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Actuary of the Future

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The International Actuary

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By Aisling Metcalfe, Van Tran, David Cosentino

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475 N. Martingale Road, Suite 600
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Phone: 847.706.3500 Fax: 847.706.3599

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EDITORS' CORNER

First Time for Everything

By Michael Adams and Steven Chin

We would like to thank Madeleine Zhang for all her wonderful years serving as the editor for the *Actuary of the Future (AOF)* biannual newsletter. She has done a great job transitioning us as co-editors for this newsletter. The Fall 2015 issue is the first issue we had the opportunity to work on together, and there were things that we needed to prepare for.

Writing an article is never an easy task; editing a newsletter is a whole different ballgame.

The timeline for publishing a newsletter is a lot wider in time than we had anticipated. To get an *AOF* newsletter published by November, we like to have all articles submitted and reviewed by September. This gives the Society of Actuaries (SOA) ample time to review, format and publish these articles. As a professional organization, we are grateful for the quality checks the SOA performs and all the support that Karen Perry, outgoing publications manager, has given us throughout this process.

In order to get enough articles to create a full and rich newsletter, we coordinate and contact any volunteers who would like to write an article. Sometimes this involves reaching out to experts in the field to gauge their interest in publishing. This process affords us the opportunity to meet very bright individuals and explore different actuarial disciplines to which we aren't accustomed. Additionally, we've learned how similar being an editor is to project management with your internal team and the client. Communication and project management play a key role in acquiring enough writers and getting quality articles submitted for publication.

Potential article topics are screened by the AOF Section Council to ensure that they align with our goals.

We generally allot a few months for authors to work around their schedules and write their content with the aid of a stylistic guide that we provide. We do our best to respond to any questions in a timely manner, but everybody involved in the process understands that we are all donating our time outside of business hours to accomplish this goal.

We admire all the volunteers who take the time to write a unique article and all the hard work they put into it. Without all of our volunteers submitting articles, we wouldn't have a newsletter to publish that holds up to the high standards of the *AOF*. The actuarial industry has such a unique blend of individuals, and we enjoy the privilege of hearing what people have to say about their careers and what they are passionate about. The process brings to light the fact that we work with such great people who are driven toward spreading the word of actuaries and who we are as a profession. We can both agree that all the people we get to work with through the SOA and the AOF Section are some of the brightest minds we have encountered. ■

Michael Adams is an actuarial analyst in San Diego, Calif. He graduated from the University of California, Santa Barbara actuarial program (class of 2012) and serves as a council member of the AOF Section. He can be reached at michael.adams452@gmail.com

Steven Chin is an actuarial associate with Aon Hewitt in Lincolnshire, Ill. He can be reached at steven.chin.2@aonhewitt.com.

The International Actuary

By Aisling Metcalfe, Van Tran, David Cosentino

Life is becoming more global, and actuarial work is no exception. Many insurance firms write business around the world and have offices in multiple countries. Actuaries are also mobile—our unique skill set means we are in demand in many areas, and an actuarial qualification is valued around the world.

There are many different reasons to move: to study, for career development, for wider opportunities, for personal reasons, or just for an adventure. One common way is to move internally within an insurance company or consultancy; this has the advantage that the company will usually help with the practicalities. There are many practical considerations to take into account, including visa requirements, language, finding a job, finding a place to live, and making new social connections. The challenges are multiplied if you are also moving a spouse or children.

Fortunately, having your actuarial qualifications recognized is not likely to be a problem. The Society of Actuaries (SOA) is the largest actuarial organization in the world, followed by the Institute and Faculty of Actuaries (IFoA), which is the U.K. actuarial body but has a very large overseas membership. Most countries have their own actuarial organizations, and there are agreements for mutual recognition of qualifications. The requirements differ between countries, but in general the various actuarial organizations have worked to ensure that actuarial qualifications are portable, and valued around the world.

Three actuaries with international experience share their stories in the sections below.

AISLING METCALFE

I began my actuarial career in the United Kingdom, and spent almost four years working at two different life insurance companies. I studied for the IFoA actuarial exams, completing all but three exams while in the United Kingdom. I moved to the United States for personal reasons and spent several months job hunting and studying for my remaining exams before starting work with KPMG in Atlanta. I completed my fellowship exams with the IFoA and then applied for mutual recognition with the SOA. The mutual recognition process was very straightforward. I had to attend a Fellowship Admissions Course, but this replaced a similar IFoA course, so there was actually no additional requirement.

Although I had few practical difficulties when moving to the United States (I am married to an American), it was not easy to find work without contacts in an unfamiliar employment market. In hindsight it might have been easier, though longer, to find a job in the United Kingdom that would then permit a transfer to the United States.

The transition from the United Kingdom to the United States is not particularly difficult, given the common language and shared culture. There were still adjustments to make—for example, U.S. corporate culture is somewhat different from the United Kingdom, especially in terms of vacation and related benefits. There are also some subtle cultural differences that I am still getting used to—including learning about American sports!

The United States is a very diverse country, and the actuarial profession in the United States is also diverse, with actuaries from many backgrounds and many parts of the world. This makes working here as a foreigner easier—I am rarely the only non-American in the room. Working for a large firm with many other international employees has also made the transition easier.

Since I did not take the SOA actuarial exams, I did have to spend some time learning about actuarial topics specific to the United States, particularly U.S. reserving, and the initial learning curve felt very steep. Fortunately, it turns out that much of the content of the actuarial exams is surprisingly portable; for

example, the United Kingdom does not use the net premium reserving method, but the principle is taught in the exams. I have found that the more general principles and analytical skills transfer very well from one country to another.

Overall I am very glad I made the move. Living and working in a different country definitely broaden your horizons, both personally and professionally. The biggest lesson for me was that there is more than one way to do something, and that the best answer often depends on the surrounding environment.

VAN TRAN

I am a career changer with a rather "international" background. I was born and raised in Vietnam; went to college in Singapore; and had a couple of years of work experience in Singapore as an engineer. One fine day, I decided to explore the world, packed my bag and left for America. I am now working for KPMG's Actuarial & Insurance Risk advisory service group in Atlanta.

Both Singapore and America are very culturally diverse. I was familiar with working in teams with people from various countries. The early exposure to an international working environment in Singapore has helped me a lot with the transition.

There are certainly some differences. America's working environment, at least for KPMG, tends to be more flexible. KPMG provides me with the needed flexibility to manage between work and personal life, such as allowing working remotely and flexible working hours. Teammates and managers are more task- and results-oriented. I feel that I am trusted with the freedom to get the work done without having to be seen. However, this goes both ways. It also means working at nights and on weekends; emails are generally expected to be responded to promptly. It is not uncommon to get an out-of-office message from your colleagues, followed by their reply to your email shortly after.

America appreciates diversity because the country understands its strength. I have seen that value reflected very strongly in KPMG, where the firm places a lot of focus on promoting diversity. Since I started work at KPMG, I have always felt welcome and accepted. I am provided with opportunities to perform and excel, as long as I am willing to work hard. My colleagues have never treated me like I am a foreigner or an outsider. They have helped me to assimilate into the culture. I am still brushing up on my American football knowledge; however, the Super Bowl has become my favorite annual sport event.

I've enjoyed my time here tremendously and look forward to continuing to broaden my actuarial knowledge in the biggest insurance industry in the world.

DAVID COSENTINO

I've worked as a life & health consultant for EY in Chicago ever since I graduated from the University of Illinois with an actuarial science degree in 2009. I've always wanted to work abroad, for both professional and personal reasons, and now I've recently transferred to our Hong Kong office on a two-year assignment.

I've heard from others that such an experience was invaluable and enhanced their careers. In the United States, I focused on advising clients on actuarial financial reporting, valuation, asset/liability management, and mergers and acquisitions, and now I'm gaining new opportunities to grow through challenging but rewarding work. The regulations are much different in Hong Kong, and I've spent a lot of time getting up to speed on embedded value (EV), International Financial Reporting Standards (IFRS) and market-consistent embedded value (MCEV), among other topics. While I've had some limited exposure to these concepts in the United States, I'm

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Our unique skill set means we are in demand in many areas, and an actuarial qualification is valued around the world.

now expected to be just as familiar with these regulations as I was with U.S. GAAP and stat. Fortunately, several colleagues in the Hong Kong office previously worked in the United States, which has been very helpful. Overall, the people are very welcoming.

While I have been here only about a month and am still adjusting, the experience has been amazing. EY has a great relocation program that made moving across the world easier and less stressful. There are some cultural differences, including communication styles, attire and working hours in the office. The food is certainly new and exciting, but raw seafood on a regular basis is not something I am accustomed to. The living arrangements are also much smaller, so I'm trying my best to make the most of out of my space. And last but not least, the heat and humidity: I think I've lost about 5 pounds (or 2.3 kilos, as they would say here) just from sweating.

Overall, I'm really satisfied in my decision to make this journey and am looking forward to the next several years working in Hong Kong. I'm sure there will be many challenges and unfamiliar situations, but that is all part of the excitement. Please feel free to contact me with any questions about working abroad; I'm more than happy to give some further perspective. ■

Aisling Metcalfe began her actuarial career in the United Kingdom before moving to Atlanta, where she is a manager with KPMG. She can be reached at AMetcalfe@kpmg.com.

Van Tran has been an associate with KPMG, Atlanta, for 2.5 years. She can be reached at lvtran@kpmg.com.

David Cosentino is a manager in EY's Actuarial and Insurance Advisory Services practice in Hong Kong. He is on a multiyear assignment in Hong Kong after spending his prior career in EY's Chicago office. He can be reached at Dave.Cosentino@hk.ey.com.

Actuarial Student Programs

By Amanda Hug

Over the last decade, the actuarial career has gained the significant attention of entry-level job-seekers as it continues to be one of the consistently top-rated jobs in the market. There are different avenues to break into the profession, but one of the most common is through an actuarial student program, where a company formally supports the exam progress of individuals through paid study materials, exam fees and time off to study. Most programs also include an emphasis on development of leadership and communication skills. As the recruiter for MassMutual's Actuarial Student Program, I get the opportunity to regularly share with candidates why I believe a student program is such a powerful springboard for a successful actuarial career. Profiled below are two actuarial students and one recent actuarial student program "graduate" to highlight the value a student program can bring to one's professional development.

BENEFITS OF STUDENT PROGRAMS: ANGELA MCSHANE

Angela joined the student program at MassMutual after graduating with a degree in actuarial science from Bryant University in December 2012. She has completed a rotation in Annuity Product Development, and is currently in her second rotation in Financial Planning and Analysis. Angela can be reached at amcshane@massmutual.com.

Which aspect of the student program has been most impactful in your own career?

Aside from exam support and rotation opportunities, the most impactful aspect has been the ability to meet and network with experienced actuaries in my field. This has given me the opportunity to make informed choices about my career path and build professional relationships. My current rotation was made possible by the connections I made through company networking events.

How have you developed your leadership skills through participation in the student program?

The student program at MassMutual, like many other industry student programs, offers many opportunities to develop leadership skills. During my time in the program I have participated in mentoring, organizing networking events, and have even led projects designed to enhance the student program. These have provided me with experience in engaging and motivating my peers and have also allowed me to make an impact on the student program as a whole. Because of these projects, I have been able to build my presentation and communication skills, and learn how to drive a project to completion.

What exposure have you had to senior leaders at the company, and is there any advice they have given that has particularly resonated with you?

I have had exposure to senior leaders at MassMutual through student program networking events as well as through opportunities within my role at the company. For example, the student program offers student-actuary lunches and exam recognition events that facilitate interactions between experienced actuaries and students, giving them the opportunity to meet and learn more about each other. Through my rotations, I have had opportunities to interact with a number of senior leaders, including the chief actuary, CIO, CFO and more. Senior leaders who are not actuaries have praised the rotational aspect of the program and have advised me to take full advantage of the opportunity to learn about different areas of the company and network across the organization. Because of that advice I chose to seek a more nontraditional role for my second rotation. In this role I am learning more about the financials of the enterprise and developing my non-technical skills.

SELECTING A STUDENT PROGRAM: MARK SPONG, ASA

Mark joined the MassMutual Actuarial Student Program in 2014. Mark's first rotation is on the Valuation and Modeling team where he updates and sets assumptions, performs quarterly reporting functions and helps with model conversions. Before starting his actuarial career and earning his ASA at MassMutual, Mark was a high school math teacher and textbook author. Mark has a B.A. from Harvard, an M.A. from Stanford, and an M.S. from the University of Connecticut. Mark can be reached at mspong@massmutual.com.

What process did you go through to land a student program position?

After my first internship I began my search for a student program position. My preferences were not set in stone, but I was leaning toward a career in life over property and casualty (P&C) and working at a company in the industry rather than a consulting firm. I was at-

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tending UCONN at the time, which has a strong actuarial science program and a well-attended actuarial career fair. To say that I simply attended the career fair would be a substantial understatement. I did not believe it was enough to research a few companies, dress well and bring copies of a polished resume. I also took time to prepare questions that would help me distinguish between companies and practiced my elevator pitch that would make my story memorable. I walked away from the fair with two interviews, two offers, and about a half-dozen calls after I'd already accepted an offer from MassMutual.

What were some key differences among the programs you considered?

On paper, most features of student programs were comparable; however, I did pick up on a few differences that I thought were particularly revealing.

First, the attention that actuarial students get from senior actuaries and leaders seemed to vary greatly between companies. With whom I spoke and what we discussed at each interview spoke volumes about the priority the actuarial community placed on the student program. Speaking to a chief actuary, for example, left a definite positive impression and contrasted sharply to talking to a recruiter who just wanted to fill a position.

Second, I deliberately considered how the structure and organization of the recruiting and interview process might reflect on how well-organized the program would be. I believed that a company whose interview process specifically targeted a wide variety of topics, including leadership and culture, would be a better fit than one where I was asked to repeat the same basic answers to each interviewer. Likewise, if the recruiting and interview process felt streamlined and efficient then I felt valued and got the impression that the student program was well-run.

Ultimately, what driving factors caused you to choose the student program at which you work?

I have a nontraditional career background as a high school teacher, and I wanted a student program where that experience would be valued. If a company wanted just another analyst then I don't think I would have been a good fit.

I also wanted to be a part of a program that would match high expectations with a solid support structure. Only the strongest student programs seemed to offer both. In other words, I was looking for a company where I would be able to make a meaningful contribution to a team, learn a ton, and find space to be recognized for high-quality work. Ultimately, I chose to work at MassMutual because I saw an opportunity to work with talented people, leverage the strong exam support, and grow my abilities.

> Getting to FSA is a long, arduous, and occasionally humbling process. A student program is a critical support during this process.

THE STUDENT PROGRAM AS A CAREER SPRINGBOARD : MARK SAYRE, ASA, MAAA

Mark is an AVP and product manager at Haven Life, a NYC-based MassMutual startup focused on online, direct-to-consumer insurance products for the millennial generation. He joined this role after five years in the Actuarial Student Program at MassMutual, where his rotations included product and valuation roles within both business and corporate units. Mark holds a B.A. from New York University, an M.Sc. from Università Commerciale Luigi Bocconi, is an associate of the Society of Actuaries, and a member of the American Academy of Actuaries. He is actively engaged in the community as a board member of both the Springfield Symphony Orchestra and New England Business Associates. In his spare time, you will find him being embarrassingly competitive at board games or checking out performances at the opera or the symphony. Mark can be reached at mark@havenlife.com.

Tell us about the role you accepted after completing the student program.

I recently accepted a role as an AVP of Product Management at Haven Life. In this position, I work with a team of business analysts and developers to enhance the company's algorithmic and manual underwriting capabilities and apply these capabilities across distribution channels. Our task is to think innovatively about the future of underwriting and connect these innovations to product design and pricing. At the end of the day, our goal is to design a best-in-class customer experience for the millennial generation—we accomplish this through technology that enables immediate coverage in a simple and transparent way.

How did the student program position you to be a strong candidate for this role?

The student program positioned me well for this new opportunity thanks to the breadth and depth of my rotations and the program's focus on exposure to senior leaders. Our program at MassMutual features a robust calendar of lunch-and-learns that allow students to gain exposure to practice areas outside their department—for example, I remember one session in particular on risk-based

capital that was extremely valuable in its balance of general principles and detailed considerations. In addition, my rotations were very diverse, including Annuity Product Management, Corporate Strategy and Life Valuation, which allowed me to develop a broader perspective of the company and understand how each piece of the puzzle fits.

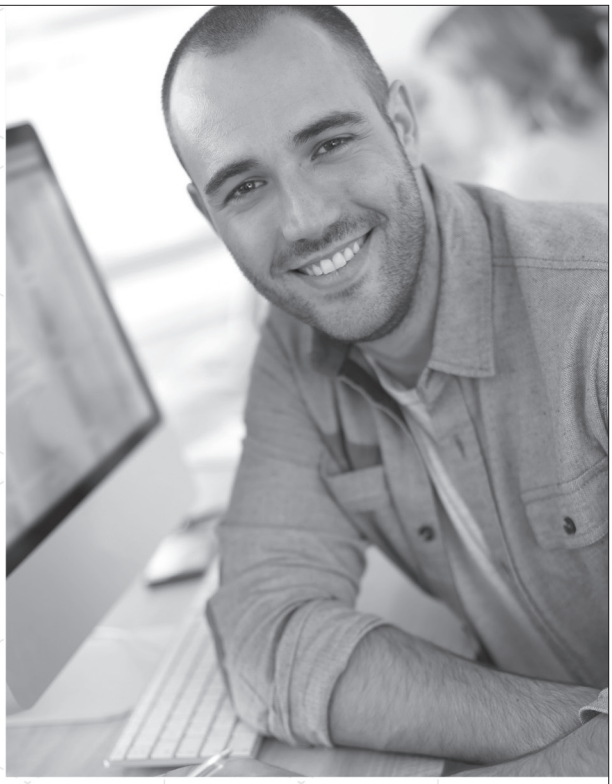
What were some development opportunities you pursued during your time in the student program?

I have often sought out opportunities to grow and shape my own leadership style and philosophy by taking on challenging roles inside and outside the actuarial community. Two years ago, I had the opportunity to participate in Leadership Pioneer Valley, a year-long leadership development program that brings 40 individuals from various industries and sectors together for training and labs designed to foster a greater understanding of the region's challenges and promote collaborative leadership to address these challenges. I was also recently appointed vice-chair of MassMutual's 300-member-strong LGBT Employee Group, where I am tasked with growing the LGBT Cultural Competency of the organization and improving the pipeline of LGBT talent into senior roles. Both of these opportunities have taught me how to lead through influence rather than position or rank—a critical skill for a rising leader in an era of matrix management.

What advice would you give to individuals pursuing their designation within or outside of a student program?

Getting to FSA is a long, arduous, and occasionally humbling process. A student program is a critical support during this process—not only does the program provide you with study time and expense reimbursement, it also gives you access to a network of other students and recent FSAs who can guide you through the process. And in the inevitable case where you fail an exam for the first time, the student program gives you the motivation and support to keep going. Of course, it is possible to succeed outside of a student program—but the support of a program allows you to successfully maneuver through the exams without taking away from or being in conflict with your on-the-job performance. ■

Amanda Hug, FSA, MAAA, is an actuary at MassMutual Financial Group. She can be reached at ahug@massmutual.com.



SOCIETY OF ACTUARIES

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Moonwalking with Einstein—The Art and Science of Remembering Everything, by Joshua Foer

Review by Dave Snell

In this age of smartphones, password vaults, cloud drive backups, and various other electronic assistants, why should an actuary care about a book on memory? That's a valid question. I hope to provide an answer in this review.

Many years ago, I knew the telephone numbers of all my friends, the text of various famous speeches, and the values of pi and e to 20 decimal places. I still know pi and e, and a girlfriend's past telephone number from 50 years ago. However, when my own family members get new cellular phone numbers, I feel helpless if I have not entered the number yet into my smartphone. When did my phone seem to become so much smarter than I am at retaining telephone numbers, shopping lists and password hints? And why do some of the old memories seem stronger than new ones?

Actuaries are known for their facility with numbers and equations and obscure regulations that make them the centerpiece attraction at any party, right? OK, perhaps not the party headliner, but we can regale (or bore) our friends with present value and reserve calculations. We can even do some (ever decreasing) mathematical problems in our heads. These feats can impress others—especially the mathematically challenged.

Yet, when I go to a Society of Actuaries (SOA) meeting or most any type of event attended by a lot of people, I often have a terrible time remembering the name of the person I was introduced to mere minutes before. Those folks who can walk into a room, meet dozens of people, and remember all their names and companies and various important facts about them, seem like rock stars of memory. We naturally assume they are very highly intelligent people.

Joshua Foer, a journalist, used to think the same thing. He covered a contest of "mental athletes"—where contestants had to compete in such qualifying events as:

1. Names and Faces—15 minutes to memorize 117 color photos of different people (head and shoulder shots) with a first and second name written below each picture.
2. Speed Numbers—five minutes to memorize a list of computer-generated numbers that are presented in rows of 20 digits with 25 rows per page.
3. Speed Cards—five minutes to memorize a freshly shuffled pack of 52 playing cards.
4. Poetry—15 minutes to memorize a previously unpublished poem.

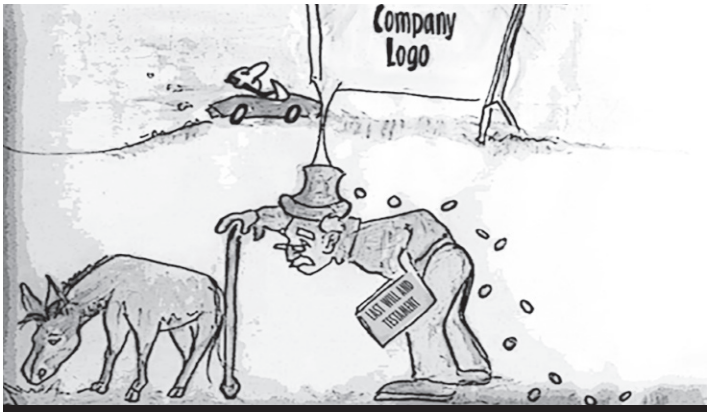
They performed these and other feats of memorization seemingly way beyond the abilities of mere mortals. Yet, when he interviewed these giants of memory magic, he was surprised to hear a consistent message. They claimed no innate gift for memory! They just learned some techniques that most other people could learn if they put in the time and effort.

Intrigued, Foer set out to learn how to memorize—under the guidance of some of these memory mentors—and a year later, he won the 2006 USA Memory Championship!

This book is a chronicle of his journey from being a forgetful person like I am, to becoming a memory wizard. Along the way, he interviews people with profound memory loss, such as a man who can't retain new information for more than a few minutes. He also interviews medical researchers to learn how the human brain remembers things, and how long-term memory and short-term memory differ.

Additionally, Foer gives the reader a history of memorization, which used to be of far greater importance and stature than now. Some of the most common and effective memory techniques used today are actually a few thousand years old! One of the best is the Memory Palace, where you visualize rooms familiar to you, and place objects into them at very specific locations. You can see them in your mind in the room, and recall them as desired. Another is the idea of absurd imagery—hence the title of the book—that was part of a nonsensical, and partly obscene, image to help the author remember a deck of cards in order.

Here is an actuarial example I created using this technique: Picture a donkey, or ass. Walk-



Surplus Risk Types: Asset, Mortality, Interest, Business (original sketch by http://www.nikkeycreative.com/)

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A good memory is still viewed as a sign of high intelligence, and it conveys a sense of confidence in the expertise of the speaker.

ing behind the ass is an old man carrying his last will and testament. He is wearing a very interesting hat with lots of coins falling from it. On top of that hat is a big sign with the logo of your company on it. A car is heading toward the sign and may crash into it. I am showing a visual to trigger ideas for you; but the best way to use this technique is to visualize your own images. That way, they become more personal for you, and also more memorable.

How can this image possibly be useful? What if you were trying to remember the four types of risks that the SOA has defined to be covered by the assigned (or allocated) surplus?

These are:

1. C1—**Asset** Risk: The risk that the assets supporting the product line lose some or all of their value.
2. C2—Insurance, or **Mortality,** Risk: The risk that the price for the insurance product provided is inadequate.
3. C3—**Interest** Rate Risk: The risk that assets must be sold at a loss in order to meet the cash needs of a policyholder.
4. C4—**Business** Risk: A "catch-all" category of risk management to cover anything not specifically included in the C1, C2 or C3 category.

As an Actuary of the Future, you do need to embrace the wonderful technological advances such as smartphones, clouds and other electronic aids. Ultimately, though, advancement beyond technical positions requires an ability to communicate. You should remember facts as needed to support your arguments, and learn to paint a mental picture to convey your ideas. The techniques used for millennia to remember people, stories, lists and related items without having to refer to a written or electronic aid still work. A good memory is still viewed as a sign of high intelligence, and it conveys a sense of confidence in the expertise of the speaker.

Moonwalking with Einstein offers several insights into human memory storage and time-proven techniques for remembering what you wish to remember. It is not an immediate solution to every problem, and some of the techniques are difficult and require much practice. It wasn't a perfect book. There were some slow spots, and some unnecessary tangents. Yet, in harmony with the topic, I found it unforgettable. ■

Dave Snell, ASA, MAAA, is technology evangelist at RGA Reinsurance Company in Chesterfield, Mo. He can be reached at Dave@ActuariesAndTechnology.com.

Musings of a Prospective Actuary

By Katrin Bor

So what exactly do you do? This is the only question most actuaries fail to prepare for amidst years of rigorous exam preparation and the first question any outsider will ask. From my limited two-and-a-half-month exposure to the field, I claim that actuaries are those who understand and communicate the bridge between realistic scenarios and their quantified values. These are the corporate voices reminding you that every present enterprise comes with a future price. As I enter my final year of college, my enterprises are among the likes of graduate school, law school, research, travel, examinations, etc. … All options considered, an investment in actuarial science seems to me an enterprise with a favorable future price.

The greatest and worst part about pursuing a bachelor's degree in mathematics is the vast pool of career opportunities available to graduates. Employers understand that a math concentration implies core logic skills that are often more valuable than a working knowledge of Microsoft Excel or C++. As such, prospective math graduates find themselves with many avenues and no directions. The decision must therefore be more dependent on personal preference rather than on a prescribed career path such as pre-med or art history, to name a few. Stress level, compensation, preparation, hourly work weeks, market capacity and the future of the industry are but a few factors to consider when preparing to build a career. After looking into academia, law, engineering and computer science, I took an internship in the actuarial department of a small reinsurance firm. My curiosity fueled this decision after my boss, in our second interview, promised to convince me by summer's end that becoming an actuary is the best career move I could make, a low-risk claim with a favorable payout. While I still have some time with the firm, his efforts have come to fruition.

Much like a doctor or lawyer, an actuary must pass numerous difficult exams to have the proper certification. Unlike the aforementioned fields, however, actuaries may begin working after two or three exams with most companies granting their prospective actuaries study days and compensation toward the exam process. To a student like myself, with more debt than total income ever accumulated, immediate post-grad employment with the potential for self-paced career growth is an extremely attractive perk. Additionally, personal experience and co-worker feedback reveal stable 40- to 50-hour workweeks associated with the job and a minimal degree of stress. Topping the perks off, a cited six-figure industry-average salary doesn't hurt as well. Coming into my internship with the above in mind, my greatest concerns revolved around the day-to-day responsibilities and assignments. Specifically, would I be challenged and intellectually stimulated? Would the extrovert in me feel stifled by the "back-end" conditions common of the actuarial profession?

I now understand that the answers to my questions are fully dependent on the firm, industry and personality of the actuary. In the small firm I was exposed to, my boss and chief actuary of the company spent most of the day verbally communicating his team's results through meetings, lectures and business trips. A different actuarial employee, on the other hand, spent much of his workday on the computer modeling complicated annuities. As I've come to realize, the career is what you make of it.

As for the level of thrill, I cannot say that the intricacies of universal life or long-term care insurance wholly captivate me. Yet, with insurance products becoming more complicated, the mathematical analysis behind these products requires a sharp, business-oriented mind. Once I began to understand how a complex calculation related to a product or industry requirement, I felt as intellectually driven as I did working with abstract math in college. Furthermore, as more actuaries pursue work in nontraditional fields, I have the option to forgo insurance and explore risk in industries such as natural disasters or energy consumption.

Two summers' worth of structured internships in between three years of a liberal arts education have given me insight about the years to come—it takes periods of repetitive work to gain professional respect and only with this respect do the multidimensional skills learned in university fully matter. As an individual weary of monotony, I seek a profession where the repetitive work is never dry and the career growth is accompanied by variety. From all I have seen in the last couple weeks, the actuarial career has few dull moments to spare. ■

Katrin (Katie) Bor is a rising senior at Hamilton College. She is a math major/economics minor, originally from Staten Island, N.Y. Her hobbies include reading, dance, tennis and traveling.

SOCIETY OF ACTUARIES

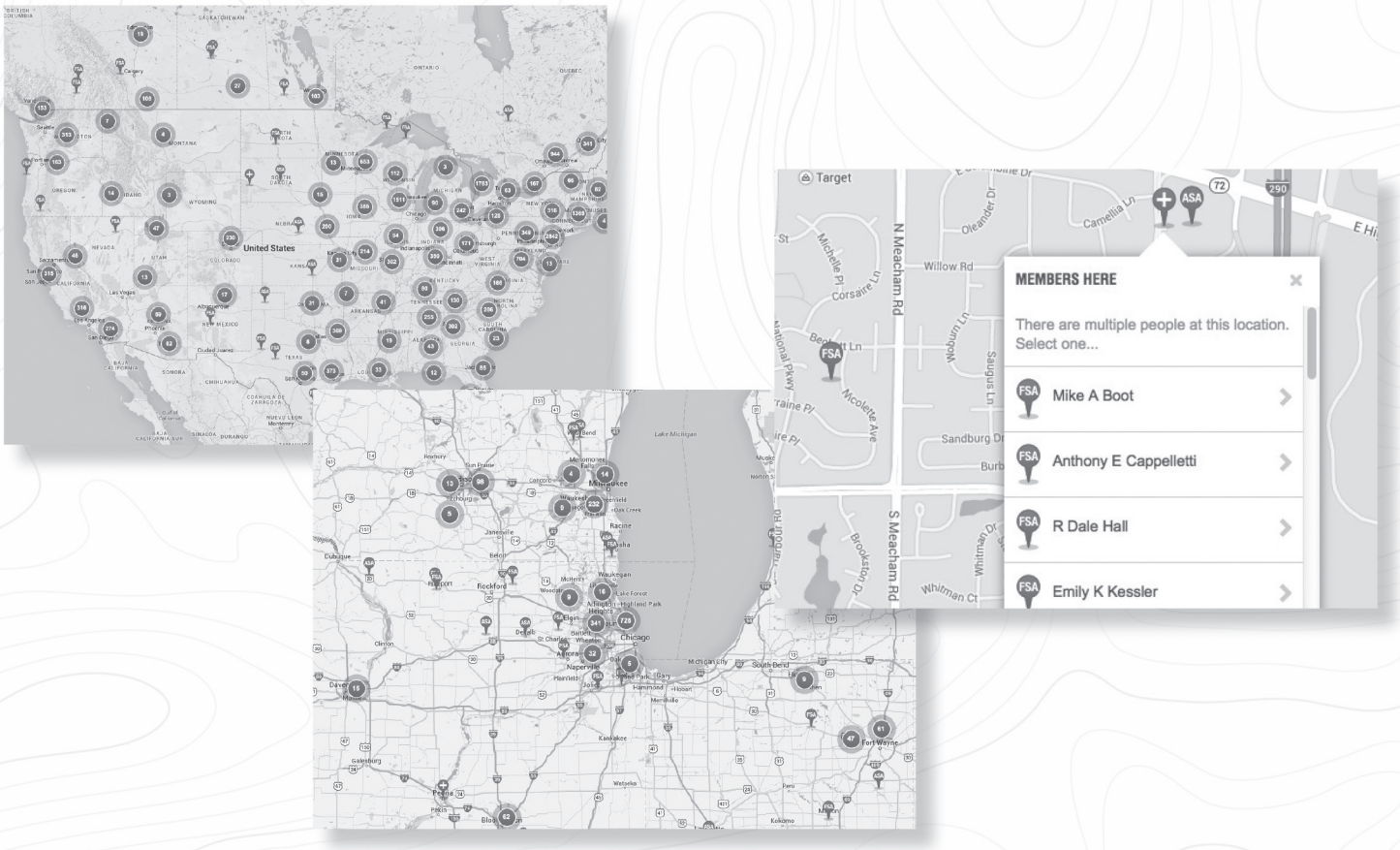
SOA EXPLORER TOOL

Find fellow actuaries around the block or around the globe

The newly-created SOA Explorer is a global map showing you where SOA members, their employers and actuarial universities are located.

- Break down your search by FSA, ASA and CERA
- Click on member pins to find contact information, including LinkedIn and Twitter pages
- Click on employer pins to see SOA members at a particular employer
- Click on university pins to learn about their actuarial programs

To use the SOA Explorer Tool, visit ***soa.org*** and sign in as a member.



Professional Email Writing

By Paul Andrejko

The most important aspect of any business communication is clarity. Whether the goal is to provide information, ask a question or make a request, it is essential that your audience understand you clearly and easily. The clearer your message is, the easier it is for your reader to do what you want them to do. Here are a few easy ways to make your business emails more reader-friendly.

WRITE SIMPLY: STRIVE TO BE UNDERSTOOD RATHER THAN TO IMPRESS

In an effort to sound more "professional," some actuaries fall into the trap of using overly formal language that obscures their message. No, changing every instance of "use" to "utilize"[1] isn't fooling anyone! Similarly, using pompous language like "thus" or "pursuant to your request" will only distance yourself from your reader and slow them down. Avoid words that sound like they belong in a legal contract.

Rather than trying to impress your reader with fancy words, focus on making it as easy as possible for your reader to understand your message. If you wouldn't say it in person, it probably doesn't belong in an email either. Your writing will be more easily understood with simple, conversational language.

> *"I love words but I don't like strange ones. You don't understand them, and they don't understand you. Old words is like old friends—you know 'em the minute you see 'em."*
>
> —Will Rogers

GET TO THE POINT

It might seem logical to organize your message chronologically: providing background upfront, describing the current status of your issue, and ending with your request and next steps. However, your message will be clearer if you structure it with the reader in mind and lead with your main point.

1. Begin with the **purpose of the note.** What are you asking the reader to do? This will help the reader know what to focus on in the rest of your email. Everything else in your note should tie back to this message.
2. Next, include **relevant background information.** Since you've already told the reader what they need to do with this note, they'll have the context to process this information more effectively.
3. End the note by expanding on your message and clearly defining **next steps and deadlines.**

> *"If you have an important point to make, don't try to be subtle or clever. Use a pile driver. Hit the point once. Then come back and hit it again. Then hit it a third time—a tremendous whack."*
>
> —Winston Churchill

WRITE CONCISELY

If you find yourself wishing there was a formula for effective writing, you're not alone! In an effort to simplify technical manuals in the 1970s, the U.S. Navy hired Ph.D. researchers who developed the Flesch-Kincaid Grade Level Formula.[2] The U.S. Department of Defense still uses this formula today to measure readability and set standards for technical documents. The Grade Level estimates the number of years of U.S. education required to understand the document. As a general rule, business emails shouldn't exceed the 10–12 range.

$$0.39 * \left(\frac{total \quad words}{total \quad sentences} \right) +$$

$$11.8 * \left(\frac{total \quad syllables}{total \quad words} \right) - 15.59$$

This formula suggests that you can make your writing more readable by reducing the words per sentence or reducing the syllables per word. This may seem obvious, but in practice this means constantly looking for opportunities to break long sentences into separate thoughts or to replace "fancy" words with simpler ones. Although these aren't the only factors that matter, they are two key ways to improve your writing's readability.

> *"The most valuable of all talents is that of never using two words when one will do."*
>
> —Thomas Jefferson

ENDNOTES

1. Although "utilize" is commonly used interchangeably as a synonym of "use," it is often used incorrectly. "Utilize" suggests a new use for something other than its intended purpose. For example, a pricing model may be *used or utilized* for some ad hoc analysis, but a pricing model can only be *used but not utilized* for pricing. Ironically, writing "utilize" incorrectly in an attempt to show off an impressive vocabulary can demonstrate the opposite!
2. Microsoft Word automatically calculates the Flesch-Kincaid Grade Level at the end of a spelling and grammar check if the following option is enabled: [Word Options]>[Proofing]>[Show readability statistics].

Paul Andrejko, FSA, CERA, MAAA, is an associate actuary at Prudential Financial. He can be reached at paul.andrejko@prudential.com.

Actuary of the Future Software Survey

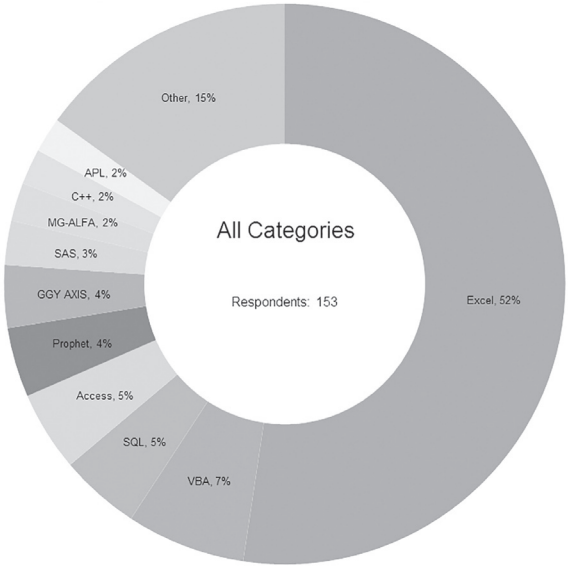
By Michael Adams

A common request that we at the Actuary of the Future (AOF) Section receive from students studying to become actuaries is for recommendations of software that they should focus on to prepare themselves for their careers. To this point, we conducted a survey that we feel can help steer students in the right direction in this respect.

To accomplish this, we asked actuaries in different Society of Actuaries (SOA) sections to complete a survey identifying what computer software they use on the job, and how much of their time they spend on each. We received responses from 153 actuaries across multiple disciplines and career progressions, and consolidated them into reports for distribution to universities across the country.

The initial intention was for the percentages provided by a given respondent to total to the percentage of their working time spent in any computer program, so that we can provide information about how much time actuaries spend in these programs in total. In reviewing the results, we found that a large portion of the responses totaled to greater than or equal to 100 percent. Therefore, the results in this article as well as the reports that we distribute will not include this metric, and the percentages associated with each program should be interpreted as the proportion of time spent using that program, as a part of the total time spent on all programs. Note that the study omits Microsoft Outlook, Microsoft Word, and Microsoft OneNote, because the data indicates that some respondents did not include these as data points, while others did.

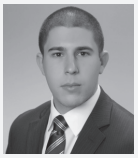
Below are the results of the study for our dataset as a whole. This includes all fields, industries and position levels.



As expected, Microsoft Excel (Excel) is consistently more heavily used among actuaries when compared to other programs. Visual Basic for Applications (VBA), SQL and Access generally follow Excel, but with lesser magnitudes of usage.

Opposite is a summary of the results in more detail—that is, the results are split out between different fields, industries and position levels. Similar graphs are possible with different combinations of those three parameters; however, sample sizes decrease significantly in the various combinations.

We want to thank those who participated in the survey, and invite others to participate as we update this study in the future. If you have any questions or are interested in seeing the anonymized raw data, don't hesitate to contact me at *michael.adams452@gmail.com.* ■



Michael Adams is an actuarial analyst in San Diego, Calif. He graduated from the University of California, Santa Barbara actuarial program (class of 2012) and serves as a council member of the Actuary of the Future Section.

Summary of Software Usage by Field, Industry and Position

Based on a survey of 153 actuaries in the Society of Actuaries

July 2015

Notes:

1. *Percentages associated with each program should be interpreted as the proportion of time spent using that program, as a part of the total time spent on all programs.*
2. *Some respondents provided software usage data, but did not indicate certain classifications. This is the cause of some respondent counts totaled across classifications not equaling 153.*
3. *Study omits Microsoft Outlook, Microsoft Word and Microsoft OneNote.*

Conducted by the Actuary of the Future Section of the Society of Actuaries

An Uncharacteristic Application of Actuarial Science—Card Counting in Blackjack

By Michael Adams

College graduates coming into the actuarial profession usually have one goal in mind: to pass their exams and gain employment as an actuary. At this level in their career, it's expected. As with any professional, actuarial students' career goals and aspirations will shift as they grow as professionals and are exposed to different types of work. A student of actuarial science is very well-suited for these shifting career objectives due to the fact that preparation for the field involves mastery of many *transferrable* core skills.

On the preliminary exams, an actuary will learn about probability, statistics, financial mathematics, modeling mortality and other uncertain events. On the job, skills such as data analysis, model development and programming become more prominent. A professional with a strong command of these skills is well-positioned for a successful career in almost any analytical field.

The purpose of this article is to demonstrate how this array of skills can be used to analyze a complex system of uncertain events with results applicable in the real world—to some. This brings us to the casino game called blackjack.

CARD COUNTING IN BLACKJACK

Blackjack has been long-studied by statisticians due to a unique characteristic that the game possesses: being purely chalked up to chance, which sometimes varies into the player's favor depending on past cards dealt. Players who can identify intervals of the game during which they have the edge over the dealer can increase their bets to take advantage of their edge. The common term for the process players use to obtain information about the current state of the deck is "card counting."

The process of card counting involves players keeping a running "count" in their head by summing pre-determined values associated with each card that has come up on the deck. Generally, lower cards have higher associated values (+1, +2, etc.) and higher cards have lower associated values. There are numerous counting strategies with different values associated with the cards. But universally, the nature of the game is such that having more high cards left in the deck is beneficial to the player. Therefore, more lower cards coming out equates to more high cards left to be played in the deck, while a higher count indicates to the players that the deck might be in their favor.

THE MODEL

Pulling from some of the tools I learned on our preliminary exams and my extensive work experience in Microsoft Excel, I used Bayesian and conditional probability to develop a dynamic chart of optimal player moves (hit, stay, double, split, surrender) based on the player's hand and the card that the dealer is showing. The chart contains expected values for each move and is based on a set of game variants.

With this model and some assumptions, we can perform calculations to obtain a composite expected value for the game and a chart of optimal moves for a player—information that is readily available with an Internet search. However, I emphasize that this model is dynamic because it depends on the user-inputted composition of the remaining deck, which brings me to the Monte Carlo simulations.

SIMULATIONS

A big part of many actuarial students' training and on-the-job work is programming. A useful programming language that complements Excel work is Visual Basic for Applications (VBA). Using my work experience in various programming languages and in VBA directly, I developed a program that performs millions of blackjack game simulations, updating the deck composition after each card that comes out. This program, paired with the model described above, provides a complete picture of real-life blackjack games, which I use to model the relative effectiveness of various card-counting strategies as well as other metrics of the game.

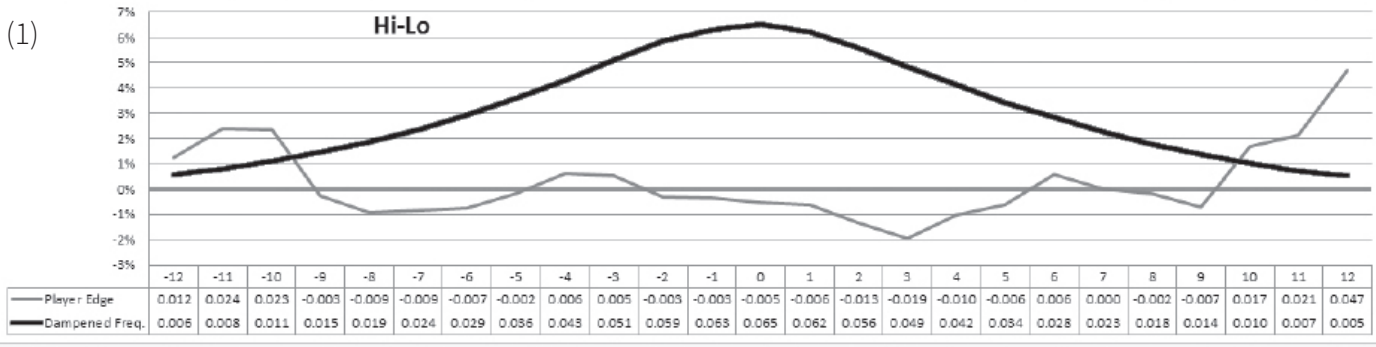
DATA AND RESULTS

Similar to an actuarial model used in practice, the user can input various game parameters, customize the card-counting strategies, and run the model to produce a rich dataset of gameplay data that can be mined for informative game metrics and strategy performance. Using this output, players can tweak their strategies and see the quantitative impact that these changes make on their performance.

The richness of the data and customizability of the model allow the users to answer almost any question they have about the game. One useful way to visually represent the results of the trial is to plot the user's deck edge against the running count using a particular counting strategy, determined by the user. For example, here are two counting strategies: the strategy most commonly used by counters called Hi-Lo (1) and a less popular strategy called *Revere Adv. Plus-Minus* (2). While both use pre-determined values assigned to each card, the values differ between the two strategies.

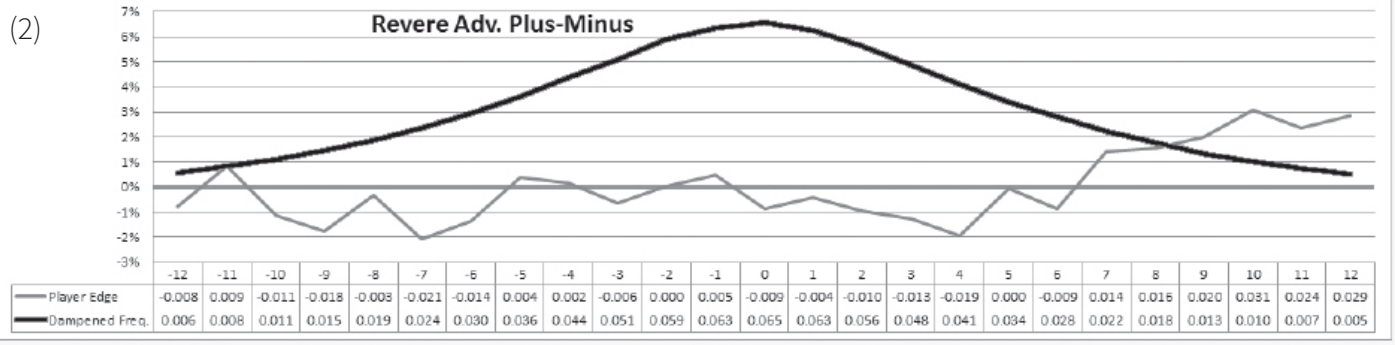
In comparing these two strategies on the same simulation

(1)



	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12
Player Edge	0.012	0.024	0.023	-0.003	-0.009	-0.009	-0.007	-0.002	0.006	0.005	-0.003	-0.003	-0.005	-0.006	-0.013	-0.019	-0.010	-0.006	0.006	0.000	-0.002	-0.007	0.017	0.021	0.047
Dampened Freq.	0.006	0.008	0.011	0.015	0.019	0.024	0.029	0.036	0.043	0.051	0.059	0.063	0.065	0.062	0.056	0.049	0.042	0.034	0.028	0.023	0.018	0.014	0.010	0.007	0.005

(2)



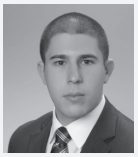
	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12
Player Edge	-0.008	0.009	-0.011	-0.018	-0.008	-0.021	-0.014	0.004	0.002	-0.006	0.000	0.005	-0.009	-0.004	-0.010	-0.013	-0.019	0.000	-0.009	0.014	0.016	0.020	0.031	0.024	0.029
Dampened Freq.	0.006	0.008	0.011	0.015	0.019	0.024	0.030	0.036	0.044	0.051	0.059	0.063	0.065	0.063	0.056	0.048	0.041	0.034	0.028	0.022	0.018	0.013	0.010	0.007	0.005

run (with about half a million game simulations), you can see that they behave differently, and informed counters can adjust their betting strategy accordingly. A big part of card counting is doing so in a discreet manner. Card counting is not illegal, but many casinos that suspect you of counting will ask you to leave the casino. With this in mind, one could argue that the second strategy in our example is marginally better than the first. You can see that whereas the player's edge in (1) increases to above 0 percent sharply at count 10, the player's edge using (2) gradually increases above 0 percent starting at count 7, and stays there for a wider count interval. This enables players using (2) to gradually increase their bets to take advantage of their edge, while avoiding the casino's arousal of suspicion.

Additionally, you can see from these graphs that even with playing 500,000+ games, there is still a great deal of volatility. This arises partially from the "all-or-nothing" nature of blackjack game outcomes, and partially from the fact that card counting at its best is still only a weak indicator of player edge.

My intent with this article is not to argue that an actuary would be wise to career-change into counting cards at casinos. Rather, it is to demonstrate that the array of skills we develop in our studies and on the job enables us to conquer a very broad range of analytical pursuits, not limited to traditional actuarial work in insurance or consulting. We can apply our skills to perform complex analyses that wouldn't be possible without our thorough understanding of statistics, modeling and complex systems.

If you have any questions, comments or suggestions, please feel free to reach out to me at *michael.adams452@gmail.com*. ■



Michael Adams is an actuarial analyst in San Diego, Calif. He graduated from the University of California, Santa Barbara actuarial program (class of 2012) and serves as a council member of the Actuary of the Future Section.

SOCIETY OF ACTUARIES

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