity organized by the year a claim closed correlated most highly with a host of inflation indices.

questions – how much inflation is baked into our reserves, and how would rising inflation grow them – returned. That explains the timing of the Morrow-Conrad paper, in which they slew Devil No. 2.

They demonstrated empirically that inflation affected claims as long as they were open. Actuaries didn’t have to worry that inflation might not affect certain claims or that inflation only affected a claim till the day it occurred. You could model all claims as if inflation operated on them continuously until the day they were closed.

They found that claim severity organized by the year a claim closed correlated most highly with a host of inflation indices.⁴ It was a better predictor than claims organized by Accident Year or Report Year.

For almost every line of business they studied, inflation appeared to affect claims from the moment they opened to the moment they closed.⁵ They suggest claims less affected by inflation might settle quickly, so they constitute a small share of year-end reserves. In any event, “this concern [Devil No. 2] was laid to rest as regards our data.”

They had less luck with Devil No. 1.

triangles “using a selection of indices with good ‘fits’ and evaluate the range of expected reserves needed under different inflation assumptions.” They show the result: a table of 19 columns (one for each inflation index) and 50 rows (five future inflation scenarios for 10 lines of business). That is a 950-cell table.

The table reflects uncertainty in the estimate, but it’s a bit busy. In my career, I found management gained little from a report so rich in fine-print data. This is particularly true because the best-fitting indices – various permutations of the Consumer Price Index – don’t change the results much. Borrowing from Morrow and Conrad’s calculations, 10% inflation will blow up commercial property reserves by 12% if you use CPI-Housing index to deflate those reserves. If you use the CPI-All Items Less Food, that percentage only changes to ... 15%.

When I modeled inflation, I focused on management’s second inflation question: the future. I estimated how much a change in the inflation rate would force reserves.

For example, a 2015 presentation I gave at the Southwest Actuarial Forum projected that a two percentage point

³ Arthur B. Laffer, “[Get Ready for Inflation and Higher Interest Rates — WSJ](#),” Wall Street Journal, June 11, 2009.

⁴ Morrow and Conrad focused on claim severity, rather than overall losses. Their research found that frequency confounded the analysis.

⁵ The exception was auto physical damage.

⁶ Jim Lynch, “[Inflation from All Angles](#),” presentation to Southwest Actuarial Forum, San Antonio, TX, December 4, 2015.

RANDOM SAMPLER

The Future of the CAS — A Confident Expectation of Success

By ROOSEVELT MOSLEY JR.

The following is the Presidential Address given by Roosevelt Mosley at the 2023 Annual Business Session at the CAS Annual Meeting in Los Angeles.

When I was growing up, my father told me that his prayer was that God would let him live long enough to see me be successful.

Because my dad was a pastor of a Baptist church, my young mind assumed that he must have special status with God, and therefore I could expect my dad to be around for a long time. In the fall of my senior year of high school, however, my father suffered a massive stroke. While he survived the stroke, he was never the same. He was moved from the hospital to a nursing home, and it was in this nursing home that he passed away – one week before my high school graduation. The funeral was two days before I graduated. As valedictorian, I had to give the valedictory address.

As a teenager who lost his hero, this was a difficult time. As I processed his death, one of my initial reactions was that God had not answered my father's prayer. He didn't get a chance to see me graduate from college. He wasn't able to see me get married. He didn't see his grandchildren. He didn't get to see my career grow or me become CAS president. But it wasn't until many years later, once I had children of my own and watched them grow and develop, that I realized God had answered his

prayer. My father held on until I had been named valedictorian of my high school graduating class. And while he didn't get to experience any of the future successes with me here on earth, he had seen enough to know that I was going to be successful.

The CAS was founded in 1914, and there have been a number of successes that we have achieved as an organization over our 109-year history. One of those successes, as you have heard about and will continue to hear about during this meeting, was reaching 10,000 members this year. As I have reflected on this milestone over the past few months, it got me thinking. I wonder if the original 97 founding members even could

As I stand here today, reflecting on the last two years of leadership of my leadership journey, the last 30 years of my career and the 109 years of our Society's existence, I can't help but wonder what heights the CAS will reach that we can't really conceive of yet.

have envisioned achieving a milestone like this. So I went back and did a little digging. I actually read through the first presidential address in 1915 by I. M. Rubinow. While a lot of the address was about setting up the society and all that had taken place in the first few months, I did find a telling quote in Rubinow's speech. It was from a publication called the *Weekly Underwriter*, an insurance

newspaper published at the time. "There is no reason why this society (known as the Casualty Actuarial and Statistical Society) should not be as valuable to the casualty business as the Actuarial Society of America (now the SOA) has been to that of life insurance." It was clear that while they may not have been thinking specifically about 10,000 members, the foundation had been laid to achieve this milestone based on the value that had been recognized by the insurance industry. Just like my father, even though I. M. Rubinow did not see results, maybe he knew that the foundation laid would ensure the society would be successful.

As I stand here today, reflecting on the last two years of leadership of my

leadership journey, the last 30 years of my career and the 109 years of our society's existence, I can't help but wonder what heights the CAS will reach that we can't really conceive of yet. Maybe it is a numerical height – crossing some new member threshold. Maybe it is an industry height – there could come a day when the property and casualty insurance industry is not the predominant

industry we serve. Maybe it is a global height – could there come a day when the majority of CAS members are not located in the U.S.?

The truth is, I don't know what greater heights the CAS will achieve. Just like my father did not know exactly what heights I would achieve. Just like I.M. Rubinow did not know what greater heights the CAS would achieve. But what I am confident of is that as a society we will achieve new heights. My confidence comes from reflection on the past two years of leadership, and I believe that we have the right people focused on the right areas that will get us to the right place.

The progression of our Society from where we are now to where we will go reminded me of a book that was written almost 30 years ago by Jim Collins called *Built to Last*. It is a companion to his book, *Good to Great*, where he talked about the characteristics of companies that turned good results to great results. In *Built to Last*, he talks about turning great results into enduring great companies. I would argue that our history has demonstrated a progression of good on the way to great, and I believe that greatness can endure. In *Built*, Collins describes nine characteristics of great companies that endure. In the interest of time, I will only highlight four and use those to illustrate with examples from the past year that demonstrate why I believe the CAS is on the way to new heights.

First, enduring great companies don't tell time, they build clocks. When you tell time, that is valuable at the moment. When you build a clock, it ensures that those who come after you will be able to tell time after you are gone. Enduring great companies are not built

on great ideas or because of great leaders: They are built on enduring processes that will last long after those who built the processes. The CAS will reach new heights because we have and are building processes that will endure.

You can see this, for example, in the Admissions Transformations Plan. The outcome of this plan will not just be a transformed basic education pathway, but a process that will ensure that our basic education remains the gold standard in the realm of property and casualty actuarial. Another example of this is our current effort to modernize the way we govern ourselves. One key outcome is a process by which our governance processes will continually be evaluated against best practices. As we build clocks, it will ensure that we maintain our leading position as P&C actuaries.

Second, enduring great companies are about more than profits. They find their organization's purpose and build the core ideology. As a professional association, our focus is not profits. You could point to other metrics, such as number of members or surplus ratio. Regardless of the KPI, the point is still applicable. The goal is not to maximize the KPI; the goal is to be the best at fulfilling our organization's purpose. If we do that well, the results will come. We have been celebrating the 10,000-member milestone, but we realize that the goal



CAS President Roosevelt Mosley Jr. (2022-2023)

has never been membership growth. The goal has been to achieve our envisioned future, which is that actuaries should be sought after for their ability to apply analytics to solve insurance and risk management problems. As we succeed in achieving this, membership growth will continue.

The CAS Board went through a strategic planning process in 2019–2020 that did just this, and it laid the foundation for us to begin going through this process again, as the Board has discussed the strategic plan over the past year. This effort starts with the key important first step — understanding our “core purpose,” understanding our “why.” While our “why” will not change every time we review the plan, the tactics on how we fulfill our purpose may. The process is established and is being solidified to continue even after all of us are gone. And I can tell you that your volunteer leaders are fierce about remaining true to our core ideology.

Third, great enduring companies have cult-like cultures and a cult-like adherence to the culture. Every time I get a chance to speak to students, candidates and new members, I talk about

the culture of the CAS as being one of its primary key attributes. I brag with pride every chance I get about the fact that 30% of our members volunteer in some capacity with the CAS. Other organizations only dream of that kind of participation. And this level of engagement means that the research we produce, the continuing education events we host and the quality of our operations are second to none.

I have seen numerous examples of this engagement from our members over the past two years, and I truly thank you for that engagement. Examples include:

- Feedback regarding what you liked and didn't like so much.
- Passion around DE&I.
- Faithful observers of our board meetings.
- Volunteers engaging with university

students.

- Members pushing us into developing areas such as climate risk and bias in rating.

I.M. Rubinow likely had no idea what we would be facing in 2023. Thirty years ago, I couldn't have predicted the things we would be facing now. The explosion of data, machine learning and AI, automated vehicles, the internet of things, climate change, cyber liability — the list goes on and on. In 1915 when Rubinow talked about the need to apply actuarial science to the emerging area of automobile liability, I don't think he contemplated a time when the car would not require a person to drive it. Similarly, there are things that, sitting here today, are not even on the radar. But that's OK. We don't need to know what those things are. Because if we ensure that our

organization is built to identify, analyze and react to trends as they develop, then we can be confident that the CAS will be built to last, and reach milestones we can't even envision yet.

Before I conclude, I have some personal thanks. Being able to fulfill the duties of this role does not happen without the help of a ton of people.

First to my family: Yashica, Bria, Michael and Brooklyn. To those at Pinnacle: the partners, team and Michelle Jones. To those at the CAS: Board, Executive Council, Victor Carter-Bey, staff and Laura Stout. Lastly, to each member. It has truly been an honor and a privilege to serve you this past year, and I truly do hope that I left things a little better than I found them. ●

RANDOM SAMPLER

To Thrive, Embrace Your Strengths By ROGER HAYNE

The following is the Address to New Members that Roger Hayne gave at the 2023 Annual Business Session at the CAS Annual Meeting in Los Angeles.

Welcome to all new members of the CAS, an organization now with more than 10,000 members. Wow! To put that in a bit of perspective, when I joined, I was one of less than 900. No, that wasn't the size of my ACAS class but of the entire CAS.

We have come a long way. Along the way, the CAS and our members have been instrumental in applying data science to solve insurance problems, using

those tools to tease out patterns hidden in vast quantities of data. You can say our members have been instrumental in applying "artificial intelligence" to insurance problems. But will we be the victims of our own success?

If you listened to local Los Angeles television news over the past five or six months, you would have heard just how serious some see AI as a threat. The Writers Guild of America went on strike for 148 days with AI being a significant bargaining point. The actors in SAG-AFTRA have also been on strike since July, again with AI being a significant concern. These groups literally put their

money (their earnings) where their mouth is when it comes to concerns about AI.

A few years ago, an Oxford University/NPR study estimated that "47% of U.S. workers have a high probability of seeing their jobs automated over the next 20 years." In addition, they estimated that in that time there's about a 21% chance that a machine will be able to do an actuary's job.

In comparison they put that chance at about 98% for bookkeepers, 89% taxi drivers, and 96% for restaurant cooks. On the other hand, head chefs stood only about a 10% chance, college profes-

sors (something I used to do part time) 3%, while it's 0.3% for mental health and substance abuse social workers.

Compared to some of these, our jobs seem pretty secure, but we still have something like one chance in five of being replaced by machines. Maybe a more optimistic view is that about 20% of what we are doing now can be done better by a machine in the future. Other similar studies done since this one offers different percentages, but not necessarily radically different results.

We should look at this as an opportunity. Calculators were once seen as a threat to actuaries. Very early in my career I can recall hearing old timers say that when programmable calculators were first introduced, some consultants worried they would reduce the billable time from their staff. We now see that automation simply freed up time to do things humans could do better.

What are those things? What separates those jobs that have a high chance of being replaced by machines and those with a low one? Generally, those jobs with a low chance of being replaced by machines require creativity, collaboration, negotiation, problem solving, and human interaction in some combination. These are things that we humans can do well and that seem to be difficult to automate (at least in the foreseeable future).

So, to help assure our continued future, we might want to think of embracing problem solving, creativity, collaboration, negotiation and, the hardest for the stereotypical actuary, human interaction. No more looking at the other person's shoes!

My wife loves telling stories of early CAS meetings we both attended. To hear her tell it, we *all* were looking at *our*

own shoes during the receptions. All right, maybe a bit of an exaggeration, but in all honesty, only a bit, and I was probably one of those most closely examining my own polish. She knew how important it was to be able to work with people. Relationships I built at those meetings and working in the CAS have lasted my entire career and helped me on both a professional, and more importantly, a personal level.

We should embrace human interaction.

Teamwork or collaboration is a hallmark of a truly strong actuary. The reserving actuary needs to understand company operations and collaborate with financial and claims people to better interpret reserving analysis. The rate-making actuary needs to understand not

We should not fall prey to the idea that there is “one right way” to solve a problem.

only the data but the market in which the company operates, but also work with underwriting and sales professionals. The valuation actuary works as part of a team, as does the actuary working in risk management.

In short, we should embrace teamwork and collaboration.

We P&C actuaries are at home with problem-solving. The wide range of hazard risks that we deal with makes it very difficult (impossible?) for a single



CAS Past President Roger Hayne (2009–2010).

method or type of analysis to work in all the situations we face. As such we deal with new problems quite often.

Part of problem solving is understanding the underlying nature of what we are estimating. Data science can give us insight into patterns that may exist and may give “accurate” forecasts as long as things do not change. Unless we can provide not only estimates, but also understanding what affects those estimates, we have really not solved the problem.

We should embrace problem solving.

Creativity often works hand in hand with problem solving. When faced with a problem that normal techniques cannot address, we are forced to think creatively to find new approaches. Our syllabus is quite good at exposing us to a wide range of methods to deal with a large portion of the hazard risks we will face. Our exams test whether we select

the most appropriate one to deal with a particular problem. However, we should not fall prey to the idea that there is “one right way” to solve a problem. Historically our exams tended to promote that idea, though current steps toward more integrative questions help recognize creativity more in our exams.

Our oldest son has a BFA in photography, a creative craft based on rather technical science. I too dabble in photography and have learned quite a bit from him. Photography is almost natural for an actuary. The interaction of light reflected off a subject and film speed (I use the old term though film is nearly impossible to find), shutter speed, lens opening or f-stop, and lens focal length, appeals to the quantitative bent of an actuary. In addition, these “parameters” can be manipulated to achieve certain effects in the final image. All this is a science and appeals to the actuary’s mathematical talents.

The art comes in with seeing the image you want to capture. A good way to expand your creativity is to challenge yourself to capture interesting images, with minimal use of Photoshop. I take advantage of my son’s experience and knowledge to challenge me. If you don’t have access to a built-in mentor, photography classes in local colleges or adult education facilities might be good places to look. These classes first deal with photography mechanics, fundamentals and techniques. Once that foundation is set, there are various exercises to expand the photographer’s creative eye.

A word of caution, though. The NPR/Oxford calculator gives a 2.1% chance of the job of photographer being replaced by machine. However, that is not to say automation is not a threat. Current feature-rich digital cameras and

photo editing software have automated a significant portion of the mechanical part of a photographer’s job. Now a lot more folks can take technically correct photos and rely on Photoshop to hide their mistakes. Just look at social media sites. In short, it is now much easier to be a mediocre photographer.

Truly accomplished photographers will still rise above the crowd. Just as automation makes it easier to take technically correct photos, it will mean it will be easier for non-actuaries to do actuarial calculations. As the true photographer, the true actuary must understand not only the mechanics and fundamentals but be able to apply them to create their final product. This understanding is a value we bring to our principals.

We should embrace creativity and understanding.

This leaves the last characteristic of a future-proof job – negotiation.

We all know that actuarial estimates are just that – estimates. As such, there is usually a “range of reasonable estimates” and a range of methods for obtaining estimates, making negotiation a key feature of an actuary’s job. Just about all of us have had or will have to engage in negotiation at some point or another.

What sets us apart though, is the fact that we are professionals and not just practitioners. We have the code of professional conduct, a duty to our profession and our principals, essentially putting limits on our ability to negotiate. This also is a significant asset for us. Our principals can trust we will abide by our code of conduct.

I had a direct experience of this difference not too long ago. I was hired as an expert witness in a case involving statistical sampling and inference. Not go-

ing into too many details, the opposing expert was a Ph.D. in econometrics from Princeton and came up with a rather convoluted (and creative) methodology to come up with his own inference. I was able to show in court, using marbles and buckets, that he could get any result he wanted with his methodology.

The judge ended up ruling that his methodology was essentially “junk science” and not admissible as evidence. As a result, I have it in writing, from a Federal judge, that “[the opposing expert] was not able to show Hayne has lost his marbles.” I cannot believe that a Ph.D. in econometrics from Princeton was not aware that what he was suggesting had no basis in statistical theory, yet he went forward with this “junk science” with the result that his client essentially had the crux of his case thrown out of court. I could never have done the same thing, because as an actuary I have to abide by our Code of Professional Conduct.

We should embrace negotiation and professionalism.

In summary, I have long seen technology taking over portions of the actuary’s job. Rather than eliminating the job, technology has freed me to be more creative in my problem solving, allowed me more time to collaborate and interact with others, granted me more time to delve into the data to give my principal a better insight into what is happening in the company, and given me the ability to understand the limits of my negotiation.

With care and foresight, you too can survive and thrive with technological change — embrace the future.

Thank you and congratulations on a fantastic accomplishment. ●

Reboot

“Did you reboot?” has been the staple question of IT support staff for so long that many of us reboot before even calling. I have found that when my PC acts erratically, I reboot, and that usually clears things up. This can also happen with your smartphone.

It seems that things get “stuck” in a computer’s register, or some part of the software, or an application gets stuck in some mode or setting. Restarting the device or unit sometimes does the trick. This also works on a washing machine. Mine got stuck in a cycle, rinsing and rinsing and rinsing and never getting out of the cycle. I looked up the problem online and found that the machine needed to reboot, accomplished by unplugging it for 10 minutes and then plugging it back in.

I think of rebooting as “flushing out the system.” Like cleaning the exhaust vent for your clothes dryer; it runs smoother once that is done.

You may have experienced a project that totally occupies and preoccupies your mind. My wife Diane says that a project “consumes me.” I work on the project constantly: I wake up thinking about it, think about it all day, go to bed thinking about it and even wake up in the middle of the night thinking about it.

Not too long ago, I had a major and complex project consuming me.

But while working on the project, a

series of unavoidable events occurred, filled my weekend, prevented me from working on the project. Since I couldn’t work on it, my mind was eventually freed from thinking about the project for a full two days. When I returned to work on Monday morning, I was able to finish the next step quickly — and without the gloomy aura.

It was as if that non-work weekend caused my brain to reboot.

Perhaps the reason for the fourth of the 10 Commandments, “Keep holy the sabbath,” is not *just* about obedience but for our own refreshing (rebooting): “Six days you shall do your work, and on the seventh day you shall rest, that your ox and your donkey may rest, and the son of your female servant and the stranger may be refreshed.”¹

I used to have one day a week that I would not use my PC. Usually a Saturday or Sunday, but it kept me from doing work and was, I admit, refreshing.

We *need* to refresh ourselves periodically, weekly works pretty well.

We need to reboot on a daily basis as well. Call it a “mini reboot.” I read about work/life balance, but I find this hard to do unless I separate my work from my home life, both spatially and mentally. The mental separation is the most difficult.

Back when we went into the office, we rebooted daily as we went home to a different environment — a different atmosphere. This was even more the

case before PCs and the internet allowed us to bring work home.

One of my fond memories happened when I worked in New York City, before personal computers and the internet. I would take the Staten Island Ferry from Manhattan, where I worked, to Staten Island, where I lived. I would sit on the back of the ferry and watch the Lower NYC skyline fade into the background. I was able to mentally leave work while I watched it physically disappear.

Now, people who work from home don’t have such a commute. Work life and home life are blurred. Their commute might be to walk to the spare bedroom after stopping for coffee in the kitchen — a far cry from driving or taking public transportation to work and stopping at a coffee shop before riding an elevator to your floor. There is no longer a time nor a spatial separation between work and personal life. The old method of rebooting daily is gone, and a new one needs to be created.

In my opinion, we all need a means of rebooting our brains on both a weekly and a daily basis. What’s yours? ●

Grover M. Edie, FCAS, CERA, CPCU, MAAA, ARM, is the former Actuarial Review editor in chief, and continues his service as a member of the AR Working Group. After his weekend reboot, he is a consulting actuary for Huggins Actuarial Services, Inc.

¹ New King James Version of the *Bible*.

IT'S A PUZZLEMENT By JON EVANS

Infinitely Many Equal Pieces

Given any finite positive real number A , can you define a set S , in the two-dimensional plane, with area A and a partition of S into infinitely many sequentially numbered subsets S_1, S_2, \dots such that any two of these subsets are isometric? Show it or prove it impossible. Isometric in this case will specifically mean two subsets related by a one-to-one mapping that only involves translation and/or rotation in the plane. Partition means that the subsets are pairwise disjoint and that their union equals S . Can you generalize your answer to a higher dimensions?

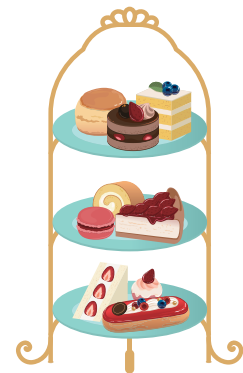
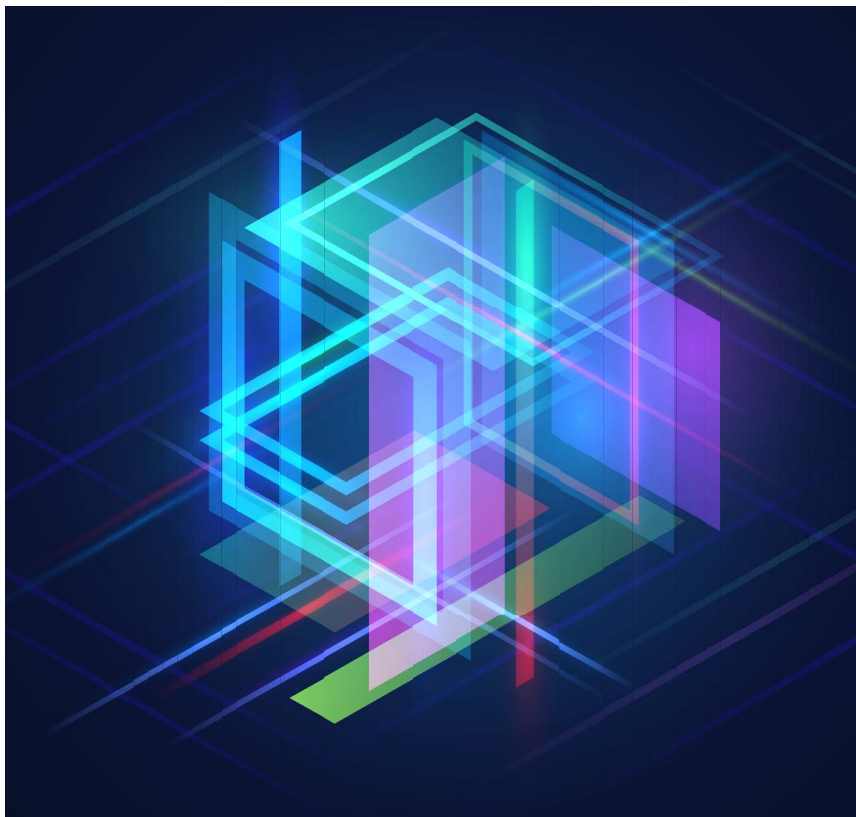
Desire For Dessert Among Logicians

In this puzzle, a group of N logicians are having dinner at the same table at a restaurant where they can all talk to each other. They have finished the main course, but none of them has any idea which of the others want to have dessert. The waiter stops by their table and asks them, "Do you all want to have dessert?" $N - 1$ of the logicians each answer in succession, "I don't know." The puzzle question was: "How might the N th logician then answer?"

If any one of the logicians had not wanted dessert, that logician would have

answered, "No." If one of them does not want dessert then it is not true that all of them want dessert. So, the N th logician will answer, "Yes" if he wants a dessert, since all of the other $N-1$ logicians must have wanted dessert in order to answer, "I don't know." However, if the N th logician does not want a dessert, he will answer, "No."

Solutions were also submitted by Shyam Bihari Agarwal, Sean Bailey, John Berglund, Jordan Bonner, Roger Bovard, Samuel James Chilson, Bob Conger, Jon Constable, Stephanie Dobbs, Jacob Fli-sakowski, Kristen Fox, Kacey L. Gilman, Josh Grode, Othon Hamill, Shira Jacobson, Rich Kollmar, Adina Landesman, Jerry Miccolis, Travis Murnan, Dave Oakden, Greg Ostergren, Sean Porreca, Alexander Rosteck, Michael Schwalen, Kwong Koon Shing, David Spiegler, Rick Sutherland, Scott Swanay, Rob Thomas, David Uhland and David Vogt. ●



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