SOCIETY OF ACTUARIES

ACTUARY OF THE FUTURE SECTION

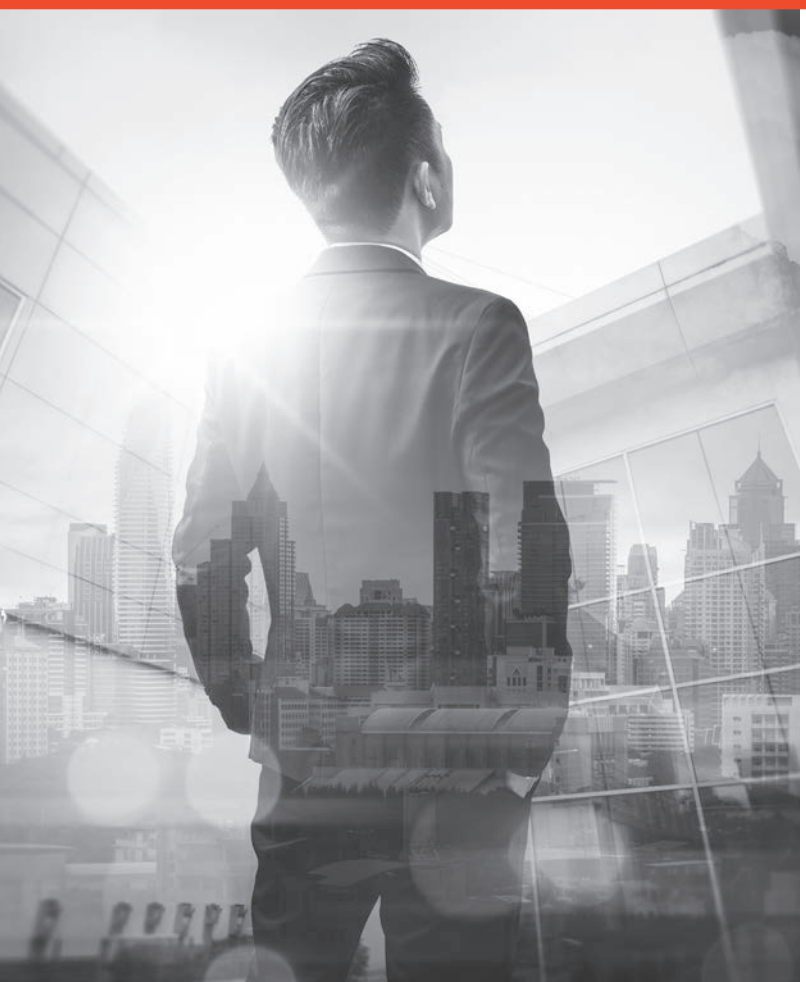
Actuary of the Future

ISSUE 43 • NOVEMBER 2018

A Short Introduction to Blockchain Technology

By Xiaochuan (Mark) Li

Page 12



Actuary of the Future

Issue 43 • November 2018

Published biannually by the Actuary of the Future Section of the Society of Actuaries.

475 N. Martingale Road, Suite 600
Schaumburg, Ill 60173-2226
Phone: 847.706.3500 Fax: 847.706.3599
www.soa.org

This newsletter is free to section members. Current issues are available on the SOA website (www.soa.org).

To join the section, SOA members and non-members can locate a membership form on the Actuary of the Future Section webpage at http://www.soa.org/sections/actuary-of-future/aof-landing/.

Publication Schedule
Publication Month: May 2019
Articles Due: Feb. 12, 2019

Chairperson's Corner: 2018 Wrap-up

By Emily Hsu

In the past year, the Actuary of the Future (AOF) Section continued many of its ongoing activities and also pushed forward several new initiatives that came out of the in-person council meeting in February.

AOF HOT TOPICS

In June 2018, AOF started sending monthly emails to section members with a curated list of trending industry news handpicked by the council. The selected topics range from applications of new technologies, changing landscapes such as legislation and players, and emerging trends in international markets. This creates more communication touchpoints with our members and constantly keeps *the future* on their minds.

SOA MEETINGS

At the Life and Annuity Symposium in May in Baltimore, AOF discussed the competency framework and invited a panel of experts to discuss how university programs are reacting to changes to Society of Actuaries (SOA) qualification requirements. At the June Health Meeting in Austin, Texas, AOF co-hosted the Women's Leadership Forum as well as a hot breakfast session. At the Predictive Analytics Symposium held in Minneapolis in September, AOF coordinated the session that explored more effective uses of the Delphi study. At the October SOA Annual Meeting & Exhibit in Nashville, Tenn., AOF discussed considerations when changing specialties and how the paradigm shift in the workplace will impact actuaries.

COLLABORATION WITH OTHER SOA GROUPS

We co-hosted a networking event in New York City in March with the International Section and the Entrepreneurial & Innovation Section and co-sponsored breakfast sessions at various SOA meetings. This provides our members with more opportunities to meet and network with members from other sections. The 13th Speculative Fiction Contest, available to SOA members and candidates (who have passed one exam), is back with a larger prize pool.[1] We also strengthened our relationship with Candidate Connect and the SOA University Outreach Program; now our efforts to reach university students are more focused and leverage the SOA's established connections.

WEBCAST AND PODCASTS

We hosted webcasts with Pennsylvania State University, University of Illinois, Iowa State University and Lebanon Valley College with a panel of working actuaries with different education and career backgrounds. The events were very well received by students, and we are looking to reach more students strategically. We also produced several podcasts where we interviewed different actuaries on their career progressions, discussed the importance of mentorship in shaping the future of the profession, and explored nontraditional opportunities for actuaries. The latest podcast is easily accessible on the AOF webpage, and previous ones can be found on the SOA Podcasts list.[2]

LOOKING FORWARD TO 2019

We thank you for your continued support and participation in the AOF. As we move forward as a section, keep an eye out for what the council has prepared for you. Will you write for the *Actuary of the Future* newsletter? Will you enter contests? Will you take home AOF swag? Stay tuned for more! We are always looking for volunteers, so reach out to any council member to get involved.

In closing, I would like to thank the 2017–2018 section council for their support and efforts in making all AOF activities possible. I am confident that under the leadership of the incoming 2018–2019 chairperson, Laura Wiland, AOF is headed in a promising direction. ■

Emily Hsu, FSA, CERA, ACIA, is the outgoing chairperson of the Actuary of the Future Section. She is an assistant actuary at Sun Life Financial in Waterloo, Canada, and can be reached at *Emily.Hsu@sunlife.com*.

ENDNOTE

1 To view the complete Speculative Fiction Contest rules, visit *SOA.org/sections/pred-analytics-futurism/pred-analytics-futurism-landing/*.

2 See *https://www.soa.org/sections/actuary-of-future/aof-landing/* and *https://www.soa.org/pdopportunities/?filters=Location[Online];Opportunity_Type[RECORDING]*, respectively.

Interview With Jennie McGinnis

Transcribed by Mitchell Tamashunas

Jennie McGinnis, FSA, CERA, MAAA

Actuary of the Future recently had the pleasure of interviewing Jennie McGinnis, FSA, CERA, MAAA, SVP of Swiss Re, about her perspectives on career development, industry trends and Society of the Actuaries (SOA) service. This transcription includes many great insights and advice that is especially interesting to readers who have not yet listened to the podcast.

Mitchell Tamashunas: Welcome to the Society of Actuaries' Actuary of the Future podcast, sponsored by the Actuary of the Future [Section]. My name is Mitch Tamashunas, and I'm currently a student at the University of Iowa. During today's podcast, we're going to be talking about reinsurance and getting involved in the SOA. To help us do that, we'll be talking to Jennie McGinnis, who is a senior vice president at Swiss Reinsurance. Jennie, thank you for joining us.

Jennie McGinnis: Happy to be with you today.

MT: To jump right in, can you tell us a little about your background?

JM: Sure. So, I actually took a while to find the actuarial profession. It ended up being my third major in undergrad. Through all of those choices, what I was really in search of was a way to practically apply math concepts. So, I was very happy once I discovered actuarial science. But, given that I found it a bit late during my undergrad, I ended up pursing a master's degree for reasons of supporting my actuarial knowledge, but also because of other aspirations too. I have been with Swiss Re since I graduated, following internships with both a direct [insurer] and a consulting firm. Also, this year I'm celebrating the 10th anniversary of having earned my FSA and CERA designations.

MT: Great, and what's been your career progression so far?

JM: Swiss Re has a rotation program and I was able to take advantage of that. On top of that, because of some organizational changes along the way, it meant that I didn't necessarily stay in one rotating spot for all that long. Through the first half of my career, I held positions in pricing, new business development, as a project manager and as the lead for the U.S. valuation modeling team. This was all before I started focusing on in-force management.

I've been in in-force management for just over five years, which is quite a difference from all that movement that I had initially. However, within the in-force management team, I've grown my responsibilities over time. I started in a role that supported people making decisions within the team [I was in]. I began to carve out certain paths that I was responsible for, now being a portfolio manager myself. This means taking the lead in setting the direction of the team and ensuring the performance for a large part of our books. While some of that work is to protect performance, the really exciting part is coming up with new solutions that can help us and our clients improve performance, and ultimately support policyholders even better.

I've also been able to participate in some really enjoyable side projects during this time. A couple of examples that were really meaningful for me have been to lead branding and communication efforts for regional divisions and being part of a project to update our global life and health strategy.

MT: Great, thank you. So, you said you joined Swiss Re right out of college. Why did you choose to work in reinsurance?

JM: At the time that I was looking for a full-time position, it just seemed to be the right mix of both the direct company and consulting-type work. As I said, I had a chance to try out both of those through internships. I'd say that since coming into reinsurance, my experience has matched that, where I've had a bit of both. It's not to say that you couldn't have that same

mix at a different kind of firm, but I've really been able to find ways to connect to the products themselves, be able to advise on solutions and also to be able to really implement those solutions as well.

MT: Thank you. And now I will pass it on to Harsh Shah, who will talk to you a little bit more specifically about your work in reinsurance.

Harsh Shah: Hi, Jennie. … I also work in reinsurance. So, I was curious, you mentioned a little bit about how your work differs from a direct insurer or a consulting company. Can you expand a little bit more on how the work at a reinsurance company, for someone coming into the profession, would be different?

JM: So, that's a really interesting question, and I don't know that the work or the tasks themselves vary all that much, but one aspect that I think certainly is different is just how close you are to the ultimate consumer. So, as a reinsurer, we have a theory about how doing something different might incent a certain policyholder behavior, say to keep their policy for longer. We can't just go make net change; we need to partner with a direct company to do something like that. On the other hand, if I were at a direct company considering a similar change, we could make a change like that. However, there'd be some real value in consulting with a reinsurer to tap into their broad data set and their knowledge about the market in general.

HS: Yes, I agree. That's also similar to what I have been noticing. I've seen that at a direct insurer, you have a little more focus or strategy to reach out to the consumer market, whereas, with reinsurers, it's more business to business. This is also true since we're working a lot more with other companies rather than people or regular consumers.

So, changing my train of thought, over the past 10 years, what's the biggest change you've seen in the actuarial industry and how do you think actuaries have had to develop themselves to adapt to this change?

JM: That's a little bit more difficult for me because it's really hard to identify one big change. I think a lot of changes actually happen incrementally. Because of this, it's hard to be able to pick up on a huge, quick shift. Rather, I would focus in on the second part of the question, which is to say how to really adapt to stay relevant in an everchanging world. For me, I really focus on three things: communication, decision-making and technology.

On the communication front, I think there's an obvious stereotype that actuaries can do the math but can't talk about it or explain what it all means. That leads into decision-making. Actuaries have roles not only in helping people make decisions based on the analysis they have done, but also have opportunities to be in roles where they themselves really are key decision-makers. I think both of those concepts are made more interesting by the changing technological landscape. As our tools and systems change, the methods we use change. Predictive analytics, for example, becomes more and more important. There's an adaptation needed to know how to use the new methods certainly, but then—back to my previous themes—I think that there's just as importantly a question about how we help our stakeholders see through what might be considered a black box. None of these are issues that can be addressed or are adaptations that can take place overnight. However, I think there's still something to be said for continuous development to make sure we don't find ourselves left in the dust.

HS: I definitely agree with what you said about continuous development. I think that's how you stay relevant. So, using that thought process and building on top of it, looking into the future, what are a few big changes you anticipate happening in the industry in the next 10 years, and do you see actuaries having to develop a different set of skills to stay relevant?

JM: So, now I have to take back my answer about things not being so big and incremental. But, in terms of the next 10 years, my eyes are really on technological changes. Specifically, those that create opportunities to enhance the whole entire insurance process. So, how do you help people get life insurance coverage faster? Are they willing to use that process if it means that they are giving up some of their privacy? How do you more quickly react to people's needs as they change? Does that freak them out that you happen to know and recognize that their needs are changing? There are product designs and aspects that answer the questions that I've just asked, and actuaries certainly play a part of that. How do you develop these products? What do they look like? How do they move and change in that environment?

I think the other consideration is, what if we don't answer these questions? As a profession, what happens is another profession steps in [that] can address these questions. For the company that you're working for, what if others find a way to do these things and you don't, and you're left with much less business? Or maybe you have business, but it ends up leaving you with an unbalanced portfolio of risks? So, as technology changes, the questions we have to ask will change too, but hopefully we'll be able to come up with answers for all of these changing questions and environments.

HS: I absolutely agree, and I know a lot of people are working on making sure that that happens at the moment. So, from your experience, is there a trend that you've seen that impacted the reinsurance industry specifically? Something

that the direct insurer might not have seen or have impacted them as much?

JM: So, what comes to mind for me is actually an ongoing question, and it's a question that affects the direct insurance company too, just a little differently. The question is: How do we grow our business? For a direct company, they'd be considering that question with respect to policyholders; a reinsurance company will be considering it with respect to the amount of risk that is out there that needs reinsurance coverage. This goes to my earlier comment about one way of having the need for more reinsurance coverage is to ensure that there is a larger insurance pool. But what about contacting and working with the policyholders? That really needs to be done in partnership with a direct insurance company.

So, if I think about how we grow our business otherwise, I would say that another example is if there is an active M&A [mergers and acquisitions] market among direct companies that will result in companies that are larger and more capable of managing larger lines of risk themselves. In which case, the reinsurer needs to ask themselves, how do we continue to provide value? I think part of that question is answered by considering the risk profile of this new resulting direct company, how that changed, whether it creates new opportunities. I would also say, working in in-force management, I see the questions answered often in part by considering what arrangements are already in place and how those can be modified, rather than strictly thinking about how to get what would be properly called "new" business. Is there another way? How can you draw even more value out of what we already have?

HS: Agreed. Thank you very much for speaking to me about the reinsurance side and also how you foresee changes in the actuarial industry. At this point, though, I want to pass it off to Paul, who will speak with you a little bit more about your career.

Paul Birch: Hi, Jennie. It's so nice to get the chance to talk to you. … I'm a student at Penn State. So, talking with you so far, it's clear you have a number of great experiences and successes throughout your career. However, I also wanted to talk to you about challenges you've faced throughout your career. So, what would you say has been your biggest challenge throughout your career, and what did you have to do to overcome it?

JM: Thanks, Paul. That's a big question to think about. I'd say for me, the biggest challenge has really been the transition into leadership and, through that process, trying to hold together what I'll call "two identities." One as an actuary and one more generally as a business person. When I first started working, I leaned into some of my training in communications—because I

was a communications minor—in order to try and differentiate myself from other actuarial students. As I started taking on roles that weren't strictly actuarial, I found myself looking for ways to try to lean into and come back toward my actuarial technical training, to be able to differentiate myself from others around the organization. And to be fair, I don't know if this is something that I can ever really overcome, or anybody can overcome. I think it's something to be aware of, to grow into and get used to. In particular, I think it's important to recognize when one aspect, characteristic or strength of yours is really more valuable to a group than another.

To say it a different way, sometimes it's more important and valuable to the team that I'm working with for me to be more technical. It might still be at the same company, but with another group it might be much more important for me to lean into my communications skills and those abilities. So, really, it just comes down to knowing what situation you're in, and which of these strengths or skills are most valuable at that time.

PB: That sounds like a really great lesson, Jennie. Especially learning how to recognize your own skills to maximize your value in any position. I'm glad you've been able to continue to overcome that and to take on some great leadership positions. Having taken on leadership positions in your career, what have you found to be the benefits of staying at one company throughout your entire career?

JM: This is an interesting question, too. Especially from the perspective of it being common for people to change roles or companies more often nowadays. For me, I would say two things come to mind. First is having that variety of experience without having to relocate or learn a new corporate culture, or other similar changes that would come with changing companies. Aside from that, I would say being able to continuously grow and enhance my abilities to connect the dots across the organization that I am in. Even that has two aspects, too. One is just understanding what the business is, how it works, how it operates more broadly. But the second is being able to understand the people that I'm working with, understand how people prefer to work and operate across the organization and globe. And, to leverage all that into building a really solid network.

PB: That sounds great, Jennie. It sounds like it's a really nice mix of both variety and familiarity. I'm glad that's been working well for you. So, outside Swiss Re, you've also had some active roles in the SOA. Can you talk a little bit about each of the positions you've held in the SOA? Specifically, how you got them and what they entailed.

JM: Absolutely. This is a very important component of my career in its development so far that we really haven't touched on. I started volunteering right around the time that I got my FSA. I've progressively taken on new roles and challenges in the SOA, similar to the way that I've taken on new roles and challenges within Swiss Re.

So, I think the first thing that I got involved in was when somebody asked me to. That was to get involved in a webcast. That led to being encouraged to run for, and ultimately being elected to, the Actuary of the Future Section Council. As part of that role, I focused on professional development opportunities. This means planning meeting sessions [and] continuing to work on webcasts, and I was also the chair of the council during my third year. During that time, we also established the role of the Section Council intern, so it's really such a pleasure to be able to talk to you guys, as the Section Council interns, and know that this is something we did that has really lasted.

Around the same time that I was on the AOF Council, the SOA created the Professional Development Committee. I was selected to represent the special interest sections [which includes the AOF]. Actually, one of our first actions as the Professional Development Committee was to start offering podcasts. Again, this has just been such a great experience to be able to see one more thing that has lasted. I also ultimately served as the chair of the Professional Development Committee. It was following that term that I was elected to the board. My board responsibilities continued on the thread of professional development, but I also began picking up responsibilities related to strategy for the organization. Also, I had board and leadership development responsibilities.

I think it's worth mentioning too that on both sides of my board experience, just before joining the board and the last year of my board term, I served on two different strategic-planning task forces. Those are really eye-opening experiences for me from the perspective of trying to think more broadly: to see outside ourselves, to really consider what's going on in the market and the environment that can have an impact on actuaries. And, not only think about what it could mean for us, but ultimately to set a direction for how we react to, or address, these things that are changing around us.

It's been about a year now since I've rolled off the board. I've stayed involved in governance work, and that's really focused on how the SOA is structured, how decisions are made within that structure, and thinking about the structure and decision-making process, and how those can be made more effective.

I've more recently been focused on launching a subgroup within the Product Development Section that focuses on supporting people who practice in the area of in-force management. We are in the very early stages of that, but we already have a very solid

agenda planned for this year. All in all, I have to say volunteering with the SOA has been a fabulous way to develop both personally and professionally.

PB: That sure sounds like a great experience, Jennie. It's so neat that it's come full circle working with the interns for this podcast. Thanks so much for giving us the opportunities to do these things. Looking at some aspiring actuaries or young actuaries who are listening to this, what would you say are the best ways to become involved in the SOA, and what are some of the rewards that come with becoming involved in professional [section] councils?

JM: That's a very good, practical question. So, in terms of how to become involved, there's really two ways. You can reach out or you can have someone tap into you. I was lucky that I already had a network where someone tapped me and invited me to participate. But, I would have to encourage young actuaries who are trying to grow their network to reach out. Now, if you're still taking exams, there are certain volunteer roles within the SOA that won't be open to you quite yet. That's not to say that there aren't roles available; some are. The SOA has a volunteer database that has a way of identifying roles that are already available that you might fit, but also a way of "raising your hand" and saying that you'd be interested. To have the SOA essentially help you look for ways to fit in is fantastic.

So, in terms of the rewards of becoming engaged, I would say largely it goes to developing a network. I had the chance to speak about the value of developing a network within my firm, but I can't say how much more powerful it is to have that network across the industry. Also, I want to come back to my comment about volunteering helping me develop both personally and professionally. As I think about the different roles that I've had volunteering at the SOA, there's several I can draw a line between showing that I am capable of doing certain things. As I showed that I was capable of doing things within the SOA volunteering structure, I then used that to show my employer, "See, I can do this, so now what's the next challenge within the workplace to do?" I think that even goes back and forth a little, so if you develop at your employer, then you have the chance to then bring that back to the SOA too. You can see your leadership roles grow there too.

PB: That's great to hear, Jennie. Thanks so much for helping inform us of how we can all continue to be involved in such rewarding enterprises. That wraps it up for today's podcast. This is Paul Birch thanking you for tuning in. We hope that you have gotten a lot out of our discussion today. I also want to thank Jennie McGinnis for joining us. Jennie, it was great talking to you today.

JM: It was a pleasure to spend time with all of you.

PB: We hope you can join us again soon for another SOA Actuary of the Future podcast. ■

Mitchell Tamashunas is currently a senior at the University of Iowa, majoring in statistics and earning a Risk Management and Insurance certificate. He can be reached at *mitchbtam@gmail.com.*

AOF Section Webcast With the Penn State Actuarial Science Club

By Paul Birch

In an ongoing effort to engage not only newly professional actuaries but also aspiring students, the Actuary of the Future (AOF) Section has been organizing webcasts with actuarial programs at different universities. Reaching out to students before they even enter the workforce is a fantastic way to both spread awareness of the functions of the AOF Section and to encourage future professionals to join and become involved in different SOA sections once they enter the workforce.

In April, three AOF Section Council members gathered in front of the cameras to give advice to and answer questions from inquiring students in the Penn State Actuarial Science Club. The panelists were Paul Andrejko, FSA, CERA, MAAA, a director and actuary at New York Life; Renee Gao, ASA, CERA, an actuary at Berkshire Hathaway; and Harsh Shah, ASA, an actuarial associate at Munich Re. The actuaries and students had an hour-long dialogue that covered many interesting and somewhat under-discussed aspects of the actuarial profession.

As a Center of Actuarial Excellence (CAE), Penn State hosts a variety of information sessions and recruiting events from different companies. This event was advertised as unique from the ordinary information session, as the panelists would be neither promoting their companies nor seeking internship or full-time applicants; rather, they would be serving as independent, unbiased, experienced actuaries. Thus, students could ask questions that would either be out of place at a company-sponsored information session or that they would feel hesitant asking a recruiter. Students came armed with this knowledge and posed a variety of hard-hitting and insightful questions about the actuarial profession.

One of the questions that particularly piqued the students' curiosity concerned whether the panelists ever feel bored at work. This is a fair consideration when entering any career, and, on the face of it, people who work primarily with math and insurance could be assumed to have some generally uninteresting workdays. The panelists responded with a number of helpful tips, acknowledging that though people are likely to face some uneventful workdays in nearly any industry, there are a number of strategies to avoid boredom. First, all actuaries should generally have some interest in the industry and work they are doing; if not, they should reconsider their career calling. Second, if there is simply a slow afternoon or hour, listening to music can help improve focus. For more extended periods, it is good to talk to a manager, and, in most situations, companies will be accommodating in moving actuarial students to roles that suit them better the next time they rotate or finding them projects more relevant to their interests. If the students seem to have mastered the role, the company may move them to one with a more challenging workload. Furthermore, if a task seems monotonous or repetitive, it can often be automated, which presents a programming challenge to actuaries and should help them proactively avoid future periods of frustration.

Other questions answered by the panelists included how to best build an internal network, whether they felt actuarial degrees pigeonholed students in regard to their future roles, the difference between insurance and reinsurance, the timelines and outlooks for actuaries looking to move up in a company, and the methods they find helpful when evaluating potential employers. Through all these questions, the panelists delivered insightful, experience-based responses, helping to assuage students' fears

about their futures in the actuarial profession and to explain expectations and opportunities associated with the actuarial career path.

The AOF Section webcast with the Penn State Actuarial Science Club was a beneficial event, engaging students with actuarial professionals, addressing student concerns or hesitations about actuarial career paths, and demonstrating to students their potential futures as involved actuarial leaders. Such events could certainly be beneficial for students at other universities, as exposing aspiring actuaries to the work of Society of Actuary (SOA) sections and their associated opportunities can only lead to increased engagement in the future.

The students of the Penn State Actuarial Science Club would like to thank the panelists and the AOF Section Council for organizing and volunteering their time for the webcast; it was undoubtedly a positive experience and learning opportunity for all attendees! ■

Paul Birch is a senior at Penn State, studying Risk Management–Actuarial Science. He can be reached at *birchp46@gmail.com.*

Famous People Related to Actuarial Science

By Harsh Shah

If you are reading this article, chances are you have heard about actuaries or actuarial science before, but the average person is likely unaware of those terms. What people might not realize is that there are many famous individuals connected with this field. These are some of the exemplary individuals related to, but not always known for, actuarial science.

- **Sir Edmond Halley.** Largely known for his contributions to astronomy and calculating the orbit of the comet named after him (Halley's comet), many forget that Sir Edmond Halley was also a mathematician. He is credited with developing one of the first life tables in 1693, which in turn influenced the creation of actuarial science.

- **Oswald Jacoby.** A man of many talents, Oswald Jacoby was a card player, war veteran, writer and actuary. He is considered one of the greatest bridge players of all time and is credited with inventing the Jacoby transfer. He also made contributions to counterintelligence during World War II and went on to write numerous books on mathematics. In the actuarial circle, Jacoby, at the age of 21, was the youngest person to become a fellow of the Society of Actuaries (SOA) until Roy Ju, FSA, CERA, MAAA, did so at age 20 in 2015.

- **Franz Kafka.** Considered to be one of the most influential authors in the 20th century, Franz Kafka's works include *The Metamorphosis*, *The Trial* and *The Castle*, to name a few. Kafka worked as an insurance executive during the day—handling claims as well as other business functions, some of which would be considered actuarial in today's world.

- **Bill James and John Dewan, FSA.** Sports enthusiasts might know Bill James as the father of Sabermetrics, the field of statistical analysis in baseball, or from the novel *Moneyball* by Michael Lewis. James started to challenge conventional baseball wisdom through the use of statistical analysis in 1977, after publishing his annual baseball extract. Soon after, John Dewan, an actuary, started working with James to find market inefficiencies and start baseball-focused companies such as STATS LLC, which he later sold to Fox Sports. James was named one of *Time* magazine's 100 most influential people in the world in 2006.

- **Howard Winklevoss, MAAA.** Those who have seen the movie *The Social Network* or have read about the history of Facebook are familiar with twins Cameron and Tyler Winklevoss. Their father, Howard Winklevoss, is an actuary. He is the founder of Winklevoss Consultants, a pension and benefits management firm.

- **Anette Norberg.** Winner of the Olympic Gold Medal in curling in 2006 and 2010, Anette Norberg is the first skipper in Olympic curling history to defend her title. Norberg was also the chief actuary at Nordea Bank AB and later appeared as a contestant on Swedish TV's *Let's Dance 2013*.

- **Warren Buffett.** One of the wealthiest people in the world, Warren Buffett almost chose a career in actuarial science after meeting a Geico vice president in 1951. Instead, he sold all the stocks he owned at the time and bought 350 shares of Geico. Currently, he is the largest shareholder of Berkshire Hathaway, which owns Geico and has numerous shares in many insurance and reinsurance companies.

- **Elizur Wright.** A prominent member of the American Anti-Slavery Society in 1833, Elizur Wright was also one of the first people to study insurance through mathematics. He was the main driver behind creating laws that would require insurance companies to hold reserves. He also created actuarial tables to help insurance companies set premiums.

- **Christine Hofbeck, FSA, MAAA.** If you watched season 35 of *Survivor*, "Heroes vs. Healers vs. Hustlers," you are well aware of Christine Hofbeck, who was voted Player of the Season by fans and was a runner-up on the show. Before that, she was a vice president and actuary, pricing and predictive analytics, for a large insurer and is currently a member of the SOA Board of Directors.

Did I miss anyone? Is there anyone on the list that doesn't belong? If so, please let me know. ■

Harsh Shah, ASA, is a senior actuarial associate at Munich Re. He can be reached at *HShah@munichre.ca.*

A Short Introduction to Blockchain Technology

By Xiaochuan (Mark) Li

Bitcoin got everyone's attention in 2017 when its price rose to $20,000 from $800. (The price dropped to around $6,500 recently.) During the height of Bitcoin fever, other cryptocurrencies were invented, most of which are associated with different initial coin offerings (ICOs) to fund projects claiming to apply the backend technology to various business areas.

Supporters claimed that Bitcoin could change the financial system fundamentally, while many other people suspect its legitimacy is due to the speculation in cryptocurrencies and huge price fluctuations. Whether cryptocurrencies will replace traditional currencies is still to be decided; the backend technology, blockchain, will definitely have wider applications. We actuaries need to be aware of this new technology; the goal here is to describe the basic characteristics of blockchain.

PROBLEM WITH CURRENT PEER-TO-PEER SYSTEMS

The core problem in a peer-to-peer system is that there is an unknown number of peers with unknown reliability and trustworthiness. When one person sends property to another on the internet, it is hard to confirm that the property right is correctly transferred without third-party verification.

Blockchain is a purely peer-to-peer system. It is an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way. Its main characteristics include decentralization, pseudonymity and immutability. It is claimed to solve the problems of the current peer-to-peer system.

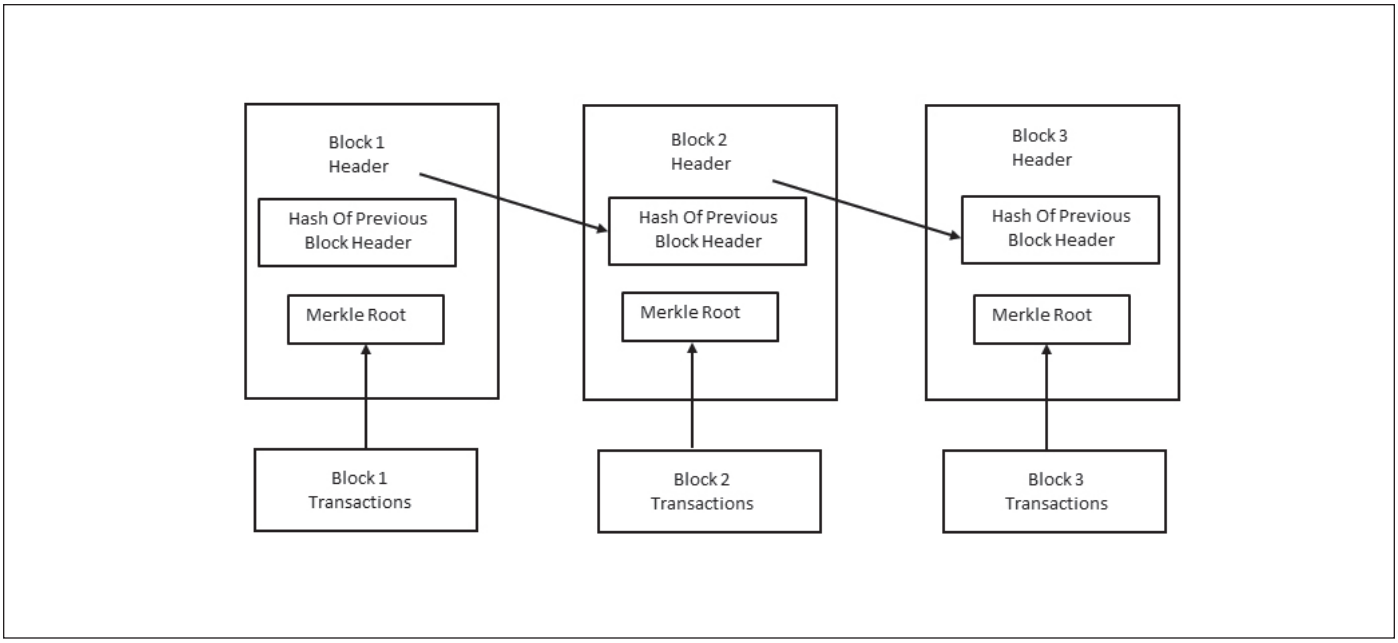
BLOCKCHAIN DATA STRUCTURE

The blockchain data structure is made up of ordered units called "blocks." Each block of the blockchain data structure consists of a block header and a tree structure that contains transaction data. Each block header references the header of the preceding block, preserving the order of the block headers and blocks, respectively, that make up the blockchain data structure (see Figure 1).

IMMUTABILITY OF STRUCTURE

Blockchain uses hash functions to create digital fingerprints for the references and contents. Hash functions are small computer programs that transform any kind of data into a number of fixed lengths, regardless of the size of the input data. If two hash values

Figure 1
Simplified Blockchain Data Structure



are identical, their corresponding input data are also identical. Hash values are useful for making basic file operations such as comparing, referring and storing data securely and efficiently.

The data structure of blockchain is change-sensitive. Rewriting a block needs to start from the head of the whole chain. Each block from the head presents a puzzle to solve, each of which requires massive computation. One example is a Hash puzzle that takes on average about 100 billion billion (1e-20) attempts to find. And there is no short cut. Therefore, it becomes impractical to change the existing blocks.

On the other hand, adding a new block to the blockchain data structure is less computationally expensive because it only requires adding the hash reference that points the current head of the chain to the new block header, declaring it the new head of the chain.

WHO CAN ADD NEW TRANSACTIONS?

Blockchain is an open system, allowing everyone to add new data to the history of transaction data while preserving its integrity. Hash functions are also used to allow computers to challenge other computers in deciding who can add new blocks to the chain. The computer that solves the puzzle first gets the right to add new blocks.

Blockchain uses a carrot-and-stick strategy. All nodes of the system are allowed to add blocks and also act as supervisors of their peers. Blockchain will reward nodes for adding valid and authorized transactions and for finding errors in the work of others; it will punish nodes for adding invalid or useless blocks. All nodes of the system have an incentive to process transactions correctly and to supervise and point out any mistake made by peers. The incentives can be in the form of cryptocurrencies, like bitcoin. Nodes-added new valid blocks get rewarded and penalized by adding invalid ones, while nodes in these situations will be rewarded.

The blockchain algorithm holds a continuous competition for rewards based on two criteria: speed and quality. Only the node that wins both competitions receives the reward for submitting a new block. The trick of the competition is that the losers of the speed competition are the referees in the quality competition, and they validate the block that the winner of the speed competition submits. This ensures a strict examination of the submitted block.

Each node will add new transaction data as a new block once informed of the data. Due to delays or errors in passing messages, at a certain point in time, all nodes may not hold an identical understanding of the transaction history. When nodes try to add new blocks, they may have different opinions regarding which is the previous block. The blockchain algorithm uses collective decision-making to solve this problem. They follow two criteria: either the longest-chain criterion or the heaviest-chain criterion to reach an agreement. These two criteria represent the chain that comprises either the largest number of blocks or blocks with the most difficulty levels; in essence, chains with the most aggregated computational effort.

APPLICATION IN INSURANCE

Blockchain uses the mechanisms specified previously to become a purely peer-to-peer system that is secure, resilient and consistent. It is mainly used as a public ledger to clarify and transfer ownership. The most notable application so far is in cryptocurrency. But there are many possible applications in different areas, including the insurance industry.

The potential of blockchain technology in insurance may include sharing data, processing claims and preventing fraud. The level of underinsurance due to lack of trust, high costs and inefficiency may be reduced to some extent by this technology.

One area to reduce inefficiency is in data management. Personal data can be controlled by individuals themselves and verified on the blockchain. One company, Tradle, is trying to develop blockchain solutions for know-your-customer (KYC) data. Clients' personal information can be more securely and easily retrieved and verified by institutions and regulators.

Privately held insurance adviser American Association of Insurance Services (AAIS) has also introduced its blockchain-based insurance database and reporting tool to enable the efficient and permission-based collection of statistical data on behalf of insurance carriers, regulators and other participating contributors.

One way to improve claim processing is through a smart contract issued on blockchain between the insured and the insurer. The contracts can be recorded and verified; only valid claims are paid and multiple claims on the same accident will not be paid. Payment can be a trigger on blockchain without human intervention. The whole process will be more transparent and customer-centric.

To prove policies and verify claims requires extensive cooperation to share information between insurers, manufacturers, customers and other parties. The Blockchain Insurance Industry Initiative (B3i) was launched in October 2016 to explore the potential use of distributed ledger technology. It currently includes dozens of direct insurer, reinsurer and brokers around the globe. ■

Xiaochuan (Mark) Li, ASA, is a data scientist at RGA Reinsurance Company, in Chesterfield, Missouri. He can be reached at *xli@rgare.com.*

Heroes of Noble Purpose

By Richard Junker

Working on "The Competency Framework: Designing Your Future" series[1] for *Actuary of the Future* made me think of my noble purpose and the heroes that were my personal inspiration. The glory of my heroes—and others—can inspire us as actuaries today, help us find our own noble purposes, and make creating a five-year plan for personal growth (part of the Competency Framework) meaningful and motivating.

In searching for heroes, reading biographies of famous people and the classics can inspire us to approach their eloquence; to emulate the poetry of how they put their ideas across to mobilize their public; to elevate our own characters by their examples; to be fully equipped to make moral and ethical judgments; and to master the primary tool, our majestic English tongue.

You may ask why we need heroes. The most compelling reasons we need them are because heroes:

- Reveal qualities we are missing.
- Save us when we are in trouble.
- Pick us up when we are down.
- Light a dark world, giving us hope.
- Give us great stories of who we are.
- Give us wisdom.
- Deliver justice.[2]

By now, you have acquired your own heroes, be they scientists, artists or athletes, or even come from a comic book. Learning of their lives, we discover how they found the noble purpose that drove them to extraordinary accomplishment, to overcome intimidating hurdles.

I invite you to consider four of my heroes, inspired by the traits they possess that actuaries treasure: intellect, vision, artistry, interpersonal versatility and courage.

JOHANNES KEPLER

I encountered Johannes Kepler in all his glory when I visited the Galileo Museum in Florence, Italy. Surfeited on art museums, I switched to science museums. The Max Caspar biography of Kepler presented itself to me in the bookstore. I spent over half my time at the museum reading the book and bought it on arriving home.

Kepler was a trained seminarian. In his early 20s, he realized his superior mathematics skills directed him to serve his god in ways other than as a priest. *His noble purpose was to worship his god for his wondrous creation, and to point humanity to peace through contemplating the beauty of the firmament as revealed through mathematics.* His fondest dream was that his revelations would introduce all to the geometric perfection of the world God gave humanity, that they might focus on its beauty and order. Thus would he divert the people and nations of the world from fighting and feuding.

Astronomy, his chief sphere, was for him the delight of the human race. Heavenly speculations, he was convinced, quench the thirst of minds and impress on custom a growing appetite for the divine virtues. Secretly they bend the wills of man, tame his disorderly cupidity so that, because he is accustomed to the lovely order in geometrical and astronomical things, thereafter he also "gains a love for justice, moderation, decency and graciousness."[3]

Kepler allied with Tycho Brahe, the Danish telescope maker who was the first human to see the marvels of the heavens past the inconstant moon. Kepler was devoted to Copernicus, who astounded the world of the 1400s with the conclusion that the planets rotate around the sun, not the earth. Applying mathematics to all of Brahe's disjointed planetary measurements, Kepler concluded that the planets orbited the sun not in perfect circles, but in ellipses, with the sun as a focal point for every planet. He teased out the mathematics of gravitational attractions between two planetary bodies of differing masses.

He fretted a full decade against publishing results, measuring and measuring again. He knew he faced the sure wrath of the Catholic Church, which would be affronted to think that God's perfect creation could possibly admit anything but perfect, circular orbits. Given Kepler's large family, he dreaded the same excommunication that had greeted his contemporary Galileo, with his scientific heresies and penchant for self-promotion.

Kepler wrote three timeless treatises on astronomy over more than 30 years, struggling against penury, undependable benefactors, illnesses, isolation, scarcity of printing presses, religious persecution and wars, all while raising his family.

Caspar died in 1956, having devoted his entire life to curating Kepler's works, artifacts and contacts, mastering every element

of his scientific writings. His book devotes a full section in the appendix to the *character* of Kepler. Kepler was a person of great charisma, a consummate networker in an intensely disconnected world. How blessed we are today, with our extraordinary velocity of knowledge sharing!

ALEXANDER VON HUMBOLDT

If my son Brian had not attended Humboldt University in Berlin, I would never have learned of Alexander von Humboldt, German aristocrat and naturalist extraordinaire. *His noble purpose was to understand in all dimensions the integrated organism that is planet Earth, from plants to vulcanism to the social institutions of humans.* Not nearly so renowned today, he was for decades the most famous scientist in the world. The centenary of his birth was celebrated worldwide, including in every large city in the U.S., in 1869, just 10 years after his death.

More places in the world are named for him than any other person. Humboldt was Charles Darwin's inspiration. Humboldt traveled in his early 20s over a five-year period, up the Orinoco River from Venezuela, proving the existence of connection to the Amazon River in the deep jungle. He invented the concept of thermoclines, variations of temperature in bodies of water or mountainous terrain. He proposed the notion of Pangea, that all continents were once connected, based on similarities of mountains he climbed in the Andes, the Alps and the Far East. (Flora at increasing elevations bore remarkably similar patterns worldwide.) His wanderlust and physical vitality even into old age were remarkable.

For actuaries, his foremost contribution is his masterful use of language. His best-selling nature travel books, and his marathon lectures all over Europe without need of notes, inspired countless young scientists to dedicate their lives to growing mankind's knowledge of nature. Darwin's *The Evolution of Species* is treasured for its clear, beautiful and poetic writing style. Darwin modeled his writing on his hero Humboldt's books. Humboldt lived much of his life in Paris, the world's center of scientific pursuits. His constant goal was winning sponsors for world explorations, such as to India and the Himalayas. Throughout his life and in his writings on South America, he decried the institution of slavery. Simon Bolivar was a contemporary in Humboldt's circle of intellectuals in Paris and drew inspiration from his writings and lectures for liberating South America from the oppressive rule of Spain.

Humboldt advocated not just empirical study for understanding nature but adding imagination in interpreting why phenomena occur. He was the lifelong friend of his countrymen Friedrich Schiller and Johannes Goethe. All shared a love of literature, their native tongue and science. They were *polymaths*.

ADA LOVELACE

I chanced on the existence of Ada Lovelace soon after reading Walter Isaacson's book *Steve Jobs*. Given also Isaacson's past duties as managing editor at *Time* magazine and president and CEO of the Aspen Institute, I pounced on his next book, published in 2014, *The Innovators: How a Group of Investors, Hackers, Geniuses, and Geeks Created the Digital Revolution*, the history of the invention of the computer and the internet.

Lovelace's story is engagingly told in *The Innovators*, yet another triumph of Isaacson, who also authored biographies of Benjamin Franklin, Albert Einstein and, most recently, Leonardo Da Vinci. Lovelace is his own preeminent hero among the legends of computing history—he opened with her in the first chapter and closed with her in the final chapter.

Lovelace was the daughter of the British poet Lord Byron. He was an impetuous man who ran off to fight the Turks for the Greeks in 1821 and died when Lovelace was only 8. She acquired ample other reasons in her tender years to be inclined to melancholy. With her mother's strong concurrence (none of that Byronic poetical nonsense for her daughter!), she concluded while a teen to take up a difficult subject to keep her personal demons at bay: mathematics. Lovelace's precocious talent and fortunate connections led her to Charles Babbage, known as the "father of computers." She was his assistant. Despite heavy investment support from the British government, his Analytical Engine was never completed.

Lovelace found her noble purpose when she was asked to supplement a manual on the working of Babbage's Analytical Engine. Her *Notes*, an elaborate 19-page addendum, contain what is regarded as the first computer program, an "algorithm to be carried out by a machine." She defined the subroutine concept and the if-then statement, which were first implemented more than 100 years later with the invention of the first computing machines.

Like Humboldt, she had a mindset of "poetical science," as she referred to it, which she directed at considering how society could relate to the technology of computing by collaborating. She had in mind much more than processing numbers. She was the visionary who inspired our current world, which has digitized every aspect of modern living from pictures to words.

WILLIAM SHAKESPEARE

William Shakespeare is recognized as the most profound master of human psychology up to Freud, and his characters are unique in maturing emotionally throughout every play. He is a master storyteller, a skill ever more recognized as essential to powerful business communications. His works are recognized as the foremost achievement in the English language, our own preeminent

tool of human commerce. It would seem a tautology that members of a learned profession such as ours would be conversant with the 38 plays of Shakespeare, as were master communicators and leaders Lincoln and Churchill. And yet, not so.

We know Shakespeare today as the preeminent artist of the past millennium. Yet his mission was not to create timeless art. He was a businessman foremost, working first for the interests of his family and the Stratford community far from London.

From the proceeds of his theater ventures, Shakespeare invested heavily in property and grain. Theater was the driver of his economic engine. As is true still today, to make money in theater required an astute business sense to solve problems, many of which Broadway impresarios do not face today. Famines and pestilence were common in his era; plagues shut down the theater business often. Theater was not a respectable business and was periodically forbidden to operate. Funding sources were volatile, ranging from penny admissions of groundlings to the support of impulsive and easily distracted royalty. Competition for actors was fierce. Throughout all such threats to solvency, his unique storytelling genius bailed him out of every financial crisis.

It is believed that William Shakespeare started his writing career in 1592. By then he was already a well-established actor with a stellar reputation. His fellow players were clever too, but none could fill the maw of an audience hungry for new amusements; none could create material like Shakespeare. By luck, by diligence, by his stellar ability to improvise on the spot, by his ability to win devoted admirers of his craft, Shakespeare's noble purpose—his mission in life—became clear. Already stagestruck, caught in the roar of the greasepaint, the smell of the crowd, he fell into his noble purpose: to entertain London (and the world) with his pen. Truly, this man is an inspiration to all actuaries seeking to achieve *versatility*.

MBA programs frequently apply Shakespeare's plays to teach essential interpersonal effectiveness in business skills, the same skills our Competency Framework seeks to address. The Nashville Shakespeare Festival offers business classes with topics such as confrontation, leadership, communication and weathering a storm.[4]

Shakespeare's intricate and ancient vocabulary is daunting, but not nearly so daunting as learning a foreign language or numerical analysis. As with learning any skill, momentum grows. Attacking a play from many angles is the solution:

- Read the play.
- Speak the words aloud—*Shakespeare never meant his plays to be books!*
- Listen to a recording.
- Attend a live performance.
- Read a compact review of the play.[5]

WHO ARE YOUR HEROES?

Now you have considered this actuary's slant on what one might learn from studying the lives of one's personal heroes, to identify their unique virtues that matter to you.

Inspired with your own noble purpose, you are ready to turn next to the Personal Planning Workbook, as addressed in the third article in the Competency Framework series.[6]

The essence of professionalism is expressed in Precept 1 of the American Academy of Actuaries' Code of Professional Conduct:

> An Actuary shall act honestly, with integrity and competence, and in a manner to fulfill the profession's responsibility to the public and to uphold the reputation of the actuarial profession.[7]

The Competency Framework is a powerful tool for helping all actuaries achieve their core duty as professionals: to act with integrity and competence. Identifying your heroes will facilitate that duty.

The editors and I welcome your feedback. The goal of the Competency Framework series has been to address your questions and needs, and to help all actuaries of the future design a future they will find meaningful and rewarding. ■

Richard Junker, FSA, MAAA, CLU, is an actuarial consultant at Greenwood Consultants in Tampa Bay, Florida. He can be contacted at *richardjunker41@gmail.com.*

ENDNOTES

1 Junker, Richard, and Curtis Lee Robbins. 2016. The Competency Framework: Design Your Future. *Actuary of the Future*, no. 39:18; Junker, Richard, and Curtis Lee Robbins. 2017. The Competency Framework: Design Your Future (Part 2). *Actuary of the Future*. no. 40:18; and Junker, Richard, and Curtis Lee Robbins. 2017. The Competency Framework: Design Your Future (Part 3). *Actuary of the Future*. no. 41:16.

2 Allison, Scott T., and George R. Goethals. 10 Reasons Why We Need Heroes. Commentary and Analysis, May 17, 2013, *https://blog.richmond.edu/heroes/2013/05/17/10-reasons-why-we-need-heroes/*.

3 Caspar, Max. 1993. *Kepler*. London: Dover Books.

4 *https://www.nashvilleshakes.org/business-workshops/*.

5 Sparknotes' *No Fear Shakespeare* puts the Bard's language side-by-side with a translation into modern English—the kind of English people actually speak today. (Sparknotes. 2003. *No Fear Shakespeare*. New York: Barnes & Noble.)

6 Junker, Richard, and Curtis Lee Robbins. 2017. The Competency Framework: Design Your Future (Part 3). *Actuary of the Future*. no. 41:16

7 American Academy of Actuaries. Code of Professional Conduct. Jan. 1, 2001. *http://dev.actuary.org/files/code_of_conduct.8_1.pdf.*

SUGGESTED READINGS

Asimov, Isaac. 1970. *Isaac Asimov's Guide to Shakespeare*. New York: Doubleday.

Bloom, Harold. 1998. *Shakespeare: The Invention of the Human*. New York: Riverhead Books.

Connor, James A. 2004. *Kepler's Witch: An Astronomer's Discovery of Cosmic Order Amid Religious War, Political Intrigue, and the Heresy Trial of His Mother*. New York: Harper Collins.

Isaacson, Walter. 2014. Ada, Countess of Lovelace. In *The Innovators: How a Group of Investors, Hackers, Geniuses, and Geeks Created the Digital Revolution,* 7–35. New York: Simon & Schuster.

Kinney, Clare R. Shakespeare's Tragedies and Shakespeare: Comedies, Histories, and Tragedies. The Great Courses. *https://www.thegreatcourses.com/professors/clare-r-kinney/.*

Von Humboldt, Alexander. 2004. *Personal Narrative of a Journey to the Equinoctial Regions of the New Continent*. Toronto: Penguin Random House Canada.

Wulf, Andrea. 2015. *The Invention of Nature: Alexander von Humboldt's New World*. New York: Vintage Books.

Advice From an Actuary: Interview With Suzanna-Grace Sayre

By Tim van Laarhoven

Suzanna-Grace Sayre, FSA, CERA, MAAA

We have a strong mentorship program at my company, Wakely Consulting, where each employee is assigned a MAC (manager, advocate and coach). Your MAC is tasked with helping you manage your workload, advocating for you at the end of the year, and coaching you to develop professionally, both short term and long term. I've found my participation in the MAC program invaluable, and I encourage all aspiring actuaries to make a connection with someone a few years your senior to develop yourself professionally.

As I am developing my career, I have access to the experience of my MAC. In the spirit of leveraging that experience and sharing knowledge, I sat down with my MAC, Suzanna-Grace Sayre, FSA, CERA, MAAA, and asked her a few questions about her career path and any advice she has to share with aspiring actuaries.

Tim van Laarhoven: How long have you been an actuary?

Suzanna-Grace Sayre: I've been working in the actuarial field since 2003, and I earned my first credential in 2005 when I got my ASA.

TVL: Could you talk a little bit about how you got to your current position?

S-GS: I've taken a more winding career path than most. I started in a pension department at an insurance company, and then moved over to life and annuities after a few years. I then moved to a different insurance company and worked in a reporting role for their Latin America division, providing quarterly estimates of economic capital and quantifying various business risks. I was there from 2007 to 2009, a time when the organization became hyper-aware of the risks in their portfolio. My next position was a complete shift, over to the health care side. I worked at a health plan in Albuquerque, New Mexico, supporting their Medicare and Medicaid programs. I discovered that I really enjoy working in health care and have been working in these areas ever since.

TVL: What do you work on at Wakely?

S-GS: One great thing about Wakely is that I get to work on a variety of projects. Every day is a little different. Recently, some of my more interesting projects have involved the Kentucky Medicaid Section 1115 waiver. We've worked with the state to create a cost-effectiveness tool that estimates the cost of a Medicaid member enrolling in an employer-sponsored insurance plan, with member premium and cost share covered by the Medicaid program. I've also assisted Kentucky with the creation of a medically frail program, which is designed to identify high-risk members and ensure they continue to receive the coverage and care that they need.

TVL: Can you walk us through your typical day?

S-GS: There are two reasons I don't have many typical days. First, I'm in consulting, where every day brings a new client and new set of challenges. Second, I work in health care, an industry that feels as though it's constantly in flux. Each day brings unexpected changes and often upends the plans I made the day or week before. So while I wouldn't say I have a "typical" day, I tend to divide my time between working directly with our clients, discussing data and results with analysts, and reading up on the latest changes in my fields of work.

TVL: What are your passions outside of work?

S-GS: The majority of my time outside work is spent rock climbing, a hobby that involves a lot of travel, another passion of mine. I really enjoy experiencing different cultures by traveling to rural climbing areas that are off the beaten path. This fall, I will spend two weeks climbing in Kalymnos, Greece.

TVL: Your parents are actuaries, right? Did that play a big part in your becoming one?

S-GS: Both of my parents being actuaries certainly played a part in my decision to enter the field. Ironically, the initial effect of having parents who were actuaries was a negative one. Growing up, I heard my parents discuss work at dinner and thought their jobs sounded boring. Despite liking math and knowing I would do something in that field, I was pretty uninterested in going the actuarial route. It wasn't until my junior year in college that I began thinking about being an actuary. One of my brothers also became an actuary, so I guess we must have enjoyed those "boring" dinner conversations after all.

TVL: What did you major in at school?

S-GS: I went to Georgia Tech, an engineering school, and I wasn't quite sure what I wanted to do but I knew it wasn't engineering. I ended up majoring in applied math with a dual minor in physics and economics. I wanted to keep my options open! I interned at an actuarial firm in the summer before my senior year in college and realized I wanted to pursue that path, so I attended graduate school at Georgia State and received a master's in actuarial science.

TVL: What did you look for when you first searched for a job as you were starting your career?

S-GS: I was looking for a job in a large company, with a large actuarial student program that would allow me to rotate positions through different departments and responsibilities. I wanted to experience as much variety as possible while I was still taking exams so that I would have a broad base of experience by the time I got my credentials and graduated from that rotational program. I didn't want to limit the scope of my experience when I started out, but I knew that I would eventually need to "choose an adventure" and focus on one area.

TVL: You studied a different specialty track than what you work in. How do you apply that in what you work in now?

S-GS: I chose the finance/enterprise risk management track because I was working in financial reporting at the time. If I had the chance to do it over again and knew that I would end up working in health, I think I would still choose finance over the health track. I enjoy the strategic considerations of finance, and I really enjoy considering risk at the enterprise level instead of within just one product or one line of business. As a health actuary, I spend a lot of my day-to-day time focused on the liability side of the balance sheet. However, I think it's important to keep all of the pieces in mind when you're working with other departments or trying to engage in a dialogue with executives of your organization. It's important to remember that there are other parts to the balance sheet, and successful companies consider all of the moving pieces before they make business decisions. The material that I studied for the finance/ERM exams gave me more insight into those other considerations.

TVL: What's the most important thing for students to remember in the early years of their career?

S-GS: I think the most important thing is to stay flexible and be open to any opportunities that cross your path. I meet students who are sure they want to work in one very specific area, based on very limited knowledge about the actuarial field. Keep an open mind; you may be pleasantly surprised by an area of work that you didn't previously consider. In the words of Ygritte from *Game of Thrones*, "You know nothing, Jon Snow." Someday you will be the expert, but in the meantime identify the experts, ask questions and learn as much as you can! ■

Tim van Laarhoven, ASA, MAAA, works on ACA rate filings at Wakely Consulting Group. He can be reached at *tim.vanlaarhov3n@gmail.com*.

SOCIETY OF ACTUARIES®

475 N. Martingale Road, Suite 600
Schaumburg, Illinois 60173
p: 847.706.3500 f: 847.706.3599
w: www.soa.org

NONPROFIT
ORGANIZATION
U.S. POSTAGE
PAID
SAINT JOSEPH, MI
PERMIT NO. 263