

# actuarial REVIEW

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## RESEARCH IN ACTION: 2023



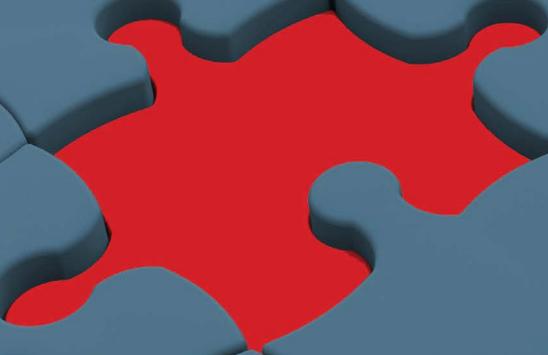


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September-October 2023



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# actuarialREVIEW

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

## CAS Research Does Not Stop

**B**rian Fannin is one busy guy. And his cover story on CAS research proves it. The CAS Research Actuary underlines what he, the Research Council and the many CAS research working groups have been working on and have completed this year. And there is much more in store from this hardworking group of volunteers.

### Risk is opportunity

The recent spate of weather catastrophes is having an impact on insurance and policy holders. *AR* welcomes back Rade Musulin, a past contributor who has written on climate change before ("[Actuarial Evolution: Climate Risk is Our Next Frontier](#)," *AR*, March-April 2022). In our feature story, Musulin and coauthor Alp Can write about how P&C actuaries can take holistic views on climate risk to find opportunities.

### Inflation through the years

Jim Lynch is on a mission to review CAS literature on inflation. His first article focuses on a 1981 paper by Robert P. Butsic, one that spent quite a few years on the CAS Syllabus of Education. Although he looks at the paper through a

rearview mirror, Lynch finds many pertinent pieces of wisdom for today. Robert Butsic is a bit of an enigma as well. He is not a CAS member but has worked on several CAS committees over the years, the last being Risk-Based Capital Dependencies and Calibration Subcommittee.

One intriguing aspect of the story was just how far technology has advanced. Today, creating equations in Word is tedious but totally doable, but it would be years after Butsic wrote his paper that this kind of program would be available. We've included part of the original paper that shows how the author handwrote Greek symbols in the text.

### And the rest

This issue is just brimming with information. Also included in this issue, CAS Past President Mike Walters has a suggestion for a future line of business for actuaries, Jonathan Evans tempts us with a dessert puzzle and three industrious CAS volunteers find their places in the spotlight. And finally, President Roosevelt Mosley discusses the changes going on with CAS staff building resources to serve the membership even more.

I hope you enjoy this *AR*. ●

*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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## Building Capabilities at the CAS

This is the fourth and final installment in my President's Message series highlighting the CAS Strategic Plan. "Building Capabilities at CAS" is foundational to fulfilling our Envisioned Future, which, as a

reminder, is:

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

This Envisioned Future is bold, and to achieve it, we will need to make significant progress toward our desired outcomes in each of our three pillars: "Building Skills for the Future," "Diversifying the Pipeline" and "Expanding Globally." This progress will not happen

**As critical as our volunteers are, the CAS would not be where we are as an organization without the key contributions of CAS staff over the years.**

without an effective partnership between CAS staff and member volunteers.

A description of this partnership is included in the Strategic Plan:

We believe it takes audacity to try to change the world and effective management to follow through. Staff and volunteers working together will dramatically improve the value that the CAS delivers to its members.

The volunteer culture within the CAS has always been core to who we are; the contributions of our volunteers are nothing short of spectacular. Over 30% of our members volunteer in some capacity, and every time I brag about that number to other actuarial organizations, they are in awe. Leaders of other member organizations (not just actuarial organizations) have commented on how

they can't even dream of volunteer participation that high. This volunteer culture is a key reason our Society remains the premier place for property and casualty actuarial education and credentialing.

As critical as our volunteers are, the CAS would not be where we

are as an organization without the key contributions of CAS staff over the years. It is this partnership that facilitates the accomplishment of important initiatives year after year, and it will be an increasingly effective partnership that will give us the ability to reach even higher heights.

Before I dive into examples of how this is happening and how it will contribute to our continued success, I have to underscore the key word here: **Partnership**. That means we are working together to achieve a common goal. It is highlighted in the Strategic Plan — CAS staff are responsible for executing the CAS strategy, a strategy which is set by the CAS Board of Directors. It is the same as what many of us do daily. To accomplish the tasks given to us by our employers, we partner with many parts of the organization. If we are tasked with developing a rate indication, which is an actuarial responsibility, we have to partner with others in nonactuarial roles, such as data professionals, product managers and regulators, and departments, such IT and accounting. Without these partnerships, completing the task would be much more difficult, if not impossible.

The same is true for the CAS. There are many elements of our Strategic Plan that will require actuarial expertise — transforming our admissions process, increasing our proficiency in predictive analytics and marketing the actuarial



The author and his wife pose with CAS staff members at the 2023 Spring Meeting. First row, left to right: Tamar Gertner, Stephanie Litrenta, Yashica Mosley, Nora Potter, Margaret Lyons, Joyce Warner, Yaroslava Jordan. Second row, left to right: Mikey Bevarelli, Shelby Wolf, President Mosley, Victor Carter-Bey, Mallory Peebles. Third row, left to right: Mike Boa, John Kleine and Wesley Ross.

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## President's Message

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profession, just to name a few. But actuarial expertise alone will not get us there. We need expertise among the CAS staff to partner with the actuarial expertise to achieve the desired outcomes.

The following are some examples of how this partnership is happening.

- As actuaries, we have a unique ability to approach problem-solving from a data perspective to recommend solutions based on analytical insights. We incorporate a similar approach as we seek to address challenges we are facing at the CAS. But as many actuaries have experienced, the lack of good data can complicate the ability to complete a good analysis. We are facing similar challenges at the CAS. The association management software platform the CAS uses has been in place since 2008. And for those who are familiar with the pace of software advancement, that is ancient. This presents CAS with a number of challenges, such as not being able to easily access data to analyze elements key to understanding our pipeline, including travel time and candidate educational backgrounds. To address this, the CAS is procuring a new association management system that will be vital to supporting our strategic initiatives and overall operations.
- Victor Carter-Bey, CEO of the CAS, has made it a priority to identify the skills that will be needed at the CAS, and he has worked to identify the right people, provide the right training and implement the right structure to achieve the goals laid

out in the Strategic Plan. Training to address identified gaps and emerging needs in management, problem solving, project management and analytical skills has been ongoing in 2023 and will continue into 2024. These skills will be critical in bringing many of our strategic initiatives to successful completion.

- One of this year's goals has been to help CAS staff gain a deeper and broader understanding of the day-to-day work of actuaries. To that end, the CAS staff actuaries have been presenting quarterly sessions to the CAS staff. Sessions delivered so far this year include an overview of how the CAS works with other actuarial organizations and an exploration into actuaries' daily work using our RPM, CLRS and Reinsurance Seminars as

guides. As part of the latter session, staff were given an interactive task of selecting which rating variables to use on a new insurance product. Other sessions included a review of the professionalism requirements that our members must adhere to, and an introduction to the modeling process many actuaries use today. With a deeper and broader knowledge base of actuarial work, staff can more effectively partner with volunteers.

- As it is important for staff to understand the actuaries' work, it is likewise important for CAS members to know the CAS staff. In *Actuarial Review*, CAS staff members have been highlighted to allow the members to get to know them better and the skills they bring to the CAS. I encourage each of you to read these

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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.*

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[Staff Profiles](#), as understanding the skills and background of our staff will help us to better partner with them.

- The recently launched Capability Model is another notable example of the volunteer-staff partnership. The CAS staff’s professional education background combined with the CAS volunteers’ expertise to develop a tool to help our members assess where they are in their skill development. Using the Capability Model, members can create a customized professional education plan to continue advancing their skills.

There are countless other examples of how this partnership has been effective in moving the CAS forward, including enhancements in marketing and communications, international activities, meeting planning and CAS administration. I have been volunteering with the CAS for 24 years, and in each capacity in which I have volunteered, I have found the staff partners to be invaluable. I am sure that many of our volunteers have their own examples of positive experiences working with staff. We truly are fortunate as an organization to have such a dedicated and skilled staff. Only with this continued partnership will we be able to achieve the lofty goals we set for ourselves.

I encourage each of you to take full advantage of the opportunity you have to interact with CAS staff. That might be through committee work, at a CAS meeting or simply reaching out to the CAS with a question. Get to know them better and let them get to know you better. I believe you will come away as confident as I am that we have the right staff partners to help get the CAS to its Envisioned Future. ●

## COMINGS AND GOINGS

**Zachary Martin, FCAS, CSPA, MAAA**, has been promoted to assistant corporate secretary at Frankenmuth Insurance, which he joined in 2018 as the director of actuarial, risk and compliance services. He brought 13 years of prior actuarial and technical experience from working for Liberty Mutual, Zurich North America and TD Insurance. Promoted to vice president in 2019, he was responsible for pricing, analytics, reserving, risk and compliance activities. Martin also leads corporate initiatives to advance the company’s use of predictive analytics.

**Michael Wise, ACAS**, has been appointed permanent director of the South Carolina Department of Insurance. Prior to being named acting director, Wise served as the agency’s deputy director of actuarial and market services.

**Joe Gravelle, FCAS, MAAA**, has been promoted to vice president-insurance analytics for Mutual Benefit Group. In this position, he will drive the development and maintenance of P&C insurance products with shared responsibilities for growth and profitability, amongst several other duties. Gravelle joined Mutual Benefit Group in April 2020 as the tactical pricing and product manager, bringing with him over 20 years of experience in the P&C insur-

ance industry. In addition, he volunteers on the CAS Member Advisory Panel.

**Albert Zhou, FCAS**, has been appointed chief risk officer for Corvus Insurance. Zhou brings more than 12 years of cross-functional insurance experience, with deep operational expertise in actuarial, risk and analytics. He reports to the company’s president and joins the leadership team. Previously, Zhou was the chief actuarial and analytics officer at SynchronoSure, an early-stage commercial MGA. In 2021 he founded Toyl Ventures, a privately owned arbitrage trading firm focused on digital assets. Zhou also spent seven years at Third Point Re and SiriusPoint, most recently as SVP, actuarial director, where he led the U.S. actuarial team in pricing, reserving, capital modeling and risk management. He began his career as an actuarial consultant at Ernst & Young.

**Kimberly Guerriero, FCAS**, has been named one of *Captive International’s* FORTY Under 40. Guerriero began her Milliman career as an intern in 2005 while in college and rose to principal and consulting actuary in 2022. Her primary focus is the alternative risk market, and most of her clients are captives, risk retention groups and self-insureds. Guerriero has been described as a highly regarded consultant within Milliman and a tremendous asset to her clients, many of which rely on her expertise to help them navigate myriad challenges they contend with while operating their captive insurance company. She has demonstrated a commitment to mentoring and developing the next generation

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**Comings and Goings**

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of talented consultants and volunteers a considerable amount of her time and energy to a variety of professional organizations that support other socially responsible initiatives.

**Aaron Hillebrandt, FCAS**, has also been named one of *Captive International's* FORTY Under 40. Hillebrandt joined the U.S. Marine Corps at 17 years old and his service took him around the U.S. and to two combat tours in Iraq. He worked in the actuarial profession for a large commercial insurer for several years and as a mathematics lecturer at Illinois State University. Hillebrandt joined Pinnacle Actuarial Resources as a consulting actuary in 2013 and became a principal of the firm in 2021. He now advises and is the appointed actuary for several commercial and captive insurance companies and self-insured entities. Described as a recognized industry leader in the captive insurance market, Hillebrandt was said to have exceeded his service to the captive community by providing a positive experience for them and fully immersing himself within the community.

**Yvonne Palm, FCAS, FIA**, has

been featured on the cover of *CIO Views Magazine* for its "Iconic Business Women to Follow in 2023" edition. Palm is the director of risk management and compliance for African Reinsurance Corporation. She currently serves on the CAS Board of Directors.

**Michael K. Chen, FCAS, MAAA**, has been appointed senior consulting actuary at Pinnacle Actuarial Resources. Prior to his return to Pinnacle, Chen was a director at a large consulting firm where he directly contributed to client projects and led execution of individual prospect sales strategies. He will focus on applying predictive analytics techniques to the insurance process, performing traditional actuarial analyses and furthering fairness and machine learning research in his role at Pinnacle. He has 20 years of actuarial experience, including as a commercial pricing actuary for FBL Financial Group and as an actuarial analyst for American Republic Insurance Company.

**Art Randolph, FCAS**, recently received the 2023 IABA Lifetime Achievement Award. Randolph has been in the insurance industry since 1998 and has been consulting since 2001. His consulting career has focused on medical professional liability, homeowners,

commercial property, workers' compensation, commercial and personal automobile, general liability, commercial multiple peril and title exposures. Randolph has been a member of the International Association of Black Actuaries (IABA) since 2001, serving as treasurer and director from 2003 to 2006 and director from 2014 to 2015. He also served as the first president of the IABA Foundation from 2004 to 2007.

**Sharon K. Robinson, FCAS, MAAA**, recently has also received the 2023 IABA Lifetime Achievement Award. Robinson is recently retired following a distinguished career in property-casualty insurance; her most recent position being that of senior vice president and chief pricing actuary for Zurich North America. Robinson held prior actuarial positions with the CNA Insurance Companies and with the St. Paul Fire & Marine Insurance Company. Robinson currently serves as chair-elect of The Actuarial Foundation Board of Trustees. She was the recipient of the 2020 Business Insurance Women to Watch award. She is also a past president and past board member of IABA. ●

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

**E-Forum Submission Guidelines Revised**

**W**ith the implementation of its new microsite, *E-Forum* no longer requires submissions to conform to an established template. When submitting an article for publication, *E-Forum* authors should prepare the following:

- A final electronic file of the paper in Microsoft Word or LaTeX.
- An accompanying pdf of the final paper.
- Separate files for figures in **JPEG or PNG format** in at least 300 dpi.
- Supplementary attachments/datasets (r files, .xls, etc.).

As a final step, authors will also be asked to provide 100-word author biographies, key words and a 30-word paper description. For more information on the *E-Forum* Submission guidelines, visit <https://eforum.casact.org/for-authors>. ●

# The CAS Institute Grants CSPA, CSCR and CCRMP Designations

Since September 2022, the following individuals have earned The CAS Institute (iCAS) designations of Certified Specialist in Predictive Analytics (CSPA), Certified Specialist in Catastrophe Risk (CSCR) and Certified Specialist in Risk Management Professional (CSRMP).

## CSPA

Kyle Bartee, ACAS, CSPA  
 Emily K. Condos, CSPA  
 Kevin Patrick Dugal, ACAS, CSPA  
 Suguru Fujita, CSPA  
 Ximena Gill, CERA, FIA, CSPA  
 Bailey Hsu, CSPA  
 Kenneth Lee, FCAS, CSPA  
 Hyun Jin Park, FCAS, CSPA  
 Nancy Ross, FCAS, CSPA  
 Humberto Enrique Viana, ACAS, CSPA

## CSCR

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 Silvia Bolanos, CSCR  
 James Digby, CSCR  
 Pragya Kamal, CSCR  
 Prasad Kengana, CSCR  
 Caiti Klein, CSCR  
 Nirmal Kumar Kannan, CSCR  
 Bhargavareddy Kothahudya, CSCR  
 Sanjeet Kumar, CSCR  
 Aradhana Madappa, CSCR  
 Rajesh Mallik, CSCR  
 Saeed Nozhati, CSCR  
 Erica Pfleiger, CSCR  
 Vani Raj, CSCR  
 Alphonsa Raju, CSCR  
 Dheeraj Rao, CSCR  
 Prem Sagayraj, CSCR  
 Niharika Sharma, CSCR  
 Nishanth Sidharthan, CSCR

## CCRMP

Peter Bingenheimer, CCRMP  
 Shaveta Gupta, CCRMP  
 Thomas I. Larsen, CCRMP  
 Matthew Nielsen, CCRMP  
 Anupama Nigam, CCRMP  
 Laura Schenck, CCRMP ●



## ARIA Prize Announced

The American Risk and Insurance Association (ARIA) has awarded David L. Dicks and James R. Garven the ARIA Prize for their paper “[Asymmetric Information and Insurance Cycles](#),” which is published in the *Journal of Risk and Insurance*. ARIA established the prize in 1997, and each year gives it to an ARIA journal paper

that provides the most valuable contribution to casualty actuarial science. The dual objectives of this award are to promote research on topics of concern to casualty actuaries and to make members of the CAS more aware of current research findings. The CAS sponsors the \$1,000 award. ●

## CALENDAR OF EVENTS

**November 5-8, 2023**

CAS Annual Meeting  
 Los Angeles, California

**March 18-20, 2024**

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

**May 5-8, 2024**

CAS Spring Meeting  
 TBD

**June 3-4, 2024**

Seminar on Reinsurance  
 Boston, Massachusetts

**October 19, 2024**

Recent Technology Advances and  
 New Market Reality Seminar  
 Virtual

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

## IN MEMORIAM

James Whisenant (ACAS 1994)  
 1948-2023

Peter A. McNamara (FCAS 2011)  
 1981-2023

## 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."*

### **The People (and Dog) Person James Whisenant (ACAS 1994) 1948-2023**

James Clifton Whisenant, known to many friends as "Whiz," died in Houston at the age of 74. He died in peace with the comfort and love of his family. He was a graduate of Lamar High School and earned his undergraduate degree in 1972 from Rice University. He continued his education attending the University of Houston, earning a post-graduate degree. The degrees earned were in the fields of math and science. One of his professors, Mac, would become his future employer and lifelong friend. His work was his primary passion, but he enjoyed playing music, discussing science and investments, and playing poker with his friends. He would often chat up the guys at the Bernardo Farm and Ranch Supply in Cat Spring, Texas. He delighted in sharing food and wine with friends and family, and he cherished conversations with his stepdaugh-

ter Dana. He is preceded in death by his parents, James Lamar Whisenant and Margaret Box Whisenant; and his canine family, Chili, Lucy, Roux and Sacha. He is survived by Brenda Whisenant, his wife; Dana and Ben Bucci, his step-daughter and son-in-law; Jazz, his best canine friend; and Sous, Dobby and Willis, his "grand puppies."

### **A Boy of Summer Peter A. McNamara (FCAS 2011) 1981-2023**

Peter Andrew McNamara, 41, of Wilton, Connecticut, passed away after battling an aggressive form of T-cell lymphoma. He passed peacefully with his loving wife, Meredith, by his side and spent his last days surrounded by close family members. Born in Huntington, New York to John and Carolyn McNamara, he grew up in a house full of love with his brother Stephen, sister Cathryn, identical twin brother James, with whom he shared a very special bond, as well as

several adoring dogs and cats. In high school, he enjoyed playing baseball and being a member of the marching band. McNamara earned bachelor's degrees in mathematics and economics in 2003 from Cornell University. He played the tenor saxophone in Cornell's Jazz Ensemble. After graduation, he moved to New York City to begin his career as an actuary. During this time, he joined a co-ed softball team (The Bandits) and spent most summer Sunday afternoons playing shortstop in Central Park alongside his closest friends. He served as chief reserving actuary for Axis Capital, where he had been employed since 2010. His first actuarial job was with AIG, where he met his wife. They had four daughters: Lillian Jane (10), Caroline Elizabeth (8), Emily Saralynn (6) and Eleanor Louise (4). In addition to his wife and children, he is survived by his parents; his siblings and their spouses/partners; his parents-in-law; his brother-in-law and his wife; and several nieces and nephews. ●

## Certify CAS CE Policy Compliance by Year's End

All Fellows and Associates need to certify their compliance with the CAS [Continuing Education \(CE\) Policy](#)'s requirements by December 31, 2023. Members must certify compliance at the end of each calendar year as compliance with

the CAS CE Policy allows the member to provide actuarial services in the year immediately following certification of compliance. This means that members should be attesting as to whether they have complied with their CE or continuing professional development (CPD)

requirements during calendar year 2023 to be able to provide actuarial services in 2024.

For more information, visit <https://www.casact.org/professional-education/continuing-education-policy>. ●

## CAS STAFF SPOTLIGHT

### Meet Colton Needles, iCAS Product Coordinator

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

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

I am the product coordinator for The CAS Institute (iCAS). That means I maintain the current iCAS exams and certifications, and I work on new products and additions, such as the new Property and Casualty Predictive Analytics (PCPA) requirements.

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

I'm continually inspired by the passion that our volunteers have for

their work and the CAS. I love that I can turn that passion into effective action.

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

I earned a bachelor's degree in theatre from Southern Utah University and then moved to Washington, D.C. where I found some theatre work, as well as a variety of jobs in customer support. I joined the CAS Administration and Customer Support (ACS) team as a representative in 2018 and became the ACS coordinator later that year. In 2022 I made the jump to iCAS.

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

Pretty much anything adventur-



Colton Needles

ous! I love to travel, and I've been fortunate to see some amazing places around the world. I also love camping and hiking, and this year I took up rock climbing.

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

Japan, which is currently the country at the top of my bucket list. The food is a big motivator, but it also seems like an incredible country to visit — especially during cherry blossom season!

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

I will eat pretty much anything except pickles. (I hate pickles.)

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

A somewhat quiet person who chooses carefully when to speak. ●



Needles (upper right) puts his undergrad degree to work, performing in a production of *The Legend of Sleepy Hollow* at the Ohio Shakespeare Festival in October 2022.

MEET THE VEEP

William Wilder, VP-Admissions By DR. SARAH SAPP, CAS EDITORIAL/PRODUCTION MANAGER

**W**illiam Wilder’s goals are to modernize the CAS admissions requirements to reflect the evolution of actuarial practice and to continue improving the experience for candidates.

As VP-Admissions, he is responsible for all aspects of the CAS admissions process and is a leader to the nearly 600 volunteers who support this work. He works closely with CAS Admissions staff and acts as the senior connection point between the staff and volunteers. Wilder reports directly to the CAS Board, who delegated him the responsibility of approving final selected pass marks for every exam.

Wilder’s ongoing goals relate to basic syllabus and exam processes such as syllabus updates, exam construction and grading, and results releases.

“Since about the time I stepped into this role in late 2020, we have had a significant initiative in flight called the Admissions Transformation Plan (ATP),” Wilder said. “A key component of modernizing admissions requirements, as announced at the Spring Meeting in Boston, our plan is to introduce a requirement for candidates to complete a predictive analytics project.”

Wilder particularly liked the way the predictive analytics project brought together such a diverse group of experts and the partnership between Admissions and the CAS Institute (iCAS).

“I’m also excited about the continuing improvements we’re making to our

candidate experience, like introducing time for a 15-minute break during the exam when the clock will pause, and expanding availability of practice tests in the testing environment,” he said.

Wilder is also pleased with the improvements the organization is making to the processes and tools. For example, a new item-writing development tool has been launched that integrates with the CAS’s item-banking platform. Introducing new item-types will increase efficiency with the organization’s volunteer grading resources.

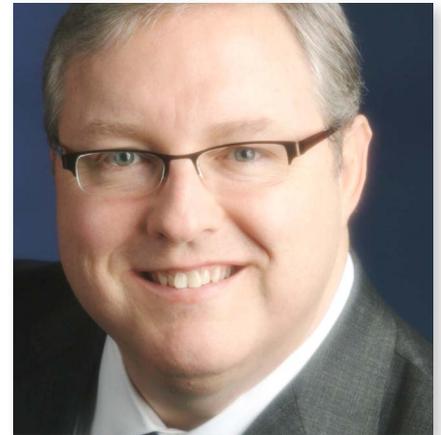
Like many other volunteer leaders, Wilder is most proud of the way volunteers and staff weathered the massive disruptions brought about by the pandemic.

“We had to skip a sitting back in 2020, but we came back with computer-based testing years ahead of schedule and never looked back,” Wilder said.

**“We had to skip a sitting back in 2020, but we came back with computer-based testing years ahead of schedule and never looked back,” Wilder said.**

“I’m also proud of the way staff and volunteers have come together in the past couple of years and how we’ve expanded opportunities for CAS members to get involved in ways beyond writing, grading and syllabus support.”

Wilder started volunteering for the Exam Committee immediately after achieving his Fellowship in 2001 and has been involved in the admissions



William Wilder

area ever since. He started writing and grading exams and then became the vice chair of his committee. He then took on a series of leadership roles from part chair to general officer to assistant chair and then chair of the full Syllabus and Exam Committee. Before being appointed as vice president, he was also elected to serve three years on the CAS Board.

“This has not only given me an opportunity to give back and keep my skills current, it’s given me a broad professional network and a number of colleagues whom I also consider to be good friends,” Wilder said.

Before he jumped into the actuarial profession, Wilder was an educator, and education has always been a passion of his.

“It’s why I volunteered for the Syllabus & Exam Working Group right after I got my FCAS,” Wilder said. “I was also specifically excited about all the initiatives and challenges the CAS was taking on in the wake of the pandemic.”

“As someone who was deeply familiar with the volunteer leadership team and also familiar with recent board priorities, it felt like a good fit,” he said. After his board term ended, Wilder decided to take some time off from volunteering. Then the Nominating Committee got in touch with him in early 2020 about taking on the VP role. “I realized that taking time off wasn’t what I really wanted after all.”

Wilder took a circuitous route to becoming an actuary. After teaching at the college level, he had planned to pursue a Ph.D. in mathematics. But Wilder met some real actuaries, and he remembered his high school guidance counselor’s

advice to pursue the actuarial field.

“I sat for the preliminary exams, got 10s, and before I knew it, I landed my first job as an actuarial assistant,” Wilder said.

With his focus on commercial products, Wilder progressed through the ranks at several insurance companies. He enjoyed commercial specialization business because of its complexity and its need to have both good analytical skills and an understanding of the specific requirements and challenges of the various market segments.

Most recently, Wilder joined EY thanks to some introductions arranged by his colleague and fellow CAS volunteer, Kathy Odomirok. This is Wilder’s first work in consulting, and he is finding it a good fit.

“We’re growing and expanding our service offerings within P&C actuarial consulting, and it’s been professionally

gratifying to be a part of that,” Wilder said. “I get to solve interesting and impactful problems, interact with loads of smart and dedicated people from diverse backgrounds and experiences, and develop my professional skills while experiencing good work/life balance and an opportunity to give back to my profession and the common good. What more could I ask for?”

Wilder encourages those who want to pursue a volunteer leadership role to start by getting involved as a member of a working group or task force.

He advocates Admissions as a good place to start. “There are lots of opportunities . . . we have so many volunteers and such a robust organizational structure and leadership team,” Wilder said. “There’s a genuine opportunity to progress and develop leadership skills that can help in your career beyond volunteerism.” ●

### Admissions Transformation Timeline

2020	2021	2022	2023	2024
<ul style="list-style-type: none"> <li>Moved all CAS exams to the Computer-Based Testing (CBT) format with Pearson VUE.</li> <li>Completed all grading in new grading management software.</li> <li>Completed Job Task Analysis for ACAS and FCAS examinations.</li> </ul>	<ul style="list-style-type: none"> <li>Administered multiple forms of each CAS exam to enhance security.</li> <li>Delivered MAS-I and MAS-II results nearly 50% faster than previous exams.</li> <li>Launched Exam 6-International.</li> </ul>	<ul style="list-style-type: none"> <li>Published plans to replace a preliminary exam requirement and launched the CAS Data Insurance Series Course: Introduction to Data &amp; Analytics (CAS DISC DA).</li> <li>Produced new Content Outlines (Syllabi) for exams MAS-I, MAS-II and 5.</li> <li>Removed the guessing penalty for MAS-I and MAS-II exams beginning with the fall 2022 administration.</li> <li>Produced new Study Materials for MAS-I and MAS-II exams.</li> </ul>	<ul style="list-style-type: none"> <li>First offering of CAS Data Insurance Series Course: Introduction to Data &amp; Analytics (CAS DISC DA).</li> <li>Refresh of Data and Insurance Series Courses: CAS DISC: Risk Management and CAS DISC: Insurance Accounting.</li> <li>Anticipated publishing of new Content Outlines: exams 7 and 9 and exams 6 and 8.</li> <li>Anticipated launch of updated exams MAS-I, MAS-II and 5 in fall 2023.</li> </ul>	<ul style="list-style-type: none"> <li>Launch New Exam Feature! Produce exam results faster.</li> <li>Anticipated launch of updated exams 6–9.</li> </ul>

*William Wilder and his Admissions team of volunteers and staff developed the Admissions Transformation Timeline.*

MEET THE VEEP

## Kimberly Guerriero, VP-Marketing & Communications

It is critical that the CAS remains engaged with its stakeholders, and the work done in marketing and communications (M&C) at the CAS is constantly evolving and shifting to meet their changing demands and keep the CAS top of mind in the industry.

Kimberly Guerriero, FCAS, MAAA, is responsible for overseeing the working groups and task forces within the M&C space. These include all the CAS engagement groups, including university, candidates, employers, new members, members and volunteers. The M&C

space also includes public relations and the Joint CAS/SOA Committee on DEI (JCIED).

“One of my goals is to ensure that all stakeholders are heard and valued, and for the CAS to better understand how our members want to be heard,” said Guerriero. “Another of my goals is to diversify the pipeline of actuarial candidates. I was really fortunate that my mother knew what an actuary was and introduced me to the profession. I want all kids to have that opportunity. In my future world, the word actuary is a

household name, kids play dress-up actuary, and #dressupactuary is trending.”

Guerriero is looking forward to the new structure and purpose of the Member Engagement Advisory Working Group and folding social media into that working group.

“I’m also really excited about all of the university outreach that we’re doing and how the CAS was able to quickly pivot in the middle of

COVID to offer the Student Central Summer Program. I love how the JCIED has partnered with all the affinity organizations and is working to expand and support the pipeline of candidates into the actuarial profession. All of the work that the Public Relations Advisory Working Group (PRAWG) is doing to get the CAS into the spotlight and highlight all the great work P&C actuaries are doing is amazing,” said Guerriero. “It’s hard to pick just one thing or even a couple of things because there are so many great things going on in this area.”

Guerriero is most proud of the M&C Council structure that formed in late 2021. This was informally put into effect with her predecessor, Shane Barnes, and then more formally with the rollout of the new volunteer-staff framework. With this new structure, all the working groups within the M&C can see what the other working groups are doing and can leverage those connections to enhance their own working groups.

“I would not have been able to do this role without the constant support of Mike Boa, chief communications officer,” said Guerriero. “I feel extremely lucky to have been able to work with him for the past almost four years. My predecessors set this position up for success the way that they worked with Mike in the past, so all I had to do was say yes and continue in their footsteps.”

Boa is appreciative of the dedication, enthusiasm and conscientiousness that Guerriero brings to the organization.



Kimberly Guerriero (left) and Katey Walker, FCAS, MAAA, CSPA, sport sailor hats and show love for the profession.

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“Throughout our years of working closely together, Kim has been unwavering in her commitment to improving member engagement,” said Boa. “One of Kim’s standout accomplishments has been her strategic use of market research methods, such as focus groups and surveys, to gain valuable insights into our members’ needs and preferences. By harnessing the power of data-driven decision-making, she has spearheaded new tactics that resonate with our members, such as a focus on LinkedIn as our members’ social media platform of choice, leading to increased participation, enhanced communication channels and a stronger sense of community within our membership.”

When Guerriero became an ACAS in 2012, she joined the New Members Committee and got hooked on volunteering. She rose from member to chair of the New Members Committee within a few years. She has also volunteered on the Committee on Professional Education, the Examination Committee and the Member Advisory Panel.

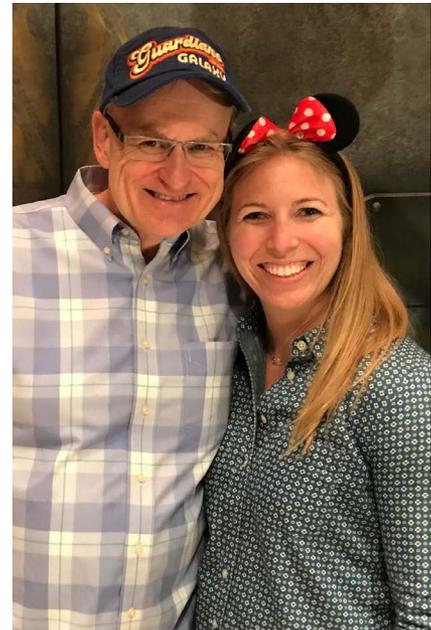
“It’s a great opportunity for me to give back, and for me, it’s an opportunity to develop my network and professional skills,” said Guerriero. “At the time I was asked to take this leadership position, I was stepping down from my position as

chair of the New Members Committee and was looking for my next volunteering opportunity. It was a natural progression from the volunteering work I had previously done with New Members. I was also really excited to learn more about the inner workings of the CAS and work with the JCIED and University Engagement.”

Guerriero graduated from Hamilton College in 2007 with a BA in economics. She began her Milliman career as an intern in 2005 while in college and rose to the role of principal and consulting actuary in 2022. Her primary focus is the alternative risk market. Most of her clients are captives, risk retention groups and self-insureds.

Guerriero encourages those interested in taking on a volunteer leadership role to dive into volunteering.

“There are so many ways to volunteer with the CAS, and, with the new volunteer-staff framework, the CAS is better poised to use the talents of its members,” said Guerriero. “I think the PRAWG is one of our best examples of this. Kate Niswander, director of communications and marketing, does a great job of identifying news outlets to highlight the amazing work of P&C actuaries. Most of us as actuaries don’t have media experience, but the CAS staff do. So, with their



*Brian Brown and Guerriero share a moment at the 2017 Annual Meeting in Anaheim, California.*

help we’re able to showcase our talents by getting placements in the media.”

Guerriero will conclude her term as vice president in November. ●

**MAKING THINGS HAPPEN** By DR. SARAH SAPP, CAS EDITORIAL/PRODUCTION MANAGER

## Zaremba's Positive Attitude Inspires Others

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

For Art Zaremba, it is an inspiring time to volunteer in Admissions with the Syllabus and Examination Committee (SECOM).

Zaremba is a SECOM general officer who helps oversee one of the CAS exams. He will soon be moving into a SECOM chair role. His main responsibilities include ensuring that the writing and grading of exams are being handled effectively, teaming up with the CAS staff on exam-related processes and initiatives, and working with other SECOM volunteers in the process.

Since the start of COVID and moving exams to computer-based testing, important changes have been taking place to help modernize the exam process. Much of this is detailed within the [Admissions Transformation Plan \(ATP\)](#) that can be found on the [CAS website](#).

“Looking ahead, it’s an exciting time where we can look to rely more on technology to help write, grade and administer exams,” Zaremba said.

Zaremba is a model volunteer because he consistently shows dedication, passion and reliability to the CAS and the SECOM, said Ashley Zamperini, CAS director of certification products.

“His willingness to give his time and effort to support the exam system is selfless, and he always advocates for what’s best for the candidates and volunteers,” said Zamperini. “He approaches volun-



*Zaremba and his wife (Kristine) and daughters (Allie and Zoe) from the summer*

teer work with a positive attitude, which inspires others to get involved.”

Zaremba is most proud of the various in-person meetings that the committee has hosted in numerous venues around the country.

“From large meetings with 50+ people where everyone has a chance to be

from these meetings,” Zaremba said.

While he started with SECOM as an exam writer and grader immediately upon attaining his FCAS in 2009, Zaremba spent many years on a reinsurance research committee and volunteered for several years on a planning committee for a joint CAS/CPCU conference.

**“Looking ahead, it’s an exciting time where we can look to rely more on technology to help write, grade and administer exams,” Zaremba said.**

heard, to small breakout meetings where we as actuaries get really in the weeds reviewing technical topics, to the social events — a lot of good memories come

“The research committee provided some neat opportunities, including presenting to a small audience on different topics, including insurtech



Zaremba (top row, far left) is pictured in his new CAS Fellow group photo at the 2009 Annual Meeting, when John Kollar (front row, center) was CAS president. See AR online for the identities of his classmates also pictured.

and insurance-linked securities. These opportunities provided me with a way to use my own personal time to get better acclimated to topics that I may not see at work day to day. The planning committee made me appreciate attending CAS meetings that much more, knowing the extensive work that volunteers put in behind the scenes to make it happen.”

Zaremba grew up in the Chicago area and attended the University of Illinois, graduating with a B.S. in mathematics in 2003. Admittedly, he did not know much about the actuarial field while in college.

“I started my career in a finance role in a large locally based corporation and began taking my first actuarial exams on the side,” Zaremba said. “Two years after graduation I moved into the actuarial field, and, looking back to that time, it was absolutely the right decision. I spent many years in consulting working for a ‘Big 4’ audit firm, which offered

a lot of great opportunities. One of the most memorable was living in London for several months working on Solvency II-related projects. Currently, I just hit the 10-year mark in a chief actuary role with an managing general agent-turned-carrier that’s part of a large German reinsurer.”

Zaremba explained that there is a broad spectrum of thought about volunteering.

“Some actuaries may never volunteer, either for personal reasons or because they want more free time after completion of exams,” he said. “For some, they volunteer upon attaining a CAS credential but only want to serve for the minimum requested time frame and then be done. Then there are many others like me, where once they started volunteering for the CAS they haven’t stopped.”

“I’ve had to spend a significant amount of personal time over the years

in my CAS volunteer roles. In general, I do find it rewarding and worthwhile, which keeps me at it. Just as important though, I feel a certain obligation to give back to the CAS. I’ve enjoyed my career path and give credit to the CAS for helping me get to where I am.”

Some fun facts about Zaremba: Outside of work and the actuarial world, Zaremba’s kids are at that age where sports and dance and other activities take up a lot of family time. He’s been coaching his kids for years in various sports, which gets him closer to the action. His main hobbies include playing basketball and skiing, two things he hopes to be able to do for many more decades. He and one of his daughters recently attended game five of the NBA Finals in Denver. He and his family are big fans of the NBA and like Nikola Jokić and the Nuggets. He booked the trip, and they were lucky that it ended up being the final game of the series. ●

EXPANDING GLOBALLY

Report from Down Under — CAS Leaders Connect with Global Counterparts on Actuarial Issues

By MALLIKA BENDER, FCAS, MAAA, CAS DIVERSITY, EQUITY AND INCLUSION STAFF ACTUARY

This past May, several CAS members had the privilege of joining actuaries from around the world as they convened for the International Congress of Actuaries (ICA) in Sydney, Australia. Some actuaries arrived early to participate in the International Actuarial Association (IAA) council and committee meetings that took place the week prior to the ICA. At these IAA meetings, CAS members formally shared information on how our organization is supporting the evolution of the P&C actuarial profession across a variety of issues, and they had the opportunity to connect in person with members of several other actuarial associations from around the world.

Over the course of two weeks, the CAS also hosted informal bilateral meetings with representatives from other actuarial associations around the world, including Australia, Brazil, China, France, Germany, Kenya, Singapore, Taiwan, United Kingdom and Vietnam. These meetings allowed the CAS representatives to deepen relationships with their counterparts in these countries, share their respective priorities and challenges, look for opportunities to collaborate, and offer CAS support and expertise, especially on issues related to P&C insurance.



**A fruitful gathering.** CAS Members celebrate a successful meeting at the IAA Official Dinner held at the Australian Maritime Museum. Pictured, left to right, are Kevin Dyke, Rade Musulin, Bob Conger, Yvonne Palm, Wes Griffiths, Kendra Felisky, Nico Vega, Mary Hosford, Maryellen Coggins and Kyle Rudden.

The ICA hosted 1,500 actuaries from more than 80 countries for three days of in-person and virtual sessions, plus a half-day diversity workshop and an extra fully virtual day at the end. Many of the sessions highlighted how actuaries are increasingly participating in interdisciplinary teams to help tackle some of the world's biggest issues, like cyber security, artificial intelligence, climate risk, catastrophes and aging infrastructure. There was a significant focus on how actuaries can use data to make a positive impact on society in alignment with "Data for

Good," a media campaign conducted by [Australia's Actuaries Institute](#). CAS members, including President Roosevelt Mosley and President-Elect Frank Chang, were featured in panel discussions on these topics.

Other ICA sessions displayed how actuarial credentialing systems around the world are evolving, as associations strive to provide their members with foundational data science skills and opportunities to earn micro-credentials or pursue more specialized knowledge tracks.



**Making connections:** The CAS delegation conducted several bilateral meetings with other actuarial organizations. Pictured from left to right are VP-International Kendra Felisky; Ron Kozlowski, FCAS; CAS President-Elect Frank Chang; and Luong Xuan Truong, head of the Actuary Division of the Insurance Association of Vietnam.

“These meetings remind us of how much great work is being done in so many places by actuaries,” said Rade Musulin, ACAS, MAAA, CCRMP, who attended both IAA and ICA. Musulin spoke at the ICA opening plenary session called “Professor Tim Flannery and the Serious Business of Climate Change” and a parallel plenary on day three called “Meeting the Climate Risk Challenge — How the Actuarial Profession is Making a Difference.” He was also chair of another ICA session on day one, “Modeling for our Future World.”

For Musulin the most impactful thing he learned at the conferences was that the actuarial profession is global and dynamic. “Having worked all over the world and being active in the IAA, I appreciate the hard work being done in various countries in various stages of development,” he said. “The Sydney meetings were an opportunity to be reminded of that, something one sometimes does not appreciate by reading papers or doing Zoom calls.”

Other CAS members also had high praise for the meetings. CAS Vice Presi-

dent-Administration Mary Hosford, AIM, FCAS, CPCU, MAAA, noted the excellence of the opening and closing keynote sessions. In the opening keynote session, Dame Inga Beale, the former Group CEO at Lloyd’s of London, discussed her experiences as the first woman in that role. The closing session featured two brothers, one an actuary in Australia and the other the CEO of Qantas airlines, who talked about the pandemic, diversity and sustainability. Hosford’s biggest takeaway from the conference was how AI like ChatGPT can improve efficiency.

Margaret Sherwood, FCAS, attended the IAA Town Hall, the Actuarial Standards Committee, the General Insurance Forum, the International Association of Consulting Actuaries Board meeting, the Climate Risk Task Force meeting and several social events. “All the sessions were important for different reasons,” Sherwood said. “My favorite parts of the IAA meeting were the interaction with actuaries in different practice areas from around the world and working with them to make the profession better and solve real-world problems.”

First-time, in-person attendee Wesley Griffith, FCAS, found that the networking was invaluable for tackling problems in his job and CAS volunteer work. “It’s wild how similar the challenges and opportunities are for actuaries around the world,” Griffith said. “While there is nuance to being an actuary in different geographies, we’re all working to solve similar problems of importance to the economy and to society. By working together through the IAA, we can help to move the needle and make progress together.”

In his July-August 2023 [President’s Message](#), Roosevelt Mosley drives home the value of the international actuarial community at the ICA, stressing the importance of learning different perspectives and finding chances to collaborate. “There is a significant opportunity for the CAS to influence the future of P&C work worldwide,” Mosley writes.

The [33rd International Congress of Actuaries](#) will take place in Tokyo in 2026. ●



**A breathtaking view:** CAS members had time to take in the sights of Sydney. CAS Board Member Yvonne Palm (left) and CAS Vice-President International Kendra Felisky take a break in front of the Sydney Opera House.



## Casualty Actuarial Society Surpasses 10,000-Member Milestone

The [Casualty Actuarial Society](#) (CAS) reached the 10,000-member milestone this year with its newest class of Fellows and Associates, with membership consisting of 6,676 Fellows, 3,340 Associates, and 33 Affiliate members, for a total of 10,049 active members. Through its rigorous examination process, extensive professional education offerings and pioneering research, the CAS has been setting the standard of expertise, credibility, and professional integrity for the property/casualty (P&C) actuarial profession for over 100 years.

Members of the CAS continue to be sought after globally for their insights and ability to apply analytics to solve insurance and risk management problems; CAS actuaries are helping companies harness new data, take advantage of innovative methodologies

and leverage advances in technology, including artificial intelligence. Demand for actuarial expertise is also evident through the organization's 5.7% average annual membership growth over the past decade.

"Reaching the milestone of 10,000 members is a profound moment for our organization, and it symbolizes the remarkable impact that actuaries have on society," said CAS President Roosevelt Mosley, FCAS, CSPA. "The CAS was formed to help usher in a new era of addressing societal risks, and more than 100 years later, we remain as relevant as ever. I am inspired by the future of the organization and the knowledge that CAS members' work has contributed to the betterment of our society."

This milestone represents the transformations the organization has undertaken to meet the demands of an

industry that is constantly changing, according to Victor Carter-Bey, CAS CEO.

"We provide our members with cutting-edge knowledge and a platform for continuous growth, while always staying true to our mission of excellence in P&C education, research and credentialing," said Carter-Bey. "As we grow from 10,000 members and beyond, we will continue innovating and adapting to provide our members with the skills, resources and opportunities they need to solve pressing risk management problems."

The CAS plans to formally recognize its 10,000 member milestone at the [CAS Annual Meeting](#), taking place on November 5-8, 2023, in Los Angeles.

In the meantime, the organization will be sharing relevant content on its social platforms with the hashtag #CAS10K. ●

# ANNUAL MEETING



## *Journey to the Top*

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

## Roger Hayne Steps Down as *Variance* Editor in Chief; Peng Shi Takes the Helm

By DONNA ROYSTON, CAS MANAGING EDITOR

After a three-year tenure, Roger Hayne is departing the position of editor in chief (EIC) of *Variance*. Peng Shi, who has served as co-editor for three years, is stepping up to the EIC position.

Hayne is a CAS Fellow with a long career at Milliman, where he started to work in 1977. He was involved in the creation of *Variance* in 2007. Before *Variance*, the CAS's refereed journal was the Proceedings of the Casualty Actuarial Society (PCAS), and, being a record of what occurred at CAS meetings, was essentially inward looking. Recognizing this limitation, the CAS formed a task force to design a new journal, giving rise to *Variance*.

"*Variance* is truly an open publication that presents quality peer-reviewed papers from around the globe, no longer limited to what happened at CAS meetings," notes Hayne. "However, many of us, including myself, felt that something may have been lost that was at the heart of the Proceedings (PCAS), that is, papers with a solidly practical orientation. Many *Variance* papers were tending toward the more theoretical. We who served on the original task force behind *Variance* did not foresee this. It was with this background I agreed to serve as editor in chief of *Variance* with a goal of trying to bring some of the practical flavor of PCAS to our modern *Variance*."

"If we can give the theory life and use by combining it with the practical tradition of PCAS," Roger adds, "then *Variance* will continue to occupy a unique place in actuarial literature. I hope that, working with Peng, we helped

nudge *Variance* closer to that place."

Roger commented humorously on his retirement: "Retirement ain't what it used to be. When did I (or am I going to) retire? I stepped back from full-time actuarial work at the end of 2014. After that, I still supported my former partners at Milliman in an on-call, part-time capacity, and have been privileged to serve the CAS on its Discipline Committee, as vice president-international and as *Variance*'s EIC. Was I retired then or not? Will stepping away from work with Milliman in September 2023 mark retirement?"

"I do plan to take advantage of the location of the 2023 Annual Meeting to renew acquaintances and continue to learn more of our growing and vibrant science. Is that retired? On the personal side, I hope to see and experience a bit more of what our planet has to offer, and to continue to learn of other lands and cultures. Is that retirement? If it is, I enjoy it."

Peng Shi, ACAS, FSA, is a professor in the risk and insurance department at the Wisconsin School of Business in Madison. He is also the Charles and Laura Albright Professor in Business and Finance. He holds a Ph.D. in actuarial science, risk management and insurance from the University of Wisconsin-Madison.



Roger Hayne



Peng Shi

"Working with Roger on the *Variance* journal has truly been a privilege," said Shi. "I look forward to working with the editorial board to further amplify the impact of the journal and expand its readership. *Variance* is the flagship journal of the CAS, and I envision it growing into a prominent hub where risk professionals and researchers exchange ideas and advance the sciences of risk. While maintaining its commitment to the CAS membership, *Variance* will also continue to cater to the broader actuarial community, in particular in the property and casualty domain."

Hayne and Shi expressed their deep appreciation for the tireless work of the associate editors and reviewers, whose dedication and spirit of volunteerism has allowed *Variance* to publish papers that are valuable to CAS members and the actuarial community.

As Shi moves into the EIC position, *Variance* is seeking to fill the co-editor position, as well as some editorial positions. If you are interested, contact Donna Royston ([droyston@casact.org](mailto:droyston@casact.org)) or Elizabeth Smith ([esmith@casact.org](mailto:esmith@casact.org)). ●



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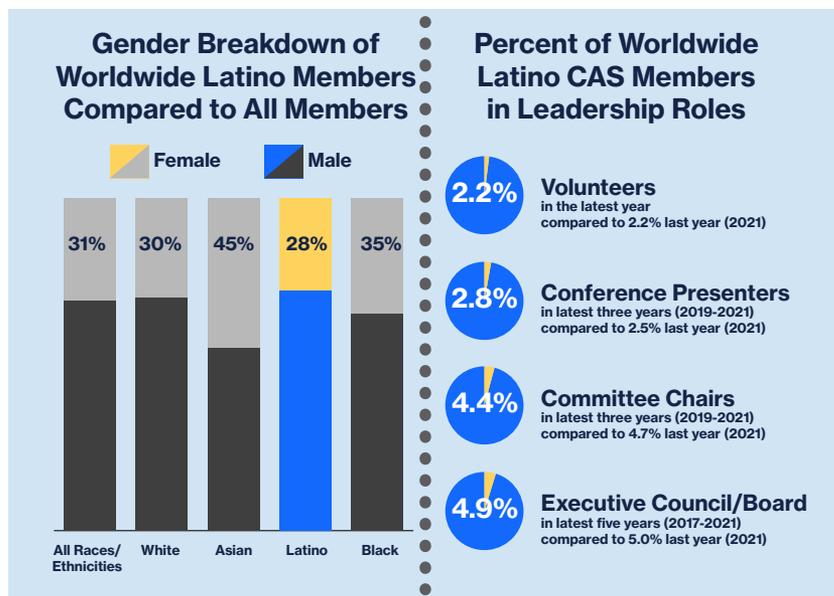
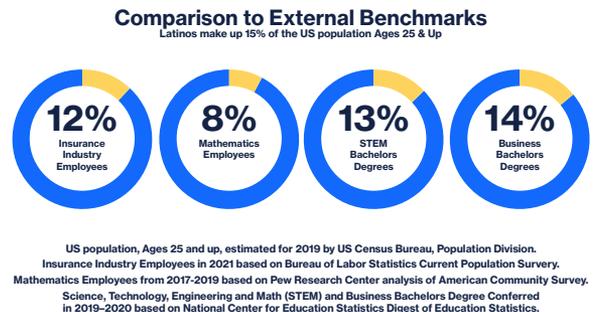


# CAS SPOTLIGHT ON DIVERSITY 2022

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United States Membership and Candidate Data as of December 2022

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



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# Climate Change Risk (and Opportunity) for the P&C Actuary

By ALP CAN AND RADE MUSULIN

*The bad news:  
Extreme weather and  
decarbonization are  
affecting us now*

July 4, 2023, was notable for more than being the 247th anniversary of America's independence. It was in the middle of a four-day stretch of the hottest global mean surface air temperature recorded in the Copernicus ERA5 database, which goes back to 1940.<sup>1</sup> Meanwhile, residents of major cities in North America experienced choking smoke from wildfires in Canada and water temperatures off the coast of Florida reached 101.1F (38.4C), threatening widespread bleaching of coral reefs.<sup>2</sup> In Europe, heat, dry vegetation and wind gusts led to fires that burned 135,000 hectares in 12 days, which is in addition to the 260,000 hectares previously burnt in 2023.<sup>3</sup> China set a national daily temperature record in July and Beijing was hit by the heaviest rainfall in 140 years.<sup>4</sup> These

<sup>1</sup> <https://climate.copernicus.eu/july-2023-sees-multiple-global-temperature-records-broken>

<sup>2</sup> <https://www.npr.org/2023/07/26/1190218132/florida-ocean-temperatures-101-marine-life-damage>

<sup>3</sup> [https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/wildfires-mediterranean-monitoring-impact-helping-response-2023-07-28\\_en](https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/wildfires-mediterranean-monitoring-impact-helping-response-2023-07-28_en)

<sup>4</sup> <https://public.wmo.int/en/media/news/exceptional-heat-and-rain-wildfires-and-floods-mark-summer-of-extremes>

are the latest in a long series of extremes providing mounting evidence that climate change is a danger to people and the financial institutions that insure their assets.

The message of the Intergovernmental Panel on Climate Change (IPCC) on this is clear. Quoting from the IPCC-International Actuarial Association paper “Climate Science: A Summary for Actuaries”:

Recent changes in the climate are widespread, rapid, and intensifying. They are unprecedented in thousands of years. It is indisputable that human activities are causing climate change. Human influence is making extreme climate events, including heatwaves, heavy rainfall and droughts, more frequent and severe.<sup>5</sup>

The signs of a changing climate surround us: retreating ice sheets, warming and acidifying oceans, rising sea levels, strengthening hurricanes, stronger monsoons and floods, and drought.

Beyond extreme weather and rising seas, energy infrastructure is moving to renewable sources and electrification. Firms face stricter reporting requirements and exposure to litigation for both environmental damage and failing to properly disclose information on investments or emissions. Corporate planners must also consider political risk, as polarization may lead to sudden changes in policies following elections.

All of this will affect P&C insurers and the actuaries who provide services to them. Like the advent of spreadsheets, laptop computers, the internet, catastrophe modeling and DFA, this new challenge will have a significant impact on actuarial practice.

### **The good news: opportunities arise**

The good news is that with increasing risk comes the opportunity for astute management of it by traders of risk, and that includes P&C insurers, which have the capacity and responsibility to embrace emerging challenges to bring new value propositions to society.

## **While these challenges are real and create financial risk for P&C insurers, they will open major opportunities for new products and markets ...**

The notion that P&C insurers can ignore this because they can reprice contracts annually, that political gridlock in the U.S. will block the type of regulatory action that are seen abroad, or that the rate regulation process will mute any price changes should be considered in the context of:

- Insurers seeing a surge in losses from extreme weather in the present.
- Reinsurance markets factoring both recent events and climate projections into their largely unregulated prices.
- Government pools exposing insurers to deficit assessments.
- The National Flood Insurance

Program facing significant fiscal challenges due to rising sea levels and extreme precipitation; if it raises prices to match risk, many properties will become uninsured and decline in value, impacting customer bases and opening the door to litigation over whether insured wind or uninsured water causes losses.

- Electric vehicles and green building practices affecting both what is insured and how it is repaired.
- Rising litigation risk due to allegations of greenwashing and liability for environmental damage.
- Increasing reporting requirements, which will impact firms across the economy; even if U.S. regulators are slow to act, the fact that many U.S. insurers that operate internationally or are publicly traded will be forced to meet demands for more disclosure.

While these challenges are real and create financial risk for P&C insurers, they will open major opportunities for new products and markets, in addition to creating a need for the type of risk analysis actuaries excel in to support resilience and adaptation measures.

### **Systems thinking: a key skill**

Climate risk requires a more holistic view, as it is quintessentially systemic. It goes beyond catastrophic events to the interaction of climate and human systems. Breaching of climate

<sup>5</sup> “Climate Science: A Summary for Actuaries”, IPCC and International Actuarial Association, page 4, [https://www.actuaries.org/IAA/Documents/Publications/Papers/Climate\\_Science\\_Summary\\_Actuaries.pdf](https://www.actuaries.org/IAA/Documents/Publications/Papers/Climate_Science_Summary_Actuaries.pdf)

tipping points can have cascading effects on complex systems. Consider a natural catastrophe having knock-on effects of property destruction, business interruption, stressed supply chains, damage to ecosystems and possibly a humanitarian crisis. Currently, many systems are underprepared to withstand projected changes in both climate and the economy, which is likely to lead to diverse forms of stress on communities, businesses and political systems.

History is full of such examples, including two recent events. In 2010 extreme weather caused a large decline in wheat production and a consequent spike in global grain prices. The resulting surge in the cost of bread in many developing countries placed great stress on significant parts of the population and many countries' political systems. Also in 2010, massive flooding in Thailand triggered by an abnormal late season monsoon significantly disrupted key suppliers of automobile parts, affecting manufacturers around the world.<sup>6</sup>

This systemic risk has ramifications for the P&C industry through potential underwriting losses or declines in asset prices. Beyond direct effects, climate change can threaten the business model of P&C insurance. Historically reliable premium and profit sources may shrink in geographies and industries exposed to climate change, thereby rendering significant portions of insurers' books of business less viable.

### **New approaches are needed**

Climate change risk necessitates new approaches to P&C insurance business. Climate-specific scenario analysis will supplement traditional catastrophe models to understand the potential impact of extreme events. Advanced analytics techniques will be needed to project how various acute and chronic hazards may affect risk over time. Actuarial assessments will need to reflect future projections derived from climate science in addition to the historical insurance experience that currently informs pricing and reserving.

There are opportunities for P&C insurers to bring new products to market, such as the insuring of electric vehicles, customizing the coverage for homes with solar panels, managing workers' compensation risk across rising and declining industries, and many more. In addition, growth in the value

at risk and higher volatility increases the demand for new and different insurance solutions. Insurers have an opportunity to offer innovative approaches to cover newer and more frequent hazards, both acute, such as wildfires, and chronic, such as reduced crop yields.

Insurers can also play a role in matching risk-transfer solutions to alternative capital from investors with more risk appetite. A case in point is a World Bank-led transaction to protect a Uruguayan state-owned electric power company against drought (which would cripple hydroelectric production) as well as against high oil prices (which would make power generation costly).<sup>7</sup>

Actuarial skills can also be applied to public policy projects, such as future-proofing building codes and land use policies or redesigning government pool mechanisms to address affordability issues in high-risk areas.

### **CAS research is making a contribution**

The CAS has been supporting research into natural disasters.

The CAS Research Paper "Climate, Spatial Dependence, and Flood Risk: A U.S. Case Study"<sup>8</sup> outlines how increasing flood losses can be understood in the context of both social and climatic factors. It shows how data on economic flood losses, historical climate, census population and geological characteristics can be used to explore drivers of flood losses and climate trends.

Another CAS Research Paper, "Catastrophe Models for Wildfire Mitigation: Quantifying Credits and Benefits to Homeowners and Communities,"<sup>9</sup> explores how catastrophe models can be used to support loss reduction efforts. Reducing losses through adaptation is a critical component of building community resilience in the face of climate risk and creating conditions where insurance can remain affordable to consumers.

Contributions like these from professional actuarial organizations help keep actuaries at the forefront of solving important social problems and informing sound public policy.

### **The future**

P&C insurers have a chance to play a major role in confronting

<sup>6</sup> "Climate-Related Scenarios Applied to Insurers and Other Financial Institutions," International Actuarial Association, Section 5, [https://www.actuaries.org/IAA/Documents/Publications/Papers/CRTF\\_Application\\_Climate\\_Scenarios.pdf](https://www.actuaries.org/IAA/Documents/Publications/Papers/CRTF_Application_Climate_Scenarios.pdf)

<sup>7</sup> <https://www.worldbank.org/en/results/2018/01/10/uruguay-insurance-against-rain-oil-prices>

<sup>8</sup> [https://www.casact.org/sites/default/files/2022-12/RP\\_ClimateSpatialDependence\\_FloodRisk.pdf](https://www.casact.org/sites/default/files/2022-12/RP_ClimateSpatialDependence_FloodRisk.pdf)

<sup>9</sup> [https://www.casact.org/sites/default/files/2022-10/RP\\_Cat\\_Models\\_for\\_Wildfire\\_Mitigation.pdf](https://www.casact.org/sites/default/files/2022-10/RP_Cat_Models_for_Wildfire_Mitigation.pdf)



climate change as stakeholders demand that insurance solutions go beyond traditional risk transfer to explicitly address climate risk adaptation and seize new opportunities. Insurers can help organizations adapt, and in this way, protect a greater share of the global economy.

To take full advantage, P&C insurers need to understand the consequences and knock-on effects of specific climate hazards within the context of different sectors and geographic areas. By adapting the tools we use in our traditional work, such as catastrophe and economic capital models, actuaries can tackle the problem of determining the optimal investment that societies should make in climate change mitigation and adaptation. To achieve this, we need to broaden our continuing education to include climate topics and get involved in multidisciplinary groups working on climate-related issues.

As the demand for climate disclosure increases, it quickly

becomes evident that addressing the uncertainty in forecasts and understanding the confidence scientists have in them is critical. Insurers must think of the future not as a single point estimate, but a range of possible states that should be considered stochastically. Actuaries are uniquely positioned to guide decision makers through this maze by creating cohesive narratives around the magnitude of the risk faced and appropriate responses. This can emphasize the importance of taking evasive action against risk while “right-sizing” the response, considering costs and benefits over time.

With diligence and foresight, we can position ourselves as crucial agents in building the economy of the future based on sustainable practices. ●

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*Alp Can, FCAS, and Rade Musulin, ACAS, are members of the International Actuarial Association's Climate Risk Task Force.*

# RESEARCH IN ACTION:

# 2023

BY BRIAN FANNIN, CAS RESEARCH ACTUARY



*Discover the latest  
from CAS Research  
and what's in store for  
the future.*



*The author (center) at the 2023 Actuarial Research Conference.*

As happens every year, we've done some interesting work for CAS research. We've looked at inflation, wildfires, floods, cannabis legislation, deep learning, new drivers in Saudi Arabia and more.

We'll kick things off by taking a look at something I'm often asked about: Does the CAS work with other actuarial societies? It gives me great joy to say that we do! The CAS has regular meetings with our research counterparts at the Canadian Institute of Actuaries (CIA) and the Society of Actuaries (SOA).

We have supported several projects with the SOA, the most significant of which was a series of panel discussions looking at cyber risk. In this series, experts discussed the various ways that cyber attacks may harm consumers and businesses and how the industry can respond. We will soon publish work that explores the risk of smart homes, a paper about cryptocurrency and a report discussing "the new normal" for the insurance industry. Where interests align, our two organizations work to support one another to make high-quality research freely available to actuaries and stakeholders.

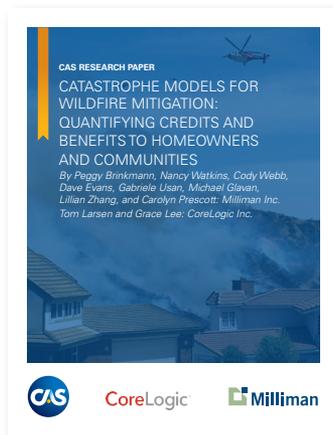
With the CIA, we published a paper at the beginning of the year that we first started discussing several years ago. The legal status of marijuana has changed over the past decade or so, most significantly when Canada decriminalized private use in 2018. This creates a natural experiment where we may examine the publicly available data on auto accident frequency

and severity to gauge whether marijuana's legal status has an impact. To discover what we concluded, you'll want to have a look at the report "[Assessing the Impact of Marijuana Decriminalization on Vehicle Accident Experience](#)" by Vyacheslav Lyubchich. When reading that report, please note that the research explored the question of whether a change in *legal status* had an impact on auto accidents. It did *not* study whether marijuana use by an individual driver would affect the likelihood of accident frequency and severity.

Speaking of international research, as I write this article, we are reviewing several proposals to research the impact of IFRS 17 in the Asian market. This is a deliberate step to engage with the growing number of CAS members in that part of the world. We expect that by providing the same caliber of relevant, pragmatic content that actuaries in the U.S. see, we may enhance the CAS's international brand.

### Climate

Last year I mentioned that we had received a final draft of a wildfire paper by Milliman and CoreLogic. I am happy to say that this CAS Research Paper has now been published. "[Catastrophe Models for Wildfire Mitigation: Quantifying Credits and Benefits to Homeowners and Communities](#)" is a very interesting work that explores the financial benefit of various risk mitigation techniques for homeowners. Consumers, the insurance industry, public policymakers and fire prevention professionals all want the same thing: fewer homes damaged by fire and a proper financial incentive to reduce risk. Insurance premium is where this second point becomes tangible. The work that Milliman and CoreLogic have done will be, we hope, a useful part of the conversations around how to move forward in everyone's mutual interest.



**By providing the same caliber of relevant, pragmatic content that actuaries in the U.S. see, we may enhance the CAS' international brand.**

Earlier this year, we saw the release of another CAS Research Paper, "Climate, Spatial Dependence and Flood Risk: A U.S. Case Study," that looks at this climate-adjacent issue. This paper was the result of four researchers, Rob Erhardt, ACAS, and Kejia Yu in the United States, and Mathieu Boudreault and David Carozza in Canada.

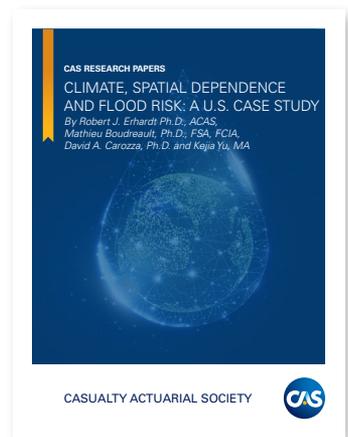
(Are we noticing a pattern about collaboration across borders and societies?) Most of the data is publicly available (see the paper's Section 2 for a partial list), so actuaries may explore the results for themselves.

### Inflation

Are you thinking about inflation? We are! Among other work, we have released two Research Papers by CAS Fellows Jim Lynch and Dave Moore that view inflation from a reserving perspective. Lynch and Moore have examined publicly available data from Schedule P, which they use to detect changes in link ratios on a calendar-year basis. This is compared to core inflation, and we find that the recent past has seen increases that are beyond your average, run-of-the-mill inflation. Social inflation? Perhaps not in full, perhaps not at all, but certainly

One of the stakeholders we engaged with was Frank Frievalt, former fire chief of the Mammoth Lakes Fire Protection District in California. His perspective was invaluable in guiding our efforts. For his part, he had this to say about working with actuaries:

"Before 2016 I had never professionally worked with actuaries. Since then, they have become one of my primary resources, and the knowledge from those relationships has made me a better fire chief; I hope our fire service contributions to them will have reciprocal value."



something that your organization can review. You can find the Research Paper “Social Inflation and Loss Development” and its “Update” under Publications on the [CAS website](#).

Jim Lynch has been very busy this year, and you’ll be able to hear from him directly in this and future issues of *Actuarial Review*. Some of us can recall the late 1970s and early 1980s when inflation in most countries was meaningfully higher than it is today. This generated a number of papers, one of which was written by Robert Butsic and published in 1982. Lynch takes a look back at how that research holds up and what lessons it has for today’s practicing actuaries — some of whom weren’t even born when Butsic wrote it! (See Lynch’s article on Butsic’s paper in this *AR*’s Actuarial Expertise Department.)

### Research working groups

We have a number of standing research working groups that support research call paper programs and requests for bespoke research. The Risk Working Group continues to look at the simulation of individual claims for reserving. The Spring 2023 *E-Forum* features the culmination of the Ratemaking Working Group’s biannual call for ratemaking papers (see next subheading). This working group is also looking to initiate research on convective storms and large language models. The Reserves Working Group is working on projects that examine expense reserving, Bayesian models for reserving and predictive analytics for case reserving. The Reinsurance Working Group has published two call papers in the Summer 2023 *E-Forum*, is finalizing an RFP and is starting a series of articles that give an overview of various reinsurance lines of business.

### Actuarial Research Conference

In early August, I was in Iowa for the 58th Actuarial Research Conference, hosted by Drake University. In addition to reconnecting with colleagues and friends, I was glad to share the stage with Peng Shi, ACAS, who presented a summary of his prize-winning Ratemaking Call Paper, “[Nonlife Insurance](#)

### [Risk Classification Using Categorical Embedding.](#)”

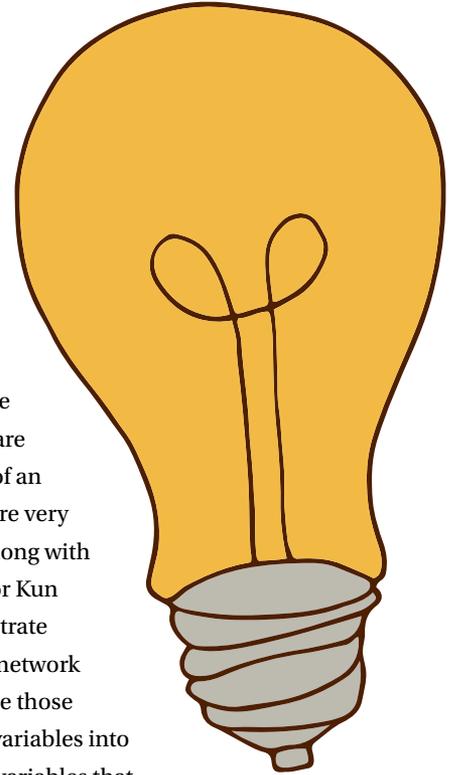
We are all aware that categorical data is ubiquitous in insurance pricing applications: territories, class codes, Standard Industrial Classification (SIC) codes, agents, size categories, etc. The list is vast. These distinctions are important for the operations of an insurance company, but they’re very difficult to model. Peng Shi, along with his co-author Kun Shi, demonstrate how a deep network may translate those categorical variables into continuous variables that may be modeled more easily.

For my part, I gave an overview of the CAS organizational structure, with an emphasis on the CAS Research Council and its responsibility for supporting the standing research working groups. CAS Chief of Advocacy Ken Williams, FCAS, conducted a session on exam changes, and University of Texas professor Alisa Walch, FCAS, talked about the CAS summer program. Both sessions were well attended.

### Rounding out the year

In just a few weeks, we will launch this year’s individual grant proposal process. At the 2023 Annual Meeting, we expect to announce the winner of this year’s Hacktuary contest. By the end of the year, we intend to finish the analysis of the third annual Actuarial Technology Survey.

This is a quick view of some of the work that CAS research is doing. There’s plenty more where this came from! ●



*Fannin (pictured above) and Peng Shi (below) represented the CAS with their presentations at this year’s Actuarial Research Conference.*

## A Peek at the CAS Archives: Inflation and Insurance By JIM LYNCH

Property-casualty insurers continue to struggle with inflation. The Consumer Price Index (CPI) rose by 7% in 2021 and 6.5% in 2022, the biggest annual increases since 1981.

As an actuarial topic, inflation has come into and gone out of focus as the phenomenon itself has waxed and waned. One of the better-known looks came from a paper that spent almost two decades on the Syllabus of Examinations. Robert Butsic’s “[The Effect of Inflation of Losses and Premiums for Property-Liability Insurers](#)” provides a detailed, though not always straightforward, look at how inflation permeates insurance operations. The insights, inelegantly reached, continue to be important for a practicing actuary:

- Rising interest rates provide insurers some insulation from a spike in inflation (just not as much as Butsic seemed to believe).
- If unanticipated claims inflation exceeds unanticipated general inflation, insurance results suffer.
- If interest rates exceed claims inflation, insurance results benefit.

Butsic’s paper also has some unstated lessons to impart:

- To create a successful model, actuaries have to thoroughly understand the process they are modeling. Butsic needed to think about when an insurer collects premium, invests funds and pays claims, and how inflation affected each of these in different ways.
- Actuaries need to consider their work as part of a larger insurance operation, not just within a pricing/reserving silo. In that way, Butsic’s



work draws a direct line to the present-day actuary — an important cog in the holistic management of an insurance operation.

Butsic wrote his paper in 1981, the year before the CPI for all Urban Consumers (CPI-U) rose by 12.5%. It had exceeded 4.8% in the previous seven years.

The paper looked at inflation’s effect on the typical actuarial jobs of the day: pricing policies and estimating. But it went further. It examined how inflation changed investment income and skewed the entire balance sheet.

It entered the syllabus just a year after publication, on Exam Part 10. The exam tested “the breadth and depth of the candidate’s understanding of the

insurance process.”

Within Part 10, the paper was included in a section testing knowledge of Financial Operations of Insurance Companies — “the various relationships that exist between underwriting results, investment income and taxes that arise out of the underwriting process and total operating income.”

The paper was about inflation, yes. But it envisioned an actuarial career broader than pricing and reserving. The Syllabus Committee, by putting the paper on the financial operations syllabus, not on the pricing or reserving exams, seemed to be saying actuaries need to develop the strategic skills that will make them leaders of the entire operation.

The paper remained on the syllabus

through 1999 when exams were reconfigured.<sup>1</sup> Inflation by then was under 3%.

Butsic's paper is quaint. He wrote it on an old-fashioned typewriter. The paper's Greek variables —  $\Delta$ ,  $\delta$ ,  $\alpha$ ,  $\rho$ ,  $\beta$ ,  $\Sigma$  — and the inequality operator,  $\geq$ , are scribbled in by hand.

He was working before personal computers permeated the workplace. The most powerful computer of the 1980s was the Cray supercomputer series, which helped the U.S. government on nuclear weapons research.

You wouldn't find one on an actuary's desktop, though. A single one costs around \$6 million. It weighed 55,000 pounds.

By today's processing standards, though, it was a runt. A six-ounce iPhone 12 is 5,000 times faster. To keep up with that iPhone, you'd need a stable of Crays weighing 27.5 million pounds, or more than every Division I college football player combined.<sup>2</sup>

Lacking the CPU heft, Butsic had to develop an algebraic model to show how pricing, reserving and investments all affected insurance results. His model was complex. I counted 34 variables.

Tracking 34 variables can be a slog. Forty years later, it may seem like Butsic introduced more variables than necessary. But his task was enormous. He modeled an insurer's entire financial operation: pricing, reserving, investments, balance sheets and cash flow. He didn't have a Lenovo desktop, or a Cray-2 or even an iPhone.

He had a typewriter. And it couldn't type  $\Sigma$ .

I say all that to help the reader

understand how the article is valuable even though its primary conclusion, "Insurers are, to a large extent, insulated against unanticipated changes in rates of inflation," proved incorrect. He seems to have gotten some stuff wrong, but he got a lot right, too.

His argument: Inflation raises claim costs, but insurers benefit from the higher interest rates at which they can invest. In most cases, he says, the benefits outweigh the costs.

Butsic leaned heavily — too heavily I'd argue — on the Fisher effect, the 1930 hypothesis that the nominal interest rate equals the sum of the real interest rate and the inflation rate. Citing the Fisher effect, he argues that "The effect of the claim inflation rate is *exactly offset* [emphasis his] by an equivalent change in the interest rate" at which claims are

Using our earlier numerical example, we had  $u = .048$ ,  $v = .211$  and  $m = 2$ . With  $r = 10\%$ , we get  $m_d = 1.952$ . Suppose that  $\rho = 2\%$ . If  $\delta$  also is 2%, we get  $\Delta u \approx -.02(2)(.952) = -.038$ . So  $u' = .010$ . But if  $\delta = 0$ , we have  $\Delta u \approx -.02(.789)(1.952)(.952) = -.029$ , so  $u' \approx .019$ . This example also shows that the underwriting margin shift is not sensitive to the accident or payment-date mode of claim inflation.

#### The Geometric Model

Again we can apply the geometric claim payment model to illustrate the preceding results concisely, without resorting to approximation. Letting  $a_k = aq^{k-1}$  in equation (43), we have

$$(53) P'_d = \sum_{k=1}^m aq^{k-1}(1+r)^{-k}(1+\rho)^{-k}(1+\delta)^k, \text{ which reduces to}$$

$$(54) P'_d = [a(1+\delta)] / [(1+r)(1+\rho) - (1+\delta)q] = a(1+\delta) / (1+r'-q').$$

Without the inflation change,  $\delta = \rho = 0$  and thus

$$(55) P_d = a / (1+r-q).$$

The average duration of discounted claim payments can be found in a similar manner:

$$(56) m_d = (1+r) / (1+r-q), \text{ and}$$

$$m'_d = (1+r') / (1+r'-q').$$

The change to the indicated price can also be determined. From (46) and some algebraic manipulation, we get

$$(57) (\Delta W) / W = [(1-v)(\delta-\rho)(1+r)] / (1+r'-q')$$

For  $\delta = 0$ , this produces

An excerpt from Robert P. Butsic's type-written paper, "The Effect of Inflation of Losses and Premiums for Property-Liability Insurers," shows the author's handwriting of Greek letters and mathematical operators.

discounted. In other words, inflation rises today, interest rates rise tomorrow.

In the real world, insurers are hit with inflation the day prices rise. The benefit from interest rates follows considerably later. As today: Despite general inflation exceeding 6% for two consecutive years, the interest rate on two-year Treasuries — two years being a decent

<sup>1</sup> Part 10 was phased out. Some of its topics were spread to the reserving exam (Part 6 then) and financial analysis exam (Part 8).

<sup>2</sup> Data on the Cray Computer from [Fast-forward — comparing a 1980s supercomputer to a modern smartphone | Adobe Blog](#). For the record: The 5,000 Crays would have weighed 27,500,000 pounds. There are 254 Division I football teams, each with up to 125 players. Assuming the average football player weighs 300 pounds (he doesn't), that's 9,525,000 pounds.

proxy for the duration of property-casualty claims — only rose about 2.5 percentage points.

Even in Butsic’s day, the Fisher effect wasn’t robust. In commentary accompanying Butsic’s paper, Rafal J. Balcarek pointed out that real interest rates after taxes had been negative for the previous 15 years, through 1980.<sup>3</sup>

Butsic also underemphasized the impact of rate regulation. If an insurer discovers inflation in their portfolio today, another year or more might pass before a regulator will approve higher rates.

For Butsic, the impact of inflation was also affected by the nature of the business being written. He modeled inflation using an accident year model and a calendar year model.<sup>4</sup> In his accident year model, inflation after the policy incepts doesn’t affect the size of a claim. In his calendar year model, it does.

Consider a policy you wrote this year expecting a single \$100 claim next year. Suppose there is a 10% inflation spike. Under Butsic’s accident year model, the claim would still be \$100. Under the calendar year model, the claim would cost \$110.

All policies, he suggested, operated according to a weighted average of the two models. Auto physical damage and workers’ compensation indemnity payments follow the accident year model, he writes. Workers’ compensation medical and products liability follow the calendar year model. Others fall in between.

Business that operates under his accident year model has an inflation

hedge. Business that follows his calendar year model ... not so much.

Maybe things were different in 1981. Except for workers’ compensation’s scheduled benefits, the accident year model doesn’t seem realistic today.

His accident year model, in my mind, resembles a fixed annuity, where the amount paid in each period is set by the terms of the contract, regardless of any inflation that occurs after the policy incepts. Most property-casualty policies try to make the indemnified parties whole, putting them in the same condition they occupied before the insured event occurred. That includes an adjustment for inflation — the calendar year model.

Whether he was correct, he was thinking hard about the process and how inflation would affect different types of policies. For example: He introduced a variable,  $\delta$ , the claims cost accelerator. Multiplying it by the duration of claims outstanding will estimate the impact of inflation on a reserve portfolio.<sup>5</sup>

He acknowledges that if claim costs rise by more than inflation, premiums will be inadequate, perhaps substantially. Proving that there is nothing new under the sun, Butsic says insurers could be vulnerable to “social inflation,” where claim payments would increase as a result of *non-economic* [emphasis his] influences.”

That won’t happen too often, he suggests. Most policies, he asserts, are a blend of his accident year and calendar year models. So normally, claim costs will rise by less than the inflation rate. In

that case, “the insurer will be better off ... (Discounted) investment income will rise faster than incurred claim costs.”

Butsic’s assumptions — that most policies are a mix of the accident year and calendar year models and that interest rates rise in near lockstep with inflation — skew his conclusions, probably in the wrong direction.

And the cost of claims rises at a different rate than overall inflation. For example, auto replacement costs for personal and commercial auto rose more than 40% from 2019 to 2022, according to the Insurance Information Institute. In that time, general inflation rose just under 16%. Interest rates haven’t risen enough to cover any of those costs.

It is easy to be critical. But actuaries of the 1970s and 1980s had primitive tools compared with today. Today we wouldn’t have to develop an extended alphabet to algebraically model an insurance operation. We’d write it in Python or stuff it into a spreadsheet. We wouldn’t have to mail the Bureau of Labor Statistics to obtain the guts of an inflation report. We’d just Google it and download.

Better data and more advanced technology let us build more nuanced, robust models. And they let us spend more time questioning assumptions and back testing outputs. The result: better understanding of pricing, reserving and everything else to do with insurance operations. ●

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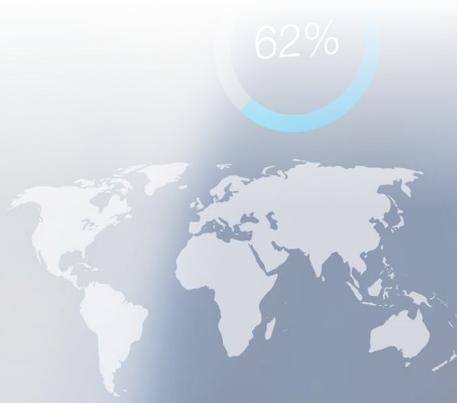
*Jim Lynch, FCAS, MAAA, is retired from his position as chief actuary at Triple-I and has his own consulting firm.*

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<sup>3</sup> Balcarek’s commentary was formally added to the syllabus in 1993, 11 years after the Butsic paper.  
<sup>4</sup> Butsic uses the terms *accident date* and *payment date*. I think my terms make it easier to follow the logic.  
<sup>5</sup> Simply put,  $\delta$  is the size of the inflation spike. If inflation has been 2% and climbs to 6%,  $\delta = 4%$ , approximately.



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## IN MY OPINION By MICHAEL A. WALTERS

## An Expanding Line of Business for Casualty Actuaries to Tackle

**W**ith the CAS at 10,000 members today, and growing at 5% a year, are there still untapped opportunities? There is potential for a major expansion of a relatively small line of business — individual health insurance. This has been neglected since Congress gave employer-based health insurance the gift of tax deductibility during World War II.

The Georgia governor has a bill on his desk that could mean a vast new opportunity for casualty actuaries, not just in Georgia, but across the U.S. If passed in Georgia, a new health insurance assigned risk plan (HARP) would offer an alternative to an Affordable Care Act (ACA) exchange insurer. It guarantees basic health insurance coverage with subsidies for pre-existing conditions — two major features that the public prefers over the previous system.

Right now, there are very few insurers in state exchanges. Many are barely hanging on because of severe underpricing from the vast federal expansion of coverage in the ACA. The recent trillion-dollar federal Inflation Reduction Act had publicized \$64 billion earmarked to increase ACA subsidies for just two more years. That is about \$1 billion a year for a state the size of Georgia. Federal subsidies had previously increased for two years under the \$2 trillion 2021 pandemic measure American Rescue Plan.

Recall that over 27 million Americans are still uninsured, despite the goals of the ACA. That likely translates to

nearly one million Georgians who still need health insurance.

The Georgia Alternative solves that problem because it allows health insurers to be profitable without requiring large rate increases. Georgia health insurers would compete like in personal auto insurance, where U.S. total pretax operating profit margins have been about 4% for decades. Personal auto insurers have been required to participate in forced underpriced assigned risk business but still collect enough overall to thrive.

#### **Why doesn't the U.S. have universal health care?**

All other industrialized countries have a form of universal health care, but not all are socialized medicine or single-payer. The three best national systems are often cited as Germany, Switzerland and Singapore, all of which have competing profit-seeking insurers providing coverage. Singapore is interesting, as it requires every worker to invest in a health

account for better use in retirement.

Why couldn't the U.S. just opt for one of these other plans? No matter how good the idea, the Constitution doesn't allow a federally mandated solution. Let the states decide. The Georgia option is a good start.

#### **Georgia insureds would get guaranteed access with subsidies**

Georgia's HARP policies would avoid ACA's very expensive underpriced giveaways and make them optional. For example, lifetime unlimited benefits were overly costly in no fault auto insurance. Under ACA, unlimited coverage has produced large numbers of multimillion-dollar claims, all funded ultimately by the U.S. Treasury. Unfortunately, these claims must be paid first by an exchange insurer who can't collect enough premium from its customer base of adversely selected insureds.

When ACA was first implemented, Georgia's insurance commissioner opined that group health insurers were

### **The Georgia governor has a bill on his desk that could mean a vast new opportunity for casualty actuaries, not just in Georgia, but across the U.S.**

savings account (HSA), incentivizing individuals to evaluate whether a minor procedure is worth it. In the U.S., such a feature could nullify defensive medicine waste by doctors seeking to avoid a tort suit. It empowers patients to make economic decisions to save the HSA ac-

lured into supporting ACA because if it failed, it would likely morph into single-payer socialized medicine. If so, former group insurers would wind up as servicing carriers, for a guaranteed third-party administrator fee of say 3%, with the federal government respon-

sible for any losses. During the first six years under ACA, there were formal insurer subsidies, but those ran out. So, Congress recently added \$64 billion more in subsidies for two years because overly generous ACA coverage is very expensive.

The major problem with ACA is that there is no extra charge for pre-existing condition coverage (PEC). It sounds appealing but is extremely expensive for exchange insurers, causing an upward spiral of adverse selection. Instead, Georgia's alternative is to offer them as options, for a premium addition.

Still, Georgia's HARP would cover many minor PECs at no extra charge over its basic premium, e.g., asthma, heartburn, high cholesterol, hypertension, migraines, sleep apnea and ulcers. The basic HARP policy would also be high deductible, like the minimum for an HSA.

More costly PECs like diabetes would be covered, but at an actuarial premium, say \$6,000. For wealthier insureds, there would be no subsidy. Others would qualify for subsidy based on a means test. The PEC subsidy pool, available to both HARP and voluntary insureds, would be funded like Medicaid, where a state is matched 3 to 1 by the federal government.

Actuaries can price each PEC, using small database techniques like predictive modeling (a casualty actuarial specialty). Initial PEC pricing can use U.S. group health data where many PECs were covered after a waiting period,

from European experience.

Specialty insurers may also emerge for certain PECs, with more sophisticated pricing and even discounts from innovative research.

## **The constitutional theory of federalism allows the states to experiment, and the best models will ultimately win out.**

### **Employer-based health insurance had an unfair competitive advantage over individual policies**

In a 2001 article, Nobel laureate economist Milton Friedman outlined why a thriving individual policy health insurance market never developed like it did in personal auto and homeowners insurance. In World War II, Congress allowed businesses to tax deduct health insurance premiums as a way around wage controls. That has never been repealed but has an insidious way of increasing costs as ultimately customers are insulated from the decision process because "Somebody else is paying for it." Employers are incentivized to add some inefficient health coverage, as it has a "tax discount." A hypothetical tax-deductible group auto insurance policy would inefficiently cover oil changes, as the cost would be "tax deductible."

### **Expanded individual health policy market could be huge**

Would a new individual health insurance market attract as many insurers as personal auto (i.e., 50 licensed carriers

writing in each state)? It depends on how quickly group health declines.

Total annual U.S. health insurer premiums are about \$900 billion, versus \$270 billion for auto and homeowners

insurance. And, if individual PEC premiums can be reasonably estimated by actuaries, individual health policies will not have the catastrophe and tort system problems that homeowners and auto insurers have.

As employers, agents, individual consumers and insurers see the success of the new system, ultimately a much larger individual policy health insurance market should develop in the U.S.

- Employers may find that losing their tax advantage erodes the benefit of offering group health coverage. Many corporations may choose to focus more on their core products and services. They may lose some employees who are only there for the insurance coverage, but that may be a good thing.
- Agents for personal lines coverage today would welcome the additional commission revenue from their auto and homeowners insurer clients jumping into the individual policy health market. Those carriers' actuaries already know how to price no fault auto medical, and



their predictive modeling expertise on small databases can quickly price different PECs for the specialty market.

- For the consumer, individual policy portability is a vast improvement, allowing coverage continuity when someone is a contract worker, employed part-time or temporarily unemployed. An added benefit to individuals is that Congress can fix the tax inequality between employer and individual policies. It can increase the 1040 standard deduction for those with individual health policies and allow those filing itemized returns a tax deduction for a basic level policy.
- Insurers are protected from bearing all the losses from free PEC coverage. States can mandate the

purchase of a basic high-deductible catastrophe policy like they do for auto liability insurance. The 2012 U.S. Supreme Court (SCOTUS) decision was seven to two against the ACA mandating individuals purchase health insurance, but it allowed a small tax on those not buying.

Fortunately, the market size build-up will be gradual to allow pricing expertise to expand. A faster growth could occur if SCOTUS rules on whether ACA coverage is constitutional. Does Article I Section 8 (enumerated powers of the federal government) allow Congress to mandate individual policy coverage features and pricing? With the availability of a system like the one proposed in Georgia, it is easy to envision SCOTUS ditching the federal coverage mandate

overreach.

SCOTUS could give states time and the incentive to produce programs that are constitutional and replace the ACA model. Massachusetts may keep RomneyCare, but others could emulate the Georgia approach or innovate with other options. The constitutional theory of federalism allows the states to experiment, and the best models will ultimately win out. Whatever the option, the experiment with ACA has demonstrated that the public will not be happy with a return to the old flawed system before ACA. They will demand nothing short of guaranteed health insurance and a minimum of strong subsidies for individual PECs. ●

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*Michael A. Walters, FCAS, served as CAS president from 1986 to 1987.*

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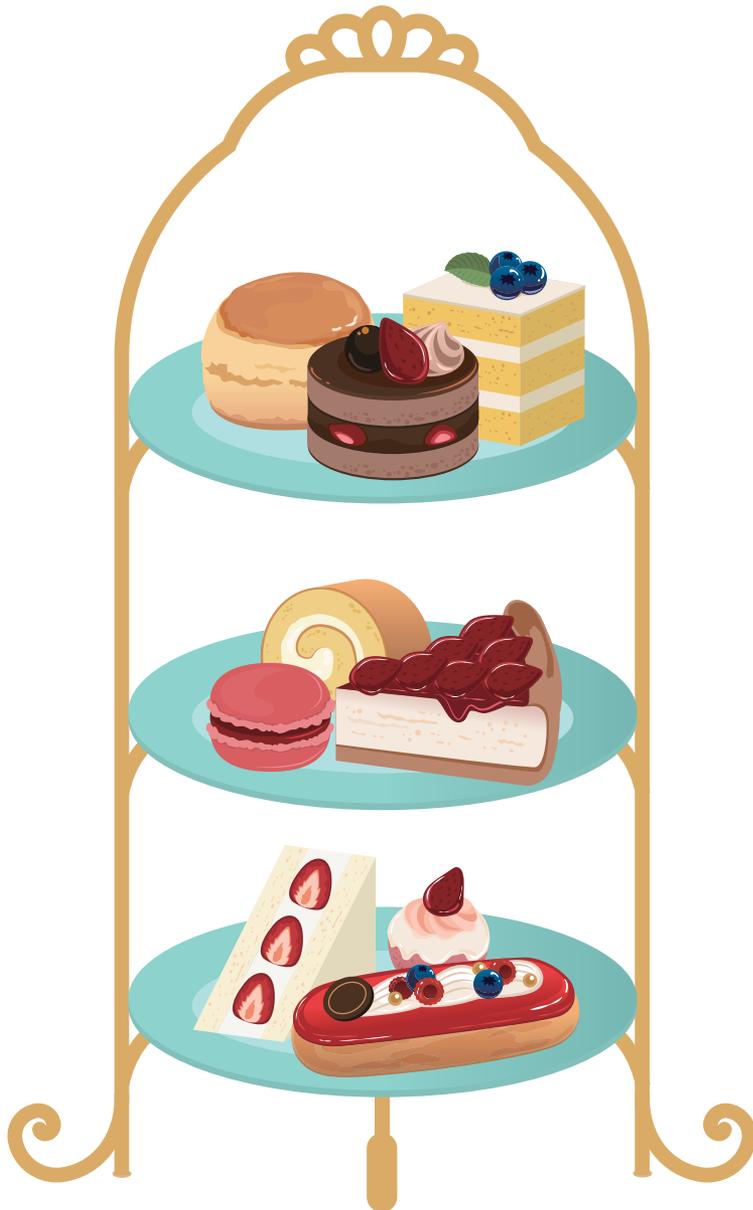
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**IT'S A PUZZLEMENT** By JON EVANS

## Desire for Dessert Among Logicians

A group of  $N$  logicians is having dinner at the same table where they can all talk to each other at a restaurant. They have finished the main course, but none of them have 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." How might the  $N$ th logician then answer?



### Getting to the Root of Things

Can you simplify the following expression into a rational number? If you can, then do it.

$$\sqrt{(1+1000000\sqrt{(1+1000001\sqrt{(1+1000002\sqrt{(1+1000003\sqrt{(1+1000004\sqrt{(1+\dots))\dots))\dots))\dots))\dots))\dots))\dots)}$$

This is a famous solution of Ramanujan. The key observation is that:

$$\sqrt{(N+1)^2} = \sqrt{(1+N^2 + 2N)} = \sqrt{(1+N\sqrt{(N+2)^2})}$$

From recursion, it becomes clear that the nested radical expression above is equal to 1,000,001.

Solutions were submitted by Shyam Bihari Agarwal, Dave Andrist, Bob Conger, John Berglund, Kenneth Klinger, Luba Pesis, Misha Rajcoomar, Dave Schofield and William Volterman. ●



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