2019 UCSB InsurTech Summit

University of California at Santa Barbara

FRIDAY MAY 3, 2019

Schedule

Friday, May 3, 2019: Marine Science Building Auditorium, UCSB Campus

Start	End	
8:30 AM	8:55 AM	**Continental Breakfast with coffee & tea** **2nd floor terrace**
8:55 AM	9:00 AM	Introductions *Mike Ludkovski, Chair, Statistics and Applied Probability; Co-Director Center for Financial Mathematics and Actuarial Research*
9:00 AM	9:40 AM	Arthur Charpentier *Insurance: Risk Pooling vs. Price Segmentation*
9:40 AM	10:20 AM	Francois Millard *Solving the Last Mile Problem: Linking Data, Design and Behavior Change*
10:20 AM	10:45 AM	**Coffee Break**
10:45 AM	11:25 AM	Emiliano Valdez *Metamodels and the Valuation of Large Variable Annuity Portfolios*
11:25 AM	12:05 PM	Howard Zail *Using Gaussian Processes in Risk Analysis for Property & Casualty Liabilities*
12:05 PM	1:45 PM	**Lunch**
1:45 PM	2:25 PM	Yiding Jiang *An Application of AI and Predictive Modeling to Addressing Gaps in Care in Medicine: Need, Solution, Challenges*
2:25 PM	3:05 PM	Brian Hartman *Predicting High-cost Members in the HCCI Database*
3:05 PM	3:30 PM	**Coffee Break**
3:30 PM	4:10 PM	Adam Tashman *Harnessing the Information Content of Alternative Data for Insurance Carriers*
4:15 PM	5:15 PM	**Panel: Bridging InsurTech Research in Industry and Academia** *Ben Bradshaw, Sara Teppema, Ian Duncan*
5:20 PM	7:00 PM	**Student Poster Session + Wine & Cheese Reception** **sponsored by Carpe Data** { CARPE DATA 2nd floor terrace

Insurance: Risk Pooling vs. Price Segmentation

ARTHUR CHARPENTIER

(Université du Québec à Montréal, Canada)

Insurance is usually defined as "the contribution of the many to the misfortune of the few". This idea of pooling risks together using the law of large number legitimates the use of the expected value as actuarial "fair" premium. In the context of heterogeneous risks, nevertheless, it is possible to legitimate price segmentation based on observable characteristics. But in the context of "Big Data", intensive segmentation can be observed, with a much wider range of offered premium, on a given portfolio. In this talk, we will briefly get back on economical, actuarial and philosophical approaches of insurance pricing, trying to link a fair unique premium on a given population and a highly segmented one. We will then get back on recent experiments (so-called "actuarial pricing game") organized since 2015, where (real) actuaries were playing in competitive (artificial) market, that mimic real insurance market. We will get back on conclusions obtained on two editions, the first one, and the most recent one, where a dynamic version of the game was launched.

Predicting High-cost Members in the HCCI Database

BRIAN HARTMAN

(Brigham Young University)

Using the Health Care Cost Institute data (approximately 47M members over 7 years), we examine which characteristics best predict and describe high-cost members. We find that cost history, age, gender, and prescription drug coverage all predict high-costs, with cost history being the most predictive. We also compare the predictive accuracy of logistic regression to extreme gradient boosting and find that the added flexibility of the extreme gradient boosting improved the predictive power. Finally, we show that with our extremely unbalanced classes, oversampling the minority class provides a better predictive model than undersampling the majority class or using the training data as is.

An Application of AI and Predictive Modeling to Addressing Gaps in Care in Medicine: Need, Solution, Challenges

YIDING JIANG

(HealthReveal, New York City)

This session will discuss applications of AI and machine learning to address gaps in care. Despite advances in medicine, a significant portion of patients are receiving suboptimal treatment. Furthermore, medicine is becoming increasingly complex, making physicians' job more difficult. HealthReveal's AI platform ingests patients' data, creates digital twins of patients and apply our guideline directed AI algorithm to identify individualized treatment recommendations. This makes large, complex medical data concise, personalized and action oriented, enhancing physicians' capabilities. The session will also discuss a number of specific applications of predictive modeling and machine learning techniques to address data ingest, missing data problems, enhance existing risk stratification tools and in value based care model facilitation.

Solving the Last Mile Problem: Linking Data, Design and Behavior Change

François Millard

(Vitality Group, Chicago)

Insurance companies are becoming increasingly sophisticated with the use of data, and the amount of data available from different sources keep increasing. However, the insurance industry still suffers from very low client engagement. Given significant insurance risk is linked to our behaviors, are there ways we can better design our product and use the data in a way we don't just assess risk and provide coverage, but create value-added experiences and improve risk by engaging our clients?

Harnessing the Information Content of Alternative Data for Insurance Carriers

Adam Tashman

(Carpe Data, Santa Barbara)

Carpe Data started as a background check company, and in 2016 it pivoted to solve problems in the insurance industry. This talk will elaborate on some of the common problems such as fighting fraud, claims risk measurement, and entity classification. The effective application of online data presents its own set of challenges, and we discuss strategies for remediation.

Metamodels and the Valuation of Large Variable Annuity Portfolios

Emiliano Valdez

(University of Connecticut)

Metamodels, which simplify the simulation models used in the valuation of large variable annuity portfolios, have recently increased in popularity. The ordinary kriging and the GB2 regression models are examples of metamodels used to predict fair market values of variable annuity guarantees. It is well known that the distribution of fair market values is highly skewed. Ordinary kriging does not fit well skewed data but it depends only on a few parameters that can be straightforwardly estimated. GB2 regression, on the other hand, can handle skewed data but its parameter estimation can be quite challenging. In this presentation, we additionally explore the rank order kriging method, which can handle highly skewed data and depends only on a single parameter, for the valuation of large variable annuity portfolios. Our numerical results demonstrate that this rank order kriging method, when combined with hierarchical k-means for selecting representative policies, performs remarkably well in terms of fitting the skewed distribution and producing accurate estimates of fair market values at the portfolio level. This is joint work with Guojun Gan from the University of Connecticut.

Using Gaussian Processes in Risk Analysis for Property & Casualty Liabilities

Howard Zail

(Elucidor LLC, New York City)

Gaussian Processes (GPs) provide a powerful and compact means of assessing risk in a Property & Casualty setting particularly when there is limited data with which to assess risks. This presentation will show how GPs can be used for loss reserve development to estimate the necessary reserves and determine the amount of risk capital required to cover downside cases. I will show how structure can be incorporated into the kernel to enable GPs to conduct extrapolation rather than just interpolation tasks. The presentation examines how professional judgement can be incorporated into GPs through virtual data points and how GPs can be adjusted to model skewed or constrained data through the use of a hurdle model.

Panel: Bridging InsurTech Research in Industry and Academia

Ian Duncan, David Kerr, Sara Teppema

Panelists:

Ian Duncan, FSA, MAAA (UCSB and SB Actuaries) is Adjunct Associate Professor of Actuarial Statistics at the University of California Santa Barbara and president of Santa Barbara Actuaries Inc. a provider of healthcare predictive modeling and actuarial services. Mr. Duncan holds a graduate degree in economics from Balliol College, Oxford and is a post-graduate research student at Heriot-Watt University, Edinburgh. He is the author of numerous peer-reviewed papers, and several books and book chapters. His latest book, a second edition of "Healthcare Risk Adjustment and Predictive Modeling" (Actex Publications) was published in May 2018.

David Kerr, MD (Sansum Diabetes Research Institute) is Director Of Research And Innovation at Sansum Diabetes Research Institute in Santa Barbara, CA. He is the creator of latinodiabetes.net and diabetestravel.org and co-founder of the Digital Diabetes Congress. Since 2007 he has been a Visiting Professor at Bournemouth University. Dr. Kerr holds a DM degree from University of Nottingham, UK.

Sara Teppema, FSA, MAAA (Blue Cross Blue Shield of Illinois) has over 25 years of health care and actuarial experience, primarily in consulting. She currently designs value-based care models for a large health insurer. She is a member of the board of directors of the Society of Actuaries and is heavily involved in SOA research activity, as well as SOA initiatives for diversity and public health.