Youngna Choi
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EDUCATION

Ph.D.	Mathematics	Northwestern University Evanston, IL	1998
M.S.	Mathematics	Northwestern University Evanston, IL	1994
B.S.	Mathematics	Seoul National University Seoul, Korea	1992

PROFESSIONAL EXPERIENCE

Associate Professor — 2009-Present

Tenured Assistant Professor — 2007-2009

Assistant Professor — 2002-2007
Montclair State University
Department of Mathematical Sciences

Acturial Analyst
Hong Won Suh's CPA Office — 2001-2002
Los Angeles, CA

Actuarial Analyst — 2000-2001
Watson Wyatt Worldwide
Cleveland, OH

Visiting Assistant Professor — 1998-2000
Department of Mathematics
Case Western Reserve University
Cleveland, OH

Lecturer — 1998-1996
Northwestern University
Evanston, IL

Research Interest

Low dimensional dynamical systems, financial and actuarial mathematics

Publications (all peer-reviewed)

Published and Accepted Papers

- Financial Crisis and Contagion: A Dynamical Systems Approach (with Raphael Douady)
  (To appear in *Handbook on Systemic Risk*, Cambridge University Press)

- Financial Crisis Dynamics: Attempt to Define a Market Instability Indicator.(with Raphael Douady)
  (*Quantitative Finance*, available online)

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

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

- A Revisit to N-Currency Arbitrage (with Yeomin Yoon)
  The International Journal of Finance, Vol. 20. No. 4, 2008

- Topological Dynamics of Two-Piece Eventually Expanding Maps
  Applied Mathematics Letters, Vol. 21, Issue. 10, Oct. 2008, pp. 1033-1036

- Arbitrage Strategy with N Currencies (with Yeomin Yoon)
  The International Journal of Finance, Vol. 18, No. 3, 2006, pp. 4105-4126

- Topology of Attractors from Two-Piece Expanding Maps
  Dynamical Systems, an international journal, Vol. 21, No. 4, Dec. 2006, pp. 385-398

- On the Curl of a Vector Field - Beyond the Formula (with Kimberly Burch)
  PRIMUS, Vol. XVl, No. 3, Sep. 2006, pp. 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, pp. 82

- Compensating Balance: a Comment (with Yeomin Yoon)
  The International Journal of Banking and Finance, Vol. 2, No. 1, June 2004, pp. 83-97

- Attractors from One Dimensional Lorenz-like Maps
  Discrete and Continuous Dynamical Systems, Vol. 11, No. 2&3, Sep. & Oct. 2004, pp. *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, pp. 765--780

- Net Present Value and Modified Internal Rate or Return: the Relationship (with Yeomin Yoon) *The International Journal of Finance,* Vol. 14, No. 3, 2002, pp. 2374--2379

*MSU undergraduate student

Papers in Review / Preprint

- Chaos and Bifurcation in 2007-08 Financial Crisis (with Raphael Douady)
  (Submitted to *Quantitative Finance,* available on SSRN
  http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1522544

Working Papers

- Sovereign Credit Risk Contagion: a dynamical systems approach (with Giuseppe Castellacci)

- Measuring Systemic Risk in the 2008-09+ Credit Crisis (with Giuseppe Castellacci)

Referenced Work

- The Endogenous Dynamics of Markets: Price Impact, Feedback Loops and Instabilities. J-P. Bouchaud.
  Lessons from the Financial Crisis, (edited by A. M. Berd, 2010, Risk Books, ISBN 978-1-906348-47-2)

- Closed Relations and Equivalence Classes of Quasicontinuous Functions. A. Crannell, M. Frantz, and M. Lemasurier. *Real Analysis Exchange*, 2005/2006, Vol. 31 Issue 2, pp. 409-423

- *An Introduction to Dynamical Systems: Continuous and Discrete*. R. C. Robinson, (Pearson Prentice Hall, 2004, ISBN 0-13-143140-4), 11.2.1 Chaotic Attractors for Expanding Maps with Discontinuities, (pp. 434-444, pp. 470, pp. 472), Ph.D. thesis was referenced as a subsection and an exercise problem

- Nonsymmetric Lorenz Attractors from a Homoclinic Bifurcation. R. C. Robinson, *SIAM Journal of Mathematical Analysis*, Vol. 32, No. 1, pp. 119-141, 2000
  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

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

*MSU undergraduate student

TEACHING EXPERIENCE

Over 60 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

- MATHEMATICS OF FINANCE

  - 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
	Stochatic 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

- "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 REVIEW

- Reviewer for *Mathematical Reviews*
- *Siam Journal on Applied Mathematics*
- *IET Control Theory and Applications*
- *PRIMUS (Primary Resources in Mathematics Undergraduate Studies)*
- *Discrete and Continuous Dynamical Systems-Series A*
- *Fundamenta Mathematicae*
- *Journal of Theoretical Biology*

BOOK REVIEW

- *Society of Actuaries Exam P / Casualty Actuaries Society Exam 1 Course Notes*
  December, 2004, BPP Professional Education

- *Society of Actuaries Exam FM / Casualty Actuaries Society Exam 2 Course Notes*
  January, 2005, BPP Professional Education

- *Finite Mathematics and Applied Calculus, 3rd*
  February, 2005, Thomson, Brooks/Cole

OTHER EXPERIENCE AND SERVICE

- INSIDE MONTCLAIR STATE UNIVERSITY

- DEPARTMENT SERVICE – PROGRAM/CURRICULA RELATED SERVICE

- 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 SERVICE – OTHER

- 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. To implement computer-based placement test
- 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 to present. 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 to present

- Member of Newsletter Committee. AY2002-05. To publish the Department Newsletter

- Academic Adviser to about 15 undergraduate students, each semester at MSU

- UNIVERSITY SERVICE

- 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

- 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

PROFESSIONAL SOCIETIES AND ORGANIZATIONS

- Bachelier Society
- International Association of Financial Engineers (IAFE)
- Member of the Society for Industrial and Applied Mathematics (SIAM)

COMPUTER SKILLS

Windows XP/Vista, Unix/Linux
Office Suite (especially Excel including financial functions and Solver), MATLAB

LANGUAGES SKILLS

Korean (native), English (main language)
French (oral: fluent, written: advanced)
Mandarin Chinese (intermediate), Italian (intermediate)
Russian (basic)