CURRICULUM VITA :: C. RICHARD JOHNSON, JR. :: APRIL 2021

DEGREES

1977 :: Ph.D.E.E. (Electrical Engineering) with minors in Engineering-Economic Systems and Art History, Stanford University, Stanford, CA.

1975 :: M.S.E.E., Stanford University, Stanford, CA.

1973 :: B.E.E. with high honors, Georgia Institute of Technology, Atlanta, GA.

ACADEMIC/RESEARCH APPOINTMENTS

2019 - present :: Senior Research Advisor, Frick Art Reference Library, New York, NY

2017 - present :: Visiting Research Professor, Conservation Center of the Institute of Fine Arts, New York University, New York, NY

2016 - 2018 :: Jacobs Fellow in Computational Arts and Humanities, Jacobs Technion-Cornell Institute, Cornell Tech, New York, NY

2013 - present :: Scientific Researcher, Rijksmuseum, Amsterdam, the Netherlands

2008 - present :: Geoffrey S. M. Hedrick Senior Professor of Engineering, Cornell University, Ithaca, NY

2007 - 11 :: Adjunct Research Fellow, Van Gogh Museum, Amsterdam, the Netherlands

1987 - present :: Professor, Electrical and Computer Engineering, Cornell University, Ithaca, NY

1981 - 87 :: Associate Professor, Electrical Engineering, Cornell University, Ithaca, NY

1977 - 81 :: Assistant Professor, Electrical Engineering, Virginia Polytechnic Institute and State University, Blacksburg, VA

PROFESSIONAL HONORS

2017 - 2018 :: Selected RKD Visiting Fellow in Computational Art History, RKD - Netherlands Institute for Art History, the Hague, the Netherlands

2005 :: Selected a Fulbright Research Scholar to Conservatoire National des Arts et Métiers (Paris, France) on "adaptive signal processing algorithms and communication systems applications"

2004 :: Designated a Stephen H. Weiss Presidential Fellow of Cornell University "for effective, inspiring, and distinguished teaching of undergraduate students and for outstanding contributions to undergraduate education"

1991 :: Selected a Distinguished Lecturer of the Signal Processing Society of the Institute of Electrical and Electronics Engineers (IEEE)

1989 :: Elected a Fellow of the IEEE "for contributions to adaptive parameter estimation theory with applications in digital control and signal processing".

1983 :: Selected the (Eta Kappa Nu) C. Holmes MacDonald Outstanding (Young Electrical Engineering) Teacher [national award]

1982 :: Selected the Eta Kappa Nu Outstanding Young Electrical Engineer [national award] for "his outstanding contributions to the field of control technology, his cultural achievements, and his involvement in professional activities"

1982 :: Received a Senior (Best Paper) Award from the IEEE Acoustics, Speech, and Signal Processing Society for "SHARF Convergence Properties" (appearing June 1981 in the *IEEE Transactions on Acoustics, Speech, and Signal Processing* and co-authored with M. G. Larimore, J. R. Treichler, and B. D. O. Anderson)

PRIMARY RESEARCH INTERESTS

1977-1991: Adaptive Feedback Systems Theory; 1991-2005: Blind Equalization in Digital Communication Receivers; 2005-present: Signal Processing in Computational Art History

SELECTED BOOKS AND BOOK CHAPTERS

- C. R. Johnson, Jr., "Exploiting Weave Maps", chapter 6 in *Counting Vermeer: Using Weave Maps to Study Vermeer's Canvases*, C. R. Johnson, Jr. and W. A. Sethares, eds., RKD Studies, 2017.
- A. C. Weislogel and C. R. Johnson, Jr., "Decision Trees and Fruitful Collaborations: The Watermark Identification in Rembrandt's Etchings (WIRE) Project at Cornell" in *Lines of Inquiry: Learning from Rembrandt's Etchings*, pp. 32-57, Herbert F. Johnson Museum of Art, Cornell University, 2017.
- C. R. Johnson, Jr., W. A. Sethares, M. H. Ellis, S. Haqqi, R. Snyder, E. Hinterding, I. van Leeuwen, A. Wallert, D. Christoforou, J. van der Lubbe, N. Orenstein, A. Campbell, and G. Dietz, "Chain Line Pattern Matching in Rembrandt's Prints" in *Rembrandt and His Circle: Insights and Discoveries*, S. Dickey, ed., pp. 319-334, Amsterdam University Press, 2017.
- C. R. Johnson, Jr., W. A. Sethares, and A. G. Klein, *Software Receiver Design: Build Your Own Digital Communication System in Five Easy Steps*, Cambridge University Press, 2011
- J. R. Treichler, C. R. Johnson, Jr., and M. G. Larimore, *Theory and Design of Adaptive Filters*, Prentice-Hall 2001
- R. A. Casas, T. J. Endres, A. Touzni, C. R. Johnson, Jr., and J. R. Treichler, "Current Approaches to Blind Decision Feedback Equalization" in *Signal Processing Advances in Communications, Vol. 1: Trends in Channel Estimation and Equalization*, G. Giannakis, Y. Hua, P. Stoica, and L. Tong, eds., pp. 367-415, Prentice Hall, 2001.
- C. R. Johnson, Jr., P. Schniter, I. Fijalkow, L. Tong, J. D. Behm, M. G. Larimore, D. R. Brown, R. A. Casas, T. J. Endres, S. Lambotharan, A. Touzni, H. H. Zeng, M. Green, and J. R. Treichler, "The Core of FSE-CMA Behavior Theory" in *Unsupervised Adaptive Filtering, vol. II: Blind Deconvolution*, Simon Haykin, ed., pp. 13-112, Wiley, 2000.
- C. R. Johnson, Jr., *Lectures on Adaptive Parameter Estimation*, Prentice Hall, 1988.
- B. D. O. Anderson, R. R. Bitmead, C. R. Johnson, Jr., P. V. Kokotovic, R. L. Kosut, I. M. Y. Mareels, L. Praly, and B. D. Riedle, *Stability of Adaptive Systems: Passivity and Averaging Analysis*, MIT Press, 1986.
- B. G. Buchanan, T. M. Mitchell, R. G. Smith, and C. R. Johnson, Jr. "Models of Learning Systems" in *Encyclopedia of Computer Science and Technology*, vol. 11, pp. 24-51. Marcel Dekker, 1978.

SELECTED JOURNAL PUBLICATIONS IN COMPUTATIONAL ART HISTORY

- M. H. Ellis, W. A. Sethares, and C. R. Johnson, Jr., "A Powerful Tool for Paper Studies: The Computational *Coding* of Watermarked Papers in Leonardo's Codex Leicester and Codex Arundel," *The Quarterly : The Review of the British Association of Paper Historians*, No. 117, April 2021.
- S. F. Gorske, C. R. Johnson, Jr., W. A. Sethares, M. H. Ellis, and P. Messier, "Moldmate Identification in 16th-century European Paper Using Quantitative Analysis of Watermarks, Chain Line Intervals, and Laid Line Density," *International Journal for Digital Art History*, 5:6.14-6.35, March 2021.

- C. R. Johnson, Jr., "Decision Trees for Watermark Identification in Rembrandt's Etchings," *Journal of Historians of Netherlandish Art*, vol. 12.2, 2020.
- W. A. Sethares, M. H. Ellis, and C. R. Johnson, Jr., "Computational Watermark Enhancement in Leonardo's *Codex Leicester*," *Journal of American Institute of Conservation*, vol. 59, issue 2, pp. 87-96, March 2020.
- M. H. Ellis and C. R. Johnson, Jr., "Computational Connoisseurship: Enhanced Examination Using Automated Image Analysis," *Visual Resources* (Special Issue on Digital Art History), vol. 35, no. 1-2, pp. 125-140, March-June 2019.
- C. R. Johnson, Jr. and W. A. Sethares,"Hunting for Weave Matches: Computation in Art Scholarship," *The Journal of Interactive Technology and Pedagogy* (Special Issue on Re-viewing Digital Technologies and Art History), Issue 12, February 2018.
- C. R. Johnson, Jr. and W. A. Sethares, "Canvas Weave Match Supports Designation of Vermeer's *Geographer* and *Astronomer* as a Pendant Pair," *Journal of Historians of Netherlandish Art* (Special issue for Walter Liedtke), vol. 9, issue 1, Winter 2017.
- C. R. Johnson, Jr., W. A. Sethares, M. H. Ellis, and S. Haqqi, "Hunting for Paper Moldmates Among Rembrandt's Prints," *IEEE Signal Processing Magazine* (Special Section - Signal Processing for Art Investigation), vol. 32, pp. 28-37, July 2015.
- P. Doing and C. R. Johnson, Jr., " On Applying Signal Processing to Computational Art History: An Interview," *International Journal for Digital Art History*, issue 1, pp. 64-75, 2015.
- C. R. Johnson, Jr., P. Messier, W. A. Sethares, A. G. Klein, C. Brown, A. H. Do, P. Klausmeyer, P. Abry, S. Jaffard, H. Wendt, S. Roux, N. Pustelnik, N. van Noord, L. van der Matten, E. Postma, J. Coddington, L. A. Daffner, H. Murata, H. Wilhelm, S. Wood, and M. Messier, "Pursuing Automated Classification of Historic Photographic Papers from Raking Light Images," *Journal of the American Institute for Conservation*, vol. 53, no. 3, pp. 159-170, 2014.
- C. R. Johnson, Jr., D. H. Johnson, I. Verslype, R. Lugtigheid, and R. G. Erdmann, "Detecting Weft Snakes," *Art Matters*, vol. 5, pp. 48-52, 2013.
- D. H. Johnson, C. R. Johnson, Jr., and R. G. Erdmann, "Weave Analysis of Paintings on Canvas from Radiographs," *Signal Processing* (Special Issue on Image Processing for Art Investigation), vol. 93, pp. 527-540, March 2013.
- W. Liedtke, C. R. Johnson, Jr., and D. H. Johnson, "Canvas Matches in Vermeer: A Case Study in the Computer Analysis of Fabric Supports," *Metropolitan Museum Journal*, vol. 47, pp. 99-106, 2012.
- P. Pérez d'Ors, C. R. Johnson, Jr., and D. H. Johnson, "Velázquez in Fraga: a New Hypothesis about the Portraits of El Primo and Philip IV," *The Burlington Magazine*, vol. CLIV, pp. 620-625, September 2012.
- L. van Tilborgh, T. Meedendorp, E. Hendriks, D. H. Johnson, C. R. Johnson, Jr., and R. G. Erdmann, "Weave Matching and Dating of Van Gogh's Paintings: An Interdisciplinary Approach," *The Burlington Magazine*, vol. 153, pp. 112-122, February 2012.
- C. R. Johnson, Jr., D. H. Johnson, N. Hamashima, H. S. Yang, and E. Hendriks, "On the Utility of Spectral-Maximum-Based Automated Thread Counting from X-Rays of Paintings on Canvas," *Studies in Conservation*, vol. 56, no. 2, pp. 104-114, 2011.
- C. R. Johnson, Jr., E. Hendriks, I. J. Berezhnoy, E. Brevdo, S. M. Hughes, I. Daubechies, J. Li, E. Postma, and J. Z. Wang, "Image Processing for Artist Identification: Computerized Analysis of Vincent van Gogh's Painting Brushstrokes," *IEEE Signal Processing Magazine* (Special Section - Signal Processing in Visual Cultural Heritage), vol. 25, pp. 37-48, July 2008.

SELECTED JOURNAL PUBLICATIONS IN SYSTEM IDENTIFICATION, BLIND EQUALIZATION, AND ADAPTIVE FILTERING AND CONTROL

- C. R. Elevitch and C. R. Johnson, Jr., "A Procedure for Ranking Parameter Importance for Estimation in Predictive Mechanistic Models", *Ecological Modelling*, vol. 419, March 2020.
- J. Balakrishnan, R. K. Martin, and C. R. Johnson, Jr., "Blind, Adaptive Channel Shortening by Sum-Squared Auto-Correlation Minimization (SAM)," *IEEE Trans. on Signal Processing*, vol. 51, pp. 3086-3093, December 2003.
- R. K. Martin, J. Balakrishnan, W. A. Sethares, and C. R. Johnson, Jr., "A Blind, Adaptive TEQ for Multicarrier Systems," *IEEE Signal Processing Letters*, vol. 9, pp. 341-343, November 2002.
- C. R. Johnson, Jr., P. Schniter, T. J. Endres, J. D. Behm, D. R. Brown, and R. A. Casas, "Blind Equalization Using the Constant Modulus Criterion: A Review," *Proc. IEEE* (Special Issue on Blind System Identification and Estimation), vol. 86, pp. 1927-1950, October 1998.
- J. R. Treichler, I. Fijalkow, and C. R. Johnson, Jr., "Fractionally Spaced Equalizers: How Long Should They Really Be?," *IEEE Signal Processing Magazine*, vol. 13, pp. 65-81, May 1996.
- Z. Ding, R. A. Kennedy, B. D. O. Anderson, and C. R. Johnson, Jr., "Ill-Convergence of Godard Blind Equalizers in Data Communication Systems," *IEEE Trans. on Communications*, vol. 39, pp. 1313-1327, September 1991.
- C. R. Johnson, Jr., "Adaptive IIR Filtering: Current Results and Open Issues," *IEEE Trans. on Information Theory* (Special Issue on Linear Adaptive Filtering), vol. IT-30, pp. 237-250, March 1984.
- B. D. O. Anderson and C. R. Johnson, Jr., "Exponential Convergence of Adaptive Identification and Control Algorithms," *Automatica*, vol. 18, pp. 1-13, January 1982.
- M. G. Larimore, J. R. Treichler, and C. R. Johnson, Jr., "SHARF: An Algorithm for Adapting IIR Digital Filters," *IEEE Trans. on Acoustics, Speech, and Signal Processing*, vol. ASSP-28, pp. 428-440, August 1980.
- C. R. Johnson, Jr., "A Convergence Proof for a Hyperstable Adaptive Recursive Filter," *IEEE Trans. on Information Theory*, vol. IT-25, pp. 745-748, November 1979.
- B. Widrow, J. M. McCool, M. G. Larimore, and C. R. Johnson, Jr., "Stationary and Nonstationary Learning Characteristics of the LMS Adaptive Filter," *Proc. IEEE* (Special Issue on Adaptive Systems), vol. 64, pp. 1151-1162, August 1976.

  Additional publications in Google Scholar Listing

PHD ADVISEES

- Dale A. Lawrence, *Adaptive System Stability Analysis via Energy Exchange*, 1985.
- William A. Sethares, *Quantized State Adaptive Algorithms*, 1987.
- Geoffrey A. Williamson, *Error System Stability in Adaptive Systems with Split Algorithms and Composite Errors*, 1989.
- Zhi Ding, *Application Aspects of Blind Adaptive Equalizers in QAM Data Communications*, 1990.
- Gonzalo J. Rey, *Quantitative Classification of the Dynamics of Adaptive Feedback Systems*, 1991.
- James P. LeBlanc, *Effects of Source Distributions and Correlation on Fractionally Spaced Blind Constant Modulus Algorithm Equalizers*, 1995.
- Thomas J. Endres, *Equalizing with Fractionally-Spaced Constant Modulus and Second-Order Statistics Blind Receivers*, 1997.

- Fernando L. de Victoria, *On the Application of Frame Theory to MMSE Fractionally-Spaced Equalizers*, 1998.
- Raul A. Casas, *Identification of Nonlinear Feedback Systems Operating in a Limit Cycle*, 1999.
- Donald R. Brown, *Parallel Interference Cancellation Multiuser Detection: Performance and Applications*, 2000.
- Philip Schniter, *Blind Estimation without Priors: Performance Convergence, and Efficient Implementation*, 2000.
- Jaiganesh Balakrishnan, *Directional Decision Feedback Equalization and MIMO Channel Training*, 2002.
- Wonzoo Chung, *Blind Parameter Estimation for Data Acquisition in Digital Communication Systems*, 2002.
- Richard K. Martin, *Blind Adaptive Equalization for Multicarrier Receivers*, 2004.
- Andrew G. Klein, *Equalization for Energy Efficient Modulation*, 2006.
- John M. Walsh, *Distributed Iterative Decoding and Estimation via Expectation Propagation: Performance and Convergence*, 2006.
- Craig R. Elevitch, *A System Identification Approach to Process-Based Plant Growth Model Reduced-Order Parameter Estimation*, 2018.