actuarial REVIEW

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AR Magazine Celebrates a Milestone

10 YEARS ANNIVERSARY

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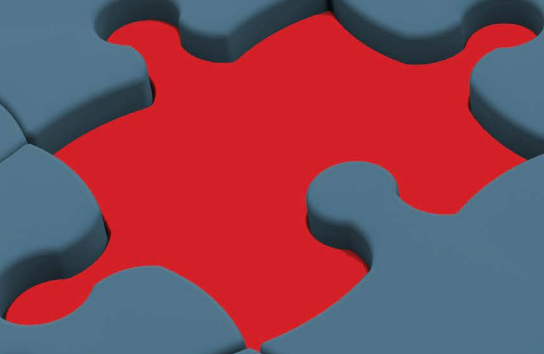
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on the cover

Editorial/Production Manager Sarah Sapp interviews Director of Publications
Elizabeth Smith as she reflects on the last 10 years of the magazine and its origins.

Get to know Mary Hosford and learn about the ways she has helped shape the CAS.

Ten Awesome Years!

One Year and Counting

The CAS celebrated National Volunteer Week April 16-22. We are proud to say that one-third of our members consistently give back to the actuarial profession by volunteering with the CAS. You allow us to continue delivering outstanding educational offerings, exams, university outreach programs, research and so much more.

We want to take this opportunity to share our appreciation for the volunteers who make *Actuarial Review* possible. The *AR* Working Group (ARWG) is instrumental in the creation of every magazine. They play a role in almost every step of the process. We were lucky to have held our first ARWG meeting this past April, and we cannot wait to see all the articles that come to fruition from our brainstorming activity.

In this edition, we also celebrate two outstanding volunteers, Mary Hosford and Henry Cheng. Read more about their contributions to the CAS, and you will understand why we are taking the opportunity to highlight these change-makers!

The #HackIsBack, and you can learn more about the Hacktuary Chal-lenge inside. For inspiration be sure to see CAS Research Actuary Brian Fannin's interviews with the two Hacktuary winners from 2022 at https://ar.casact.org/hacktuary-winners-build-novel-apps-with-actuarial-know-how/.

I am grateful to write this editor's note while celebrating my one-year anniversary with the CAS, especially during the 10-year anniversary of the magazine. When I came aboard, I spent days looking through just a year's worth of magazines and was impressed by the breadth and quality of the articles that our writers and columnists produce. I wondered if I would be able to keep up with the fast pace. But after a year under my belt working with wonderful Publications staff and amazing volunteers, I am finally on firm footing.

I hope you will enjoy reading about the changes the magazine has gone through over the years. Perhaps you will feel inspired to write an article for *AR*. We are always looking for new and innovative content, so reach out to us at AR@casact.org and let us know! ●

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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Diversifying the Pipeline

I have taken the opportunity this year with the president's message to highlight the CAS Strategic Plan. If you have not read the plan, I encourage you to review it online at https://www.casact.org/about/cas-strategic-plan.

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

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

To achieve this Envisioned Future, three strategic pillars have been identified. In the March-April 2023 *Actuarial Review*, I talked about the first pillar, Building Skills for the Future. The second pillar is Diversifying the Pipeline. The goal of the CAS in Diversifying the Pipeline is to:

… ensure that we attract high-potential professionals into our community who love to solve business problems with data and analytics.

I have been a part of the actuarial profession for nearly 30 years, and I can say without hesitation that the CAS has attracted many "high-potential professionals." I know because I have worked for them, worked with them, heard them present at CAS meetings, collaborated with them on CAS volunteer efforts and studied the results of their research and development efforts. The CAS would not have been as successful as we have been for 109 years if this were not true. To ensure that we maintain our position of strength and continue to attract high-potential professionals, we must continue to understand and adjust to the reality of the world we live in today.

Two of the vivid descriptions in the Strategic Plan highlight how diversifying the pipeline will help us continue to attract high potential professionals. The first is:

… the CAS has attracted many "high-potential professionals." I know because I have worked for them, worked with them, heard them present at CAS meetings, collaborated with them on CAS volunteer efforts and studied the results of their research and development efforts.

CAS members of the future will emerge through a pipeline that represents a wide variety of universities, majors, degrees and other pathways, and they will pursue a variety of career paths and opportunities afforded by the CAS educational system.

What sources feed the actuarial candidate pipeline today? Your mind may immediately go to the traditional places: math majors and universities that offer an actuarial science degree. Many of our members do come from these traditional sources, but we also have a number of members who emerge from a variety of other backgrounds. We have members who studied music, business, science and English. We have many members who did not graduate from an actuarial science program. What this has taught us is that while actuarial science programs and math degrees will remain an important part of our pipeline, our future high-potential professionals can also come from many different places.

I have experienced this personally. I knew I wanted to be an actuary going into college, and I graduated with an actuarial science degree. My son also knew he wanted to be an actuary going into college, and he graduated with a degree in accounting and finance. My son's accounting and finance focus will give him a different perspective than what my actuarial science focus did for me, and such different perspectives will continue to strengthen the profession.

Given that we are actuaries, we are approaching this from a data-driven perspective. One of our first steps was to determine the current distribution of universities and majors among our current members. Sounds simple enough, right? Well, for those of you that have been involved in efforts to try to compile data for analysis purposes, you know that often nothing is as simple as it seems. While the CAS has been collecting this data historically, it was not collected with the purpose of this kind of analysis in mind. So, the process of cleaning and analyzing this data has been a significant undertaking, and the

partnership of staff and volunteers has made excellent progress. We will use this data to establish a baseline of where we are today and then set thoughtful, intentional goals to ensure that we attract future actuarial professionals, no matter what educational or university backgrounds they come from.

This concept extends beyond just universities. Another source of future actuaries is career changers. Some actuaries have become aware of the profession later in life, coming from other careers. An actuary just shared the story with me of her son who began passing exams after a career as a teacher. These stories are great and impactful, but we also want to explore whether there is a way that we can deliberately position the actuarial profession as a more visible avenue to those who might be considering a change in career.

The second vivid description is related to diversity, equity and inclusion (DE&I) and is as follows:

> CAS members, candidates and staff support diversity, equity and inclusion in the actuarial profession. CAS members are empowered to positively influence diversity efforts and create inclusive environments within their workplaces.

There has been a lot of discussion over the last couple of years about what DE&I is and the real motivations behind it. In short, our DE&I efforts are focused on ensuring:

1. That there are no unnecessary barriers to joining the profession.
2. That all, regardless of background, are aware of the actuarial profession.

3. That, once qualified, CAS members feel that they belong and are able to contribute to the profession.

The CAS has been involved in efforts to increase awareness of the actuarial profession for longer than I even knew it existed. I was a beneficiary of these efforts. When I was a senior in high school, I received several brochures about being an actuary. In one of these brochures, two Black actuaries were

When I was a senior in high school, I received several brochures about being an actuary. In one of these brochures, two Black actuaries were highlighted, Ollie Sherman and Mike Poe, both of whom are CAS Fellows. Just seeing them in this brochure was impactful to me, and that moment was influential in my decision to pursue an actuarial career.

highlighted, Ollie Sherman and Mike Poe, both of whom are CAS Fellows. Just seeing them in this brochure was impactful to me, and that moment was influential in my decision to pursue an actuarial career.

That was over 30 years ago, and the efforts to increase awareness continue today. The study on Barriers to Entry (https://www.casact.org/barriers-entry-study) to the actuarial profession highlighted a number of unnecessary barriers to becoming an actuary, and many CAS efforts are attempting to address those that are related to awareness. These efforts include:

- Co-sponsoring Be An Actuary day, where high school students from diverse backgrounds who are strong in math are brought together to hear from practicing actuaries and participate in actuarial activities to

learn about the profession.
- Partnering with STEM organizations that are focused on diverse backgrounds to ensure that students already interested in STEM know that the actuarial profession is an option for them.
- Supporting The Actuarial Foundation in their efforts to improve math literacy and awareness of the actuarial profession.

Once someone has made the decision to pursue the actuarial profession, we want to ensure there are no unnecessary barriers to achieving membership in the CAS. It is often stated, and it is true, that the actuarial exams are unbiased. However, just because the actuarial exams are unbiased does not mean there are not historical systematic biases that make it more difficult for some to access and pass the exams. These could manifest themselves in financial difficulties, (paying for both exam fees and prep materials) as well as in a lack of exam support — sometimes having a community to lean on throughout the exam process could be the difference between success and failure. This is why efforts like our exam reimbursement program are so important — we want to help remove as many of these unnecessary barriers as possible.

On March 6 this year, the CAS and Society of Actuaries hosted a Be an Actuary Day event in conjunction with Philadelphia's Temple University. Be An Actuary Day exposes diverse high school students to the actuarial profession as a career choice. Students have the chance to meet and learn from actuarial science students and practicing actuaries. Temple University plans to host the event annually.

Another area we're working on right now is commissioning a disability consultant to independently review our exam accommodations (as well as communications and processes around requesting accommodations) for candidates with disabilities. Many of us don't understand the extent to which exam conditions, like access to food and drink, frequency of breaks, technology limitations and even lighting can pose unnecessary barriers to exam takers with disabilities.

Lastly, once someone has become a part of the profession, we want them to feel like they belong here, like they are part of the community and that their voices and opinions are valued. Just because someone qualified to be an actuary by passing our exams and is working as an actuary does not mean that they feel like they belong to the actuarial community. This is why CAS support of the affinity groups is so important. Affinity groups, such as the Network of Actuarial Women and Allies or the Organization of Latino Actuaries, can speak more directly and authentically to the struggles of certain groups in the profession and can provide support to those facing the same challenges as we work for change. The affinity groups offer us additional channels through which we can promote opportunities to share opinions, volunteer and influence the direction of the CAS and the profession (leadership/research/thought leadership), specifically to groups that have been underrepresented in these spaces in the past.

At the end of the day, DE&I is not about keeping anyone out; it is about making sure that everyone is able to enter, and once they enter, that they are able to succeed. I also know that DE&I efforts benefit us all. Understanding the challenges that other actuaries face can help me better support them through their journeys, and vice versa. So, I would encourage each of you to learn more about what the CAS is doing in the DE&I space and consider thinking about how you can help. There are many ways to support awareness, joining, belonging and contributing — you can see all the things the CAS is doing online at https://www.casact.org/about/diversity-equity-inclusion. Your involvement can help ensure that we continue to attract high-potential professionals to our field and realize our Envisioned Future. ●

If you are interested in helping organize your own Be an Actuary event, please visit the Be An Actuary Day page on BeAnActuary.org for more information.

COMINGS AND GOINGS

Brittany Henrich, ACAS, MAAA, has been promoted to consulting actuary for Pinnacle Actuarial Resources Inc. Henrich has been with Pinnacle since 2016 and was promoted from the position of associate actuary.

Sandra Kipust, FCAS, CPCU, has been appointed senior practice leader and actuary at The National Council on Compensation Insurance (NCCI). In this leadership role, she will focus on the operational framework of NCCI's actuarial and economic group and its strategic focus on thought leadership. Kipust is a proven industry leader with diverse expertise and technical acumen spanning over 20 years.

Andrew Krieger, FCAS, MAAA, has been appointed consulting actuary for Pinnacle. Krieger joins Pinnacle from a large personal lines insurer.

Hongmei Li, ACAS, MAAA, has been appointed senior consulting actuary for Pinnacle. Li joins Pinnacle from a large consulting firm.

Nicole McArdle, ACAS, MAAA, has been promoted to consulting actuary for Pinnacle. McArdle has been with Pinnacle since 2016 and was promoted from the position of associate actuary.

Darcie Truttmann, FCAS, MAAA, has been promoted to senior consulting actuary for Pinnacle. Truttmann has been with Pinnacle since 2005, most recently in a consulting actuary role. ●

EMAIL "COMINGS AND GOINGS" ITEMS TO AR@CASACT.ORG.

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ACTUARIAL REVIEW *LETTERS POLICY*

Letters shall not contain personal attacks or statements denigrating another person's character either directly or implicitly, 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. 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.*

Dustin Larson, Certification Program Manager

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

- **What do you do at the CAS?**
  I am the certification program manager and currently focus on the Admissions Transformation Plan — updating the way we write, publish and grade our exams.

- **What inspires you in your job, and what do you most love about it?**
  I have always really enjoyed creating things, and so any opportunity where I can create something new, I run with it. I have really enjoyed managing the creation of some of our newer study materials. I also really have enjoyed the psychometric aspects of my position.

- **Describe your educational and professional background.**
  I double majored in undergrad, receiving a degree in psychology and child learning and development (University of Texas-Dallas). I also have a master's degree in forensic psychology (George Washington University). My career path to the CAS was varied I'd say. I have worked as research assistant for both the Dallas Callier Center and the Naval Research Laboratory, I was an English teacher for ESL adults and school-age children in Taiwan, I was a social worker in D.C. and even managed a gay bar in Arlington, Virginia, for a while. Those are just a few of the positions I had before I found the CAS.

- **What is your favorite hobby outside of work?**
  I am a big movie buff; I watch roughly 200-250 movies a year. Some of my favorites are *Legend* (1985); *Starship Troopers*; *Bladerunner* (both new and old); *Lady Bird*; *I Love You, Man*; *Forgetting Sarah Marshall*; *Alien*; *Mulan* (animated); *Still Alice*; *Meet Me in St. Louis*; *That Thing You Do* and *Inside Out*. This list is too long, but one of my favorite things to do is see a movie in the theatre and then go to a bar and talk about it. I am also a big Liverpool Football Club fan, so I watch a good amount of European football.

- **If you could visit any place in the world, where would you go and why?**
  I have been very fortunate with my opportunities to travel and have seen a lot of the world, but I have never been to South America. I would love to do a trip that starts in Buenos Aires and goes out to the Andes Mountains and the Atacama Desert. Singapore is also on the top of my list; the food and the dragon boat races are really enticing to me.

- **What would your colleagues find surprising about you?**
  I am a pretty open-book and have probably over-shared with my co-workers, so this one is a bit tricky for me. I don't know if I have ever told them that I served as an expert witness in several trials during my time as a social worker in D.C.

- **How would your friends and family describe you?**
  When I was applying for my master's degree, I had one of my undergraduate professors write a letter of recommendation for me, and it started off essentially by saying, Dustin is "brash but respectful." That was 10 years ago now, and I am still not sure if I like the description or not. ●

Dustin Larson

Volunteers Needed for CAS Exams!

The Admissions Department is currently recruiting for volunteer positions for Exams taking place in the fall 2023. Exams will be administered in late October-early November, and sittings will include:

- Exams MAS-I and MAS-II (Modern Actuarial Statistics I and II)
- Exam 5 (Ratemaking and Estimated Claim Liabilities)
- Exams 6C, 6I, and 6U (Regulation and Financial Reporting)
- Exam 8 (Advanced Ratemaking)

There are a variety of roles in which an Exams and Admissions Volunteer can participate. Volunteers are members of the CAS and are expected to have a strong understanding of all covered topics of the exam for which they are volunteering. Associates are only allowed to serve on Associateship-level examinations.* Some of the roles we are seeking to fill include the following:

Writer. A Writer for any exam is an FCAS.* Writing takes place over the course of approximately three months, ending in a writing summit that meets either virtually or in-person, 6-8 weeks prior to an exam sitting. Writers are responsible for creating the actual content of the exam using source materials, questions from previous exams and other methods.

Grader. A Grader for any exam is an FCAS.* Grading starts almost immediately following the administration of exams, with the majority of grading taking place at an in-person or virtual grading summit, 2-3 weeks following the closing of exams. There will be some additional grading post-summit.

Pre-Tester. The Pre-Tester may be a top performer from a recent exam

sitting or other qualified volunteer and has passed the exam for which they are volunteering within the past five years. A Pre-Tester needs to have a strong familiarity with the material covered by the exam and review the learning objectives to ensure familiarity with current examination expectations. Pre-Testers provide valuable feedback on the length and comprehensiveness of the exam and will take part in a one-day panel meeting (in-person or virtual) prior to the exam administration.

Pass-Mark Panelist. A Pass-Mark Panelist is an ACAS or FCAS who *has not* taken a CAS exam within the last three years. Panel members may not currently be sitting for CAS exams. Generally speaking, the Pass-Mark Panelist will be someone with close proximity to the exam and someone who has recently been involved in the grading session.

The time commitment for Writers and Graders is about 10-20 hours in the weeks leading up to a Writing or Grading Summit, plus the summit itself, which is two-three days. Pre-testers and Pass-Mark Panelists can also expect 10-20 hours of volunteer time, with a one-day panel that could meet virtually or in-person. Travel to summits and panels is reimbursed by the CAS. Ideally, volunteers would be willing to participate in both fall and spring Exams (and keep volunteering the following year if interested!) but can sign up for just the fall if necessary.

If you fit the parameters for any of the positions listed and are interested in becoming an Exams Volunteer, please email admissions-volunteer@casact.org and be sure to check out the Exam Writing and Grading FAQs for more info! ●

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* Associates are welcome to serve on an exam for which they have credit if they have not taken an exam for the last two years and do not plan to take an exam for three years after serving on the Exam Committee.

Volunteer as a New Member!

CAS

Did you know?

96%
of committees accept new ACAS volunteers

56
is the number of CAS Committees, Task Forces, and Working Groups

2,953
members volunteered in 2021

23%
of new members volunteer within their first three years as a member

According to the 2018 CAS Membership Survey, members who volunteer are more likely to have higher overall satisfaction with the CAS.

There are many volunteer opportunities to fit your interests!

Marketing and Communications	Publications	Finance and Investment	Admissions
public relations collaboration mentoring engagement university outreach career awareness	writing editing industry knowledge research peer review	budgeting audit risk management investment policy	exam creation exam grading team-oriented growth potential networking

Professional Education	Research	International	Governance
content development networking collaboration public speaking facilitation	independent analytics subject matter experts advancing knowledge	outreach partnership training global growth	strategy leadership diversity, equity, and inclusion member engagement

Why Volunteer with the CAS?

- **Social**
- **Values**
- **Job Advancement**
- **Knowledge/ Experience**
- **Fulfillment**

There are ample opportunities that align with your motivation for volunteering. Interested? Fill out the VIP Survey at any time. Questions? Contact volunteer@casact.org.

MAKING THINGS HAPPEN

Raising the Bar on Actuarial Modeling Skills

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

L ike many a curious thinker, Henry Cheng wonders if there is a better way.

Cheng, who earned the Certified Specialist in Predictive Analytics (CSPA) credential from The CAS Institute (iCAS) in 2018, has been actively volunteering for the CAS subsidiary since 2019.

He observed that the curriculum for CSPA Exam 3 was quite top-heavy, consisting of three CAS study notes, 11 research papers and 10 books for the required learning materials. That is a lot of material to digest for one exam.

Candidates were finding it difficult to stay motivated, complete the curriculum and take the examination. Cheng saw a need for change.

So, he suggested revising the curriculum to cut back substantially on the material, proposing to use just three books as the primary learning materials. He persuaded the iCAS Exam 3 Committee, and they decided to retain one book from the original list of learning materials and introduce two new books, thus lightening the load of study and refining it.

Cheng also worked his powers of persuasion to get permission from Bill Venables, the principal author of *Modern Applied Statistics with S*, allowing candidates access the book to study for the CSPA examination — and at no

Henry Cheng

cost. The book that Venables and his co-authors wrote is a valuable asset to candidates. It contains an automated function in the MASS package for generalized linear model (GLM) selection that solves many past challenging problems faced by actuarial data scientists and CSPA project examination candidates.

But Cheng was not finished with his CSPA Exam 3 update. He also introduced a new item to the curriculum, *Modern Applied Statistics with S*, that covers model selection from generalized linear models and tree-based regression models. The other new book, *Computational Actuarial Science with R*, introduces practical advanced ratemaking and reserving models, such as loss triangles with real datasets.

He also serves on the CSPA Project Committee, where he has mentored two candidates virtually upon their request for help.

Impressed with his work, in 2021

CAS staff invited Cheng to review all the predictive modeling components in all CAS examinations. He was also asked to join other CAS Examination task forces to draft examination questions. In 2023 he was likewise invited to join a CAS special task force for a new examination paper — a predictive analytics project. He collaborated with other volunteers to analyze interview data responses from iCAS examination candidates.

"I am proud of working in all the CAS and iCAS (CSPA) examination committees," he said. "They were able to review and make the determination on the changes within a short period. Teamwork is the key to success," Cheng said.

Cheng has a Ph.D. in statistics. He was formerly a high school physical education and mathematics teacher, has taught at several tertiary institutions and was an experienced actuarial mathematics curriculum coordinator.

He currently works as an actuary in the Washington state government. "I am responsible for designing, developing, training, building, testing and deploying two automated predictive modeling systems consisting of thousands of machine learning models for auto-adjudication of new claims and individual open-claim case reserving," he said. "I hope to share

my actuarial predictive modeling experience with all actuaries."

Cheng has definitely had an impact on the CAS and iCAS, but he is also well-known internationally for his contributions to predictive analytics. He was one of the lead scientists in modeling ecologically sustainable harvesting of the Western Rock Lobster fishery in 2000. The fishery received the world's first Marine Stewardship Certificate (MSC) from the MSC Council in Britain and set the standard for all the world fisheries. He has received numerous national management and leadership awards internationally and, in the U.S. particularly, in optimal statistical experiment design and modeling.

"Volunteers add value in build-ing a better sustainable world through management based on science, science based on data and applying predictive analytics to extract the maximum information out of data," he said. "We can learn and grow from other volunteers and CAS staff."

Cheng volunteers for other organizations as well. For the past 10 years, he has worked as a principal investigator for several competitive federal grants with federal, state and tribal scientists and pathologists to conduct new drugs trials aimed at increasing the survival rate of salmon in the U.S. This work brings all types of experts together to investigate and improve the situation scientifically through optimal experimental design and longitudinal modeling. ●

Henry Cheng presents at the 2019 iCAS forum at RPM.

Landry and Martin Win 2023 *Variance* Prize By DONNA ROYSTON, CAS MANAGING EDITOR

The *Variance* Prize for papers published in its 15th volume (2022) has been awarded to Drake Landry and Steven Martin for their paper "Policy-Level Unreported Frequency Model for Pure IBNR Estimation."

Peng Shi, ACAS, Ph.D., co-editor of *Variance*, chaired the judges panel, and Brian Fannin, ACAS, CSPA, research actuary at the CAS, co-chaired.

"The selection committee recognized the paper for its exceptional originality, scientific contribution and relevance to the practice of actuarial science," said Shi. "At the heart of the paper is an individual reserving method that enables actuaries to estimate the pure IBNR reserves and to quantify the associated uncertainty."

He noted that the method represents a significant advancement in the reserving practice in that it leverages claim- and policy-level information in reserves prediction. "What makes this paper truly remarkable is the authors' ability to integrate cutting-edge methodology with practical implementation.

They provide a detailed methodology and a worked example that demonstrates its effectiveness in practice."

"This practical application of their method makes it a valuable tool for actuaries working in the insurance industry," said Roger Hayne, editor in chief of *Variance*. "Overall, the paper represents a noteworthy contribution to actuarial science by providing a novel approach to reserving that addresses a critical challenge faced by insurers, as well as a practical solution that can be easily implemented in real-world settings."

The *Variance* Prize honors original thinking and research in property-casualty actuarial science and is awarded to the author or authors of the best paper published in each volume year. To be eligible, a paper must show original research and the solution of advanced insurance problems.

Drake Landry, FCAS, is an actuary STP 1 at Liberty Mutual Insurance, where he has held roles in product

Drake Landry   *Steven Martin*

management, capital modeling and reserving. He graduated from Boston University with a B.A. in mathematics in 2016.

Steven Martin, FCAS, is an actuary manager at Liberty Mutual Insurance, where he's held roles in internal reinsurance, ERM and capital management. Prior to Liberty Mutual he worked in pricing roles at AIG and GEICO. He graduated from the University of Maryland, Baltimore County in 2008 with a B.A. in Mathematics and a B.S. in Computer Science.

The winning paper is published in volume 15, issue 1 of *Variance* and is online at https://variancejournal.org/article/32517-policy-level-unreported-frequency-model-for-pure-ibnr-estimation. ●

Research Working Group Announces Co-Recipients of CAS Ratemaking Prize

The Ratemaking Research Working Group has announced two winners of their 2023 call paper program:
• "Nonlife Insurance Risk Classification Using Categorical Embedding" by Peng Shi and Kun Shi.
• "An Analysis of the Current Saudi

Arabian No-Claim Discount System and Its Adaptability For Novice Women Drivers" by Jorge Yslas Altamirano, Asrar Alyafie and Corina Constantinescu.

Both papers will be available in the Spring 2023 volume of the *E-Forum*, along with four other papers submitted

for the call paper program. The $15,000 cash prize available for the call will be split equally between the two papers.

"Peng and Kun's paper addresses a data analysis problem that is particularly acute in actuarial applications: categorical data with many different categories," said Brian Fannin, CAS staff actuary for

research. "These are things like rating territory or class codes. They're vital to insurance companies, but they don't play well with many modeling techniques which expect data to exist on a continuum. This paper illustrates a technique to use categorical data in a novel way to support risk classification and input to deep learning models."

The paper by Altamirano, Alyafie and Constantinescu is broader than the title may suggest. Beyond a critical examination of the regulatory response to the sudden appearance of a large, new class of drivers, the authors consider rating schemes in other countries. "The result is a fantastic primer of some of the possible options to gauge the success of mandatory auto tariffs," Fannin said. "This is foundational material for actuaries working in those markets, and also for policymakers who want more context to evaluate their decisions."

Research call paper programs are routinely announced by the Ratemaking, Reinsurance, Risk and Reserving research working groups. Each group typically operates a call paper program once every two years, though additional calls are sometimes conducted in off years. For each call paper program, authors are invited to submit short research proposals, which are vetted by the sponsoring working group. If accepted, authors are paired with reviewers who will comment on preliminary and final drafts. A cash prize is available to recognize particularly exemplary work. All papers which are cleared by reviewers will appear in the *E-Forum*.

Peng Shi, ACAS, FSA, Ph.D., is the associate editor of *Variance* and an associate professor in the Risk and Insurance Department at the Wisconsin School of
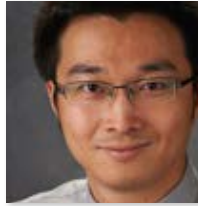
Peng Shi, ACAS, FSA

Jorge Yslas-Altamirano

Asrar Alyafie

Corina Constantinescu

Business. He is also the Charles and Laura Albright Professor in Business and Finance. His interests are problems at the intersection of insurance and statistics. His current research focuses on actuarial data science, probabilistic forecasting and predictive modeling, insurance and risk analytics, dependence models and multivariate analysis, machine learning and statistical learning, and intensive longitudinal data methods. He holds a Ph.D. in business with a minor in economics from the University of Wisconsin-Madison.

Kun Shi, FCAS, is a senior advisor, data science for Southwest Airlines in Dallas. Shi holds a Ph.D. in statistical signal processing from Georgia Institute of Technology, a master's in statistical signal processing from Tsinghua University, and a B.S. in wireless communication and signal processing from Beijing University of Posts and Telecommunications. Kun Shi has also worked in data science for Deloitte, FICO and Texas Instruments.

Asrar Alyafie is a Ph.D. student at the Institute for Financial and Actuarial Mathematics in the Department of Mathematical Sciences of the University of Liverpool. She is supervised by Dr. Constantinescu and Dr. Yslas on the theme "Fair pricing of insurance for women drivers in Saudi Arabia." She holds a bachelor's degree in statistics from King Abdulaziz University and a

master's in financial mathematics from the University of South Wales. Asrar also serves as a lecturer at the University of Jeddah, Saudi Arabia.

Corina Constantinescu is professor of mathematics and director of the Institute for Financial and Actuarial Mathematics at the University of Liverpool. Prior to being an academic, Corina worked as an actuary and led the life insurance department of one of the first private Romanian insurance companies. Named in Cranfield University's 100 Women to Watch list in 2020, her expertise focuses on analytical methods for exact or asymptotic results for ruin probabilities and, more recently, fair insurance pricing and financial inclusion. During her sabbatical year, 2022-23, she is a visiting scholar within the Social Finance Programme, International Labour Organization, United Nations.

Jorge Yslas is a lecturer in actuarial mathematics at the Institute for Financial and Actuarial Mathematics of the University of Liverpool. He earned his Ph.D. in insurance and economics from the University of Copenhagen. Jorge's research expertise spans across extreme value theory, actuarial modeling and statistical theory and applications. Beyond academia, he has four years of experience in the insurance sector, where he worked on various subjects, including reserving, capital modelling and insurance pricing. ●

2023 CAS Hacktuary Challenge – The Hack is Back!

Actuary /ak(t)SHə,werē/ noun
- *A professional who quantifies risk, particularly in the area of insurance*
- *A statistical discipline which focuses on financial uncertainties*

Hacktuary /hak(t)SHə,werē/ noun
- *An actuary who is particularly skilled at the development of novel, technologically innovative solutions for risk engineering*
- *An actuary with strong programming skills who deploys them in very clever ways*
- *Familiar reference to a contest sponsored by the Casualty Actuarial Society (CAS) which supports the creation of risk engineering solutions of benefit to the insurance industry and the public*

Overview

The CAS is offering a prize of $15,000 to the individual or group who develops an application which utilizes actuarial concepts to solve a pressing risk management problem related to property insurance. The target platform of the application is open. It may be deployed as a mobile app, an interactive web site, a desktop application, or some other means. The only deployment criteria is that it be publicly available and contain interactive elements.

The 2023 Hacktuary Challenge builds on the success of the 2022 program, which recognized two entries that represent fantastic examples of how actuaries can use technology to bring risk management closer to consumers. Learn more about the 2022 Hacktuary Challenge winning entries on the CAS website and in the March/April issue of *Actuarial Review*.

Although restricted to property risk,

we are open to a wide range of ideas on this topic. Potential applications could be:

- How can the use of satellite imagery assess potential risk and/or estimate post-event damages?
- How can services like Zillow and Redfin augment insurer risk assessment?
- What can actuaries and/or consumers learn from public institutions like the Federal Emergency Management Agency or the Census Bureau?
- How are construction practices continuing to change the level of risk for properties? To what extent does this or should this factor into the decision about purchasing property?
- Are there macro trends that will affect portfolio risk? Are populations shifting to or away from risk-prone areas?

The Process

Interested parties should respond to the interest survey to indicate their interest in participation. The survey will be open through July 31, 2023.

Entrants will be required to submit a link to their application along with a cover note describing its development. Entrants will be assessed by a panel of judges. Judges will be nominated by the CAS research council.

The CAS expects that submissions are of a quality consistent with what the public has come to expect from actuaries and analysts working in the insurance industry. In the event that no submissions are deemed acceptable, and at the sole discretion of the CAS, no prize may be awarded. In that event, the CAS may elect for the prize fund to be rolled over and combined with the fund available for the 2024 contest.

All final entries must be submitted by August 31, 2023. Winner(s) will be announced at the CAS Annual Meeting in November.

Requirements

- All code for the apps must be made publicly available on the CAS

GitHub site. Repos should use the Mozilla Public License version 2.0.

- Only publicly available sources of data may be used. This also applies to any data sources used to calibrate model parameters.
- Any model calibration or parameter estimation techniques which are used must be published.
- Apps must be deployed and accessible via the internet or mobile app provider without the need for a user to install any additional tools, or utilities.
- Participants are responsible for the deployment of the app. A resource list is available at the conclusion of this document.

The Scoring Criteria

Judges will look at four key categories:

- Utility of the application to the general public to manage their risk.
- Quality of the user experience and user interface design.
- Use of concepts which illustrate quantitative risk analysis, especially in the fields of actuarial science and risk engineering.
- Novelty of approach.

Suggested Resources

These suggestions should be regarded as precisely that. Applicants need not feel constrained by these ideas and are free to use whatever platform and data they feel will be most useful. Further, note that the CAS has no financial incentive to promote any of the commercial providers listed below.

Data sources

- OpenStreetMap
- FEMA
- AHS
- NOAA
- US Census population data
- HydroSHEDS

Tech platform

- Shinyapps.io
- React JS
- Python Dash
- Heroku
- Django REST Framework
- DigitalOcean

For questions about the contest, please contact CAS Research Actuary Brian Fannin at bfannin@casact.org. ●

CAS Public Discipline Listings Available Online

The CAS has created an online listing of prior public discipline cases going back to 2013. This listing is in keeping with other organizations' practices, including the American Academy of Actuaries, which reports disciplinary actions concerning all members. Each case was originally published in *Actuarial Review* as prescribed by the CAS Bylaws.

Having these disciplinary cases in one location makes them more accessible to members and other interested parties. The listings can also be a resource to volunteers teaching professionalism courses.

The listing can be found on the CAS website on the "About" tab and then "Professionalism": https://www.casact.org/about/professionalism. ●

The Casualty Actuarial Society is pleased to announce the release of the Annual Report for the year 2022. Inside you will find highlights from the previous year encompassing all facets of the CAS, including admissions, engagement, research and more.

Read the report online at https://www.casact.org/about/annual-reports.

Message from the CEO of the Casualty Actuarial Society, 2022 CAS Annual Report.

2022 Annual Report

FISCAL YEAR 2022 CASUALTY ACTUARIAL SOCIETY ANNUAL REPORT

International

"Expanding Globally" is a key pillar of the CAS Strategic Plan. In 2022 the CAS increased its commitment to becoming a more global association through various initiatives reaching Africa, Asia and Latin America.
The following are some of 2022's highlights:

Asia: New efforts were made to expand connections among CAS members across Asia through virtual and in-person networking events. The CAS also boosted awareness of its credentialling pathway by engaging hundreds of students in CAS Student Central Summer Programs and by having CAS members serve as featured speakers at virtual events across Asia.

Latin America: In 2022 the CAS launched its first-ever Spanish language webinar series for actuaries in Latin America and supported local actuarial conferences in Brazil, Colombia and Argentina.

Africa: The CAS elevated its presence in key markets on the continent by speaking at the 6th African Actuarial Congress in Ghana and the Actuarial Society of Kenya's Annual Convention. Additionally, the Africa Region Working Group was formed to increase volunteer support for these initiatives.

CAS Casualty Actuarial Society

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Victor Carter-Bey, D.M.

CAS Chief Executive Officer

The CAS continues to operate in a position of strength. Combining a bold strategic plan from the CAS Board with a top-notch execution plan by CAS staff and volunteers has allowed the organization to do a great deal since my arrival in 2019. Switching to computer-based testing, implementing a new staff-volunteer model, and making it through the pandemic and thriving in spite of it are all exceptional accomplishments. But what stands out the most is the community and pride that I have witnessed in working with CAS members around the world. Community means everything. Seeing community come together to build exams, publish research and conduct events is inspiring. The power of community will propel us to the next phase of the Strategic Plan.

Obtain Your Credentials in Predictive Analytics and Catastrophe Risk Management From The CAS Institute
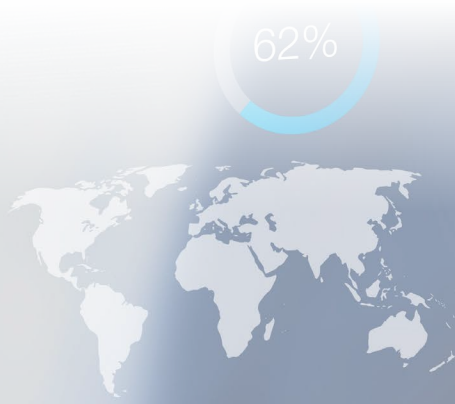
Certified Catastrophe Risk Management Professional (CCRMP) and Certified Specialist in Catastrophe Risk (CSCR)

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

Required assessments and courses for earning the CSCR include:

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

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

For more information, visit CatRiskCredentials.org.

Certified Specialist in Predictive Analytics (CSPA)

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

Required assessments and courses for earning the CSPA include:

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

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

For more information, visit TheCASInstitute.org.

Meet the VEEP: Mary Hosford, Vice President-Administration

By DR. SARAH SAPP, CAS EDITORIAL/ PRODUCTION MANAGER
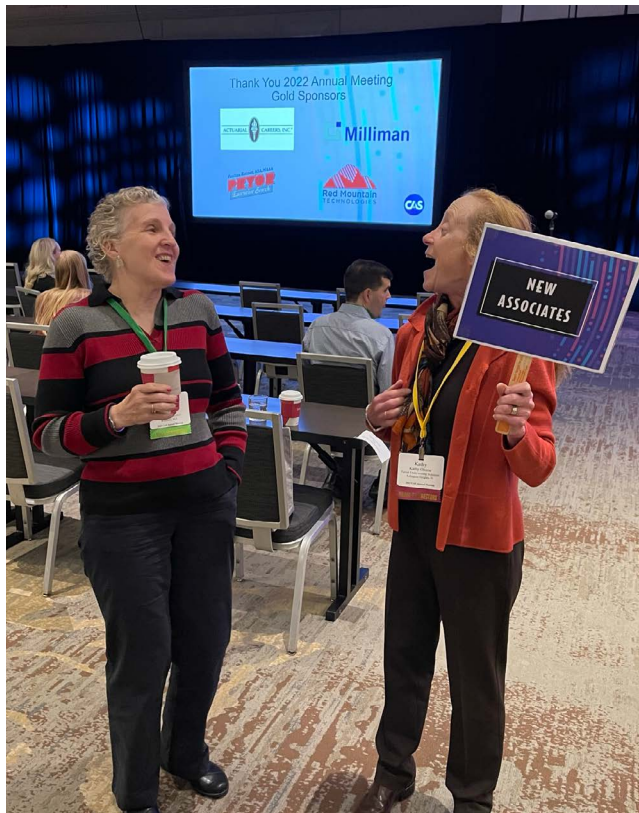
VP-Administration Mary Hosford (left) and CAS Board Member Kathy Olcese share a light-hearted moment during their 2022 Annual Meeting duties guiding new Associates to their designated seats.

Mary Hosford, Vice President-Administration

If you ask Mary Hosford to describe her role at the CAS as the VP-Administration, she will tell you that her position is a "coat of many colors."

First and foremost, the Board tasked Hosford with overseeing the development of key performance indicators, or KPIs, to measure the organization's progress in achieving the goals of the CAS Strategic Plan on a quarterly basis.

"She took the early draft KPIs to a whole other level," said Mike Boa, CAS chief communications officer. "Mary's project management and volunteer engagement skills enabled a steady evolution of building these important metrics into a valuable reporting tool, and the Board was ultimately pleased with the final work product. While the KPIs are a team effort, Mary's leadership was central to the success of the project."

Alongside CAS staff, Hosford co-leads a wide variety of areas, including the CAS Finance and Investment Councils, the CE Compliance Working Group, several functions within the CAS Publications Department and elections. She is also responsible for the maintenance of the CAS Constitution and Bylaws.

The Finance Council handles all CAS financial matters, such as developing the budget and income statements and insurance coverage. The council is just getting started on the budget for the 2024 fiscal year, which will run from 4Q23 through 3Q24. The VP-Administration also sits on the CAS Audit Committee, which coordinates the annual audited financial statements prepared by our outside accounting firm. The CAS budget is currently around $16M.

Similarly, the Investment Council handles the CAS investments, making sure that there is enough cash to cover expenses while maximizing returns, within the CAS investment policy, on longer-term investments. The funds for investments were around $23 million at year end 2022.

The CE Compliance Working Group conducts the annual
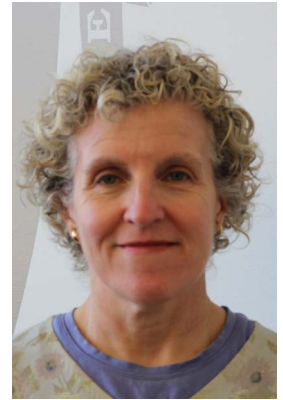
audits of member compliance with continuing education requirements. They randomly select 1% of CAS members (as well as a few others, such as new Board members) and check that the continuing education activities that these members documented are in accordance with CAS requirements. The staff liaisons are Kellee Jenkins and Wendy Ponce.

Hosford helps with the CAS Publications Department as a part of the group that reviews opinions, among other duties. "We call her when a decision needs to be made, like revising editorial policies or finding a *Variance* co-editor in chief replacement," said Elizabeth Smith, director of publications. "She is very active on the review of *AR* opinion pieces, many times editing the pieces for better flow and clarity, which is above and beyond."

For elections, the CAS has a detailed step-by-step process for the annual election of officers and directors, covering every activity from the solicitation of nominations to notifying the successful candidates. The procedures and guidelines are reviewed each year by staff and Hosford and presented to the board for approval with any suggested changes.

As for the Constitution and Bylaws, there are occasionally changes proposed to CAS procedures or activities that require corresponding modifications to these documents. Such changes are under Hosford's purview, although typically the CAS will work with outside counsel to ensure that what is being proposed is within legal bounds.

Hosford's goal in her role is to "keep all the plates spinning." Incidentally, Hosford has been spinning plates as VP for five years — two years beyond the regular tenure of three. She was asked and agreed to stay on by the Board. This November she will complete her unusual term.

"I think this VP role is a little different than the others," said Hosford. "As opposed to having one focus area, such as Research or Admissions, composed of various subgroups all rowing in the same direction to achieve the goals of that area, the VP-Admin empire is a combination of several mostly unrelated groups. It's the 'all other' of CAS VPs."

Hosford has a long history of volunteering with the CAS, beginning with her work with what was then called the Ratemaking Seminar Committee, where she ultimately chaired.

"I've participated in several different CAS committees and eventually was elected to serve on the CAS Board," said Hosford. "As my Board term was wrapping up and I was pondering what CAS volunteer opportunity would follow, I happened to sit in on an Executive Council meeting while delayed in Nashville due to a snowstorm. Based on what I saw, the VP role looked like it would be a great potential next step for me."

"It's a little unusual to go from Board to VP – usually, if anything, it's the other way around. However, I really like the 'view from the top' of the workings of the CAS, and this seemed like a way to continue that but from a slightly different perspective."

For members who want to make their way up to volunteer leadership roles, Hosford recommends starting small.

"Get your foot in the door and keep looking for opportunities to increase your CAS 'footprint,'" said Hosford. "When I completed the CAS exams, I didn't have any aspirations to volunteer, until I was cajoled into joining the Ratemaking Seminar Committee. It has made a huge difference in my career, and I strongly encourage others to find a way to get involved. You make a lot of great connections this way!"

Over the years, Hosford has worked in actuarial roles for several different P&C insurers. She has also worked as a regulator and for Lloyd's as an underwriter.

"I've been back in regulation with the Massachusetts Division of Insurance for a while now, this time in a health role — which is very much like P&C, I've discovered. As you might imagine, health insurance is a very active field."

Hosford is a graduate of Boston College with degrees in mathematics and economics. "Because of my work schedule, I needed a math elective that met on Monday, Wednesday and Friday, and thus signed up for a course called 'Actuarial Mathematics' to fulfill that requirement — that's how I stumbled into the actuarial profession!" ●

> **She took the early draft KPIs to a whole other level. Mary's project management and volunteer engagement skills enabled a steady evolution of building these important metrics into a valuable reporting tool, and the Board was ultimately pleased with the final work product.**

A Decade of Serving Members:

AR Magazine Celebrates a Milestone

By DR. SARAH SAPP, CAS EDITORIAL/ PRODUCTION MANAGER

T*his May-June issue of* Actuarial Review *marks its 10th year as a four-color magazine. CAS Editorial Production Manager Sarah Sapp, interviews Publications Director Elizabeth Smith as she reflects on the many changes occurring with* AR *during its new life as a magazine.*

Sarah Sapp: Tell me about the beginnings of the magazine. How did it get started and why?

Elizabeth Smith: For years I said that *The Actuarial Review** was a magazine masquerading as a newsletter. The newsletter's issues kept getting bigger and bigger – from 16 pages to a whopping 48 pages.

Then one day in early 2013, the head of CAS marketing and communications, Mike Boa, approached me about *AR* getting a makeover: one complete with paid advertising, full color, and a change from a quarterly to a bimonthly frequency.

These *AR* changes were part of larger expansion efforts within the CAS to better serve the needs of the growing membership. In just one year, the CAS would be celebrating its centennial and, while there was much to celebrate about the organization's history, the association sought to make changes

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* The article "The" would soon disappear from the title of the magazine although many still use it today.

to modernize and consistently brand its publications. These changes would benefit an increasing membership and pave the way for an even brighter future for the actuarial profession.

But now my stray comment about the newsletter becoming the size of a magazine was becoming a reality. We only had a few short months to find a designer, determine a new layout and figure out how to keep the magazine filled with stories.

So, I set to work, but I wasn't alone.

Internally, we formed a dedicated team that included CAS staff members representing the admissions, finance, research, and marketing & communications departments, as well as the publications department's core team of Staff Editor Donna Royston, Graphic Designer Sonja Uyenco and me. We met over several weeks to accomplish a multitude of tasks, including content planning and RFPs to designers and printers. We also sought the wise counsel of a select group of CAS volunteers, including *AR* Editor in Chief Grover Edie. Ultimately, we chose great vendors to bring the magazine to life (some of whom are still serving us today – thank you, Mount Royal Printing of Baltimore, Maryland!).

Meanwhile, another group of CAS members and staff had been hard at work to determine a new logo and tagline for the CAS. The first logo was nearly 100 years old, and it was time for a change. Our new CAS logo debuted at the 2013 CAS Spring Meeting in Vancouver and graced *AR*'s first magazine cover in July of that year.

The most important aspect of the new magazine was the content. With the newsletter, several members contributed several stories over the years. But switching to a bimonthly would not only put new pressure on acquiring content but also on our regular columnists. (Instead of four "Presidents Message" columns per year, the CAS president would now have to write six in the same timeframe.)

The challenge of finding content, supporting regular columnists and illustrating the magazine would be helped by a new budget item for freelance writing and design. (See the sidebar for some of my favorite stories and writers.)

For the new *AR* section and column names, we took our inspiration from the new CAS tagline of "Expertise. Insight. Solutions." "Expertise" yielded the department "Actuarial Expertise," which would house the columns "Brainstorms" (later known as "Explorations") and other technical discussions of actuarial methods. "Insight" led to "Professional Insight," where "Ethical Issues" and other stories on career and skills development would find a home. "Solutions" produced "Solve

This," which included perhaps our most popular column, "It's a Puzzlement."

SS: How has the magazine changed over the years?
ES: *AR* progressed from humble print beginnings. Matthew Rodermund started it as The CAS Newsletter. He worked with his wife Edyth in their basement mimeographing, stapling and mailing the newsletter to CAS members beginning in 1970.

Rodermund, who was the editor in chief (EIC) for many years, was a devoted CAS leader. Today the CAS's most coveted award bears his name: The Matthew Rodermund Memorial Service Award. He later turned over the job to notable CAS members such as Ted Zubulake, Stan Khury, Walter Wright, Paul Lacko and now Grover Edie, who has served as EIC since November 2010.

Mimeographed and stapled sheets morphed into a newsletter that was desktop-designed with the latest software and later introduced duotone photography. Duotones use two inks, one of which is black and the other a signature color chosen by an organization. From the beginning, the CAS's preferred color was blue, which was chosen for the first edition of the *Proceedings of the Casualty Actuarial Society* in 1914.

Now we have our four-color magazine (cyan, magenta, yellow and black are used to create a variety of colors). Having color available enabled the magazine to illustrate stories in far greater ways and spurred debate among *AR* Working Group (ARWG) members on which concepts best depict the cover stories. Now we choose between multiple mock-up designs for some issues, and choosing a cover illustration from several concepts has been a fun and challenging exercise for the *AR* team.

SS: Tell me about your favorite stories.
ES: I like the stories about people in "Downtime," "Making Things Happen" and "In Remembrance" columns. In "Downtime" we've covered a beekeeper, singer-songwriter, dancers and a forest owner, among many other members with fascinating hobbies. "In Remembrance" has the most poignant stories of our members' lives — many quite surprising and uplifting. We may be saddened by these people's passing, but the column celebrates their lives.

One of the most heartwarming stories to grace the pages of *AR* is "Overcoming the Odds: Actuary Receives Life-Extending Kidney from CAS Classmate" (March/April 2019). It's about the friendship between CAS Fellows Larry Artes and Kay
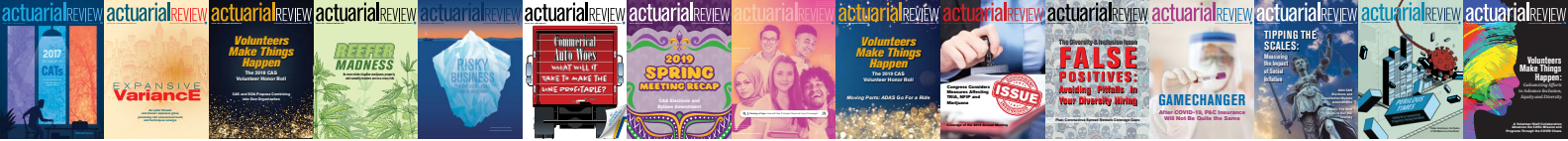
How do you solve a problem like content creation?

Going from a quarterly to a bimonthly publication was tricky. We had plenty of articles before. Would the trend continue? Luckily, we now had a bigger budget for the magazine, which meant that we were able to hire freelance writers for in-depth reporting and design firms for our changing covers – a new one for each issue. We hired staff writers from the Insurance Information Institute as well. We even had some funds for cover designs, which was quite helpful to CAS Graphic Designer Sonja Uyenco who was responsible for nearly all CAS publications.

Over the decade, the work of several dedicated writers and content creators has deepened and enhanced *AR*. Following are some of these writers and a few of their best works.

Annmarie Geddes Baribeau

- "Driverless Utopia." May-June 2018. Bronze EXCEL Award for Magazine Feature Article.
- "Gamechanger: After COVID-19, P&C Insurance Will Not Be Quite the Same." May-June 2020.
- "Demystifying the Regulatory Web: Dodd-Frank and Its Complex Impact." March/April 2016.

Jessica Leong

- *AR*'s President's Message Series 2021 (video interviews with prestigious actuaries). Winner of the Communicator Award of Distinction.

Jim Lynch

- "The Casualty Actuary's Tools Can Fix All Sorts of Problems." May-June 2014.
- "Taming the Social Inflation Tiger." July-August 2021.
- "How To Tap into the AI Revolution." May-June 2021.

Jim Lynch and Dave Moore

- "Looking for Social Inflation in Loss Development." September-October 2022.

Liz Haigney Lynch

- "An Accident in the Country: Injury and Accountability in the Early Auto Era." May-June 2015.

Laurie McClellan

- "Pioneering CAS Fellows: Linda Shepherd and Ollie Sherman Reflect on their Careers." January-February 2021.

Steven Sullivan

- "The Great Trade-Off and the Birth of the CAS." March-April 2014. Winner of a Silver EXCEL Award in the category of Feature Article in a Magazine.

Kufera, who began their actuarial careers together at the same company. Years after they had left that company and forged their own career paths, the two reconnected when Artes, who had long lived with polycystic kidney disease, began a desperate search for a kidney donor. It turned out that Kufera was a perfect match, and the two colleagues connected in one of the most caring ways. This gift changed the lives of both the donor and recipient. To me, the story of this friendship is emblematic of the ties that CAS members develop through their shared experience of studying and working together. I talked to Grover Edie recently who fondly recalled this story. He told me this story was one of his favorites and an excellent example of what *AR* is about.

SS: What has been your goal for the magazine?
ES: People like to read about their colleagues, see what's going on in the organization and learn how they can get involved. I want *AR* to help members with their jobs — give them tools and resources to advance their careers. Those are the goals — and if *AR* can entertain as well, that is gravy.

SS: What story or series of stories have we published that you consider groundbreaking?
ES: In late January 2020, we were just learning about COVID-19 and the destruction it was wreaking in Asia and Italy. I spoke to *AR*'s frequent freelance writer, Annmarie Geddes Baribeau, and asked her to check out the story, with the aim

of monitoring the CDC (Centers for Disease Control) website and other sites that were keeping track of the diseases deadly toll throughout the world and exploring what it might mean for the P&C industry. Annmarie began her research and by early March 2020 we had our story, just days before COVID was classified as a pandemic.

I'll never forget a few weeks later on a Friday evening just before quitting work for the day. Annmarie had turned in her story and was telling me more about her research on another COVID story. She was exhausted and so was I. Monitoring COVID's statistics was frightening. Emotions were raw and the world seemed to be turning upside down, but we had to keep going.

I'm most proud of the work that Annmarie did during that time.

SS: Are there any standout volunteers who really had influence over the years?
ES: When I was hired at the CAS in 1997, we had two copy editors on board as volunteers: Parker Boone and Paul Lacko. Paul and Parker were top-notch editors, and they were my sole support, aside from the EIC. It was a shoestring operation, but we worked well together. Today there are 37 ARWG members. Each one of them brings their unique perspectives to editing articles. Practically every one of them has found something to fix that everyone else has missed!

SS: How do the volunteers help with the *AR* process?
ES: Our volunteers fact check and review articles with an actuarial eye. They are looking to see that all the concepts are sound and clearly explained, but they are also word lovers. They offer suggestions on just the right words to use — they have improved authors' writing so much. Often, they have enhanced the clarity and the style of the text. ARWG members enjoy language and are keen on honing that soft skill of communication that the CAS has been encouraging its members to improve upon over the years. They are first-rate communicators who know how to clarify concepts. They question outcomes and look for solutions to sometimes tangled words.

This past April, the ARWG had their first virtual meetings. In all the years I had been working on *AR*, I had yet to have a meeting with the entire team. We had gotten to know

each other through e-mail, but nothing can really compare to that face-to-face interaction. Our first group meetings were a smashing success — we ended up scheduling two meetings on different days so we could get as many people involved as possible. It was so nice to connect people's names with their faces. We will meet at least twice a year now. I am amazed at and grateful for the dedication of these people who have never met in person.

SS: Where do you see *AR* going in the future?
ES: Just this year, we introduced digital advertising on our website, so the trend is going toward full-on digital. But honestly, I don't think print is dead yet. People still like to hold a document in their hands, feel the paper, take it on a plane and then recycle it. While I do love the "deadwood" version, I do foresee a time when *AR* becomes solely a website or an app. I believe that I will have long been retired when that happens.

One thing that won't change is the involvement of CAS members. They have established so much of what *AR* and the CAS are today. I see them continuing to volunteer their time to produce an award-winning publication. And truly, member involvement is the secret to the magazine's success. ●

ETHICAL ISSUES

The ABCD and The CAS's Processes and Disciplinary Actions

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

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

While the articles will pose scenarios as they apply to credentialed actuaries, we feel that these could apply to anyone performing work of an actuarial nature, regardless of whether they intend to become credentialed.

To continue improving this professionalism experience, we want your feedback. You can send your comments and questions to ar@casact.org.

In our last column (*AR*, March-April 2023), we saw our protagonist Bilbo in a dilemma. He had questions about an actuarial report that he was reviewing as part of his M&A work. Without getting answers to these questions, he would have to report his concerns, which potentially could kill or seriously affect the deal. The problem was that Bilbo had signed a non-disclosure agreement (NDA) related to the M&A, and the actuary, Gollum, who produced the report was not part of the M&A project, so Bilbo couldn't talk to her.

Now, let's assume that Bilbo decides that he cannot opine on the report without talking to Gollum. He approaches his firm's partner, I.M. Balrog, FCAS, who is in charge of the M&A deal to get permission to talk to Gollum, but the partner tells him "You shall not pass!" any information or questions onto Gollum. Bilbo decides to ignore Balrog and talk directly to Gollum. He justifies his non-compliance because otherwise it could lead to decisions based on

> **He approaches his firm's partner, I.M. Balrog, FCAS, who is in charge of the M&A deal to get permission to talk to Gollum, but the partner tells him "You shall not pass!" any information or questions onto Gollum.**

incomplete information. In addition, this might result in damage to his client's and his firm's reputation being damaged due to their inability to fully complete the work and secure the deal.

So, Bilbo does contact Gollum. Gollum cooperates with Bilbo based on Precept 10 of the Code of Conduct that states an Actuary "shall cooperate with others in the Principal's interest." Eventually, Balrog finds out that Bilbo has broken the NDA by talking to Gollum without permission. He also believes that Bilbo has violated the precepts of confidentiality (Precept 9) and professional integrity (Precept 1). Balrog feels that he is bound by Precept 13 on Violations of the Code. Balrog is unsuccessful at discussing the issue with Bilbo. Balrog has a couple of choices: He could do

nothing, contact the ABCD for counseling or submit a complaint to the ABCD. If he chooses the latter, or if the ABCD counsels him to submit a complaint, this is how it would proceed.

Balrog believes that Bilbo's contacting Gollum is an action that might adversely reflect upon the actuarial profession adversely. Balrog reports Bilbo to the ABCD, believing that Bilbo had violated Precepts 1 and 9 by not upholding the conditions of the NDA and contacting Gollum to discuss items within the M&A project. This sets the wheels of the ABCD in motion.

At this point, the complaint would be forwarded to Bilbo for Bilbo's response. Once the response is provided, generally within 30 days, the ABCD Chairs will review both the complaint and response and then will decide to either dismiss the complaint or determine that an investigation is warranted. If the Chairs decide that an investigation is needed, an investigator will be appointed, and Bilbo will be notified. Bilbo has the option to appeal the choice of the appointed investigator in the event Bilbo believes the investigator will not

Figure 1.
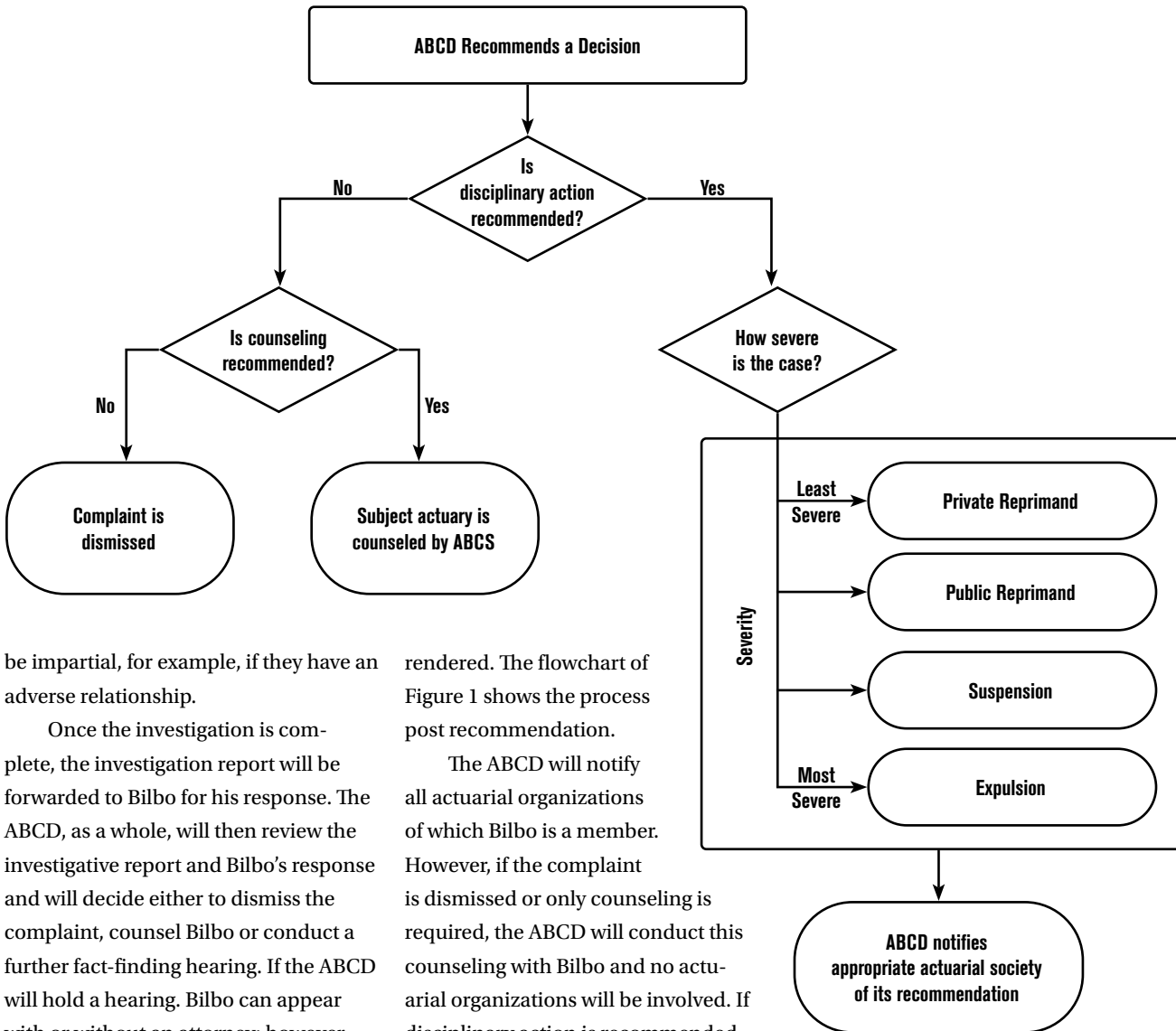
be impartial, for example, if they have an adverse relationship.

Once the investigation is complete, the investigation report will be forwarded to Bilbo for his response. The ABCD, as a whole, will then review the investigative report and Bilbo's response and will decide either to dismiss the complaint, counsel Bilbo or conduct a further fact-finding hearing. If the ABCD will hold a hearing. Bilbo can appear with or without an attorney; however, the attorney can only engage in a limited fashion by lodging legal objections or advising Bilbo. The lawyer does not actively participate in the hearing. Bilbo is allowed to give an opening statement to the ABCD to share his view on the matter, question the investigator and present a case in defense, including the presentation of witnesses.

After the hearing is adjourned, the ABCD will go into an executive session where a recommendation will be

rendered. The flowchart of Figure 1 shows the process post recommendation.

The ABCD will notify all actuarial organizations of which Bilbo is a member. However, if the complaint is dismissed or only counseling is required, the ABCD will conduct this counseling with Bilbo and no actuarial organizations will be involved. If disciplinary action is recommended by the ABCD and Bilbo is a member of the CAS, the CAS president, CEO and the chair of the Discipline Committee are notified. The ABCD also notifies Bilbo of its disciplinary recommendation.

When the chair of the Discipline Committee receives the recommendation, they make a determination on whether further fact-finding or investigation is required. Upon receipt of the ABCD recommendation or following the CAS fact-finding or investigation, the

CAS conducts a disciplinary hearing, as shown in the flowchart in Figure 2.

The ABCD and CAS Discipline Committee proceedings are confidential. The hearing panel consists of six members of the Discipline Committee and the Discipline Committee Chair; CAS counsel also attends. Bilbo can provide supplemental material in his defense at least 15 days in advance of the hearing. Bilbo has the right to appear at

Figure 2.

```
┌─────────────────────────────────────────────────────────────────┐
│                    CAS receives ABCD's notice                     │
└─────────────────────────────────────────────────────────────────┘
                                  │
                                  ▼
┌─────────────────────────────────────────────────────────────────┐
│          Chair may decide to perform more fact-finding on the case│
└─────────────────────────────────────────────────────────────────┘
                                  │
                                  ▼
┌─────────────────────────────────────────────────────────────────┐
│  CAS Discipline Committee and subject actuary are notified and a  │
│                       hearing is scheduled                        │
└─────────────────────────────────────────────────────────────────┘
                                  │
                                  ▼
┌─────────────────────────────────────────────────────────────────┐
│            CAS Discipline Committee renders a decision            │
└─────────────────────────────────────────────────────────────────┘
```

Does the CAS accept ABCD's recommendation?

No → Does the CAS want to modify ABCD's recommendation?

Yes → The modified recommendation is implemented.

No → CAS dismisses the case

Yes → CAS to carry out the disciplinary action

The modified recommendation is implemented. → CAS to carry out the disciplinary action

---

the hearing, with or without his attorney, and may make an oral presentation and respond to questions posed by the Discipline Committee panel members. Bilbo's attorney has a limited role similar to the ABCD hearing. The Discipline Committee Panel then goes into an executive session and renders a decision. The Discipline Committee Panel has the discretion to accept, reject or modify the recommendation received from ABCD. The decision is binding; however, Bilbo can appeal the decision to the CAS Board of Directors, if he has grounds to appeal.

For further information on ABCD and CAS disciplinary processes, visit the following links:

- ABCD: www.abcdboard.org/resources/rules/
- CAS: www.casact.org/about/professionalism/rules-procedure-disciplinary-actions

Special thanks to the ABCD General Counsel and CAS Discipline Committee Chair for their help with this article. ●

aggregate: Frequency-Severity Distributions Made Easy

By STEPHEN J. MILDENHALL

aggregate *is an open-source Python package available for free online that I've been developing since 2017. The following example shows how you would use it in practice — and check out a video tutorial in the link section at the end of this article.*

You are the risk manager for ABC Trucking, Inc. ABC has a captive providing commercial auto liability insurance for its fleet with a $10 million occurrence limit. You manage the captive's net exposure using per occurrence reinsurance and an aggregate stop loss. Your goal is to buy reinsurance to keep the 99th percentile of your net loss around $3.5 million. Previously, you relied on a simple Excel spreadsheet and some broker rules of thumb to guide your purchases. This year, you will use new software called aggregate to model your gross and net risk.

The documentation (see links below) explains that you need to start by installing the software. You fire up your favorite Python interface (e.g., Jupyter Lab or RStudio) and enter:

```
!pip install aggregate
```

First, you need to specify the gross distribution of losses for your portfolio. This is done using the Dec Language (DecL), a human-readable way to go from a declarations (dec) page to a frequency-severity probability distribution. The DecL for your account has six clauses:

```
Agg   ABC.Gross
   exposure
   limit
```

Figure 1.

```
In [1]: import numpy as np
In [2]: means = np.array([2.764e3, 24.548e3,
   275.654e3, 1.917469e6, 10e6])
In [3]: tmeans = 1.07 ** (2024 - 2008) * means
In [4]: weights = np.array([0.824796, 0.159065,
   0.014444, 0.001624, 0.000071])
```

```
   severity
   occurrence reinsurance
   frequency
   aggregate reinsurance
```

agg is a keyword, like select in SQL, instructing DecL to create an aggregate distribution. ABC.Gross is a label. The remaining clauses contain your specific details.

exposure describes the volume of risk. Your actuary's expected loss cost is $5 million, and they estimate severity of $38,236, giving an expected claim count of 130.8. The exposure clause is 130.8 claims, which can be specified using a Python f-string as f'{5e6 / 38236} claims'. The f-string substitutes the values into the string.

The severity clause specifies the unlimited size of loss distribution. A lognormal distribution with mean 50 and CV 4.5 is simply sev lognorm 50 cv 4.5, and you can probably guess the form for a gamma or other commonly used severity distributions. All scipy.stats distributions are available. Your actuary recommends using a mixed exponential severity, heroically trended from an old CAS presentation with means and weights as follows as shown in Figure 1.

The DecL is entered as f'sev {tmean} * expon 1 wts {weights}', where sev is a DecL keyword and expon 1 specifies a standard exponential distribution with mean 1.

There is no reinsurance for the gross portfolio — we'll come to that later. The frequency clause specifies the claim count distribution. Your actuary recommends a gamma-mixed Poisson distribution with a mixing CV of 20%, producing a negative binomial. The DecL is mixed gamma 0.2

The next step is to use aggregate to build the compound probability distribution from its DecL specification. Returning to Python, you import build and qd from the library and run a short program. The build object provides easy access to all functionality, and qd is a quick-display function providing formatted printing. You can enter the gross portfolio DecL as show in Figure 2, using line breaks for clarity, since Python automatically concatenates strings between parentheses.

What has this done? aggregate has created a discrete approximation to the severity distribution using $2^{16}=65536$ buckets of size 800. Then, it uses a Fast Fourier Transform (FFT) algorithm to compute the convolutions and aggregate

Figure 2.

```
In [5]: from aggregate import build, qd
In [6]: gross = build('agg ABC.Gross '
   ...:    f'{5e6 / 38236} claims '
   ...:    '10e6 xs 0 '
   ...:    f'sev {tmeans} * expon 1 wts {weights} '
   ...:    'mixed gamma 0.2 ')
   ...:
In [7]: qd(gross)
          E[X]      Est E[X]     Err E[X]    CV(X)   Est CV(X)  Skew(X)  Est Skew(X)
 X
 Freq   130.77                   0.21828             0.40153
 Sev    38236        38233      -7.202e-05  7.3971    7.3976    24.457     24.456
 Agg    5e+06     4.9996e+06    -7.2027e-05 0.6827   0.68275    2.0204     2.0204
 log2 = 16, bs = 800, validation: not unreasonable.
```

Figure 3.

```
In [8]: qd(gross.density_df[['p_total', 'p_sev', 'F', 'S', 'lev']].loc[:10e6:1250])
               p_total       p_sev          F          S          lev
      loss
       0.0             0    0.04034          0          1            0
 1000000.0    1.055e-05  4.3512e-06  0.0019479    0.99805   9.9976e+05   1000000.0
 2000000.0   0.00013947  1.3789e-06   0.087543    0.91246   1.9693e+06   2000000.0
 3000000.0    0.0001808  4.9266e-07    0.30375    0.69625   2.7778e+06   3000000.0
 4000000.0   0.00014089  2.1903e-07    0.50707    0.49293   3.3682e+06   4000000.0
 5000000.0   9.7242e-05  1.2698e-07    0.65512    0.34488   3.7826e+06   5000000.0
 6000000.0   6.3713e-05  9.0007e-08    0.75448    0.24552   4.0744e+06   6000000.0
 7000000.0   4.1197e-05  7.0771e-08      0.819      0.181   4.2853e+06   7000000.0
 8000000.0   2.7125e-05  5.8083e-08    0.86098    0.13902   4.4439e+06   8000000.0
 9000000.0   1.8608e-05  4.8449e-08    0.88911    0.11089    4.568e+06   9000000.0
10000000.0   1.3452e-05  0.00032826    0.90888    0.09112   4.6685e+06  10000000.0
```

distribution. Separately, it computes the expected mean, CV, and skewness for limited severity and the aggregate distribution analytically and compares them with the FFT routine. These statistics are reported by `qd(gross)`. The mean has a relative error of 7.2e-05, and the CVs and skewnesses agree to four significant digits. The last line reports that all validation tests pass: the approximation is "not unreasonable." (Validation is like a null hypothesis; not failing is the best result.)

The discretized severity and aggregate distributions are stored in a Pandas dataframe that can be accessed and manipulated using Python code, such as that shown in Figure 3. The function `qd` here just provides sensible number formats. `p_total` and `p_sev` are the aggregate and severity probabilities, `F` and `S` are the aggregate cdf and survival function.

Now, you want to apply occurrence reinsurance. You usually buy a tower starting at $250,000 with a co-participation, building up to the $10 million occurrence limit. The DecL clause `occurrence net of 50% so 250e3 xs 250e3` applies a 50% share of (`so`) the $250,000 xs $250,000 layer, with unlimited reinstatements. Layers can be chained together. Your full program is as

Figure 4.

```
In [9]: net_occ = build('agg ABC.net_occ '
   ...: f'{5e6 / 38236} claims '
   ...: '10e6 xs 0 '
   ...: f'sev {tmeans} * expon 1 wts {weights} '
   ...: 'occurrence net of '
   ...: '50% so 250e3 xs 250e3 and '
   ...: '90% so 500e3 xs 500e3 and '
   ...: '95% so 4e6 xs 1e6 and '
   ...: '5e6 xs 5e6 '
   ...: 'mixed gamma 0.2')
   ...:
In [10]: qd(net_occ)
            E[X]        Est E[X]     Err E[X]     CV(X)    Est CV(X)   Skew(X)   Est Skew(X)
 X
 Freq     130.77                     0.21828               0.40153
 Sev       38236           23684    -0.38059    7.3971      2.4709    24.457       5.4104
 Agg       5e+06       3.097e+06    -0.38059    0.6827      0.30714    2.0204       0.5392
 log2 = 16, bs = 800, validation: n/a (reinsurance).
```

Figure 5.

```
In [12]: net_agg = build('agg ABC.net_agg '
   ....: f'{5e6 / 38236} claims '
   ....: '10e6 xs 0 '
   ....: f'sev {tmeans} * expon 1 wts {weights} '
   ....: 'occurrence net of '
   ....: '50% so 250e3 xs 250e3 and '
   ....: '90% so 500e3 xs 500e3 and '
   ....: '95% so 4e6 xs 1e6 and '
   ....: '5e6 xs 5e6 '
   ....: 'mixed gamma 0.2 '
   ....: f'aggregate net of {net_occ.q(0.99) - 3.5e6} xs 3.5e6')
   ....:
In [13]: qd(net_agg)
            E[X]        Est E[X]     Err E[X]     CV(X)    Est CV(X)   Skew(X)   Est Skew(X)
 X
 Freq     130.77                     0.21828               0.40153
 Sev       38236           23684    -0.38059    7.3971      2.4709    24.457       5.4104
 Agg       5e+06      2.8789e+06    -0.42421    0.6827      0.22151    2.0204      -0.64794
 log2 = 16, bs = 800, validation: n/a (reinsurance).
 In [14]: net_occ.q(0.99), net_agg.q(0.99)
 Out [14]: (5672000.0, 3500000.0)
```
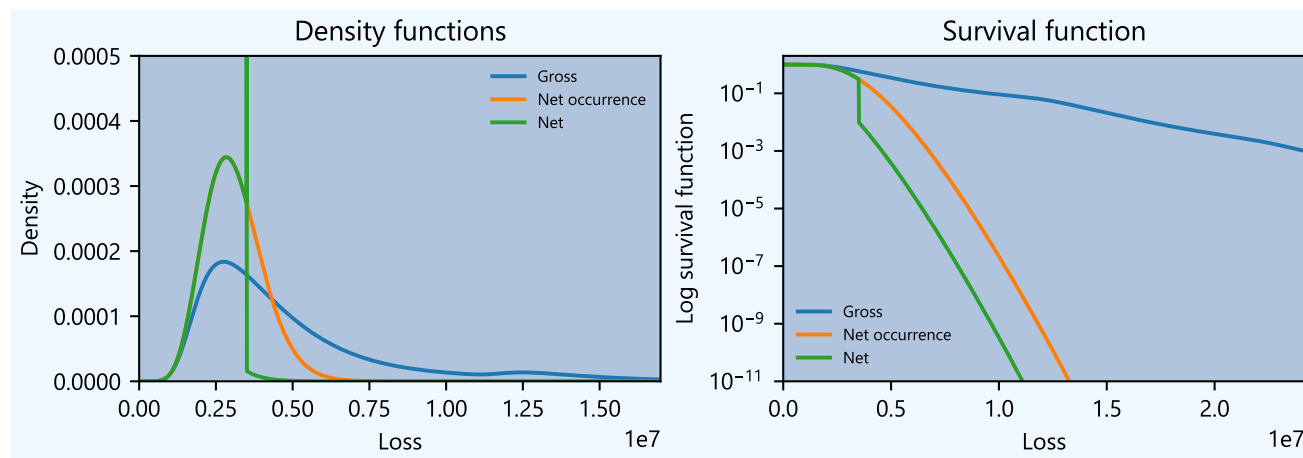
Figure 6.

shown in Figure 4.

The reported `Est[imated]` statistics now refer to the net result. This has lowered the expected loss from $5 million to $3.1 million and reduced the portfolio CV from 68% to 31%. An objective of `aggregate` is to make working with frequency-severity distributions as easy as working with the lognormal, with standard probability functions built in. The cumulative distribution function (cdf) and quantile function (inverse of cdf, aka VaR function) are accessed as

```
In [11]: gross.cdf(3.5e6),
    net_occ.cdf(3.5e6),
    gross.q(0.99), net_
    occ.q(0.99)
Out[11]:
    (0.41186030905343524,
    0.6902259054503352,
    16984000.0, 5672000.0)
```

The occurrence reinsurance has reduced the 99th percentile loss from $17 million to $5.7 million. Your target 99% loss is only $3.5 million. To get there, you model an aggregate stop loss to attach at $3.5 million and cover up to $5.7 million as seen in Figure 5.

Net losses now have a mean of $2.9

million and CV of 22%. The last line confirms the 99th percentile achieves the $3.5 million target.

From here, a few lines of standard Python code can produce graphics and visualizations (see Figure 6).

I hope this short example gives you a feel for the power of `aggregate`. I used it to create all the case study exhibits and figures in my book with John Major, *Pricing Insurance Risk* (see Richard Goldfarb's book review in *AR*, November-December 2022). If you install it, you can recreate those exhibits and create your own for different portfolios. You can read more about it in the documentation, and the source code is on Github. There is also a series of short videos on YouTube.

Links

1. Documentation: https://aggregate. readthedocs.io/en/latest/
2. Source code: https://github.com/ mynl/aggregate
3. Videos: playlist https://youtube. com/playlist?list=PLQQxycbewjqM

Dmw0hfZdB6Rzm60Qcq3Ao and a video on this specific example at https://youtu.be/nLMmhbFVHyw
4. Scipy.stats distributions list: https://docs.scipy.org/doc/scipy/ reference/stats.html
5. The mixed exponential parameters: https://www.casact.org/sites/default/files/presentation/rpm_2011_ handouts_ws1-zhu.pdf. The means and weights shown on slide 24 are trended from 2008 to 2024 at 7% per year.
6. *Actuarial Review*: https://ar.casact. org/fairness-for-insureds-and-investors/
7. Jupyter Lab workbook: https:// colab.research.google.com/ drive/1gKO4zJfhqR_difNyKHBdSbq 0IK5gP1X9?usp=sharing
8. Video walk-through: https://youtu. be/nLMmhbFVHyw ●

Stephen Mildenhall, FCAS, CERA, Ph.D., MAAA, ASA, CCRMP, CSPA, is retired with over 25 years of experience in the insurance industry and academia. He now spends far too much time programming in Python.

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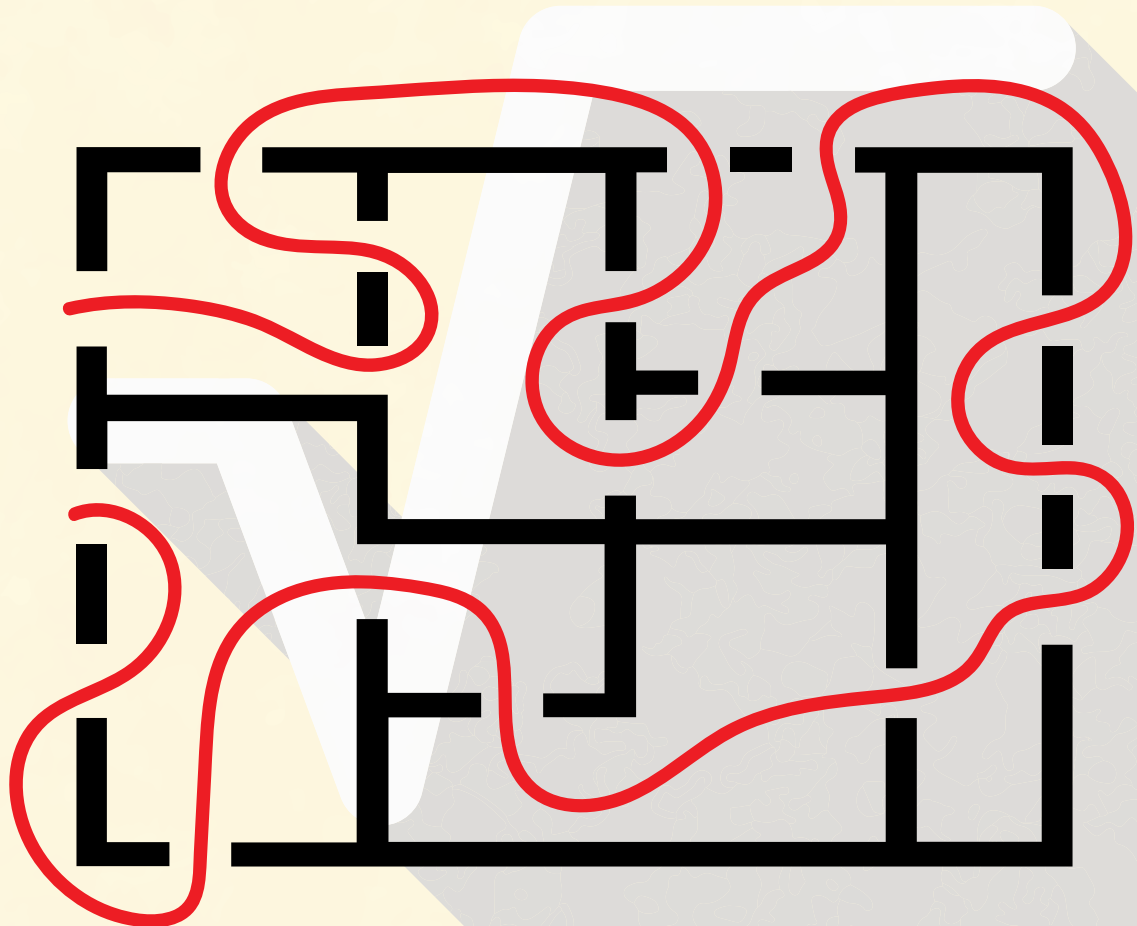## IT'S A PUZZLEMENT By JON EVANS

Getting to the Root of Things

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

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

Cross Every Doorway Once

Many solutions were received. Here is one by Shyam Bihari Agarwal.

Solutions were also submitted by Jordan C. Bonner, Roger Bovard, Paul Chabarek, Al Commodore, Bob Conger, Akshar Gohil, Luc Langlois, Jerry Miccolis, Christina Negley, Gregory Scruton, Betty-Jo Walke, David Uhland and David Vogt. ●

Know the answer?
Send your solution to
ar@casact.org.

99233 – Des Moines, IA – Assistant Actuary
This established insurer is looking to add a newer ASA to their team to work on model development, including ALM, PBR, and CFT, in an environment that fosters growth and development in actuarial matters, as well as leadership.

98010 Healthcare Actuarial Consultant, Midwest or Southeast or Remote
FSA desired to provide services for Medicaid, group and pharmaceutical clients. Manage clients and projects in a growing, fast-paced environment.

98191 – Midwest – Associate Pricing Actuary
Specialty P&C insurer plans to hire Chicagoland pricing Actuary to support specialty lines of business during an exciting growth process. Must have strong communication skills to effectively present assumptions and results of analysis to business partners, and have functional knowledge of data visualization tools. Near ACAS to near FCAS.

99501 – Remote – Managing Actuary
ACAS or FCAS sought for remote managerial role. Actuary will manage and develop staff, prioritize workload, and oversee all resources associated with the actuarial operations unit responsible for advanced actuarial analyses, calculating reserves, and product development.

99593 – Remote – Chief Actuary, Health Reinsurance
Growing non-traditional pioneering medical stop-loss carrier is looking for an entrepreneurial FSA or ASA to lead this reinsurers structured reinsurance and alternative stop-loss risk transfers strategies, working closely with the Chief Product officer and executive team.

99412 – Remote – Medical Economics Actuary
Hospital system seeing an ASA to lead the building of models to support financial performance projections for various initiatives including clinical programs and corporate decision making and strategies. Work on cross-functional teams including clinical, pharmacy, network, and actuarial and analytics.

98855 – Remote – Financial and Audit Life Actuary
FSA sought to build projection and valuation models, perform financial reporting, establish reserves, conduct risk analysis for various lines of life and annuity business, and analysis of reinsurance opportunities. Will present and make recommendations to leadership.

99205 – Northeast / Multiple locations or Remote – Actuarial Consultant
Actuarial Consultant needed by a top-tier nationally recognized firm. FCAS or ACAS with 5+ years of property and casualty actuarial experience preferred.

99118 – Remote – Senior Actuarial Director
Leading Life Consulting practice seeks a leader who can lead large, complex client engagements, manage client relationships and grow them, and manage a team to develop tools and provide clients with a high-quality work product. A propensity to develop and utilize cutting-edge technologies is a plus!

99049 – Northeast – Associate Actuary
Our client, a large P&C global reinsurer, has an opportunity for an Actuary to join Northeast office to assist in pricing and new product launch for their various lines of commercial and specialty lines of business. Actuary will support the development of models and pricing tools. ACAS – FCAS

98749 – West or Remote – Consulting Actuary
Bay Area healthcare consulting client is looking for a passionate and self-motivated Consulting Actuary to lead client engagement as well as be a leader within the firm. ASA/FSA required (up to $180K); pre-ASA supporting Analyst (up to $140K) is actively being sought for hire.

99490 – Midwest – Analytics Director
Remote Analytics Leader opportunity with a Midwest carrier. Actuary will lead a small team using analytics and research to influence business strategy across personal and commercial product lines. Python and Emblem experience preferred. A great culture with great perks! FCAS with 8-10+ years of experience sought.