**Résumé: Virginia R. Young**

Department of Mathematics                University of Michigan
530 Church St, Ann Arbor, MI 48109       Email: vryoung@umich.edu

## EDUCATION HISTORY

BA          Cumberland College, Williamsburg, Kentucky; Mathematics; May 1981.

PhD         University of Virginia; Algebraic topology; May 1984.
            Thesis:      *Branched coverings arising from group actions*
            Advisor:     Robert E. Stong

Postdoctorate Institute for Advanced Study, Princeton; Aug 1984 to May 1986.

FSA         Fellow of the Society of Actuaries; Sept 1992.

## CAREER HISTORY

Teaching Asst    University of Virginia, Dept of Math; Aug 1982 to May 1994
                 –taught calculus sequence and graded for graduate topology.

Assistant Prof   Cumberland College, Williamsburg, Kentucky, Dept of Math;
                 Aug 1986 to May 1989.
Associate Prof   May 1989 to May 1990.
                 –taught a broad range of math courses–14 to 20 hours per semester.

Actuary          Wausau Insurance Cos, Wausau, Wisconsin; May 1990 to July 1993.
                 –priced group health and workers compensation insurance.

Assistant Prof   U of Wisconsin-Madison, Sch of Business; Aug 1993 to June 1999.
Associate Prof   U of Wisconsin-Madison, Sch of Business; June 1999 to Sept 2003.
                 –taught and researched in actuarial mathematics.

Professor        U of Michigan, Dept of Math; Sept 2003 to present.
                 –teach and research in actuarial mathematics. My research interests
                 include insurance economics, pricing insurance risks using
                 non-additive measures, and individual financial and insurance
                 decision making.

## SPECIAL HONORS AND AWARDS

G. T. Whyburn Fellow, University of Virginia; June 1981 to May 1982.

President's Fellow, University of Virginia; June 1981 to May 1984.

NSF Fellowship for Postdoctoral Study in Mathematics at the Institute for Advanced
    Study, Princeton; August 1984 to May 1986.

Winner of the L. Ronald Hill Memorial Prize (1994) for my paper "The application of
    fuzzy sets to group health underwriting."

Co-winner of the Edward Lew Award (1998) for the papers "Forecasting Social Security actuarial assumptions," written with Edward W. Frees, Yueh-Chuan Kung, Majorie A. Rosenberg, and Siu-Wai Lai; and "A longitudinal data analysis interpretation of credibility models," written with Edward W. Frees and Yu Luo. The Society of Actuaries gives the Edward Lew Award for the best paper in modeling in actuarial mathematics.

Co-winner of the annual Halmstad Prize (1999) for the paper "Forecasting Social Security actuarial assumptions," written with Edward W. Frees, Yueh-Chuan Kung, Majorie A. Rosenberg, and Siu-Wai Lai. The Actuarial Education and Research Fund awards the Halmstad Prize for the best paper in actuarial mathematics.

Ethel M. and Cecil J. Nesbitt Professor of Actuarial Mathematics, University of Michigan, September 2003 to present.

## REFEREED RESEARCH PUBLICATIONS

1. Virginia R. Young (1985). Unoriented branched coverings arising from group actions, *Proceedings of the American Mathematical Society*, 93: 525-531.

2. Virginia R. Young (1985). Free $Z_p$ and $S^1$ actions, *Indiana University Mathematics Journal*, 34: 607-617.

3. Virginia R. Young (1993). The application of fuzzy sets to group health underwriting, with discussion, *Transactions of the Society of Actuaries*, 45: 551-590.

4. Virginia R. Young (1996). Fuzzy subsethood, *Fuzzy Sets and Systems*, 77: 371-384.

5. Virginia R. Young (1996). Credibility and persistency, *ASTIN Bulletin*, 26: 53-69.

6. Virginia R. Young (1996). Insurance rate changing: A fuzzy logic approach, *Journal of Risk and Insurance*, 63: 461-483.

7. Edward W. Frees, Yueh-Chuan Kang, Marjorie A. Rosenberg, Virginia R. Young, and Siu-Wai Lai (1997). Forecasting Social Security actuarial assumptions, *North American Actuarial Journal*, 1 (4): 49-82.

8. Virginia R. Young (1997). Credibility using a loss function from spline theory, *Scandinavian Actuarial Journal*, 1997 (2): 160-185.

9. Shaun S. Wang, Virginia R. Young, and Harry H. Panjer (1997). Axiomatic characterization of insurance prices, *Insurance: Mathematics and Economics*, 21 (2): 173-183.

10. Virginia R. Young and Mark J. Browne (1997). Explaining insurance policy provisions via adverse selection, *Geneva Papers on Risk and Insurance Theory*, 22: 121-134.

11. Virginia R. Young (1997). Credibility using semiparametric models, *ASTIN Bulletin*, 27: 273-285.

12. Virginia R. Young (1997). Adjusting indicated insurance rates: Fuzzy rules that consider statistical data, *Proceedings of the Casualty Actuarial Society*, 84: 734-765.

13. Virginia R. Young and Shaun S. Wang (1998). Updating non-additive measures with fuzzy information, *Fuzzy Sets and Systems*, 94: 355-366.

14. Virginia R. Young (1998). Credibility using a loss function from spline theory: Parametric models with a one-dimensional sufficient statistic, with discussion, *North American Actuarial Journal*, 2: 101-117.

15. Shaun S. Wang and Virginia R. Young (1998). Ordering risks: Expected utility theory versus Yaari's dual theory of risk, *Insurance: Mathematics and Economics*, 22: 145-161.

16. Shaun S. Wang and Virginia R. Young (1998). Risk-adjusted credibility premiums using distorted probabilities, *Scandinavian Actuarial Journal*, 1998: 143-165.

17. Virginia R. Young (1998). Families of update rules for non-additive measures: Applications in pricing risks, *Insurance: Mathematics and Economics*, 23: 1- 14.

18. Virginia R. Young (1998). Robust Bayesian credibility using semiparametric models, *ASTIN Bulletin*, 28: 187-203.

19. Marjorie A. Rosenberg and Virginia R. Young (1999). A Bayesian approach to understanding time series data, *North American Actuarial Journal*, 3: 130-143.

20. Edward W. Frees, Virginia R. Young, and Yu Luo (1999). A longitudinal data analysis interpretation of credibility models, *Insurance: Mathematics and Economics*, 24: 229-247.

21. Virginia R. Young (1999). Optimal insurance under Wang's premium principle, *Insurance: Mathematics and Economics*, 25: 109-122.

22. Virginia R. Young (1999). Discussion of Christofides' conjecture regarding Wang's premium principle, *ASTIN Bulletin*, 29: 191-195.

23. Virginia R. Young (2000). Credibility using semiparametric models and a loss function with a constant penalty, *Insurance: Mathematics and Economics*, 26: 151-156.

24. S. David Promislow and Virginia R. Young (2000). Equity and exact credibility, *ASTIN Bulletin*, 30: 3-11.

25. Virginia R. Young and Thaleia Zariphopoulou (2000). Computation of distorted probabilities for diffusion processes via stochastic control methods, *Insurance: Mathematics and Economics*, 27: 1-18.

26. S. David Promislow and Virginia R. Young (2000). Equity and credibility, *Scandinavian Actuarial Journal*, 2000: 121-146.

27. Jan Dhaene, Shaun S. Wang, Virginia R. Young, and Marc Goovaerts (2000). Comonotonicity and maximal stop-loss premiums, *Bulletin of the Swiss Actuarial Association*, 2000: 99-113.

28. Virginia R. Young and Mark J. Browne (2000). Equilibrium in competitive insurance markets under adverse selection and Yaari's dual theory of risk, *Geneva Papers on Risk and Insurance Theory*, 25: 141-157.

29. Edward W. Frees, Virginia R. Young, and Yu Luo (2001). Credibility ratemaking using panel data models, *North American Actuarial Journal*, 5: 24-42.

30. Virginia R. Young and Thaleia Zariphopoulou (2002). Pricing dynamic insurance risks using the principle of equivalent utility, *Scandinavian Actuarial Journal*, 2002 (4): 246-279.

31. S. David Promislow and Virginia R. Young (2002). Measurement of relative inequity and Yaari's dual theory of risk, *Insurance: Mathematics and Economics*, 30 (1): 95-109.

32. S. David Promislow and Virginia R. Young (2003). Decomposition properties of dual choice functionals, *Social Choice and Welfare*, 20 (2): 189-201.

33. Virginia R. Young (2003). Equity-indexed life insurance: Pricing and reserving using the principle of equivalent utility, *North American Actuarial Journal*, 7 (1): 68-86.

34. Kristen S. Moore and Virginia R. Young (2003). Pricing equity-linked pure endowments via the principle of equivalent utility, *Insurance: Mathematics and Economics*, 33 (3): 497-516.

35. Virginia R. Young (2004). Pricing in an incomplete market with an affine term structure, *Mathematical Finance*, 14 (3): 359-382.

36. Yu Luo, Virginia R. Young, and Edward W. Frees (2004). Credibility ratemaking using collateral information, *Scandinavian Actuarial Journal*, 2004 (6): 448-461.

37. Virginia R. Young and Thaleia Zariphopoulou (2004). Pricing insurance via stochastic control: Optimal consumption and terminal wealth, *Finance*, 25: 141-155.

38. Virginia R. Young (2004). Optimal investment strategy to minimize the probability of lifetime ruin, *North American Actuarial Journal*, 8 (4): 105-126.

39. Kristen S. Moore and Virginia R. Young (2005). Optimal design of a perpetual equity-indexed annuity, *North American Actuarial Journal*, 9 (1): 57-72.

40. Sebastian Jaimungal and Virginia R. Young (2005). Pricing equity-linked pure endowments with risky assets that follow Lévy processes, *Insurance: Mathematics and Economics*, 36 (3): 329-346.

41. S. David Promislow and Virginia R. Young (2005). Unifying framework for optimal insurance, *Insurance: Mathematics and Economics*, 36 (3): 347-364.

42. S. David Promislow and Virginia R. Young (2005). Minimizing the probability of ruin when claims follow Brownian motion with drift, *North American Actuarial Journal*, 9 (3): 109-128.

43. S. David Promislow and Virginia R. Young (2005). Supermodular functions on finite lattices, *Order*, 22 (4): 389-413.

44. Moshe A. Milevsky, Kristen S. Moore, and Virginia R. Young (2006). Asset allocation and annuity-purchase strategies to minimize the probability of financial ruin, *Mathematical Finance*, 16 (4): 647-671.

45. Kristen S. Moore and Virginia R. Young (2006). Optimal insurance in a continuous-time model, *Insurance: Mathematics and Economics*, 39 (1): 47-68.

46. Kristen S. Moore and Virginia R. Young (2006). Optimal and simple, nearly-optimal rules for minimizing the probability of financial ruin in retirement, *North American Actuarial Journal*, 10 (4): 145-161.

47. Moshe A. Milevsky, S. David Promislow, and Virginia R. Young (2006). Killing the law of large numbers: Mortality risk premiums and the Sharpe ratio, *Journal of Risk and Insurance*, 73 (4): 673-686.

48. Erhan Bayraktar and Virginia R. Young (2007). Hedging life insurance with pure endowments, *Insurance: Mathematics and Economics*, 40 (3): 435-444.

49. Moshe A. Milevsky and Virginia R. Young (2007). The timing of annuitization: Investment dominance and mortality risk, *Insurance: Mathematics and Economics*, 40: 135-144.

50. Erhan Bayraktar and Virginia R. Young (2007). Minimizing the probability of lifetime ruin under borrowing constraints, *Insurance: Mathematics and Economics*, 41 (1): 196-221.

51. Moshe A. Milevsky and Virginia R. Young (2007). Annuitization and asset allocation, *Journal of Economic Dynamics and Control*, 31 (9): 3138-3177.

52. Erhan Bayraktar and Virginia R. Young (2007). Correspondence between lifetime minimum wealth and utility of consumption, *Finance and Stochastics*, 11 (2): 213-236.

53. Michael Ludkovski and Virginia R. Young (2008). Indifference pricing of pure endowments and life annuities under stochastic hazard and interest rates, *Insurance: Mathematics and Economics*, 42 (1): 14-30.

54. Erhan Bayraktar and Virginia R. Young (2008). Pricing options in incomplete equity markets via the instantaneous Sharpe ratio, *Annals of Finance*, 4 (4): 399-429.

55. Virginia R. Young (2008). Pricing life insurance via the instantaneous Sharpe ratio, *Insurance: Mathematics and Economics*, 42 (2): 691-703.

56. Masahiko Egami and Virginia R. Young (2008). Indifference prices of structured catastrophe (CAT) bonds, *Insurance: Mathematics and Economics*, 42 (2): 771-778.

58. Erhan Bayraktar and Virginia R. Young (2008). Mutual fund theorems when minimizing the probability of lifetime ruin, *Finance Research Letters*, 5 (2): 69-78.

58. Erhan Bayraktar and Virginia R. Young (2008). Maximizing utility of consumption subject to a constraint on the probability of lifetime ruin, *Finance Research Letters*, 5 (4): 204-212.

59. Erhan Bayraktar, Kristen S. Moore, and Virginia R. Young (2008). Minimizing the probability of lifetime ruin under random consumption, *North American Actuarial Journal*, 12 (4): 384-400.

60. Erhan Bayraktar and Virginia R. Young (2008). Minimizing the probability of lifetime ruin when consumption is ratcheted, *North American Actuarial Journal*, 12 (4): 428-442.

61. Erhan Bayraktar, Moshe A. Milevsky, S. David Promislow, and Virginia R. Young (2009). Valuation of mortality risk via the instantaneous Sharpe ratio: applications to life annuities, *Journal of Economic Dynamics and Control*, 33 (3): 676-691.

62. Masahiko Egami and Virginia R. Young (2009). Optimal reinsurance strategy under fixed cost and delay, *Stochastic Processes and Their Applications*, 119 (3): 1015-1034.

63. Erhan Bayraktar and Virginia R. Young (2009). Minimizing the probability of lifetime ruin with deferred life annuities, *North American Actuarial Journal*, 13 (1): 141-154.

64. Erhan Bayraktar and Virginia R. Young (2009). Minimizing the lifetime shortfall or shortfall at death, *Insurance: Mathematics and Economics*, 44 (3): 447-458.

65. Michael Ludkovski and Virginia R. Young (2009). Optimal risk sharing under distorted probabilities with transaction costs, *Mathematics and Financial Economics*, 2 (2): 87-105.

66. Erhan Bayraktar and Virginia R. Young (2010). Optimal investment strategy to minimize occupation time, *Annals of Operations Research*, 176 (1): 389-408.

67. Michael Ludkovski and Virginia R. Young (2010). *Ex post* moral hazard and Bayesian learning in insurance, *Journal of Risk and Insurance*, 77 (4): 829-856.

68. Erhan Bayraktar and Virginia R. Young (2011). Proving the regularity of the minimal probability of ruin via a game of stopping and control, *Finance and Stochastics*, 15: 785-818.

69. Erhan Bayraktar, Xueying Hu, and Virginia R. Young (2011). Minimizing the probability of lifetime ruin under stochastic volatility, *Insurance: Mathematics and Economics*, 49 (2): 194-206.

70. Ting Wang and Virginia R. Young (2012). Optimal commutable annuities to minimize the probability of lifetime ruin, *Insurance: Mathematics and Economics*, 50 (1): 200-216.

71. Zhibin Liang and Virginia R. Young (2012). Dividends and reinsurance under a penalty for ruin, *Insurance: Mathematics and Economics*, 50 (3): 437-445.

72. Ting Wang and Virginia R. Young (2012). Maximizing the utility of consumption with commutable annuities, *Insurance: Mathematics and Economics*, 51 (2): 352-369.

73. Erhan Bayraktar and Virginia R. Young (2013). Life insurance purchasing to maximize utility of household consumption, *North American Actuarial Journal*, 17 (2): 114-135.

74. Erhan Bayraktar, S. David Promislow, and Virginia R. Young (2014). Purchasing life insurance to reach a bequest goal, *Insurance: Mathematics and Economics*, 58: 204-216.

75. Erhan Bayraktar, S. David Promislow, and Virginia R. Young (2015). Purchasing term life insurance to reach a bequest goal: time-dependent case, *North American Actuarial Journal*, 19 (3): 224-236.

76. Huaxiong Huang, Moshe A. Milevsky, and Virginia R. Young (2015). A glide path for target date fund annuitization, *Journal of Retirement*, 3(1). Summer 2015: 27-37.

77. Bahman Angoshtari, Erhan Bayraktar, and Virginia R. Young (2015). Minimizing the expected lifetime spent in drawdown under proportional consumption, *Finance Research Letters*, 15, November 2015: 106-114.

78. Kristen S. Moore and Virginia R. Young (2016). Minimizing the probability of lifetime ruin when shocks might occur: perturbation analysis, *North American Actuarial Journal*, 20 (1): 17-36.

79. Bahman Angoshtari, Erhan Bayraktar, and Virginia R. Young (2016). Optimal investment to minimize the probability of drawdown, *Stochastics*, 88 (6): 946-958.

80. Erhan Bayraktar, S. David Promislow, and Virginia R. Young (2016). Purchasing life insurance to reach a bequest goal while consuming, *SIAM Journal on Financial Mathematics*, 7 (1): 183-214.

81. Asaf Cohen and Virginia R. Young (2016). Minimizing lifetime poverty with a penalty for bankruptcy, *Insurance: Mathematics and Economics*, 69: 156-167.

82. Bahman Angoshtari, Erhan Bayraktar, and Virginia R. Young (2016). Minimizing the probability of lifetime drawdown under constant consumption, *Insurance: Mathematics and Economics*, 69: 210-223.

83. Ting Wang and Virginia R. Young (2016). Hedging pure endowments with mortality derivatives, *Insurance: Mathematics and Economics*, 69: 238-255.

84. Erhan Bayraktar and Virginia R. Young (2016). Optimally investing to reach a bequest goal, *Insurance: Mathematics and Economics*, 70: 1-10.

85. Virginia R. Young and Yuchong Zhang (2016). Lifetime ruin under ambiguous hazard rate, *Insurance: Mathematics and Economics*, 70: 125-134.

86. Huaxiong Huang, Moshe A. Milevsky, and Virginia R. Young (2017). Optimal purchasing of deferred income annuities when payout yields are mean-reverting, *Review of Finance*, 21 (1): 327-361.

87. Yelei Gu, David Kausch, Kristen S. Moore, and Virginia R. Young (2017). Balancing income and bequest goals in a DB/DC hybrid pension plan, *Journal of Retirement*, 4 (3): 51-62.

88. Dangping Li, Dongchen Li, and Virginia R. Young (2017). Optimality of excess-loss reinsurance under a mean-variance criterion, *Insurance: Mathematics and Economics*, 75: 82-89.

89. Virginia R. Young (2017). Purchasing casualty insurance to avoid lifetime ruin, *Insurance: Mathematics and Economics*, 77: 133-142.

90. Virginia R. Young (2017). Target-bequest investment and insurance fund, *North American Actuarial Journal*, 22(2): 182-197.

91. Xiaoqing Liang and Virginia R. Young (2018). Annuitization and asset allocation under exponential utility, *Insurance: Mathematics and Economics*, 79: 167-183.

92. Xiaoqing Liang and Virginia R. Young (2018). Minimizing the probability of ruin: two riskless assets with transaction costs and proportional reinsurance, *Statistics and Probability Letters*, 140: 167-175.

93. Xiaoqing Liang and Virginia R. Young (2018). Minimizing the probability of ruin: optimal per-loss reinsurance, *Insurance: Mathematics and Economics*, 82: 181-190.

94. David Landriault, Bin Li, Danping Li, and Virginia R. Young (2018). Equilibrium strategies for the mean-variance investment problem over a random horizon, *SIAM Journal on Financial Mathematics*, 9(3): 1046-1073.

95. Zhibin Liang and Virginia R. Young (2019). Optimal dividends with an affine penalty, *Journal of Applied Mathematics and Computing*, 60(1): 703-730.

96. Bahman Angoshtari, Erhan Bayraktar, and Virginia R. Young (2019). Optimal dividend distribution under drawdown and ratcheting constraints on dividend rates, *SIAM Journal on Financial Mathematics*, 10(2): 547-577.

97. Xiaoqing Liang and Virginia R. Young (2019). Minimizing the probability of lifetime ruin: two riskless assets with transaction costs, *ASTIN Bulletin*, 49(3): 847-883.

98. Danping Li and Virginia R. Young (2019). Optimal reinsurance to minimize the probability of ruin under ambiguity, *Insurance: Mathematics and Economics*, 87: 143-152.

99. Xiaoqing Liang and Virginia R. Young (2019). Minimizing the probability of lifetime exponential Parisian ruin, *Journal of Optimization Theory and Applications*, 184: 1036-1064.

100. Xiaoqing Liang and Virginia R. Young (2019). Reaching a bequest goal with life insurance: ambiguity about the risky asset's drift, *ASTIN Bulletin*, 50(1): 187-221.

101. Dongchen Li and Virginia R. Young (2020). Maximizing expected utility of consumption with a constraint on expected time in poverty, *Annals of Finance*, 16(1): 63-99.

102. Xiaoqing Liang and Virginia R. Young (2020). Minimizing the discounted probability of exponential Parisian ruin via reinsurance, *SIAM Journal on Control and Optimization*, 58(2): 937-964.

103. Xiaoqing Liang, Zhibin Liang, and Virginia R. Young (2020). Optimal reinsurance under the mean-variance premium principle to minimize the probability of ruin, *Insurance: Mathematics and Economics*, 92: 128-146.

104. Asaf Cohen and Virginia R. Young (2020). Rate of convergence of the probability of ruin in the Cramér-Lundberg model to its diffusion approximation, *Insurance: Mathematics and Economics*, 93: 333-340.

105. Xia Han, Zhibin Liang, and Virginia R. Young (2020). Optimal reinsurance to minimize the probability of drawdown under the mean-variance premium principle, *Scandinavian Actuarial Journal*, 2020(10): 879-903.

106. Asaf Cohen and Virginia R. Young (2021). Optimal dividend problem: asymptotic analysis, *SIAM Journal on Financial Mathematics*, 12(1): 29-46.

107. Danping Li and Virginia R. Young (2021). Bowley solution of a mean-variance game in insurance, *Insurance: Mathematics and Economics*, 98: 35-43.

108. Xiaoqing Liang and Virginia R. Young (2022). Discounted probability of exponential Parisian ruin: diffusion approximation, *Journal of Applied Probability*, 59(1): 17-37.

109. Danping Li and Virginia R. Young (2022). Stackelberg differential game for reinsurance: mean-variance framework and random horizon, *Insurance: Mathematics and Economics*, 102: 42-55.

110. Bahman Angoshtari, Erhan Bayraktar, and Virginia R. Young (2022). Optimal investment and consumption under a habit-formation constraint, *SIAM Journal on Financial Mathematics*, 13(1): 321-352.

111. Xiaoqing Liang and Virginia R. Young (2022). A simple and nearly optimal investment strategy to minimize the probability of lifetime ruin, *ASTIN Bulletin*, 52(2): 619-643.

112. Xiaoqing Liang, Ruodu Wang, and Virginia R. Young (2022). Optimal insurance to maximize RDEU under a distortion-deviation premium principle, *Insurance: Mathematics and Economics*, 104: 35-59.

113. Jingyi Cao, Dongchen Li, Virginia R. Young, and Bin Zou (2022). Stackelberg differential game for insurance under model ambiguity, *Insurance: Mathematics and Economics*, 106: 128-145.

114. Xiaoqing Liang and Virginia R. Young (2023). Optimal proportional reinsurance to maximize an insurer's exponential utility under unobservable drift, *Journal of Applied Probability*, 60(3): 874-894.

115. Pablo Azcue, Xiaoqing Liang, Nora Muler, and Virginia R. Young (2023). Optimal reinsurance to minimize the probability of drawdown under the mean-variance premium principle: asymptotic analysis, *SIAM Journal on Financial Mathematics*, 14(1): 279-313.

116. Jingyi Cao and Virginia R. Young (2023). Asymptotic analysis of a Stackelberg differential game for insurance under model ambiguity, *Scandinavian Actuarial Journal*, 2023(6): 598-623.

117. Jingyi Cao and Virginia R. Young (2023). Approximating the classical risk process by stable Lévy motion, *Scandinavian Actuarial Journal*, 2023(7): 679-707.

118. Jingyi Cao, Dongchen Li, Virginia R. Young, and Bin Zou (2023). Stackelberg differential game for insurance under model ambiguity: general divergence, *Scandinavian Actuarial Journal*, 2023(7): 735-763.

119. Prakash Chakraborty, Asaf Cohen, and Virginia R. Young (2023). Optimal dividends under model uncertainty, *SIAM Journal on Financial Mathematics*, 14(2): 497-524.

120. Bahman Angoshtari, Erhan Bayraktar, and Virginia R. Young (2023). Optimal consumption under a habit-formation constraint: the deterministic case, *SIAM Journal on Financial Mathematics*, 14(2): 557-597.

121. Jingyi Cao, Dongchen Li, Virginia R. Young, and Bin Zou (2023). Reinsurance games with two reinsurers: tree versus chain, *European Journal of Operational Research*, 310(2): 928-941.

122. Jingyi Cao, Dongchen Li, Virginia R. Young, and Bin Zou (2023). Reinsurance games with $n$ variance-premium reinsurers: from tree to chain, *ASTIN Bulletin*, 53(3): 706-728.

123. Xiaoqing Liang and Virginia R. Young (2023). Annuitizing at a bounded, absolutely continuous rate to minimize the probability of lifetime ruin, to appear in *Insurance: Mathematics and Economics*.

124. Jingyi Cao, Dongchen Li, Virginia R. Young, and Bin Zou (2023). Stackelberg reinsurance chain under model ambiguity, to appear in *Scandinavian Actuarial Journal*.

125. Jingyi Cao, Dongchen Li, Virginia R. Young, and Bin Zou (2023). Equilibrium reporting strategy: two rate classes and full insurance, to appear in *Journal of Risk and Insurance*.

**UNREFEREED RESEARCH PUBLICATIONS**

1. James C. Hickman and Virginia R. Young (1994), discussion of "Option pricing by Esscher transforms," by Hans U. Gerber and Elias S. W. Shiu, *Transactions of the Society of Actuaries*, 46: 99-140.

2. Virginia R. Young (1997), book review of *Practical Actuarial Credibility Models* (1996), by Dannenburg, D., R. Kaas, and M. J. Goovaerts, Institute of Actuarial Science and Econometric, University of Amsterdam, Amsterdam, The Netherlands. The review appeared in the *North American Actuarial Journal*, 1(3): 66-68.

3. Virginia R. Young (1998), discussion of "Utility functions: From risk theory to finance," by Hans U. Gerber and Gérard Pafumi, *North American Actuarial Journal*, 2(3): 74-100.

4. Virginia R. Young (2004), discussion of "Pricing perpetual fund protection with withdrawal option," by Gerber, Hans U. and Elias S. W. Shiu (2003), *North American Actuarial Journal*, 7(2): 60-77; Discussions 77-92 and (2004) 8(1): 96-99.

5. Virginia R. Young (2006). Premium principles, in *Encyclopedia of Actuarial Science*, John Wiley & Sons.

## RESEARCH UNDER REVIEW

Jingyi Cao, Dongchen Li, Virginia R. Young, and Bin Zou. "Strategic underreporting and optimal deductible insurance," under review at *ASTIN Bulletin*.

Jingyi Cao, Dongchen Li, Virginia R. Young, and Bin Zou. "Optimal insurance to maximize exponential utility when premium is computed by a convex functional," under review at *SIAM Journal on Financial Mathematics*.

## RESEARCH IN PROGRESS

Jingyi Cao, Dongchen Li, Virginia R. Young, and Bin Zou. "Stackelberg game with a buyer who might underreport losses."

Jingyi Cao, Dongchen Li, Virginia R. Young, and Bin Zou. "Optimal insurance in the presence of experience rating."

Jingyi Cao, Dongchen Li, Virginia R. Young, and Bin Zou. "Optimal underreporting of losses in a continuous-time model."

Xiaoqing Liang and Virginia R. Young, "Stackelberg game under functionals that depend on the mean and variance."

Bahman Angoshtari, Xiaoqing Liang, and Virginia R. Young, "Optimal consumption and annuitization under drawdown and ratcheting constraints."

## COURSES TAUGHT

At the University of Wisconsin-Madison, 1993-2003, I taught the following courses: Mathematical Analysis for masters students in business, Interest Theory, Life Contingencies, Risk Theory, Loss Distributions and Credibility, Intermediate Business Statistics (a course in regression and elementary time series), Decision Theory, Time Series Analysis, and Technical Risk Management.

At the University of Michigan, I taught the following courses:

| | | |
|---|---|---|
| Math 523-Risk Theory | Fall 2003 | 20 students |
| Math 528-Topics in Casualty Actuarial Math | Winter 2004 | 18 students |
| Math 523-Risk Theory | Fall 2004 | 26 students |
| Math 523-Risk Theory | Winter 2005 | 33 students |
| Math 520-Life Contingencies I | Fall 2005 | 19 students |
| Math 521-Life Contingencies II | Winter 2006 | 15 students |
| Math 523-Risk Theory | Winter 2006 | 35 students |
| Math 520-Life Contingencies I | Fall 2006 | 45 students |
| Math 521-Life Contingencies II | Winter 2007 | 43 students |
| Math 525-Probability | Winter 2008 | 25 students |
| Math 520-Life Contingencies I | Fall 2008 | 55 students |
| Math 521-Life Contingencies II | Winter 2009 | 49 students |
| Math 526-Stochastic Processes | Fall 2009 | 14 students |
| Math 423-Mathematics of Finance | Spring 2010 | 25 students |
| Math 520-Life Contingencies I | Fall 2010 | 39 students |
| Math 521-Life Contingencies II | Winter 2011 | 34 students |
| Math 423-Mathematics of Finance | Spring 2011 | 27 students |
| Math 423-Mathematics of Finance | Fall 2011 | 25 students |
| Math 520-Life Contingencies I | Fall 2011 | 41 students |
| Math 423-Mathematics of Finance | Spring 2012 | 25 students |
| Math 423-Mathematics of Finance | Fall 2012 | 33 students |
| Math 520-Life Contingencies I | Fall 2012 | 30 students |
| Math 423-Mathematics of Finance | Spring 2013 | 28 students |
| Math 424-Theory of Interest | Fall 2013 | 20 students |
| Math 523-Risk Theory | Fall 2013 | 28 students |
| Math 523-Loss Models I | Fall 2014 | 31 students |
| Math 524-Loss Models II | Winter 2015 | 10 students |
| Math 520-Life Contingencies I | Fall 2015 | 57 students |
| Math 523-Loss Models I | Fall 2016 | 29 students |
| Math 521-Life Contingencies II | Winter 2018 | 34 students |
| Math 521-Life Contingencies II | Winter 2019 | 28 students |
| Math 524-Loss Models II | Winter 2019 | 29 students |
| Math 523-Loss Models I | Fall 2019 | 24 students |
| Math 524-Loss Models II | Winter 2020 | 16 students |
| Math 523-Loss Models I | Fall 2020 | 24 students |
| Math 524-Loss Models II | Winter 2021 | 23 students |
| Math 523-Loss Models I | Fall 2021 | 36 students |
| Math 524-Loss Models II | Winter 2022 | 23 students |
| Math 525-Probability | Fall 2022 | 17 students |
| Math 523-Loss Models I | Fall 2023 | 32 students |

## PhD COMMITTEES

| | | |
|---|---|---|
| 2005 | Jungmin Choi | AIM, Department of Mathematics |

| 2005 | Jim Brown | Department of Mathematics |
| 2006 | Hyekyung Min | AIM, Department of Mathematics |
| 2008 | Bo Yang | Department of Mathematics |
| 2009 | Hao Xing | Department of Mathematics |
| 2011 | Ting Wang (advisor) | AIM, Department of Mathematics |
| 2011 | Xueying Hu | Department of Mathematics |
| 2012 | Ashley Selegue Holland (advisor) | AIM, Department of Mathematics |
| 2012 | Jeremy Crosmer (DMA) | School of Music |
| 2013 | Matthew Zalkind (DMA) | School of Music |
| 2014 | Britton Riley (DMA) | School of Music |
| 2015 | Zhou Zhou | Department of Mathematics |
| 2015 | Yuchong Zhang | Department of Mathematics |
| 2017 | Roman Gyaduk | Department of Mathematics |
| 2017 | Alexander Munk | Department of Mathematics |

## DEPARTMENTAL AND UNIVERSITY SERVICE

| Winter 2004 | 3-Year Review Committee, Kristen Moore, Math |
| Winter 2004 | 3-Year Review Committee, Mattias Jonsson, Math |
| Fall 2004 | Tenure Review Committee, Mattias Jonsson, Math |
| Fall 2004-Winter 2006 | PhD Admissions Committee, Math |
| Fall 2004-Winter 2006 | Masters Committee, Math |
| Fall 2004-Winter 2007 | AIM PhD Committee, Math |
| Fall 2005-Winter 2010 | Long-Range Planning Committee, Math |
| Fall 2006-Winter 2008 | Executive Committee, Math |
| Fall 2009 | Tenure Review Committee, Erhan Bayraktar, Math |
| Fall 2010-Winter 2011 | Personnel Committee, Math |
| Fall 2012-Winter 2014 | Provost's Advisory Committee for Budgetary Affairs |
| Fall 2013-Winter 2014 | Area Leader for Financial and Actuarial Mathematics, Math |
| Fall 2007 to present | Undergraduate Advisor, Math |
| Fall 2018-Winter 2020 | Self-study Committee, Math |
| Fall 2021 | Climate Committee, Math |

## PROFESSIONAL MEMBERSHIP

Member, Society of Actuaries.