Youngna Choi, Ph.D.

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Citizenship

U.S. citizen by naturalization

Education and Other Degrees

Ph.D. Mathematics, Northwestern University, Evanston, IL, June 1998
Dissertation: *One Dimensional Lorenz-like Attractors*
Committee: Professors Clark R. Robinson (Advisor), John Franks, and Keith Burns

M.S. Mathematics, Northwestern University, Evanston, IL, December 1994

B.S. Mathematics, Seoul National University, Seoul, Korea, August 1992, with distinction

Professional Experience

- Employment

2023- present	Associate Professor, School of Computing Montclair State University, Montclair, NJ
2020 - 2023	Associate Professor, Department of Applied Mathematics and Statistics Montclair State University, Montclair, NJ
2009 - 2020	Associate Professor, Department of Mathematical Sciences Montclair State University, Montclair, NJ
2007-2009	Tenured Assistant Professor, Department of Mathematical Sciences Montclair State University, Montclair, NJ
2002 - 2007	Assistant Professor, Department of Mathematical Sciences Montclair State University, Montclair, NJ
2001 - 2002	Actuarial Analyst, Hong Won Suh's CPA Office Los Angeles, CA
2000 - 2001	Actuarial Analyst, Watson Wyatt Worldwide Cleveland, OH
1998 - 2000	Visiting Assistant Professor, Department of Mathematics Case Western Reserve University, Cleveland, OH
1996 - 1998	Lecturer, Northwestern University, Evanston, IL

- VISITS AND RESEARCH

June 2015	Fields Institute for Research in Mathematical Sciences Toronto, Canada
Oct./Nov. 2013	Fields Institute for Research in Mathematical Sciences Toronto, Canada
Sep./Oct. 2013	University of Paris I Pantheon-Sorbonne Paris, France
March 2013	University of North Carolina at Charlotte Charlotte, NC
August 2006	Indiana University Purdue University Indianapolis (IUPUI) Indianapolis, IN

- TEACHING

  - Developed the Mathematics Major with Concentration in Mathematics of Finance (MAFI) at Montclair State University. Currently the Program Coordinator in full charge, also the Actuarial Advisor of the University

  - Since 1996, ranging from freshman level general education courses to graduate level courses, from pure mathematics (e.g. analysis) to applied mathematics (e.g. mathematics of finance, operations research)

RESEARCH INTEREST

Econophysics and quantitative finance, focusing on financial instability, contagion, and systemic risk

PUBLICATIONS (all peer-reviewed)

Published and Accepted Papers

- Economic Stimulus and Financial Instability: Recent Case of the U.S. Household, *Journal of Risk and Financial Management, 15(6*), 266, 2022, https://doi.org/10.3390/jrfm15060266

- On Hedge Parameters of Currency Options, *International Journal of Business, 27(1),* 2022, available online at https://ijb.cyut.edu.tw, hard copy to be available soon

- Borrowing Capacity, Financial Instability, and Contagion, *International Journal of Theoretical and Applied Finance, 22(1*), 2019, https://doi.org/10.1142/S0219024918500607

- Masked Instability: Within-Sector Financial Risk in the Presence of Wealth Inequality *Risks, 6*(3), 65, 2018, https://doi.org/10.3390/risks6030065

- Modeling Contagion in the Eurozone via Dynamical Systems (with Giuseppe Castellacci) *Journal of Banking and Finance, 50*, Jan. 2015, p. 400-410

- Financial Instability Contagion: a Dynamical Systems Approach (with Giuseppe Castellacci)
  Quantitative Finance, 14(7), 2014, p. 1243-1255

- Financial Crisis and Contagion: A Dynamical Systems Approach (with Raphael Douady)
  Handbook on Systemic Risk, Cambridge University Press, 2013, p. 453-479

- Financial Crisis Dynamics: Attempt to Define a Market Instability Indicator (with Raphael Douady)
  Quantitative Finance, 12(9), 2012, p. 1351-1365

- *Undergraduate Research: Mathematical Modeling of Mortgages (with Steven Spero*)*
  PRIMUS, 20(8), Nov.-Dec., 2010, p. 698-711

- The Mathematics of Refinancing (with Crystal Dahlhaus*)
  The UMAP Journal, 30(4), 2009, p. 467-494

- A Revisit to N-Currency Arbitrage (with Yeomin Yoon)
  The International Journal of Finance, 20(4), 2008, p. 4980-4986

- Topological Dynamics of Two-Piece Eventually Expanding Maps
  Applied Mathematics Letters, 21(10), Oct. 2008, p. 1033-1036

- Arbitrage Strategy with N Currencies (with Yeomin Yoon)
  The International Journal of Finance, 3(18), 2006, p. 4105-4126

- Topology of Attractors from Two-Piece Expanding Maps
  Dynamical Systems, an international journal, 21(4), Dec. 2006, p. 385-398

- On the Curl of a Vector Field - Beyond the Formula (with Kimberly Burch)
  PRIMUS, XVI(3), Sep. 2006, p. 275-287

- Taking the Arbitrage Strategy to More Than Three (N) Currencies (with Yeomin Yoon)
  Book of Abstracts: the 17th Asian Finance Association Conference, Auckland, New Zealand, July 2006, p. 82

- Compensating Balance: a Comment (with Yeomin Yoon)
  The International Journal of Banking and Finance, *2*(1), June 2004, p. 83-97

- Attractors from One Dimensional Lorenz-like Maps
  Discrete and Continuous Dynamical Systems, *11*(2&3), Sep. & Oct. 2004, p. 715-730

- On Triangular Arbitrage in the Currency Market (with Yeomin Yoon)
  Proceedings of the Annual Conference of the Korea Money and Finance Association,
  Oak Valley, Kangwon Province, Korea, May 2004, p. 765-780

- Net Present Value and Modified Internal Rate or Return: the Relationship (with Yeomin Yoon)
  The International Journal of Finance, 14(3), 2002, p. 2374-2379

*MSU undergraduate student

PRESENTATIONS / INVITED VISITS

Dynamics of Wealth Inequality in the United States (poster)
• XXV Workshop on Quantitative Finance, Bologna, Italy. April 2018

Financial Instability, Economic Stimulus, and Wealth Inequality of the United States Household during the Covid-19 Pandemic
• SIAM Student Chapter Event, Montclair State University, Montclair, NJ. March 2022 (via Zoom)

Financial Instability and Wealth Inequality of the United States Household during the Covid-19 Pandemic
• CCS 2021 Satellite on Econophysics, Lyon, France. October 2021 (via Zoom)

Masked Financial Instability caused by Wealth Inequality
• Research in Options 2018, Búzios, Rio de Janeiro, Brazil. November 2018

Masked Financial Instability caused by Wealth Inequality (poster)
• 3rd Eastern Conference on Mathematical Finance, Chicago, IL. October 2018

Ostensible Financial Stability caused by Wealth Inequality (poster)
• XIX Workshop on Quantitative Finance, Rome, Italy. January 2018

Ostensible Financial Stability caused by Wealth Inequality
• The 12th Bachelier Colloquium on Mathematical Finance and Stochastic Calculus, Metabief, France. January 2018

Ostensible Financial Stability caused by Wealth Inequality
• Econophysics 3rd International Conference, Volos, Greece. September 2017

Tracking Financial Instability Contagion: modeling and data calibration
• Spring 2017 Conference of the Multinational Finance Society, Lemesos, Cyprus. April 2017

Tracking Financial Instability Contagion: modeling and data calibration
• Research in Options 2016, Rio de Janeiro, Brazil. November/December 2016

Tracking Financial Instability Contagion: modeling and data calibration
• Quantitative Methods for Financial Regulation, Stony Brook, NY. September 2016

Tracking Financial Instability Contagion: modeling and data calibration
• The 10th Bachelier Colloquium on Mathematical Finance and Stochastic Calculus, Metabief, France. January 2016

Tracking Financial Instability Contagion: modeling and data calibration
• Econophys 2015, New Delhi, India. November/December 2015

Financial Instability Contagion: modeling and data calibration (poster presentation), also as discussant
• Network models, stress testing and other tools for financial stability monitoring and macroprudential policy design and implementation, Banco de Mexico, Mexico City, Mexico. November 2015

Regulating Systemic Risk - Insights from Mathematical modeling (participation by invitation)
• Isaac Newton Institute for Mathematical Sciences, Cambridge, UK. December 2014

Financial Instability Contagion: modeling and data calibration
• Research in Options 2014, Búzios, Rio de Janeiro, Brazil. November/December 2014

Financial Instability Contagion: a Dynamical Systems Approach (poster presentation)

• The 8th World Congress of the Bachelier Finance Society, Brussels, Belgium. June 2014

Financial Instability Contagion: a Dynamical Systems Approach
• Department of Risk Management and Insurance, Georgia State University, Atlanta, GA. April 2014

Financial Instability Contagion: a Dynamical Systems Approach
• The 8th Bachelier Colloquium on Mathematical Finance and Stochastic Calculus, Metabief, France. January 2014

Financial Instability Contagion: a Dynamical Systems Approach
• Scuola Normale Superiore, Pisa, Italy. January 2014

Financial Instability Contagion: a quantitative definition and mechanism
• Mathematics for Economic Thinking Workshop, The Fields Institute, Toronto, Canada. October 2013

Sovereign Credit Risk Contagion: a Dynamical Systems Approach
• FEBS/ LabEx-ReFi 2013 Financial Regulation & Systemic Risk, ESCP Europe, Paris, France. June 2013

Sovereign Credit Risk Contagion: a Dynamical Systems Approach
• Department of Finance, University of North Carolina at Charlotte, NC. March 2013

Sovereign Credit Risk Contagion: a Dynamical Systems Approach
• Research in Options 2012, Búzios, Rio de Janeiro, Brazil. December 2012

Sovereign Credit Crisis: Dynamical Systems Approach
• Instabilities in Financial Markets, Scuola Normale Superiore, Pisa, Italy. October 2012

Lectures on Financial Crises and Systemic Risk - Dynamical Systems Approach
• The National Institute for Mathematical Sciences, Daejeon, Korea. August 2012

Financial Crises and Contagion: Dynamical Systems Approach
• Sojourns in Nonlinear Economics
The Fields Institute for Research in Mathematical Sciences, Toronto, Canada. June 2012

Financial Crises and Contagion: Dynamical Systems Approach
• IMA Hot Topics Workshop: The Mathematics of the New Financial Systems
Institute for Mathematics and its Applications, University of Minnesota, MN. May 2012

Sovereign Credit Risk Contagion: a Dynamical Systems Approach
• 5th Financial Risks International Forum, Paris, France, March 2012

Financial Crises and Systemic Risk – Dynamical Systems Approach
• Centre d'Economie de la Sorbonne, University of Paris I, Paris, France. November 2011

Financial Crises and Systemic Risk – Dynamical Systems Approach
• ECONOPHYSICS-VI - International Workshop on Econophysics of Systemic Risk and Network Dynamics, Saha Institute of Nuclear Physics, Kolkata, India. October 2011

Financial Crisis Dynamics: Attempt to Define a Market Instability Indicator (Poster)
• 4th Financial Risks International Forum, Paris, France. March 2011

Financial Crisis Dynamics: Attempt to Define a Market Instability Indicator
• Mathematical Finance and Partial Differential Equations Conference, Rutgers University, New Brunswick, NJ. December 2010

Financial Crisis Dynamics: Attempt to Define a Market Instability Indicator
• Research in Options 2010, Angra dos Reis, Rio de Janeiro, Brazil. November/December 2010

Attractors of Two-Piece Expanding Maps
• Midwest Dynamical Systems Seminar, University of Michigan, Ann Arbor, MI. October 2007

Attractors of Two-Piece Expanding Maps
• Midwest Dynamical Systems Seminar, IUPUI, Indianapolis, IN. August 2007

Portfolio Selection as a Nash Bargaining Game (presented with coauthor Mike Jones)
• Mathematical Association of America General Contributed Paper Session, American Mathematical Society - Mathematical Association of America Joint Mathematics Meeting, New Orleans, LA. January 2007

Starting a B.S. in Mathematics-Mathematics of Finance Concentration Track: case of Montclair State University
• Mathematical Association of America General Contributed Paper Session , American Mathematical Society - Mathematical Association of America Joint Mathematics Meeting, New Orleans, LA. January 2007

Mathematics of Refinancing (presented with coauthor Crystal Dahlhaus*)
• Mathematical Association of America General Contributed Paper Session , American Mathematical Society - Mathematical Association of America Joint Mathematics Meeting, New Orleans, LA. January 2007

Markov partitions from Two-Piece Eventually Expanding Maps
• Mathfest, Knoxville, TN. August 2006

Taking the Arbitrage Strategy to More Than Three (N) Currencies (presented by coauthor Yeomin Yoon)
• The 17th Asian Finance Association, Auckland, New Zealand. July 2006

Markov partitions from Two-Piece Eventually Expanding Maps
• Graph Theory Day 51, Montclair State University. May 2006

Actuarial Science: Implementation and Revision
• Mathematical Association of America General Contributed Paper Session, American Mathematical Society - Mathematical Association of America Joint National Meeting, San Antonio, TX. January 2006

Topology of Attractors from Two-Piece Expanding Maps
• Midwest Dynamical Systems Seminar, University of Minnesota, Minneapolis, MN. April 2005

Actual Cost of Debt: Compensating Balance vs. Discount Point
• Mathematical Association of America Spring Sectional Meeting, Middlesex County College, Edison, NJ. April 2005

Topology of Attractors from Two-Piece Expanding Maps
• Semiannual Dynamical Systems Workshop, University of Maryland, College Park, MD. March 2005

Topology of Attractors from Expanding Maps with a Discontinuity: a preliminary report
• Weekly Dynamical Systems Seminar, Northwestern University, Evanston, IL. January 2005

When a Paddle Wheel Spins
• Mathematical Association of America Contributed Paper Session, American Mathematical Society - Mathematical Association of America Joint National Meeting, Atlanta, GA. January 2005

A Heuristic Exercise on Triangular Arbitrage in the Currency Market
• Allied Business Education Association Joint Meeting, Mystic, CT. March 2004

Safety Deposit: what it really costs
• Mathematical Association of America General Contributed Paper Session, American Mathematical Society - Mathematical Association of America Joint National Meeting, Phoenix, AZ. January 2004

Attractors of One Dimensional Lorenz-like Maps
• Maryland - Penn State Dynamical Systems and Related Topic Workshop, College Park, MD. March 1998

One Dimensional Lorenz-like Attractors
• Midwest Dynamical Systems Conference, Minnesota, MN. October 1997

Summer School for Graduate Students
• Mathematical Sciences Research Institute, Berkeley, CA. August 1995

*MSU undergraduate student

TEACHING EXPERIENCE

Various courses since 1996, ranging from freshman level general education courses to graduate level courses, from pure mathematics (e.g. analysis) to applied mathematics (e.g. mathematics of finance, operations research)

STUDENT RESEARCH

- GRADUATE LEVEL

Gustavo Trujillo	Capstone Advisor	Spring 2024
Gary Rauco	Capstone advisor	Spring 2023
Scott Theodore	Capstone advisor	Spring 2022

- UNDERGRADUATE LEVEL

Seniya V. Liyanagunawardana	Capstone Advisor	Fall 2023
Emma Schreiber, Caitlyn Burns	Capstone Advisor	Spring 2022

- Alli Conlon in Spring 2021 (Department representative of the Casabona competition, CSAM convocation speaker) on 2017 Tax Cuts and Jobs Act

- Independent Studies with three students, Mathematics of Finance Majors at MSU

Michael Mancuso	Advanced Topics in Financial Engineering	Spring 2009
Crystal Dahlhaus	Mathematics of Refinancing	Spring 2006
	Stochastic Calculus	Spring 2007
Steven Spero	Modeling of Mortgages	Fall 2006
	Topics in Actuarial Mathematics	Spring 2007

- Research Presentations by three Mathematics of Finance major students at MSU

  - Michael Mancuso (oral presentation)

    The US Subprime Mortgage Debacle: How it Started and Provoked the Current Financial Crisis

    - Sixth Annual Garden State Undergraduate Mathematics Conference
      (In conjunction with Association of America - MAA - New Jersey sectional meeting
      Monmouth College, West Long branch, NJ, March 29, 2009

    - Third Annual Student Research Symposium , Montclair State University, April 30, 2009

  - Priyank Bhatt , Diego Pinilos (poster session)

    On the Subprime Mortgage Crisis

    - Sixth Annual Garden State Undergraduate Mathematics Conference
      (In conjunction with Association of America - MAA - New Jersey sectional meeting)
      Monmouth College, West Long branch, NJ, March 29, 2009

    - Third Annual Student Research Symposium , Montclair State University, April 30, 2009

GRANTS AND HONORS

- 2023-2024 Career Development Award, Montclair State University

- "2006 Bright Idea Award" sponsored by the New Jersey Policy Research Organization (NJPRO), an independent affiliate of the New Jersey Business & Industry Association (NJBIA) and the Stillman School of Business at Seton Hall University

- Association for Women in Mathematics (AWM) Mentoring Travel Grant (funded by National Science Foundation) to visit Dr. Michal Misiurewicz at Indiana University Purdue University Indianapolis (IUPUI), 2006

- Multiple travel grants from Midwestern Dynamical Systems Seminar and Penn State – Maryland Semiannual Workshops in Dynamical Systems, 1992-2009

- Represented Northwestern University at Summer School for Graduate Students at MSRI, 1995, Berkeley, CA

- Mathematics Departmental Fellowship, 1993-1996; University Fellowship, 1992-1993, Northwestern University

- University Scholarship, 1988-1992, Seoul National University

JOURNAL AND BOOK REVIEW

- Regular reviewer for *Mathematical Reviews*

- Regular reviewer for journals by Elsevier, SIAM, AIMS, World Scientific etc.

- Selected books in financial engineering, actuarial science, and pure mathematics

Other Experience and Service

- Inside Montclair State University

- Department/School Service – Program/curricula related service

- School of Computing Curriculum Committee. AY 2023-Present

- Program Coordinator of the proposed Certificate of Actuarial and Financial Mathematics: full proposal being written as of November 2021

- Program Coordinator of the new Mathematics Major-Mathematics of Finance Concentration Track at Montclair State University that became official in September 2007

    - Prepared, revised and finalized the Proposed Curriculum Guide and all the related documents for the program

    - Developed two new 3-credit courses: MATH 466 - *Mathematics of Finance I* and MATH 467- *Mathematics of Finance II* that were launched during AY2004-05 and have been offered every other year thereafter

    - Actuarial advisor of the Department of Mathematical Sciences at Montclair State University since 2002. Guided students to succeed on actuarial examinations administered by societies of actuaries. Advisees have been hired by companies like Horizon Blue Cross Blue Shield of NJ and Presidential Life

    - Advisor to Math Finance Major students. Advisees have been hired by companies like Oppenheimer Fund (formerly CIBC) and Deloitte & Touche

    - Member of the Committee - Course Development for the New Five-Year BSAD/MBA Honors Program. AY2003-04. Participated in revising the current MATH 114 - *Business Calculus* to create MATH 114 - *Honors Business Calculus*. Developed a new 3-credit course MATH 119 *Mathematics of Interest Theory and Probability* and prepared its course outline including catalogue description

- Responsible for Financial Engineering sector of the proposed Professional Education (Masters and/or Certificate) Program, AY2009-10

- Department/School Service – other

- Graduate Program Coordinator. AY 2023-Present

- Personal Advisory Committee. AY 2023-Present

- Undergraduate Advisor. AY 2020-2022

- High Impact Course Redesign Committee. AY 2021-2022

- Graduate Committee. AY 2017-2020

- Department Budget Committee. AY 2017-2020

- Search Committee. AY 2016-17
- Professional Science Masters Committee. AY2010-Present. To prepare and launch a PSM program
- Department Personal Advisory Committee. AY2009-12. To make decisions on reappointment and/or promotion.
- Basic Skills Committee. AY2006-08. To write common final examinations for basic skills courses (MATH 050/051, MATH 060/061, and MATH 100)
- Member of the Department Curriculum Committee. AY2005-07
- Member of Placement Test (Acuplacer) Committee. AY2005-06.
- Member of Seminar Committee. AY2004-06. To invite and arranged for speakers to give talks at MSU
- Member of Search Committee. AY2004-05 and AY2007-08. To hire two new faculty members
- Member of Math Readiness/Placements Test Committee. AY2003-04. To revise and update existing tests
- Member of Space Committee. AY2003-2020. To expand the Department's space according to the renovation plan of the College of Science and Mathematics
- Member of Special Interest Group on Pure and Applied Mathematics. AY2002-2020
- Member of Newsletter Committee. AY2002-05. To publish the Department Newsletter
- Academic Adviser to about 15 undergraduate students, each semester at MSU

- UNIVERSITY SERVICE

- University Undergraduate Curriculum Committee. AY 2023-Present
- CSAM Program Vitality Committee. AY 2023-Present
- CSAM Undergraduate Research Committee. AY 2020-2023
- CSAM Research Committee. AY2007-11
- Judged at the MSU 1st Annual Students Research Symposium (poster session), Spring 2007
- Member of Resource Faculty for the New Faculty Seminar. AY2005-06. To participate in the university-wide orientation (organizer: Dr. Luis E. Montesinos) for the new faculty

❑ OUTSIDE MONTCLAIR STATE UNIVERSITY

- Reviewer for Mathematical Reviews, 2010-2020
- Session Organizer of Mathematics Association of America Contributed Paper Session on "How to start and develop Financial Mathematics Program at Undergraduate Level" at the American Mathematical Society - Mathematical Association of America Joint Mathematics Meeting, New Orleans, LA, January 2007
- Organizing Committee Member of "Graph Theory Day 51" hosted by MSU, May, 2006

- Session Organizer of American Mathematics Society Special Session on "Contemporary Dynamical Systems" (Code SS21 A) at the American Mathematical Society - Mathematical Association of America Joint Mathematics Meeting, San Antonio, TX, January 2006

- Examiner of Ph.D. dissertation for the Finance Department at Monash University, Australia, AY2005 to present

- Committee member of KSEA-Math & Science Olympiad (KMSO) hosted by Korean-American Scientist and Engineering Association (KSEA), Fall 2005

- Session Organizer of "Applications of Mathematics to the Social Sciences and Finance" at the Mathematics Association of America New Jersey Sectional Meeting, April, 2005

- Leader of Lunch Table Discussion (title: "Financial Mathematics" at the Mathematics Association of America New Jersey Sectional Meeting, November 2004

- Judged, by invitation, the 36th Annual Greater Metropolitan New York Area Math Fairs. Pace University, NY, March, 2004

- Passed the Society of Actuaries Examination Program passed Course 1 with a full score, November 2000

- Advisor to the Putnam Mathematics Competition of Case Western Reserve University Team. AY1998-99

LANGUAGES SKILLS

Korean (native), English (main language)
French: Diplômes de Français Professionnel – Affaires B2, avec Mention Bien
Mandarin Chinese (intermediate), Italian (intermediate)
Russian (basic)

REFERENCES

Available upon request