Yu-Jui Huang

CONTACT INFORMATION
Department of Applied Mathematics
University of Colorado
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RESEARCH AREAS
Mathematical finance, stochastic control, optimal stopping, mathematics of machine learning.

EMPLOYMENT
University of Colorado, Boulder, USA
Assistant Professor, Department of Applied Mathematics
Aug. 2016 onward

Dublin City University, Dublin, Ireland
Lecturer in Financial Math., School of Mathematical Sciences
Sep. 2013-Aug. 2016

EDUCATION
University of Michigan, Ann Arbor, USA (2008-2013)
Ph.D., Applied and Interdisciplinary Mathematics
May 2013

• Advisor: Prof. Erhan Bayraktar
• Dissertation: “Topics in Stochastic Control with Applications to Finance”

National Taiwan University, Taipei, Taiwan (2002-2007)
B.S., Mathematics
June 2007

B.B.A., Finance
June 2007

GRANTS
National Science Foundation, Division of Mathematical Sciences
Topics in Stochastic Control: Finance, Epidemics, and Machine Learning
DMS-2109002, PI, $273,374
2021-2024

National Science Foundation, Division of Mathematical Sciences
Stochastic Games for Intergenerational Equity in Mathematical Finance
DMS-1715439, PI, $186,166
2017-2021

AWARDS
SIAM SIGEST Award
Awarded by Society for Industrial and Applied Mathematics (SIAM) for the article “American Student Loans: Repayment and Valuation” in SIAM Journal on Financial Mathematics.

2015 Bruti-Liberati Fellow
Quantitative Finance Research Centre, University of Technology Sydney

SUBMITTED PAPERS
• Yu-Jui Huang, Zhenhua Wang, and Zhou Zhou (2022)
Convergence of Policy Improvement for Entropy-Regularized Stochastic Control Problems

• Yu-Jui Huang and Yuchong Zhang (2022)
GANs as Gradient Flows that Converge

• Yu-Jui Huang, Shih-Chun Lin, Yu-Chih Huang, Wen-Yi Zeng, and Wan-Yi Lin (2022)
On Characterizing Optimal Wasserstein GAN Solutions for Non-Gaussian Data

• Joshua Aurand and Yu-Jui Huang (2021)
Epstein-Zin Utility Maximization on a Random Horizon

• Arash Fahim, Yu-Jui Huang, and Saeed Khalili (2019)
Generalized Duality for Model-Free Superhedging given Marginals
Publications

Journal articles:

• Paolo Guasoni and Yu-Jui Huang (2022)
  Minimizing the Repayment Cost of Federal Student Loans
  SIAM Review, Vol. 64, No. 3, pp. 689–709.

• Yu-Jui Huang and Zhou Zhou (2022)
  A Time-Inconsistent Dynkin Game: from Intra-personal to Inter-personal Equilibria
  Finance and Stochastics, Vol. 26, Issue 2, pp 301–334.

• Joshua Aurand and Yu-Jui Huang (2021)
  Mortality and Healthcare: A Stochastic Control Analysis under Epstein-Zin Preferences
  SIAM Journal on Control and Optimization, Vol. 59, No. 5, pp 4051–4080.

• Yu-Chih Huang, Yu-Jui Huang, and Shih-Chun Lin (2021)
  Asymptotic Optimality in Byzantine Distributed Quickest Change Detection
  IEEE Transactions on Information Theory, Vol. 67, No. 9, pp 5942–5962.

• Yu-Jui Huang and Xiang Yu (2021)
  Optimal Stopping under Model Ambiguity: A Time-Consistent Equilibrium Approach
  Mathematical Finance, Vol. 31, Issue 3, pp 979–1012.

• Yu-Jui Huang and Zhou Zhou (2021)
  Strong and Weak Equilibria for Time-Inconsistent Stochastic Control in Continuous Time
  Mathematics of Operations Research, Vol. 46, Issue 2, pp 428–451.

• Yu-Jui Huang and Zhenhua Wang (2021)
  Optimal Equilibria for Multi-Dimensional Time-Inconsistent Stopping Problems
  SIAM Journal on Control and Optimization, Vol. 59, No. 2, pp 1705–1729.

• Paolo Guasoni, Yu-Jui Huang, and Saeed Khalili (2021)
  American Student Loans: Repayment and Valuation
  SIAM Journal on Financial Mathematics, Vol. 12, No. 2, pp SC-16–SC-30.

• Yu-Jui Huang and Zhou Zhou (2020)
  Optimal Equilibria for Time-Inconsistent Stopping Problems in Continuous Time
  Mathematical Finance, Vol. 30, Issue 3, pp 1103–1134.

• Yu-Jui Huang, Adrien Nguyen-Huu, and Xunyu Zhou (2020)
  General Stopping Behaviors of Naïve and Non-Committed Sophisticated Agents, with Application to Probability Distortion
  Mathematical Finance, Vol. 30, Issue 1, pp 310–340.

• Paolo Guasoni and Yu-Jui Huang (2019)
  Consumption, Investment, and Healthcare with Aging
  Finance and Stochastics, Vol. 23, Issue 2, pp 313–358.

• Yu-Jui Huang and Saeed Khalili (2019)
  Optimal Consumption in the Stochastic Ramsey Problem without Boundedness Constraints
  SIAM Journal on Control and Optimization, Vol. 57, No. 2, pp 783–809.

• Yu-Jui Huang and Zhou Zhou (2019)
  The Optimal Equilibrium for Time-inconsistent Stopping Problems - the Discrete-Time Case
  SIAM Journal on Control and Optimization, Vol. 57, No. 1, pp 590–609.

• Yu-Jui Huang and Adrien Nguyen-Huu (2018)
  Time-consistent Stopping under Decreasing Impatience
  Finance and Stochastics, Vol. 22, Issue 1, pp 69–95.

• Xiaoshan Chen, Yu-Jui Huang, Qingshuo Song, and Chao Zhu (2017)
  The Stochastic Solution to a Cauchy Problem for Degenerate Parabolic Equations
  Journal of Mathematical Analysis and Applications, Vol. 451, Issue 1, pp 448–472.

• Arash Fahim and Yu-Jui Huang (2016)
  Model-independent Superhedging under Portfolio Constraints
  Finance and Stochastics, Vol. 20, Issue 1, pp. 51–81.

• Erhan Bayraktar, Yu-Jui Huang, and Zhou Zhou (2015)
On Hedging American Options under Model Uncertainty
SIAM Journal on Financial Mathematics, Vol. 6, No. 1, pp. 425–447.

- Erhan Bayraktar and Yu-Jui Huang (2013)
Robust Maximization of Asymptotic Growth under Covariance Uncertainty
Annals of Applied Probability, Vol. 23, No. 5, pp. 1817–1840.

- Erhan Bayraktar and Yu-Jui Huang (2013)
On the Multi-Dimensional Controller-and-Stopper Games
SIAM Journal on Control and Optimization, Vol. 51, No. 2, pp. 1263–1297.

- Erhan Bayraktar, Yu-Jui Huang, and Qingshuo Song (2012)
Outperforming the Market Portfolio with a Given Probability
Annals of Applied Probability, Vol. 22, No. 4, pp. 1465–1494.

Conference articles:

- Yu-Chih Huang, Shih-Chun Lin, and Yu-Jui Huang (2019)
A Tight Converse to the Asymptotic Performance of Byzantine Distributed Sequential Change Detection
2019 IEEE International Symposium on Information Theory, pp. 2404–2408.

- Yu-Jui Huang, Shih-Chun Lin, and Yu-Chih Huang (2019)
On Byzantine Distributed Sequential Change Detection with Multiple Hypotheses
2019 IEEE International Symposium on Information Theory, pp. 2209–2213.

Research Visits

University of Technology Sydney, Sydney, Australia
Quantitative Finance Research Centre
December 2015

City University of Hong Kong, Hong Kong, China
Department of Mathematics
May-June 2013

Invited Talks

- Seminar in Communication Engineering
National Taiwan University
August 4, 2022

- Hong Kong-Singapore Joint Seminar in Financial Mathematics/Engineering
International online seminar
July 21, 2022

- SIAM Annual Meeting
Pittsburgh, Pennsylvania
July 13, 2022

- Mathematical Finance, Stochastic Analysis, and Machine Learning Seminar
Illinois Institute of Technology
April 5, 2022

- One World Optimal Stopping and Related Topics Seminar
International online seminar
December 8, 2021

- SIAM Annual Meeting
Virtual conference
July 23, 2021

- Stochastics and Finance Seminar
University of Sydney
May 27, 2021

- Control and Optimization Seminar
University of Connecticut
March 29, 2021

- AMS Spring Eastern Meeting
Virtual conference
March 20, 2021

- Financial/Actuarial Mathematics Seminar
University of Michigan
February 24, 2021

- Analysis Seminar
University of Oklahoma
November 16, 2020

- INFORMS Annual Meeting
Virtual conference
November 10, 2020
• SIAM Conference on Control and Its Applications  
  Chengdu, China  
  June 19, 2019

• SIAM Conference on Financial Mathematics and Engineering  
  Toronto, Canada  
  June 5, 2019

• Financial Mathematics Seminar  
  Dublin City University, Dublin, Ireland  
  January 29, 2019

• Systems Engineering and Engineering Management Seminar  
  The Chinese University of Hong Kong  
  January 14, 2019

• AIMS Conference on Dynamical Systems, Differential Equations and Applications  
  Taipei, Taiwan  
  July 6, 2018

• Symposium on Optimal Stopping — in Memory of Larry Shepp  
  Rice University  
  June 28, 2018

• Applied Mathematics Colloquium  
  The Hong Kong Polytechnic University  
  May 21, 2018

• Byrne Workshop on Stochastic Analysis in Finance and Insurance (Plenary speaker)  
  University of Michigan  
  May 9, 2018

• Mathematical Finance and Applied Probability Seminar  
  University of Connecticut  
  April 11, 2018

• Mathematical Finance and Probability Seminar  
  Rutgers University  
  March 20, 2018

• Probability Seminar  
  University of Colorado, Boulder  
  November 16, 2017

• Mathematical Finance Seminar  
  Columbia University  
  November 9, 2017

• Seminar on Financial Mathematics  
  National Center for Theoretical Sciences, Taipei, Taiwan  
  July 11, 2017

• Stochastic Analysis and Financial Mathematics Common  
  Worcester Polytechnic Institute  
  March 27, 2017

• SIAM Conference on Financial Mathematics and Engineering  
  Austin, Texas  
  November 19, 2016

• Mathematical Finance Colloquium  
  University of Southern California  
  September 26, 2016

• Stochastics Seminar  
  National Central University, Taoyuan, Taiwan  
  June 3, 2016

• Probability Seminar  
  Academia Sinica, Taipei, Taiwan  
  May 30, 2016

• Mathematical Finance Seminar  
  Boston University  
  February 1, 2016

• Statistics Seminar  
  University of Toronto  
  January 28, 2016

• Special Mathematics Departmental Seminar  
  Rutgers University  
  January 26, 2016

• Nicola Bruti-Liberati Lecture  
  Quantitative Methods in Finance Conference (QMF), Sydney  
  December 18, 2015

• Special Applied Mathematics Departmental Seminar  
  University of Colorado at Boulder  
  December 1, 2015

• Nomura Seminar in Mathematical Finance  
  University of Oxford  
  June 4, 2015

• ORFE Colloquium
Princeton University  January 30, 2015
• Mathematics Colloquium
Florida State University  January 16, 2015
• Financial Mathematics Seminar
Florida State University  January 15, 2015
• Seminar on Probability and Statistics with Applications
National Chiao Tung University, Hsinchu, Taiwan  January 5, 2015
• One-Day Course in Financial Mathematics
National Tsing Hua University, Hsinchu, Taiwan  December 17, 2014
• Mathematical Finance Seminar
The Hebrew University of Jerusalem  May 26, 2014
• Joint Financial Mathematics and Risk Stochastics Seminar
London School of Economics  March 3, 2014
• Mathematics Colloquium
Dublin City University, Dublin, Ireland  October 24, 2013
• Probability Seminar
Academia Sinica, Taipei, Taiwan  June 27, 2013
• Mathematical Finance Seminar
University of Texas at Austin  April 12, 2013
• AMS Sectional Meeting (Special Session on Financial Mathematics)
Boston College, Chestnut Hill  April 7, 2013
• Probability and Statistics Seminar
Wayne State University, Detroit  March 20, 2013
• SIAM Conference on Financial Mathematics and Engineering
Minneapolis  July 9 & 10, 2012
• Financial and Actuarial Mathematics Seminar
University of Michigan  September 29, 2011
• 7th International Congress on Industrial and Applied Mathematics (ICIAM)
Vancouver  July 21, 2011

Contributed Talks (2010-2016)
• 9th World Congress of the Bachelier Finance Society
New York, USA  July 19, 2016
• 8th World Congress of the Bachelier Finance Society
Brussels, Belgium  June 5, 2014
• AMS Sectional Meeting (Special Session on PDE and stochastic Analysis)
Temple University, Philadelphia  October 13, 2013
• Probability, Control and Finance, a conference in honor of Ioannis Karatzas
Columbia University  June 5, 2012
• Workshop on Stochastic Analysis in Finance and Insurance
University of Michigan  May 18, 2011
• Mathematical Finance and Partial Differential Equations Conference
Rutgers University  December 10, 2010
• 6th World Congress of the Bachelier Finance Society
Toronto, Canada  June 23, 2010

Students
University of Colorado

Ph.D. students (degree; current position):
• Zachariah Malik (Ph.D. student in Applied Math, defense expected Spring 2025).
• Joshua Aurand (Ph.D. in Applied Math, May 2020; Machine Learning Engineer–Robotics,
Verus Research).
• Zhenhua Wang (Ph.D. in Math, May 2020; Postdoc, University of Michigan).
• Saeed Khalili (Ph.D. in Math, Dec. 2019; Assistant Professor of Math, Fort Lewis College).

Master’s students (degree; current position):
• Li-Yin Young (Professional MS in Applied Math, May 2020; Software/AI Engineer, NOAA).

Undergraduate research students:
• Iker Acha on the project “Gradient Flow Approach for Generative Adversarial Networks”
  (Discovery Learning Apprenticeship Program)  
  August 2022-April 2023
• Trevor McCord on the project “Merton’s Problem with Human Capital Investment”
  (Discovery Learning Apprenticeship Program)  
  August 2016-April 2017

Dublin City University

Internship students:
Monitored the progress of internship students in financial firms. Duties included communications/meetings with students and their supervisors, and on-site visits to the companies.

• Michael Flynn, Sean McCarthy, and Thomas Quinn
  @ Office of the Comptroller and Auditor General, Ireland  
  February-September 2016

• Adelle Heskin
  @ AIG Asset Management  
  February-September 2015

• Damian Murphy and Eoin Phelan
  @ SCOR Global Life Reinsurance Ireland  
  February-September 2015

• Jenifer Black
  @ Hannover Re (Ireland) Limited  
  February-September 2014

Services

Academia

Panelist:
• National Science Foundation, Division of Mathematical Sciences.

Associate Editor:
• Proceedings of 2018 IEEE Conference on Decision and Control (CDC 2018).

Organizer of conferences/symposiums:
• Organized the minisymposium “Advances in Stochastic Control with Financial Applications” in SIAM Annual Meeting (virtual, July 19-23, 2021).
• Organized the minisymposium “Advances in Stochastic Control and Machine Learning” in SIAM Conference on Financial Mathematics and Engineering (virtual, June 1-4, 2021).
• Organized the minisymposium “New Developments on Optimization under Time-inconsistency” in SIAM Conference on Financial Mathematics and Engineering (Toronto, July 4-7, 2019).
• Co-organized (with Chao Zhu) the special session “Recent Developments in Stochastic Analysis, Stochastic Control and Related Fields” in AIMS Conference on Dynamical Systems, Differential Equations and Applications (Taipei, Taiwan, July 5-9, 2018).
• Co-organized (with Adrien Nguyen-Huu) the minisymposium “Stochastic Control and Stopping under Time Inconsistency” in SIAM Conference on Financial Mathematics and Engineering (Austin, Texas, November 17-19, 2016).
• Co-organized (with Arash Fahim) the minisymposium “Robust Hedging and Pricing under Model Uncertainty” in SIAM Conference on Financial Mathematics and Engineering (Chicago, November 13-15, 2014).

Referee for peer-reviewed journals:
Advances in Applied Probability
Annals of Applied Probability
Applied Mathematics and Optimization
Finance and Stochastics
Games and Economic Behavior
Journal of Applied Probability
Journal of Industrial and Management Optimization
Journal of Mathematical Analysis and Applications
Management Science
Mathematical Finance

Mathematics and Financial Economics
Mathematics of Operations Research
Methodology and Computing in Applied Probability
Nonlinear Analysis: Hybrid Systems
Operations Research Letters
Probability, Uncertainty and Quantitative Risk
SIAM Journal on Control and Optimization
SIAM Journal on Financial Mathematics
Stochastic Processes and their Applications

Referee for book series:
Springer Finance

University of Colorado
Department of Applied Mathematics:
Serving on Graduate Committee (August 2019-present)
Served on Undergraduate Committee (August 2016-May 2019)
Served on Probability/Statistics Preliminary Exam Committee (August 2022, January 2022, August 2020, August 2019, August 2018, January 2017)
Served on Applied Analysis Preliminary Exam Committee (August 2017)

Outreach
Boulder STEM Camp:
Taught “Introduction to Machine Learning” to high school and middle school students (at Trail Ridge Middle School, Longmont, Colorado, on June 22, 2018).

STEM School Highlands Range:
Enriched the middle school’s science program by introducing how mathematics matters to finance and economics, and assisted a seventh-grade student to complete a project on mathematical finance and economics.

University of Colorado Boulder

• APPM 6570 Stochastic Differential Equations (Spring 2021)
• APPM 6560 Measure-Theoretic Probability (Spring 2022)
• APPM 4530/5530 Stochastic Analysis for Finance (Fall 2022, Fall 2021, Fall 2020, Fall 2019, Fall 2018, Fall 2017)
• APPM 4120/5120 Operations Research (Spring 2021, Spring 2017)
• APPM 3170 Discrete Applied Mathematics (Spring 2022, Spring 2020)
• APPM 1360 Calculus II for Engineers (Fall 2019, Spring 2017, Fall 2016)

Dublin City University

• Probability and Finance I (Fall 2015)
  A measure-theoretic probability course for graduate students, with common financial models introduced as applications.
• Probability I (Spring 2016, Spring 2015, Spring 2014)
An introductory probability course for undergraduate students.

- *Data Analysis and Statistics* (Fall 2014)
  A statistics course for biological engineering students, with a focus on analyzing biological and medical data.

- *Statistics I* (Fall 2013)
  An introductory statistics course for undergraduate students.

**University of Michigan**

- *Integral Calculus* (Fall 2011, Winter 2010).
- *Differential Calculus* (Fall 2009, Winter 2009).
- *Pre-calculus* (Fall 2008).

Last Updated October 16, 2022