<table>
<thead>
<tr>
<th>Time</th>
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<tbody>
<tr>
<td>09:00-09:05 a.m.</td>
<td>Announcement and Introduction of Dean of the College of Business</td>
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<tr>
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<td>Sue Vagts, Director of Actuarial Science at University of Nebraska-Lincoln</td>
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<tr>
<td>09:05-09:15 a.m.</td>
<td>Welcome to ARC 2020</td>
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<tr>
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<td>Kathy Farrell, Dean of the College of Business</td>
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<tr>
<td>09:15-09:30 a.m.</td>
<td>Instructions and Recognition of Sponsors</td>
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<tr>
<td>09:30-10:15 a.m.</td>
<td>Keynote Speaker: The COVID-19 Pandemic: Updates and a Perspective</td>
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<td>Michael T. Osterholm, PhD, School of Public Health, University of Minnesota</td>
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<td><strong>Moderator:</strong> Max Rudolph, Rudolph Financial Consulting, LLC</td>
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<tr>
<td>10:15-10:30 a.m.</td>
<td>Break</td>
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<tr>
<td>10:30-11:45 a.m.</td>
<td>Concurrent Sessions 1</td>
</tr>
<tr>
<td>1-SIS-A</td>
<td>Climate Data: Use &amp; Management</td>
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<td></td>
<td><strong>Moderator:</strong> Rob Montgomery, Society of Actuaries Consultant</td>
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<td><strong>Panelists:</strong> Patrick Wiese, Society of Actuaries</td>
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<td>David Schneider, National Center for Atmospheric Research</td>
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<td>James Penn, Deloitte LLP</td>
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<tr>
<td></td>
<td>Cindy Bruyère, National Center for Atmospheric Research</td>
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<tr>
<td>1-SIS-B</td>
<td>The Micro-Insurance Landscape</td>
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<td><strong>Moderator:</strong> Ida Ferrara, York University</td>
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<td></td>
<td><strong>Panelists:</strong> Barbara Magnoni, EA Consultants</td>
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<td>Michael J. McCord, MicroInsurance Center at Milliman</td>
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<tr>
<td>1-SIS-C</td>
<td>COVID-19: International Perspectives</td>
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<td><strong>Moderator:</strong> John Robinson, Life Insurance Regulator, Minnesota</td>
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<td><strong>Panelists:</strong> Doug Andrews, University of Waterloo</td>
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<td>Shubhash Gosine, Duggan Associates</td>
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<tr>
<td>1-PS-A</td>
<td>Cyber Risk</td>
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<td><strong>Moderator:</strong> Maochao Xu, Illinois State University</td>
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<tr>
<td>10:30-10:55 a.m.</td>
<td>Cyber Claim Analysis Through Generalized Pareto Regression Trees With Applications to Insurance</td>
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<tr>
<td></td>
<td><strong>Authors:</strong> Sébastien Farkas,* Sorbonne University</td>
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<td>Olivier Lopez, Sorbonne University</td>
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<td>Maud Thomas, Sorbonne University</td>
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</table>
## 2020 ARC Annual Meeting Agenda

### 10:55-11:20 a.m.

**Extreme Cyber Losses: An Alternative Approach to Estimating Probable Maximum Loss for Data Breach Risk**
Authors: Kwangmin Jung,* POSTECH/Drake University

### 11:20-11:45 a.m.

**Unraveling Dependence Among Cyber Risks**
Authors: Maochao Xu,* Illinois State University

### 1-PS-B

**Post-Retirement Benefits**

**Moderator:** Peter Hieber, University of Ulm

### 10:30-10:55 a.m.

**AHP Application to Post-Retirement Planning and Decision-Revisited**
Authors: Marie-Claire Koissi,* University of Wisconsin-EC
Arnold F. Shapiro, Penn State University

### 10:55-11:20 a.m.

**Tail Index-Linked Annuity: A Longevity Risk Sharing Retirement Plan**
Authors: Mark Schultze,* Ulm University
An Chen, Ulm University
Hong Li, University of Manitoba
Mark Schultze, Ulm University

### 11:20-11:45 a.m.

**Optimal Retirement Products Under Subjective Mortality Beliefs**
Authors: Peter Hieber,* University of Ulm/Université Catholique de Louvain
An Chen, University of Ulm
Manuel Rach, University of Ulm

### 1-PS-C

**Actuarial Mathematics**

**Moderator:** Jean-François Bégin, Simon Fraser University

### 10:30-10:55 a.m.

**Probability of Up-Crossing Before Ruin for a Levy Process Having Two-Sided Jumps**
Authors: Mohammad Jamsher Ali,* University of Tartu

### 10:55-11:20 a.m.

**Analysis of Bounds for the Tail of Bivariate Compound Distributions**
Authors: Ang Li,* University of Western Ontario
Jiandong Ren, University of Western Ontario
Ricardas Zitikis, University of Western Ontario

### 11:20-11:45 a.m.

**Do Jumps Matter in the Long Run? A Tale of Two Horizons**
Authors: Jean-François Bégin,* Simon Fraser University
Mathieu Boudreault, Université du Québec à Montréal

### 11:45 a.m.-12:45 p.m.

**Lunch Break - Fun and Games**
## Concurrent Sessions 2

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Speaker(s)</th>
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<tbody>
<tr>
<td>12:45-02:00 p.m.</td>
<td><strong>2-SIS-A</strong> COVID-19 Overview</td>
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<tr>
<td>Moderator:</td>
<td>Rhonda Ahrens, Nebraska Department of Insurance</td>
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<tr>
<td>Panelists:</td>
<td>Dale Hall, Society of Actuaries</td>
<td>Max Rudolph, Rudolph Financial Consulting, LLC</td>
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<tr>
<td>12:45-02:00 p.m.</td>
<td><strong>2-SIS-B</strong> US Health Care Reform Efforts: State Solutions To Stabilization Of Individual Market Premiums Through CMS Waivers</td>
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<td>Moderator:</td>
<td>Steven Konnath, Blue Cross and Blue Shield of Nebraska</td>
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<tr>
<td>Panelists:</td>
<td>Rick Rush, GERICK</td>
<td>Michael Cohen, Wakely</td>
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<td>Veronica Fontama, Kaiser Permanente</td>
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<tr>
<td>12:45-01:10 p.m.</td>
<td><strong>2-PS-A</strong> Actuarial Techniques for COVID-19</td>
<td>Hirbod Assa, University of Liverpool</td>
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<td>Risk Management: Evaluating the Role of a National Risk Avoidance Policy in Limiting the Spread of Corona Virus (Perspective from Saudi Arabia)</td>
<td>Hany Saleh,* Mansoura University</td>
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<td>Authors:</td>
<td></td>
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<tr>
<td>01:10-01:35 p.m.</td>
<td><strong>Insurance-by-Credit</strong></td>
<td>Hirbod Assa,* University of Liverpool</td>
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<td>Authors:</td>
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<tr>
<td>12:45-01:10 p.m.</td>
<td><strong>2-PS-B</strong> Optimization</td>
<td>Frédéric Godin, Concordia University</td>
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<td></td>
<td>Deflators and Optimal Portfolios Under Random Horizon</td>
<td>Sina Yansori,* CIBC</td>
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<tr>
<td>Authors:</td>
<td></td>
<td>Tahir Choulli</td>
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<tr>
<td>01:10-01:35 p.m.</td>
<td><strong>Mean-Variance Investment and Risk Control Strategies: A New Time-Consistent Formulation</strong></td>
<td>Bin Zou,* University of Connecticut</td>
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<tr>
<td>Authors:</td>
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<tr>
<td>01:35-02:00 p.m.</td>
<td><strong>A Mixed Bond and Equity Fund Model for the Valuation of Segregated Fund Policies</strong></td>
<td>Frédéric Godin,* Concordia University</td>
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<td>Authors:</td>
<td></td>
<td>Maciej Augustyniak, University of Montreal,</td>
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<td>Emmanuel Hamel, Université Laval</td>
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<td>Session</td>
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<tr>
<td>2-PS-C</td>
<td>Statistical Issues</td>
<td>Chudamani Poudyal, Tennessee Technological University</td>
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<tr>
<td>12:45-01:10 p.m.</td>
<td>Introduction to Splines and Their Implementation in Excel</td>
<td>Manoharreddy Ramireddy,* Maryville University</td>
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<tr>
<td>12:45-01:10 p.m.</td>
<td>Regression Shrinkage and Selection for Actuarial Models</td>
<td>Gee Lee,* Michigan State University</td>
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<tr>
<td>01:10-01:35 p.m.</td>
<td>Estimating Longnormal Insurance Payment Severity Models</td>
<td>Chudamani Poudyal,* Tennessee Technological University</td>
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<tr>
<td>01:35-02:00 p.m.</td>
<td>Estimating Longnormal Insurance Payment Severity Models</td>
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<td>02:00-02:15 p.m.</td>
<td>Break</td>
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<tr>
<td>02:15-03:30 p.m.</td>
<td>Concurrent Sessions 3</td>
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<tr>
<td>3-SIS-A</td>
<td>Parametric Insurance</td>
<td>Denise Olson, Zurich North America</td>
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<tr>
<td>3-SIS-B</td>
<td>Natural Hazards Risk Management</td>
<td>Shasta Gaughen, Pala Environmental Department</td>
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<tr>
<td>3-SIS-C</td>
<td>COVID-19: Life Insurance and Assets</td>
<td>Noel Harewood, Ameritas</td>
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<td>Andrew Hallsworth, SCOR</td>
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<td>Edward Toy, Risk Regulatory Consulting</td>
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</tbody>
</table>
3-PS-A  Machine Learning
Moderator:  Arnold Shapiro, Penn State University

02:15-02:40 p.m.  Joint Dynamic Pricing of Multiple Non-Life Perils Using Neural Networks and Telematics
Authors:  Roel Henckaerts,* Katholieke Universiteit Leuven
          Katrien Antonio, Katholieke Universiteit Leuven
          Marie-Pier Côté, Université Laval

02:40-03:05 p.m.  Quantile Regression Mixtures for Robust Estimates of Insurance Misrepresentation
Authors:  Jianxi Su,* Purdue University
          Hong Li, University of Manitoba
          Qifan Song, Purdue University

03:05-03:30 p.m.  Machine Learning: What Is It, What Are Its Components, and What Are Its Implications for the Insurance Industry?
Authors:  Arnold Shapiro,* Penn State University

3-PS-B  Variable Annuities
Moderator:  Thorsten Moenig, Temple University

02:15-02:40 p.m.  Pseudo-Model-Free Hedging for Variable Annuities Via Deep Reinforcement Learning
Authors:  Haoen Cui,* Georgia Institute of Technology
          Wing Fung Chong, University of Illinois at Urbana-Champaign
          Yuxuan Li, University of Illinois at Urbana-Champaign

02:40-03:05 p.m.  Green Nested Simulation of Variable Annuities
Authors:  Jessica Dang,* University of Waterloo
          Ben Feng, University of Waterloo
          Mary Hardy, University of Waterloo

03:05-03:30 p.m.  Efficient Valuation of Variable Annuity Portfolios With Dynamic Programming
Authors:  Thorsten Moenig,* Temple University

3-PS-C  Optimization
Moderator:  Silvana Pesenti, University of Toronto

02:15-02:40 p.m.  Bilateral Risk Sharing with Heterogeneous Beliefs and Exposure Constraints
Authors:  Mario Ghossoub,* University of Waterloo
          Tim J. Boonen, University of Amsterdam
02:40-03:05 p.m. **Optimal Investment and Consumption With Forward Preferences and Uncertain Parameters**  
**Authors:** Wing Fung Chong,* University of Illinois at Urbana-Champaign  
Gechun Liang, University of Warwick

03:05-03:30 p.m. **Portfolio Optimisation Within a Wasserstein Ball**  
**Authors:** Silvana Pesenti,* University of Toronto  
Sebastian Jaimungal, University of Toronto

03:30-03:45 p.m. **Break**

03:45-05:00 p.m. **Concurrent Sessions 4**

<table>
<thead>
<tr>
<th>4-SIS-A</th>
<th>Resolved: The United States Should Require That Persons in the United States Be Vaccinated if an Efficacious Covid-19 Vaccine Becomes Available</th>
<th>DEBATE</th>
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<tr>
<td><strong>Moderator:</strong></td>
<td>John Robinson, Life Insurance Regulator, Minnesota</td>
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</table>
| **Panelists:** | David Cram Helwich, Debating Coach, University of Minnesota  
Brian Rubaie, Debating Coach, University of Iowa  
Hamza Jamal, University of Minnesota  
Allegro Wang, University of Minnesota  
Elizabeth Bennett, University of Iowa  
Spencer Roetlin, University of Iowa |

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<tr>
<th>4-PS-A</th>
<th>Health Economics</th>
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<tr>
<td><strong>Moderator:</strong></td>
<td>Ian Duncan, University of California, Santa Barbara</td>
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</tbody>
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03:45-04:10 p.m. **Trends in Pre-Diabetes: A Longitudinal Study of a South African Cohort**  
**Authors:** Sam Zhang,* University of California, Santa Barbara  
Kyle Guan,* University of California-Santa Barbara  
Lingyu Zhou,* University of California-Santa Barbara

04:10-04:35 p.m. **Polypharmacy, Medication Possession and Deprescribing of Potentially Non-Beneficial Drugs In Hospice Patients**  
**Authors:** Ian Duncan,* University of California, Santa Barbara  
Terri Maxwell, Turn-Key Health

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<tr>
<th>4-PS-B</th>
<th>Loss Reserving</th>
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<tr>
<td><strong>Moderator:</strong></td>
<td>Anas Abdallah, McMaster University</td>
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03:45-04:10 p.m. **Tort Reform and Physician Moral Hazard**  
**Authors:** Juan Zhang,* NAIC
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<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
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</thead>
</table>
| 04:10-04:35 p.m. | Macro and Micro Loss Reserves With Inflation, Discount, Trends and Dependence | Authors: Anas Abdallah,* McMaster University  
Emmanuel Hamel, Laval University  
Ghislain Léveillé, Laval University |                                                                          |
| 05:30-06:30 p.m. | **Poster Session**                          | Sensitivity Analysis With Chi-Square Divergences                      | Authors: Vaishno Devi Makam, University of London                                               |
|               |                                              | Joint Generalized Quantile and Conditional Tail Expectation Regression for Insurance Risk Analysis | Authors: Albert Pitarque, University of Barcelona                                             |
|               |                                              | Modelling Bivariate Count Data With Copula-Based Finite Mixture Models | Authors: Lluis Bermúdez, University of Barcelona                                             |
|               |                                              | AutoSULT: An R Package for Generating Life Contingencies Problems     | Authors: Chris Groendyke, Robert Morris University                                           |
|               |                                              | Stochastic Mortality Modelling for Dependent Coupled Lives           | Authors: Kira Henshaw, University of Liverpool                                                 |
|               |                                              | Actuarial Formula Predictor                                          | Authors: Lahiru Somaratne, University of Nebraska - Lincoln                                    |
|               |                                              | Minimizing Shootings in Multi-State and Differential Equation Models of Gun Violence | Authors: Yulong Wu, University of Michigan                                                   |
|               |                                              | Modeling Malicious Hacking Data Breach Risks                          | Authors: Hong Sun, Lanzhou University                                                          |
|               |                                              | Optimal Reinsurance and Investment Problem With Default Risk and Correlation for an Insurer Under the CEV Model | Authors: Yiqi Yan, Tianjin University                                                        |
|               |                                              | Robust Optimal Investment and Benefit Payment Adjustment Strategy for Target Benefit Pension Plans Under Default Risk | Authors: Hui Zhao, Tianjin University                                                       |
## Concurrent Sessions 5

### 5-SIS-A: Making Micro-Insurance Work for Women
- **Moderator:** Katherine Baez, Barma Management School/EA Consultants/ALAS
- **Panelists:**
  - Sarah Ebrahimi, International Finance Corporation
  - Queenie Chow, MicroInsurance Center at Milliman
  - Gilles Renouil, Women’s World Banking

### 5-SIS-B: Cyber Risk
- **Moderator:** Cindy Xu, University of Nebraska-Lincoln
- **Panelists:**
  - Martin Eling, University of St. Gallen
  - Ben Goodman, 4A Security & Compliance
  - Greg Thompson, Manulife
  - Rainer Böhme, University of Innsbruck

### 5-SIS-C: Malaysia’s National Islamic Insurance (i.e. Takaful) Scheme for the Underprivileged Group
- **Moderator:** Zainal Abidin Mohd Kassim, Actuarial Partners
- **Panelists:**
  - Jasveen Marne, Great Eastern Takaful Berhad
  - Khairul Anuar Che Yeop, Great Eastern Takaful Berhad
  - Irene Ng, GenRe Asia

### 5-PS-A: Mortality and Longevity
- **Moderator:** Fei Huang, University of New South Wales

#### Mortality Forecasting Using Factor Models: Time-Varying or Time-Invariant Factor Loadings?
- **Authors:**
  - Jianjie Shi,* Monash University
  - Lingyu He, Australian National University
  - Fei Huang, Australian National University
  - Yanrong Yang, Australian National University

#### Tempered Pareto-Type Modelling Using Weibull Distributions
- **Authors:**
  - José Carlos Araujo-Acuna,* University of Lausanne
  - Hansjörg Albrecher, University of Lausanne
  - Jan Beirlant, University of the Free State
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<tr>
<th>Time</th>
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<th>Authors</th>
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| 08:50-09:15 a.m | Modelling Life Tables With Advanced Ages: An Extreme Value Theory Approach | Fei Huang,* University of New South Wales  
                           Ross Maller, Australian National University  
                           Xu Ning, Australian National University |
| 08:00-08:25 a.m | Disability and Survival Among People aged 50+: The English Longitudinal Study of Ageing | Marjan Qazvini,* Heriot-Watt University |
| 08:25-08:50 a.m | Demand for Reverse Mortgages: The Role of Mental Accounting and Choice Bracketing | Tin Long Ho,* University of New South Wales  
                           Hazel Bateman, University of New South Wales  
                           Joshua Funder, Household Capital Pty Ltd  
                           Katja Hanewald, University of New South Wales |
| 08:50-09:15 a.m | Combining Reverse Mortgage and Long-Term Care Insurance               | Yang Shen,* University of New South Wales  
                           Michael Sherris, University of New South Wales  
                           Ning Wang, Macquarie University  
                           Jonathan Ziveyi, University of New South Wales |
| 08:00-08:25 a.m | Using Bayesian Spatiotemporal Modeling to Understand Mortality Rates in the United States | Zoe Gibbs,* Brigham Young University  
                           Chris Groendyke, Robert Morris University  
                           Brian Hartman, Brigham Young University  
                           Robert Richardson, Brigham Young University |
| 08:25-08:50 a.m | Age Heaping in Population Data of Emerging Countries                   | Andres Barajas Paz,* Heriot-Watt University  
                           Andrew Cairns, Heriot-Watt University  
                           Torsten Kleinow, Heriot-Watt University |
Full Meeting Agenda

08:50-09:15 a.m.  Subnational mortality modeling: Bayesian hierarchical models with common factors
Authors: Katja Hanewald,* University of New South Wales
Qian Lu, Renmin University of China
Xiaojun Wang, Renmin University of China

09:15-09:30 a.m.  Break

09:30-10:30 a.m.  Keynote Speaker: The Voluntary D.I.E.T. - How to Gain More Than You Lose and Still Feel Great
Jeff Johnson, FSA, MAAA, Actuary, John Hancock Life Insurance Company
Moderator: John Robinson, Life Insurance Regulator, Minnesota

10:30-10:45 a.m.  Break

10:45 a.m.-12:45 p.m.  Session 6
6-SIS-A  Diversity and Inclusion Panel
Moderator: Sharon Robinson, Zurich North America
Panelists: Adelaida Campos, Organization of Latino Actuaries President
Roy Goldman, Society of Actuaries President Elect
Mallika Bender, Co-Chair of Joint Casualty Actuarial Society/Society of Actuaries Committee on Inclusion, Equity and Diversity
Jason Leppin, Actuarial Foundation Executive Director
Jacque Friedland, Canadian Institute of Actuaries President Elect
Dwayne Husbands, International Association of Black Actuaries President Elect
Shawna Ackerman, American Academy of Actuaries Immediate Past President

12:45-01:00 a.m.  Break

01:00-02:15 p.m.  Concurrent Sessions 7
7-SIS-A  Impact of Climate Change on Vulnerable Populations
Moderator: Jesse Bell, University of Nebraska Medical Center
Panelists: Maxine Burkett, University of Hawai‘i-Mānoa
Jesse Bell, University of Nebraska Medical Center
Marty D. Matlock, University of Arkansas
Jeniffer Hanna Collado, Dominican Republic
Nicolette Elvira Cooley, Northern Arizona University
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<th>Session</th>
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<th>Authors</th>
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<tr>
<td>7-SIS-B</td>
<td>Being an Actuary</td>
<td>RT</td>
<td>John Robinson, Life Insurance Regulator, Minnesota</td>
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<td>Moderator: John Robinson, Life Insurance Regulator, Minnesota</td>
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<td>Panelists: Mischelle Schweickert, Kaiser Permanente</td>
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<td>7-PS-A</td>
<td>Actuarial Modeling</td>
<td>01:00-01:25 p.m.</td>
<td>Chau Lung Ngan Spark Tseung, University of Toronto</td>
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<td></td>
<td>Moderator: Chau Lung Ngan Spark Tseung, University of Toronto</td>
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<td>On the Cost of Misspecifying Risk Categories in Pricing</td>
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<td>Authors: Dina Finger,* University of Lausanne</td>
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<td>01:25-01:50 p.m. Deep Hedging of Long-Term Derivatives: A Numerical Study</td>
<td></td>
<td>Authors: Alexandre Carbonneau,* Concordia University</td>
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<td></td>
<td>01:50-02:15 p.m. LRMoE: An R Package for Flexible Actuarial Loss Modelling Using Mixture of Experts Regression Model</td>
<td></td>
<td>Authors: Chau Lung Ngan Spark Tseung,* University of Toronto</td>
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<tr>
<td>7-PS-B</td>
<td>Mortality and Longevity</td>
<td>01:00-01:25 p.m.</td>
<td>Hong Li, University of Manitoba</td>
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<td></td>
<td>Moderator: Hong Li, University of Manitoba</td>
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<td>Local Modeling of U.S. Mortality Rates: A Multiscale Geographically Weighted Regression Approach</td>
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<tr>
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<td>Authors: Kyran Cupido,* St. Francis Xavier University</td>
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<td>01:25-01:50 p.m. Unravelling the Contribution of Financial and Longevity Risks to Changes Over Time in Life Annuities</td>
<td></td>
<td>Authors: Jesus-Adrian Alvarez,* University of Southern Denmark</td>
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<td>Authors: Jesus-Adrian Alvarez,* University of Southern Denmark</td>
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<td></td>
<td>01:50-02:15 p.m. Forecasting Mortality With International Linkages: A Global Vector-Autoregression Approach</td>
<td></td>
<td>Authors: Hong Li,* University of Manitoba</td>
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<td>Authors: Hong Li,* University of Manitoba</td>
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</tbody>
</table>
7-PS-C Actuarial Risk Theory

Moderator: Corina Constantinescu, University of Liverpool

01:00-01:25 p.m. Ruin Probabilities for Generalisations of Cox-Renewal Risk Processes Via Time Change

Authors: Ronnie Loeffen,* University of Manchester

01:25-01:50 p.m. Ruin and Dividend Measures in the Renewal Dual Risk Model

Authors: Renata Alcoforado,* Universidade de Lisboa
Agnieszka I. Bergel, Universidade de Lisboa
Alfredo D. Egido dos Reis, Universidade de Lisboa
Rui M. R. Cardoso, Universidade Nova de Lisboa
Eugenio V. Rodriguez-Martinez, Universidade de Lisboa

01:50-02:15 p.m. A Ruin Model With a Resampled Environment

Authors: Corina Constantinescu,* University of Liverpool
Michel Mandjes, University of Amsterdam
Leonardo Rojas-Nandayapa, University of Liverpool
Guusje Delsing, University of Amsterdam

02:15-02:30 p.m. Break

02:30-03:45 p.m. Concurrent Sessions 8

8-SIS-A Climate Finance

Moderator: Thomas Singh, University of Guyana
Panelists: Michael A. Goldstein, Babson College
Steve Kolk, Kolkulations LLC
Didier Serre Ruah, Analysis Group
Rade Musulin, Finity Consulting

8-SIS-B The Impact of COVID-19 on Health Care Utilization: Commercial, Medicare and Medicaid

Moderator: Gopi Shah Goda, Stanford University
Panelists: Steven Konnath, Blue Cross & Blue Shield of Nebraska
Sabrina Gibson, Centene
Erik Anderson, Humana
### 8-PS-A  Financial Mathematics

**Moderator:** Ruodu Wang, University of Waterloo

**02:30-02:55 p.m.**

**Convolution Bounds on Quantile Aggregation**

**Authors:** Yang Liu,* Tsinghua University

Ruodu Wang, University of Waterloo

**02:55-03:20 p.m.**

**A Comprehensive Framework for Flexible Group Benefit Plans**

**Authors:** Cherie Ng,* Simon Fraser University

Jean-François Bégin, Simon Fraser University

Barbara Sanders, Simon Fraser University

**03:20-03:45 p.m.**

**Some Recent Theories for the Expected Shortfall (TVaR)**

**Authors:** Ruodu Wang,* University of Waterloo

### 8-PS-B  Predictive Modeling

**Moderator:** Margie Rosenberg, University of Wisconsin-Madison

**02:30-02:55 p.m.**

**Benchmarking Predictive Models for Insurance Pricing: A Story of Black Boxes and Surrogate Models**

**Authors:** Marie-Pier Côté,* Université Laval

Roel Henckaerts, Katholieke Universiteit Leuven

Katrien Antonio, Katholieke Universiteit Leuven

**02:55-03:20 p.m.**

**A Posteriori Ratemaking Using the Bivariate Negative Binomial-Inverse Gaussian Regression Model**

**Authors:** George Tzougas,* London School of Economics

A. Pignatelli di Cerchiara, London School of Economics

**03:20-03:45 p.m.**

**Predicting the Highest Health Care Utilizers Using Clustering Methods**

**Authors:** Margie Rosenberg,* University of Wisconsin-Madison

Fanghao Zhong, New York University

### 8-PS-C  Variable Annuities

**Moderator:** Wenchu Li, Temple University

**02:30-02:55 p.m.**

**High-Water Mark Fee Structure in Variable Annuities**

**Authors:** Yumin Wang,* University of Waterloo

David Landriault, University of Waterloo

Bin Li, University of Waterloo

Dongchen Li, University of St. Thomas
02:55-03:20 p.m. Accommodation or Obfuscation? Product Innovation in the Variable Annuities Market
Authors: Xiaochen Jing,* University of Wisconsin-Madison
         Daniel Bauer, University of Wisconsin-Madison

03:20-03:45 p.m. Basis Risk in Variable Annuities
Authors: Wenchu Li,* Temple University
         Thorsten Moenig, Temple University
         Maciej Augustyniak, University of Montreal

03:45-04:00 p.m. Break

04:00-05:15 p.m. Concurrent Sessions 9

Moderator: Mary Hegemann, Wakely
Panelists: Julia Lerche, NC Medicaid
          Ellen Breslin, Health Management Associates
          Allison Orris, Manatt Health

Moderator: Ian Sterling, KPMG
Panelists: Ian Sterling, KPMG
          Bill Van Dyke, Deloitte
          Brian Fannin, Casualty Actuarial Society
          Volker Kudszus, S&P Global
          Jefferson Gibbs, KPMG

9-PS-A Actuarial Techniques for COVID-19
Moderator: Michael Ludkovski, University of California, Santa Barbara

04:00-04:25 p.m. Pandemic Risk Management: Resources Contingency Planning and Allocation
Authors: Runhuan Feng,* University of Illinois at Urbana-Champaign
         Xiaowei Chen, Nankai University
         Wing Fung Chong, University of Illinois at Urbana-Champaign
         Linfeng Zhang, University of Illinois at Urbana-Champaign
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<th>Time</th>
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<th>Topic</th>
<th>Authors</th>
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</table>
| 04:25-04:50 p.m. |         | **Gaussian Process Modeling for Covid-19 Excess Deaths**             | Michael Ludkovski,* University of California, Santa Barbara  
Nhan Huynh, University of California, Santa Barbara |
| 04:00-04:25 p.m. | 9-PS-B  | **Cyber Risk**                                                        | Petar Jevtic, Arizona State University                                                      |
|              |         | **Statistical Modeling of Data Breaches and Its Application in Cyber Insurance** | Meng Sun,* Simon Fraser University  
Yi Lu, Simon Fraser University |
| 04:25-04:50 p.m. |         | **(Self-)Insurance of Social Networks: Dynamic Structural Percolation Model of Loss Distribution on Erdős-Rényi graphs** | Petar Jevtic,* Arizona State University  
Nicolas Lanchier, Arizona State University |
| 04:00-04:25 p.m. | 9-PS-C  | **General Insurance**                                                 | Michael Sherris, University of New South Wales                                                   |
|              |         | **Peer-to-Peer Multi-Risk Insurance and Mutual Aid**                 | Samal Abdikerimova,* University of Illinois at Urbana-Champaign  
Runhuan Feng, University of Illinois at Urbana-Champaign |
| 04:25-04:50 p.m. |         | **Demand for Non-Life Insurance under Habit Formation**             | Wenyuan Li,* University of Waterloo  
Ken Seng Tan, Nanyang Technological University  
Pengyu Wei, University of Waterloo |
| 04:50-05:15 p.m. |         | **Developments in Multi-Factor and Multi-Cohort Continuous Time Mortality Modelling** | Michael Sherris,* University of New South Wales |
| 05:30-06:30 p.m. |         | **Henry Doorly Zoo Backstage Virtual Tour Sponsored by Ameritas**     |                                                                                                                                 |
## Full Meeting Agenda

**Wednesday, August 12**

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<th>Moderator</th>
<th>Panelists</th>
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<tbody>
<tr>
<td>07:30-08:45 a.m.</td>
<td>Concurrent Sessions 10</td>
<td><strong>10-SIS-A</strong> Micro-Insurance: Case Studies and Lessons Learned</td>
<td><strong>RT</strong></td>
<td>Luis Arcila, MAPFRE - Peru</td>
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<td><strong>Moderator:</strong> Luis Arcila, MAPFRE - Peru</td>
<td><strong>Panelists:</strong> Lisa Morgan, ILO</td>
<td>Katharine Pulvermacher, MicroInsurance Network</td>
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<td>Richard Leftley, MicroEnsure</td>
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<td>Saurabh Sharma, MicroInsurance at Britam</td>
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<tr>
<td>07:30-07:55 a.m.</td>
<td><strong>10-PS-A</strong> Actuarial Risk Theory</td>
<td>Dividend Barrier Strategies in a Renewal Risk Model With Phase-Type Distributed Interclaim Times</td>
<td>Jae Youn Ahn, Ewha Womans University</td>
<td>Linlin Tian,* Nankai University</td>
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<td>Zhaoyang Liu, Nankai University</td>
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<tr>
<td>07:55-08:20 a.m.</td>
<td></td>
<td>Testing for Random Effects in Compound Risk Models via Bregman Divergence</td>
<td>Himchan Jeong,* Simon Fraser University</td>
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<tr>
<td>08:20-08:45 a.m.</td>
<td></td>
<td>Collective Risk Model: Choices Between Historical Frequency and Aggregate Severity.</td>
<td>Jae Youn Ahn,* Ewha Womans University</td>
<td>Rosy oh, Ewha Womans University</td>
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<td>Youngju Lee, Ewha Womans University</td>
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<td>Dan Zhu, Monash University</td>
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<tr>
<td>07:30-07:55 a.m.</td>
<td><strong>10-PS-B</strong> Actuarial Modeling</td>
<td>A Generalized Linear Model for Bush Fire Insurance in Australia</td>
<td>Biju Mathew, Malabar Christian College</td>
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<td><strong>Moderator:</strong> Biju Mathew, Malabar Christian College</td>
<td><strong>Authors:</strong> Kevin Fergusson,* University of Melbourne</td>
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</tr>
<tr>
<td>07:55-08:20 a.m.</td>
<td></td>
<td>Generalized Risk-Based Premiums for Insurance Guaranty Schemes</td>
<td>Gaeun Lee,* Sungkyunkwan University</td>
<td>Hangsuck Lee, Sungkyunkwan University</td>
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<td>Seongju Song, Korea University</td>
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<td>08:20-08:45 a.m.</td>
<td></td>
<td>What Determines Life Insurance Lapsation in Kerala, India?</td>
<td>Biju Mathew,* Malabar Christian College</td>
<td>S. Sunitha, NIT Calicut</td>
</tr>
</tbody>
</table>
10-PS-C  Quantitative Risk Management
Moderator:  Rosy Oh, Ewha Womans University

07:30-07:55 a.m.  Monte Carlo Valuation of Future Annuity Contracts
Authors:  Fabio Viviano,* University of Udine
           Anna Rita Bacinello, University of Trieste
           Pietro Millossovich, University of London

07:55-08:20 a.m.  Optimal Reinsurance to Minimize the Probability of Drawdown Under the Mean-Variance Premium Principle
Authors:  Xia Han,* Nanjing Normal University
           Zhibin Liang, Nanjing Normal University
           Virginia R. Young, University of Michigan

08:20-08:45 a.m.  On Copula-based Collective Risk Models: from Elliptical Copulas to Vine Copulas
Authors:  Rosy Oh,* Ewha Womans University
           Jae Youn Ahn, Ewha Womans University
           Woojoo Lee, Seoul National University

08:45-09:00 a.m.  Break

09:00-10:00 a.m.  Keynote Speaker: Longevity Risk and COVID-19: A Model for the Future
Amy Kessler, SVP and Head of Longevity Risk Transfer, Prudential Retirement
Moderator:  Yijia Lin, University of Nebraska-Lincoln

10:00-10:15 a.m.  Break

10:15-11:30 a.m.  Concurrent Sessions 11
11-SIS-A  Agriculture Insurance
Moderator:  Cory Walters, University of Nebraska-Lincoln
Panelists:  Cory Walters, University of Nebraska-Lincoln
           Kwasi Etu-Bonde, Agribusiness and Rural Development Consultant
           Colby D. Duren, University of Arkansas
           David Hennessy, Michigan State University
           George Kuria, ACRE Africa
           Collin Olsen, US RMA Topeka
           Tara Chiu, University of California Davis
### Full Meeting Agenda

#### 11-SIS-B  Professionalism: Being an Actuary - Beyond the Mathematics  
**Moderator:** Sarah Christiansen, Insurance Strategies Consulting  
**Panelists:** Warren Luckner, University of Nebraska-Lincoln (Emeritus)

#### 11-SIS-C  New Tools New Opportunities  
**Moderator:** John Robinson, Life Insurance Regulator, Minnesota  
**Panelists:** Sam Wehner, Actuarial Resources Corporation  
Ronald Richman, QED Actuaries & Consultants  
Mike Ludkovski, University of California, Santa Barbara

#### 11-PS-A  Financial Mathematics  
**Moderator:** Tim J. Boonen, University of Amsterdam

10:15-10:40 a.m.  
**Haezendonck-Goovaerts Capital Allocation Rules**  
**Authors:** Gabriele Canna,* Università di Milano-Bicocca  
Francesca Centrone, Università del Piemonte Orientale  
Emanuela Rosazza Gianin, Università di Milano-Bicocca

10:40-11:05 a.m.  
**Predicting the Time for the Highest Gain for the Money Makers**  
**Authors:** Mian Adnan,* Bowling Green State University

11:05-11:30 a.m.  
**Insurance With Heterogeneous Preferences**  
**Authors:** Tim J. Boonen,* University of Amsterdam  
Fangda Liu, University of Waterloo

#### 11-PS-B  Predictive Modeling  
**Moderator:** Brian Hartman, Brigham Young University

10:15-10:40 a.m.  
**Inference on Latent Factor Models for Informative Censoring**  
**Authors:** Francesco Ungolo,* Technische Universiteit Eindhoven  
Edwin R. van den Heuvel, Technische Universiteit Eindhoven

10:40-11:05 a.m.  
**Discrimination-Aware Decisions in Finance and Insurance**  
**Authors:** Carlos Araiza,* University of Waterloo  
Mary Hardy, University of Waterloo  
Paul Marriott, University of Waterloo
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<th>Time</th>
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<tr>
<td>11:05-11:30 a.m.</td>
<td>Synthesizing Property &amp; Casualty Ratemaking Datasets using Generative Adversarial Networks</td>
<td>Brian Hartman,* Brigham Young University, Marie-Pier Cote, Universite Laval, Olivier Mercier, Universite Laval, Joshua Meyers, Brigham Young University</td>
<td>Xun Zhang, Central University of Finance and Economics</td>
</tr>
<tr>
<td>10:15-10:40 a.m.</td>
<td>Is There Structural Exploitation in Life Settlement Market?</td>
<td>Yujia Zhang,* Renmin University of China, Wing Fung Chong, University of Illinois at Urbana-Champaign, Runhuan Feng, University of Illinois at Urbana-Champaign, Li Wei, Renmin University of China</td>
<td>Xun Zhang, Central University of Finance and Economics</td>
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<td>10:40-11:05 a.m.</td>
<td>Hedge Interest Rate Risk: Evidence from U.S. Life Insurance Industry</td>
<td>Qianlong Liu,* Georgia State University</td>
<td>Xun Zhang, Central University of Finance and Economics</td>
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<tr>
<td>11:05-11:30 a.m.</td>
<td>Asset-Liability Management of Life Insurers in the Negative Interest Rate Environment</td>
<td>Xun Zhang,* Central University of Finance and Economics, Yijia Lin, University of Nebraska-Lincoln, Sheen Liu, Washington State University, Ken Seng Tan, Nanyang Technological University</td>
<td>Xun Zhang, Central University of Finance and Economics</td>
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<td>11:30 a.m.-12:00 p.m.</td>
<td>Announcements, Invitation to ARC 2021, etc...</td>
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<td>12:00-1:00 p.m.</td>
<td>Lunch Break, Comments from CAS and SOA Presidents starting at 12:10</td>
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<tr>
<td>12:00-1:00 p.m.</td>
<td>Concurrent Sessions 12</td>
<td>12-SIS-A: Blockchain/Smart Contracts RT</td>
<td>Petar Jevtic, Arizona State University</td>
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<td>Session</td>
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<td>Moderator</td>
<td>Panelists</td>
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<tr>
<td>12-SIS-B</td>
<td>Social and Racial Inequities in Health</td>
<td>Roy Machamire, Kaiser Permanente</td>
<td>Julia Raifman, Boston University School of Public Health</td>
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<td>Isaac Edrah, Deloitte</td>
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<td>Cornell P. Wright, NC Office of Minority Health and Health Disparities</td>
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<td>Dejun Su, University of Nebraska Medical Center</td>
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<td>Edward Fox, National Indian Health Board</td>
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<td>Sade Kosoko-Lasaki, Creighton University</td>
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<td>12-PS-A</td>
<td>Machine Learning</td>
<td>Marie-Claire Koissi, University of Wisconsin-EC</td>
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<tr>
<td>01:00-01:25 p.m.</td>
<td>Data Augmentation for Improving Telematics based Risk Evaluation</td>
<td>Sak Lee,* University of Iowa</td>
<td>Nariankadu D. Shyamalkumar, University of Iowa</td>
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<tr>
<td>01:25-01:50 p.m.</td>
<td>A Machine Learning Approach to Incorporating Industry Mortality Table Features Into a Company’s Insured Mortality Analysis</td>
<td>Marc Vincelli,* SCOR</td>
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<td>01:50-02:15 p.m.</td>
<td>Emerging Data Analytics Techniques With Actuarial Applications</td>
<td>Marie-Claire Koissi,* University of Wisconsin-EC</td>
<td>Herschel Day, University of Wisconsin-EC</td>
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<td>Vicki Whitledge, University of Wisconsin-EC</td>
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<td>Su Qian Ng, University of Wisconsin-EC</td>
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<td>12-PS-B</td>
<td>Mortality and Longevity</td>
<td>Thomas Bernhardt, University of Michigan</td>
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<td>01:00-01:25 p.m.</td>
<td>Adjusting for IBNR in Life Settlements Mortality Using Cure Rate Models</td>
<td>Hong Beng Lim,* University of Iowa</td>
<td>N.D. Shyamalkumar, University of Iowa</td>
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<tr>
<td>01:25-01:50 p.m.</td>
<td>Stacked Regression Ensemble Learning for Mortality Forecasting</td>
<td>Salvatory Kessy,* University of New South Wales</td>
<td>Andres M Villegas Ramirez, University of New South Wales</td>
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<td>01:50-02:15 p.m.</td>
<td>The Exact Number of Members that Remove Idiosyncratic Mortality Risk In Pooled Annuity Funds</td>
<td>Thomas Bernhardt,* University of Michigan</td>
<td>Catherine Donnelly, Heriot-Watt University</td>
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<td>12-PS-C</td>
<td>Professional Actuarial Education</td>
<td>Stuart Klugman, Society of Actuaries</td>
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01:00-01:25 p.m.  
**Academic Integrity in the Time of COVID-19**  
**Authors:** Diana Skrzydlo,* University of Waterloo

01:25-01:50 p.m.  
**Enhancing the Utility of Complex Tables in Actuarial Teaching**  
**Authors:** Russell Hendel,* Towson University

01:50-02:15 p.m.  
**Society of Actuaries Education Update**  
**Authors:** Stuart Klugman,* Society of Actuaries

02:15-02:30 p.m.  
**Break**

02:30-03:45 p.m.  
**Concurrent Sessions 13**

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<td>02:30</td>
<td>COVID-19 – Retirement/Individual Impact</td>
<td>Steve Siegel, Society of Actuaries</td>
<td>Anna Rappaport, Anna Rappaport Consulting, Carol Bogosian, CAB Consulting</td>
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03:45-04:00 p.m.  
**Break**

04:00-04:30 p.m.  
**Closing Ceremony**

**Note:**

1. All events are listed in North American Central Time Zone (CDT).
2. SIS = Special Invited Session and PS = Parallel Session.
3. RT = Round Table Format and TD = Traditional Slide Presentation Format.
4. For PS, "*" Denotes the presenter or poster presenter.
UNL Incredible Student Workers

Stefan Kang (co-leader)
Senior, Economics and Actuarial Science

Li-Jing Li (co-leader)
Graduate Student, Actuarial Science

XueYao Qi (co-leader)
Senior, Actuarial Science and Finance

Chengjie Tang (co-leader)
Graduate Student, Actuarial Science

Noelle Mware
Graduate Student, Civil Engineering

Doris Kedou Ngabgna
Junior, Actuarial Science

Justin Niyongabo
Junior, Integrated Science

Matthew Ringler
Senior, Actuarial Science

Siok Ann Siek
Senior, Actuarial Science

Vu Nhat Nguyen Tran
Junior, Actuarial Science

Xueqiang Wang
Senior, Finance

Jing Weng
Senior, Accounting

Xuan Wu
Sophomore, Actuarial Science

Bo Yang
Senior, Mechanical Engineering

Liming Zheng
Senior, Finance

Operations Committee

Emily Bergen
University of Nebraska–Lincoln

Amanda Colborn
University of Nebraska–Lincoln

Sheri Irwin-Gish
University of Nebraska–Lincoln

Kathy Mellick
University of Nebraska–Lincoln

Laura Niles
University of Nebraska–Lincoln

Davis Podany
University of Nebraska–Lincoln

Kimberly Smith
University of Nebraska–Lincoln

Sue Vagts
University of Nebraska–Lincoln

Shengchao Zhuang
University of Nebraska–Lincoln

Sue Vagts
University of Nebraska–Lincoln
Organizing Committee

Yijia Lin  
University of Nebraska–Lincoln

Denise Olson  
Zurich North America

Colin Ramsay  
University of Nebraska–Lincoln

Sue Vagts  
Chair, University of Nebraska–Lincoln

Shengchao Zhuang  
University of Nebraska–Lincoln

Scientific Committee

Rhonda Ahrens  
Nebraska Department of Insurance

Luis Arcila  
MAPFRE - Peru

Ida Ferrara  
York University

Katherine Baez  
Barna Management School / EA Consultants / ALAS

Edward Furman  
York University and Risk and Insurance Studies Centre

Steven Konnath  
Blue Cross and Blue Shield of Nebraska

Noel Harewood  
Ameritas Life Insurance Corp

Mary Hegemann  
Wakely Consulting

Petar Jevtic  
Arizona State University

Graham Liu  
University of Nebraska–Lincoln

Yijia Lin  
University of Nebraska–Lincoln

Mostafa Mashayekhi  
University of Nebraska–Lincoln

Roy Machamire  
Kaiser Permanente

Victor Oguledo  
Florida A&M University

Eric Ofosu-Hene  
De Montfort University

Denise Olson  
Zurich North America

Colin Ramsay  
Chair, University of Nebraska–Lincoln

Max Rudolph  
Rudolph Financial Consulting, LLC

John Robinson  
Life Insurance Regulator, Minnesota

Ronnie Tan  
Great Eastern

Gopi Shah Goda  
Stanford University

Darryl Wagner  
Deloitte

Sue Vagts  
University of Nebraska–Lincoln

Shengchao Zhuang  
University of Nebraska–Lincoln

Cindy Xu  
University of Nebraska–Lincoln
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