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EXPANSIVE VariancE

As cyber threats and insurer exposure grow, promising risk assessment tools and techniques emerge

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departments

FSC LOGO

on the cover

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A Little Bit Better, Easier, Brighter

Just a few years ago, the CAS was busy preparing for its centennial celebration in 2014. In honor of the event, the CAS conducted an interview with Frank Harwayne, FCAS, who was then the second oldest living CAS member. Harwayne died in 2016, and his obituary is included in this issue's In Remembrance column. When composing his obituary, I came across Harwayne's interview. He had these words of wisdom for new actuaries:

> Your work is with numbers, but your business is with people. We did not enter this field to have stories, books, songs, or movies written about us; we entered this field to make the lives of everyday people just a little bit better, a little bit easier, and a little bit brighter.

I was struck by his humble sentiment and how he differentiated actuarial work from the meaning of that work. With all the discussion of big data and insurtech disruption amongst those in insurance, Harwayne hearkens back to the basics of what it means to be an actuary — "Your business is with people."

In his In My Opinion column, *AR* Editor and Chief Grover Edie espouses a similar take on the business of actuaries, trying on a different answer to that age-old question, "What do you do?" I am amazed that Grover's column touches on the same subject as Harwayne did. Then again, in my many years of working with actuaries, it seems that they all, at one time or another, contemplate just how to explain what it is they do. I know that I have!

Be sure to read Grover's piece and see if you agree with his definition of an actuary.

Small World

I have never met Ana Mata, ACAS, but I feel that I know through her volunteer work as an *AR* copyeditor. So I was very happy to see a photo of her on social media taken at the International Congress of Actuaries held last June in Berlin. She was presenting the results of a paper produced by the joint Institute and Faculty of Actuaries-CAS International Pricing Working Party. Dr. Mata, along with Chairperson John Buchanan, who is the subject of this issue's Downtime column, served on the joint working party. It really is a small world!

To read the paper, which is the 2016 winner of the prestigious Brian Hey Prize, visit actuaries.org/uk.

Actuarial Review welcomes story ideas from our readers. Please specify which department you intend for your item: Member News, Solve This, Professional Insight, Actuarial Expertise, etc.

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president's MESSAGE By BRIAN Z. BROWN

The Benefits of Microinsurance

You can make a difference and make the world a better place.

Many people in the insurance industry have some doubts whether this statement applies to their jobs. However, in the insurance industry we make a big difference. What could be more important than providing insurance to help someone rebuild their life after a catastrophe — in particular, if they are already low-income and vulnerable? Microinsurance does just that.

The need for microinsurance

One striking difference between developing and developed countries is the extent of insurance penetration. In the U.S., non-life insurance penetration (insurance premium compared to GDP) in 2017 was 4.28 percent, whereas penetration in Asia was 1.93 percent across 26 markets, and in Africa just 0.97 percent across nine of its larger markets.[1] With almost half of the entire world population living under US $5.50 per day,[2] this is not surprising. These people are the most vulnerable and are the most likely to be devastated by a natural disaster. Small shop owners and farmers are most at risk, as an event can deprive them of the limited assets they have and even basic necessities.

Imagine that you are a small shop owner in Haiti after a severe flood. Your business nets you about $6 a day of income, and you are in the process of paying back a $540 loan[3] that you got from a microfinance institution to purchase your inventory. The flood resulted in a need to close the shop for repairs, and the inventory spoiled. Since you have no money coming in from the shop, you have to sell your cow (your other source of income from selling milk and calves) to pay the loan. You are starting from scratch and have just been knocked back below the poverty line.

What could be more important than providing insurance to help someone rebuild their life after a catastrophe — in particular, if they are already low-income and vulnerable? Microinsurance does ust that.

But what if you had had an insurance product that specifically addressed your needs? Microinsurance is designed to do that.

Microinsurance specifically addresses the risks that low-income people face globally.

While there is no global, uniformly-accepted definition of microinsurance,[4] almost all stakeholders agree that, at its core, microinsurance is insurance for low-income populations.

Microinsurance products, therefore, need to be designed differently than traditional insurance products. Katie Biese of the MicroInsurance Centre promotes the need for "SUAVE" (simple, understood, accessible, valuable and efficient) design.

- ***Simple:*** The products need to be simple in benefit structure and have few to no exclusions. Benefits are often a fixed amount.
- ***Understood:*** If people don't understand the product, they won't buy it. Most of the microinsurance target market are first-time insurance buyers.
- ***Accessible:*** Sales need to happen through channels that reach low-income people where they are, such as cooperatives, input suppliers, microfinance banks, or simple mobile phones.
- ***Valuable:*** Products need to provide clear value both for clients and for insurers.
- ***Efficient:*** A low-income target client has a lower ability to pay premiums. In order for products to be affordable, it's critical that processes be efficient and low-cost. This often results in low policy limits. It is important that claims are paid quickly.

Examples of microinsurance property-casualty products

There is a growing number of micro-

President's Message, page 8

[1] World insurance in 2017: Solid, but mature life markets weigh on growth. Swiss Re Institute, Sigma No3/2018. Table IX, p. 46
[2] http://iresearch.worldbank.org/PovcalNet/povOnDemand.aspx Accessed July 26, 2018.
[3] Average loan outstanding in Haiti, 2008. http://www.haitianmicrofinance.com/HaitianMicrofinanceIndustryOverview.pdf Sourced 26 July 2018
[4] One example from the International Association of Insurance Supervisors is as follows: While the term "inclusive insurance" is aimed at excluded or underserved markets the term "microinsurance" has been defined as insurance that is accessed by low-income populations, provided by a variety of different entities, but run in accordance with generally accepted practices (which include the Insurance Core Principles). Source: IAIS. Issues paper on conduct of business in Inclusive Insurance, Nov 2015 p. 5.

President's Message
from page 6

insurance property-casualty products globally, protecting a variety of assets against a number of perils. Some of the most common are:

- ***Property Insurance.*** After Typhoon Haiyan in the Philippines in 2013, more than 110,000 low-income Filipinos received non-life micro-insurance claims payouts totaling more than $12 million to help them rebuild after the disaster.[5] A variety of flood, fire and other calamity coverages protects homes and small businesses in markets such as Haiti, the Philippines, Colombia and Ghana. (See "Microinsurance in Ghana."[6])
- ***Crop Insurance.*** Due to the linkage with larger development goals such as food security, a significant amount of funding and resources is being directed to developing, piloting and scaling up both index-based and indemnity-based crop insurance for smallholder farmers. Allianz protects small farms in Burkina Faso and Mali, covering outstanding corn or cotton loans if rainfall is insufficient for proper growth of crops, with payouts triggered automatically based on an index.[7]
- ***Livestock Insurance.*** Like crops, livestock represents a key source of food and income in many developing markets. Local insurance companies in Kenya provide index insurance to pastoralists, based on assessments of grazing conditions made by satellites measuring the color of the ground. The product is designed to pay in time to keep livestock from dying, and it is supported by the Kenyan Government, World Bank, International Livestock Research Institute and Swiss Re.[8]
- ***Regional disaster insurance programs.*** In addition to products targeting individual clients, there is a number of macro-level programs that cover developing markets. The African Risk Capacity (ARC) "helps member states to improve their capacities to better plan, prepare and respond to extreme weather events and natural disasters, therefore protecting the food security of their vulnerable populations."[9] The ARC provides parametric weather insurance coverage through a risk pool, capitalizing on the natural diversification of weather risk across Africa. Other similar programs include the Caribbean Catastrophe Risk Insurance Facility (a segregated portfolio company) and the Pacific Catastrophe Risk Assessment and Financing Initiative.

The above are just a few examples of numerous individual projects glob-

Microinsurance in Ghana

In October 2011 a flood hit the bustling market near Accra, Ghana's most populous city. Many low-income people faced severe damage to their businesses. MicroEnsure, a specialized microinsurance intermediary, in partnership with a local insurer and microfinance bank, offered insurance coverage aimed at addressing some of the business risks faced by informal sector business owners, including damage from flood, fire and earthquakes.

The *Obra Pa* ("Good life in the future") product is a mandatory coverage sold with microfinance clients' loans in Ghana. Benefits include payment of the business's outstanding loan as well as a fixed cash benefit (approximately USD 114 at the time of the flood).

After the flood, the insurance coverage, while not covering the entire losses faced, allowed insureds to recover more quickly and use fewer burdensome coping mechanisms like selling assets, depleting savings and taking out additional loans. A long claim processing time — averaging 45 days — eroded the value of the insurance somewhat, but 92 percent of clients said it was a good idea to purchase the coverage and would recommend it to others.

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[5] "Aiding the disaster recovery process: the effectiveness of microinsurance service providers' response to Typhoon Haiyan." Luxembourg: Microinsurance Network, 2015. pp. 6, 21.
[6] Magnoni, B., T. Chandani and E. Zimmerman. "Milk Brief 10 – Doing the Math with Property Insurance in Ghana." Appleton: MicroInsurance Centre, 2012.
[7] "Emerging Consumers Product Pool: Overview and assessment of Allianz products for low-income populations in developing countries." Allianz, October 2017. p. 59.
[8] http://www.swissre.com/reinsurance/successful_Kenya_livestock_insurance_program_scheme_scales_up.html
[9] http://www.africanriskcapacity.org/

ally. In addition, there are many recent larger-scale initiatives underway that should increase the availability of microinsurance products. One is the G7 Climate Risk Insurance Initiative. This was adopted by the G7 in 2015 to increase access to insurance coverage against climate change for an additional 400 million of the most vulnerable people in developing countries by 2020.[10] There has also been significant activity by the private sector, with demonstrated interest from major multinational insurers. For example, Blue Marble Microinsurance is a "consortium of nine companies collaborating to extend socially impactful, commercially viable insurance protection to the underserved," with crop insurance ventures piloted in Zimbabwe and Colombia.[11]

You may be thinking that some of these products might be "interesting" to price … or reserve or reinsure.

Implications for actuaries

By now you may be thinking that some of these products might be "interesting" to price … or reserve or reinsure. Indeed, many of the characteristics of microinsurance that make the products appropriate for low-income people may make actuaries a bit uncomfortable. François-Xavier Hay, CERA, chief risk officer of the French insurance company Groupe Macif, sees microinsurance as an opportunity for reimagining: "Microinsurance invites actuaries to rethink the answer to risks starting from a blank page … to revisit insurance products and processes in an inclusive way where clients are considered as active stakeholders."[12]

If you are up for the challenge, we as actuaries can be involved in microinsurance in many ways.

- Actuaries are needed to price the products. This is often complicated as data on low-income populations and their risks is hard to find and significant judgment is necessary.
- For index products, actuaries can do research and publish this information to help the growth of insurance products in developing countries.
- We can publish educational material that will help local companies to price products.
- Actuaries can be the champions who get their organizations more involved in microinsurance. Actuaries with the appropriate knowledge and background can help design products that are profitable for their companies and benefit society.

The CAS is currently researching additional ways that our members can become involved in microinsurance. I would appreciate your input. Thank you. ●

[10] https://www.insuresilience.org/about
[11] www.bluemarblemicro.com/ventures
[12] Blacker J., (Ed.), *Actuaries in Microinsurance: Managing Risk for the Underserved*, Connecticut: ACTEX Publications, Inc., 2015, p. 16.

CALENDAR OF EVENTS

October 15-16, 2018
In Focus Seminar: "Taking Root: Insurtech in P&C Insurance"
Toronto Marriott Eaton Centre
Toronto Ontario

November 11-14, 2018
Annual Meeting
Caesars Palace Las Vegas
Las Vegas, NV

March 25-27, 2019
Ratemaking, Product and Modeling (RPM) Seminar & Workshops
The Westin Boston Waterfront
Boston, MA

May 19-22, 2019
Spring Meeting
Hyatt Regency New Orleans
New Orleans, LA

June 3-4, 2019
Seminar on Reinsurance
Fairmont Southhampton
Hamilton, Bermuda

September 16-18, 2019
Casualty Loss Reserve Seminar (CLRS) & Workshops
Fairmont Austin
Austin, TX

COMINGS AND GOINGS

Manuel Almagro, FCAS, has been promoted to chief financial officer at IFG Companies. Almagro has been the chief actuary at IFG Companies since 2000, with previous leadership positions at the Travelers Insurance Companies and Towers Watson.

Andrew K. Kempen, FCAS, has been promoted to the position of chief actuary at IFG Companies, taking on Almagro's previous post. Kempen has been IFG's chief pricing actuary since 2015. Prior to joining IFG, Kempen served in a number of actuarial roles, including positions at Milliman and ING.

Wei Xie, FCAS, has been appointed vice president of pricing and actuarial services at American Integrity Insurance Company. During the course of his career, Xie has managed teams in reserving, pricing and predictive analytics.

Rob Sanders, FCAS, has joined Compton & Wendler in the position of valuation analyst. Before his new post, Sanders was responsible for valuation research, cost and pricing trend analysis, financial forecasting and audit support for companies including Capital Group, Allianz and GEICO.

Rick Gorvett, FCAS, has accepted the position of professor and chair in the department of mathematics at Bryant University, in Smithfield, Rhode Island. Gorvett has served as staff actuary at the Casualty Actuarial Society since 2016 and, prior to that, he was the director of the actuarial science program at the University of Illinois at Urbana-Champaign.

Claudine Modlin, FCAS, is the new head of strategic planning & competitive intelligence at Farmers Insurance. Modlin leaves Willis Towers Watson as their director of insurance consulting.

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

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.*

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

Ronald A. Dahlquist (FCAS 1980)
1951-2018

Gerald R. Hartman (FCAS 1969)
1933-2018

Martin M. "Marty" Simmons (ACAS 1971)
1942-2018

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.

Groundbreaker

Frank Harwayne (FCAS 1950)
1920-2016

In 2014 Frank Harwayne was the second oldest CAS member, but advanced years and infirmity could not keep him from celebrating. He attended the CAS Centennial Gala in New York City as a special guest and wrote for the CAS Centennial history book. Harwayne decided to be an actuary while serving in the U.S. Signal Corps during World War II. He had been quite impressed by the CAS membership list that his wife, Ruth, sent him while he was in the Philippines. He earned his ACAS in 1949 and was hired by the National Bureau of Casualty and Surety Underwriters. He next worked for the New York State Insurance Department as chief actuary, setting rates for auto insurance, a booming product during the 1950s. His work differentiating rates between urban and rural owners was groundbreaking, with many states basing their insurance policies on it. At NCCI he created its first-ever research division. He also taught at the City College of New York, Pace College and the College of Insurance. He and Ruth Harwayne were married for 71 years. She died in September 2015 and he the following August. He is survived by four children, five grandchildren and seven great-grandchildren.

Paving the Way for Others

Erica Purwati Partosoedarso (ACAS 1996)
1963-2015

Erica Partosoedarso was born in Madison, Wisconsin, where her parents were Ph.D. scholarship students at the University of Wisconsin. Because of this experience, her father was determined that his children study abroad. Not knowing anyone, Partosoedarso left her home in Indonesia to attend the University of Adelaide in South Australia, a move that was very isolating at first to the reluctant trailblazer. Over time she made friends and established herself, thus preparing the way for her siblings to attend school. After earning a BSc in mathematics, Partosoedarso obtained an MA in mathematics at the University of Indiana in Bloomington in 1986. Her younger sister, Elita, spoke of Partosoedarso's generosity and commitment to education. Partosoedarso provided education funding for her younger siblings' children and, before she died, established an educational fund in Indonesia with her mother. In the spirit of Partosoedarso's "pay-it-forward" philosophy, the fund stipulates that each scholarship winner sponsor two other scholars to go to university. Two people have since graduated using the fund. Partosoedarso is survived by her mother, her siblings and their spouses and children. She was preceded in death by her father. Her husband, Michael Lomax, FIA, died in the attacks on the World Trade Center in 2001.

Auto Safety Advocate

John "Jack" Simmons Trees (ACAS 1966)
1932-2016

Jack Trees died June 4, 2016, at the age of 84. He was born in Evanston, Illinois, grew up in Glencoe and was a 1954 graduate of DePauw University. Trees served as a first lieutenant in the Strategic Air Command of the United States Air Force from 1954 to 1957. Trees next took a position at Allstate Insurance Company, the organization that would become his home. He retired from the company as a group vice president. Trees became deeply involved in automobile safety, an interest that would lead him to government service. From 1972-1990, Trees was the director of the Highway Loss Data Institute in Washington. President Jimmy Carter appointed him to the National Highway Safety Advisory Commission in 1978. He also served on the Insurance Institute for Highway Safety (1987-1990) and Advocates for Auto and Highway Safety (1989-1990). Trees also volunteered within his community, serving as a member of Illinois's Lake Bluff Board of Appeals from 1971-1978 and the Lake Bluff School Board from 1964-1971. He is survived by his wife of more than 60 years, Dianne; children, Julie (J.D.) Watumull, Michael Trees, and Nancy Vogt; his sister, Joanne (Phillip) Davis; his grandchildren and great-grandchildren; and many nieces and nephews.

Track-and-Field Letterman

Kenneth L. Leonard Jr. (FCAS 2007)
1971-2016

Kenneth Lee Leonard Jr., 45, of Normal, Illinois, died October 7, 2016, surrounded by family. Leonard was born May 9, 1971, in Park Ridge, Illinois, to Kenneth and Barbara Hans Leonard Sr. He married his college sweetheart, Lana Waynette Davis, on November 6, 1993. Leonard graduated in 1989 from James B. Conant High School in Hoffman Estates, Illinois. He graduated from Illinois State University in 1993, earning a BS in mathematics with an emphasis in actuarial science. At Illinois State, Leonard was a four-year track-and-field letterman and competed in the decathlon. He was Missouri Valley Conference Champion in the decathlon in 1991 and runner-up in 1992 and 1993. Leonard worked at Willis Towers Watson as a senior consultant and he was a consulting actuary for 18 years, thoroughly enjoying his work. Leonard was a faithful member Calvary Baptist Church for the last 20 years. He is survived by his wife; daughters, Machayla Ann and Mackenzie Lee; brothers, James (Sandra) Leonard and Joseph (Shannon) Leonard; sister, Michele Leonard Volo; grandmother, Elizabeth Hans; in-laws, Gordon and Ruth Ann Davis; sister-in-law, Dawn (Sam) Major; and many nieces, nephews, aunts, uncles, cousins and friends.

The Promising Student

Bernard H. Battaglin (ACAS 1970)
1933-2016

Bernard "Bernie" Battaglin died July 16, 2016, at the age of 83. The son of first-generation Italian-Americans, the Chicago native graduated from Fenger Academy High School in 1950 as a member and an officer of the National Honor Society. Battaglin was such a good student that he was one of only two recipients of a four-year Fire Protection and Safety Engineering Scholarship to the Illinois Institute of Technology in Chicago. The Western Actuarial Bureau sponsored the scholarship awards.
He also won a $100 scholarship to the college of his choice from the Chicago area Junior League through the Horace Mann Foundation. He earned a bachelor's degree from the Illinois Institute

of Technology in January 1955. Battaglin became an ACAS in 1970 while working as an assistant manager for the Fire Insurance Research and Actuarial Association, located in Lower Manhattan. In the 1970s, Battaglin was working for ISO in New York and was part of an ISO group that developed simplified policies that were easier to read and understand. He was featured in an October 1975 *Chicago Daily News* article, "Easier-to-Read Insurance Policies May Become Insurer's Policy." He is survived by his wife, Jeannette.

The Linksman

Jerry A. Hillhouse (FCAS 1966)
1934-2017

Jerry A. Hillhouse of Bloomington, Illinois, died July 8, 2017. Born in 1934 in Marionville, Missouri, the son of John Allen and Pearle Catherine Butler Hillhouse, he married Mary Ellen Verfurth in Billings, Montana in 1957. Hillhouse earned a BS in mathematics from Southwest Missouri State, where he was a member of Tau Kappa Epsilon as well as Kappa Mu Epsilon, an honorary mathematics fraternity. A member of the Air Force ROTC, he was named in "Outstanding Young Men of America" in 1970. He worked at State Farm Insurance Company for 35 years as an actuary, retiring in 1992. He was a member of the Academy, the Midwestern Actuarial Forum and the Insurance Institute of America. Hillhouse enjoyed spending his time with his family, especially his grandchildren and great-granddaughter. He liked travel, golf and sports, and was a charter member of Crestwicke Country Club and a member of the McLean County Senior Golf Association. His community interests included the Knights of Columbus in Normal and the Central Illinois Mended Hearts Association. He is survived by his wife, three children, a sister, eight grandchildren, one great-granddaughter and his nieces and nephews.

Bridge Champ and Teacher

James Robert "Jim" Nikstad (FCAS 1983)
1949-2017

Community and education advocate, Jim Nikstad died July 7, 2017, at his home in Wausau, Wisconsin, surrounded by his devoted family. Nikstad was born in Superior, Wisconsin, the third of eight children, and grew up on the family farm. He earned a bachelor's degree in mathematics and a minor in physics from the University of Wisconsin-Superior and after served in the U.S. Army (1972-1974). He married Emalyn Tucker in 1976, the same year that he received a master's in statistics from Marquette University. Nikstad was a fervent duplicate bridge player, becoming a Life Master with 1,225 master points and the Wisconsin Upper Michigan Bridge Association player of the year in his division four years running (2013-2016). Wherever he traveled, be it South Texas, Alaska or Edinburgh, Scotland, he and his wife would find a bridge game. In their retirement, the couple taught bridge lessons and shared their love of the game with many students, making many friends along the way. Nikstad is survived by his wife, three children, three grandchildren, his siblings and their spouses, four aunts, one uncle, his in-laws and many nieces, nephews and cousins. He was preceded in death by his parents, a brother and sister, and his father-in-law.

Resort-Town Citizen

Howard R. Hardy (FCAS 1974)
1941-2016

Howard Rogers Hardy, 74, of Wolfeboro, New Hampshire, lost his battle with ALS on January 28, 2016. He was born to Henry W. and Eleanor R. Hardy, and grew up in Cape Elizabeth, Maine. Hardy graduated from Phillips Academy Andover in 1960 and The College of William and Mary in 1964. He was married to Karen (Kean) Hardy for 49 years. He joined the Travelers Insurance Companies in 1965 and became an actuary and senior vice president until he retired in 2004. He and his wife lived in Wethersfield, New Hampshire, where they raised their children. He served on the CAS Examination Committee from 1974 to 1976. He retired to the lake town Wolfeboro, the "oldest summer resort in America," and was very involved in the community. He was a member of the First Congregational Church and the Lions Club, and helped organize the Great Waters Music Festival. He served on the Wolfeboro Town Budget Committee and as a trustee of the Town Trust Funds. Hardy is survived by his wife; children, Jennifer (Brad) Backer, Kimberly Baylis, and Roger (Patricia) Hardy; brother, Henry W. Hardy; and four grandchildren. The family requested memorial donations to ALS research.

TWENTY-FIVE YEARS AGO IN THE *AR* BY WALT WRIGHT

Academy Debuts Practice Notes

The November 1993 AR *ran a brief announcement that signaled the beginning of casualty practice notes. The first practice note, "Statement of Actuarial Opinion on Loss and Loss Adjustment Expense Reserves," has been updated and revised annually, and it continues to serve as an important reference for any member providing an actuarial opinion on loss reserves.*

Casualty Practice Council to issue practice notes

WASHINGTON, D.C. — In recognition of casualty actuaries' need for guidance on current actuarial practices that are the subject of a standard of practice or compliance guideline, the Casualty Practice Council (CPC) of the American Academy of Actuaries (AAA) has announced plans to issue practice notes.

The first practice notes will be on the Statement of Actuarial Opinion on Loss and Loss Adjustment Expense Reserves. This information is expected to be released shortly and will be mailed to all casualty actuary members of the AAA for use in year-end preparations.

Practice notes are intended to supplement the available actuarial literature where the areas of practice addressed are subject to emerging technology or recently adopted external requirements. They are not interpretations of standards, nor do they convey generally accepted actuarial practices in the same sense that standards of practice do. Actuaries are not in any way bound to follow practice notes.

Walter Wright, FCAS, retired as a principal from Oliver Wyman in 2008. He has volunteered for Actuarial Review *since 1993 and served as* AR *editor in chief from 1998 to 2002.*

CAS Snapshot

The CAS in Singapore
Speakers and attendees network over drinks during the Singapore Actuarial Society 10th General Insurance Conference, held May 31 through June 1 at the Sofitel Singapore City Centre. Seventy-five conference attendees were Singapore locals and came from Malaysia, Thailand, Hong Kong and Australia. The CAS was an organizer and exhibitor for the event. Speakers from the CAS include Nathaniel Loughin, ACAS; Han Chen, ACAS; Shaun Wang, FCAS; Suh Sin Moo, FCAS; Hussain Ahmad, FCAS.

CAS STAFF SPOTLIGHT

Meet Cecily Marx, Webmaster and Online Services Coordinator

Cecily Marx

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

- **What do you do at the CAS?**
  I'm the webmaster and work on the CAS suite of eight websites, keeping them up to date by making required improvements and implementing changes. I also run the Career Center and help with IT things when needed.
- **What do you enjoy most about your job?**
  I enjoy working with the other staff and building out sections of the websites. I just like building websites.
- **What's your hometown?**
  Mequon-Thiensville, Wisconsin, about 25 miles north of Milwaukee on Lake Michigan.
- **Where'd you go to college and what's your degree?**
  My undergraduate degree is from the University of Wisconsin–Stout: a BFA in art concentrating in graphic design, with honors.
  I went to graduate school in Scotland at Edinburgh Napier University. I earned an MSc in applied multimedia technology, which focused on usability and accessibility of websites for dyslexics.
- **What was your first job out of college?**
  I worked as a web developer at General Dynamics on a contract for the Federal Energy Regulatory Commission. We did an extensive usability study in my time there. Towards the end of the eight-month contract, I did some work on one of their publications, working in QuarkXPress and helping their in-house graphic designer.
- **Describe yourself in three words.**
  Tenacious, independent and reliable.
- **What's your favorite weekend activity?**
  I have a variety of interests but I enjoy quilting, cross-stitch, needlepoint and traveling.
- **What's your favorite travel destination?**
  It's a toss-up among Edinburgh, Prague and Barbados. I've traveled extensively so it's hard to pick one.
- **Name one interesting or fun fact about you.**
  It took 24 years for me to be diagnosed as dyslexic. I was diagnosed when I was living in Scotland during graduate school. Dyslexia is still a misunderstood learning disability, but I found that Scotland had more resources available and a better understanding of it compared to my experiences in the U.S.

DOWNTIME BY LAURIE MCCLELLAN

Travels with Buchanan and August

"What's wrong?" That was John Buchanan's question when the pilot of the six-seater airplane in Botswana suddenly zoomed upward, just as she was about to land on an airstrip in the forest. "Giraffes on the runway!" the pilot shouted. "And that's when I *knew* I was in Africa," Buchanan says.

As an actuary, Buchanan serves as the managing principal of excess and reinsurance at Verisk/ISO in Jersey City, New Jersey. But in his downtime, Buchanan recently combined his love of travel and a passion for dance to create a completely new job title: indie filmmaker. A short film he shot while vacationing in Cuba was accepted into the prestigious Cinema New York City Film Festival last year, beating out some 30,000 other entries from professionals. How did he do it?

Buchanan's interest in film developed almost by accident. Since 2012, he's been traveling the world with partner Gail August, a linguistics teacher who says she "leads a double life as a college professor and a belly dancer." Together, the couple has explored Morocco, Spain, Patagonia, Zimbabwe and the Galapagos. And on each trip, August has packed a few of her belly dancing costumes. "The costumes always produce a Pied Piper effect," Buchanan explains, "bringing a trail of interested children who follow us along." The dancing helps them connect to people wherever they travel, and behind the camera, Buchanan films it all for the home movies he puts together after each trip.

The colorful costumes, complete with veils and silk wings, attract attention from adults as well. On a cruise ship off the coast of Ecuador, Gail was dancing at the bow of the boat, "going for the shot from *Titanic*," says Buchanan, when the captain of the ship called for them to come to his deck. They sheepishly complied — expecting to hear that they'd broken a rule — when the captain reached for his guitar and began serenading them, wanting to join in the performance. It was just the kind of spontaneous, unexpected encounter they hoped for.

Film poster for Cuba: People to People — Roses, Cars, & Wings.

Buchanan enjoyed posting his travel movies on YouTube for family, friends and his actuarial colleagues to share. "Sometimes they'd get picked up by a fair number of people," he says. "I'd end up getting a thousand hits or so." He and August were thinking about visiting Cuba when, on November 25, 2016, the news came that Fidel Castro had died. Afraid that tourism would soon be curtailed, Buchanan says, "We booked our tickets that night." The couple decided to travel on an educational exchange called People to People that connects visitors to ordinary Cubans, outside the world of tourism. Because of their focus on education —

John Buchanan (standing, wearing a white hat) and his partner, Gail August (left of Buchanan) with other contestants at a World Salsa Summit.

Buchanan tries to get kids interested in math and science via STEM projects — they arranged to meet teachers and professors as part of the trip.

In January 2017, the two arrived in Havana to find a city pulsing with music. Buchanan filmed people dancing in restaurants and bands playing on the street. They rode in a taxi so dilapidated that it no longer had door handles inside the car. Instead, the driver had to open their door from the outside to let them out. "Because of the sanctions, they just can't get parts for the cars," Buchanan explains. The island's past was as ubiquitous as its music. "Sixty years of history pervades the Cuba we visited," says Buchanan. "On every street corner, there is a story or an artifact from the Cuban Revolution."

That history came in handy when Buchanan was able to rent a classic convertible painted canary yellow, said to be originally owned by American gangster Meyer Lansky, for an impromptu film shoot. August cruised around town, perched on the back of the car and dressed in a bright blue costume, turning heads as she waved her silk wings at the passing cars. Other classic rides from the 1940s drove up to exchange greetings, including a flamingo-pink convertible decked out with fins and chrome. As always, Buchanan took pictures and video with a simple hand-held camera. "Gail is the star!" he says. "I'm just the actuary behind the camera."

Describing the process of filming, Buchanan says, "We didn't really go with any kind of preconceived plan. All I knew was, we'd dedicate a couple days to just taking her out somewhere, and putting her in the middle of a group of people." One day, August suggested visiting a public square in Havana to dance. "Within five minutes," Buchanan says, "a group of kids came up, and they just sat down in front of her, as if she was a kind of paid performer." Soon, August was handing the children props and teaching them how to dance.

Later when he viewed the footage from the square, Buchanan realized they had something special. "It wasn't until we came back home and started putting the pieces together that we saw there was a story there," he says. "The movie just grew and flowered on its own … as we began to analyze and organize our materials, a story naturally evolved."

Buchanan started putting the film together on his iPad, using iMovie software. He combined still photos, video footage and music that seemed to capture the mood of each section, which grew to include classic cars, the Cuban missile crisis, the Cuban revolution and the country's future. But the heart of the film turned out to be the video of August in the Plaza de la Catedral, linking the differences of language, country and culture by teaching a group of kids how to dance. Buchanan, who honed his musical tastes as a college DJ, chose Louis Armstrong, Chuck Berry, the Beatles and John Lennon for the soundtrack.

"Sixty years of history pervades the Cuba we visited," says Buchanan. "On every street corner, there is a story or an artifact from the Cuban Revolution."

The finished film, titled *Cuba People to People — Roses, Cars, & Wings*, might have been just another home movie destined for YouTube. Then August showed the film to a friend who happens to be a film professor. According to Buchanan, "He said, 'This is pretty good, why don't you make these few adjustments and submit it to film festivals?' So I submitted it to two or three festivals, but I didn't give it much of a chance." One of those was the 2017 Cinema New York City Film Festival. "Looking at the website," recalls Buchanan, "I saw there were about 30,000 films that were submitted to the festival every year, and I thought, there's no chance that this is going to win. About a month later, I got a

Team Colombia meets Team USA at the 2016 World Salsa Summit in Miami. Gail August and John Buchanan are the couple on the right, representing the U.S.

notice the film was one of 400 that were accepted to go into the next round ... then it was accepted into the actual film festival of about 100 films."

He and August got to watch their home movie screen at the festival, along with the professional efforts produced by large casts and crews. Says Buchanan, "Gail and I would sit next to each other and poke each other, and ask, "Why is our film in this? It just looks like a home movie." Later, they had the opportunity to ask a few judges that exact question. Along with liking the grass roots, indie feel of the film, "They said it was really different, in that it had this hopeful message of 'why can't we just get along?'" says Buchanan.

On the surface, directing a movie might seem completely different from Buchanan's day job as an actuary, but he believes creativity and problem-solving drive both kinds of work. "When you get beyond a spreadsheet, math is creative," says Buchanan. "I've always tried to figure out what's something that's going to work — that nobody's ever thought about before?"

He also credits his math skills for his success in a completely different creative venture: learning to salsa dance. Between trips, he says, August convinced him to take salsa classes. "She said, 'You'll like salsa because it's very mathematical.' I was really bad at it. I was quitting every two weeks. She kept on dragging me back to class, and eventually I got it." Since then, Buchanan has competed at the World Salsa Summit in Miami, where he's won numerous bronze and silver medals, but says he's "still waiting on that elusive gold." He's even performed salsa dances during the halftime show at Madison Square Garden.

The unexpected success of the movie reminds Buchanan of an idea he's tried to instill in his children. "I've always told my kids that if you don't do something, there's only one thing that's going to happen: That's nothing. If you do something, there are only two things that might happen: either something or nothing. So you might as well do something and see what happens."

The film has been shown in five festivals to date, and Buchanan is still submitting it to a contest or two each month. He's currently waiting to hear back from festivals in Madrid and Berlin. If the film gets accepted overseas, Buchanan and August are thinking about using it as a springboard to their next adventure. "We'll plan the next trip, and the next filming opportunity, around wherever it may get accepted," he says.

Laurie McClellan is a freelance writer and photographer living in Arlington, Virginia. She is on the faculty of Johns Hopkins University, where she teaches in the M.A. in Science Writing program.

You don't need to travel to New York or Berlin to see *Cuba People to People — Roses, Cars, & Wings*. Check out the movie on Vimeo at vimeo.com/231243903. Buchanan's earlier travel films, including *Africa Trek*, *Penguin Trek* and *Galapagos Trek*, can be found at vimeo.com/album/5323032.


CAS
ANNUAL
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CAS Receives Industry Awards for Marketing and Communications

The Casualty Actuarial Society has won three coveted EXCEL Awards for exemplary marketing and communications work over the past year for a special issue of the CAS *Future Fellows* newsletter, a social media campaign for the 2017 CAS Annual Meeting and an advertisement about CAS diversity efforts. The EXCEL Awards, hosted by Association Media & Publishing, recognizes excellence in nonprofit association marketing and communications. Winners of the highly competitive contest, which received over 800 entries this year, were honored at the EXCEL Awards Gala on June 25 in Washington, D.C.

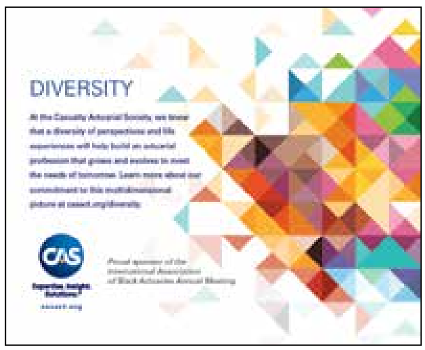
The complete listing of awards includes:

- **A bronze award in the category of "Editorial Excellence (Print)" for CAS *Future Fellows* newsletter.** *Future Fellows*, the CAS's quarterly newsletter dedicated to providing

information and resources to CAS candidates, was recognized for its December 2017 newsletter, an issue reporting solely on the transition to Technology-Based Examination.

- **A bronze award in the category of Social Media Campaign (Event/Convention) for the 2017 CAS Annual Meeting.** The #CASAnnual campaign was executed on a variety of social media platforms before, during and after the meeting last November. The campaign includes elements such as a social media toolkit for speakers, a daily Twitter contest for attendees and a custom Snapchat filter.

- **A silver award in the category of "Advertisement Single Piece" for the CAS Diversity ad.** This advertisement was featured in the program guide at the International Association of Black Actuaries (IABA) 2017 Annual Meeting. The graphic reflects the CAS's ongoing commitment to supporting and promoting diversity in the actuarial profession as well as its proud sponsorship of IABA.



Staffers show off awards that the CAS received at the Association Media & Publishing EXCEL Awards Gala on June 25. Left to right, are Jessica Whelan, public relations coordinator; Mike Boa, chief communications officer; Kate Niswander, marketing and communications manager; and Elizabeth Smith, publications manager.

Association Media & Publishing will showcase EXCEL Award winners in the August/September issue of its *Signature* magazine.

Thank You to 2017-2018 Society Partners

The CAS appreciates the support of the 2017-2018 Society Partners.

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Meet the Winners of the 2018 CAS University Award Program

BY TAMAR GERTNER, CAS UNIVERSITY ENGAGEMENT MANAGER

The Casualty Actuarial Society has selected three universities to receive the 2018 CAS University Award, a prize created to recognize schools doing exemplary work in preparing students for careers in the property-casualty insurance industry.

The 2018 CAS University Award Program winners were determined by a panel of judges from companies across the P&C insurance industry. The three winning schools each receive a $5,000 monetary award to further enhance their programs, and they will be recognized at the 2018 CAS Annual Meeting, taking place November 11-14, 2018, in Las Vegas, Nevada.

Meet the 2018 CAS University Award Winners and learn about the ways they are exposing their students to the P&C insurance industry!

Actuarial program students of the Arizona State University.

Arizona State University

Arizona State University (ASU) has a robust actuarial science program, led by Actuarial Science Program Coordinator Dr. Jelena Milovanovic, ACIA, AIAA. The program has five actuarial faculty members and just more than 100 actuarial students. ASU's program is recognized for its focus on P&C insurance within its curriculum; highlights include courses on P&C ratemaking and reserving, an introduction to P&C insurance course and actuarial models, the latter of which is taught by a casualty actuary and based on P&C examples and data. ASU also provides students with extensive, real-world P&C industry experiences through its annual P&C case competitions, chances to attend and present at regional and national P&C conferences, and internship and research opportunities made available through ASU's partnerships with local P&C companies. ASU fully leverages the P&C industry resources that the CAS makes available, including the CAS University Liaisons, Student Central and Academic Central Programs, and CAS committee participation.

Renmin University of China

Paving the way for students to pursue the P&C actuarial career path, Professors Shengwang Meng and Xiaojun Wang lead the nine actuarial faculty members and 110 actuarial students making up Renmin University of China's actuarial science program. In addition to covering basic technical courses, the program has a strong and responsive curriculum incorporating mentorships with P&C professionals and mandatory student internships. Renmin's actuarial science program emphasizes programming languages, soft skills and emerging issues, such as telematics and machine learning. Members of Renmin's faculty have written seven textbooks on P&C concepts that are used in the university's P&C-specific courses. The university is also recognized for wide-ranging research that has been published in international journals on P&C topics such as telematics, as well as for its abundant research connections to government organizations, insurance

Actuarial program students from Renmin University of China.

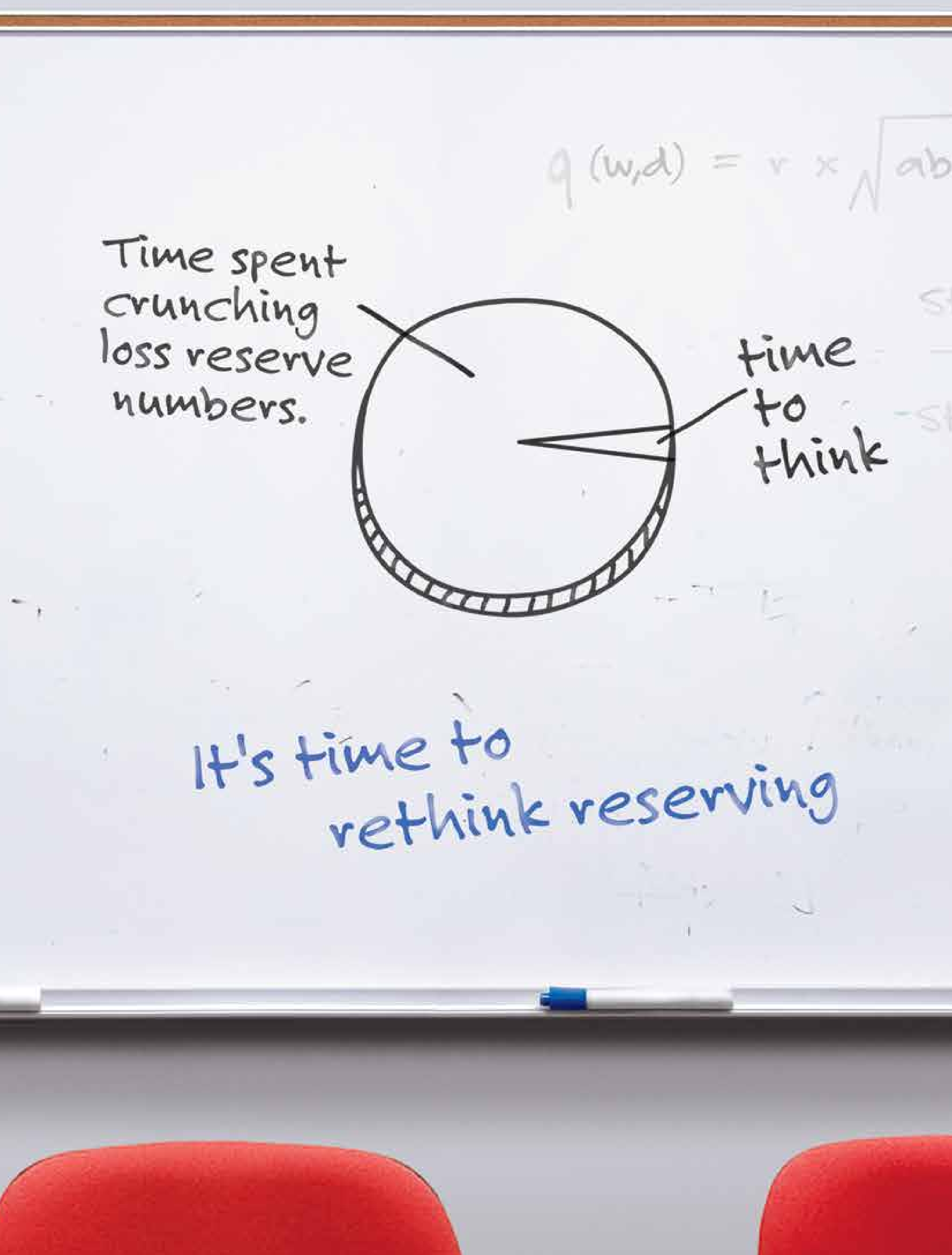
institutions and private companies in the P&C industry.

The University of Texas at Austin

Eight actuarial faculty members and 280 actuarial students make up The University of Texas at Austin (UT Austin) actuarial science program, which is led by Actuarial Program Director Dr. Mark Maxwell, ASA, and Actuarial Program Assistant Director Alisa Walch, FCAS. UT Austin has developed a solid curriculum to help students understand and learn about the P&C field. The topics covered in the courses are relevant to the P&C industry and to CAS-specific exam material, such as Exams MAS-I and MAS-II. UT Austin also exposes students to real-world actuarial insurance problems through its "P&C Case Studies" course. This course helps students prepare for their first jobs, as it challenges their actuarial skills while strengthening their presentation, project management and communication abilities. In addition to having impressive connections to the P&C industry, UT Austin hosts case competitions and engages with the CAS through multiple channels, including University Liaisons, Academic and Student Central Programs, and committee volunteer opportunities.

The University of Texas at Austin
Actuarial Science
College of Natural Sciences

University of Texas at Austin actuarial program students.


Time spent crunching loss reserve numbers.
time to think
It's time to rethink reserving

University Engagement Committee Programs Work for the Future

BY ERIN OLSON AND TOM WHITCOMB, UEC VICE CHAIR AND CHAIR

What is the CAS doing to promote the property-casualty actuarial career to university students and professors in actuarial science departments? As leaders of the CAS University Engagement Committee (UEC), we get this question often. Our answer? A lot! Our committee has 60 volunteers spread across six working groups that are executing on a variety of initiatives to fulfill our university engagement strategy. Read on to learn more!

University Liaison Thomas Lapinski, FCAS, (center) manned the CAS booth at an October 2017 career fair at the University of Michigan in Ann Arbor. Pictured with Lapinski are (left) Roger Natarajan, Ph.D., FSA, Michigan's actuarial program director and (right) CAS Student Ambassador Bryce Peterson.

University Liaisons

Nearly 20 years ago the CAS introduced the University Liaison (UL) Program to facilitate the partnership between the academic community and the actuarial profession. Today this program connects more than 300 member volunteers with universities to provide ongoing support and guidance and to share the latest CAS resources and information. We won't delve too much into this program, since UL Program Chair Jaris Wicklund wrote an in-depth article in the last issue of *Actuarial Review*. With all of the new programs and resources you will learn about in this article, University Liaisons continue to be essential to the work of the committee, as these volunteers bring all of our information and materials to the attention of the universities.

CAS Student Central

Four years ago, the CAS launched a free student membership program called CAS Student Central, with the goal of helping actuarial students make the successful transition from the classroom to a career as a property-casualty actuary. Today the program boasts 7,000 members from over 500 schools. The program was released with an accompanying website, CASstudentcentral.org, which houses its exclusive member resources like the CAS Curriculum Guide. We will be unveiling a redesigned website this fall semester, which we are excited to share with our student members!

Since 2014 the CAS Student Central program has not only grown in membership, but also in the number and types of benefits offered to students. Thanks to partners like The Infinite Actuary and Gross Consulting, we have been able to offer membership benefits like access to free practice exams on probability and financial mathematics, and predictive modeling software with accompanying training videos.

We have a library of eight webinar recordings, taken from CAS webinars held throughout the year, that focus on student-specific topics such as "Predictive Analytics and Your Actuarial Career," "Excel and R for Actuaries" and "Landing Your First Actuarial Job." We also host five CAS Student Programs that are held in conjunction with CAS meetings and seminars. These programs include activities like speed networking, profes-

CAS Student Central presents at the Midwest Actuarial Student Conference in September 2017.

sional headshots and mock interviews as well as deep-dive discussions into the P&C topics that align with each CAS seminar (ratemaking, reserving and reinsurance.)

Participants in the CAS Student Program held during the 2017 CAS Spring Meeting in Toronto.

Student Ambassadors

In 2015 we created the CAS Student Ambassadors Program to cultivate student leaders among the thousands of students who have signed up for CAS Student Central. Currently running at 18 universities, this program matches students with their CAS University Liaisons to champion the CAS and the P&C actuarial profession to their classmates. CAS Student Ambassadors plan actuarial club presentations and networking sessions as well as career panels with P&C industry professionals. Student Ambassadors also provide the UEC with valuable feedback on the benefits we offer through Student Central.

In November 2018, the CAS will be running its first-ever conference exclusively for CAS Student Ambassadors in conjunction with the CAS Annual Meeting. We are looking forward to having these student leaders together in one place to learn from each other, network with CAS members, and gain more insights into our industry to bring back to their universities.

CAS Academic Central and Resources

Actuarial science program professors are essential to the development of a successful pipeline of P&C actuaries. Recognizing this, the UEC has expanded the resources and benefits it provides to academics. Through our free membership program, CAS Academic Central, professors gain access to a number of P&C resources and professional development opportunities. These include free and unlimited CAS webinar registrations and complimentary attendance at up to three in-person CAS meetings and seminars annually.

We provide a robust set of P&C materials for the classroom, including five case study toolkits containing facilitator guides, presentations, data and problem sets. Academic Central members also have access to the CAS Property and Casualty Resource Library, which educators can use the library to develop university-level courses. The Library is built around three syllabi for courses on reserving, ratemaking and a combination of the two, and it is made up of supporting course materials consisting of articles, texts and other resources — all hand-selected by UEC.

The CAS also offers support to academics pursuing CAS credentials, including exam fee reimbursements for full-time professors who pass CAS exams, CAS Online Courses and the Course on Professionalism. Additionally, academics who attain a CAS designation receive grants from the CAS in the amount of $7,500 for Fellowship and $5,000 for Associateship.

CAS Case Competitions

In recent years, case competitions have grown in popularity among actuarial science program administrators and employers, who recognize them as practical, real-world tools for developing critical thinking and presenting skills. In 2016 the UEC began developing its own case competition toolkits, each one complete with a P&C case study, introductory presentation, data workbook, judge rubric and grading sheet. To date, the UEC has released three competition topics (warranties, workers' compensa-

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University Engagement

from page 27

tion reserving and auto safety features) and an Excel and data visualization case will be released fall 2018. Canada's Actuarial Students National Association (ASNA) have used by the CAS toolkits twice for its annual convention competition, and they will be incorporating our new case at the 2019 ASNA Convention Case Competition. Additionally, Arizona State University, The University of Texas at Austin, UCLA and the University of Nebraska-Lincoln have all run case competitions with our materials. In spring 2018, the University of Minnesota incorporated the case competition materials into a spring semester capstone course.

CAS University Award

The UEC introduced the CAS University Award Program in 2016 to recognize universities doing exemplary work to prepare their students for careers in the P&C insurance industry. We were inspired to create this award after hearing several exciting examples of how universities were engaging with the P&C industry and incorporating P&C topics into their curricula and research. The University Award's goals are to celebrate the winning schools' achievements and to promote idea sharing within the academic community.

Now in its third year, the program has recognized 10 universities: Illinois State University, University of California, Santa Barbara, University of Connecticut and University of Illinois at Urbana-Champaign in 2016; Ball State University, St. John's University and the University of Wisconsin-Madison in 2017; and Arizona State University, Renmin University of China and The University of Texas at Austin in 2018.

CAS University Award winners are determined by a panel of judges from companies across the P&C insurance industry. The winning schools each receive a $5,000 award to further enhance their programs, are recognized at the CAS Annual Meeting and are invited to present an Annual Meeting session. For the last three years, CAS University Award winners have also presented at the Actuarial Research Conference to fulfill the goal of sharing ideas.

CAS Chief Communications Officer Mike Boa (background) talks with some prospective future actuaries at the 2017 Leadership Symposium of Gamma Sigma Iota, an international business fraternity for students of insurance, risk management and actuarial science.

CAS Trust Scholarship

The CAS Trust Scholarship was created to further students' interest in the P&C actuarial profession and encourage the pursuit of CAS designations. Since 2002, 47 students have been awarded the scholarship. The award is funded by the CAS Trust and is extremely competitive, requiring an essay, two recommendation letters and a transcript. Beginning in 2014, the CAS has awarded up to three scholarships, one for $10,000 and two for $5,000, and scholarship recipients have been invited to the CAS Annual Meeting.

Get Involved

The University Engagement Committee is always looking for new ways to expand our outreach to schools big and small. It is an incredibly fulfilling job to help schools improve their actuarial programs and students discover this exciting career path. If you would like to become a University Liaison or get involved with the UEC, please contact Tamar Gertner (tgertner@casact.org).

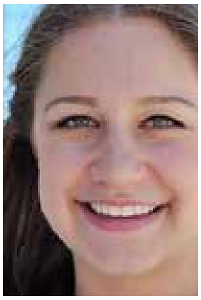
Erin Olson, FCAS, is state management director for USAA in San Antonio, Texas. Tom Whitcomb, FCAS, a senior actuary with Travelers in Hartford, Connecticut.

Get to Know the CAS Trust Scholarship Winners

The CAS Trust Scholarship Committee is pleased to announce this year's winners of the CAS Trust Scholarship: Ann Pogrebitskiy, Kristen Marshall and Adam Lathan.

Ann Pogrebitskiy, a junior at The University of Nebraska–Lincoln, double majoring in actuarial science and finance, and minoring in computer science, mathematics, and statistics, is this year's recipient of the $10,000 CAS Trust Scholarship.

"I am incredibly honored to be selected as one of the scholarship recipients this year," she said. Pogrebitskiy is currently interning at Cigna, within the Group Healthcare Expense Pricing sector. Her internship allows her to analyze expense allocation factors to determine how expenses are included in group case premiums, as well as to communicate with various matrix partners in order to learn how financial reporting currently allocates expenses. "Becoming an actuary is no easy feat, but having the support of an organization like the CAS simplifies the process and makes a complicated career path understandable. I have worked very hard to get to where I am today, and this award means that I am heading in the right direction. I hope that winning this award inspires other young aspiring actuaries to take the chances they think are impossible."

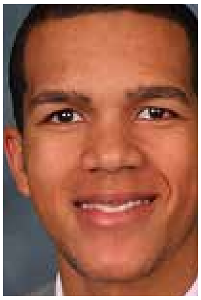


Ann Pogrebitskiy

Kristen Marshall, a senior at Illinois State University working towards a major in actuarial science and a minor in risk management and insurance, has been awarded a $5,000 CAS Trust Scholarship. "As an aspiring Fellow of the Casualty Actuarial Society, I am truly honored to be chosen as one of the recipients of the prestigious CAS Trust Scholarship. I am blown away by the generous support from the industry through scholarships, internships, and conferences that foster the next generation of leaders," Marshall said. During her senior year, Marshall will serve as co-president of the Actuarial Club and treasurer of Christian Business Leaders. Throughout the remainder of her college career, she will continue to gain experience through her internship at Pinnacle Actuarial Resources, where she has accepted a full-time offer after graduation. "I look forward to the opportunity to meet actuaries from across the nation at the Annual Meeting in the fall. For my senior year at Illinois State University, I am excited to help improve participation in the Actuarial Club and to pay it forward by taking the time to help younger students find their way in the competitive field of actuarial science. Finally, I would like to thank my family, co-workers, professors, and classmates who supported me in pursuing my passion."

Kristen Marshall

Adam Lathan is an actuarial science, data analytics and information systems major, and a rising junior at Drake University. He has been awarded a $5,000 CAS Trust Scholarship. "I am incredibly honored to be selected as one of the scholarship recipients this year," Lathan said. Lathan recently completed an actuarial internship at the Iowa Farm Bureau, where he contributed to the creation of automated reporting tools to be used across multiple departments, as well as working on automation, reducing runtime by over 50 percent, or roughly 20 hours. Prior to his internship at the Farm Bureau, Lathan worked as a project associate at Bridge Solutions, studying historical pricing methods for microinsurance products, among other tasks. "Receiving this scholarship helps me with more than just paying for school — it gives me the confidence of knowing that there is a wealth of support and resources for aspiring actuaries like myself."



Adam Lathan

To learn more about the CAS Trust Scholarship, and to apply for next year, be on the lookout for the 2018-2019 announcement and application in fall 2018.

EXPANSIVE VariancE

By ANNMARIE GEDDES BARIBEAU

Amid profitability and growth potential, cyber insurers are facing new risk exposures — and not just from hackers.

Warren Buffett, chairman of Berkshire Hathaway, Inc., keeps cyber insurance to a minimum in his company's book of business. "I don't think we or anybody else really knows what they're doing when writing cyber [insurance]," Buffett said during the company's annual meeting in May.[1] He forecasts that every year offers a two percent chance of a super catastrophe costing $400 billion or more in insured losses, and cyberrisk is a contributing factor to this estimate.

While cyberrisk and the possibility of a "cybergeddon" always loom large among insurers and their policyholders, carriers are facing growing exposures beyond criminal activity.

Evan Greenberg, the CEO of Chubb Ltd., sees cyber insurance quite differently.[2] Last year, his company surpassed American Insurance Group, Inc., in overall direct written premium to become the nation's largest writer of cyber insurance.[3]

For the estimated 170 insurers that offer cyber insurance, accepting the risk has generally appeared worthwhile. "Cyber insurance, to date, has been reasonably profitable," says Gerry Glombicki, a cyber insurance analyst with Fitch Ratings. Further, in 2017, direct written premium and policy counts grew, while loss expenses and premium prices declined.

While cyberrisk and the possibility of a "cybergeddon" always loom large among insurers and their policyholders, carriers are facing growing exposures beyond criminal activity. These include the growth of "silent" cyberrisk affecting traditional insurers, inadequately priced contingent business interruption (BI) coverage, and new laws and regulations. At the same time, there are more tools available than ever to help insurers with everything from underwriting to aggregation modeling.

The Market

Cyber stand-alone and package direct written premiums combined rose 37 percent to $1.9 billion from 2016 to 2017, according to "U.S. Cyber Insurance Market Share and Performance," released by Fitch Ratings in May 2018. The report is based on the 2017 data reported to the National Association of Insurance Commissioners (NAIC) in the "Cybersecurity and Identity Theft Insurance Coverage" supplement to the Annual Statement.

The cyber insurance line was also quite profitable in 2017. Aon Benfield (Aon) estimates the combined ratio at 61.4 percent, with a direct incurred industry loss ratio of 32.4 percent and an expense ratio of 29.0 percent, according to its July 2018 report, "US Cyber Market Update."

Despite its current profitability, cyber insurance requires

[1] https://www.bloomberg.com/news/articles/2018-05-05/buffett-cautious-on-cyber-insurance-because-no-one-knows-risks
[2] https://www.bloomberg.com/news/articles/2018-06-07/buffett-s-wrong-on-cyber-insurance-risk-chubb-s-greenberg-says
[3] https://www.intelligentinsurer.com/news/chubb-overtakes-aig-xl-in-cyber-exposure-15384

a cautious approach, warns Alex Krutov, president of Navigation Advisors, LLC. "Cyberrisk has a significant catastrophic component that may not yet have shown itself, making cyber insurance appear more profitable than it actually is," he observes.

For now, the results are favorable. Also, using the NAIC supplement, Aon reports declines in frequency and severity from 2016 to 2017. The major cause of the loss ratio decline was a 37.6 percent drop in claim severity, according to the brokerage firm, which calculates the cost per claim as having fallen from $90,865 in 2016 to $56,688 in 2017. Jon Laux, Aon's head of cyber analytics, says that there are a couple ways to consider claims frequency. When looking at raw numbers, insurers collectively saw total claim counts rise 55 percent to 9,224 in 2017, up from 5,952 in 2016. However, because insurers' total number of policies went up 67 percent to 3.46 million in 2017 from 2.07 million the prior year, insurers saw their frequency rate decline by 7.4 percent on a per policy basis.

There was also an 18.3 percent drop in premium per policy from 2016 to 2017, Aon reports, noting that the decrease was not due to rate changes but to outsized growth in package cyber policies, which generally cater to small businesses and have lower average premiums.

Meanwhile, the nation's largest cyber insurers, ranked by direct market share, are Chubb Limited (17 percent), American International Group, Inc. (12 percent), and XL Group Ltd. (10 percent), Fitch reports. A.M. Best's May 2018 report, "Cyber Insurance Market Sees Steady Growth but Still Awaiting a Real Growth Spurt," indicates a similar ranking, though stand-alone and packaged policies are developing differently. (See "Stand-alone vs. Packaged Cyber Coverage.")

Headline-making cyberattacks reveal how criminal behavior and attack targets are changing, driving customers to seek more expansive coverage. The WannaCry ransomware attack shut down about 400,000 computers worldwide last year … The NotPetya attack … led to significant losses for … Merck & Co. and FedEx.

Risky Business

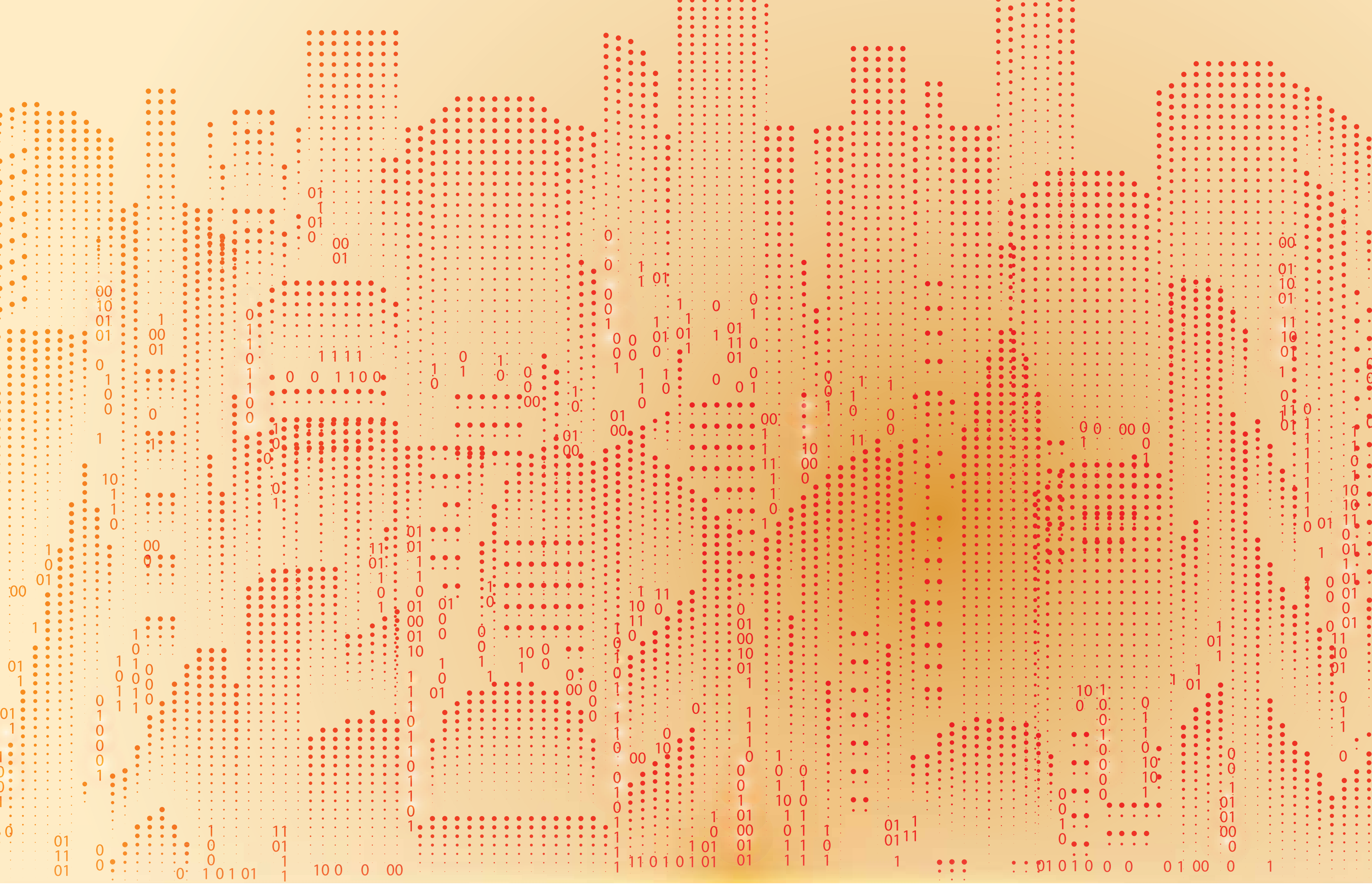
Cyber insurance grows and develops in a continual state of flux. "Cyberrisk is not only growing in magnitude but is changing and evolving, and these changes shift risk exposures and create new ones," says Krutov, who started the Casualty Actuarial Society's Cyber Risk Task Force four years ago.

The longstanding cyberrisk is still quite disconcerting as well. "The old risks do not necessarily go away, but they might be shifting in terms of prominence," says Ben Goodman, president of 4A Security & Compliance, which offers a cyber analytics platform and cyberrisk management services to insurance carriers and their customers.

And of course, there are the new risks. Headline-making cyberattacks reveal how criminal behavior and attack targets are changing, driving customers to seek more expansive coverage. The WannaCry ransomware attack shut down about 400,000 computers worldwide last year, affecting the operations of hospitals, auto manufacturers, government agencies and other organizations around the world.[4] The NotPetya attack, designed to disrupt business operations in the Ukraine, led to significant losses for Fortune 100 companies Merck & Co. and FedEx.[5]

Criminals and their wares are getting smarter, even deploying artificial intelligence to evade detection. "This year, cryptojacking, or secretly installing cryptocurrency mining software on people's computers, has become a popular way for criminals to make money, effectively stealing your com-

[4] https://www.straitstimes.com/world/organisations-hit-by-global-cyberattack
[5] https://www.insurancebusinessmag.com/us/news/cyber/cyber-exposures-lead-to-magnified-risk-for-fortune-500-companies-104172.aspx
[6] https://info.vectra.ai/hubfs/Vectra-Hidden-Tunnels-Report-052418.pdf
[7] https://www.businesswire.com/news/home/20180322005344/en/CyberCube-Analytics-Emerges-Stealth-Mode-Providing-Inside-Out
[8] https://www.symantec.com/content/dam/symantec/docs/reports/istr-23-2018-en.pdf page 5



puter processing power and electricity," Goodman says.

The perpetrators of last year's Equifax breach carefully bypassed cybersecurity defenses, invaded a single webserver, accessed the company's network and created hidden command-and-control tunnels to retrieve the personal data of 145 million Americans, according to a study by Vectra called, "Could an Equifax-sized data breach happen again?" Despite impressive efforts to protect the data, the breach lasted 78 days, the June study reports.[6]

Attack vulnerability is also on the rise. For example, internet of things applications and gadgets are vulnerable to intrusion at each point of connection, says Pascal Millaire, CEO of CyberCube, a cyberrisk analytics firm that deploys Symantec data for insurance applications.[7]

Attacks against internet of things devices rose 600 percent from 2016 to 2017, according to Symantec's "Internet Security Threat Report" released in March.[8] "We are really only just beginning to see the losses, damages and risks from what we are incorporating in our lives, especially with the emergence of the internet of things," Millaire observes.

Mobile apps that control internet of things mechanisms do not always use security measures or provide encrypted firmware updates, he explains. "There is a rush to market, but security is an afterthought."

Other Exposures

Insurers are also facing other growing exposures. "Silent" cyberrisk affects traditional insurance lines not designed to cover cyber losses. Like cyber coverage in general, silent cyberrisk has a lot to do with the specific language of individual policies and how they are interpreted. "It is a much bigger concern to many insurers than the risk on their stand-alone cyber portfolio," Laux says.

Insurance professionals believe the potential impact is becoming a growing issue, according to a survey by Willis Re. For property coverage, about half of the 750 industry practitioners surveyed last year anticipate one cyber loss or fewer for every 100 non-cyber losses in 2018, according to its report, "Silent Cyber Risk Outlook," released in September 2017. For example, more than 75 percent of those representing auto liability and workers' compensation estimated silent cyber claims at a rate of one or fewer per hundred.

The degree of perceived risk also varied greatly among industries. For liability coverage, the top three industry categories with the estimated likelihood of 50 percent or more additional claims were information technology (IT)/utilities/telecom, financial services and retail/hospitality. For property coverage, financial services and IT/utilities/telecom also topped the list, followed by hospitals/medical facilities/life

Stand-alone vs. Packaged Cyber Coverage

Since stand-alone and package policies approach covering cyber incidents differently, their individual growth and development differ.

Stand-alone polices increased by about eight percent to $992 million in direct written premium (DWP) between 2016 and 2017, with 103,212 policies in force in 2017, according to "U.S. Cyber Insurance Market Share and Performance," released by Fitch Ratings in May. The report is based on the National Association of Insurance Commissioners' (NAIC) "Cybersecurity and Identity Theft Insurance Coverage Supplement" for 2017.

Meanwhile, the loss ratio for stand-alone policies declined to 35 percent in 2017, down from 43 percent the prior year, Fitch reports. In its July report, "US Cyber Market Update," Aon Benfield estimates a 35.4 percent loss ratio based on NAIC figures and a 27.1 percent expense ratio to reach a combined ratio of 62.5 percent for the stand-alone segment of cyber insurance.

Using NAIC figures, A.M. Best notes that stand-alone claims represented 43.7 percent of all cyber claims in 2017 in its report "Cyber Insurance Market Sees Steady Growth but Still Awaiting a Real Growth Spurt," released in May. The average closed claim with payment, including defense and cost containment, was $188,525 for stand-alone polices with 28.4 percent of closed claims receiving payment, according to the A.M. Best report.

Package policies tell a different story. The expansion of cyber package sales, which increased by 99 percent in 2017 to $864 million direct written premium, drives the overall growth in cyber insurance, Fitch reports. There were approximately 3.3 million package cyber policies in force in 2017, up from 2 million the year before, according to Fitch.

However, A.M. Best counts an increase from 1.9 million policies in 2016 to 2.5 million in 2017, noting that many insurers have expanded their commercial package policies (CPPs) and business owners policies (BOPs) by adding cyber endorsements. Further, about half of those package policies do not feature occurrence triggers. Both Fitch and A.M. Best caution that the actual number of policies could be lower due to reporting differences by insurers.

A.M. Best also notes a 32 percent decline in stand-alone policies. Among other potential reasons, the decline is likely because cyber endorsements for CPPs and BOPs are less expensive than stand-alone policies, which contain more definitive coverage language.

Aon calculates direct incurred losses at 28.8 percent of premium and adds in an expense ratio of 31.5 percent to reach an estimated combined ratio of 60.3 percent for package coverages. Claim information for package policies was not specified in the NAIC supplement.

sciences.

Accounting for the cyber peril in traditional policies is not a mere bookkeeping issue. If the loss ratio for a book of property coverage was 60 percent excluding cyber losses, but silent cyber losses followed the same severity distribution, the exposure could raise the loss ratio to between 60.6 percent and 64.6 percent, according to the report, depending on the assumptions used to make inferences from survey responses. These responses, however, predate WannaCry, NotPetya and other attacks, which could change participant perceptions. A new report is expected for release in September 2018.

Another burgeoning source of exposure is the rising popularity of contingent BI insurance, which covers losses when network-dependent operations stop due to cyberattacks. "What concerns me is we are not seeing insurers pricing for cyber business interruption coverage when they are issuing policies," Laux says.

Of course, offering new coverage and hedging bets on pricing adequacy is nothing new. Cyber insurance's growth and development has depended on insurers' agility to respond quickly to market demands. Not surprisingly, actuaries express concern when the sale happens before they can reasonably price it.

In the case of contingent BI, however, charging little or no premium for additional coverage arguably makes being competitive a higher priority than collecting enough money for potential losses. Contingent BI has the potential to be a major exposure for insurers and the insurance industry as a whole if a cyberattack causes massive business shutdowns on a large scale.

Just consider the headline-making incidents that stopped multibillion-dollar, household-name companies in their tracks. Customer demand for contingent BI coverage, Goodman says, reached a tipping point after the 2016 cyberattack on Dyn, the internet domain name system provider. The attack effectively knocked hundreds of top websites off the internet, including major news organizations such as CNN and Fox News and e-commerce sites and website-dependent companies such as Amazon, Twitter, Yelp and Zillow. "It was also yet another example of hidden cyber aggregation risk, where a single point of failure could potentially generate losses across multiple insureds," he adds.

And catastrophic risk, Millaire says, is "the thing that is most concerning to our clients."

Incidences that have already taken place provide clues into what could occur, Millaire explains. "What we have seen is really a precursor to cat losses that will originate from a single point of failure, and some losses to date have really started to prove that."

Better Solutions

Cyber insurers are discovering and applying tools to anticipate risk potential by capturing cybersecurity and other client data at both the policyholder and aggregated portfolio levels. The approach is gaining ground because past claim data has limited value for pricing cyber insurance.

Originally developed for cybersecurity professionals, cybersecurity scores rate a company's security posture using a variety of metrics, such as promptness of patching software applications and whether the company's leaked credentials are for sale on the dark web, Laux explains. "Together, these metrics provide a snapshot of the company's cyberhygiene, and unlike the typical insurer's underwriting application, these ratings are updated on an ongoing basis throughout the year," he adds.

"There's no question that the market for cyberrisk quantification is growing," says Goodman, who assembled a catalog of the tools for the CAS Cyberrisk Task Force and a global cyberrisk quantification network at the World Economic Forum.

Several vendors are marketing cybersecurity or risk scores to insurers. And like in any emerging market, it can be difficult to distinguish whether a tool is unique or if the vendors employ different terms to describe similar wares or approaches. BitSight Technologies has been offering cybersecurity scores for years. Envelop Risk offers a score to identify cyberrisk by policyholder and industry sector, and SecurityScorecard, chosen by AXA Partners, will help the insurer set premiums. Besides Ben Goodman's and Pascal Millaire's companies, FICO, AIR Worldwide and others are also in the mix.

The scores can help with the underwriting and risk selection process in multiple ways and across entire portfolios. Besides providing extra insight beyond policy forms and interviews for the underwriting process, some security or risk scoring services allow an insurer to identify noninvasively which specific policyholders use a particular cloud server and to monitor their exposure to potential aggregations, Laux says. For example, because so many businesses are cloud-dependent for their operations, cyber insurers are particularly concerned by the risk of a prolonged outage with a major cloud service provider. "Using this information, modeling companies can then go a step further to estimate the potential damages to these policyholders from a cloud outage," he says.

Laux observes that insurers also are realizing that gauging a company's cybersecurity health should go beyond renewal time. He adds that some insurers are deploying security or risk scoring tools that monitor every 24 hours because it "informs

[9] "Today's State of Vulnerability Response: Patch Work Demands Attention," April 2018. https://www.servicenow.com/company/media/press-room/servicenow-research-uncovers-security-patching-paradox.html

a continuously changing picture of the security health of the company."

This daily monitoring also reveals the cadence of how quickly a company installs security patches, one key indicator of a company's cybersecurity commitment, he says. Laux cites a Ponemon Institute survey that reveals 57 percent of breaches are due to unpatched but known vulnerabilities.[9]

Laux also cautions that cybersecurity scores are not a panacea. Detectors can miss so-called zero-day bugs, which have no patch when first discovered. Additionally, cyber security or risk scores are more difficult to obtain for small businesses, which may not have a significant web presence. That's a key issue since industry observers see the greatest market growth among small- to medium-sized companies.

Beyond risk scores, some vendors offer to quantify and predict risk potential of a cybergeddon. Incidences that have already taken place provide clues into what could occur, Millaire explains. "What we have seen is really a precursor to cat losses that will originate from a single point of failure, and some losses to date have really started to prove that," he says, adding that CyberCube has identified more than 1,000 such potential points that could lead to catastrophic cyber events.

Such past events, he offers, include attacks on cloud, email, web and domain name service providers, as well as on content management, payroll and marketing automation systems. The true costs of these attacks include many difficult-to-measure factors that add up quickly. "For Merck, as an example, the NotPetya attack amounted to lost time and losses that could exceed one billion dollars," Millaire says.

"Cyber aggregation models are like hurricane models, which require exposures, hazards and vulnerabilities," says Laux. The hazards continue to change, "but exposure and vul-

Laws, Regulations to Affect Cyber Insurance

New laws and regulations will widen the expanse of insurer exposure to liability, experts say.

The European Union's (EU) General Data Protection Regulation (GDPR), which became effective in May 2018, will affect insurers in multiple ways, sources say. "Cyber has been the Wild West for 15 to 20 years, and now Europe is the unexplored frontier again with this new regulation," says Keith Daniels, JD, CIPP/U.S., who helped Lloyds of London develop its first cyber liability insurance policy nearly 20 years ago.

"Any resident of the EU can bring an action if they feel the company has not been properly dealing with their data," says Daniels, and this can have an impact on U.S. companies. He and others believe it likely that customers will want additional cyber coverage to handle the greater liability potential from GDPR.

On the first day of GDPR enforcement, Facebook and Google were hit with lawsuits accusing the companies of coercing users into sharing personal data. The lawsuits seek to fine Facebook and Google 3.9 billion and 3.7 billion euro, respectively, which totals about $8.8 billion.[10]

New GDPR-related liability exposure is already showing itself. In Europe, there are now pending class-action-type lawsuits, and attorneys are running advertisements to collect names of potential victims, which is unusual in an otherwise non-litigious culture, Daniels explains.

GDPR also affects the underwriting process. This can be great for risk managers and actuaries hungry for more customer-specific information, but cumbersome for underwriters. Daniels says that insurers will need to develop new policy forms and application questions to ensure their policyholders are complying with GDPR to limit exposure potential.

GDPR has many requirements, and it is estimated that as many as 50 percent of companies in Europe were not GDPR-compliant as of the May 25 effective date. "The ability to be perfectly compliant as well remains questionable," says Daniels, "especially for companies [that] maintain personal data on multiple systems, which may not be able to effectively communicate with each other." One difficulty for some companies is the requirement to notify regulators of a known breach within 72 hours.

[10] https://www.theverge.com/2018/5/25/17393766/facebook-google-gdpr-lawsuit-max-schrems-europe

nerability are things we can generally get our arms around," he says, explaining that the most commonly exploited software vulnerabilities are more than 10 years old.

Krutov says many insurers remain justifiably cautious about using cybersecurity or risk-scoring tools in both pricing and enterprise risk management. "The catastrophic risk component of cyber insurance portfolios can be nondiversifiable in traditional ways and, to the degree possible, actuaries should explicitly consider it in their analysis," he observes. While acknowledging their potential usefulness, Krutov believes the existing risk scoring tools do not solve the difficulty actuaries still have with proper risk-based pricing or cyberrisk aggregation management.

Conclusion

The main constant in cyberrisk and insurance is change. The cyber insurance market continues to grow along with new risks, vulnerabilities and exposures. As a line that appears to be profitable, the competition for business is stiff. This not only pressures insurers to charge lower prices, but also to offer coverage, such as contingent BI, at little or no cost.

As lawmakers and regulators institute measures to protect consumer data privacy, insurers will feel the effect. Moreover, while cybersecurity tools are becoming more sophisticated, cybercriminals are exploiting artificial intelligence and other means to evade detection.

Glombicki of Fitch Ratings sums up understanding cyberrisk and insurance quite well: "The biggest thing that I have learned is it is a big market and nobody knows everything and, if they do, they are not saying it."

To manage risk potential, Daniels sees EU residents and regulators looking for gaps or noncompliance in areas such as:

- Anonymizing collected data to protect privacy.
- Safely handling data transfer across borders.
- Requiring certain companies to appoint a data protection officer to oversee GDPR compliance.

State Developments

State legislative initiatives are also moving toward greater protection of personal data, explains Alex Hageli, director of personal lines policy for the Property Casualty Insurers Association of America (PCI).

Approved by Gov. Jerry Brown in June, the California Consumer Privacy Act of 2018, like GDPR, further restricts how organizations can use consumer data and authorizes regulators to fine those that do not comply.[11] There is some concern that insurers might be called upon to help pay fines for noncompliance, Hageli says. Not surprisingly, pushback on the new law is expected long before its effective date of January 1, 2020.[12]

"GDPR and the California initiative are changing the game," Hageli observes, explaining that consumer control of data could potentially fundamentally impact how he feels companies like Facebook and Google make their billions of dollars: the unrestricted ability to collect as much consumer information as possible and monetize it.

"Other companies within the insurance ecosystem operate the same business model as do Facebook and Google," Hageli says. "Credit reporting agencies operate in much the same way, as do certain insurance support organizations. These new laws have the potential to disrupt the underpinnings of that ecosystem," he warns.

Hageli explains that other state laws are also broadening the definition of personal data to items such as user names and passwords, which increases the touch points for a breach notification. Connecticut is the first state to mandate that cyber-breached companies provide credit monitoring or identity theft protection to state residents who may be affected. Hageli says Pennsylvania and other states are considering whether to follow suit.

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[11] https://www.itgovernanceusa.com/blog/californias-gdpr-like-privacy-law-passes-what-you-need-to-know/
[12] https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB375

Reserving Research Hall of Fame Announces New Class of Inductees

BY JULIE LEDERER

An ultimate loss method and an *E-Forum* paper will be inducted into the Reserving Research Hall of Fame (RRHOF) at the 2018 Casualty Loss Reserve Seminar in September.

The inductees are:

- **Hans Bühlmann and James N. Stanard for their work in developing the Stanard-Bühlmann/Cape Cod method.**
- **"On the Accuracy of Loss Reserving Methodology,"** written by Tapio N. Boles and Andrew Jon Staudt and published in *Casualty Actuarial Society E-Forum*, Fall 2010, Volume 1.

Two years ago, the CAS Reserves Committee established the Reserving Research Hall of Fame (RRHOF) to honor and draw attention to important reserving-related research. The inaugural RRHOF class, announced at the 2016 Casualty Loss Reserve Seminar, included papers by Thomas Mack, Ronald Bornhuetter and Ronald Ferguson, and James Berquist and Richard Sherman.

This spring, the CAS Reserves Committee announced five nominees for the second RRHOF class. CAS members and interested parties were invited — via Weekly Bulletin emails, Facebook posts, LinkedIn posts and tweets — to visit the RRHOF webpage and rank the nominees. The CAS Reserves Committee considered the voting results and the comments received when selecting the second class of inductees.

Bühlmann and Stanard independently derived the Stanard-Bühlmann/Cape Cod method. The Stanard-Bühlmann method is similar to the Bornhuetter-Ferguson method in that projected ultimate losses are split into two components: actual reported and expected unreported. The main difference between the two methods is in the selection of the initial expected loss ratio. While the selection of the ratio in the Bornhuetter-Ferguson method is often subjective and typically relies heavily on prior experience and judgment, the analogous parameter under the Stanard-Bühlmann method is calculated using the experience reported to date.

The Boles and Staudt paper evaluates the performance of various loss reserving methods and their associated parameterizations under a variety of environmental changes, such as inflation, changes in case reserve adequacy, and changes in claims settlement practices. The authors offer the reserving actuary a roadmap for selecting appropriate methodologies and parameterizations given the past, current and expected future environmental conditions affecting the reserving process.

The CAS Reserves Committee established the Reserving Research Hall of Fame to honor important reserve-related research. An ultimate loss method and an *E-Forum* paper will be inducted into the RRHOF at the 2018 CLRS.

RRHOF inductees can include papers, articles, presentations, models, an author's body of work, and other reserve-related research. The CAS Reserves Committee considers the following criteria when reviewing potential RRHOF nominees and inductees:

- Originality/value added.
- Wide applicability.
- Frequently referenced.
- Readability/user-friendliness.
- Test of time/staying power/lasting influence.

Nominees and inductees do not have to meet each of these criteria, but the list may serve as a helpful starting point for thinking about the impact a piece of research has had on reserving practice.

CAS members played an important role in the selection of the second class of inductees. Visit http://www.casact.org/area/reserve/index.cfm?fa=hall-of-fame to nominate a candidate for the third RRHOF class and provide feedback on the RRHOF. Here you'll also find information on the selection criteria and links to RRHOF inductee material. The CAS Reserves Committee plans to induct new members into the RRHOF every two to three years. ●

Julie Lederer, FCAS, MAAA, is a member of the CAS Reserves Committee and a copy editor for Actuarial Review. *She works for the Missouri Department of Insurance, Financial Institutions and Professional Registration.*

CAS Members and Banking — Yes, Our Skills are Portable

BY KEVIN BINGHAM AND AARON HALPERT, CAS INNOVATION COUNCIL CO-CHAIRS

As the market demand for sophisticated analytical skills grows, many of our CAS members are looking at new career opportunities both inside and outside of the insurance industry. One of the newer frontiers that has already shown promise for actuaries in other countries is the banking sector. Now may be the right time to leverage this opportunity in the U.S. as well.

In mid-July we were excited to host Scott Hallworth, FCAS, the chief data officer and chief model risk officer at Capital One, as a presenter in our CAS Actuarial Innovator Profile webinar series, sponsored by the CAS Innovation Council. Hallworth is a pioneer in applying the actuarial skill set to banking at one of the nation's largest banks. His presentation covered a number of important topics including the significance of data and advanced analytics in making decisions, Gartner's 2017 "Hype Cycle of Emerging Technologies" and bank regulation. He also recommended articles for actuaries interested in banking careers and shared real-life examples of different analytical capabilities that Capital One uses to tackle mission-critical issues.

From leveraging analytical techniques like optical character recognition, neural networks and natural language processing, to using programming languages like R, SAS, Python and Spark, Hallworth made clear that not only are math skills portable, but that this is truly an ideal time to bring our actuarial skill set and modeling capabilities to bear in the banking arena. He also pointed out how features in the banking industry (bank deposits, loss forecasts) can be modeled using time-tested approaches that actuaries have developed in the insurance industry (claim reserves, economic modeling).

This article will leverage Hallworth's presentation to highlight some key considerations for CAS members who want to learn more about opportunities to apply actuarial and analytical skills in banking.

Features in the banking industry (bank deposits, loss forecasts) can be modeled using time-tested approaches that actuaries have developed in the insurance industry (claim reserves, economic modeling).

People's Analytical Skills: A Company's Greatest Asset

For analytics to continue to evolve and advance in industries as fluid as banking and insurance, the skills and capabilities of people will form the backbone. Hallworth notes five areas that are critical for any organization to succeed when it comes to implementing models:

1. Core and deep understanding of the math behind the analysis.
2. Ability to work on a cross-functional and diverse team.
3. Problem-solving abilities.
4. Analytical abilities (statistical analysis, database programming).
5. Keen business sense and perspective.

A quick visit to The CAS Institute and the pathway to the Certified Specialist in Predictive Analytics (CSPA) credential shows the CAS commitment to developing these five areas. Through online courses and five assessments, which address areas such as data concepts and visualization, predictive modeling methods and techniques, and a case study project, the CAS is helping actuaries and data scientists advance their analytic capabilities.

Data: An Opportunity for Math Experts

Every day we leave behind data about how we drive, what we buy, what we eat, what we read, where we travel, how we bank, how we surf the web and more.

As actuaries (i.e., "math gurus"), our careers are focused on analyzing a plethora of internal and external data sources and using advanced analytics to tease out themes and trends from the data. Hallworth points out that there is a high degree of context and understanding needed to create useful features from the mountain of unstructured ("raw" text, voice and image) and structured (utilization, claims and mortgage applications) data. At the same time, the complexity and depth of knowledge required to leverage unstructured data is

There is a high degree of context and understanding needed to create useful features from the mountain of unstructured and structured data.

much deeper than the respective levels necessary for managing structured data. Fortunately, we actuaries work daily with data, which exposes us to text mining and fuzzy matching. We also perform such tasks as handling protected health information, standardizing database elements, de-duping raw data, capping outlier values, addressing missing values and adjusting for changes in variable definitions over time. These types of skills are in great demand and are just as transferable to banking as our math skills.

Model Risk Management in Banking

For any actuary looking to learn more about models in banking regulation, Hallworth recommends reading two documents issued by the U.S. federal government:

- SR 11-7 – Guidance on Model Risk Management from the Board of Governors of the Federal Reserve System.[1]
- OCC Bulletin 2011-12 – Supervisory Guidance on Model Risk Management from the Office of the Comptroller of the Currency (OCC).[2]

At a high level, the documents define expectations for model management, covering topics such as risk,

[1] https://www.federalreserve.gov/supervisionreg/srletters/sr1107.htm
[2] https://www.occ.treas.gov/news-issuances/bulletins/2011/bulletin-2011-12a.pdf

Actuarial Science Moves into Banking

In November 2016, South African actuaries published the article "SA Formalise the Role of Actuaries in Banking." In it, the author shared that South Africa's banking industry employs more than 300 actuaries. Michael Tichareva, chair of the Actuarial Society of South Africa's (ASSA) Banking Committee, notes that employing actuaries in banking is a relatively new trend, sparked mainly by global regulatory reforms, such as Basel II and III, and changes in international accounting rules.

In November 2017, the International Actuarial Association Banking Working Group and ASSA held a seminar in Chicago called "The Actuary in Banking." The seminar included presentations by actuarial practitioners from South Africa, Canada and the United States, who covered topics such as the wide application of the actuarial toolbox to banking. These tools included modeling, setting assumptions, developing product cost and price, provisioning, and discerning relationships between assets and liabilities. The U.S. section focused on the opportunity facing CAS members arising from a new FASB accounting framework proposal for loan loss reserves and how our skill sets are well positioned to address the need. As current CAS President Brian Brown noted, the econometric variables underlying prepayment and foreclosure models (e.g., credit score, loan-to-value ratio, occupancy type, property type, loan term, etc.) and our actuarial skill sets are a perfect match.

development, implementation, use and validation as well as ongoing monitoring and the resulting model risk. These expectations pertain to not just the modelers within a bank, but also the engagement throughout (e.g., escalation of issues to ensure that they are well managed). As noted in OCC Bulletin 2011-12, rigorous model validation plays a critical role in model risk management; however, sound development, implementation and model use are also vital elements. With models affecting areas such as product cross-selling, customer screening and retention, collections and fraud prevention, model management is more important than ever as the data available for analysis continues to grow exponentially.

The March 2014 *Claims Magazine* cover story, "End-to-End Claims Analytics — An Equation for Financial Success," tells stories from the field about the roles data science, implementation, communication and technology play in deploying models. The end-to-end analytic journey is a familiar one to actuaries and includes the following:

1. Model deployment strategy.
2. Predictive model development.
3. Business and operational implementation.
4. Organization change management.
5. Performance management and loop-back improvement.

Our ability as actuaries to clearly articulate a model's purpose, validate the segmentation power of the model, develop a well-defined implementation plan and foster a strong sense of ownership with the end users plainly aligns with SR-11-7 and OCC Bulletin 2011-12.

Closing

As Tony Robbins writes in his book *Unlimited Power*, "I believe it's in your moments of decision that your destiny is shaped." Let's hope that the CAS decision to embrace creating opportunities in the banking industry will change the destiny of many future actuarial graduates who will one day call banking their home.

Kevin Bingham, ACAS, is managing director with Deloitte Consulting LLP in Hartford, Connecticut, and currently leads the company's medical professional liability practice. He has over 25 years' industry experience, including 20 in consulting, and has frequently written and presented on P&C industry trends. Aaron Halpert, ACAS, recently retired from KPMG's Actuarial Practice and is an active CAS volunteer, having served as chair for Long Range Planning, Risk Management and Leadership Development Committees.

If you are interested in helping the CAS develop a more formalized practice network in banking, please reach out to authors Aaron Halpert (ahalpert@amhadvisory.com) or Kevin Bingham (kbingham@deloitte.com). They are actively working with CAS Leadership to look at ways to expand opportunities for actuaries in the banking industry.

A Conversation with The CAS Institute

Cat Risk Management Credential Introduced; Updates on CSPA

Actuarial Review sat down with iCAS Director Amy Brener to learn about the latest credential offering from The CAS Institute.

***Actuarial Review*: So, what's new at The CAS Institute — or iCAS – these days?**

Amy Brener: The CAS Institute is ready to roll out its second credential, which is actually envisioned as a two-tier credential, in catastrophe risk management. The first tier will consist of four parts: ethics, insurance fundamentals for catastrophe risk, introduction to catastrophe modeling, and introduction to catastrophe risk management. The second tier will contain two additional modules: advanced construction of catastrophe models and advanced uses of models in catastrophe management. We're in the process of naming the credentials.

***AR*: What is the timeline for release of the exams?**

AB: For the ethics part we are beginning to make a list of existing ethics courses that will provide the required content; we do not plan to develop our own course at this time. The insurance fundamentals for catastrophe risk course will be a two-parter. The first half will consist of an online course and multiple-choice exam, administered for us by The Institutes, which also runs two of the courses for the Certified Specialist in Predictive Analytics credential. Part one will be available in the last quarter of 2018; the exam may be taken any time between October 15 and December 15 at a Prometric testing center.

The second half of the cat risk course is under development and will be more like a CAS exam in that we will produce a syllabus and reading list. The Institutes will develop a multiple-choice test for us, which we anticipate being available in January 2019, again given through Prometric.

The Introduction to Catastrophe Modeling course is currently under development. The course and exam are scheduled to be released in midspring/early summer 2019.

We are also just starting to develop the Introduction to Catastrophe Risk Management course and are putting together the exam committee for it.

***AR*: Who are the subject matter experts and where are they coming from?**

AB: As you know, we are working with the International Society of Catastrophe Managers on these credentials. What I love about our program is that it is platform-agnostic. Most of the major modeling vendors have their own certifications, but they are platform-specific. We are creating a credential that is independent of the model platforms. The major vendors are not only supporting our efforts, but representatives of AIR, RMS and Corelogic are all actively participating in the development of the credential.

***AR*: What's the status of the Certified Specialist in Predictive Analytics credential?**

AB: The first sitting of the third exam for the CSPA credential is scheduled for September 13, 2018. It is an examination that will be administered twice a year — once in September and once in the March/April timeframe. This exam sitting will use in-person proctors, although we intend to move to remote proctoring for the next sitting. Candidates will log into a platform provided by our vendor, TrueAbility, using their own computers.

Starting in October 2018, we will have two projects ready for the final phase of the program. Candidates will be assigned a case study project with a unique data set. They will have two months to work on the project in a secure environment. When candidates complete their projects, they will submit their output for a panel to review. If more work is needed, the candidates will be given another month for an additional charge to cover the cost of access to the secure environment. Candidates who can complete the entire project, including any rework needed, within two months will not incur any additional cost.

***AR*: How long is the case study project anticipated to take?**

AB: We are estimating the project to take between 20 and 40 hours total.

EXPLORATIONS BY DON MANGO

Actuarial Optimism about Insurtech

In a previous Explorations column (*AR* May/June 2018), we looked at threats to the actuarial profession from the wave of digital disruption. This column will discuss six reasons for actuarial optimism.

1. Advice in a Rip Current: Don't Panic

While writing this piece, I heard in the background another TV news report about a drowning from rip currents on the New Jersey shore. Every summer, many people tragically drown in rip currents. Per the NOAA instructional video:[1]

> Stay calm. It is not going to pull you under, just pull you out from shore.
>
> Don't swim against it; you'll only tire yourself out.
>
> Swim with it and move parallel to the current until you can get back to the regular breaking waves and ride them back in.

That is good advice for this digital disruption:

> Stay calm. This wave is not going to pull us under, just pull us farther from our comfort zone — disruption, not destruction.
>
> Don't swim against it; you'll only tire yourself out. Don't cling to outmoded approaches. Don't bet on regulation and opacity to save the day.
>
> Swim with it and move parallel to the current until you can get back to the regular breaking waves and take them back in. The regular breaking waves are: People need insurance, the insurance system mostly works well and actuaries are critical to the sound functioning of the insurance system.

We will be back where we started, just maybe farther down the beach. It may not look familiar and may take a while to get our bearings, but it's the same beach.

2. Guidance from Physics: Conservation Laws

Let's take a cue from physics and the conservation laws of energy and momentum. Remember, energy is neither created nor destroyed; it merely changes form. I humbly propose a "conservation law of risk" and a corollary, "resilience of actuarial value." By conservation of risk, I mean that most of the impact of this new technology will be to make it cheaper and easier to get to the same core risk decisions (Is the past representative of the future? Are future contingencies predictable?), which have not changed materially since the origins of insurance. Resilience of actuarial value means our expertise meaningfully impacts these decisions for the better; therefore, our role will probably not diminish, and may in fact grow in importance.

3. Disruption is the Way of Things

In his brilliant LinkedIn piece,[2] "The First Great Insurtech Disruption," Larry Marcus, FCAS, points out how disruptive catastrophe modeling has been to the industry when viewed over a 20-year time horizon. Catastrophe models have changed the entities that sell reinsurance (pension funds), the prices insurers pay for reinsurance (returns closer to fixed income than venture capital), how reinsurance decisions are made (using dynamic financial analysis models incorporating catastrophe model exceedance probability curves) and how insurers are evaluated by rating agencies and regulators. Lesson: Our industry does absorb change, but slowly. Slow change favors the incumbents.

4. Remember the Underlying Risk Processes?

Many academic actuarial papers discuss "underlying risk processes," whose financial impacts we observe as claims. These claims are an indirect, delayed product of those risk processes. We have built a substantial body of professional knowledge to model the financial consequences of changes to risk processes — all indirectly, after the fact, retrospectively. We have been operating from behind a screen.

With the evolution of sensor technology and the internet of things, we can observe the risk processes. This will

[1] https://oceantoday.noaa.gov/ripcurrent/
[2] https://www.linkedin.com/pulse/first-great-insuretech-disruption-lawrence-marcus-fcas-cfa/

allow us to follow the risk upstream to causal analytics. This is a promising new frontier for actuaries that I have dubbed "actuarial engineering." To capitalize on the opportunity will require us to expand our brand outside traditional employers. We must also be prepared to collaborate (and compete) with other risk analytics professionals, including the incumbent engineers.

5. Data Scientists Need Our Help

There is good news for the insurance industry and public: Data scientists are bringing fresh perspectives to our industry. New techniques of identifying, gathering, prepping, modeling, interpreting and presenting data are already benefitting all parts of the insurance value chain. Many large traditional employers of actuaries have voted with their wallets by setting up "analytics" units comprising both actuaries and data scientists. There is good news for actuaries: The data scientists need actuarial guidance and leadership. Insurance (really, financial services as a whole) is a promising playground for data people because there is so much data. But those who do not know their history are condemned to repeat it. And those who don't know the context and history of the industry cannot tell what data is worth analyzing. Actuaries can focus data science efforts on the problems worth tackling. We can also explain the current data sources and efforts made to date without stifling their exploration.

6. We Are Well Suited For Insurtech Advisory

Actuaries are perfectly positioned to serve as advisors to insurtech and innovation efforts. We have a broad understanding of all aspects of insurance company operations, have financial and quantitative skills, and tend to be well-versed in technical matters. I have developed a simple but effective heuristic for screening insurtech opportunities: target, tech and talent.

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Target: Are insurtech opportunities going after something worth changing — identifying the "should" from the "could?"

Tech: Are they using the best available tools and methods for data capture, analysis and insight delivery?

Talent: Have they amassed the right combination of technical, business and insurance expertise to successfully navigate the startup landscape? Our advisory expertise can help startups, accelerators, incumbent insurers and reinsurers, industry associations, system integrators, consultancies, investors and regulators.

Communicate

This column and the May/June 2018 Explorations are far from exhaustive in their treatments of both opportunities and threats. This digital hand of evolution has upended retail, media, livery, shipping, banking and manufacturing. One of our greatest strengths as a profession is the CAS community. By leveraging our sharing culture, we can keep each other apprised of threats and opportunities, as well as new avenues for us to deliver our expertise, insights and solutions. Share your ideas with the CAS leadership and keep the dialogue going.

IN MY OPINION BY GROVER EDIE

What is an Actuary?

When I meet someone for the first time, they often ask what I do for a living. When they find out I am an actuary, they often ask, "What is that?" I used to say, "We are mathematicians who work for insurance companies" or something like that, which usually prompts the person to either change the subject or look for someone else to talk with.

More recently I would say, "We convert data into information that is pertinent to an insurance company's operations, usually for pricing their products or for financial purposes." That got a similar result.

My new answer is, "Actuaries save lives and prevent injuries."

Really. We do.

If I said I saved lives as an emergency medical technician or firefighter, others would immediately understand. But how does a person in an office using a computer to crunch data prevent accidents, let alone save lives?

How actuaries save lives and prevent accidents requires some explanation. We do it by providing incentives for safer behaviors and actions. People and companies who perform riskier actions pay more for insurance than people and companies who perform safer actions. Perhaps some personal examples would help.

I drive on a lot of long trips. I am tempted to go 80 miles an hour, but I don't. We all know the math on how much time an additional 10 miles an hour can save on a 500-mile road trip. I can afford the cost of a speeding ticket, but I don't want to pay the extra cost of my insurance going up due to a few speeding tickets, so I slow down.

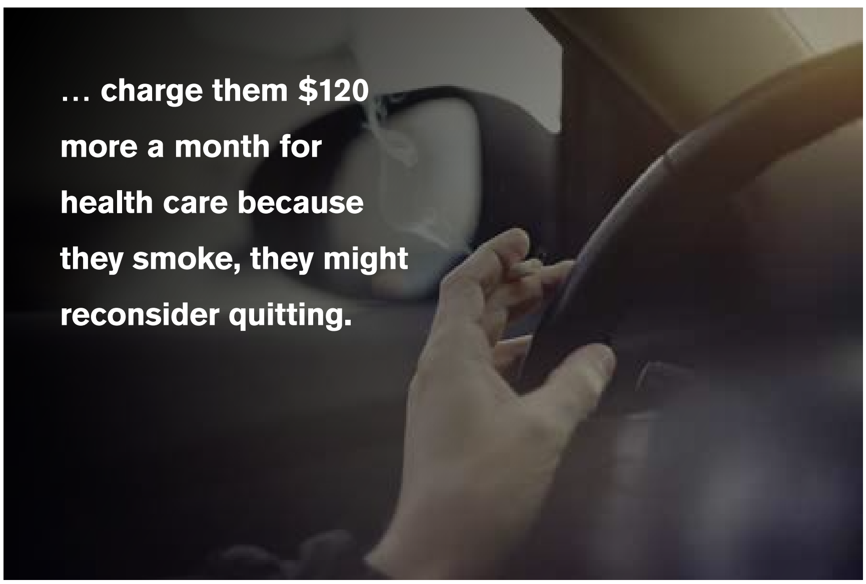
My insurance rates and its perceived increase modify my actions: I drive slower than I would otherwise like. In doing so, it also decreases the probability of my having an accident.

Money is a powerful motivator. Reflecting the riskiness of actions through the price of insurance is a big, albeit somewhat hidden, motivator for people to change behaviors. If people know that smoking will shorten their lives, they might or might not quit. But if you charge them $120 more a month for health care because they smoke, they might reconsider quitting.

Some of you may recall the discounts insurers offered in the past to non-smoking drivers and homeowners. I wasn't sure the discounts were warranted until a friend of mine and I were headed to lunch one day. While he was driving, he dropped his lit cigarette into his lap. I thought that he was about to lose control of the car! Fortunately, he recovered, but only after a harrowing few seconds of erratic driving.

I wonder how many accidents have happened because someone dropped their cell phone and were looking for it. It's a similar situation — distracted driving — but I would much rather have a cell phone in my lap than a lit cigarette.

In two ways, actuaries have already saved lives. First, we started estimating "safe driver" credits. This drove home the idea that, if you are a bad driver, you will pay more for insurance. Second, actuaries were some of the first to champion smoke detectors, lowering the insurance costs for those buildings where they were installed. We offered this discount long before building codes required smoke detectors. This gave homeowners and building owners powerful incentives to purchase and install



smoke detectors, saving countless lives.

Actuaries continue to save lives because we:

- Justify lowering insurance rates for businesses who protect their workers (workers' comp premiums), which ensures that the companies' goods and services are more cost effective than those who do not protect their workers.
- Recognize that drivers of high performance cars should pay more than the same drivers using more sedate vehicles.
- Determine the costs of various types of insurance, including fire, based on how well the community protects its citizens and properties through law enforcement and fire department response times and expertise.

No doubt, you can add one or two examples of your own where your daily work activities shape people's behaviors, and therefore save lives and prevent accidents.

Governments can pass laws and ordinances in attempts to protect its citizens and their property, but the violators are only punished (fined) when caught. Insurance applies cost differentials to all who purchase it and almost immediately punishes the insureds who exhibit unsafe practices.

Actuaries predict the final cost of insurance claims that might otherwise take years to know, thus decreasing the time needed to recognize the monetary cost of unsafe behaviors.

Catastrophe modelers encourage people to either not live in catastrophe-prone areas or pay the price. In some instances, buildings designed and built to withstand hurricanes in those zones save the lives of their occupants.

Self-insurance pricing and reserving provide much the same incentives as primary insurers, perhaps with even greater leverage.

Reinsurers also have a role to play. They hold primary companies to expected loss levels, so those companies can't escape the consequences of their actions, be it underwriting, pricing or demographics.

So, the next time someone asks, "What is an actuary?" I still plan to respond, "Actuaries save lives and prevent injuries." So far, it has been a rewarding discussion.

Congratulations and thanks to all of you who join me in the noble profession of saving lives and preventing accidents.

An aside: The next time you speak to a group of students, start off with that line and see if you get their attention better than, "We are mathematicians for insurance companies." I'd like to hear how it goes.

CAS Snapshot

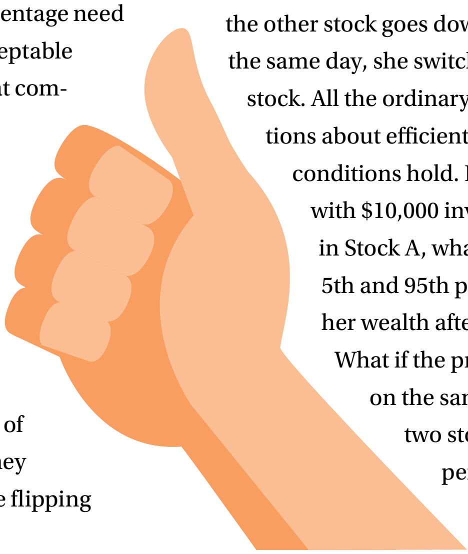
Current and former CAS presidents represent at ICA 2018 in Berlin. Pictured left to right are Bob Conger (elected 2001), Steve Lowe (elected 2015), current CAS President Brian Brown and Bob Miccolis (elected 2014).

A pioneer in data mining, Louise Francis, FCAS, chats with Peter Watson of SCOR at ICA 2018 in Berlin.

IT'S A PUZZLEMENT BY JON EVANS

Risk Appetites

Kim and Ann start with an equal amount of money, but they value money very differently. Kim acts to maximize the expected squared amount of her total wealth. For example, Kim is indifferent between a 100 percent chance of her wealth being $1 and a risk for her total wealth of a 75 percent chance of $0 and a 25 percent chance of $2. In contrast, Ann tries to maximize the expected square root of the amount of her wealth. For Ann, a 100 percent chance of $1 total wealth is the same as a risk for total wealth of a 75 percent chance of $0 and a 25 percent chance of $16. Kim and Ann can each choose a percentage, from 0 percent to 100 percent, of their initial wealth to gamble on a fair coin flip, with the winner claiming the total amount that both bet. The coin flip is voluntarily negotiated beforehand so that the percentage each of them bets — the percentage need not be equal — is acceptable to the other one. What combinations of betting fractions would be mutually acceptable to both of them? You might want to draw a graph. Do you have an opinion about what specific combination of betting percentage they might settle on before flipping the coin?



Day Trader

Martha only invests each day in either Stock A or Stock B, both having an even probability of closing +5 percent or -5 percent from the previous day. There are no sequential autocorrelations or sequential cross-correlations between the price changes. Whenever the stock Martha holds goes up +5 percent and the other stock goes down -5 percent on the same day, she switches to the other stock. All the ordinary basic assumptions about efficient transaction conditions hold. If Martha starts with $10,000 invested entirely in Stock A, what are the mean, 5th and 95th percentiles of her wealth after 1,000 days? What if the price changes on the same day for the two stocks have a +50 percent cross-correlation? What if the cross-correlation is -50 percent?

Here is a short and simple summary of the solution as suggested by Clive Keatinge. The value of the stock after 1,000 days of trading is the product of $10,000 and 1,000 independent random variables, each with an expected value of 1. Therefore, the expected value of the stock after 1,000 days of trading is $10,000. The number of up and down days follows a binomial distribution, which leads to a 5th percentile of $212 and a 95th percentile of $38,598. Same-day cross-correlations would not change the results.

Solutions were also submitted by Bob Conger, Kristen Fox-Neff, Eamonn Long and Jerry Miccolis.

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

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