

PAUL H. JOHNSON, JR., Ph.D.

Assistant Professor of Actuarial Science
Department of Mathematics
University of Illinois at Urbana-Champaign

Contact Information

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Education

- **Ph.D. (Actuarial Science, Risk Management and Insurance)**
University of Wisconsin – Madison, August 2008
Dissertation: “Multilevel Regression Model Analyses of Racial Disparities in U.S. Inpatient Mental Health Treatment.” Committee Members: Edward W. Frees, Marjorie Rosenberg, Mark Browne, John Mullahy, Jee-Seon Kim
- **M.S. (Actuarial Science)**
University of Wisconsin – Madison, May 2003
- **B.S. (Chemistry and Mathematics)**
University of Wisconsin – Eau Claire, May 2001

Professional Memberships

- Member of the American Risk and Insurance Association (ARIA)

**Society of Actuaries (SOA)/Casualty Actuarial Society (CAS)
Examinations Passed**

- SOA/CAS Course 1, SOA/CAS Course 2, SOA Exam M, SOA/CAS Exam C

Currently Studying for Society of Actuaries (SOA) Examinations

- SOA Fundamentals of Actuarial Practice (FAP) e-Learning Course

Current Position

Assistant Professor, Actuarial Science, Department of Mathematics
University of Illinois at Urbana-Champaign, August 2008 – present

Current Research

- **Affiliations**
 - Department of Mathematics, University of Illinois at Urbana-Champaign
 - Department of Kinesiology and Community Health, University of Illinois at Urbana-Champaign
 - Department of Actuarial Science, Risk Management and Insurance, School of Business, University of Wisconsin-Madison
 - Department of Mathematics, Central Washington University
 - Department of Computer Science, Central Washington University
 - Milliman (Seattle, Stochastic Modeling Group)
- **Areas**
 - Racial disparities in mental health care
 - Multilevel regression models, with a focus on the mitigation of endogeneity
 - Health care affordability at both the national and stakeholder-levels
 - Cost-effectiveness of cervical cancer screening among the elderly
 - Bias-adjusted maximum likelihood estimation
 - Development of CSTEP (Cluster Sampling for Tail Estimation of Probability): a desktop-based application to assist actuaries in efficient stochastic modeling through the implementation of Representative Scenario approaches
 - Development of AMOOF (Actuarial Model Optimal Outcome Fit): a desktop-based application to assist actuaries in efficient curve fitting while mitigating small sample bias

Academic Positions

- **Assistant Professor, Actuarial Science, Department of Mathematics**
University of Illinois at Urbana-Champaign, 2008 – present
Courses:
 - MATH 471: Actuarial Theory I (Fall 2008, Fall 2009, Fall 2010, Fall 2011, Fall 2012, Fall 2013, Fall 2014)
 - MATH 472/567: Actuarial Theory II/Topics in Actuarial Theory I (Spring 2009, Spring 2010, Spring 2011, Spring 2012, Spring 2013, Spring 2014)
 - MATH 478/568: Actuarial Modeling/Topics in Actuarial Theory II (Spring 2010)
 - MATH 597: Actuarial Science Seminar for Graduate Students (Fall 2009, Summer 2011, Summer 2012)
 - MATH 390: Independent Study in Actuarial Science (Fall 2009, Fall 2013)

- **Teaching Assistant, School of Business**
University of Wisconsin – Madison, January 2002 – May 2006
Courses:
 - AS 300: Actuarial Science Methods: Course 1 Review (Spring 2002)
 - Developed all lectures, taught students the subject material.
 - Instruction facilitated through homework assignments and quizzes.
 - Held office hours outside of class for individual or group mentoring.

 - AS 300: Actuarial Science Methods: Course 2/Exam FM Review (Fall 2002 – Spring 2006)
 - Similar to AS 300: Actuarial Science Methods: Course 1 Review.

 - GB 304: Intermediate Business Statistics (Fall 2003 – Spring 2004)
 - Led discussion sections in which students applied techniques for data analysis using real-life management problems/case studies.
 - Helped develop materials used in discussion sections.
 - Graded homework.
 - Helped students become proficient in *Microsoft Excel* and *Minitab*.

- Math Camp (Summer 2003)
 - Part of an orientation program for incoming M.B.A. students, designed as a basic review of pre-calculus, calculus, statistics, and financial mathematics.
 - As course instructor, prepared and delivered all lectures and facilitated “break-out” sessions where groups of students worked on problem sets and case studies.

Industry Positions

Northwestern Mutual

Extended Internship Position, May 2001 – December 2001

- Applied Visual Basic skills to add additional useful functionality to the company’s premium pricing and expense analysis program for the QuietCare long term care insurance product.

Publications

Articles in Refereed Journals:

- Chueh, Yvonne C., and Paul H. Johnson, Jr. 2014. “Case Studies for Model Efficiency: Special Sampling and MLE Bias Correction.” *International Journal of Science Commerce and Humanities* 2(1).
- Johnson, Paul H. Jr., Edward W. Frees, and Marjorie A. Rosenberg. 2012. “Analyses of Racial/Ethnic Disparities in U.S. Inpatient Mental Health Treatment.” *Internet Journal of Mental Health* 8(1): 1-20.
- Rosenberg, Marjorie A, Paul H. Johnson, Jr., and Ian G. Duncan. 2010. “Exploring Stakeholder Perspectives on what is Affordable Health Care.” *Risk Management & Insurance Review* 13(2): 251-263.
- Rosenberg, Marjorie A., Edward W. Frees, Jiafeng Sun, Paul H. Johnson Jr., and James M. Robinson. 2007. “Predictive Modeling with Longitudinal Data: A Case Study of Wisconsin Nursing Homes.” *North American Actuarial Journal* 11(3): 54-69.

Other Articles and Significant Work:

- Johnson, Paul H. Jr., Yvonne C. Chueh, and Yongxue Qi. 2013. “Small Sample Stochastic Tail Modeling: Tackling Sampling Errors and Sampling Bias by Pivot-Distance Sampling and Parametric Curve Fitting Techniques.” *Actuarial Research Clearing House* 2013.1: 1-9.
- Johnson, Paul H. Jr. 2012. “SOA Exam MLC and CAS Exam 3L Study Supplement.” Midwestern Actuarial Forum, approximately 300 pages.
- Johnson, Paul H. Jr., Yongxue Qi, and Yvonne C. Chueh. 2012. “CSCK MLE Bias Correction.” Fully functional open-source Mathematica program, part of the AMOOF2 project between Central Washington University and the University of Illinois at Urbana-Champaign.
- Chueh, Yvonne C., and Paul H. Johnson, Jr. 2012. “CSTEP: a HPC Platform for Scenario Reduction Research on Efficient Stochastic Modeling – Representative Scenario Approach.” *Actuarial Research Clearing House* 2012.1: 1-12.
- Rosenberg, Marjorie A., and Paul H. Johnson, Jr. 2007. “Health Care Predictive Modeling Tools.” *Health Watch* 54: 24-27.

Citations and Abstracts:

- Johnson, Paul H. Jr., Yvonne C. Chueh, and Yongxue Qi. 2013, “Stochastic Model Efficiency Applications: Cluster-Distance Sampling and Parametric Curve Fitting to Tackle Sampling Errors and Bias.” *The 17th International Congress on Insurance: Mathematics and Economics July 1-3, 2013 Copenhagen: Abstracts*. University of Copenhagen, Department of Mathematical Sciences: 87-88.

Software Development:

- Currently assisting in the development of AMOOF3 (Actuarial Model Optimal Outcome Fit Version 3.0) software, Bias-Corrected MLEs, <https://bitbucket.org/AMOOF3/amoof-3.0/wiki/Home>.

Working Papers:

- Johnson, Paul H. Jr., Yvonne C. Chueh, and Yongxue Qi. 2012. “Stochastic Model Efficiency Applications: Cluster-Distance Sampling and Parametric Curve Fitting for Tackling Sampling Errors and Bias.” (submitted to *North American Actuarial Journal*).

Presentations

- “AMOOOF3: Stochastic Efficient Modeling Application” presented at the 49th Actuarial Research Conference, Santa Barbara, CA, July 2014 (this talk was given as part of Yvonne Chueh’s session entitled “Actuarial Model Outcome Optimal Fit (AMOOOF 3.0): Probability Modeling Tool for Education and Research”).
- “Teaching Session: Modeling Efficiency Workshop: Free Research Tool for Selecting Economic Scenarios” presented at Society of Actuaries’ Life & Annuity Symposium, Atlanta, GA, May 2014 (with Yvonne Chueh).
- “Actuarial Exam Preparation Strategies” presented at Purdue University, West Lafayette, IN, October 2013.
- “Stochastic Model Efficiency Applications: Cluster-Distance Sampling and Parametric Curve Fitting to Tackle Sampling Errors and Bias” presented at Simon Fraser University, Burnaby, British Columbia, Canada, July 2013 (with Yvonne Chueh).
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- “Stochastic Model Efficiency Applications: Cluster-Distance Sampling to Tackle Sampling Errors and Bias” presented at the 17th International Congress on Insurance: Mathematics and Economics, Copenhagen, Denmark, July 2013. *One of only 6 U.S. researchers to be invited out of 238 total participants.*
- “Bridging the Gap between Industry Actuaries and Practicing Actuaries” roundtable discussion at the 2013 Centers of Actuarial Excellence Faculty Conference, Rosemont, IL, June 2013.
- “Stochastic Model Efficiency Applications: Cluster-Distance Sampling and Parametric Curve Fitting to Tackle Sampling Errors and Bias” presented at Central Washington University, Ellensburg, WA, October 2012.
- “Efficient Stochastic Tail Modeling with Small Sample Runs: Tackling Sampling Errors and Sampling Bias by Pivot-Distance Sampling and Parametric Curve Fitting Techniques and Tools” presented at the 47th Actuarial Research Conference, Winnipeg, Manitoba, Canada, August 2012.
- “Bias-Corrected Maximum Likelihood Estimation in Actuarial Science” presented at the 46th Actuarial Research Conference, Storrs, CT, August 2011.

- “Bias-Corrected Maximum Likelihood Estimation in Actuarial Science” presented at Northern Illinois University, Division of Statistics, DeKalb, IL, April 2011.
- “Exploring Stakeholder Perspectives on what is Affordable Health Care” presented at the 44th Actuarial Research Conference, Madison, WI, July 2009.
- “Racial Disparities in US Healthcare” presented at the Society of Actuaries’ Health Spring Meeting (Section 70: Disparities in Health Care), Los Angeles, CA, May 2008.
- “Mitigating the Impact of Endogeneity in Mental Healthcare Data via Multilevel Models” presented at the 42nd Actuarial Research Conference, Moon Township, PA, August 2007. *Earned 2nd place for best student presentation.*
- “Is the U.S. Health Care System In or Near Crisis?” presented at the Society of Actuaries’ Annual Meeting, New York, NY, November 2005 (with Marjorie A. Rosenberg).

Students Mentored

- Kim, Hyunsu; Lee, Jung Seok; Sandoval, Lenin; 2014, Society of Actuaries' Centers of Actuarial Excellence Grant, Topic: Stochastic Efficient Modeling of Financial Outcomes.
- Gong, Pan; Ni, Siliang; Ding, Xiongfei; 2014, Society of Actuaries' Centers of Actuarial Excellence Grant, Topic: A Multi-Part, Multi-Level Regression Model for the Demand for US Inpatient Mental Healthcare.
- Bywaters, Will, 2013, Unpaid Undergraduate Research Assistantship, Topic: A Two-Part Multiple Regression Model of US Mental Health Insurance Demand.
- McKee, Eric, 2013, Independent Study, Topic: Actuarial Copula Modeling.
- Deng, Xuan, 2011-2012, Unpaid Graduate Research Assistantship. Topic: Evolution of the US Health Care System: From Past to Present to Future.
- Chen, Sha, 2011, Reading Course, Topic: Various Reserving Methodologies Employed in Actuarial Science.
- Yongxue (Corin) Qi, 2010-2013, Unpaid Graduate Research Assistantship, Topic: Bias-Corrected Maximum Likelihood Estimators in Actuarial Science.
- Pan Carlos Wong, 2010, Unpaid Graduate Research Assistantship, Topic: Rigorous Mathematical Analysis of Varying Term Insurance.
- Natasya Ng, 2009, Independent Study, Topic: Microinsurance Modeling in Indonesia.
- Hio Lam Lao, 2009, Independent Study, Topic: Intersection of Health Care Access, Cost, and Quality.
- Cheng Sze Lem, 2009, Independent Study, Topic: Empirical Analysis on Retirement Age and Life Expectancy after Retirement.

Awards, Grants, and Scholarships

- **Centers of Actuarial Excellence: 2013 Grant Competition**

Title: "An Undergraduate Research Program in Risk and Actuarial Science."

Amount: \$231,911

This grant proposal was developed in conjunction with all four actuarial faculty (myself, Rick Gorvett, Runhuan Feng, David Varodayan); my major contribution was aiding Rick Gorvett in providing a foundation of teaching excellence as well as beginning a research program in the actuarial program at the University of Illinois at Urbana-Champaign.

- **2012 Individual Grant Competition: The Actuarial Foundation.**

Title: "Developing and Testing an Open-Source HPC Platform: the AMOOF2 for Probabilistic Data Analysis to be used for Insurance, Financial, and Actuarial Studies as Well as Stochastic Modeling Efficiency on Post Scenario-Reduction Research."

Amount: \$19,000.

- N. Tenney Peck Award in Mathematics for Exemplary Teaching, 2011.
- University of Illinois at Urbana-Champaign: "Excellent Teacher," 2008-present.
- National Institutes of Health: Ruth L. Kirschstein National Research Service Award No. T32 MH18029-22 from the National Institute of Mental Health, 2006-2008.
- University of Wisconsin – Madison: Henry C. Naiman Teaching Award, 2005.
- University of Wisconsin – Madison: Reggie Tate Excellence in Teaching Award, 2003.
- University of Wisconsin – Eau Claire: Scholarship for Outstanding Achievement in Mathematics by a Junior Student, 1999.
- University of Wisconsin – Eau Claire: Diversity Scholar, 1996 – 2000.

Academic and Scholarly Activities

- **Grant Proposal Reviewer III**
Reviewed a grant proposal of a faculty member at St. Mary's University (March 2014).
- **Math Teaching Awards**
University of Illinois at Urbana-Champaign (August 2013 – present).
- **Actuarial Science Scholarship Group**
Reviewed applications for incoming actuarial science students to determine who would be eligible for scholarships (with Bob Muncaster and A.J. Hildebrand, 2013).
- **Grant Proposal Reviewer II**
Reviewed a grant proposal of a faculty member at University of Illinois at Urbana-Champaign (Runhuan Feng, February 2013).
- **Grant Proposal Reviewer I**
Reviewed a grant proposal of a faculty member at Northern Illinois University (January 2013).
- **Math Prizes Committee**
University of Illinois at Urbana-Champaign (August 2012 – May 2013).
- **Online Course Development**
Assisted the director of the University of Illinois at Urbana-Champaign's actuarial science program, Rick Gorvett, with implementation of online actuarial science courses (Summer 2012).
- **Midwestern Actuarial Forum (MAF) Seminar – Lecturer (twice a year, 2012-present)**
Prepared candidates for Exams MLC and 3L, professional examinations sponsored by the Society of Actuaries (SOA) and Casualty Actuarial Society (CAS), respectively.
- **Book Review**
Reviewed "Actuaries' Survival Guide," by Fred E. Szabo, to help author determine whether a new edition was needed (Fall 2010).

- **Math Elections Committee – Chair**
University of Illinois at Urbana-Champaign (August 2010-May 2011).

- **Centers of Actuarial Excellence Designation**
Along with other actuarial faculty, submitted materials to and met with members of the Society of Actuaries to get the UIUC actuarial science program approved as a Center of Actuarial Excellence. This will provide the mathematics department with access to grants and funding for research and increase the prestige of the actuarial program at UIUC (Spring 2010).

- **Undergraduate Affairs Committee**
University of Illinois at Urbana-Champaign (August 2009-May 2010).

- **Math Area Chair (Actuarial Science)**
University of Illinois at Urbana-Champaign (August 2009-May 2010).

- **Math Elections Committee**
University of Illinois at Urbana-Champaign, August 2008-May 2009.