VITAE

DOUGLAS M. PATTERSON
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Office Address:

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Virginia Polytechnic Institute and State University
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EDUCATION

Doctor of Philosophy, 1978, Graduate School of Business, University of Wisconsin, Madison, Wisconsin.

Dissertation: "Warrant Prices in the Context of the Option Pricing Model and the Efficiency of the New York Stock Exchange." Dissertation Committee Co-chairmen, Robert Haugen and Dean Wichern.

Master of Business Administration, 1972, University of Wisconsin, Madison, Wisconsin.

Bachelor of Science, 1968, Electrical Engineering, University of Wisconsin, Madison, Wisconsin.

TEACHING EXPERIENCE

Professor, Virginia Polytechnic Institute and State University, 1999–present.

Associate Professor, Virginia Polytechnic Institute and State University, 1986–1999.

Visiting Associate Professor, University of California, Santa Barbara, Winter, 1989.

Assistant Professor, Virginia Polytechnic Institute and State University, 1980–1985.

Assistant Professor of Finance, University of Michigan, School of Business Administration, 1978–1980.

Lecturer in Finance, University of Michigan, School of Business Administration, 1976–1977.

Teaching Assistant, University of Wisconsin, School of Business, 1972–1973.

Undergraduate Courses Taught at Virginia Polytechnic Institute and State University:

Advanced Financial Management (MBA)
Investment Analysis and Equity Markets
Investments (MBA and Undergraduate)
Managerial Economics (MBA)
Investment Analysis and Equity Markets
International Finance (MBA and Undergraduates)
Debt Markets and Interest Rates
Free Markets and Individual Freedom (MS)
Ph.D. Finance Seminar in Finance Theory

Courses Taught at Other Universities:

Managerial Finance (MBA and Undergraduate)
Investments (MBA and Undergraduate)
Quantitative Methods in Finance
Theory of Finance
Ph.D. Seminars in finance theory and investments

Innovations:

Computer Applications:

> Developed a series of investment exercises which use Value Screen Plus by Value Line.
>
> Wrote computer program to calculate various measures of bond yield and estimate the term structure of interest rates
>
> Wrote computer programs to calculate IRR and NPV (uses methods of Teichroew, Robichek, and Montalbano)
>
> Developed a bond portfolio management game that simulates a bond market with a stochastic term structure.
>
> Developed series of exercises that are used in conjunction with an LP package to apply Weingartner's capital budgeting methods.
>
> Updated and modified for the PC a program by Gordan Alexander which solves for the mean-variance efficient frontier.

Developed a course Web page for every teaching assignment since 1997.

Developed and published course lecture notes for every teaching assignment since 1999.

INDUSTRIAL EXPERIENCE

Electrical Engineer, Westinghouse Electric Corporation, Baltimore, Maryland, 1968–1971.

PUBLICATIONS

I. Refereed Journal Articles:

Patterson, Douglas. "An ARFIMA Model for Volatility Does Not Imply Long Memory." *Nonlinear Time Series and Finance*, edited by Semei Coronado Ramirez, 27-33. Guadalajara: Guadalajara University Press, 2013.

Ashley, Richard and Douglas Patterson. "A Test of the GARCH(1,1) Specification for Daily Stock Prices." *Macroeconomic Dynamics* 14 (Supplement 1), 2010: 137-144.

Patterson, Douglas and Vivek Sharma. "The Incidence of Informational Cascades and the Behavior of Trade Interarrival Times During the Stock Market Bubble." *Macroeconomic Dynamics* 14 (Supplement 1), 2010: 111-136.

Ashley, Richard and Douglas Patterson. "Apparent Long Memory In Time Series as an Artifact of a Time-Varying Mean: Considering Alternatives to the Fractionally Integrated Model." *Macroeconomic Dynamics* 14 (Supplement 1), 2010: 59-87.

Ashley, Richard, Elena Rusticelli and Douglas Patterson. "A New Bispectral Test for Nonlinear Dependence." *Econometric Reviews* 28, no. 1–3 (June 2009): 279–293.

Hinich, Melvin and Douglas Patterson. "Detecting Epochs of Transient Dependence in White Noise." In *Money, Measurement and Computation,* edited by M. Belongia and J. Binner, 61–75. New York: Palgrave Macmillian, 2006.

Ashley, Richard and Douglas Patterson. "Evaluating the Effectiveness of State Switching Time Series Models for U.S. Real Output." *Journal of Business and Economic Statistics* 24, no. 3 (July 2006): 266–277.

Ammermann, Peter and Douglas Patterson. "The Cross-Sectional and Cross-Temporal Universality of Nonlinear Serial Dependencies: Evidence from World Stock Indices and the Taiwan Stock Exchange." *Pacific-Basin Finance Journal* 11 (2003): 175–195.

Kadlec, Greg and Douglas Patterson. "A Transactions Data Analysis of Nonsynchronous Trading." *Review of Financial Studies* 12 (Fall 1999): 609–630.

Altug, S., Richard Ashley and Douglas Patterson. "Are Technology Shocks Nonlinear?" *Macroeconomic Dynamics* 3, no. 4 (1999): 506–533.

Hinich, Melvin and Douglas Patterson. "A Test for Nonstationarity: Abridged Version." In *Nonlinear Dynamics in Economics*, edited by W. Barnett, M. Salmon, and A. Kirman, 297–306. New York: Cambridge University Press, 1996. *(An earlier version of this paper appeared in the Proceedings of the Business and Economic Statistics Section of the American Statistical Association, San Francisco, August 8–12, 1993.)*

Ashley, Richard and Douglas Patterson. "On the Importance of Being Nonlinear: A Frequency Domain Approach to Nonlinear Model Identification and Estimation." In *Nonlinear Dynamics in Economics*, edited by W. Barnett, M. Salmon, and A. Kirman. New York: Cambridge University Press, 1995. *(An earlier version of this paper appeared in the Proceedings of the Business and Economic Statistics Section of the American Statistical Association, San Francisco, August 8–12, 1993.)*

Hinich, Melvin and Douglas Patterson. "Intra-Day Nonlinear Behavior of Stock Prices." In *Evolutionary Dynamics and Nonlinear Economics - A Transdisciplinary Dialogue*: *Proceedings of the International Symposium, the University of Texas at Austin*, edited by R. Day and P. Chen. New York: Oxford University Press, 1993. *[An earlier version of this paper was published as "Bispectral Analysis of Trade-by-Trade Stock Prices and the Time-of-Day Effect," in the Proceedings of the Business and Economics Statistics Section of the American Statistical Association, New Orleans, August 22–25 (1988), pp. 81–90. (Invited paper).]*

Hinich, Melvin and Douglas Patterson. "A New Diagnostic Test of Model Inadequacy Which Uses the Martingale Difference Criterion." *Journal of Time Series Analysis* 13, no. 3 (1992): 233–252.

Bosshardt, Donald and Douglas Patterson. "The Marginal Value of Management Under Stochastic Control." *Journal of Economic Dynamics and Control* 15 (1991): 455–489.

Ashley, Richard and Douglas Patterson. "A Nonparametric Distribution-Free Test for Serial Independence in Stock Returns: A Comment." *Journal of Financial and Quantitative Analysis*, (September 1990): 417–418.

Hinich, Melvin and Douglas Patterson. "Identification of the Coefficients in a Non-Linear Time Series of the Quadratic Type." In *New Approaches to Modeling, Specification Selection, and Econometric Inference*, edited by W. Barnett and A. R. Gallant. New York: Cambridge University Press, 1990.

Ashley, Richard and Douglas Patterson. "Nonlinear Serial Dependence in Industrial Stock Returns." In *Advances in Mathematical Programming and Financial Planning*, vol. 2, edited by D. Lawrence, J. Guerard, and G. Reeves. Greenwich: Jai Press, 1990.

Ashley, Richard and Douglas Patterson. "Linear Versus Nonlinear Macroeconomies: A Statistical Test." *International Economic Review* 30, no. 3 (1989): 685–703.

Hinich, Melvin and Douglas Patterson. "Evidence of Nonlinearity in the Trade-by-Trade Stock Market Return Generating Process." In *Economic Complexity: Chaos, Sunspots, Bubbles, and Nonlinearity,* edited by W. Barnett, J. Geweke, and K. Shell, 383–409. New York: Cambridge University Press, 1989.

Brockett, Patrick, Melvin Hinich and Douglas Patterson. "Bispectral Based Tests for the Detection of Gaussianity and Linearity in Time Series." *Journal of the American Statistical Association* (September 1988): 657–664.

Ashley, Richard and Douglas Patterson. "A Diagnostic Test for Nonlinear Serial Dependence in Time Series Fitting Errors." *Journal of Time Series Analysis* (1986): 165–178.

Patterson, Douglas. "The Speed of Adjustment of Warrant Prices to Changes in Stock Prices," *Journal of Business & Economic Statistics* (1986): 223–241.

Ashley, Richard and Douglas Patterson. "A Non-Parametric, Distribution-Free Test for Serial Independence in Stock Returns." *Journal of Financial and Quantitative Analysis* (1986): 221–227.

Hinich, Melvin and Douglas Patterson. "Identification of the Coefficients in a Nonlinear Time Series of the Quadratic Type." *Journal of Econometrics* 30, no. 12 (1985): 109–129. *(This work was supported by Research Grant N60921-83-G-A165-B005, Naval Surface Weapons Center.)*

Hinich, Melvin and Douglas Patterson. "Reply to Marsh's Note." *Journal of Econometrics* 30, no. 12 (1985): 140–142.

Hinich, Melvin and Douglas Patterson. "Evidence of Nonlinearity in Daily Stock Returns." *Journal of Business & Economic Statistics* 3, no. 1 (1985): 69–77.

Patterson, Douglas. "BISPEC: A Program to Estimate the Bispectrum of a Stationary Time Series." *American Statistician* 37, no. 4 (1983): 323–324.

II. Other Publications:

Patterson, Douglas. "Stock Markets." In *Encyclopedia of Electrical and Electronics Engineering*, vol. 20, edited by J.G. Webster, 555–566. New York: John Wiley & Sons, 1999.

Patterson, Douglas. Review of *Nonlinear Dynamics, Chaos, and Instability,* by W. A. Brock, D. A. Hsieh, and B. LeBaron. *Journal of Finance*, 48, no. 1 (1993): 404–407.

Patterson, Douglas. *Warrant prices in the context of the option pricing model and the efficiency of the New York Stock Exchange*, (dissertation). Library of Congress call number H62 D57 1978 P38. Ann Arbor: University Microfilms, 1978.

III. Books:

Patterson, Douglas and Richard Ashley. *A Nonlinear Time Series Workshop: A Toolkit for Detecting and Identifying Nonlinear Serial Dependence*. New York: Kluwer Academic Publishers, 2000.

IV. Working Papers:

"Herding During the Stock Market Bubble: An Intraday Analysis," with Vivik Singh. January 2017.

"A Second Order Cumulant Spectrum-Based Test for Strict Stationarity," with Denisa Roberts. December 2016.

"Nonlinear Contagion between National Stock Markets in Brazil, Chile, Colombia, Peru and the US," with Richard Ashley and Seimi Coranado. November 2016.

V. AWARDS AND GRANTS

Department of Finance, Virginia Polytechnic Institute and State University summer research grant, 2009.

Department of Finance, Virginia Polytechnic Institute and State University summer research grant, 2003.

National Science Foundation travel grant, 2001. Supported travel to the NBER Time Series Seminar, North Carolina State University, Raleigh, NC.

National Science Foundation travel grant, 1998. Supported travel to the Econometrics and Financial Times Series Conference, Isaac Newton Institute, Cambridge, UK.

National Science Foundation travel grant, 1998. Supported travel to the NBER Time Series Seminar, University of Chicago Graduate School of Business, Chicago, IL.

Department of Finance, Virginia Polytechnic Institute and State University summer research grant, 1997. Supported work in the area of continuous time valuation theory.

National Science Foundation travel grant, 1996. Supported travel to the NBER Time Series Seminar, Erasmus University, Rotterdam, Netherlands.

National Science Foundation travel grant, 1995. Supported travel to NBER Time Series Seminar, Harvard University, Cambridge, MA.

Naval Underwater Systems Center research contract, "Angle Glint and its Bicovariances,"

($19,700), 1990.
Department of Finance Virginia Polytechnic Institute and State University summer research grant, 1988. Supported work on the paper “Intra-Day Nonlinear Behavior of Stock Prices.”

National Science Foundation travel grant, 1986. Supported travel to the NBER Time Series Seminar, Southern Methodist University, Dallas, TX.

Naval Surface Weapons Center research grant, ($28,138), “Methods for Nonlinear Time Series Identification,” 1985. Provided support for “Linear Versus Nonlinear Macroeconomies: A Statistical Test,” (with R. Ashley).

Learning Resources Center, Virginia Polytechnic Institute and State University, Teaching Learning Grant, “CRSP Access System,” 1984 (competitive award).

Naval Surface Weapons Center research grant, ($26,989), “Proposal to Study the Statistical Properties of Ambient Noise Using Bispectral Estimation Techniques,” 1984. Provided support for “Identification of the Coefficients in a Nonlinear Time Series of the Quadratic Type,” (with M. Hinich) *Journal of Econometrics* (1985).

Learning Resources Center, Virginia Polytechnic Institute and State University, Teaching Learning Grant, “Bond Market Simulation Game,” 1981 (competitive award).

Rackham Graduate School, University of Michigan research grant, ($2,500). Provided support for acquisition of trade-by-trade stock and option price data, 1979 (competitive award).

Faculty Research Fellowship, Rackham Graduate School, University of Michigan, 1979 (competitive award).

EDITORIAL SERVICE (Past 10 years)

The Review of Financial Studies— referee

National Science Foundation— proposal reviewer

Review of Economics and Statistics— referee

Macroeconomic Dynamics— referee

Journal of Financial and Quantitative Analysis— referee

Journal of Applied Econometrics— referee

Communications in Statistics – simulation and computation

Cambridge University Press— proposal reviewer
Journal of Economic and Business Organization— referee

The Financial Review— referee

Journal of American Acoustical Society— referee

Journal of Business Economics— referee

Econometric Reviews— referee

Journal of the Society for Nonlinear Dynamics and Econometrics—referee

Journal of Empirical Economics—referee

Quantitative Finance – referee

PROFESSIONAL MEETINGS, CONFERENCES, AND WORKSHOPS

Patterson, Douglas. "Did Herding Cause the Stock Market Bubble of 1998-2001?" Presentation, annual meeting of the Society for the Study of Nonlinear Dynamics and Econometrics, San Francisco, CA, April 3–4, 2008.

Patterson, Douglas. "A Disequilibrium Capital Asset Pricing Model." Presentation, NBER/NSF Conference on Financial Risk and Time Series Analysis, Munich, Germany, September 20–21, 2005.

Patterson, Douglas. Invited speaker, Conference on Statistical Inference on Linear and Non-Linear Dynamics in Time Series, Bressanone, Italy, June 9–11, 2005.

Patterson, Douglas. Discussant, NBER/NSF Time Series Seminar, University of Chicago, Chicago, IL, September 19–20, 2003.

Patterson, Douglas. "Identification of Coefficients in a Quadratic Moving Average Process Using the Generalized Method of Moments." Presentation, Research Seminar of the Atlanta Fed, Atlanta, GA, March 20, 2003.

Patterson, Douglas. "Identification of Coefficients in a Quadratic Moving Average Process Using the Generalized Method of Moments." Presentation, Tenth Annual Symposium of the Society for Nonlinear Dynamics and Econometrics, Atlanta, GA, March 14–15, 2002.

Patterson, Douglas. "Identification of Coefficients in a Quadratic Moving Average Process Using the Generalized Method of Moments." Presentation, NSF/NBER Time Series Seminar, Raleigh, NC, Sept. 20–22, 2001.

Patterson, Douglas. "A Transactions Data Analysis of Nonsynchronous Trading." Presentations, University of California, Santa Barbara; the University of California, Riverside; and University of Southern California, Los Angeles; April 16–22, 1999.

Patterson, Douglas. “The Episodic Behavior of Dependencies in High Frequency Stock Returns.” Presentation, the Econometrics and Financial Time Series Conference, Isaac Newton Institute for Mathematical Sciences, Cambridge, England, October 12–16, 1998.

Patterson, Douglas. “Nonlinear Model Specification/Diagnostics: Insights from a Battery of Nonlinearity Tests.” Presentation, NSF/NBER Time Series Seminar, Graduate School of Business, University of Chicago, Chicago, IL, September 4–5, 1998.

Patterson, Douglas. “A Direct Comparison of the BDS, Hinich, and Other Tests for the Presence of Nonlinear Dependence in Time Series.” Presentation, meeting of the Society of Nonlinear Dynamics and Econometrics, New York, NY, March 19–20, 1998.

Patterson, Douglas. “A Direct Comparison of the BDS, Hinich, and Other Tests for the Presence of Nonlinear Dependence in Time Series.” Presentation, NSF/NBER Time Series Seminar, Rotterdam, Netherlands, October 17–19, 1996.

Patterson, Douglas. “Detecting Epochs of Transient Dependence in Intra-Day Stock Returns.” Presentation, Annual Meeting of the Society for Nonlinear Dynamics and Econometrics, Boston, MA, March 15–17, 1996.

Patterson, Douglas. “Detecting Epochs of Transient Dependence in White Noise.” Presentation, NBER Time Series Seminar, Harvard University, Cambridge, MA, November 17–18, 1995.

Patterson, Douglas. “The Episodic Nature of Observed Linear and Nonlinear Behavior in Common Stock Intra-Day Returns and Trading Volume.” Presentation, Southwest Conference on Dynamical Systems and Ergodic Theory, Austin, TX, November 19–20, 1994.

Patterson, Douglas, discussant for: “A Test for Nonstationarity: Abridged Version.” Presentation, 153rd annual meeting of the American Statistical Association, San Francisco, CA, August 8–12, 1993.

Patterson, Douglas. “A Causal Relationship Between Stock Returns and Volume,” by Rochelle L. Antoniewicz. Presentation, 153rd annual meeting of the American Statistical Association, San Francisco, CA, August 8–12, 1993.

Patterson, Douglas. “A New Diagnostic Test of Model Inadequacy Which Uses the Martingale Difference Criterion.” Presentation, 67th Annual Conference of the Western Economic Association, San Francisco, CA, July 9–13, 1992.

Patterson, Douglas. “Relating Sample Bicovariances of a Process to the Parameters of a Quadratic Nonlinear Model.” Presentation, UCLA Program in Applied Econometrics Conference on Nonlinear Dynamics and Econometrics, Los Angeles, CA, April 5–6, 1991.

Patterson, Douglas. “Bispectral Analysis of Trade-by-Trade Stock Prices and the Time-of-Day Effect.” Presentation, Department of Finance Seminar Series, University of Texas at Austin, November 3, 1989.

Patterson, Douglas. “New Diagnostic Test of Model Inadequacy Which Uses the Martingale Difference Criterion.” Presentation, the Econometrics Workshop, Department of Economics, University of California, Los Angeles, May 19, 1989.

Patterson, Douglas. “Intra-Day Nonlinear Behavior of Stock prices.” Presentation, International Symposium on Evolutionary Dynamics and Nonlinear Economics, IC^2 Institute, Austin, TX, April 16, 1989.

Patterson, Douglas. “Bispectral Analysis of Trade-by-Trade Stock Prices and the Time-of-Day Effect.” Presentation, annual meeting of the American Statistical Association, New Orleans, LA, August 22–25, 1988.

Patterson, Douglas. “Fitting a Quadratic Moving Average Model to Data.” Presentation, annual meeting of the Economic Dynamics and Control Society, Tempe, AZ, March 17–19, 1988.

Patterson, Douglas. “A Bispectrum Based Test of the Stationary Martingale Model.” Presentations, University of Manchester Institute of Mathematics and Statistics, Manchester, UK; University of Kent, Canterbury, UK; London School of Economics, London, UK; Imperial College of Technology, London, UK, December 3–9, 1987.

Patterson, Douglas. “Evidence of Nonlinearity in the Trade-by-Trade Stock Market Return Generating Process.” Presentation, Conference on Economic Complexity: Chaos, Sunspots, Bubbles and Nonlinearity*,* Austin, TX, May 28–29, 1987.

Patterson, Douglas. “Linear Versus Nonlinear Macroeconomies: A Statistical Test” and “A Bispectrum Based Test of the Stationary Martingale Model.” Presentations, NSF-NBER Seminar on Time Series*,* Dallas, TX, October 17–18, 1986.

Patterson, Douglas. “Linear Versus Nonlinear Macroeconomies: A Statistical Test.” Presentation, Interdisciplinary Modeling Seminar, Department of Economics, New York University, New York, NY, April 28, 1986.

Hinich, Melvin and Douglas Patterson. “Identification of the Coefficients in a Nonlinear Time Series of the Quadratic Type.” Presentation, New Approaches to Modeling, Specification Selection, and Econometric Inference, sponsored by the Institute for Creative Capitalism, University of Texas, Austin, TX, May, 1984.

Hinich, Melvin and Douglas Patterson. “Evidence of Nonlinearity in Daily Stock Returns.” Presentation, meeting of the Financial Management Association. Atlanta, GA, October, 1983.

SERVICE

Director of the Program on Exploring the Foundations of Capitalism and Freedom, 2007–2016.
Past chair, Department of Finance Promotion and Tenure Committee.

Past member Finance Department Undergraduate Curriculum Committee.
Director of Department of Finance Ph.D. Program, 1991–1996.
Chairman of the Pamplin College of Business Computer Committee, 1990–1995 and 2000–2001.
Undergraduate Career Advisor, Finance, 1993–1995.
Past chairman of the Finance Department Student and Faculty Awards Committee.
Past member Pamplin College of Business Faculty and Student Awards Committee.
Past member Finance Department Ph.D. Committee.
Past member Finance Department Graduate Curriculum Committee.

HONORS AND RECOGNITIONS

Listed in 70th edition of Marquis Who's Who in America (See http://wwlifetimeachievement.com/2016/10/28/douglas-patterson).

Listed in Marquis Who's Who in Finance and Industry (1997-2010).

College of Business, Virginia Polytechnic Institute and State University, Certificate of Teaching Excellence, 1983.

PH.D. COMMITTEES

I. Service as Chairman:

Vivek Sharma, Ph.D in Business, Virginia Polytechnic Institute and State University, 2004.

Debra Skaradzinski, Ph.D. in Business, Virginia Polytechnic Institute and State University, 2003.

Peter Ammermann, Ph.D. in Business, Virginia Polytechnic Institute and State University, 1999.

Douglas DeJong, Ph.D. in Business, University of Michigan, 1980.

II. Service as Committee Member:

William Moore, Ph.D. in Business, Virginia Polytechnic Institute and State University, 1982.

Zakri Bello, Ph.D. in Business, Virginia Polytechnic Institute and State University, 1982.

John MacDonald, Ph.D. in Business, Virginia Polytechnic Institute and State University, 1986.

Thomas Gosnell, Ph.D. in Business, Virginia Polytechnic Institute and State University, 1987.

Phillip Taylor, Ph.D. in Economics, Virginia Polytechnic Institute and State University, 1989.
John Broughton, Ph.D. in Business, Virginia Polytechnic Institute and State University, 1989.

Calin Valsan, Ph.D. in Business, Virginia Polytechnic Institute and State University, 1996.

Jaideep Chowdhury, Ph.D. in Business, Virginia Polytechnic Institute and State University, 2008.

Nikolaos Artavanis, Ph.D. in Business, Virginia Polytechnic Institute and State University, 2013.

MEMBERSHIP IN HONORARY AND PROFESSIONAL ORGANIZATIONS

American Finance Association

American Economic Association

Beta Gamma Sigma