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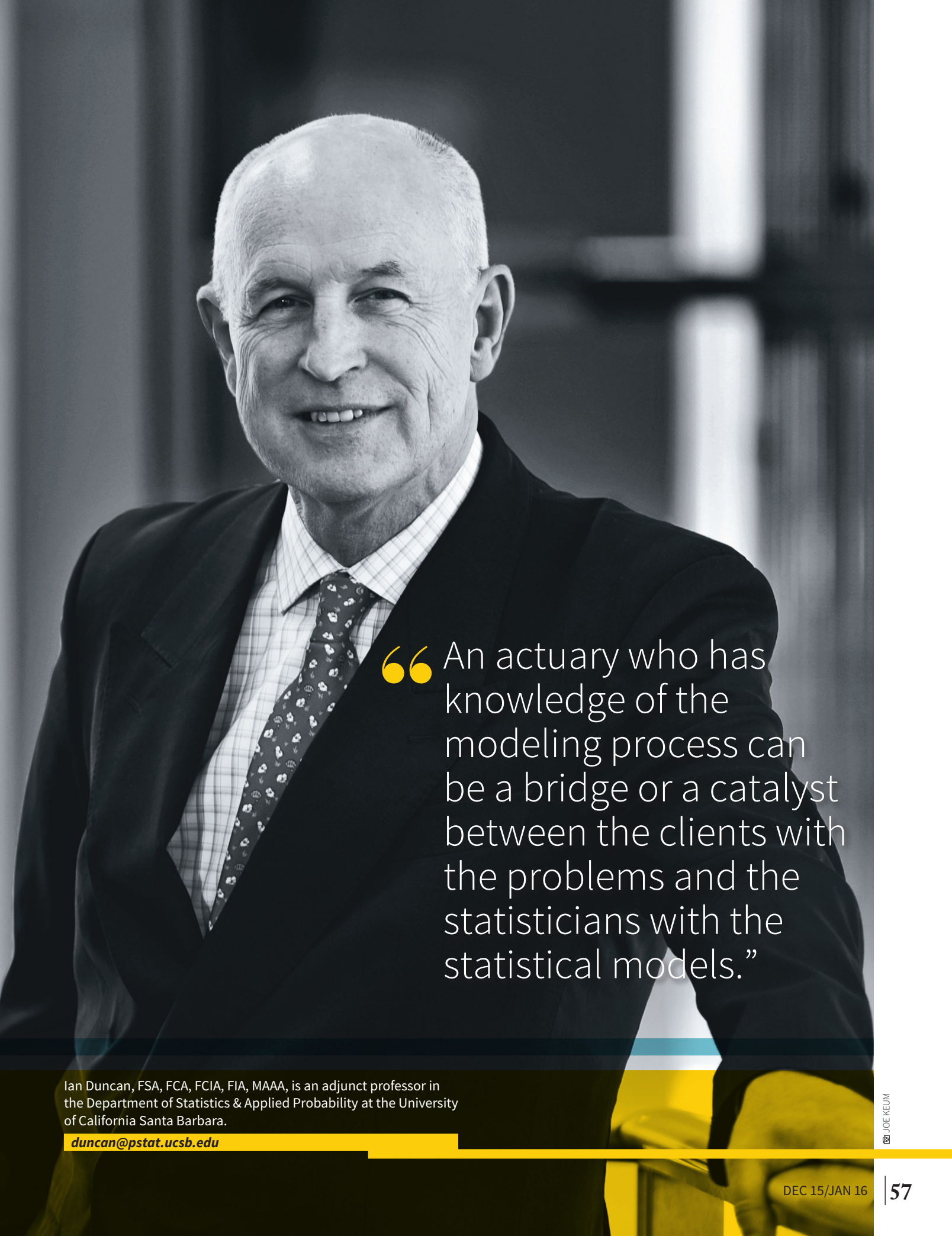
Q&A

PREDICTIVE PIONEER

Q&A WITH IAN DUNCAN, PROFESSOR OF ACTUARIAL SCIENCE

Q: Tell us a little about your background. How did you make the decision to become an actuary?

A: I was interested in the actuarial profession while I was studying for an undergraduate degree in mathematics and economics. I had a summer internship at an insurance company and disliked it; I had no idea what I was doing, and everyone kept telling me how hard the exams were and how hard you had to study. I then pursued a graduate degree in economics at Oxford and considered becoming an academic. But I liked the precision of the actuarial approach to things such as interest and present value, and suddenly the actuarial profession looked more appealing. Plus, you got paid to study. I left before starting my dissertation (more on that later) and became an actuarial student in London.



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Q: Would you provide some work history and how it segued into your interest in predictive analytics?

A: I had a fairly typical actuarial student career (rotating from pensions to valuation to international to reinsurance). But what was atypical was moving from England to Canada and then to the United States. Consulting, with the variety of projects and clients, was appealing, and I had the opportunity to start a health actuarial practice at Aetna. When Aetna got out of the business, I moved to Price Waterhouse.

At PW, I had the opportunity to work in management consulting, which was a significant learning experience. I first encountered predictive analytics (PA) sometime around 1995 while leading an underwriting automation project for a large health insurer. They had a team of doctors that manually evaluated high-cost claimants and gave prognoses for future costs. I asked why this couldn't be modeled and automated. I don't think the models existed at the time and, to be honest, access to data was too difficult to have made it practical. But the idea was there.

My next predictive analytics project was working in a consulting role to develop a model to predict variable annuity terminations for a life insurer. Some years later, I had the opportunity to join a health predictive modeling startup, which provided another major learning experience in terms of modeling and data management as well as the difficulties of applying modeling in an operational environment. Today, I am at the University of California Santa Barbara and continue to consult on a number of PA clients.

Q: What skills positioned you for work in predictive analytics?

A: My technical skills consisted of having had tutorials in econometrics (regression) at Oxford—that was it. Everything else I taught myself. But I would say that my role in different jobs has been that of a consultant: understanding what PA can do and then organizing others to deliver models, working with the client to see the vision, and implementing the models.

Q: What skills do actuaries bring to analytics that other professionals may not?

A: I work with statistics Ph.D. students, who I find understand the modeling. However, they don't have the business context, understanding of the data, nor the

vision to understand how to solve the business problem with a PA model. Nor are they trained in the evaluation and management of risk, which is what sets actuaries apart from other professionals in this space. Some commentators suggest that actuaries can apply their modeling skills in other businesses (we have an alumnus who works at Uber, so this is possible). But our differentiator as actuaries is risk, so our biggest opportunity is in insurance and related businesses.

I think an actuary who has knowledge of the modeling process (without necessarily being an expert) can be a bridge or a catalyst between the clients with the problems and the statisticians with the statistical models. Of course, actuaries could significantly ramp up their statistical knowledge and do it all, and I think that will happen in time as we broaden the ASA syllabus and expand the actuarial knowledge base.

Q: What advice do you have for people who may be interested in positions in predictive analytics?

A: It depends on your level. If you are a college student, get plenty of statistics courses in methods such as generalized linear models, regression and time series, and build up a portfolio of relevant work to show employers.

If you are a more seasoned actuary with broad experience, the questions to ask include how data and automation could improve the timeliness and accuracy of whatever process you are involved in (underwriting, reserving, risk management, etc.). If you are fortunate enough to have actuarial students, who are probably trained in methods and models, work with them to figure out how models can address your needs.

There are also university courses that you can consider. There has been an explosion of courses in predictive modeling, in addition to more traditional courses in statistics.

One thing, though, that more experienced actuaries will need to be willing to do is potentially take a step back in their careers and compensation. The payoff will be significant, but the short-term sacrifice could be nontrivial for some actuaries.

Q: Tell our readers something they may not know about predictive analytics.

A: The SOA Predictive Analytics initiative will feature actuaries and their models and projects, allowing inter-

ested parties to get a broad exposure to the topic. What I find interesting about the models is the economics. Think about this: If we rank a population in terms of a particular outcome that we want to change (e.g., by targeting them in a marketing campaign), the question is how many members of the population should we be targeting?

Some of my published work has been in the area of constructing economic models in health care. How do we estimate the potential return from a program and use this information to structure and run a program? I think there is a feeling that predictive models tell us who will do what. However, the more important use is operational: identifying a subset of members who represent an opportunity and then determining how to engage them.

Q: Where do you see opportunities for actuaries in the predictive analytics arena?

A: I work in health care, where there are two types of PA opportunities. The first is in a traditional actuarial area: risk adjustment, which uses predictive models to normalize populations. The second is in the area of case-finding:

identifying high-risk patients for medical management. Before the Affordable Care Act banned underwriting, these models could be used for underwriting and pricing purposes. Now, health plans, hospitals and accountable care organizations have a common interest in knowing what the future holds for their high-risk patients, and what can be done to improve the outcome both clinically and financially. This is a big opportunity if actuaries are willing to get involved in the operations.

Q: What is the SOA doing to support members and help candidates prepare for this growth in demand? Are there other support mechanisms you feel would be helpful to have in place?

A: I have been privileged to be involved in the SOA's Cultivate Opportunities Team during my board term and to have led the SOA Predictive Analytics initiative. I am pleased to say that the board in June endorsed the plan to raise the profile of actuaries in PA. This endorsement comes with a significant commitment of funds, in addition to a



BEING TRAINED IN THE EVALUATION AND MANAGEMENT OF RISK IS WHAT SETS ACTUARIES APART FROM OTHER PROFESSIONALS IN THE PREDICTIVE ANALYTICS SPACE.



major overhaul of the ASA exams to include PA. The SOA's liaison with universities, particularly with Centers of Actuarial Excellence, allows us to collaborate with educators to ensure that candidates are alerted to the opportunity and receive appropriate training.

The SOA has sponsored a professional development course in Advanced Analytics for some years and is expanding its offerings this year with a similar seminar in Health PA. There also has been a significant increase in the number of PA offerings at SOA meetings.

There is one important area in which I hope to see progress. The Casualty Actuarial Society (CAS) is also promoting actuaries in PA, and our efforts would be stronger and more efficient if we could pool our resources, as we do with the Joint Risk Management

Section of the SOA, CAS and Canadian Institute of Actuaries, and Chartered Enterprise Risk Analyst initiatives.

Q: What are some of your best professional memories/experiences as an actuary that may inspire others to explore different actuarial paths?

A: Being an actuary enabled me to come to the United States, which has been a great experience because of the vast range of professional and personal possibilities that the country offers. I would say that the greatest professional experience, though, was starting and running a small health care consulting company. Everyone should

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have the experience of starting and running a company—it's the best way to learn about business in a very short space of time!

Q: If you could turn back the clock, knowing all that you know now, would you choose the actuarial profession again? If yes, why?

A: I said I would come back to the dissertation topic again! I left Oxford and started as an actuarial student (feeling old at 26) because I thought that if I didn't, I would be too old to do the exams. But I always wanted to finish my dissertation, and 40 years later I am a

candidate at Heriot-Watt University in Edinburgh (one of the largest U.K. actuarial programs). Talk about being too old! The topic, for those interested, is an application of Markov modeling to prediction of different health states. Having to do over, I probably would have finished the Ph.D. first.

The actuarial profession has been very good to me: It has allowed me to live in three different countries, change the focus of my career several times and always provided interesting challenges. I also met my wife, Janet (FCAS, FSA), through the profession. I would hate to give up all the good things that I have experienced by turning the clock back. ■

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