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## **ROBERT C. HANNUM, PH.D.**

Reiman School of Finance  
Daniels College of Business  
University of Denver  
Denver, CO 80208

*Phone:* 303-871-2115  
*Email:* rhannum@du.edu

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### **ACADEMIC DEGREES**

- Ph.D., Statistics, Florida State University
- M.S., Statistics, Florida State University
- B.S., Mathematics, University of Dayton (summa cum laude)

### **PRIMARY RESEARCH INTERESTS**

- Probability & Risk
- Mathematics of Games & Gambling
- Casino Gaming Operations

### **PRIMARY TEACHING INTERESTS**

- Probability Theory
- Statistical Methods
- Calculus & Linear Algebra
- Mathematics of Games & Gambling

### **PROFESSIONAL EMPLOYMENT**

- Professor of Risk Analysis & Gaming, University of Denver, 2010-present
- Professor of Statistics, University of Denver, 2004-2010
- Associate Professor of Statistics, University of Denver, 1986-2003
- Visiting Assistant Professor of Statistics, Temple University, 1985-1986
- Assistant Professor of Statistics, University of Denver, 1979-1985
- Visiting Assistant Professor of Mathematics, Bucknell University, 1977-1979

### **ADMINISTRATIVE EXPERIENCE**

- Director, Data Mining Program, University of Denver, 2004-2005
- Acting Chair, Department of Statistics & Operations Technology, 2002
- Chair, Department of Statistics & Operations Technology, 1992-1996; 1987-1991

### **PROFESSIONAL AFFILIATIONS**

- American Statistical Association
- American Mathematical Society
- Decision Sciences Institute
- International Masters of Gaming Law

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## CURRICULUM DEVELOPMENT AND TEACHING INNOVATION

### **Programs and Initiatives**

- *Master of Science (and affiliated programs) in Data Mining*: Sole responsibility for development and implementation of new cross-disciplinary Master of Science, M.B.A. concentration, and Professional Business Certificate data mining programs, including SAS industry certification. Personally created and designed several new courses in data mining and statistical modeling.
- *Statistical Computing Technology*: Led the integration of modern statistical software and knowledge discovery technology into the business curriculum.
- *Laptops in the Classroom*: Coordinated integration of laptop technology in the classroom for core statistics courses.

### **New and Innovative Courses Developed & Taught**

- *Data Mining I* – Concepts and basic techniques of data mining, the process of discovering useful knowledge by exploring and modeling relationships in very large data sets.
- *Data Mining II* – A continuation of Data Mining I with a focus on predictive modeling.
- *Statistical Computing* – The use of modern statistical software and programming with SAS for data analysis and modeling.
- *Applied Statistical Modeling* – Categorical data analysis and generalized linear models with implementation of models using SAS and/or other statistical software.
- *Financial Econometrics* – The application of statistical techniques to problems in finance.
- *Chance Honors Seminar* – A university honors seminar on risk, probability, and uncertainty.
- *Statistics and the Law* – Special topics offering on the interface of statistics and the law.
- *The Theory of Gambling & Risk* – A special topics course.
- *Probability Theory: The Mathematics of Gambling* – A course on the theory and applications of probability with an emphasis on casino gaming.
- *The Science of Poker* – A special topics course covering the concepts, mathematics, theory, and history of poker.
- *Risky Business: Introduction to Gambling & Commercial Gaming* – A unique travel course to Las Vegas, where students learn about the theory of gambling and the business of casino gaming. Publicity has included feature articles in the Denver Post and the Las Vegas Sun, and pieces in more than twenty campus newspapers nationwide.
- *Casino Operations* – A special topics course on the many facets of casino operations.
- *Economic and Social Impacts of Gaming in Colorado* – A special topics course combining on-campus lectures and off-campus research work in Colorado mountain towns.
- *Gaming Law* – Developed and taught at the request of the D.U. Law School. Held in Las Vegas, with half-dozen world-class experts in gaming law, regulation, and operations addressing the class of 68 students.
- *MBA Online Pre-course* – Wrote and developed the statistics pre-course used for several years as required course material for University of Denver MBA students.

## GRANTS, AWARDS, AND OTHER RECOGNITION

### Grants

#### Center for Teaching & Learning

- Integrating Modern Software Technology into the Core Curriculum, 2005 (with T. Dalton)
- Incorporating Knowledge Technology into the Curriculum, 2003 (with T. Dalton)
- Software Technology, 2003 (with T. Dalton)
- Integrating Laptop Technology into the Classroom, 2000 (with T. Obremski)

#### College Research Grants

- Economics of Poker, Summer Research Grant, 2012
- Financial Econometrics Course Development Grant, Fall 2012
- Statistical Comparison of Casino Comp Policies for Premium Players, 2003
- Statistical Issues in Gaming Regulation, 2001
- Casino Gaming in the Caribbean: Policies & Economic Impacts, 2001
- Business Research Grant, 1994
- Business Research Grant, 1990

#### University Internationalization Grants

- Internationalization of Gaming Curriculum & Research, 2003
- Mathematics & International Economic Impact of Gaming, 2002
- International Casino Gaming: Operations, Policies, and Impacts, 2001

### Awards, Honors, Notables

- Merit Awards for Teaching – 2010, 2004, 2003, 2002, 2001, 2000
- Merit Awards for Research & Publication – 2005, 2004, 2003, 2002
- Provost Merit Award – 2010
- Merit Award for Exemplary Service – 2010
- Mathematician in Residence – *Aria Resort & Casino*, Las Vegas, December 2010
- Mathematician in Residence – *MGM Grand Hotel & Casino*, Las Vegas, December 2007
- Expert faculty list, *Gaming Studies Research Center*, UNLV, 2004—present
- Invited member, *International Masters of Gaming Law*, 2004—present
- Disability Awareness Award Recognition, 2001
- Best paper award – Cases, workshops and special sessions, *WDSI Annual Meetings*, 2002
- Cecil Puckett Award – Outstanding Teacher, College of Business, 1988

### Interviews/Quotes/Sources/Features

- Source for expert analysis and opinion for articles in:
  - *Law360* – Second Circuit’s decision in DiCristina case (Aug. 2013)
  - *Men’s Health Magazine* – Odds at bingo, scratch cards (July 2013)
  - *The Motley Fool* – Biotech investing riskier than Vegas (July 2013)
  - *Men’s Health Magazine* – Best way to blow \$100 in a casino (Aug. 2013)
  - *Wall Street Journal* – Online poker handle & revenues (May 2013)
  - *Cleveland Plain Dealer* – Casino games betting limits – how & why? (Nov. 2012)
  - *Pittsburgh Tribune-Review* – Impact of Ohio casinos on Pennsylvania (Aug. 2012)

- *Cleveland Plain Dealer* – Ohio casino revenue in first two months (Aug. 2012)
- *Science News China* – Charitable gaming; math of gaming; luck (July 2012)
- *Press of Atlantic City* – Investigation \$1 million scratch card promotion (July 2012)
- *National Public Radio*, “This American Life” with Ira Glass – Blackjack (May 2012)
- *Akron Beacon Journal* – Rational gambling; odds of casino games (May 2012)
- *Cleveland Plain Dealer* – New casino in Ohio; math/odds of games (Apr. 2012)
- *Discovery Channel / MY Tupelo* – “The Equalizer” show; gambling math (Apr. 2012)
- *Fort Worth Star-Telegram* – “Lucky” places to buy lottery tickets (Dec. 2011)
- *Short Stacked Radio* – interview; math of gambling; poker & skill (Aug. 2011)
- *Westword Magazine* – feature article; poker & skill; online poker (June 2011)
- *NBC-TV Birmingham (WVTM)* – Math & chances of winning in casinos (Apr. 2011)
- *Education-Portal* – Using gambling & casino games to teach statistics (Feb. 2011)
- *60 Minutes* – Slot Machines: The Big Gamble (“Playing the Odds”) (Jan. 2011)
- *Portland Monthly Magazine* – Math & odds of casino games (Jan. 2011)
- *Gambling Compliance (U.K.)* – Games of chance legislation in Colorado (Nov. 2010)
- *Wired Magazine (U.K.)* – Advantage play in casino games (Oct. 2010)
- *Gambling Compliance (U.K.)* – Poker; recent cases; internet gambling (July 2010)
- *Forbes* – Gambling, math, technology (Apr. 2010)
- *Los Angeles Times* – Skill vs. chance in poker; various legal cases (Sept. 2009)
- *Delaware News Journal* – Sports betting, skill & chance (Aug. 2009)
- *NBC-TV News Denver* – NCAA college basketball tournament odds (Mar. 2009)
- *Fox News Radio (600KCOL)* – Skill vs. chance in poker (Mar. 2009)
- *Wall Street Journal* – Skill vs. chance in poker (Mar. 2009)
- *Denver Post* – Skill in poker (Mar. 2009)
- *New Scientist* – Skill in poker (Mar. 2009)
- *Pittsburg Post-Gazette* – Skill in poker (Feb. 2009)
- *The Economist* – Skill in poker (Feb. 2009)
- *The Coloradoan* – Skill in poker (Jan. 2009)
- *Newsweek* – The elderly & gambling (Nov. 2008)
- *PressBox Sports Magazine* – Slot machine legislation in Maryland (Nov. 2008)
- *USA Today* – Slot machines & proliferation of slots in U.S. (Jan. 2008)
- *Las Vegas Review-Journal* – Poker/royal flush probabilities (Aug. 2007)
- *Philadelphia Inquirer* – Slot machines (2007)
- *U.S. News & World Report* – Casino gambling & gaming industry (2005)
- *Investor’s Business Daily* – Mathematics of casino gambling (2005)
- *Chicago Tribune* – Casino gambling, house advantage, table games (2005)
- *South Florida Sun Sentinel* – Casino gambling & gaming industry (2005)
- *San Diego Union-Tribune* – Multi-state lotteries (2005)
- *Deseret News* – Casino gambling, house edge, Internet gambling, etc. (2005)
- *British Broadcasting Corporation* – Blackjack & advantage play (2004)
- *Pittsburgh Tribune* – Passing of slot legislation in Pennsylvania (2004)
- *Pittsburgh Post-Gazette* – Proposed slots in Pennsylvania (2004)
- *Miami Herald* – Indian gaming (2004)
- *Philadelphia Inquirer* – slot machine odds (2004)
- *Sacramento Bee* – Casino math, Indian casinos reporting hold percentages (2004)
- *CBS-TV Buffalo, NY (WIVB)* – Casino gambling (2003)

- *CBS Market Watch* – Feature segment on *Practical Casino Math* book (2003)
- *Baltimore Sun* – Proposed slots legislation in Maryland (2003)
- *Canadian Broadcasting Corporation* – Video lottery terminals (2002)
- *National Public Radio* – On the popular book *Bringing Down the House* (2002)
- *CBS-TV News Denver* – Mathematics of gambling
- *ABC-TV News Denver* – *Mathematics of Gambling* class filmed & aired
- *CBS-TV News Los Angeles* – Special segment featuring *Practical Casino Math*
- *CBS National Radio* – Powerball
- *Men's Health Magazine* – Gambling & casino gaming
- *Denver Post* – Feature article on *Risky Business* course
- *Las Vegas Sun* – Feature article on *Risky Business* course
- Feature articles on *Risky Business* course in more than forty campus newspapers

### **SELECTED PROFESSIONAL SERVICE, NATIONAL AND REGIONAL**

- Session Chair, *International Conference on Gambling & Risk Taking* (2013)
- Reviewer, *Beijing Law Review* (2013)
- Reviewer, *Gaming Research & Review Journal* (2011)
- Session Chair, *International Conference on Gambling & Risk Taking* (2009)
- Referee (2 papers), *Optimal Play: Mathematical Studies of Gambling* (2007)
- Contributor – *SAS Global Academic Initiative Newsletter* (2004)
- Session Chair, *International Academy of Business & Economics Conference* (2003)
- Session Chair, *International Business & Economic Research Conference* (2002)
- Session Chair, *International Conference on Gambling & Risk Taking* (2000)
- Session Chair, *International Conference on Gambling & Risk Taking* (1997)
- Chair, Workshop on Decision Sciences and the Law, *DSI Annual Meetings* (1993)
- Chair, Workshop on Decision Sciences and the Law, *DSI Annual Meetings* (1992)
- Invited session chair, *Institute of Mathematical Statistics National Meetings* (1981)
- Ad hoc Referee: *J.A.S.A.*; *Decision Sciences*; *Comm. Statistics*; *Review of Policy Research*
- Numerous textbook reviews
- Contributing author, Source Book for College Admissions Tests, Colorado Dept. Education
- GMAT, GRE, SAT/ACT courses, Continuing Education Program

### **SELECTED PROFESSIONAL SERVICE, COLLEGE AND UNIVERSITY**

#### **Recent**

- Business Information & Analytics Department APT Committee (2012)
- Scholarship Enhancement Committee, Daniels College of Business (2010-present)
- Appointment, Promotion, & Tenure Committee, Daniels College of Business (2004-2010)
- Learning Enhancement Committee (2006-2009)

#### **Previous**

Statistics Department Search Committee (2006-2007); Department Chair Search Committee (2005-2006); College Undergraduate Core Design Committee (2003-2004); College Curriculum Committee (2002-2004); Scholarship of Discovery Committee (2000-2003); Acting Department

Chair (2002); Department Chair (8 years); Faculty Senate, Faculty Research Committee; Faculty Development Committee; Daniels Undergraduate Programs Committee; College Appeals Committee; Case Center Mentor; Freshman Mentor Program; Graduate Student Advisor; MBA Foundations Course Committee; MBA Analytical Skills Course Design Committee; MBA Values Course Committee; MBA Design Committee; Graduate Business School Admissions Committee; Committee on Instruction & Teaching Evaluation; Faculty Advisory Committee to Dean; Faculty/Alumni Advisory Committee for Executive MBA Program; Honors Committee.

### **CONSULTING AND RELATED WORK**

Consulting primarily in the areas of casino gaming, the mathematics of gambling, game analysis, statistical modeling, regression, and sampling design and analysis.

- Selected Consulting Work:
  - DEQ Systems (card counting the Dragon 7 & Panda 8 in EZ Baccarat)
  - Parker v. Commissioner of I.R.S. (retained as expert; taxes on gambling wins)
  - DEQ Systems/Talisman Group (counting the Dragon 7 & Panda 8 in EZ Baccarat)
  - Sonnenschein Nath Rosenthal Denton (retained as expert; taxes on gambling wins)
  - McConnell Fleischner Houghtaling (background expert; medical malpractice)
  - Connecticut Dept. of Revenue (expert testimony; profit expectation in casino games)
  - Wisconsin Dept. of Revenue (expert testimony; profit expectation in casino games)
  - Poker Players Alliance (expert witness testimony; skill versus chance in poker)
  - International Game Technology (retained as expert; game analysis)
  - Casinos Austria Research & Development (retained as expert; game analysis)
  - MindPlay/Bally (retained as expert)
  - Aria Resort & Casino, Las Vegas (Mathematician in Residence, Dec. 2010)
  - MGM Grand, Las Vegas (Mathematician in Residence, Dec. 2007)
  - Casino Double-or-Nothing
  - Gaming VC (Casino Club), Germany
  - International Tournament Poker League
  - Last Resort Consulting
  - Ameristar Casino, Mississippi
  - ShuffleMaster
  - Cut N' Shuffle
  - ProShuffle
  - Talisman Group (EZ Baccarat)
  - Terra Payments (FirePay)
  - Pari-Mutuel Poker & Billiards
  - Cyberview Technology
  - Spin & Win
  - Mirage, Las Vegas
  - Bellagio, Las Vegas
  - Iowa Racing & Gaming Commission
  - Casino Lugano, Switzerland
  - Loyal Commerce Systems, Board of Advisors
  - Data Mining Services
  - Comcast Communications
  - TCI/AT&T

- Ford Motor Company
- Credco
- D'Appolonia Engineers

## **Expert Witness**

### Expert Witness Testimony

- *Charlie Daniels d/b/a The Poker Palace v. City of Portsmouth, VA* (2011)
  - Trial: Expert testimony centered on whether Texas Hold'Em poker is a game of predominately skill or chance.
  - Testimony via affidavit (on behalf of Plaintiff).
- *Three Kings Holdings & Cobra Crew v. Stephen Six, Kansas Attorney General, et al* (2009)
  - Trial: Expert testimony centered on whether Texas Hold'Em poker is a game of predominately skill or chance.
  - Testified on behalf of Plaintiff.
- *Commonwealth of Pennsylvania v. Lawrence R. Burns* (2009)
  - Defendant charged with unlawful gambling by organizing Texas Hold'Em tournaments at fire halls; expert witness testimony centered on whether Texas Hold'Em poker is a game of predominately skill or chance.
  - Testified on behalf of Defendant.
- *Three Kings Holdings & Cobra Crew v. Stephen Six, Kansas Attorney General, et al* (2009)
  - Preliminary hearing: Plaintiffs sought injunction to enjoin defendants from prosecuting and/or taking administrative or civil action against plaintiffs in connection with the poker-based game *Kandu*; expert testimony centered on whether Texas Hold'Em poker is a game of predominately skill or chance.
  - Testified on behalf of Plaintiff.
- *South Carolina v. Chimento et al* (2009)
  - Defendant charged with illegal gambling; expert witness testimony centered on the roles of skill and chance in poker and whether poker is a game of skill.
  - Testified on behalf of Defendant.
- *Colorado v. Raley* (2009)
  - Defendant charged with illegal gambling; expert witness testimony centered on the roles of skill and chance in poker and whether poker is a game of skill.
  - Testified on behalf of Defendant.
- *Commonwealth of Kentucky v. 141 Internet Domain Names* (2008)
  - Commonwealth of Kentucky filed to seize and compel forfeiture of 141 Internet gambling site domain names; whether poker is a game of skill.
  - Testimony via affidavit (on behalf of PPA, Amicus Curiae, Defense).
- *Peter B. Stone v. Commissioner of Revenue Services, State of Connecticut* (2006)
  - Whether or not: (1) the plaintiff is a professional gambler in the trade or business of gambling; (2) the Department of Revenue Services' income tax is discriminatory as applied to Plaintiff and other individuals categorized by the Commissioner as non-professional gamblers; (3) the State impermissibly discriminates against individuals

based upon the type of gambling activity engaged in; and (4) the State selectively enforces income reporting requirements against those winning larger sums of money in gambling activities. Expert witness testimony centered on the mathematics of casino games, expectation, and profit objective.

- Testified on behalf of the Connecticut Commission of Revenue Services.
- *Thomas Calaway v. Wisconsin Department of Revenue* (2005)
  - Whether or not the petitioner was engaged in a trade or business in playing slot machines in Las Vegas and Atlantic City. Expert witness testimony centered on the mathematics of casino games, expectation, and profit objective.
  - Testified on behalf of the Wisconsin Department of Revenue.

#### Retained as Expert

- *Parker v. Commissioner of Internal Revenue* (2013)
  - Estimating gambling losses.
  - Retained by Parker representatives.
- *United States of America v. George Pitsilides* (2011-2012)
  - Skill versus chance in Texas Hold’Em.
  - Retained by Pitsilides representatives.
- *Byrum v. Commissioner, United States Tax Court* (2010)
  - Estimating gambling losses.
  - Retained by Byrum (Brittingham) representatives.
- *Aristocrat v. IGT* (2006-2007)
  - Patent case; mathematical & statistical issues surrounding gaming devices.
  - Retained by IGT representatives.
- *ShuffleMaster v. MindPlay/Alliance/Bally Gaming* (2005)
  - Patent case; statistical issues surrounding gaming devices.
  - Retained by Bally Gaming representatives.
- *Casinos Austria Research & Development (CARD) v. ShuffleMaster* (2004)
  - Patent case; statistical (randomness) issues surrounding gaming devices.
  - Retained by CARD representatives.

#### Amicus Curiae Testimony

- Brief of Amicus Curiae Robert C. Hannum, Ph.D., In Support of Defendant-Appellee and Affirmance, *U.S. v. DiCristina*.
  - On Appeal from the United States District Court for the Eastern District of New York, March 28, 2013.
  - Whether poker is illegal gambling under federal law; poker is a game of predominantly skill.

#### **VOLUNTEER WORK & COMMUNITY SERVICE**

- Pro Bono: Weighted average baccarat hands, MGM Grand Las Vegas (2013)
- Pro Bono: Volatility of slot play, Aria Casino (2013)



- Pro Bono: Statistical analysis of baccarat sorts scam, first card knowledge, Aria Casino (2012)
- Pro Bono: Statistical analysis of suspected roulette cheater, MGM Grand Casino (2012)
- Pro Bono: Statistical analysis of blackjack scam, Aria Casino (2012)
- Pro Bono: Mathematical analysis of suspected blackjack cheater, Aria Casino (2010)
- Pro Bono: Casino math issues, MGM Grand Las Vegas (2010)
- Pro Bono: Casino math issues, Mirage Las Vegas, Bellagio Las Vegas (2009)
- Pro Bono: Lottery for Fisher Learning Center (2009)
- Pro Bono: Statistical analysis of \$40,000 Casino War loss, MGM Grand (2008)
- Pro Bono: Probability analysis for Dragon Seven bet in EZ Baccarat, Talisman (2008)
- Pro Bono: Casino Metrics – Win% versus Hold %, Banc of America Securities (2008)
- Pro Bono: Editing and fact checking on new casino business book (2007)
- Pro Bono: Mathematics & gaming regulations, Iowa Racing & Gaming Commission (2004)
- Pro Bono: Casino math issues, Casino Lugano, Switzerland (2003)
- Advisory Board Member: *Loyal Commerce, Inc.* (2006-2009)
- Guest lecture BSBA 1010 classes (2007, 2004, 2002)
- Guest lecture CORE 2639 class (2009, 2008, 2007)
- Guest speaker, Discover Daniels Weekend (2007)
- Marsico University Lecture (2004)
- Guest speaker, DU Residence Hall (2004)
- Guest speaker, UNLV School of Law (2003)
- Guest speaker, UNLV School of Law (2002)
- Guest speaker, various other college classes
- Workshops on mathematics and probability, Cherry Creek School District
- Youth soccer association coach
- Youth baseball coach
- Youth basketball coach
- Community swim team judge

### SELECTED PRESENTATIONS

- “Baccarat Edge Sorting: A Further Look,” *International Conference on Gambling & Risk Taking*, Las Vegas, NV, May 28, 2013.
- “Blended Learning: A Roadmap to Success,” *Society for Information Technology and Education (SITE) 24<sup>th</sup> International Conference*, New Orleans, LA, March 26, 2013.
- “Poker Today: SWAT Teams and Science” (Keynote Address), *Behavioral Decision Research in Management Conference*, June 28, 2012.
- “The Criminology of Poker,” *Academy of Criminal Justice Sciences Annual Meetings*, New York City, March 15, 2012.
- “The Business & Science of Gambling,” *University of Colorado at Denver Mathematical & Statistical Sciences Seminar*, Nov. 1, 2011.
- “The Science of Gambling: How Casinos Make Money,” *University of Denver Alumni Symposium*, Oct. 1, 2011.
- “Skill versus Chance in Poker: Key Arguments and New Evidence,” *Hawaii International Conference on Social Sciences*, Honolulu, June 2011.

- “Casino Math & Surveillance,” Seminars for surveillance personnel, *Aria Resort & Casino*, December 2010.
- “House Advantage and Volatility,” *Excellence in Table Games Management*, Seminars for casino executives, Denver & Cripple Creek, Colorado, June 2009.
- “Poker and Skill,” *14<sup>th</sup> International Conference on Gambling & Risk Taking*, Lake Tahoe, May 2009.
- “Super Pan 9: Unraveling the Mystery of the 70% Banking Rule,” *14<sup>th</sup> International Conference on Gambling & Risk Taking*, Lake Tahoe, May 2009.
- “Gaming Mathematics,” *Johns Hopkins University Conference for Educators*, Las Vegas, NV, January, 2009.
- “Poker and the Law,” *Gaming Law Symposium*, Drake Law School, September 2008.
- “Table Games and Profitability: Money, Math, & Myths,” *Gaming Operations Summit*, Las Vegas, NV, April 2007.
- “Knowing When to Hold ‘Em & When to Fold ‘Em: The Mathematics of Poker,” *NSF Program on Games of Chance*, University of Utah, July 2005.
- “A Graduate Data Mining Program Using SAS,” *SAS Data Mining Conference*, Cary, NC, June 2005.
- “Teaching Data Mining Using SAS Enterprise Miner,” *SAS Data Mining Conference*, Cary, NC, July 2004.
- “Developing a Data Mining Program at the University of Denver,” *SAS Data Mining Conference*, Loma Linda, CA, June 2004.
- “A Mathematical Analysis of Casino Dead Chip Programs,” *International Academy of Business & Economics Conference*, October 2003.
- “Mathematics & Gaming Regulation,” *University of Nevada School of Law*, October 2003.
- “Statistical Standards in Gaming Regulation: Fact & Fiction,” *International Masters of Gaming Law Symposium*, September 2003.
- “Effective House Advantage and Dead Chip Programs,” *International Conference on Gambling & Risk Taking*, May 2003.
- “Flaws & Fallacies in Casino Mathematics,” *International Conference on Gambling & Risk Taking*, May 2003.
- “Casino Gaming in the Caribbean,” *International Business & Economic Research Conference*, October 2002.
- “Gaming Law & Mathematics,” *University of Nevada School of Law*, September 2002.
- “How Casinos Make Money,” *Asia-Pacific Gaming & Casinos World Conference*, Singapore, June 2002.
- “Keeping Casino Games Fair and Honest: The Role of Statistical Evidence in Gaming Regulation,” *Western Decision Sciences Institute*, April 2002.
- “The Business of Casino Gaming,” *Western Decision Sciences Institute*, April 2002 (Best paper award).
- “Casino Mathematics,” Seminar for casino executives, Aruba, March 2002.

## PUBLICATIONS

### Books

- [1] Hannum, R., & Cabot, A. (2012). *Practical Casino Math*, Chinese edition. Taipei: Yang-Chih Book Co.
- [2] Hannum, R., & Cabot, A. (2005). *Practical Casino Math*, 2<sup>nd</sup> edition. Reno, NV: Institute for the Study of Gambling & Commercial Gaming, University of Nevada.
- [3] Hannum, R. (1998). *Introductory Statistics: A Self-Study Guide* (Self-published).

### Articles & Papers

- [1] Hannum, R. (forthcoming). The Science & Economics of Poker. In L. Vaughan-Williams & D. Siegel (Eds.), *Oxford Handbook of the Economics of Gambling*.
- [2] Hannum, R. (forthcoming). A Primer on the Mathematics of Gambling. In L. Vaughan-Williams & D. Siegel (Eds.), *Oxford Handbook of the Economics of Gambling*.
- [3] Hannum, R. (2013). In Support of Defendant-Appellee and Affirmance, *U.S. v. DiCristina* (On Appeal from the U.S. District Court for the Eastern District of New York), Brief of Amicus Curiae, U.S. Court of Appeals for the 2<sup>nd</sup> Circuit, March 28, 2013.
- [4] Hannum, R., Rutherford, M., & Dalton, T. (2012). Economics of Poker: The Effect of Systemic Chance. *Journal of Gambling Business and Economics*, Vol. 6, No. 1.
- [5] Hannum, R. (2011). Mathematics and Surveillance: Unlikely Bedfellows? *Catwalk*, March, 2011.
- [6] Hannum, R. (2010). Casino Mathematics. In *Casino Gaming Methods: Games, Probabilities, and Controls*, Williams, D., & Hashimoto, K., eds. Upper Saddle River, NJ: Prentice Hall.
- [7] Hannum, R. (2010). Surveillance and Casino Math, *Atlantic City Surveillance News*, Issue 9, Spring.
- [8] Hannum, R., & Cabot A. (2009). Toward Legalization of Poker: The Skill vs. Chance Debate. *Gaming Research & Review Journal*, Vol. 13, No. 1.
- [9] Hannum, R. (2008). Product: Games and Statistics. In *Casino Management: A Strategic Approach*, Hashimoto, K., ed. Upper Saddle River, NJ: Prentice Hall.
- [10] Hannum, R. (2008). Crash and Burn: Casino Management's Response to an Improbable Win. *Casino Enterprise Management*, Vol. 6, No. 4.
- [11] Hannum, R. (2007). The Partager Rule at Roulette: Analysis and Case of a Million Euro Win. In *Optimal Play: Mathematical Studies of Games & Gambling*, Ethier, S., & Eadington, W., eds. Reno, NV: Institute for the Study of Gambling & Commercial Gaming, University of Nevada.
- [12] Hannum, R. (2006). Skill versus Chance: A Delicate Dance. *Casino Lawyer*, Vol. 2, No. 3.
- [13] Cabot, A., & Hannum, R. (2005). Poker: Public Policy, Law, Mathematics and the Future of an American Tradition. *Cooley Law Review*, Vol. 22, No. 3.
- [14] Cabot, A., & Hannum, R. (2005). Statistical Standards in Gaming Regulation: Fact and Fiction. *Casino Lawyer*, Vol. 1, No. 3.
- [15] Hannum, R. (2005). Objective of Profit: A Taxing Concept for Gamblers. *Casino Enterprise Management*, Vol. 3, No. 8.

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- [16] Cabot, A., & Hannum, R. (2005). Advantage Play and Commercial Casinos. *Mississippi Law Journal*, Vol. 74, No. 3.
- [17] Hannum, R. (2005). Risky Business: The Use and Misuse of Statistics in Casino Gaming. *Chance*, Vol. 18, No. 2.
- [18] Hannum, R., & Kale, S. (2004). Dead Chip Programmes: Finding and Keeping the Edge. *International Gambling Studies*, Vol. 4, No. 1.
- [19] Hannum, R. (2003). Percentages Never Lie. *Global Gaming Business*, Vol. 2, No. 5.
- [20] Hannum, R. (2003). A Guide to Casino Mathematics. *Gaming Studies Research Center*, University of Nevada Las Vegas, <http://gaming.unlv.edu/research/subject/>.
- [21] Hannum, R. (2003). A Mathematical Analysis of Casino Dead Chip Programs. *Review of Business Research*, Vol. 1, No. 1.
- [22] Hannum, R., & Eadington, W. (2002). The Evolving Role of Casino Gaming in the Caribbean. *Proceedings of the International Business & Economic Research Conference*.
- [23] Cabot, A., & Hannum, R. (2002). Gaming Regulation and Mathematics: A Marriage of Necessity. *John Marshall Law Review*, Vol. 35, No. 3.
- [24] Hannum, R., & Cabot, A. (2002). Keeping Casino Games Fair & Honest: The Role of Statistical Evidence in Gaming Regulation. *Proceedings of Western Decision Sciences Institute Annual Meetings*.
- [25] Hannum, R.C. (2002). Special Session: The Business of Casino Gaming. *Proceedings of Western Decision Sciences Institute Annual Meetings*. (Best paper award).
- [26] Hannum, R. (2002). The Luck Myth. *Global Gaming Business*, Vol. 1, No. 3.
- [27] Hannum, R. (2000). Casino Card Shuffles: How Random Are They? In *Finding the Edge: Mathematical Analysis of Casino Games*, Vancura, O., Eadington, W., & Cornelius, J., eds. Reno, NV: Institute for the Study of Gambling & Commercial Gaming, University of Nevada.
- [28] Hannum, R., & Bien, D. (1996). Utility Vehicle Rollovers: A Case Study in Statistics, Public Policy, and Law. Case Study, Self-published (presented at *3rd International Conference on Forensic Statistics*).
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