

actuarialREVIEW

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PUBLISHED BY THE CASUALTY ACTUARIAL SOCIETY 



2019 SPRING MEETING RECAP

CAS Elections and
Bylaws Amendment





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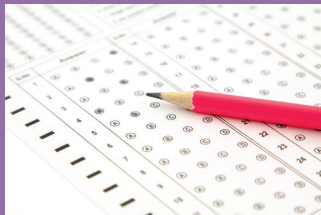
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2019 CAS Spring Meeting Recap

CAS Spring Meeting attendees were immersed in discussions on a host of hot topics — from the future of actuarial work to wildfire modeling and mitigation — all in the midst of the Crescent City, New Orleans.

2019 CAS Elections and Bylaws Amendment

On the ballot: Candidates for president-elect and board of directors, and an amendment to the bylaws.

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

Bienvenue à la Nouvelle-Orléans!

New Orleans conjures up many things — food, drink, music, art and even voodoo. Put all these elements together, throw in some actuarial types and you have all the ingredients for a great meeting.

If you didn't have a chance to attend the Spring Meeting this year, *AR*'s got you covered. One of our regular contributors, the Insurance Information Institute's Lucian McMahon, covers three of the many Spring Meeting sessions that addressed the hottest topics for property-casualty actuaries. You can also take advantage of the recordings and webcasts available from Spring Meeting. I highly recommend watching the keynote by retired Lt. General Russel L. Honoré, commander of the Joint Task Force Katrina. His experience as a go-to disaster preparedness and recovery expert is especially pertinent to the actuarial profession and particularly relevant to hear about in New Orleans. This featured speaker is one of the highest-rated the CAS has ever had. His talk proffers some sound suggestions for reducing risk ex-

posures, along with some salty language. So, listen at your discretion.

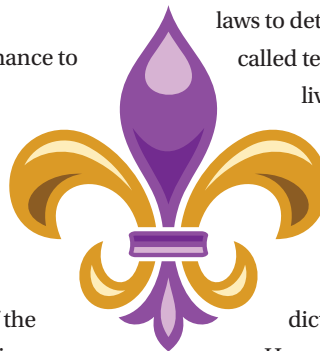
In other news, *AR* editor Jim Weiss and CAS Candidate Khanh Luu tackle that age-old query: Can you believe the hype? Weiss and Luu formulate some laws to determine whether some so-called technological advances truly live up to the hype and are worth the gamble.

AR welcomes back Katey Walker, who previously contributed an article in May/June's Predictive Analytics Marketplace.

Her piece in this issue focuses on the elements that are shifting the nature of workers' compensation, including rate changes and the aging workforce.

Write for *AR*!

Many thanks go out to Weiss, Luu and Walker for their stories in this issue. It's so wonderful to have members' input that we'd love for even more members to write for *Actuarial Review*. Tell us your perspectives on the issues of the day in your work and in your world. We have a brilliant team of editors who can help refine your message. Take advantage of your association magazine! ●



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The CAS's Strategic Initiatives

Every November, our new CAS Board of Directors begins its term with a brainstorming session to identify the most important strategic initiatives for the coming year. This exercise results in a long list of ideas for potential areas of focus, which we then whittle down to a manageable handful through online surveys of the board. Based on that process, the board has identified the following six strategic initiatives for 2019: 1) predictive analytics; 2) The CAS Institute; 3) Strategic alliances; 4) CAS Education Task Force; 5) Volunteer/staff model; and 6) Diversity and inclusion. I touched on these at the Spring Meeting's Business Session in New Orleans. Following is a little more about the work we are doing on each initiative.

Predictive Analytics

The board is thinking strategically about how best we can prepare actuaries to add value in this area. The CAS recently added significant predictive analytics material to its syllabus. This material is largely on new exams MAS I and MAS II. This will ensure that all new Associates have been exposed to and are tested on predictive analytics. For existing Fellows, we continue to offer sessions at all major CAS meetings and seminars on the use of predictive analytics. There were a variety of sessions offered in New Orleans. In addition, we are co-sponsoring programs like the Joint Predictive Analytics Seminar, which was held in Toronto this past February.

To build upon these efforts, the board formed a working group to help ensure that we will meet the needs of our members and employers in the fu-

ture for this fast-growing practice area.

The CAS Institute

The CAS Institute, or iCAS for short, was created as a CAS subsidiary to bridge the gap between actuaries and data scientists in insurance companies. The iCAS now has over 400 members and offers three different credentials, the first of which is the Certified Specialist in Predictive Analytics (CSPA). The iCAS has already awarded over 200 CSPAs, with more candidates in the pipeline. This year, the iCAS expanded beyond predictive analytics and is now offering

gic partners. Once potential partners are identified, the task force has developed a set of criteria for evaluating the fit for a strategic alliance. We already have several examples of strong partnerships that have evolved over the years, including The iCAS with the International Society of Catastrophe Managers; University Engagement with Gamma Iota Sigma, the International Association of Black Actuaries (IABA) and the Organization of Latino Actuaries (OLA); and the CAS Board of Directors with The Institutes, whose chief executive, Pete Miller, serves on the CAS Board.

This “manageable handful” of strategic initiatives for 2019 and beyond illustrate how we are continually striving to improve our association and our profession.

two new credentials in catastrophe risk management:

- Certified Catastrophe Risk Specialist, which represents a working knowledge of catastrophe risk management.
- Certified Catastrophe Risk Management Professional, which represents an advanced application of catastrophe risk management.

Both new credentials are offered in partnership with the International Society of Catastrophe Managers.

Strategic Alliances

The board created a task force to look at potential strategic partnerships with other organizations. This task force has provided two reports to the board this year. The task force has articulated a set of criteria for identifying potential strate-

The criteria developed by our task force will allow us to be more intentional about forging these kinds of mutually beneficial relationships in the future.

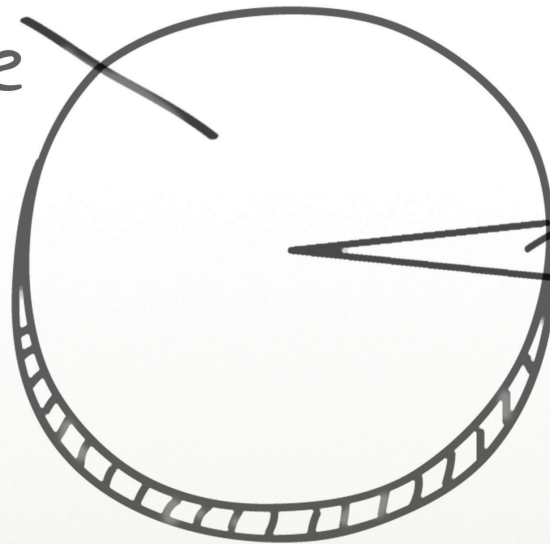
Though not a strategic alliance, as discussed in my last President's Message, we continue to look at ways we can collaborate with the Society of Actuaries where we would benefit by working together.

CAS Education Task Force

The CAS Board established a task force to look broadly at our current examination and credentialing process, and to make recommendations. This initiative is a topic of ongoing interest to all of our stakeholders — members, candidates, employers of actuaries and other users

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President's Message

from page 6

of our services. The task force is reviewing the following:

- **Content** — Is the present CAS style of questioning on examinations the most effective way to accomplish the objectives of its education process? Does the content examined adequately prepare candidates for the job market? Are there gaps or redundancies on the syllabus?
- **Experience** — Would alternatives to examinations such as online learning modules or project-based experiences be more effective ways to accomplish educational objectives?
- **Access** — Do the costs, locations and timing of the examinations present barriers to entry for all or certain candidates, particularly early in the credentialing journey?

Volunteer/Staff Model

As the CAS continues to grow, the current largely volunteer-centric model is under increasing pressures. A board task force is looking at how we can evolve our volunteer/staff model to utilize staff resources, while making the best use of volunteers. We are expecting to benefit in a number of ways through any restructuring. For example, we should be able to identify opportunities to increase speed-to-market by using paid staff instead of volunteers. We can also improve committee accountability and efficiency.

There is more work we need to do to get there, such as pinpointing which specific committees should be more staff-driven versus volunteer-driven. So, we will continue with completing evaluations focused on committee goals and

CAS staff capabilities.

Diversity and Inclusion

Diversity is a great example of a goal that may benefit from a different structure than our traditional volunteer-driven model. There is so much work to do to enhance our diversity and inclusion efforts — not just for the CAS, but for the actuarial profession as a whole — and we could benefit from engaging with professionals experienced in this area who do not come from an actuarial background. It is also an area where we will be working with organizations like IABA, OLA, and the Society of Actuaries to determine the best path forward for attracting and retaining black and Hispanic youth, parents and teachers.

Conclusion

This “manageable handful” of strategic initiatives for 2019 and beyond illustrate how we are continually striving to improve our association and our profession. We are now, and always have been, up to the challenge of change. ●

ACTUARIAL REVIEW LETTERS POLICIES

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

COMINGS AND GOINGS

Jeremy Richardson, FCAS, has joined Beecher Carlson as senior vice president. Richardson previously held positions at Willis Towers Watson and CIGNA.

Pinnacle Actuarial Resources has appointed **Greg Frankowiak, FCAS**, as a senior consulting actuary. Frankowiak is a former director at State Farm.

Scott Hallworth, FCAS, has been appointed to chief data, modeling and analytics officer at Fannie Mae. Hallworth joins Fannie Mae after a seven-year tenure at Capital One.

Christopher Schubert, FCAS, has joined Pinnacle Actuarial Resources as a consulting actuary in the organization's Atlanta office. Schubert has over eight years of property-casualty experience. ●

EMAIL “COMINGS AND GOINGS”
ITEMS TO AR@CASACT.ORG.

Want the latest on CAS member activities? We post real-time news on our social media channels. Follow us on Twitter, Facebook and LinkedIn to stay in the know!

IN MEMORIAM

Lee M. Smith (FCAS 1972)
1945-2019

Bernard Lynn Webb (FCAS 1965)
1924-2016



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CALENDAR OF EVENTS

September 16-18, 2019

Casualty Loss Reserve Seminar
(CLRS) & Workshops
Fairmont Austin
Austin, TX

October 1-3, 2019

In Focus
Virtual Event

November 10-13, 2019

Annual Meeting
Hilton Hawaiian Village Waikiki
Beach Resort
Honolulu, HI

March 2020

Ratemaking, Product
and Modeling (RPM)
Seminar & Workshops

May 2020

Spring Meeting

June 2020

Seminar on Reinsurance

September 2020

Casualty Loss Reserve Seminar
(CLRS) & Workshops

November 2020

Annual Meeting

CAS STAFF SPOTLIGHT

Meet Ken Williams, Staff Actuary

Welcome to the CAS Staff
Spotlight, a column featur-
ing members of the CAS staff.
For this spotlight, we are
proud to introduce you to

Ken Williams.

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

I do a variety of tasks to support the staff and members, including speaking at different meetings, answering media requests and doing research related to actuarial science. I also work on projects related to admissions and exams, such as the National Association of Insurance Commissioners' review of the appointed actuary credential.

- **What do you enjoy most about your job?**

I like traveling and meeting people while promoting the actuarial profession. Being an actuary is a great career, and I will discuss the profession to anyone who will listen.

- **What's your hometown?**

I grew up in two small towns in Indiana: Washington and Ramsey.

- **Where'd you go to college and what's your degree?**

I am a Boilermaker from Purdue University with a degree in math and statistics and a focus on actuarial science.

- **What was your first job out of college?**

I was hired as an actuarial analyst at Country Financial (then Coun-



Ken Williams

try Companies) in Bloomington, Illinois. I worked there for 27 years before joining the CAS.

- **Describe yourself in three words.**

Friendly. Inquisitive. Adventurous.

- **What's your favorite weekend activity?**

For the last eight years, many of my weekends have involved watching my daughter play travel softball.

- **What's your favorite travel destination?**

Wow! This one is tough — probably San Diego.

- **Name one interesting or fun fact about you.**

My son and I have ridden almost all of Amtrak's long-distance train routes. We have taken trains from Chicago to New York, Philadelphia, Washington, New Orleans, Los Angeles, Reno and Seattle. ●



CSPA Exam 3 Tests Real-World Predictive Modeling Skills

BY AMANDA ROBERTS, ICAS MEMBERSHIP AND MARKETING MANAGER

On November 7, 2019, The CAS Institute (iCAS) will administer the third exam for its Certified Specialist in Predictive Analytics (CSPA) credential. “Predictive Modeling — Methods and Techniques” focuses on advanced tools using various multivariate regression techniques, statistical modeling, machine learning and practical applications.

“This exam is really the first of its kind ... examinees ... may be asked to write simple R code and run that code against a provided dataset,” explains Joanne Spalla, president of The CAS Institute. “Together with the final case study, Exam 3 is where CSPAs demon-

strate their ability to apply their analytics and modeling knowledge to a real-life situation.”

Created specifically for predictive analytics professionals in property-casualty insurance, the CSPA credential covers the fundamentals of P&C insurance, data concepts and visualization, and predictive modeling methods and techniques. The credential is open to any analytics practitioner and offers these professionals and their employers the opportunity to certify technical skills and knowledge specifically as applied to P&C insurance.

“Professionals with the CSPA credential enter this growing field already



having proven their ability to address real-world situations. We now hear from employers that they are coming to rely on the CSPA credential to bolster the predictive analytics skills on staff and to find the right candidates for future positions,” Spalla says. ●

NAIC Approves CAS Credentials

WASHINGTON — The National Association of Insurance Commissioners (NAIC) completed its assessment of the CAS’s educational credentialing materials against new minimum educational standards to define a qualified actuary. The assessment included the NAIC’s development of about 100 objective knowledge statements and the CAS’s mapping of its educational materials to the minimum standards. On June 6, 2019, the CAS announced the NAIC conclusion assessing CAS designations as NAIC Accepted Actuarial Designations for the 2019 Statement of Actuarial Opinion Instructions, under the following specific terms: (1) FCAS with successful completion of Exam 6-U.S.;

(2) ACAS with successful completion of Exam 6-U.S. and Exam 7.

The assessment was made under the agreement that the CAS will make minor identified changes to the CAS syllabus by January 1, 2021. These changes include adding coverage of three Actuarial Standards of Practice and two Statements of Statutory Accounting Principles, as well as a more thorough discussion of ORSA. The CAS will announce the changes as they are incorporated into the syllabus along with other syllabus changes the CAS makes as part of its ongoing effort to maintain a rigorous and relevant credentialing program.

The positive outcome of the assessment reinforces the CAS’s 100+ year

track record in setting the standard in educating and credentialing property-casualty actuaries. The assessment will remain effective until a new assessment is conducted, which is expected to occur in 5-10 years or upon significant modification to the CAS syllabus. The CAS develops its credentialing exams using the practical experience of actuaries, thus rendering CAS exam content relevant to actual practice.

The CAS thanks members of its NAIC Task Force: Sarah McNair-Grove, chair; Eric Blanche; Jeanne Crowell; Brian Fannin; Scott Merkord; Chris Nyce; Jason Russ; Fran Sarrel; Thomas Struppeck; Ken Williams; and CAS Admissions Director Ashley Zamperini. ●

IN REMEMBRANCE

In Remembrance is an occasional column featuring short obituaries of CAS members who have recently died. Longer versions of these obituaries are posted on the CAS website at bit.ly/PCASobits.

World Wanderer

**Alan Fleck “Al” Royer (ACAS 1959)
1924-2018**

Al Royer was born in 1924 in Altoona, Pennsylvania, to John F. Royer and Grace Lucas Royer. A talented musician, he held the second violin chair with the Harrisburg Symphony Orchestra while still at John Harris High School in Harrisburg, Pennsylvania. During World War II, he served in the Philippines with the U.S. Army’s 32nd Battalion and later became the commander of American Legion Post 46 in New Cumberland, Pennsylvania. After WWII he married Patricia Ann Thomas and attended the Peabody Conservatory of Music. He graduated from Syracuse University with a degree in mathematics and became an actuary, working in Pennsylvania, Illinois, New York and New Jersey. He retired as the casualty actuary for the state of New Jersey in 1987. In retirement he and his wife traveled extensively. An avid skier and cyclist who often traveled with friends from high school, Royer cycled twice through the Netherlands. The couple celebrated their 70th wedding anniversary in 2017. In addition to his wife, survivors include children Rebecca Louise (Peter) Royer Michaelson, Alan Todd (Lorette) Royer and Mark (Marla) Brackenridge Royer; six grandchildren; two great-grandchildren; two sisters, Margaret (John) Royer Billman and Anna Royer. His brothers Gregg and Jim predeceased him.

Program Builder and Methodologist

**James R. Berquist (FCAS 1957)
1928-2018**

James R. “Jim” Berquist, the coauthor with Richard Sherman of the seminal 1977 *Proceedings* paper, “Loss Reserve Adequacy Testing: A Comprehensive Systematic Approach,” died just shy of his 90th birthday. An industry standard that is still part of exams, the paper won the Dorweiler Prize in 1978 and was the basis of the Berquist-Sherman method, which has been studied by numerous actuarial students and researchers exploring the concept. Berquist’s childhood in Rhinelander, Wisconsin, was marked by a tough year in which his father was a POW during WWII. Despite this, Berquist went on to serve twice in the U.S. Navy. In 1950 he married his true love and life partner, Elaine Sajna. His career began with Employers Insurance of Wausau in 1953. Transamerica recruited him in 1968 to be vice president of casualty insurance in Los Angeles, and he started the company’s actuarial department. In 1971 he joined Milliman & Robertson in Pasadena as a consulting actuary and principal, again building up a company’s casualty program. He received the Matthew Rodermund Service Award in 2001. Berquist loved his family and valued education, his Catholic faith and philanthropy. He is survived by his wife, five children, four grandchildren and seven great-grandchildren.

Dutiful and Professional

**Ronald A. Dahlquist (FCAS 1980)
1951-2018**

I first met Ron Dahlquist when Rick Sherman hired him away from Transamerica to work in the San Francisco office of Coopers & Lybrand, where I was a student. We immediately found something in common — twin boys. His were a little older, and I looked to Ron for advice and perspective in life as well as in my actuarial career. Ron moved from C&L to Industrial Indemnity to build a non-comp pricing team to complement the WC team Les Dropkin had been leading for many years. Soon after he joined Industrial, California’s Prop 103 passed, which was just Ron’s luck! But true to form, Ron rolled up his sleeves and did an outstanding job orchestrating Industrial’s non-comp filings for the first time ever in California. I hear the party after the final submission was quite the wing-ding! Ron moved from Industrial to CSAA (AAA of Northern California) where he modernized the actuarial department and built CSAA’s first product management department. Ron ended his distinguished career as chief actuary for California’s Department of Insurance. In all of Ron’s roles, his commitment to duty and professionalism never faltered. Our Society lost one of its unsung heroes.

Respectfully,

*Dan Murphy, FCAS, Trinostics, with
Martin King, ACAS, Kaiser Permanente*

Fierce, Honest and Wise

**Martin “Marty” Simons (ACAS 1971)
1942-2018**

A fervent insurance advocate, Marty Simons was a public consulting actuary who advised regulators, legislators and consumers throughout the U.S. and Canada. A Washburn University graduate and U.S. Air Force veteran (1959-1963), Simons worked as deputy director and chief actuary for the South Carolina Department of Insurance (12 years) and P&C actuary for the Hawaii Insurance Division (27 years). He gave expert testimony on all lines of P&C insurance on behalf of insurance companies as well the Massachusetts FAIR Plan, the Florida Hurricane Catastrophe Fund and the California Earthquake Authority. He served on the Actuarial Standard Board’s General Committee, the Academy’s Extreme Events Committee and numerous NAIC committees. He wrote about rate-making, regulation, catastrophe modeling and insurance company profitability, and was a Fellow of the Conference of Consulting Actuaries. Simons spoke at 15 Courses on Professionalism (COP) in his nearly 11 years on the CAS Committee on Professionalism Education. “One of Marty’s sayings to COP attendees that still reverberates with me today is ‘Do not mess up MY profession!’” recalled CAS Actuary Ken Williams. Simons’ wife of 52 years, Sharon, and his brother, Richard, preceded him in death. He is survived by his daughters, Randi Duncan and Stephanie Foster; seven grandchildren and 10 great-grandchildren.

Educator-Turned-Actuary

**Owen M. Gleeson (FCAS 1978)
1939-2018**

Professor, writer and small business owner, Owen Gleeson was at the forefront of expansions in financial analysis. After earning a BA, a master’s and a doctorate in mathematics in his hometown at St. Louis University, he taught there and at various schools before joining USF&G in Baltimore, founding its financial planning department in 1980. He later worked at Gen Re, where he solidified his deep interest in the 1986 Tax Reform Act’s impact on general reinsurance and P&C companies. He founded Financial Analysis and Control Systems Inc., which developed a widely used and accepted model for P&C companies operating under the legislation. The model was adopted by three of the five largest U.S. P&C companies. He served on various CAS financial committees that changed as methods evolved: Financial Analysis, Valuation & Financial Analysis, Dynamic Financial Analysis, and Dynamic Risk Modeling Committees. After being TIG Reinsurance Company chief actuary and operating a consulting firm, he joined MBA Actuaries in 2003 as a consulting actuary and senior director. Gleeson ushered at St. Mary Roman Catholic Church and enjoyed opera, Baroque music, fishing, his Irish/German heritage, Duke University basketball and the St. Louis Cardinals. His wife of 53 years, Judith (Mecker) Gleeson, son, daughter-in-law and sister survive him.

The Chorister

**William Van Ark (FCAS 1982)
1945-2018**

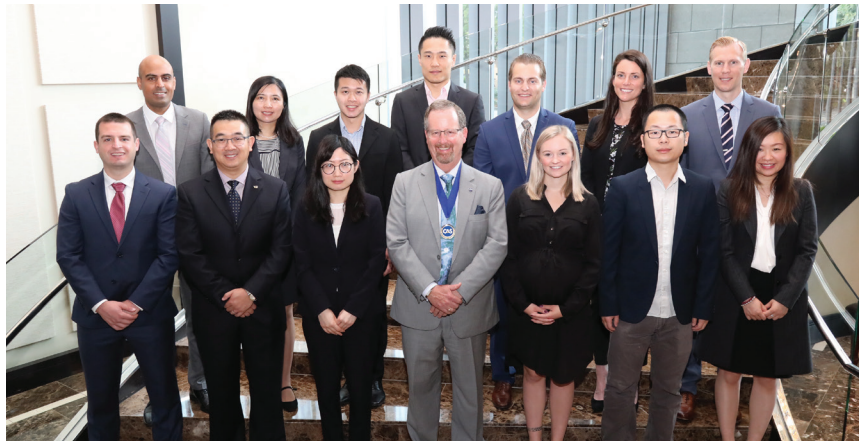
With his wife and daughter at his side, Bill Van Ark of Wyoming, Michigan, lost a long battle with Parkinson’s disease on October 7. He was born in Chicago, the oldest of William Jury and Esther (Van Houten) Van Ark’s eight children. In the pivotal year of 1968, he graduated from Michigan’s Grand Valley State University, joined the Coast Guard (serving until 1973) and, most importantly, married Judy Palmer. In 1975 he earned a master’s in actuarial science at the University of Michigan and began his long actuarial career that included beginning with Sentry Insurance in Stevens Point, Wisconsin, and ending with Michigan Professional Insurance Exchange in Grand Rapids. He and his siblings began singing as children at Grace Episcopal Church in Holland, Michigan. Years later, “The Ark-Tet” joined their mother, aunts and other relatives in the “Van Arks and Friends” concerts at the church. He sang with church choirs everywhere he lived, including the Grace Episcopal Grand Rapids choir and the Kentwood Seniors Chorale. He sang in Carnegie Hall and cathedrals across Europe with the Grand Rapids Symphony Chorus. He is survived by his wife, his mother, his children and their spouses, two grandchildren, four sisters, three brothers and a large extended family. ●

NEW FELLOWS ADMITTED IN MAY 2019



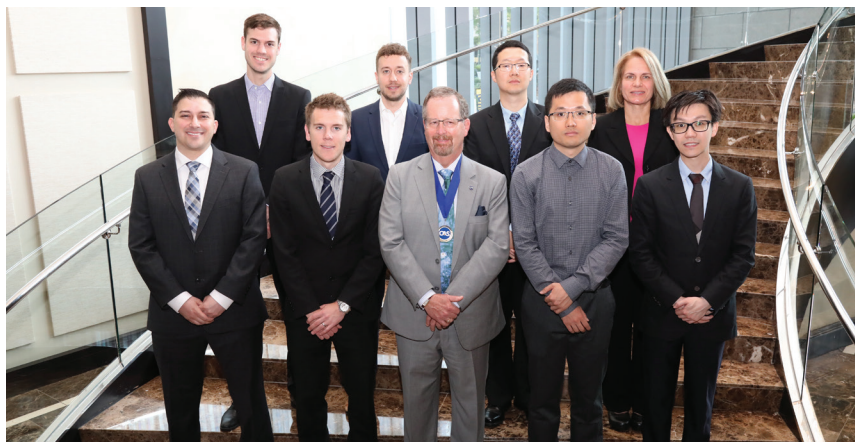
Row 1, left to right: Sophie Poulin, Derek England, **CAS President Jim Christie**, Sunny Zhou, Qian Cui.

Row 2, left to right: Lee Smith, Elizabeth Smith, Ellen Raushel, Jemmy Gu, Michelle Faille, Vincent Lavalée-Laliberte, Michael Lewitter.

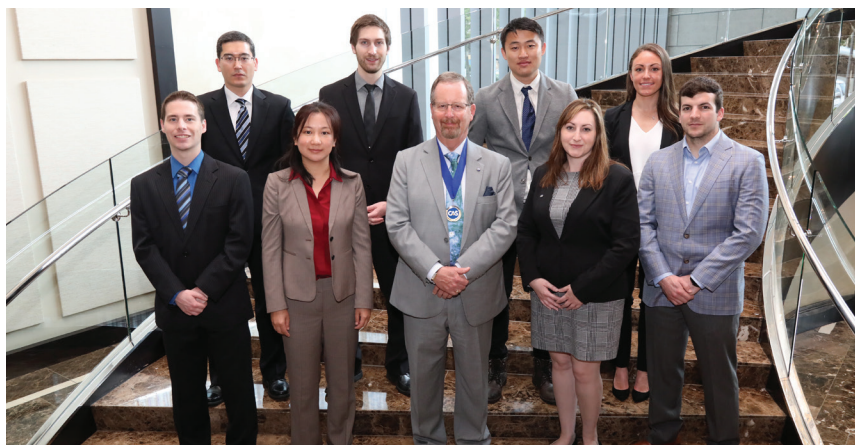


Row 1, left to right: Steven Bunker, Liang He, Chunling Cong, **CAS President Jim Christie**, Brooke Smith, Daochun Li, Yuet Ying Fong.

Row 2, left to right: Pranav Amin, Ziyu Li, Zi Chuen Soo, Shi Yong (Mark) Zheng, Nicholas Klinka, Colleen Duggan, Scott Gibson.



Row 1, left to right: Gianpiero Berardi, Sam Redding, **CAS President Jim Christie**, Yang Hou, Chung Yiu Chan.
Row 2, left to right: Laurent Caron, Jean-Sebastien Fournier, Xiaoyang Leng, Kayne Smith.



Row 1, left to right: Alexis D. Gingras, Xuyun Shi, **CAS President Jim Christie**, Marjorie Kitchen, Keith Hebert.
Row 2, left to right: David Hausman, Marc-André Hamelin, Jonathan Huang, Kylie Gauthier.

New Fellows not shown: Yi Chao, Yutong Chen, Erik Christianson, Pavel Derlukiewicz, Wee Poh Ee, Philippe Elkabas, Pierre-Antoine Espagnet, Hang Fan, Xuan Fang, Mark Geske, Dmitriy Guller, Constantinos Hadjistephanou, Allen Huang, Anna Krylova, Nicholas LeClaire, Qing Liu, Yang Liu, Yisi Lu, Dean Marcus, Zhihai Mi, Andrew Newbill, Tim Nijkamp, Alessandro Pace, Xiaoxi Shen, Jayson Taylor, Clive Thompson, Justine Vachon, Huan Wang, Alyssa Webb, Fei Xu.

NEW ASSOCIATES ADMITTED IN MAY 2019



Row 1, left to right: Nicholas Easley, Yun Wan, Sumaali Chheda, Lilly Park, **CAS President Jim Christie**, Moriah Librun-Sawyer, Cindy Bywaters, John Yeager, Yanjun Shen.

Row 2, left to right: Justin Jarbola, Tianyi Song, David Zheng, Lawrence Heymann, Sherrita Arorash, Frederick Bucher, Brad Herman.

Row 3, left to right: Spencer Miller, Chen Fu, Dominic DeMarco, Yuan Tao, Shawn Pruitt, Jeremy Dula, Nickolas Alvarado, Jacob Brouillette, Brian Klaif.



Row 1, left to right: Jennifer Patrick, Siyu Tu, Marisa DiMare, Amy Borgone, **CAS President Jim Christie**, Taylor Perkins, Kate McCoy, Christina Malleo, Xuan Chen.

Row 2, left to right: Adam Greenspan, Gabriel Garcia, Yue Wang, Tyler Muehlbauer, Leisha Cavallaro, Anne Grosse, Lindsey Peterson, Sara Chen, Yi Luo.

Row 3, left to right: Thomas Duffy, Cole Meixner, James Boyle, Michael Baznik, Chen Li, Justin Greene, Russell Karis, Matthew Meade, Claude Faan.



Row 1, left to right: Hao Li, Hio-Kei Tong, Robin Wright, Yoyo Tsai, **CAS President Jim Christie**, Kenneth Clancy, Leanne Logelin, Thomas Corcoran, Roy Drusky.

Row 2, left to right: Chance Mingos, Zachary Shiro, Bradley Hipsher, Kyle Kusy, Taylor Vaughn, Robert Patronaggio, Paul Blain, Jessica Lehr, Nicole Rabatin.

Row 3, left to right: Anthony Milas, Jameson Voll, Andrew Spaulding, Ariaiah Tough, Ryan Paluszek, Christopher Hecht, Luis Carlo Parga, Michael Schwalen, Enbo Jiang.



Row 1, left to right: Tyler Munro, Shimon Epstein, Jessica Ahn, Joseph Aprile, **CAS President Jim Christie**, Vanessa Vander Brink, Juhyun Shin, Chloe Marshinski, Jessica Hildebrandt.

Row 2, left to right: Luke Phillips, Zheng Lyu, Frank Zhang, Rachel Miccolis, Christopher Matthews, Blair Rose, Michael St. Clair, Tjun Tuen.

Row 3, left to right: Brendan Zehnder, Avraham Akerman, Matthew Eliseo, Nicholas Carey, Kevin Beglane, Paulius Junokas, Jeffrey Greco, David Lueders, Daniel Lack.

NEW ASSOCIATES ADMITTED IN MAY 2019



Row 1, left to right: Isabel Ji, Abby Pearlman, Kathy Liu, Cortney Schoenberger, **CAS President Jim Christie**, Laurel Brown, Anna Demuynck, Colleen Tygh, Chelsea Gelley.

Row 2, left to right: Emma Wieduwilt, William Kelley, Susan Bennett, Thomas Fiorillo, Erin Bruggeman, Joseph Henton, Jonah Lam Tsang On, Michael McCarley, Arena Govier.

Row 3, left to right: Daniel Palardy, Dawei Xiao, Philippe Corriveau, Philippe Cloutier, James Johnson, Daniel Richard, Olivia Metzger, Yitao Yuan, William Van Alsten, Ethan Genteman.



Row 1, left to right: Deirdre Roeder, Christopher Davey, Catherine Erdelyi, Jingyi Huang, **CAS President Jim Christie**, Jacqueline Weiss, Molly Covill, Molly Rozran, Sarha Dionne.

Row 2, left to right: Eduardo Espinola, Amanda Glish, Devyn McNicoll, Maura Ryan, Alycia Barron, Rachel Pellegrino, Aaron Fong, Philippe Blouin-Leclerc, Nicholas Anderson.

Row 3, left to right: Jacques Gauthier-Duchesne, Caleb Kim, Maxime Belanger, Jared McKinney, Matthew Walkowiak, Andrew Wagner, Tan Tran, Xiang Long, Samuel Matthews.



Row 1, left to right: Catherine Budish, Kim Limoges, Chen Liu, **CAS President Jim Christie**, Roberto Perez, Kerrie Rubadue, Julie Tse.

Row 2, left to right: Hai Qi Liang, Justin Dagenais, Jimmy Levesque, Stephanie Kalina, Elizabeth Johnson, Willis Liu, Jacob Zirbel, Jennifer Nettnay.

Row 3, left to right: Caroline Poulin, Julie Marriott, Armin Yousefi, John Struharik, Nicholas Kellogg, Edgar Harrell, Tina Warnecke, Jake Levinson.

New Associates not shown: Katherine Adam, Salmaan Allibhai, Andrew Austin, Anthony Baer, Michael Barr, Michael Borysek, Samuel Bushong, Joseph Chan, Chia-Ling Chen, Fen Chen, Chi Ho Cheng, Iengiang Cheng, Sean Collision, Christopher Deaver, Jing Deng, Jeremy Doyle, Gabriel Dufresne, Joseph Dumas, Jesse Finkel, Lauren Fisher, Jingyuan Gao, Steven Getselevich, Amanda Granville, Andrew Groth, Isabelle Guerard, David Haimes, Tingyu He, Claire Hemmele, Yun Hong, Maoying Huang, Cody Jacobson, Adam Johari, Nathanael Karel, Jason Kass, Andrew Kerper, Christine Kho, Ji Hyun Kim, Thanakrit Krupanyamart, Kuo-Hua Lai, Chun Shing Lau, Lei Lei, Chuning Li, Chen Liang, Bruno Lima, Ziyue Liu, Kelly MacDonald, Anthony Methe, Qianhui Miao, Lhea Mio-Giroux, Satomi Miyanaga, Shaoxuan Mo, Chiho Moon, Michael Moskowitz, Eric Murphy, Michelle Muzulu, Paul Nelson, Patrick Newell, Simone Nichols, Jin Sheng Ooi, Frederique Paquet, Neel Patel, Moira Power, Nathan Pritzl, Huanchuan Qiu, Erik Quinonez, Neil Redpath, Cameron Rose, Adrian Rowland, JiaQi Ruan, Andrew Sapp, Mark Schiebel, Kelly Skogheim, Robert Skrabal, Chi Song, Christine Tan, Kristen Taylor, Anh Tran, Ronald Tsang, Yiding Wang, Raychel Watters, Andrew Weaver, Qing Wei, Thomas Wendling, John Winslow, Kathryn Wood, Qiuyi Wu, Rui Xu, Hua Zhang, Tong Zhang, Xi Zhang, Ying Zhang, Rong Zhuang.

2019 SPRING MEETING



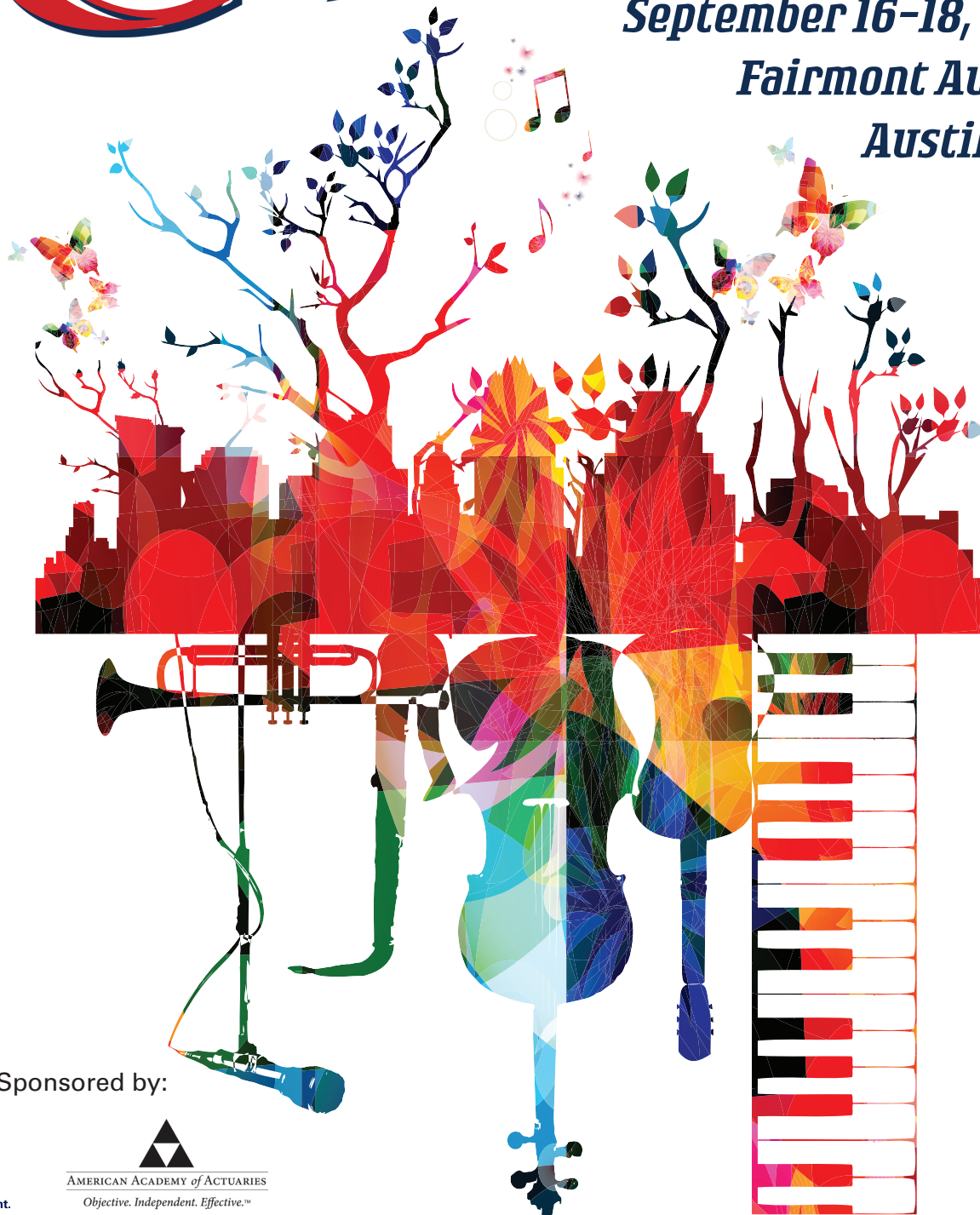


1. Pictured with several CAS leaders is Michel C. Simard (front, left), executive director of the Canadian Institute of Actuaries. Simard was a special guest at the 2019 CAS Spring Meeting.
2. CAS President Jim Christie made the rounds at the reception for new CAS Fellows. Pictured with Christie are (a) Pranav Amin and his wife, Kristie; (b) Liang He (holding younger daughter, Mia), his wife, Ke Zhao, and elder daughter, Ariana; (c) Chung Yiu (Benny) Chan and his wife, Ada; (d) Vincent Lavallée-Laliberté and his guest, Ally O'Neil; and (e) CAS Board Director Mark Shapland.
3. Newly minted CAS Associates enjoy a reception in their honor.
4. CAS President Jim Christie speaks to attendees during the CAS Business Session on May 20.
5. Dubbed the "Category 5 General," featured speaker Lt. General Russel L. Honoré is an expert on emergency and disaster preparedness. He spoke on "Resilient Leadership: Prepare Today To Prevail Tomorrow."
6. "With care and foresight, you too can survive and thrive with technological change — embrace the future," says CAS Past President Roger Hayne in his address to new members.
7. Vice President-Professional Education Justin Brendan highlights the meeting program.
8. New Associate Shimon Epstein chats with new Fellow Jonathan Huang.



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2019

CAS ELECTION

CAS Fellows will vote on a proposed amendment to the CAS Bylaws and a slate of candidates for the CAS Board of Directors and CAS President-Elect, with online voting beginning on August 1, 2019. On that day, the CAS will email Fellows a link to the online ballot. Paper ballots will be mailed on August 1 to those Fellows who do not have an email address on file with the CAS office. Completed ballots must be submitted online or returned to the CAS office by August 29, 2019.

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

More details about each candidate can be found in the Meet the Candidates section of the CAS website. Please contact Mike Boa (mboa@casact.org) with any questions or comments about the election process. ●

Proposed CAS Bylaws Amendment: Article X — Arbitration

June 21, 2019

To: Fellows of the Casualty Actuarial Society

From: Mary Hosford, Vice President-Administration

Re: Proposed Amendment to the CAS Bylaws

The CAS Board of Directors proposes that a new amendment, Article X — Arbitration, be added to the CAS Bylaws. The amendment stipulates that arbitration would be used to resolve disputes by members with the CAS, as arbitration would be more efficient and cost effective than litigation. The text of the amendment states:

ARTICLE X. – Arbitration

Any dispute or controversy arising under or in connection with the above or any controversy or claim that is in any way connected to or associated with CAS shall be settled exclusively by arbitration to be held in the Commonwealth of Virginia in accordance with the rules of the American Arbitration Association then in effect. Judgment may be entered on the arbitrator's award in any court having jurisdiction.

CAS Fellows will vote on the proposed amendment to the Bylaws in conjunction with the 2019 CAS elections, which will take place from August 1-August 29.

The Bylaws may be amended by an affirmative vote of 10% of the Fellows or two-thirds of the Fellows voting, whichever is greater. ●

Meet the *Candidates*

President-Elect Nominee



Jessica (Weng Kah) Leong

FCAS 2006

Becoming an actuary is one of the best decisions I've ever made. I want to do my part so that new members and students feel the same way as they progress through their career.

Did you know that in the last 10 years, the profession has almost doubled from 4,500 members to 8,000?

Clearly the profession has been successful and we've done well to maintain our relevance.

But how can we do even better? How can we thrive in today's environment? How can we thrive for the next 30 years? These opportunities make me excited about this role.

Board Director Nominees



Carl X. Ashenbrenner

FCAS 2000

I will work to ensure the CAS is the premier educational, research

and accrediting institution for casualty actuaries worldwide. As a board member, I will be representing all CAS members. I am open-minded and will listen to CAS members for their ideas and thoughts. I will work on maintaining the high standard of the CAS designation, enhance CE opportunities, encourage research and publications, and support diversity and inclusion within the CAS.



Kudakwashe Chibanda

FCAS 2014

We are changing — in what we do and how we do it. This change

affords us the opportunity to decide on our profession's future trajectory. In my decade working in insurance, consulting and data science, I have experienced the breadth of our technical and business capabilities. As a CAS volunteer, I have grappled with the challenges of meeting the needs of a rapidly changing organization. I hope to leverage those experiences and perspectives on the CAS Board to help guide our future.



Smitesh Davé

FCAS 1998

Fueled by a desire to give back to the actuarial profession that has provided me with so

much over my career, I seek to bring my experiences to the CAS Board, including:

- as an actuary presenting to the board of my company.
- as a board member of a non-profit helping guide the management team.
- as a member of society that is served by the CAS membership.

I believe that for every issue we should:

- seek multiple viewpoints representing the various constituents.
- engage in vigorous yet respectful debate.
- strive for an outcome with consensus.

**Emilee Kuhn***FCAS 2010*

I have known I wanted to be an actuary since I was 16, and I have a passion for this

profession. I have spent my career looking at opportunities through a different lens, and I want to do all that I can to help the CAS continue to grow and thrive. I am honored and humbled to have been nominated to be a leader of this organization and hope that I can earn your vote.

**Todd Lehman***FCAS 2002*

I have served the CAS for almost 20 years in various committee roles and leadership positions. Most

recently, I have been partnering with fellow actuaries, nonactuarial colleagues and CAS staff to help launch The CAS Institute and begin building it into a leading organization for predictive analytics and data science education.

Today, digitization and technology are driving emerging issues, creating new approaches and disrupting our operations. Despite these changes, I believe our society can simultaneously remain independent while leading the way in our specialty and finding common ground with professions and organizations where we have aligned interests and goals.

**Sherwin Li***FCAS 2013*

Times are changing very fast and new technologies have quickly entered our lives.

AI, blockchain, cloud computing, big data — the so-called ABCD — all have become normal parts of markets all over the world. Facing these new opportunities today, many organizations want to take the lead in both mature and emerging markets. As a leading P&C actuarial professional organization, however, the CAS has numerous comparative advantages. Working outside the U.S., I will try to promote actions that expand the CAS as the best P&C actuarial organization — from North America to the world, from traditional to new technologies.

**Mary Frances Miller***FCAS 1988*

I have given back to the Society throughout my career. Now more

than ever, CAS needs strong leadership to help us as we move forward in the face of membership growth, of rapidly advancing science, and of competition for our members from other professions and organizations. I am especially good at identifying core issues and building consensus solutions, and I look forward to bringing my experience to the board.

**Kathy Odomirok***FCAS 2005*

I am incredibly grateful, excited and passionate about the opportunity

to serve on the Board. My 30 years of consulting experience and longstanding history of volunteering and serving in leadership roles within the profession have provided me with the necessary experiences to be successful in this role. I have always been a strong proponent of education in actuarial science, as evidenced by my involvement in the CAS education system. As a member of the board, I will devote my time and energy to keeping a sharp eye around the corner and help the profession evolve through these ever-changing times.



2019 SPRING MEETING RECAP

In the following pages, the Insurance Information Institute's Lucian McMahon highlights a few of the many outstanding sessions offered at the CAS 2019 Spring Meeting in New Orleans.

Wildfires: Could They Be Manageable Catastrophes? BY LUCIAN MCMAHON

With 11 major fires resulting in billions of insured losses, 2017 and 2018 were record-setting years for wildfires in the United States. The Camp Fire alone destroyed 18,800 structures and killed 88 people and is expected to be one of the largest insured loss events in U.S. history.

The sheer magnitude and unexpectedness of these events have roiled communities and their insurers. Many are worried that catastrophic wildfires could become the new normal. As Chris Folkman, senior director with RMS, put it during a CAS Spring Meeting session on wildfires, “From the 1960s to about 1990, wildfires just weren’t that big a deal to U.S. industry, but then something changed [...] Over the past decade we’ve had an incredible increase in severe events.”

As wildfire risks continue to grow across the country, actuaries will play an important role in helping insurers and vulnerable communities respond to the threat.

A perfect storm for wildfires

Folkman argued that there are at least three major reasons for the increase in catastrophic wildfires, particularly in California and other western states.

Increased exposure: For one, wildfires have gotten so much more destructive because there is so much more to burn. Folkman noted that there are roughly 40% more houses and people in high-risk, fire-prone areas in the U.S. than just three decades ago.

20th century fire suppression tactics: On a related note, Folkman pointed to the aggressive fire suppression policy across the U.S. for much of the 20th century, which helped increase the fuel load in many states. Unfortunately for Smokey Bear, per Folkman, “A more balanced fire policy of thinning programs and controlled burns is a big part of good policy.” But this new approach did not gain traction until the 21st century. “It’s going to take some time to correct a century of misguided policy,” Folkman said. “The net result of an aggressive fire policy is a very difficult fuel landscape, including dense, burnable vegetation.”

Climate change: Combined with more buildings and more vegetation, there also looms the specter of climate change. Warmer average temperatures over a long period of

time can create more “ignition points” — places where a fire could ignite. Climate change can also lead to more extreme weather conditions, including longer dry seasons and shorter, more intense wet seasons. These extremes encourage rapid vegetative growth that turns into vast quantities of dry tinder over the long drought season.

Combined, these factors have created a perfect storm for wildfires to ignite and spread destruction.

Mitigation matters for individuals and communities

The good news is that individuals and communities can do a lot themselves to mitigate wildfire risks. “Fire can be a very binary peril,” Folkman said. “Mitigation matters a lot. What an individual homeowner does to protect their home and make it safer can mean the difference between 100% damage and no damage at all.”

According to the Insurance Institute for Business and Home Safety (IBHS), there are many simple ways to help protect buildings from wildfires, including creating noncombustible “defensible space” around a structure; cleaning debris from the roof and gutters; and covering vents with mesh. Costlier measures include installing noncombustible siding, a fire-rated roof, and multi-pane, tempered glass windows.

Many of these mitigation strategies are designed to minimize the impact of embers. The IBHS estimates that about 90% of damaged buildings were first ignited by embers or fires set by embers. “You’re trying to reduce the ignition probability when the building is subject to an ember hazard,” said Folkman. “If embers get on the roof or inside a vent, window or cladding, that’s when loss potential goes through the roof.” Better protection against flying embers also means fewer ignition points, which does not just benefit the homeowner, but also the wider community around them.

But mitigation does not stop with an individual homeowner. Effective wildfire mitigation requires a holistic effort, including the implementation of community and land use planning that takes into account the elevated fire risks. Regulators, legislators and community members all contribute to these efforts. And insurers can create products to protect communities and to incentivize safe behavior, such as premium discounts for home mitigation.



Insurance responses: Modeling the risk

The key for insurers to effectively address wildfire risk is improved catastrophe modeling. Prior to the 2017 wildfire season, insurers essentially treated wildfires as, in Folkman's words, "attritional sources of loss." No longer. Wildfires are now a legitimate catastrophe concern.

John Rollins, FCAS, a consulting actuary at Milliman, compared the situation out West to Florida after Hurricane Andrew in 1993. "Everyone is basically in a state of shock about what could happen," he noted. But it was the shock from Andrew that launched the development of catastrophe modeling for hurricanes. And Folkman and Rollins both agreed that the recent catastrophic wildfires have spurred many insurers to similar action. The newest frontier for catastrophe modeling is now wildfire risk.

Complicated risk, limited data

A wildfire is a complicated risk. There are several hazards, including the flames themselves, flying embers, smoke and urban conflagrations. Folkman also noted that wildfires are very similar to floods. "Wildfires are a high-gradient peril; you can't model them on a ZIP-code level." How a fire burns and spreads is also highly dependent on the natural and built environment, including building construction and mitigation features.

Plus, of course, there is the data issue. "Wildfires are not events that happen frequently in history. So traditional actuarial-based loss approaches are not going to shed sufficient

Much of the data already exists, but is only now being leveraged by insurers. Governments and firefighting officials have been collecting useful wildfire data for decades.

insight into this catastrophe peril," said Folkman. Rather, a probabilistic model based on simulations is required. In Folkman's work, for example, he used a 50,000-year climate simulation to yield insights into ignitions and fire spreads that consider complicated wildfire hazards and environmental features. "In the past, analytical models approximated the risks, but now, by simulating years of behavior we can actually physically simulate the risks," Folkman said.

Folkman is confident that models will continue to improve as more data is collected. "After tragedies, insurers

get more real about data collection practices," he said. He pointed to earthquakes in the 1980s and hurricanes in the 1990s as examples of catastrophes that encouraged insurers to change how they collect data and manage risks. "That's where we are with wildfires right now. Data collection will change." Indeed, much of the data already exists, but is only now being leveraged by insurers. Governments and firefighting officials have been collecting useful wildfire data for decades. Folkman argued that since wildfires were not considered catastrophe risks, insurers did not need to harvest such granular data. But now, that's changing. "Think about hail claims and damages: There is so much data, so much loss data, and sophisticated underwriting and pricing. We're going to get there for wildfires."

Technological improvements are a big part of this change. Folkman pointed to deploying artificial intelligence to analyze satellite imagery to understand individual building risks in wildfire-prone areas. "I would expect that this will be part and parcel of underwriting data a decade from now," he said. "Analytically advanced carriers are already adopting it."

National problem, state regulations

Wildfire is not just a California problem; it is a national problem. There have been major wildfire events in places such as Tennessee, South Carolina and Florida in recent years. But insurance is regulated on the state level. How different states regulate insurance — and particularly ratemaking — can impact how insurers can leverage catastrophe modeling for wildfires.

For example, ratemaking regulations in California, the epicenter of many of the worst recent fires, may complicate how insurers can react to wildfire risks. Cody Webb, FCAS, a principal with Milliman based in California, pointed out that the California code requires that catastrophe losses be based on a long-term average of catastrophe claims, and that fire losses for homeowners insurance be based on a minimum 20-year average.

Under these requirements, argued Webb, carriers that suffered wildfire losses could adjust rates accordingly, but those carriers that did not suffer loss could not — even though the risk profile may warrant a rate adjustment. “Unprecedented things can happen,” said Webb. “And if we only use historical averages, then we fail to contemplate the potential

for things outside our experience to happen. If risks change, those changes won’t be captured by allowable ratemaking procedures.”

In other wildfire-prone states, this may not be as big an issue. “Most western states are not those with very strict rate regulations,” Webb added. “Insurers are more free to price how they see fit in other states besides California.”

Either way, the increase in wildfires presents an opportunity for insurers to offer new products to help protect vulnerable communities. “There could be opportunity here,” said Webb, “but big risks.” The hope is that as catastrophe models become more robust, insurers will be in a better position to underwrite, price and manage these big risks.

And data is improving all the time. “Use that data. Use analytics,” Folkman stressed. “I think good things will come out of modeling that will benefit private homeowners and communities. That is ultimately the benefit the insurance industry provides.” ●

Lucian McMahon, CPCU, ARM-E, AU-M, is a senior research specialist at the Insurance Information Institute in New York City.

Change is Coming — and Insurers Are Ready BY LUCIAN MCMAHON

The challenges facing the insurance industry are real and the changes they will usher in are sweeping. Speaking at a CAS Spring Meeting general session, Sean Kevelighan, CEO of the Insurance Information Institute (I.I.I.), listed several of the challenges.

For one, natural catastrophes continue to break records. Three of the 10 largest insured property loss events in U.S. history were 2017 hurricanes. The 2018 California Camp Fire is also expected to make the list after the full insured losses are assessed.

Mother Nature alone is not responsible for all major catastrophes. Cyberattacks continue to dominate headlines, and their potential for catastrophic impacts is only increasing. The World Economic Forum noted a growing trend of attacks targeting critical infrastructure, including power grids. A successful attack could cripple the national economy and disrupt global supply chains.

Growing political uncertainty is also contributing to

economic uncertainty. Rising nationalism and protectionist tendencies around the globe are shaking confidence in future growth. “Growth is expected to slow,” Kevelighan said. “With the geopolitical tensions we’re seeing, companies are not comfortable investing if they don’t know where trade wars or tariffs are going.”

The insurance industry itself continues to face fundamental transformations. Commercial auto losses continue to rise, up 30% between 2007 and 2017. Personal auto is also facing an uncertain future, as loss costs keep creeping up with increases in repair costs.

Another concern is the insurance talent gap. “One of the biggest challenges we face is talent,” Kevelighan said. “Organizations will need to change to attract new types of talent. That will change the culture of our organizations. We need to be ready to embrace positive change.”

But Kevelighan believes there is abundant cause for optimism. He argued that the insurance industry is uniquely poised to be a leader in helping society overcome its most daunting hurdles. “All the disruptive forces in the world can be

overwhelming,” he said. “But we as an industry have done a good job leading throughout history.” He pointed out that insurance has supported innovation since the dawn of the industrial age. “You can’t innovate or modernize unless you’re able to transfer risks.”

Insurance will not automatically keep pace with change. Kevelighan suggested that insurers need to take a more proactive approach. “We used to stand behind and support innovation. Now we have to innovate ourselves and come to terms with what we need to do as an industry.” He cited cyber insurance as a prime example of the industry quickly innovating to respond to a societal need. Total direct written U.S. cyber premiums reached \$2 billion in 2018 and are expected to keep growing.

The insurance industry can also make a large impact in protecting against natural disasters, especially flood and wildfires. “We are financial first responders. We rebuild communities through our investments. That’s what we do. We mitigate risk and protect capital,” Kevelighan said.

One way to do that is to encourage resilience. “We as an industry need to talk about resilience more. We need people to understand that we are the ones who can provide solutions to a world of increasing natural disasters,” said Kevelighan. Insurers, he argued, can be at the forefront of encouraging more resilient behavior among individuals and communities. “We have an opportunity to help people learn and change their behavior to mitigate their risks. Otherwise, we’re at risk of repeating our mistakes over and over again.” Indeed, risk management services are increasingly becoming a critical value factor for customers and a way for insurers to gain a competitive advantage.

Another way that insurers can strengthen communities against disasters is by developing new insurance products, like private flood insurance. He pointed to the consistently low take-up rate in flood insurance as an area where insurers can make an immediate impact. The I.I.I. has found that only about 12% of homeowners nationwide report having flood insurance. The percentage may be overstated, as many respondents who believe they have flood insurance may not be covered for flood events under their policies. Kevelighan

We as an industry need to talk about resilience more. We need people to understand that we are the ones who can provide solutions to a world of increasing natural disasters.

expressed confidence that private flood insurance offered outside the National Flood Insurance Program will be crucial to closing that gap. “Private flood is one of the fastest growing insurance lines in the U.S. right now,” he said. “It’s growing even faster than cyber.” This is good news for vulnerable communities and for the insurance industry itself.

Indeed, even with the past few years of catastrophe losses, the industry remains stable and in strong financial health. Also speaking during the general session, Benoit Carrier, FCAS and managing director at Aon, noted that average statutory surplus remains high

despite recent catastrophes and deteriorating ratios.

In fact, average industry surplus continues to increase. Carrier gave several reasons for why that might be the case.

Access to alternative capital, such as catastrophe bonds, has allowed for investor diversification. Regulators play a role as well by requiring insurers to maintain certain amounts of capital so they can pay claims. Additionally, new technologies are helping reduce insurer costs (e.g., automation in claims handling and underwriting). Insurtech, which was once a fearful specter that many worried would radically upend traditional insurance, has mostly supported insurers so they can do their jobs better. As Kevelighan noted, “According to McKinsey, 60% of insurtechs are actually looking to help our value chain. Only 9% are truly looking to upend our industry.”

Advancements in predictive modeling are also helping insurers to identify better risks and price them accordingly. Catastrophe models have helped the industry prepare for large losses. “It would take a very large catastrophe to turn the market down,” Carrier said. “It’s not like in 1992 when Hurricane Andrew struck. Back then there was basically no modeling. We are in a different world now where we can understand these large catastrophes.”

Both Kevelighan and Carrier stressed that, though there may be storms on the horizon, the insurance industry is well-positioned to weather them and to help guide communities and economies through the upheaval.

“The future is bright for our industry,” Carrier concluded. ●

The Future Belongs to the Actuaries, If They Want It BY LUCIAN MCMAHON

The increasing use of technology and the rise of data science have left many actuaries asking: What will actuarial jobs look like in just a few short years? Is the profession experiencing a revolution of new capabilities — or is it declining into irrelevancy?

Panelists at a CAS Spring Meeting session agreed that actuaries could become increasingly more valuable to the insurance industry as they begin to leverage new technologies and processes. The actuaries of the future can be highly efficient, technology-enabled insurance leaders.

But the panel also warned that this outcome is not a given: Actuaries themselves have an opportunity to lead change, defining their future roles by taking initiative when it comes to adopting some of the technology tools and data science techniques that many insurers are starting to explore. Actuaries should become more vocal advocates for their profession, expounding the valuable skills and industry knowledge that they bring to the organizations that hire them, and working to establish themselves once they're in those organizations. If actuaries don't actively lead change and advocate for themselves, they could feel like the victims of change, being displaced as technology and data science re-shape insurance operations and transform traditional roles.

Automation: Here to help, not replace

There are many opportunities to add automation to support insurance business operations, including the actuarial function. Far from being a threat to actuaries, however, introducing automation can actually be a great boon. Technology can take on some of the more manual, repetitive tasks, like data retrieval and formatting said Joseph Milicia, FCAS, Americas P&C Business Process Excellence product leader for Willis Towers Watson. "It allows humans to focus [more time] on where they can add value and where they can make decisions that drive the value chain."



Day Bishop, a director in Willis Towers Watson's insurance consulting and technology business unit, cited a global survey on the future of work that her company conducted in 2018. That survey found that, even though the use of automation is steadily increasing and expected to nearly double over the next three years, that number is still relatively low at present, with 20% of the insurers surveyed expecting to introduce automation within their organizations. Automation is not expected to decimate the actuarial workforce. Rather, Bishop said that most companies see automation as a way to augment human performance and productivity. Bishop maintained that automation is not being used today to replace people — especially not by insurers; it's being used to help people do their work.

Automation can take on independent, repetitive tasks — the plugging-and-chugging that takes up so much of an actuary's time. As they say, 80% of analysis is just getting and cleaning up the data. With these tasks largely automated, that leaves more time to focus on valuable, stimulating tasks that require collaboration and ingenuity.

Indeed, the fear of robots replacing actuaries wholesale is unfounded. If anything, they could make an actuary's life easier. Milicia noted that the tasks that are ripest for automation are the tasks that actuaries don't want to do anyway.

Actuaries are more than data scientists. They are business leaders.

But even if robots won't replace actuaries, will the data scientists? Not according to Milicia, in particular when taking account of the well-rounded knowledge that actuaries have and their exposure to all of the functional areas of an insurer's operations. These attributes put actuaries in better positions for leadership, leveraging the contributions of data scientists, Milicia said. While data scientists may be in high demand right now, actuaries are still indispensable components of the insurance value chain for a very simple reason: Actuaries know how insurance works.

Besides, he argued, the functions of data scientists could themselves be automated away soon. "Technology is way closer to automating [model building] than it is to automating decision-making and how to implement decisions to extract value within an organization," he said. Model fitting, a task that is done with limited collaboration, is likely to be automated soon. "I'd predict that AI will replace it within the next five years," said Milicia.

Milicia also noted that there are many tools that already exist today that can do what a data scientist does. For example, automated machine-learning algorithms can fit models today without human intervention, but maybe not as well as a human can. As technology continues to improve, Milicia said, "We absolutely can get to where the modeling could be automated." The last person standing, if that happens, will be the actuary, not the data scientist. Actuaries can interpret a model's output, garnering insights for insurance applications and for extracting business value. Bishop said that because data scientists can work across a variety of different industries, they're not necessarily going to have a deep understanding of how the insurance business works, which can make it difficult to tie what they're doing in the models they build back to business impact.

Actuaries need to act to cement their roles and the values they bring. Leveraging automation will enable actuaries to spend more time on value-added tasks so that they can contribute the valuable insights that management needs to make strategic decisions. While a background in data science can help the actuary to fulfill this role, soft skills that are not unique to the actuary's domain will ultimately ensure the continued relevance of the actuarial profession. "I would want actuaries to have a data science skill set, sure," added Milicia. "But in the longer term, I think it's the insurance knowledge,

it's the non-data science skills, it's the soft skills that a computer can't reproduce where actuaries add significant value."

To survive, actuaries need to make their case

But Noelle Codispoti, CEO of Gamma Iota Sigma (GIS), argued that maintaining this strict divide between the data scientists as modelers and the actuaries as insurance experts and business leaders might be easier said than done. Codispoti offered her insights through a unique perspective — GIS has an annual membership of over 5,000 students, primarily actuarial, risk management and insurance majors, from a growing network of chapters at nearly 80 colleges and universities throughout North America, making GIS the insurance industry's premier collegiate talent pipeline. In her role, she interacts with both students and company recruiters, with insights gleaned from an annual recruiting survey of students and a recruiter's roundtable held at the GIS annual meeting.

Codispoti pointed out that even the recruiters within many insurance companies themselves are confused by the data scientist/actuary divide. "Most people don't know there's a difference between data scientists and actuaries," Codispoti said. "Most don't take the time to understand what those skill sets are."

Per Codispoti, whether data scientists begin to displace actuaries in many insurance functions could very well depend on this perception. "Job openings for data scientists continue to grow in insurance. The industry is thinking that's the direction it's moving in. The role of data scientists is growing, but the demand for actuaries remains the same."

The very soft skills that actuaries possess, such as critical thinking and complex problem solving, do make actuaries crucial components of the insurance value chain, but these skills are not theirs exclusively. "Those skills are for everybody," Codispoti said. "Data scientists with those soft skills can move laterally and up — and so can anybody else."

Codispoti argued that, even with their insurance knowledge, if actuaries do not work to establish themselves within their organizations, they could grow increasingly irrelevant — or at least perceived as such.

"I would encourage the profession to stand up for its skill set and for the value that actuaries bring," said Codispoti. "Because right now, we're not seeing the discussion moving in that direction. That's why actuaries need to step up. Otherwise, we will talk ourselves out of the discussion." ●

ETHICAL ISSUES

The Case of the Disappearing Increase

Ethical Issues is written by members of the CAS Committee on Professionalism Education (COPE). The column's intent is to stimulate discussion among CAS members. Therefore, positions are sometimes stated in such a way as to provoke reactions and thoughtful responses on the part of the reader. The opinions expressed by readers and authors are for discussion purposes only and should not be used to prejudge the disposition of any actual case or modify published professional standards as they may apply in real-life situations.

Vermont Accident Mutual Protection (VAMP) is a mid-sized regional insurer that writes \$900 million of personal auto premium and \$400 million of homeowners premium. They write an additional \$100 million of rental property, tenant and business owners insurance.

The chief pricing actuary is Bela, who has been with VAMP for seven years and was recently promoted to chief actuary. Since none of VAMP's three other pricing actuaries (including a newly minted ACAS) had the required experience to be promoted to chief pricing actuary, they hired Boris, an FCAS with 10 years of pricing experience.

Boris is excited to start. He knows he has the pricing experience, but he has never been in charge of a pricing unit before, much less been a chief pricing actuary.

Bela calls Boris into his office shortly after Boris's onboarding. "Boris, the homeowners book has been performing poorly over the last two years," Bela says. "I think the unfavorable results are being driven by poor customer retention and adverse selection. The CEO is livid! She wants to turn the book around or heads will roll!"

"Wow! It looks like I stepped into the fire in my first week," Boris re-

sponds. "The issue could be with claims settlements or customer service, or the pricing could be too high compared to the competition. I will take a look at the pricing. When was the last review performed?"

Bela checks on his computer. "There hasn't been a pricing review in four years. That looks like a good place to start. Let me know what you find out."

Boris tasks the pricing staff with calculating a homeowners indication for each state by territory. Boris reviews the results and notices that the statewide indications range from +3% to +17% with many territory indications in the +25% to +30% range. Only a handful of territories have negative indications.

Boris goes back to Bela to tell him the news. "Well, the poor results are likely due to inadequate pricing, but that doesn't explain the bad retention rate."

Bela is shocked. "Wow! That is not good news. If we raise prices, we will lose even more business, especially if we raise them by the indicated amounts. The insurance departments won't like the size of the increases either." Bela thinks to himself, "I'm going to get blamed for not catching these inadequacies while I was the chief pricing actuary. I could even get fired!"

"OK. Let's propose no change in rates and make some increases in

the worst territories. We can offset the increases by increasing credits for higher deductibles and decreasing the increased limits factors (ILFs) for higher limits," Bela offers. "That way we are only increasing rates on our worst customers."

Boris is shocked this time. "But we have no support for changing deductible factors or ILFs, and our rate indications do not support a 0% rate change proposal."

"Just do it," says Bela. "You can just change development factor selections and trend assumptions to get the indicated range to include no change. The low end of your range is +3%, so it shouldn't take much to get that down to +0%. We can blame the retention issues on underwriting and customer service. Then we can slowly move to more adequate rates over the next few rate changes. That will deflect the attention away from us." Bela adds, "Sometimes being the chief pricing actuary means making tough decisions to keep management happy."

Boris is uncomfortable doing what Bela asks, but he doesn't want to get fired from his first leadership position because he is unwilling to play the political game.

What is Boris to do? Should Boris tell Bela that these actions are unethical?

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Tell Bela that he won't do them? Contact the Actuarial Board for Counseling and Discipline? Should Boris make the requested adjustments to the analysis, while providing supporting documentation behind the changes?

Yes

Precept 1 of the CAS Code of Conduct states: "An Actuary shall act honestly, with integrity and competence, and in a manner to fulfill the profession's responsibility to the public and to uphold the reputation of the actuarial profession."

Annotation 1-4 goes on to state: "An Actuary shall not engage in any professional conduct involving dishonesty, fraud, deceit, or misrepresentation or commit any act that reflects adversely on the actuarial profession."

Bela is pushing blame onto others to avoid taking the blame himself. This does not improve the reputation of the actuarial profession and is dishonest.

Precept 13 states: "An Actuary with knowledge of an apparent, unresolved, material violation of the Code by another Actuary should consider discussing the situation with the other Actuary and attempt to resolve the apparent violation. If such discussion is not attempted or is not successful, the Actuary shall disclose such violation to the appropriate counseling and discipline body of the profession, except where the disclosure would be contrary to Law or would divulge Confidential Information."

The revised indication is within reasonable limits, but Bela's instruction to revise the indication to further his own interest qualifies as an apparent or material violation of the Code.

Actuarial Standards of Practice 53, section 3.5, Methods, Models and Assumptions states: "The actuary should use methods or models, along with reasonable assumptions, that, in the actuary's professional judgment, have no known significant bias in the aggregate relative to the intended measure."

The revised assumptions are reasonable, but Bela has introduced a known significant bias in the aggregate to arrive at the desired results.

No

According to the Statement of Principles Regarding Property and Casualty Insurance Ratemaking, "A rate is an estimate of the expected value of future costs." It also states that consideration should be given to past and prospective changes in claim costs, claim frequencies, exposures, expenses and premiums when selecting trend. Finally, it states: "Informed actuarial judgments can be used effectively in ratemaking. Such judgments may be applied throughout the ratemaking process and should be documented and available for disclosure."

Bela argues that ratemaking is not an absolute science and a wide range of indications can be considered reasonable. Bela is recommending a change in assumptions to revise the range of reasonable indications. Given that the current low end of the range is +3%, modest-but-reasonable changes in assumptions will likely yield a flat indication overall. Bela is not responsible if management decides that pricing is not the issue and places the blame on another department. There is nothing dishonest in that. ●

Five Laws of Hype for Actuaries

BY JIM WEISS AND KHANH LUU

The global insurance industry reportedly spends nearly \$200B annually on technology,¹ never knowing which technologies will survive into the future. To help visualize this future, the research firm Gartner publishes a graphic each year called the Hype Cycle that represents emerging technologies' maturity, adoption rates and real-world relevance. The curve essentially compares public expectations over time to show how new technology has larger-than-expected impact in the long run, but smaller effects than initially assumed in the short run.² A quick rummage through our garages or basements will probably remind us that not all innovations ultimately ascend Gartner's "slope of enlightenment" that elevates technology from the "trough of disillusionment" (failed experiments and divestments) to the "plateau of productivity" (mainstream adoption). Therefore, it is instrumental to an organization's success to be able to sift through hype and place informed bets on which technologies will prevail.

Actuarial science may not be the first profession that comes to mind in connection with hype, but actuaries can play a critical role in curating it. Most of the topics on recent Hype Cycles — including blockchain, artificial intelligence and autonomous driving — are absent from actuarial exams and many actuaries' everyday work. However, these topics are ubiquitous at recent CAS conferences and in publications such as the *Actuarial Review*, so the absence

is not due to unawareness. Actuaries even have their own Standard of Practice (ASOP No. 13) devoted to conducting trend analyses to project future values. If actuaries astutely characterize technology trends as well as they are capable of doing, they have the potential to be powerful strategic voices in their organizations. If they instead consistently misestimate technology's potential, they risk losing relevance to professionals more closely associated with new technologies, such as data scientists. As actuaries attempt to master the science of hype, they should consider the following "laws."

Law #1 — Provide measures of hope

One of the greatest strengths actuaries bring to hype is a fluency in speaking quantitatively about trends. ASOP No. 13 presents several different ways actuaries can do so, such as using point estimates, ranges or probability distributions. Such premeditation is not necessarily typical of what one would hear when consuming hype, which may contain vague or out-of-context statistics with the potential to lead one to the wrong conclusion. For example, it is often noted that autonomous vehicles (AVs) could reduce or eliminate the 94% of car crashes caused in whole or in part by human error.³ Such a reduction would logically diminish the demand for auto insurance, which indemnifies policyholders for liabilities and damages related to such crashes. While this possibility may cause some auto insurers concern,

the actual reduction in demand would probably not be a full 94%. Actuaries can help their organizations more precisely estimate how much AVs are likely to reduce demand and when.

James Lynch, FCAS, who is chief actuary at the Insurance Information Institute and a former journalist with the *Miami Herald*, has been covering AVs for nearly a decade. Lynch points to hyped hypotheses that AVs will spell the end of accidents or cause products liability coverage to supplant auto insurance as testable. "There is substantial data in the public realm regarding how long people hold onto vehicles, how long technologies take to mature and how effectiveness of vehicle safety features varies by manufacturer," he says. "If an accident occurs because someone failed to maintain an AV, could product liability cover that? Will public policy evolve quickly enough, if at all, that you will start to see more of these vehicles en masse? Will people be able to afford them?" he asks. "The more questions you ask, the less likely you see . . . the hyped possibilities happen overnight."

Law #2 — History repeats itself

ASOP No. 13 offers detailed guidance regarding the use of historical data to analyze trends. The past may seem less relevant to understanding technology than claim frequency or severity. However, many hyped technologies are clever repackagings of technologies actuaries know and understand. For example, AVs synthesize technologies including radar, LIDAR and global posi-

¹ Source: 2017 Celent Study, <https://www.celent.com/insights/980614747>.

² This tendency is called "Amara's Law."

³ Source: National Highway Traffic Safety Administration, <https://www.nhtsa.gov/press-releases/usdot-releases-2016-fatal-traffic-crash-data>.

tioning. Similarly, blockchain makes use of cryptography, backup and distributed computing. Understanding hype's ancestors not only breaks a larger problem into more digestible sub-problems, but also helps form a more refined view of viability. The Lindy Effect states, "Future life expectancy of some non-perishable things like a technology or an idea is proportional to their current age, so that every additional period of survival implies a longer remaining life expectancy."⁴ In other words, if a predecessor technology has failed to thrive, the apple may not fall far from the tree.

The Lindy mindset is especially useful in interpreting instances where hype descends, in part, from other topics that are currently trending. For example, blockchain is largely a response to security challenges of transacting with virtual currency. However, as insurers and others look for ways to generalize this technology to their businesses, they may consider what their own relevant security challenges are. Many of these challenges may relate to pursuits with connected homes, vehicles and workplaces and the larger internet of things. Lo and behold, these technologies also reside on Gartner's hype cycle — and are far from ascending the "slope of enlightenment." One could thus consider a single new technology a response to challenges largely created by adopting other, not fully proven technologies. Actuaries may assign a different credibility to hype when its ancestry is more versus less speculative.

Law #3 — Connect the dots

Shifts in the zeitgeist can materially influence the direction and magnitude of a trend. ASOP No. 13 advises actuaries to consider economic and social influences in their trend analyses. The sharing economy — a trendy topic at many actuarial conferences in recent years — provides an instructive example of why. At their core, on-demand services such as ridesharing use technology to align supply with demand quickly and at scale. Postmates, whose platform connects consumers with local couriers, is one of the companies born in the past decade whose technology helps power this sector. However, Mustafa Rahman, software engineer at Postmates, observes, "The basic approaches underlying many on-demand services are not new. Integer programming has been around since at least the 1940s." Actuaries pondering what "the next sharing economy" is should start by considering what changes led to the original sharing economy boom.

Rahman, who previously worked at CSAA Insurance Group, cites a number of factors that helped contribute to the rise of companies like Postmates. "Conditions became more favorable for execution," he says. "Streaming APIs sped up processing.⁵ Enough data accrued over many years to make old problems solvable. Celebrities started using services like ours and promoting them over social media." In other words, gradual changes stoked the embers of the sharing economy, but chance occurrences poured gasoline on the fire.

Vision is required for technology

to boom even when conditions serve as accelerants. Actuaries possess aptitudes to provide this vision for their organizations. David Clark, FCAS, senior actuary at Munich Re, points to associative thinking — defined by Illumine Training as "the process of linking one thought or idea to another" — as one such aptitude. "The key is seeing what's trending in one field and reflecting on whether and how it might apply in another," Clark says. "Consider parallels between sociological analyses of students progressing through the education system and actuarial analyses of the life of a claim. There are strong similarities there, but it takes effort and intellectual curiosity to connect these dots." Luckily, actuarial trend analysis is quite literally an exercise in connecting dots.

Law #4 — Consider the source

ASOP No. 13 urges diligence in communications and disclosures related to trends. Actuarial standards generally counsel that actuarial reporting should be sufficiently clear for other qualified professionals to appraise the reasonability of the analysis. Such clarity is not typical of hype. "The social institution of hype is a kind of specialization of labor, where we 'trust' some parties and they do the homework," says David Wright, ACAS, managing director at Beach Re and host of the *Not Unreasonable* podcast. Susanne Sclafane, FCAS, executive editor at Wells Media Group and previously a practicing actuary, adds, "I worry sometimes about the fact that if the media reports on something, it feeds a frenzy that might not be real."

⁴ Source: Nicholas Nassim Taleb, *Antifragile* (2017), https://books.google.com/books?id=5E5o3_y5TpAC&pg=PA514#v=onepage&q&f=false

⁵ Streaming application programming interfaces (APIs) are sets of functions and procedures that essentially send data over the web to subscribed parties whenever a particular event happens.

Fortunately, actuaries are experienced in separating truth from fiction.

In a 2017 article that appeared in the *Actuarial Review*, Stephen Mildenhall, FCAS, offered, “Actuaries write headlines about risk.”⁶ This quote evokes the similarities between actuarial science and journalism. ASOP No. 23 on Data Quality advises actuaries to consider the extent of any checking, auditing or verification performed on data they rely upon. This extent can be difficult to determine with hype. Sclafane observes, “Some articles might cite Bloomberg or *The New York Times* as a source. Those sources, in turn, might link to McKinsey or Deloitte as a source. Those might even cite other sources. It often takes hours to find the original source. Only then can you begin to determine whether the result is worth citing, by reading the original document to determine exactly how a number was derived, and how old the related study is.” Actuaries cannot speak confidently about the trends they hear about without having confidence in the underlying information.

Law #5 — Look in the mirror

ASOP No. 13 suggests that actuaries consider the effect of known distortions that could influence how they perceive trends. Ironically, one such distortion could be their own preconceptions. “Actuaries are probably less likely than others to trust hype, particularly in their domains of expertise,” says Wright. “But they have weaknesses to tropes like the rest of us, especially ‘intellectual superiority’ kinds of cognitive traps,” he says.

Clark similarly hypothesizes that actuaries may instinctively lean

bullish or bearish on hyped technology depending on the circumstances:

- **Bearish:** “There is a tendency for actuaries and others to dismiss sci-fi-like buzzwords such as ‘artificial intelligence,’ or AI, after hearing about them ad infinitum,” says

Actuaries cannot speak confidently about the trends they hear about without having confidence in the underlying information.

Clark. “But by dismissing AI as a whole, one may also be dismissing everyday automations that could help their companies substantially.” Clark points to autocorrect as one of the earlier examples of AI, asking, “Could our predispositions against AI lead us to miss the next autocorrect?”

- **Bullish:** Technical types may have a blind spot for hype presented in a technical vocabulary. As an example, Clark points to techniques that gained rapid popularity in the profession. “Markov chain Monte Carlo [MCMC] methods are a clever solution for integrating over highly dimensional spaces and have rapidly gained popularity by the standards of ‘technical hype,’” he says. “At the same time, much of the related technology is still computationally intensive; it requires compromises in how variables are defined, and the models may not always converge. It may not be wise to throw MCMC at a problem when simpler methods are available.” To help manage one’s preconcep-

tions, Wright points to the concept of “steelmanning,” that is, developing the best version of an opponent’s argument. “When looking at what others are talking about, do whatever it takes to answer the question, ‘How can this be right?’” he says. This approach is oriented towards

helping avoid either of the misestimating tendencies cited in our introduction.

Getting to the bottom of hype requires a lot of work. If it were easy to do, more people would probably be analyzing hype, and fewer people would be hyping. Actuaries’ skills and standards of practice make them uniquely qualified to be their organizations’ curators of hype. If they rise to this challenge and keep their standards relevant in a rapidly changing technology environment, they may find themselves possessing a rare form of control. “Maybe the only part of hype that’s controllable is people’s feeling of understanding something complicated or new without needing to do the work,” concludes Wright. “Actuaries can help simplify explanations of complicated things.” ●

Jim Weiss, FCAS, CSPA, works for Crum and Forster as an actuary in Morristown, New Jersey. He currently chairs the CAS Education Task Force and is an editor for Actuarial Review.

Khanh Luu works for AIG as an analytics manager in New York City and is a CAS candidate.

⁶ Source: “The Coming Revolution in Actuarial Modeling,” <https://ar.casact.org/the-coming-revolution-in-actuarial-modeling-election-day-lessons-for-the-predictive-data-analyst/>.

Workers' Compensation Trends: Forces Changing The Face of The Market

BY KATEY WALKER

When thinking of the most hazardous jobs, first responders, aircraft pilots and construction workers often come to mind. Yet, according to the Bureau of Labor Statistics (BLS), registered nurses (RNs) rank among the top five occupations with the most (and some of the worst) work-related injuries. Given the rigorous physical lifting, transferring and repositioning of patients, it is not surprising that RNs suffer from numerous musculoskeletal disorders (MSDs) such as degenerative disc disease, ruptured or herniated discs, rotator cuff tears, and many more.

Today, new technology such as robotic exoskeletons can enable nurses to lift patients with ease, side-stepping often crippling injuries and making their jobs potentially safer. In the construction industry, wearables such as high-tech vests and helmets that vibrate to alert employees to potentially dangerous surroundings help reduce the number of injuries.

Training is also an important component in the ergonomic process. It ensures that workers are aware of ergonomics and its benefits, become informed about ergonomic-related concerns in the workplace and understand the importance of reporting early symptoms of MSDs.

Medical advancements are also impacting workers compensation outcomes. What was once a permanent or partial permanent injury may now have treatments available and be temporary, allowing injured workers to return to work — and return sooner.

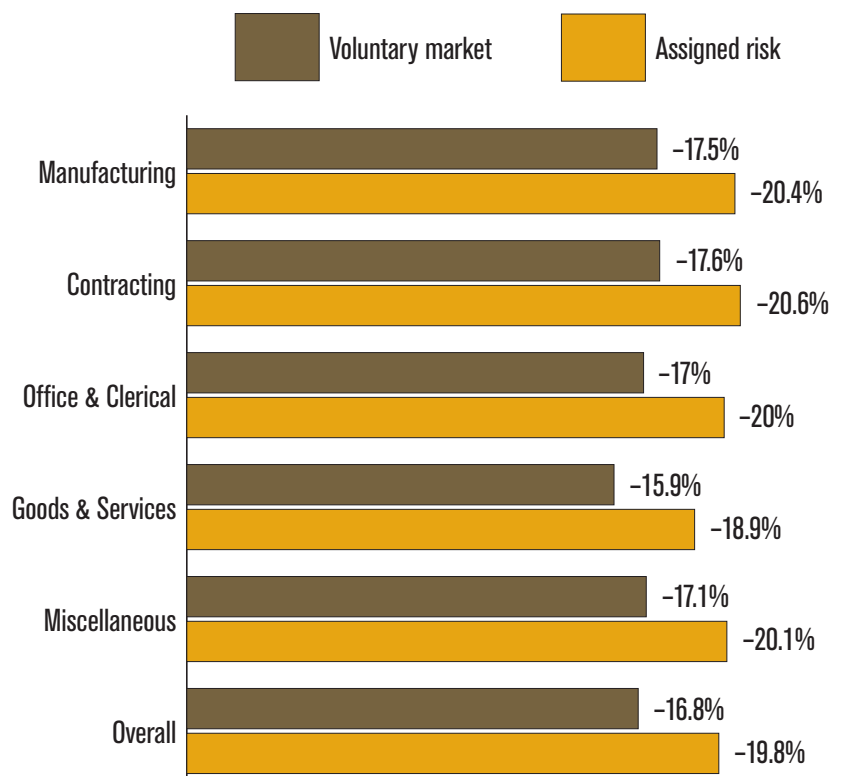
In addition, the implementation of corporate return-to-work programs is an important practical approach, allowing injured employees to return sooner into a modified or alternate job role, helping to reduce workers' compensation costs for businesses.

The National Council on Compensation Insurance (NCCI) reported that workplace injury and illnesses are continuing to decline about 2% to 3% annually across all demographic categories but are dropping most precipitously among younger workers. According to the study, based on data from the BLS, while historically younger workers

between the ages of 25 and 34 suffered more workplace injuries and illnesses than workers in other age brackets, the incident rate for illnesses and injuries among younger workers decreased by nearly 50% between 2006 and 2017.

The NCCI recommended a 16.8% overall average rate reduction in 2019 for the voluntary market (Figure 1). The steady decline in accidents and injuries on the job mirrors the decline of workers' compensation claims and the change in the U.S. workplace, including how different jobs are rated compared to 1969 or even 1999.

Figure 1. Proposed 2019 workers compensation rate changes



Source: National Council on Compensation Insurance

Key Forces Reshaping the Sector

Key findings from the NCCI's survey of insurance company leaders found that their greatest concerns were not only new and changing risks associated with an aging workforce, unskilled workers, independent contractors and new technology, but with assessing these and other unknown risks. Additionally, the future of the workers' compensation industry, opioid abuse and medical marijuana, and advancements in technology are all top of mind. New concerns for worker safety are tied to the hiring of more unskilled workers, distracted drivers and the challenge of "under the influence" workers.

The steady decline in accidents and injuries on the job mirrors the decline of workers' compensation claims and the change in the U.S. workplace.

Physical and mental issues in the workplace

While some occupations have seen a drop in physical injuries, others, such as first responders, are dealing with new traumas. An increase in weather-related catastrophes as well as school incidents and workplace violence have resulted in an increase in post-traumatic stress disorder (PTSD). "Getting Out in Front of PTSD," a 2016 report by Willis Towers Watson, found that 34% of first responders were diagnosed with clinical depression or PTSD, and that it is likely that 20% to 37% of first responders will be diagnosed with PTSD at some point. There are now 33 states and the District of Columbia that permit the use of medical marijuana to treat first responder PTSD. The lack of persuasive scientific evidence is irrelevant; there is a senti-

ment over science that marijuana helps with PTSD.

Workplace violence and safety issues

Violence has emerged as an important safety and health issue in today's workplace. The most extreme form, homicide, is the third-leading cause of fatal occupational injury in the country, accounting for about 9% of all workplace fatalities in 2015, according to the BLS. In addition, the National Safety Council reports that in 2016, 17% of workplace deaths were the result of violence. Homicide is not the only concern. Sexual harassment, patient attacks on health care workers and even mass casualty events impact a company's workers'

compensation program. Workplace violence is a challenge for employers striving to maintain a safe working environment for their employees. There must be an emphasis on training, planning and solid programs to prepare and react to these threats.

Advanced medical technology in controlling claim costs

One of the most significant concerns for workers' compensation underwriters is a potential surge in claim costs stemming from the increased use of advanced medical technology. As treatments become more complex, more effective and more expensive, there is a concern that workers' compensation claim costs will rapidly escalate.

Paradoxically, health companies have established that wearable devices

can be a preventative measure to injury and illness — but what about the privacy issue? Do employees want their employer to have access to their Fitbit and other wearables?

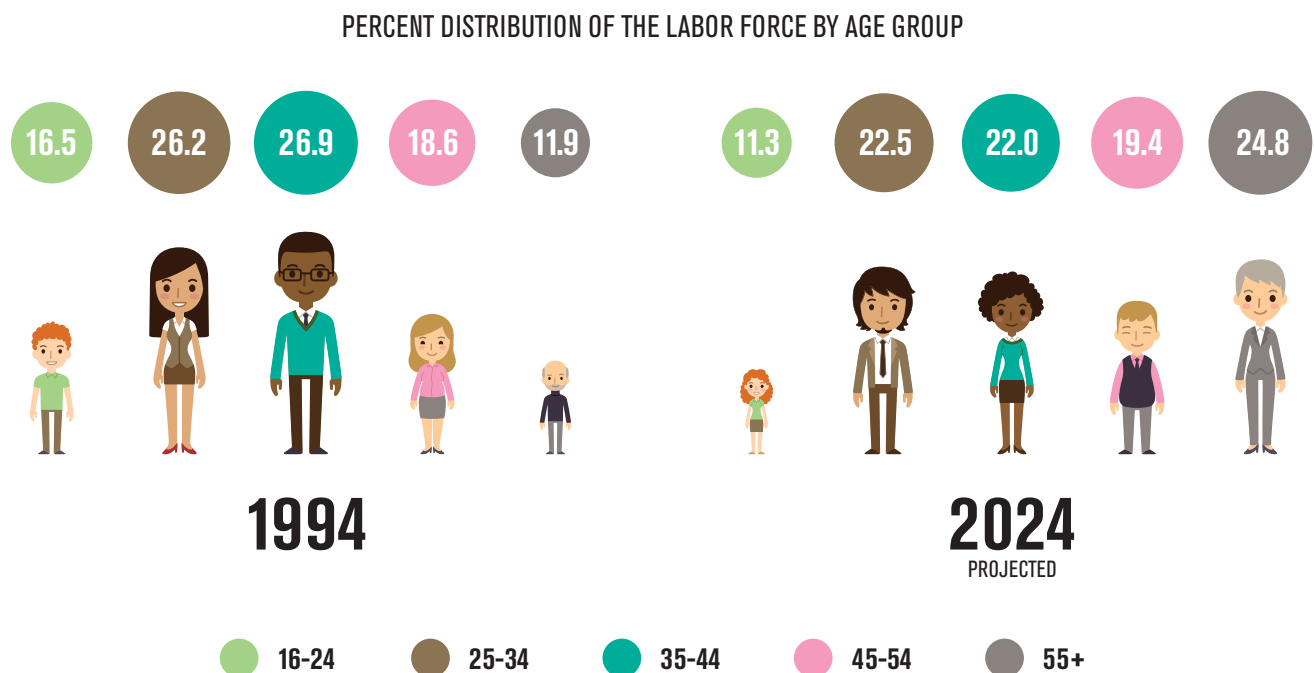
Changing demographics in the workplace

The gig economy, which includes temporary drivers, laborers and independent professionals, is transforming the U.S. workforce. A study by Intuit predicts that by 2020, 40% of U.S. workers will be independent contractors. This trend carries benefits and risks. Independent contractors can exercise flexibility in their schedules and workload; however, ambiguity in medical coverage for injuries occurring on the job is a long-standing discussion. Who is really going to be responsible? As technology improves and companies find ways to cut operating costs, we will continue to see a growth in the gig economy. But as the workforce changes, are companies adapting to or ameliorating the safeties and benefits of workers?

Another concern for insurers is the aging workforce, putting a strain on the pool of skilled workers and resulting in increased severity and duration of care (Figure 2). Not only do older workers want to work longer, they often need to work longer. Changes in pension plans, increased health care costs and longer life expectancy have led to a postponement of retirement. Further, as jobs change and become more automated, workers are being asked to do more tasks involving technology. Less skilled workers in complex jobs are more likely to become injured.

Additionally, employees are living longer with more chronic diseases. Conditions such as diabetes, heart disease

Figure 2. The Labor Force is Aging



Source: Bureau of Labor Statistics

and obesity can complicate treatment and recovery from a work-related injury, creating more ambiguity in medical losses. As the average age of the workforce increases, this issue will affect workers' compensation costs even more than in years past.

Opioid epidemic

According to the Centers for Disease Control, opioid overdoses claim more than 40,000 lives each year in the U.S., and the numbers are rising. Workplace injuries often result in some degree of chronic pain, and a starting point for relief and treatment has typically been prescription opioids. However, state governments and insurers are becoming increasingly proactive in mitigating abuse and monitoring for red flags.

Legalization of marijuana

The legalization of cannabis creates a huge issue for many states with regard to drug testing. Already legal for medical use in most states, 10 states have now legalized marijuana for recreational use, despite its classification as a Schedule 1 substance under the Controlled Substances Act. Schedule 1 drugs are illegal because they are considered to have high abuse potential, no medical use and severe safety concerns. This generates challenging scenarios for insureds and policyholders when it comes to marijuana. What are the implications when someone is legally allowed to have it but is considered impaired when operating machinery? Are companies restricted from terminating employees with prescribed opioids or cannabis who

cannot safely return to regular work duties? Companies are focused on defining pain management protocols. Carriers are trying to expedite worker recovery and oversee treatment and pain management, knowing that non-traditional treatments are now standard treatments.

Employers and policymakers will need to continue to adapt as the benefits and harms of cannabis become clearer. Both marijuana and opioids impact the existing pain treatment protocols, making it increasingly important for companies to focus on personalized treatment plans with more rigorous oversight and change in formularies for chronic pain conditions. This will impact pain evaluation criteria, communication and interaction with patients and, potentially, the introduction of other

holistic pain management services as approved treatments.

Data breaches and cyberthreats in the workers' compensation claim process

Data breaches and cyberthreats impact all lines of insurance; workers' compensation is not immune. Companies must be vigilant to the susceptibilities that exist before a data breach or cyberattack occurs because of the type of personal information that can be accessed. When a claim is initiated in the workers' compensation process, there is personal information that becomes an integral component in ensuring that the claim is handled properly including personal health information, credit and social security numbers that are communicated to physicians, hospitals and other insurers.

In 2017, health systems locally and worldwide were hit with ransomware, shutting down hospital and private practice computer systems while demanding money in exchange for digital keys to unlock the systems. Patient data hacks have resulted in medical device malfunctions and treatment delays — a cyberattack on Merck impacted its ability to produce medicines. History shows companies without a solid cyberinsurance program put their business at risk. Companies and customers will place even greater emphasis on cyber risks in the future, so it's important that networks are secured, using encryption appropriately and making sure employees are trained on how to keep confidential data protected.

An Industry on the Cusp of Transformation

While technology hasn't transformed workers' compensation yet, artificial intelligence (AI), machine learning and other new technologies are helping to improve the claim and underwriting processes and, ultimately, the customer experience.

Advanced analytics in the claim process

By combining claim data with detailed medical transaction data, predictive models can supplement the claim administration process to estimate and score an injured worker's propensity for high future medical costs and ac-

greater insight. In fact, insurers are increasingly implementing underwriting processes that rely on data and software solutions to help analyze thousands of pages of medical bills and health records to predict injury risks, reducing the need for human evaluation, which would take far longer to complete. With the support of AI, insurers are better able to predict losses and provide better risk management to its customers.

The Future of Workers' Compensation

Despite numerous challenges related to aging workers, increased opioid usage and higher medical costs, industry innovations addressing these issues

Despite numerous challenges related to aging workers, increased opioid usage and higher medical costs, industry innovations addressing these issues have kept rates steady or declining and should continue to do so through 2019.

celerate treatment. This can ultimately reduce workers' compensation costs and improve claim settlement rates. In addition, technology is empowering adjusters to focus on customer service. Machine learning apps may also help to predict high-risk claims while claim management software reduces manual workflow to improve claim handling.

Using new technology in underwriting

Workers' compensation insurers are looking to new technologies to provide

have kept rates steady or declining and should continue to do so through 2019. Technology is opening new frontiers in risk management, but whether this downward trend in workers' compensation rates continues in 2020 and beyond remains to be seen and will require close attention and further study. ●

Kathryn Walker, FCAS, is a senior director with Willis Towers Watson's Insurance Consulting and Technology, Americas P&C practice.

IN MY OPINION BY GROVER EDIE

Thinking Outside the Box

Sometimes, someone will ask me, “How do you think outside the box?” A recent experience has enabled me to provide at least one example of how that can be accomplished.

Thinking outside the box is defined by one source as, “To think differently, unconventionally or from a new perspective. This phrase often refers to novel or creative thinking.”* There can be other definitions, but I’ll stick with this one.

Currently, I am studying for the Certified Specialist in Predictive Analytics credential (CSPA). I am also engaged in three projects for three separate clients. The projects are very dissimilar, and adding in the CSPA coursework, plus trying to learn the R programming language on the side, I have five different mental tasks going at once. I realize that the CSPA requires some knowledge of R, but I am going beyond what is required for that course for personal and professional reasons.

To clarify, I am not multitasking; I am not doing multiple tasks at the same time. I have found that to multitask is to fail at every task simultaneously. Sometimes, I can’t even listen to the radio while I am driving, especially if I have to find a street address. When I do something, I generally have to give all my attention to the task at hand.

But when I shift from one project to another, some of what I was just learning

or doing is occasionally useful in the other task. For example, the CSPA materials on data quality list some steps that should be undertaken when receiving data for a project. While we all (hopefully) validate the data we receive, the CSPA materials provide steps one can point to as “this is how it should be done.”

This is not just me saying that is how I like it, or how I have done it in the past; here we have a published set of steps for validating data. If thinking outside the box involves new thinking, I believe this qualifies.

The first suggestion to think outside the box is to do diverse tasks within a reasonably close time frame. I don’t mean deep sea fishing and taking calculus. There needs to be some sort of link that can tie the two disciplines together. Learning how to display charts and graphs in R isn’t directly related to my litigation support project, but the examples of how data can alternatively be expressed might help me explain some of the more complex issues of the latter engagement.

The term “think outside the box” is visual, but what is the box? Perhaps the word “box” implies a confined space of thought and the limitations of your experience.

If the box is what you know, how can you think outside of that? How can you do something you are not aware of? Who came up with this box idea, anyway? Was she or he thinking outside

the box? If your box is your knowledge, skills and experience, may I suggest you expand your box? You can’t apply something you don’t know how to do and you can’t implement something you have never heard of, but you can explore and discover what you need to know.

In a prior IMO column called “Stuff,” I talked about getting rid of physical items that get in the way of finding what you need. Sometimes, we need to get rid of old ideas that get in the way of our thinking about solutions. Computing power and data storage have advanced immensely since I started in this profession. Solutions I think of today were never considered years ago because of the cost of computing power and data storage. We need to be aware of how our box has changed and how the boundaries of our capabilities have expanded, whether we acknowledge it or not.

Another trick that I use isn’t really thinking outside of all boxes, just outside the box I am currently considering. Solutions I tried in the past that worked in other situations might apply to the one I am trying to solve. Even some solutions that did not work elsewhere might work here. What is outside the box you are contemplating might be well within the realms of another box.

No matter what you call it, thinking outside the box can expand what we do and how we do what we do. ●

* https://en.wikipedia.org/wiki/Thinking_outside_the_box

IT'S A PUZZLEMENT BY JON EVANS

Grading on a Curve

Professor Mannboltz is a world expert on statistical mechanics. A testing service contracted the professor to determine the ranges of scores for the grades on a standardized exam, before the test is administered to many students around the world. The exam is scored from 0 to 2,400 points. There will be 15 grades from highest to lowest: A, B, C, D and F, each with the option to add a + (plus) or - (minus) suffix. The service requests that the resulting distribution of grades among the students to be as close as possible to the following:

A+	1%	B-	13%	D	2%
A	5%	C+	13%	D-	2%
A-	10%	C	13%	F+	1%
B+	13%	C-	10%	F	1%
B	13%	D+	2%	F-	1%

The only other information Mannboltz is given is that students always average close to 30% of the possible points on a test like this. Otherwise, he knows absolutely nothing else about the test, the students, etc. What ranges of scores do you think Professor Mannboltz will come up with?

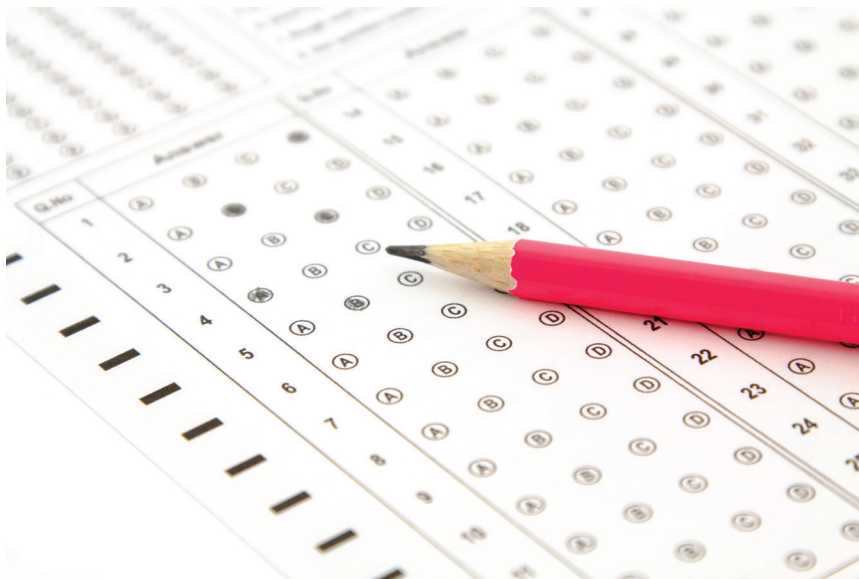
Identity Politics

Here is a meticulously detailed solution to the March-April puzzle, submitted by master puzzle-solver Bob Conger.

Let C denote the population share of Paleomorphs, with $0 < C < 1$.

Let D denote the population share of Neomorphs, with $0 < D < 1$.

As such, $C = 1 - D$.



Let P denote the voting parameter as described in the puzzle, with $0 \leq P \leq 1$.

Case 1

The Patriocrat percentage of the total vote = $C \times D$.

The Xenocrat percentage of the total vote = $D + [(C \times (1 - D)) \times (1 - P)]$.

Then, we note that the Patriocrat percentage of the total vote $< D$ for any values over the range of C and D , and the Xenocrat percentage of total vote $\geq D$ for any values over the range of C , D and P .

Then, we can see that the Xenocrat percentage always exceeds the Patriocrat percentage, and thus the Patriocrat policies never will be implemented — neither by majority nor by coalition government.

Thus, the policies of either the Plutocrats or Xenocrats will always be implemented and the ratio of Neo-

morphs to Paleomorphs will grow by 10% per year. The proportion of Neomorphs in the population will increase monotonically forever and eventually will approach 100% asymptotically, no matter how small the initial population of Neomorphs.

Case 2

Plutocrat policies are implemented.

The Plutocrat percentage of the total vote = $C \times (1 - \text{SQRT}(D)) \times P$.

Plutocrat policies will be implemented when $C \times (1 - \text{SQRT}(D)) \times P \geq 0.5$, which is equivalent to $P \geq 0.5 / [(1 - D) \times (1 - \text{SQRT}(D))]$.

If $P < 0.5$, then Plutocrat policies will never be implemented.

If P is barely above > 0.5 , then Plutocrat policies will be implemented when D is very, very small.

As P grows above 0.5, Plutocrat pol-



icies will continue to be implemented as the population of Neomorphs grows slightly larger.

If P is very nearly 1.0 (or $P = 1$), then Plutocrat policies will be implemented when D is any amount up to approximately 0.1624.

From further analysis, it turns out that if $P = 0.7382$, then the Plutocrat policies will prevail as long as D is 0.0727 or smaller (thus allowing Neomorph growth up to this size). If $P > 0.7382$, then the cap on D grows (up to 0.1624 as P approaches 1.0). Once D crosses the threshold, Patriocrat policies prevail and Neomorph growth stops.

If $P < 0.7382$, then the Xenocrat policies step in as D crosses the threshold of being too large for the Plutocrats to gain a majority. The Xenocrat policies allow continued growth of the Neo population to a point, as analyzed in the following:

If the starting population of Neomorphs is relatively large and $P > 0.643$, then Xenocrat policies may always prevail.

Case 3

If conditions for Plutocrat policies to be implemented are not met, then Xenocrat policies will be implemented when the Xenocrat percentage of the total vote exceeds the Patriocrat percentage of the total vote, namely when:

$D + [C \times (1 - \text{SQRT}(D))] \times (1 - P) > C \times \text{SQRT}(D)$, which is equivalent to

$P < 1 - [2 \times (1 - D) \times \text{SQRT}(D)] / [(1 - D) \times (1 - \text{SQRT}(D))]$.

If $P < 0.643$ (approximately), this condition is met for all D ($0 < D < 1$). Thus, when $P < 0.643$, the policies of Patriocrats never will be implemented, regardless of the magnitude of D , and the ratio of Neomorphs to Paleomorphs will grow by 10% per year. The propor-

tion of Neomorphs in the population will increase monotonically, forever, and will asymptotically approach 100%, no matter how small the initial population of Neomorphs.

If $P = 0.644$ (approximately), the condition is met for $D < 0.18$ (approximately). In this case, assuming that the initial population of Neomorphs is less than 0.18 of the total population, the proportion of Neomorphs in the population will increase until it approaches 0.18, enjoy one more 10% increase under the policies implemented in that regime, and then experience no further growth.

If P increases above 0.644, the condition is met for smaller values of D . For example, if $P = 0.7382$ (approximately), the condition is met for $D < 0.0727$ (approximately). In this case, the proportion of Neomorphs in the population will increase until it approaches 0.0727, enjoy one more 10% increase under the policies implemented in that regime, and then experience no further growth. This point ($P = 0.7382$, $D = 0.0727$) also happens to be the boundary for satisfying the Plutocrat majority scenario addressed in the first section of Case 2. Thus, if $P > 0.7382$, the boundaries of D are dictated by the Plutocrat majority scenario.

Interestingly, if $P \geq 0.644$, the condition for Xenocrat percentage being greater than Patriocrat percentage is also met for larger values of D . For example,

- If $P = 0.644$, the condition is met if $D > 0.21$ (approximately).
- If $P = 0.7382$ (approximately), the condition is met for $D > 0.30$ (approximately).
- If $P = 1.00$, the condition is met for $D > 0.39$.

In these cases, the Xenocrat poli-

cies will prevail on an ongoing basis, and the percentage of Neomorphs will grow (asymptotically to 100%) forever. However, since there is a gap of greater than 10% growth between the small values of D that satisfy the condition and these larger values, this scenario only is encountered if the starting value of D is larger than the upper portion of this boundary condition.

An interesting situation occurs when $0.6430 < P < 0.6435$. For example, when $P = 0.6432$, the condition for Xenocrat percentage being greater than Patriocrat percentage is met for $D < 0.189$ and for $D > 0.200$. This gap is narrow enough that a one-year 10% growth in Neomorph population can bridge the gap, and then continue growing on the other side of the gap. But it won't necessarily do so — it all depends on how close to 0.189 the proportion of Neomorphs is as it approaches 0.189. It might land in the gap and never grow again, or it might leap the gap and continue growing forever.

Note: I have not addressed cases exactly on the boundary where the Patriocrat and Xenocrat vote counts are tied and the Plutocrat vote count is less than 50%. We are not told what policies would be implemented in this case. I also have not addressed the effects of rounding the vote count to a whole number of voters in cases where we are near the boundary.

Solutions were also submitted by Clive Keatinge, Brad Rosin and Ethan Triplett. ●

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