August 2022 News from the

Actuarial Science Program

1. There are 33 **enrolled seniors** in BS-Actuarial Science in F2022 and we expect approximately 30 students will graduate in May or August 2023.

2. Faculty members in the actuarial science program are actively involved in COMS PhD program's student dissertation supervision**. All 5 faculty members**, Drs. Hong, Khaliq, Manathunga, Wu, Xiong are working with at least one COMS PhD student(s) **each** on research projects.

3. Faculty members in the Actuarial Science program are currently/recently under the following **grant support**:

(1) CAS Research Grant (PI: D. Hong, co-PIs: V. Manathunga, L. Xiong, and Q. Wu)

(2) NSF Research Grant (PI: Q. Wu)

(3) Industrial Collaboration Grant (PI: L. Xiong)

(4) ORS and OER grants (PI: V. Manathunga)

(5) S2022 URECA Grants: (Jialin Zhang with Don Hong) and (Xinpeng Hua with Vajira Manathuna)

4. Publications & submitted manuscripts

(1) ***In the field of actuarial science***:

a. Shuzhe Xu, Chaunlong Zhang, and Don Hong, BERT-based NLP techniques for classification and severity modeling, Insurance: Mathematics and Economics, Volume 107 (2022), 57-67. https://doi.org/10.1016/j.insmatheco.2022.07.013. This is **the first publication** that MTSU faculty and students jointly published their research work in the journal, **a top journal** in the actuarial science field. The reviewers and the editor who handling the manuscript gave praise to the paper saying that "I would like to thank the authors for this interesting manuscript", "I appreciate the authors performing a full analysis involving loss severities." and “I think this is a valuable paper."

b. Shuzhe Xu, Vajira Manathunga, and Don Hong, Framework of BERT-Based NLP Models for Frequency and Severity in Insurance Claims, Variance, submitted manuscript 2022. Variance is the research journal published by the Casualty Actuarial Society (CAS), **a listed journal** for research publications to meet the Center of Actuarial Excellence (CAE) application **by the Society of Actuaries** (SOA).

c. Donglin Wang, Don Hong, and Qiang Wu, Prediction of Loan Rate for Mortgage Data: Deep Learning Versus Robust Regression, Computational Economics, https://doi.org/10.1007/s10614-022-10239-5 (2022).

d. Lu Xiong and Don Hong, CapSolve: A Solvency Assessment and Prediction Framework for Workers' Compensation Captive Insurance Companies, Journal of Insurance Issues, manuscript under revision after review, 2022.

e. Tingting Sun and Lu Xiong, Valuation of Large Variable Annuity Portfolio with XGBoost Regression, manuscript for Frontiers in Applied Mathematics and Statistics, 2022.

f. Vajira Manthunga and Danlei Zhu, Unearned Premium Risk and Machine Learning Techniques, manuscript for Frontiers in Applied Mathematics and Statistics, 2022.

(2) ***In Computational & Data Science fields:***

(i) Donglin Wang, Don Hong, and Qiang Wu, Attention Deficit Hyperactivity Disorder Classification Based on Deep Learning", IEEE/ACM Transactions on Computational Biology and Bioinformatics, DOI: 10.1109/TCBB.2022.3170527, 2022.

(ii) Donlin Wang and Qiang Wu, "On the Selection of Hyperparameters in Convolutional Neural Networks," *2021 International Conference on Computational Science and Computational Intelligence (CSCI)*, 2021, pp. 1728-1731, doi: 10.1109/CSCI54926.2021.00327. Published by **IEEE *Xplore*:** 22 June 2022

(iii) Donglin Wang, Qiang Wu, and Don Hong, Extracting Default Mode Network Based on Graph Neural Network for Resting State fMRI Study, Frontiers in Neuroscience, accepted for publication, 2022.

5. Presentations at the 2022 Actuarial Research Conference held at the University of Illinois-Urbana Champaign from August 3-6, 2022:

(1) V. Manathunga and Shuzhe Xu, Framework for BERT Based NLP Models with Applications.

(2) Yuan Chen and Abdul Khaliq, Data Driving LSTM Method to Predict Mortality under COVID-19 in the United States Based on Deep Learning.

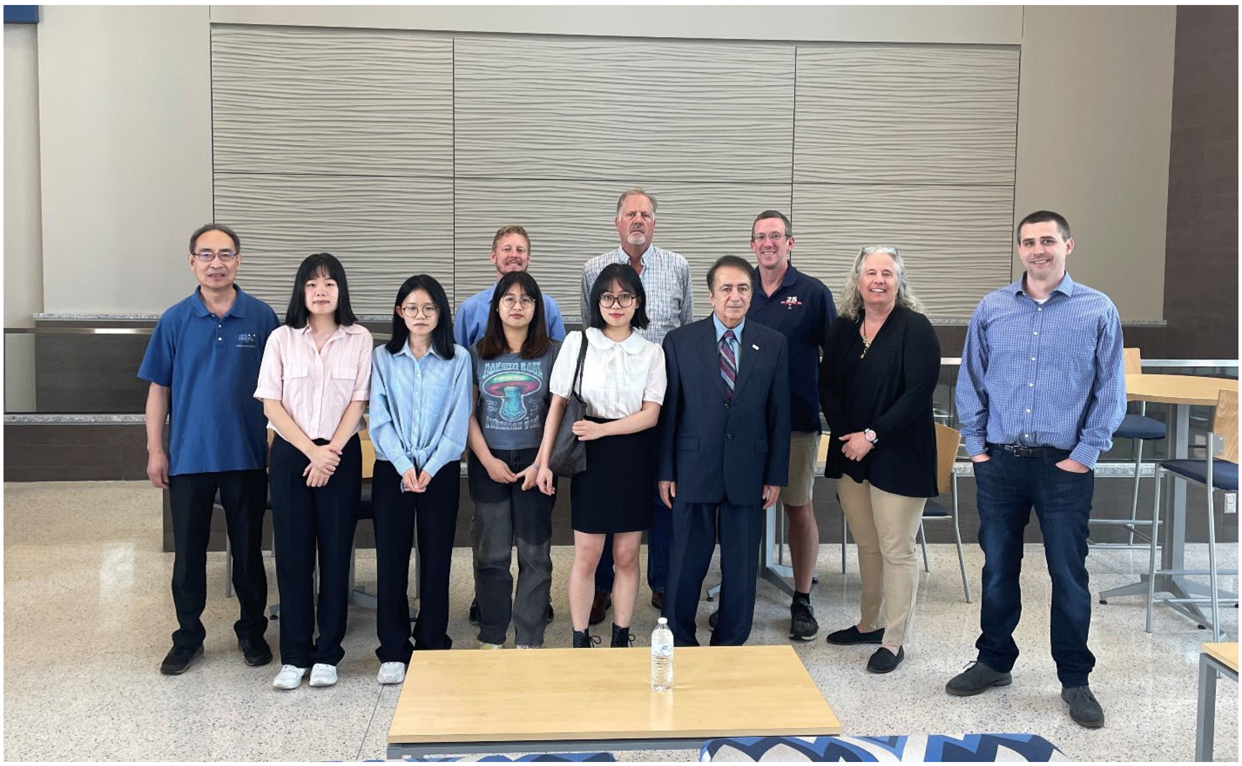
6. News on **Actuarial Exams**:

Congratulations to the following students in the program who have successfully passed their corresponding actuarial professional exam(s) from the SOA/CAS since June 2022:

Yuwen Qian (P), Tanner O’Grady (FM), Xinyu Chen (IFM), Lulu Liu (STAM), Jiamin Zhao (IFM), and Danlei Zhu (SRM and STAM).

7. **Internship** Experience:

Congratulations to the following students who completed their Summer Internship: Tingyuan Deng, Paul Dowell, Lulu Liu, Haocheng Pan, Yuwen Qian, Jiamin Zhao, and Danlei Zhu. Much appreciation to our industrial partners for their consistent support!



Advisory Board Members of the Program who participated the 2022 MSPS Internship Presentations [2nd row from left to right: David A. Craig, ASA (BCBS-TN), Richard Waggoner, FSA, MAAA (AETNA), Tony King and L. Michelle Bradley, ACAS, MAAA, ARM, CERA (SIGMA Actuarial Consulting)].