

Dr. John M. Ennis

Curriculum Vitae



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The Institute for Perception ▪ 7629 Hull Street Road ▪ Richmond, Virginia 23235

EDUCATION

Ph.D. (2004) Mathematics: University of California, Santa Barbara
M.A. (2004) Mathematics: University of California, Santa Barbara
B.S. (1998) Mathematics: Virginia Polytechnic Institute and State University
B.S. (1998) Philosophy: Virginia Polytechnic Institute and State University

EMPLOYMENT

The Institute for Perception - Richmond, Virginia (1994 – Present)

Vice President – Research Operations (2009 – Present)
Research Consultant (2008 – 2009)
Scientific Editor - IFPress Newsletter (1998 – 2007)
Data Analyst (1994 – 1998)

University of California, Santa Barbara (2004 – 2007)

Postdoctoral Researcher – Psychology Department

PROFESSIONAL EXPERTISE

Advertising Claims Support, Concept Testing, Discrimination Testing, Market Research, Product Development, Project Management, Sensory Science Consulting, Short Course Instruction, Software Development, Statistical Analysis, Statistical Consulting

SELECTED PRODUCT CATEGORY EXPERIENCE

Alcoholic Beverages, Child Care, Condiments, Cosmetics, Fine Fragrances, Household Care, Over-the-Counter Medications, Packaged Foods, Packaging, Personal Care, Snack Foods, Soft Drinks

PROFESSIONAL MEMBERSHIPS

American Society for Testing and Materials (ASTM), Sensometrics Society,
Society of Sensory Professionals (SSP), The Institute of Food Technologists (IFT)

SERVICE POSITIONS CURRENTLY HELD

Chair of ASTM subcommittee E18.04 – “Fundamentals of Sensory”
Editorial board member – Journal of Sensory Studies
Editorial board member – Journal of Experimental Agriculture
Secretary - Sensometrics Society
Scientific programming committee member – IFT 2012, 2013 SCSD

REVIEW ACTIVITY

American Journal of Experimental Agriculture, Communications in Statistics, Food Quality and Preference, Journal of Chemosensory Perception, Journal of Sensory Studies

PUBLICATIONS

- Ennis, D.M., & **Ennis, J. M.** (*in press*) Multivariate Mapping of Hedonic Data: A Process-Based Review. Submitted to *Journal of Sensory Studies*.
- Ennis, J. M.** & Christensen, R. H. B. (*in press*) Precision of measurement in Tetrad testing. Submitted to *Food Quality and Preference*.
- Christensen, R. H. B., **Ennis, J. M.**, Ennis D. M., & Brockhoff, B. (*in press*) Paired preference data with a no-preference option - statistical tests for comparison with placebo data. Submitted to *Food Quality and Preference*.
- Ennis, J. M.** (*in press*) A Thurstonian analysis of the Two-Out-of-Five test. Submitted to *Journal of Sensory Studies*.
- Rousseau, B. & **Ennis, J. M.** (*in press*) The importance of correct instructions in the Tetrad test. Submitted to *Journal of Sensory Studies*.
- Jesionka, V., Rousseau, B., & **Ennis, J. M.** (*in press*) Transitioning from Proportion of Discriminators to a more meaningful measure of sensory difference. *Food Quality and Preference*.
- Ennis, D. M. & **Ennis, J. M.** (2013) Analysis and Thurstonian scaling of applicability scores. *Journal of Sensory Studies*, 28, 188-193.
- Worch, T. & **Ennis, J. M.** (2013) Investigating the single ideal assumption using Ideal Profile Method. *Food Quality and Preference*, 29, 40-47.
- Ennis, D. M. & **Ennis, J. M.** (2013) A Thurstonian ranking model with rank-induced dependencies. *Journal of Classification*. 30, 124-147
- Jervis, S. M., **Ennis, J. M.**, & Drake, M. A. (2012) A Comparison of adaptive choice-based conjoint and choice-based conjoint to determine key choice attributes of sour cream with limited sample size. *Journal of Sensory Studies*. 27(6), 452-462.
- Ennis, J. M.** (2012) Guiding the switch from triangle testing to tetrad testing. *Journal of Sensory Studies*. 27(4), 223-231.
- Garcia, K., **Ennis, J. M.**, and Prinyawiwatkul, W. (2012) A large-scale experimental comparison of the tetrad and triangle tests in children. *Journal of Sensory Studies*. 27(4), 217-222.
- Ennis, J. M.**, Fayle, C. M., & Ennis, D. M. (2012) . Assignment-minimum clique coverings. *Journal of Experimental Algorithmics (JEA)*. 17(1), 1.5:1-1.5:17.
- Ennis, J. M.** & Ennis, D. M. (2012). Justifying count-based comparisons. *Journal of Sensory Studies*, 27(2), 130-136.
- Ennis, J. M.**, & Ennis, D. M. (2012). A comparison of three commonly used methods for treating no preference votes. *Journal of Sensory Studies*, 27(2), 123-129.
- Nestrud, M. A., **Ennis, J. M.**, & Lawless, H. T. (2012). A group level validation of the supercombinatorality property: Finding high-quality ingredient combinations using pairwise information. *Food Quality and Preference*, 25(1), 23-28.
- Ennis, J. M.**, Fayle, C. M., & Ennis, D. M. (2012). eTURF: A competitive TURF algorithm for large datasets. *Food Quality and Preference*, 23(1), 44-48.
- Ennis, D. M. & **Ennis, J. M.** (2012). Accounting for no difference/preference responses or ties in choice experiments. *Food Quality and Preference*, 23(1), 13-17.
- Ennis, J. M.** & Jesionka, V. (2011). The power of sensory discrimination methods revisited. *Journal of Sensory Studies*, 26(5), 371-382.
- Ennis, J. M.** & Ennis, D. M. (2011). Confidence bounds for multiplicative comparisons. *Communications in Statistics: Theory and Methods*, 40(17), 3049-3054.
- Nestrud, M. A., **Ennis, J. M.**, Fayle, C. M., Ennis, D. M., & Lawless, H. T. (2011). Validating a graph theoretic screening approach to food item combinations. *Journal of Sensory Studies*, 26(5), 331-338.
- Ennis, D. M. & **Ennis, J. M.** (2010). Equivalence hypothesis testing: Reply to Bi. *Food Quality and Preference*, 21, 261.
- Ennis, D. M. & **Ennis, J. M.** (2010). Equivalence hypothesis testing. *Food Quality and Preference*, 21(3), 253-256.
- Ennis, J. M.** & Wei, G. (2010). Describing the universal cover of a noncompact limit. *Geometry & Topology*, 14, 2479-2496.
- Ennis, D. M. & **Ennis, J. M.** (2009). Hypothesis testing for equivalence based on symmetric open intervals. *Communications in Statistics - Theory and Methods*, 38(11), 1792-1803.

- Ennis, D. M., **Ennis, J. M.**, Palen, J., & Lampe, R. (2008). Confidence bounds for positive ratios of normal random variables. *Communications in Statistics - Theory and Methods*, **37**, 307-317.
- Ashby, F.G., **Ennis, J. M.** & Spiering, B. (2007). A neurobiological theory of automaticity in perceptual categorization. *Psychological Review*, **114**(3), 632-656.
- Ashby, F. G. & **Ennis, J. M.** (2006). The role of the basal ganglia in category learning. *The Psychology of Learning and Motivation*, **46**, 1-36.
- Ennis, J. M.** & Wei, G. (2006). Describing the universal cover of a compact limit. *Differential Geometry and its Applications*, **24**(5), 554–562.
- Bi, J., Templeton-Janik, L., **Ennis, J. M.**, & Ennis, D. M. (2000). Replicated difference and preference tests: How to account for inter-trial variation. *Food Quality and Preference*, **11**, 269-273.
- Ennis, J. M.**, Ennis, D. M., Yip, D. & O'Mahony, M. (1998). Thurstonian models for variants of the method of tetrads. *British Journal of Mathematical and Statistical Psychology*, **51**, 205-215.

ARTICLES UNDER REVIEW

- Garcia, K., **Ennis, J. M.**, and Prinyawiwatkul, W. (*in review*) Reconsidering the Specified Tetrad Test. Submitted to *Journal of Sensory Studies*.

BOOKS

- Ennis, D. M., Rousseau, B. & **Ennis, J. M.** (2013). *Short Stories in Sensory and Consumer Science*, Richmond, VA: The Institute for Perception.

TECHNICAL REPORTS

- Ennis, J. M.**, Rousseau, B., and Ennis, D. M. (2012). Proper Task Instructions and the Two-out-of-Five Test. *IFPress*, **15**(4), 4-5.
- Ennis, J. M.** and Ennis, D. M. (2012). Efficient Representation of Pairwise Sensory Information. *IFPress*, **15**(3), 3-4.
- Rousseau, B., **Ennis, J. M.**, and Ennis, D. M. (2012). Deciphering the Language of Emotions to Develop an Emotion Lexicon. *IFPress*, **15**(2), 3-4.
- Ennis, J. M.** & Rousseau, B. (2012). Reducing Costs with Tetrad Testing. *IFPress*, **15**(1), 3-4.
- Ennis, D. M. & **Ennis, J. M.** (2011). Interpreting Applicability Scores. *IFPress*, **14**(4), 3-4.
- Ennis, J. M.**, Fayle, C.M. & Ennis, D.M. (2011). From Many to Few: A Graph Theoretic Screening Tool for Product Developers. *IFPress*, **14**(2), 2-3
- Ennis, D. M. & **Ennis, J. M.** (2011). How to Set Identity Norms for No Preference Data. *IFPress*, **14**(1), 2-3.
- Ennis, D. M. & **Ennis, J. M.** (2010). How to Account for “No Difference / Preference” Counts. *IFPress*, **13**(3), 2-3.
- Ennis, J. M.** & Fayle, C. M. (2010). Portfolio Optimization Based on First Choice. *IFPress*, **13**(2), 2-3.
- Ennis, J. M.**, Fayle, C. M. & Ennis, D. M. (2011). Optimum Product Selection for a Drivers of Liking Project. *IFPress*, **13**(1), 2-3.
- Ennis, J. M.** & Ennis, D. M. (2009). Multiplicative versus Ratio Comparisons. *IFPress*, **12**(2), 2-3
- Ennis, D. M. & **Ennis, J. M.** (2008). New Developments in Equivalence Testing. *IFPress*, **11**(4), 2-3.
- Ennis, J. M.** & Ennis, D. M. (2008). Conditional Ratio Statements. *IFPress*, **11**(2), 2-3.

WORKSHOPS ORGANIZED AT INTERNATIONAL MEETINGS

- Ennis, J. M.**, Cowden, J., Garcia, K., & Punter, P. (2012). An Exploration of Tetrad Testing. Workshop chaired at 2012 Society of Sensory Professionals, Jersey City, USA.
- Ennis, J. M.**, Loss, C. R., Nestrud, M. A., & Rossi, F. (2011). Combinatorial Tools in Sensory Science and Consumer Research. Workshop chaired at 2011 Pangborn Sensory Science Symposium, Toronto, Canada.

PRESENTATIONS AT INTERNATIONAL MEETINGS

- Ennis, J. M.**, Christensen, R. H. B., Ennis, D. M., Rousseau, B. (2012). The Sensitivity of the Tetrad, Triangle, and Degree of Difference Tests. Talk given at 2012 Society of Sensory Professionals, Jersey City, USA.
- Ennis, J. M.** & Rousseau, B. (2012). Developing an Emotional Lexicon Using Landscape Segmentation Analysis (LSA) and Graph Theoretic Analysis (GTA). Poster presented at 2012 Society of Sensory Professionals, Jersey City, USA.
- Ennis, J. M.**, Lu, J. C., & Carr, B. T. (2012). A New Approach to Product Selection with Numerous Practical Constraints. Poster presented at 2012 Society of Sensory Professionals, Jersey City, USA.
- Ennis, D. M. & **Ennis, J. M.** (2012). Analysis and Thurstonian Scaling of Applicability Scores. Poster presented at 2012 Society of Sensory Professionals, Jersey City, USA.
- Worch, T. & **Ennis, J. M.** (2012). A Cooperative Approach to Product Optimization. Poster presented at 2012 Society of Sensory Professionals, Jersey City, USA.
- Christensen, R. H. B., **Ennis, J. M.**, Ennis, D. M., & Brockhoff, P. B. (2012). A New Statistic to Detect Segmentation or Unequal Variance in 2-Alternative Choice (2-AC) Testing. Talk given at 2012 Sensometrics Conference, Rennes, France.
- Ennis, J. M.** & Corbett, C. (2012). Finding Best Product-bundles of Sparkling Fruit-juice Beverages using Graph Theoretic Analysis (GTA). Talk given at 2012 Sensometrics Conference, Rennes, France.
- Ennis, J. M.** & Christensen, R. H. B. (2012). Advances in Tetrad Testing. Talk given at 2012 Sensometrics Conference, Rennes, France.
- Ennis, J. M.**, Fayle, C. M., & Ennis, D. M. (2012) Compact Letter Displays to Concisely Represent Pairwise Sensory Information. Poster presented at 2012 Sensometrics Conference, Rennes, France.
- Christensen, R. H. B., **Ennis, J. M.**, Ennis, D. M., & Brockhoff, P. B. (2012). A Thurstonian model for the Degree of Difference Test with Extensions to Unequal Variance, Sequence Effects and Replicated Data. Talk given at 2012 Sensometrics Conference, Rennes, France.
- Jesionka, V., **Ennis, J. M.**, & Rousseau, B. (2012). Transitioning from Proportion of Distinguishers to a More Meaningful Measure of Sensory Difference. Talk given at 2012 Sensometrics Conference, Rennes, France.
- Ennis, J. M.** & Rousseau, B. (2012). An Introduction to Graph Theoretic Tools for Sensory and Consumer Scientists. Tutorial taught prior to 2012 Sensometrics Conference, Rennes, France.
- Ennis, J. M.**, Fayle, C.M., & Ennis, D.M. (2011). Selecting the Best Combinatorial Tool for Your Specific Challenges. Talk given at 2011 Pangborn Sensory Science Symposium, Toronto, Canada.
- Ennis, J. M.** & Ennis, D. M. (2011). Establishing Identity Norms for No Preference Data. Poster presented at 2011 Pangborn Sensory Science Symposium, Toronto, Canada.
- Ennis, J. M.**, Ennis, D. M., & Fayle, C. M. (2011). Searching for a Single Grain of Sand: How to Find Optimal Combinations of Features or Components. Poster presented at 2011 Pangborn Sensory Science Symposium, Toronto, Canada.
- Ennis, J. M.** (2011). Busting the Myth that the Power of the 3_AFC over the Triangle comes from Attribute Awareness. Talk given at 2011 ASTM, Anaheim, USA.
- Ennis, J. M.** & Ennis, D. M. (2010). How to Best Account for 'No Preference' Counts. Talk given at 2010 Society of Sensory Professionals, Napa, USA.
- Ennis, J. M.** & Ennis, D.M. (2010). Recommendations for 'No Preference' Responses. Talk given at 2010 Sensometrics Conference, Rotterdam, The Netherlands.
- Ennis, J. M.** & Ennis, D.M. (2010). Chi Square Control Charts. Talk given at 2010 Sensometrics Conference, Rotterdam, The Netherlands.
- Ennis, J. M.** (2010). New Methods - Alternate Methods for Consideration. Talk given at 2010 ASTM, St. Louis, USA.
- Ennis, J. M.**, Rousseau, B., & Ennis, D.M. (2010). Successful Product Development using a Consumer Perspective. Talk given at 2010 ASTM, St. Louis, USA.
- Ennis, J. M.** & Ennis, D. M. (2009). Multiplicative Comparisons of Normal Variables. Talk given at 2009 ASTM, Vancouver, Canada.
- Ennis, J. M.** & Ennis, D. M. (2009). Lower Bounds for Multiplicative Comparisons. Talk given at 2009 Joint Statistical Meetings, Washington DC, USA.
- Ennis, J. M.**, & Ennis, D. M. (2008) Ratios of Normal Variables in Superiority Claims. Talk given at 2008 Sensometrics Conference, St. Catherine's, Canada.

THEORETICAL CONTRIBUTIONS TO SENSORY SCIENCE

- Innovation of the Tetrad test as an alternative to the Triangle test (with Daniel Ennis and Michael O'Mahony)
- Invention of Graph Theoretic Analysis (GTA) for analysis of pairwise sensory data (with Daniel Ennis and Charles Fayle)
- Validation of Graph Theoretic Analysis at individual and group levels (with Michael Nestrud and Harry Lawless)
- Invention of eTURF, the first exact algorithm for Total Unduplicated Reach and Frequency of large datasets (with Charles Fayle)
- Statistical and psychological analysis of the proper treatment of “no-preference votes (with Daniel Ennis, Rune Christensen, and Per Brockhoff)
- Solution to problem of multiple ideal points in unfolding, using Ideal Profile Method (with Thierry Worch)
- Statistics for equivalence testing of sensory quantities (with Daniel Ennis)
- Statistics for multiplicative and count-based comparisons of sensory quantities (with Daniel Ennis)

PROFESSIONAL COURSES TAUGHT

Tools and Applications of Sensory and Consumer Product Testing

Williamsburg, Virginia (2008, 2009)

White Sulphur Springs, West Virginia (2008, 2009)

Seeing the Market through the Eyes of the Consumer

Williamsburg, Virginia (2008, 2009)

White Sulphur Springs, West Virginia (2008, 2009)

Creating Optimal Products and Portfolios

Rotterdam, The Netherlands (2010)

Sensory Product and Concept Testing: Analyses, Applications and Computer Workshop

Williamsburg, Virginia (2010, 2011)

Drivers of Liking[™], Segmentation and Portfolio Optimization

White Sulphur Springs, West Virginia (2010, 2011)

Sensory Testing for Product Development and Claims Support

New Orleans, Louisiana (2011) [Invited Pre-IFT short course]

Combinatorial Tools for Sensory and Consumer Scientists

New Orleans, Louisiana (2011) [Invited Pre-IFT short course]

Current Topic in Sensory and Consumer Science

Toronto, Canada (2011)

A Powerful Framework for Sensory Product Testing

Brussels, Belgium (2011, 2012)

Williamsburg, Virginia (2012)

Drivers of Liking[®] and Product Portfolio Optimization

Brussels, Belgium (2011, 2012)

Combinatorial Tools for Product and Brand Optimization

White Sulphur Springs, West Virginia (2011, 2012)

Descriptive Analysis and Panel Training

Williamsburg, Virginia (2012)

Advertising Claims Support: Case Histories and Principles

Sea Island, Georgia (2012)

Drivers of Liking[®] and Emotion Mapping

White Sulphur Springs, West Virginia (2012)

SOFTWARE DEVELOPMENT

IFPrograms™ Software libraries (developed in FORTRAN 95)

AWARDS AND SCHOLARSHIPS

ASTM E18 - Award of Appreciation (2012)
University of California, Santa Barbara - Outstanding Educator (2003)
Virginia Polytechnic Institute - Outstanding Graduating Senior – Mathematics (1998)
Virginia Polytechnic Institute - Outstanding Graduating Senior – Philosophy (1998)
Virginia Polytechnic Institute – Hatcher Scholarship for Mathematics (1994, 1995)

PERSONAL NOTES

Con conversationally proficient in Dutch, French, and Portuguese
Competitive swing dancer: Amateur Grand Slam winner, 2007 National Jitterbug Championship
Swing dance instructor (with wife Ruth Brown) in Richmond, VA, USA
Passionate about the preservation and development of vintage jazz dancing