Dr. Jimmy Risk

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Department of Mathematics & Statistics | Cal Poly Pomona
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WORKING EXPERIENCE

California State Polytechnic University, Pomona CA
Department of Mathematics & Statistics
- **Assistant Professor** (Tenure–Track) — Sept 2017–Current

University of California, Santa Barbara CA
Department of Statistics & Applied Probability
- Teaching Assistant — Sept 2013–Dec 2013
- Teaching Associate (Student Lecturer) — January 2012–June 2013

Michigan State University
Department of Statistics & Probability
- Teaching Assistant — Sept 2013–Dec 2013
- Teaching Associate (Student Lecturer) — Summer 2012

EDUCATION

Doctor of Philosophy, Statistics & Applied Probability — September 2013–June 2017
Emphasis in Financial Mathematics and Statistics
University of California, Santa Barbara, CA
Dissertation Committee:
- Michael Ludkovski (Advisor)
- Jean-Pierre Fouque
- Tomoyuki Ichiba

Thesis Topic: Applications of Gaussian Processes to Actuarial Modeling and Pricing

Extended Adademic Visit — September 2015
ISFA: Institut de Science Financière et d'Assurances - Université Lyon 1
Topic: Stochastic Kriging in Longevity Risk Pricing
Invited by Stéphane Loisel

Master of Science, Statistics & Probability — January 2011–May 2013
Michigan State University, East Lansing, MI

Bachelor of Science, Mathematics — January 2007–August 2010
Michigan State University, East Lansing, MI
Actuarial Specialization

RESEARCH

RESEARCH INTERESTS
- **Gaussian processes and their regression applications**
  - Statistical learning kernels; their properties and influence particularly in Gaussian process regression
  - Gaussian process super-resolution
  - Connections between Gaussian processes and neural networks (via Neural Tangent Kernel)
- **Mortality and longevity modelling**
  - Gaussian process models
  - Mortality improvement analysis
  - Multi-population mortality models (through multi-output Gaussian processes)
- **Mathematical Finance**
  - Level-set estimation (with regards to VaR and TVaR calculations)

– Efficient approximations in nested Monte Carlo settings

PUBLICATIONS

Risk, Jimmy, Huynh, Nhan, and Ludkovski, Michael. "SOA 2021 ILEC mortality prediction contest." *Society of Actuaries* (2021). https://www.soa.org/globalassets/assets/files/resources/research-report/2021/mort-prediction-contest.pdf

Risk, Jimmy, and Ludkovski, Michael. "Sequential Design and Spatial Modeling for Portfolio Tail Risk Measurement." *SIAM Journal on Financial Mathematics 9.4* (2018) 1137-1174.

Ludkovski, Michael, Risk, Jimmy, and Zail, Howard. "Gaussian Process Models for Mortality Rates and Improvement Factors." *ASTIN Bulletin: The Journal of the IAA 48.3* (2018) 1307-1347.

Risk, Jimmy, and Ludkovski, Michael. "Statistical emulators for pricing and hedging longevity risk products." *Insurance: Mathematics and Economics* 68 (2016): 45-60.

Risk, Jimmy. "Correlations between Google search data and Mortality Rates." arXiv preprint arXiv:1209.2433 (2012). https://arxiv.org/abs/1209.2433

WORKING PREPRINTS *(Available upon request)*

Risk, Jimmy, Amelin, Charles, and Frank, Hakeem. "Interpretable Kernels for Gaussian Process Super-Resolution." *(To be submitted soon.)*

Risk, Jimmy, and Ronald Lenčevicius. "Gaussian Process Specific Comparisons between Neural Tangent and Laplace Kernels."

Risk, Jimmy, and Ludkovski, Michael. "Flexible Kernels for Multi-Population Gaussian Process Mortality Models."

HONORS & AWARDS	Winner of SOA Mortality Prediction Contest	Fall 2021

- Open entry (internationally)
- The Society of Actuaries (SOA) is global professional organization for actuaries; one of the two largest in the United States
- See research publications section for winning submission

Recipient of SOA Hickman Scholarship   Spring 2015–Spring 2017
- Worldwide scholarship for PhD students pursuing academia & actuarial credentials
- Only five new scholars awarded annually

ACTUARIAL   Passed exams P, FM, MLC, C, MFE; All VEE credits completed

TEACHING EXPERIENCE

Assistant Professor
Department of Mathematics & Statistics, California State Polytechnic University, Pomona
- STA 5250 (Graduate Level Time Series Analysis)   (F17, F19, F21)
- STA 4250 (Survival Analysis)   (Sp18, Sp20)
- STA 1200 & 1200H (Statistics with Applications)   (S18, Su18, F18)
- STA 2100 (Introduction to Statistics)   (F18, F20)
- STA 4320 (Applied Regression Analysis)   (F18, Su20)
- STA 5320 (Linear Statistical Models)   (S19)
- MAT 3100 (Introduction to Real Analysis)   (Su20)
- STA 5900 (Statistical Consulting)   (F20)
- MAT 4190 (Advanced Linear Algebra)   (Su21)
- STA 4990 (Introduction to Actuarial Science)   (Su21)

Teaching Associate (Student Lecturer)

Department of Statistics & Applied Probability, University of California, Santa Barbara
- PSTAT 109 (Statistics for Economics) (Summer 2015, 2016)

Department of Statistics & Probability, Michigan State University
- STT 200 (Introduction to Probability & Statistics) (Summer 2012)

Teaching Assistant

Department of Statistics & Applied Probability, University of California Santa Barbara
- PSTAT 501 (TA Training Course) (F16 W16)
- PSTAT 213ABC (PhD Level Probability Theory) (F15 F16 W16 W17 S16 S17)
- PSTAT 160A (Introduction to Stochastic Processes) (F15)
- PSTAT 171 (Mathematics of Interest) (F13 F14)
- PSTAT 172AB (Actuarial Statistics) (W14 W15 W16 S14 S15 S16)
- Lecturer for PSTAT 182T (Tutorial for Exam P & FM) (W14 S14)

Department of Statistics & Probability, Michigan State University
- STT 315 (Introduction to Probability & Statistics for Business) (S12, F12, S13)
- STT 455/456 (Actuarial Models) (F12, S13)

TEACHING CERTIFICATION	**Applying the Quality Matters Rubric** (Summer 2021)

- Intensive workshop to certify ability to apply the rubric from the global organization *Quality Matters* (QM).

- QM Provides a scalable quality assurance system for online and blended learning used within and across organizations.

- QM professional development is designed to help educators deliver the promise of quality online learning opportunities to every level of learner.

Cal Poly Pomona Safe Zone Ally Training (Fall 19)

- Organized training to learn more about individuals that may identify as Gay, Lesbian, Bisexual, Transgender, Queer/Questioning or may be unsure of their sexual orientation or gender identity.

INVITED LECTURES	

- Science on Tap *(Cal Poly Pomona College of Science)* October 2021
  Topic: *How Random Was That? (An Introduction to Statistical Modelling)*
- UC Riverside Applied Statistics Colloquium March 2021
  Topic: *The Role of a Kernel in Statistical Learning*
- AMS Sectional Meeting; Special Session on Markov Processes, Gaussian Processes and Applications in San Francisco, CA October 2018
- Fourteenth International Longevity Risk and Capital Markets Solutions Conference in Amsterdam September 2018
  Topic: *An Interactive R Markdown Approach to Mortality Rate and Improvement Modeling using Gaussian Process Models*
- Twelfth International Longevity Risk and Capital Markets Solutions Conference in Chicago September 2016
  Topic: *Gaussian Process Models for Mortality Rates and Improvement Factors*
- 50th Actuarial Research Conference (ARC), University of Toronto August 2015
  Topic: *Statistical Emulators & Longevity Risk*
- Eleventh International Longevity Risk and Capital Markets Solutions Conference at Université Lyon 1, Lyon, France September 2015
  Topic: *Statistical Emulators & Longevity Risk*

SEMINAR TALKS	

- CPP Mathematics and Statistics Colloquium November 2017 Topic: *Stochastic Kriging in Quantile Estimation with Applications to VaR Calculations*
- CPP Mathematics and Statistics Colloquium March 2017 Topic: *Gaussian Processes for Machine Learning*
- UCSB Statistics Department Gaussian Process Research Group November 2016
  Newly established quarterly seminar for faculty and PhD students to discuss top-

ics and their current research in Gaussian Processes
Topic: *Stochastic Kriging in Quantile Estimation with Applications to VaR Calculations*

- UCSB Statistics Department Colloquium Talk   May 2016
Topic: *Statistical Emulators & Gaussian Processes*
- UCSB Mathematics Department   May 2015
Topic: *Proving the Central Limit Theorem in the strong operator topology*

IN PERSON CONFERENCE ATTENDANCE

- 8th Western Conference in Mathematical Finance   March 2017
University of Washington
- Society of Actuaries Annual Meeting & Exhibit   October 2015
Austin, TX
- Second NUS-UParis Diderot Workshop on Quantitative Finance September 2015
University of Paris Diderot
- Conference on Stochastic Asymptotics & Applications   September 2014
Joint with Sixth Western Conference on Mathematical Finance
University of California Santa Barbara
- 49th Actuarial Research Conference (ARC)   July 2014
University of California Santa Barbara

ADVISED MASTERS THESES

- Ronald Lencevicius *Connections between Neural Tangent and Laplace Kernels* Spring 2022 *(Expected)*
- Chris Muzquiz *Multi-output Gaussian Process Kernels for Natural Language Processing*   Spring 2022 *(Expected)*
- Charles Amelin *Gaussian Process Super-Resolution*   Summer 2021
- Kaitlyn McGloin *Methodology and Analysis of Collaborative Filtering Recommender Systems*   Spring 2021
- Esteban Escobar *An Introduction to Practical Topological Data Analysis* Spring 2021
- Hakeem Frank *Gaussian Process Models for Computer Vision*   Spring 2020
- Yuying (Bella) Guan *Introduction to Gaussian Processes For Regression* Spring 2020
- Kevin Bailey *Statistical Learning for Esports Match Prediction*   Spring 2020
- Greg Nelson *Red and White Wine Data Analysis*   Spring 2020

PROGRAMMING

- LaTeX, Markdown

- R, R Markdown

    - Fluent in base R, `tidyverse`, and `ggplot`.

    - Fluent in crossing R code with `python` and `Julia` in RStudio.

    - Created accompanied R Notebook for publication *Gaussian Process Models for Mortality Rates and Improvement Factors.*

- Julia

- Python

    - Familiarity with `pytorch`
        * Using GPU's for tensor math
        * Neural network programming
        * `gpytorch`

    - Familiarity with `scikit-learn` framework

- Experience with `github`

LEADERSHIP EXPERIENCE	CPP STA 1200 (Statistics with Applications) Coordinator	F20–Current

- STA 1200 is one of CPP's highest enrolled courses
- First coordinator, creating a plan for coordination
- Meet biweekly with all STA 1200 instructors to discuss teaching duties
- Revise curriculum and teaching methods to better assist students and lecturers
- Develop assessment tools (common final exam item) for course assessment
- Develop resources to assist students and lecturers (Canvas course shell, list of recommended applets, videos, etc.)

ACADEMIC COMMITTEE EXPERIENCE

Cal Poly Pomona Mathematics and Statistics

- TA and Lecturer Hiring Committee   F18–S20
- Faculty Search Committee   F21–Current
- Assessment Committee   F18–Current
    - Develop and utilize tools for department wide course assessment
- Graduate Committee   F17–S18
- Statistics Committee   F17–Current
- Colloquium Committee   F17–S18
- Advising Committee (Chair)   F18–S19

EXTRA-CURRICULAR ACTIVITIES

- Faculty advisor for Cal Poly Pomona Association of Applied Statistics   F20–Current
- Led student research group studying Continuous Martingales and Brownian Motion by Revuz & Yor   F15–S16
- Member of SOA Education & Research Section   Su16–Current
- Member of SIAM   S12–Current