Tianxiang Shi Ph.D., FSA

Department of Risk, Actuarial Science, and Legal Studies
Fox School of Business, Temple University
612 Alter Hall
Philadelphia, PA 19122 USA

Office: +1 (215) 204-6192
Department: +1(215) 204-8456
Fax: +1 (215) 204-4712
Email: tshi@temple.edu

Employment

Associate Professor	2022 – Present
Edna Tuttleman Research Fellow	
Department of Risk, Actuarial Science, and Legal Studies	
Fox School of Business, Temple University	
Assistant Professor	2016 – 2022
Co-Director, M.S. Program in Actuarial Science	2017 – 2022
Fox School of Business, Temple University	
Assistant Professor, Department of Finance	2013 – 2016
University of Nebraska-Lincoln	

Education & Credential

Fellow of the Society of Actuaries (FSA)	2017
Ph.D. in Actuarial Science, University of Waterloo	2013
M.S. in Applied Mathematics, University of Illinois at Urbana-Champaign	2009
B.S. in Mathematics, Zhejiang University	2007

Refereed Publications

Chen, H. and T. Shi (2025). Securitization and Financial Sustainability of the HECM Program, ***Journal of Real Estate Finance and Economics***, in press.

Jiang, Q. and T. Shi (2024). Auto insurance pricing using Telematics data: Application of a Hidden Markov model, ***North American Actuarial Journal***, 28(4): 822-839.

Lin, Y., R. MacMinn and T. Shi (2023). Do pension buyouts help or hurt employees (retirees)? ***Journal of Risk and Insurance***, 90(3): 667-702.

MacMinn, R., Y. Lin, and T. Shi (2023). Buy-ins, buy-outs, longevity bonds, and the creation of value. ***Journal of Demographic Economics***, 89(3): 329-347.

Shi, T. and X. You (2023). Multiemployer pension plans: Employer withdrawals and financial vulnerability. ***North American Actuarial Journal***, 27(1): 121-147.

Lee, Y.T. and T. Shi (2022). Valuation of reverse mortgages with surrender: A utility approach. ***Journal of Real Estate Finance and Economics***, 65(4): 593-621.

Shi, T. and Y.T. Lee (2021). Prepayment risk in reverse mortgages: An intensity-governed surrender model. *Insurance: Mathematics and Economics* 98: 68-82.

Landriault, D., B. Li, T. Shi and D. Xu (2019). On the distribution of classic and some exotic ruin times. *Insurance: Mathematics and Economics* 89: 38-45.

Cox, S.H., Y. Lin, and T. Shi (2018). Pension risk management with funding and buyout options, *Insurance: Mathematics and Economics*, 78: 183-200.
-nominated for the 2019 SOA Redington Prize.

Cai, J., D. Landriault, T. Shi and W. Wei (2017). Joint insolvency analysis of a shared MAP risk process: a capital allocation application, *North American Actuarial Journal*, 21(2): 178-192.

Lin, Y., T. Shi and A. Arik (2017). Pricing buy-ins and buy-outs. *Journal of Risk and Insurance*, 84: 367-392.
-nominated for the 2019 SOA Redington Prize.

Huynh, M., D. Landriault, T. Shi and G.E. Willmot (2015). On a risk model with claim investigation. *Insurance: Mathematics and Economics*, 65: 37-45.

Landriault, D. and T. Shi (2015). Occupation times in the MAP risk model. *Insurance: Mathematics and Economics*, 60: 75-82.

Landriault, D. and T. Shi (2014). First passage time for compound Poisson processes with diffusion: ruin theoretical and financial applications. *Scandinavian Actuarial Journal*, 2014(4): 368-382.

Shi, T. and D. Landriault (2013). Distribution of the time to ruin in some Sparre Andersen risk models. *ASTIN Bulletin*, 43(1): 39-59.

Landriault, D., T. Shi and G.E. Willmot (2011). Joint densities involving the time to ruin in the Sparre Andersen risk model with exponential claim sizes. *Insurance: Mathematics and Economics*, 49: 371-379.

Awards & Scholarships

RFP: "The Impact of Climate Change and Other Catastrophes on the U.S. Health Infrastructure", co-PI 2024
"Climate Anomalies and Their Enduring Impacts on U.S. Mortality and Health Landscape" (PI & co-PI: Wenjun Zhu and Yanbin Xu). Sponsor: Society of Actuaries, Catastrophe & Climate Strategic Research

2023-2024 Sabbatical Award (for Spring 2025)   2024
Temple University

RFP: "Evolution of the Effects of Pension Plans from a Corporate Financial Perspective", PI   2024
"Effects of Pension Plans on Corporate Valuation" (co-PI: Dekun Zhai). Sponsor: Society of Actuaries, Retirement Section Research (RSR)

2020 SOA Individual Grant Competition, PI   2020
"Auto Insurance Pricing Using Telematics Data: Application of a Hidden Markov Model" (co-PI: Qiao Jiang). Sponsor: Casualty Actuarial Society and CKER of the Society of Actuaries.

Faculty of the Year, MS Actuarial Science   2019
Temple University

Society of Actuaries FSA Institutional Grant, PI   2017
    Sponsor: Society of Actuaries.

2014 SOA Individual Grant Competition, PI   2014
    "Economical Capital and Its Optimal Allocations in the Joint-Insolvency Risk Model" (co-PI's: David Landriault and Wei Wei). Sponsor: CKER of the Society of Actuaries.

CAS & CSAF Educational Grant, PI   2013
    "Introduction to Property&Casualty Actuarial Science", University of Nebraska-Lincoln. Sponsor: Casualty Actuarial Society and the Central States Actuarial Forum.

James C. Hickman Scholar   2011 – 2013
    The Society of Actuaries.

Invited Seminars

"Predicting Employer Withdrawals in Multiemployer Defined Benefit Pension Plans: Machine Learning Approaches"
    Department of Finance, University of Nebraska-Lincoln, March 2025

"The Big Thaw: Unfreeze Defined Benefit Pension with Cash Balance Plans"
    School of Insurance and Economics, University of International Business and Economics, October 2024

"Securitization and Financial Sustainability of the HECM Program"
    Maurice R. Greenberg School of Risk Science, Georgia State University, November 2023

"The Value of a Pension Buyout: An Employee (Retiree) Perspective"
    Department of Mathematics, Towson University, October 2021

"DB Pension: To Buyout or Not to Buyout?"
    The School of Mathematics and Statistics, Ningbo University, November 2019

"Pension Risk Management with Funding and Buyout Options"
    Department of Mathematical Science, Middle Tennessee State University, October 2017
    The School of Management, University of Science and Technology of China, May 2017

"Pension De-Risking: Buy-ins and Buy-outs"
    Department of Mathematics, Chongqing University, June 2016
    Smeal College of Business, Penn State University, January 2016
    Department of Mathematics, University of Connecticut, November 2015

"Pricing Pension Buy-ins and Buy-outs"
    School of Public Affairs, Zhejiang University, July 2014

Conference Presentations

"Pension Fund Management with a Machine Learning Strategy" (Joint work with Hua Chen, Siyu Chen, and Binbin Lin)
    Nineteenth International Longevity Risk and Capital Markets Solutions Conference, Amsterdam, Netherlands, September 2024 (presented by coauthor)

Risk & Ruin: A Celebration of Gord Willmot's Contributions to Actuarial Research, Waterloo, Canada, July 2024 (**Invited**)

27th International Congress on Insurance: Mathematics and Economics, Chicago, July 2024

China International Conference on Insurance and Risk Management, Ningbo, China, July 2024

The 2nd International Conference on Actuarial Science, Quantitative Finance, and Risk Management, Beijing, China, July 2024

"Securitization and Financial Sustainability of the HECM Program" (joint work with Hua Chen)

The American Risk and Insurance Association Annual Meeting, Washington DC, August 2023 (presented by coauthor)

27th Asia-Pacific Risk and Insurance Association Annual Meeting, Osaka, July 2023

26th International Congress on Insurance: Mathematics and Economics, Edinburgh, July 2023

"The Effect of PBGC Premium Structure on Corporate Pension Funding Strategies" (joint work with Krupa Viswanathan and Dekun Zhai)

The American Risk and Insurance Association Annual Meeting, Washington DC, August 2023 (presented by coauthor)

58th Actuarial Research Conference, Des Moines, IA, August 2023 (presented by coauthor)

27th Asia-Pacific Risk and Insurance Association Annual Meeting, Osaka July 2023

"Reverse Mortgage Design and Its Application: A Taiwan Case" (joint work with Yung-Tsung Lee)

26th International Congress on Insurance: Mathematics and Economics, Edinburgh, July 2023 (presented by coauthor)

"Multiemployer Pension Plans: Employer Withdrawals and Financial Vulnerability" (joint work with Xuesong You)

The American Risk and Insurance Association Annual Meeting, Virtual, August 2021 (presented by coauthor)

24th International Congress on Insurance: Mathematics and Economics, Virtual, July 2021 (presented by coauthor)

"Reverse Mortgages with Surrender Options: Application of an Intensity-Governed Model" (joint work with Yung-Tsung Lee)

Fifteenth International Longevity Risk and Capital Markets Solutions Conference, Washington DC, September 2019 (presented by coauthor)

"To Buyout or Not to Buyout?" (joint work with Yijia Lin and Richard MacMinn)

2019 NBU International Conference on Actuarial and Financial Mathematics, Ningbo, China, November 2019 (**Invited**)

The American Risk and Insurance Association Annual Meeting, Chicago, IL, August 2018 (presented by coauthor)

22nd International Congress on Insurance: Mathematics and Economics, Sydney, Australia, July 2018

"On the Distribution of Classic and Some Exotic Ruin Times" (joint work with David Landriault, Bin Li and Di Xu)

23rd International Congress on Insurance: Mathematics and Economics, Munich, Germany, July 2019

7th International Gerber-Shiu Workshop, Melbourne, Australia, July 2018

"On the Valuation of Reverse Mortgages with Surrender Options" (joint work with Yung-Tsung Lee)

China International Conference on Insurance and Risk Management, Chengdu, China, July 2019

Thirteenth International Longevity Risk and Capital Markets Solutions Conference, Taipei, China, September 2017

21st International Congress on Insurance: Mathematics and Economics, Vienna, Austria, July 2017 (presented by coauthor)

"Joint Insolvency Analysis of a Shared MAP Risk Process: A Capital Allocation Application" (joint work with Jun Cai, David Landriault and Wei Wei)

20th International Congress on Insurance: Mathematics and Economics, Atlanta, GA, July 2016

"Pension Risk Management with Funding and Buyout Options" (joint work with Samuel H. Cox and Yijia Lin)

The American Risk and Insurance Association Annual Meeting, Cambridge, MA, August 2016 (presented by coauthor)

Eleventh International Longevity Risk and Capital Markets Solutions Conference, Lyon, France, September 2015

50th Actuarial Research Conference, Toronto, Canada, August 2015

China International Conference on Insurance and Risk Management, Hangzhou, China, July 2015

19th International Congress on Insurance: Mathematics and Economics, Liverpool, UK, June 2015

"Experience of Developing the New Casualty Actuarial Science Course at UNL"

Central State Actuarial Forum Annual Meeting, Kansas City, MO, September 2014

"Pricing Buy-ins and Buy-outs" (joint work with Yijia Lin and Ayşe Arik)

Tenth International Longevity Risk and Capital Markets Solutions Conference, Santiago, Chile, September 2014

18th International Congress on Insurance: Mathematics and Economics, Shanghai, China, July 2014

"Joint Distribution Involving the Time to Ruin in Sparre Andersen Risk Models" (joint work with David Landriault)

15th International Congress on Insurance: Mathematics and Economics, Trieste, Italy, June 2011

International Conference on Actuarial Science and Related Fields, Hainan, China, March 2011

"Finite-Time Ruin Problems in Sparre Andersen Models with Arbitrary Interclaim Times" (joint work with David Landriault and Gordon E. Willmot)

45th Actuarial Research Conference, Vancouver, Canada, July 2010

Teaching

Temple University   2016 – *Present*
AS3503/5104 Short-Term Actuarial Modeling, Spring & Fall 2019 – 2024
AS4503/5114 Advanced Short-Term Actuarial Modeling, Spring 2024
AS3501/5102 Long-Term Actuarial Modeling, Fall 2018, Spring 2018 – 2023
AS2101 Actuarial Probability & Statistics II, Fall 2016 – 2018, 2020 – 2021; Spring 2018
AS2502/5101 Theory of Interest, Fall 2016; Spring 2019
AS3502 Actuarial Modeling II, Spring 2017

University of Nebraska-Lincoln   2013 – 2016
ActS 470 Life Contingencies I, Spring 2014 – 2016
ActS 471 Life Contingencies II, Fall 2013 – 2015
ActS 474/874 Intro to Property/Casualty Actuarial Science, Spring 2014 – 2016

University of Waterloo   2011 – 2012
    ACTSC 232 Introduction to Actuarial Mathematics, Winter 2012
    ACTSC 221 Mathematics of Investment, Fall 2011

Service

Editorial Board
    Guest Editor, Special Issue on "*Financial Risk, Actuarial Science, and Applications of AI Techniques*",
    Risks   2024 – Present

Society of Actuaries
    Faculty advisor, University-Earned Credit (UEC) Oversight Committee   2021 – Present
    Committee member, Advanced Actuarial Examinations Committee   2022 – Present
    Chair, Hickman Scholar Awards Committee   2020 – 2021
    Committee member, Hickman Scholar Awards Committee   2018 – 2021
    SOA Fellowship Exam Item Writer, QFI-PM Exam   2019 – 2020
    Pretestor, LTAM Exam for Spring and Fall 2020   2020
    Grader and/or Team Leader, LTAM/ALTAM/ASTAM Exam   2018 – Present

Scientific/Program Committee
    Program Committee, China International Conference on Insurance and Risk Management, 2025
    Scientific Committee, 59th Actuarial Research Conference, 2024

Ad-hoc Referee Service
    Acta Mathematicae Applicatae Sinica, Annals of Actuarial Science, Applied Mathematics and Computation, Asia-Pacific Journal of Risk and Insurance, ASTIN Bulletin, ESAIM: Probability and Statistics, European Actuarial Journal, Insurance: Mathematics and Economics, Journal of Insurance Issues, Journal of Risk and Insurance, Methodology and Computing in Applied Probability, North American Actuarial Journal, Risks, Scandinavian Actuarial Journal, Sustainability

Doctoral Dissertation Committee
    Committee Chair for Dekun Zhai, Ph.D. in RMI at Temple University, completed in 2024
    Committee Chair for Qiao Jiang, Ph.D. in RMI at Temple University, completed in 2022
    Committee member for Xuesong You, Ph.D. in RMI at Temple University, completed in 2021
    Committee member for Rui Ju, Ph.D. in RMI at Temple University, completed in 2019
    Committee member for Myeonghun Choi, Ph.D. in RMI at Temple University, completed in 2019

College/Department Service
Temple University
    UEC Accreditation Actuary for Temple's Actuarial Science Program   2022 – Present
    Committee member, Fox Promotion and Tenure Committee   2024 – Present
    Committee member, Fox Undergraduate Program Committee   Fall 2023
    Co-Director, MS Program in Actuarial Science   2017 – 2022
    Faculty Coordinator, Owlympiad Math Competition   2021 – 2022
    Leading/Co-leading Faculty for Exam Creations, Owlympiad Math Competition   2017 – 2020, 2024
    Committee member, Department Research Committee   2018 – Present
    Committee member, Department PhD Students Committee   2018 – Present
    Committee member, Department Students Award Committee   2019 – 2022

University of Nebraska-Lincoln
    Actuarial Science Undergraduate Student Advisor   2013 – 2016
    Committee member, Actuarial Science Advisory Board, Research Committee   2014 – 2016
    Committee member, CBA Scholarship, Honors and Awards Committee   2015 – 2016
    Committee member, Actuarial Science Search Committee   2015
    Committee member, Finance (PoP) Search Committee   2014 – 2015
    Committee member, Actuarial Science (PoP) Search Committee   2014

Updated in March 2025.