

Seul ki Kang

CONTACT INFORMATION

OSS 210 Mathematics,
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PROFESSIONAL EXPERIENCE

UNIVERSITY OF ST.THOMAS
Assistant Professor of Mathematics and Actuarial Science

St. Paul, MN
2022-Present

EDUCATION

GEORGIA STATE UNIVERSITY
Ph.D., Risk Management and Insurance
Dissertation: "RISK ANALYSIS AND UNCERTAINTY QUANTIFICATION IN INSURANCE RATEMAKING"

- Advisor: Professor Liang Peng
- GPA: 4.09/4.30

Atlanta, GA
2017-2022

TEXAS A&M UNIVERSITY
Ph.D., Mathematics
Dissertation: "MULTISCALE SIMULATION AND UNCERTAINTY QUANTIFICATION TECHNIQUES FOR RICHARDS' EQUATION IN HETEROGENEOUS MEDIA"

- Co-Advisor: Professor Yalchin Efendiev, Professor Raytcho Lazarov
- GPA: 3.95/4.00

College Station, TX
2007- 2012

KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY (KAIST)
Bachelor of Science, Division of Mathematics, Department of Mathematics.

- Advisor: Professor U JIN CHOI
- 100% Tuition waived
- One year experience as an exchange student at KTH, Stockholm, Sweden
- Major GPA: 3.76 Overall GPA: 3.38

Daejeon, Korea
2002- 2007

RESEARCH INTERESTS

- Actuarial mathematics
- Extreme value theory in finance and insurance
- Statistical modeling of finance and insurance losses
- Econometrics
- Nonparametric statistics
- Empirical likelihood methods
- Bayesian statistics
- Computational modeling
- Uncertainty quantification

PUBLICATIONS

- "Three-Step Risk Inference In Insurance Ratemaking", Yanxi Hou, Seul Ki Kang, Steve Lo, Liang Peng, Insurance: Mathematics and Economics 2022.
- "Two-Step Risk Analysis In Insurance Ratemaking", S.Kang, L.Peng, A. Golub, Scandinavian Actuarial Journal 2021.
- "Risk analysis with categorical explanatory variables", S.Kang, L.Peng, H. Xiao, Insurance: Mathematics and Economics 2020.
- "Spectral multiscale finite element for nonlinear flows in highly heterogeneous media: A reduced basis approach", J Galvis, SK Kang, Journal of Computational and Applied Mathematics 2014.
- "Robust multiscale iterative solvers for nonlinear flows in highly heterogeneous media", Y. Efendiev, J. Galvis, S.Kang, R.Lazarov, Numerical Mathematics: Theory, Methods and Applications 2012.

RESEARCH EXPERIENCE

GEORGIA STATE UNIVERSITY, Department of Risk Management and Insurance
Graduate Researcher: Advisor: Professor Liang Peng.
Risk analysis and uncertainty quantification in insurance ratemaking

- Made inferences about risk measures, such as VaR or Expected Shortfall, for insurance claims.
- Developed more generalized two steps quantile regression techniques for measuring VaR and applied it

Atlanta, GA
2017-2022

in insurance ratemaking.

- Applied generalized Pareto distribution(GPD) for measuring risks with high risk level and used quantile regression for setting a dynamic threshold of GPD.
- Proposed several techniques for measuring uncertainty regarding proposed inference.

TEXAS A&M UNIVERSITY, Department of Mathematics

College Station, TX

Graduate Researcher: Advisor: Professor Yalchin Efendiev and Professor Raytcho Lazarov *2009-2012*

Multiscale simulation and uncertainty quantification techniques for Richards' equation in heterogeneous media

- Developed multiscale finite element methods and uncertainty quantification techniques for Richards' equation, a mathematical model to describe fluid flow in unsaturated porous media.
- Developed an accurate coarse-scale numerical method by constructing an effective multiscale map that captures the multiscale features of the large-scale solution without resolving the small scale details
- Present numerical methods based on upscaling techniques and the Markov chain Monte Carlo method for uncertainty quantification applications for Richards' equation

FRAUNHOFER INSTITUTE FOR INDUSTRIAL AND MATHEMATICS, ITWM

Kaiserslautern, Germany

Visiting scholar: Advisor: Professor Yalchin Efendiev and Professor Oleg Iliev *2011*

- Studied Richards' equation using multiscale finite element method and uncertainty quantification method.
- Applied multiscale finite element method to paper machine problem.

TEXAS A&M UNIVERSITY, Institute for Scientific Computation

College Station, TX

Summer Graduate Researcher: *Advisor:* Professor Guido Kanschat *2008*

- Studied Wavelet theory and conservation law.
- Discovered the best way to solve wavelet equations with the fewest errors using several numerical methods.

KAIST NUMERICAL ANALYSIS LABORATORY

Daejeon, Korea

Undergraduate Researcher: Advisor; Dr. Doyoung Kwak *2006*

- Found the approximate values of several Ordinary Differential Equations and checked their values using a computational tool, such as C++.
- Found recent articles about an option market and discussed about the newly accepted theories.

**TEACHING
EXPERIENCE**

UNIVERSITY OF ST. THOMAS

St. Paul, MN

Spring 2023: ACSC 375 "Short-term Actuarial Models"

Spring 2023: ACSC 264 "Theory of Interest"

Fall 2022: ACSC 264 "Theory of Interest"

Fall 2022: MATH191 "Finite Mathematics"

GEORGIA STATE UNIVERSITY

Atlanta, GA

Spring 2021: AS 4360 "Ratemaking & Loss Reserving",

Highlighted in the 2021 CAS University Award winner.

Spring 2020: AS 4360 "Property and Casualty(P&C) Catastrophe Modeling and Ratemaking"

TEXAS A&M UNIVERSITY

College Station, TX

Experience Graduate Teaching Assistant, Department of Mathematics

2007 - 2011

- Recitation TA: Calculus I, Calculus II
- Grader (Graduate level): Analysis for Applications, Algebra, Linear Algebra, Partial Differential Equations
- Grader (Undergraduate level): Advanced Calculus I

PRESENTATIONS

SRIA(Southern Risk and Insurance Association) 2021

Online

Presented at SRIA 2021 about "Three-Step Risk Inference in Insurance Ratemaking."

November 2021

WSSAF(Waterloo Student Conference in Statistics, Actuarial Science and Finance) 2021 *Waterloo, Canada(Online)*

Presented at WSSAF 2021 about "Three-Step Risk Inference in Insurance Ratemaking."

November 2021

SETA(The 15th International Symposium on Econometric Theory and Applications) 2019 *Osaka, Japan*

Presented at SETA 2019 about "Risk analysis with categorical explanatory variables."

June 2019

KSTLC(Korean Students Technical & Leadership Conference) 2012 *Chicago, IL*
Presented poster at KSTLC 2012 about “Uncertainty quantification methods for characterizing vardoze zone.”
March 2012

JMM(Joint Mathematics Meetings) 2012 *Boston, MA*
Presented at JMM 2012 about “Multiscale simulations for Richards' equation in high-contrast media and applications.”
January 2012

INVITED TALK *Kaiserslautern, Germany*
Presented at ITWM Institute about Richards' equation and its numerical solving methods.
March 2011

**INDUSTRY
WORK
EXPERIENCE**

SAMSUNG FIRE AND MARINE INSURANCE CO. *Seoul, Korea*
Senior Manager *2012 - 2017*

- Worked at Auto Insurance Pricing Division
- Model loss and cost distribution using Emblem
- Model loss reserving using SAS and R
- Developed and managed the web crawling and scraping tools using Java.
- Managed and analyzed big data using SQL, Java, R, and Tableau

WOORI INVESTMENT & SECURITIES CORPERATION *Seoul, Korea*
Intern/Research Assistant *2007- 2007*

- Worked at Research center.
- Assisted Analyst who is specialized in analyzing construction companies' data.

EXAM

- SOA Exam P
- SOA Exam FM
- SOA Exam MFE
- SOA Exam C
- SOA Exam SRM

SKILLS

COMPUTER SKILLS:

- **Languages:** JAVA, Visual Basic, SQL
- **Mathematical Tools:** R, SAS, STATA, Matlab, Maple, WinBUGS
- **Systems:** Windows, Linux
- **Others :** MS Office, Emblem, Tableau, LaTeX

LANGUAGE SKILLS: Native: Korean, Fluent in Japanese, and English.

AWARDS

CEAR SCHOLAR FUNDING *2021*
Merit-based scholarship awarded to Ph.D. students

VISITING SCHOLAR GRANT, Fraunhofer Institute for Industrial and Mathematics ITWM *2011*
Funded for researching as visiting scholar

NATIONAL SCIENCE FOUNDATION GRANT, Computational Mathematics *2010-2012*
Partially supported research

NATIONAL SCIENCE FOUNDATION GRANT, Earth Sciences Research *2009-2012*
Partially supported research

INSTITUTE FOR APPLIED MATHEMATICS AND COMPUTATIONAL SCIENCE FELLOWSHIP *2010- 2012*
Funded Ph.D. student who is dedicated to the promotion of leading edge research within the interdisciplinary field broadly known as the computational sciences

KAIST SCHOLARSHIP *2002- 2007*
Merit-based scholarship awarded to students

SAMSUNG HUMAN TECHNOLOGY THESIS AWARDS

Competition for young scientists' thesis works, Earned Prize for Encouragement(4th place) with thesis "Study of Stabilization of Heavy Metal Ion in EAF Dust" 2002