

CURRICULUM VITAE

Taikang Ning (甯太康)

Department of Engineering, Trinity College
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EDUCATION

Ph. D. in Electrical Engineering (1986)

M. S. in Electrical Engineering (1983)

University of Connecticut, Storrs, CT

B. S. in Automatic Control Engineering (1979)

National Chiao-Tung University, Hsinchu, Taiwan

PROFESSIONAL EXPERIENCE

Professor of Engineering - Department of Engineering, Trinity College, Hartford, CT

7/2006 – 6/2012 *Department Chair*

1/2010 - 5/2010 *Visiting Research Scholar*

National Taiwan University and National Science Council, Taipei, Taiwan

1992-2005 **NASA Campus Director**- Connecticut Space Grant College Consortium

1/1993 - 7/1993 *Visiting Research Professor*

1/1991 - 7/1991 *Visiting Research Fellow*

National Tsing-Hua University and National Science Council, Hsinchu, Taiwan

6/1984 – 8/1985 *Research Associate* - The Shock Trauma Center, Maryland Institute for Emergency
Medical Services Systems, Baltimore, MD

Performing array ECG analysis for patients with acute cardiac ischemia

RESEARCH INTERESTS AND ACTIVITIES

Signal Processing and Applications

- machine learning
- multi-channel modeling and coherence analysis
- linear and nonlinear spectral analysis
- nonlinear dynamics and chaos analysis
- helicopter vibration analysis
- data compression of optical emission spectrum data during wafer fabrication

Biomedical Signal Processing Applications

- detection and classification of heart sounds and murmurs
- hippocampal EEG analysis
- respiratory signal analysis and apnea monitor design

Mechanical Vibrations

- gear faults detection
- servo-flap rotor blade helicopter performance analysis with linear and nonlinear measures

HONOR & AWARDED GRANTS

- ***Trinity College Trustee Award for Faculty Excellence (2021)***
- ***Principal Investigator – Research Grants from Lam Research Corp. Fremont, CA (2013-2016)***
Compression of Optical Emission Spectrum Images using Discrete Wavelet Transform(DWT)
Collaborator – C. H. Huang, J. A. Jensen, V. Wong and H. Chan
- ***Principal Investigator - NASA Experimental Program to Stimulate Competitive Research Grant (RPSCoR) 2002***
On-Board Image Segmentation and Processing for Airborne Remote Sensing
Collaborator – Patrick Coronado, Information Sciences & Technology/Code 935, NASA Goddard Space Flight Center, MD
- ***Principal Investigator - NASA EPSCoR Grant (2003)***
Real-Time Parallel Image Processing Design with FPGA for Remote Sensing
Collaborator – Patrick Coronado, Information Sciences & Technology/Code 935, NASA Goddard Space Flight Center, MD
- ***Principal Investigator - NASA EPSCoR Grant (2004)***
Mobile Vision System for Real-Time Remote Monitoring
Collaborator – Patrick Coronado, Information Sciences & Technology/Code 935, NASA Goddard Space Flight Center, MD
- ***Principal Investigator - NASA EPSCoR Grant (2005)***
Tracking the Moving Boundary of Streamed Images using Level Sets and Field Programmable Gate Array
Collaborator – Patrick Coronado, Information Sciences & Technology/Code 935, NASA Goddard Space Flight Center, MD
- ***Principal Investigator - NASA EPSCoR Grant (2006)***
Nonlinear Modeling and Spectral Analysis of Helicopter Vibrations Generated by Servo-Flap Rotor Blades
Collaborator – Dr. F.S. (John) Wei, Chief Engineer, Kaman Aerospace Corp., CT
- ***Co-PI Howard Hughes Medical Institute (HHMI) Grant (2004-2008)***
Biomedical Engineering - Biomedical Signal and Image Processing

SERVICES & PROFESSIONAL ACTIVITIES

- Senior Member— IEEE Signal Processing Society (SP) and IEEE Engineering in Medicine and Biology Society (EMBS)
- Member—Biomedical Engineering Society (BMES)
- Professional Member—American Institute of Aeronautics and Astronautics (AIAA)
- Manuscript Reviewer—IEEE Trans. on Signal Processing
- Manuscript Reviewer—IEEE Trans. on Biomedical Engineering
- Manuscript Reviewer—Journal of AIAA
- Manuscript Reviewer—Annals of Biomedical Engineering
- Reviewer Committee—Scientific Journal International
- Local Arrangement of Professional Conferences – IEEE Annual Northeast Bioengineering Conference; Southern New England Science and Technology Exchange Conference
- Session Chair of Professional Conferences - IEEE Annual Northeast Bioengineering Conference, International Conference of Signal Processing (ICSP)
- Trinity College Appointments and Promotions Committee (present)
- Chair of Engineering Department (2006 - 2012)
- Acting Chair of Engineering Department (1996, 2005)
- Advisory Committee of Center for Urban and Global Studies (2007-present)
- Steering Committee of Howard Hughes Medical Institute Grant for Trinity (2006 - present)
- Committee on Committees (1993-1995) & one-year replacement on CC in 1999
- Faculty Conference Committee (1987-1989)
- Advisory Committee for Trinity Math/Science Upward Bound Summer Program (1992)
- Teacher of Trinity Saturday Class/Connecticut Pre-Engineering Program (1990).
- Board of Directors, Chinese Culture Center (CCC), Inc., Hartford, (1995-2003)
- President of Board of Directors, Chinese Culture Center (CCC), Inc., Hartford (1997-1998)
- Chinese Language School of Great Hartford (Principal 2007, Vice-Principal 2006)
- Volunteer speaker at Wethersfield public schools (elementary, middle, and high schools) (1997-2017)

PUBLICATIONS (*journals and peer-reviewed conferences*)

- A. D. Levin, A. Ragazzi, S. L. Szot, and **T. Ning**, "Extraction and assessment of diagnosis-relevant features for murmur classification," *Methods*, 2021
- H. Zukowski, M. Rupp, W. Mollel, **T. Ning**, and C. P. Byers, "A Model Experiment of Aortic Valve Stenosis To Correlate Narrowness With The Acoustic Spectrum," Proc. ASME 2021 & Int. Mechanical Engineering Congress and Exposition (IMECE 2021), Nov 1-5, 2021, Virtual Online.
- A. D. Levin, A. Ragazzi, S. L. Szot, and **T. Ning**, "A Machine Learning Approach to Heart Murmur Detection and Classification," Proc. 13th Int. Congress on Image and Signal Processing, BioMedical Engineering and Informatics (CISP-BMEI), pp.521-525, Nov. 6th, 2020
- E. B. Evangelista, F. Guajardo and **T. Ning**, "Classification of Abnormal Heart Sounds with Machine Learning," Proc. 15th IEEE Int. Conf. on Signal Processing, pp.285-288, Beijing, China, Oct 2020.
- D. Melesse, M.Khalil, E. Kagabo and **T. Ning**, "Appearance-Based Gaze Tracking Through Supervised Machine Learning," Proc. 15th IEEE Int. Conf. on Signal Processing, pp.467-471, Beijing, China, Oct 2020.
- C. P. Byers, A. M. Sinson, C. M. Sheffers and **T. Ning**, "Non-Invasive Measure of Stenosis Severity Through Spectral Analysis," Proc. 15th IEEE Int. Conf. on Signal Processing, pp.546-5508, Beijing, China, Oct 2020.
- T. Ning**, CH Huang, J. A. Jensen, V. Wong, and H. Chan, "Estimation of Process Time Delay between Chamber Measurements and Optical Emission Spectrum," *Proc. 2020 SEMI Advanced Semiconductor Manufacturing Conf.* (ASMC), Saratoga Springs, New York, August 2020
- T. Ning**, CH Huang, J. A. Jensen, V. Wong, and H. Chan, "Coherence Analysis of Wafer Process Measurements from Chamber and Optical Emission Spectrum," *Proc. 2019 SEMI Advanced Semiconductor Manufacturing Conf.*, Saratoga Springs, New York, May 6-9, 2019
- T. Ning**, CH Huang, J. A. Jensen, H. Chan and V. Wong, "Harmonic Analysis of Wafer Fabrication Data in the Frequency Domain," , " *Proc. 2019 SEMI Advanced Semiconductor Manufacturing Conf.*, Saratoga Springs, New York, May 6-9, 2019
- K. Huang, M. Khalil, E. Luciani, D. Melesse, and **T. Ning**, "A Date-Driven Approach for Gaze Tracking," *Proc. 14th IEEE Int. Conf. on Signal Processing*, pp. 494-499, Beijing, China, Aug.12-16, 2018
- K. Chen, A. Mudvari, F. G. G. Barrera, L. Cheng, and **T. Ning**, "Heart Murmurs Clustering Using Machine Learning," *Proc. 14th IEEE Int. Conf. on Signal Processing*, pp. 94-98, Beijing, China, Aug.12-16, 2018
- S. Szon, A. Levin, A. Ragazzi, and **T. Ning**, "A Wireless Digital Stethoscope Design," *Proc. 14th IEEE Int. Conf. on Signal Processing*, pp. 74-78, Beijing, China, Aug.12-16, 2018
- P. Dahal, **T. Ning** and J. H. Blaise, "Chaotic Analysis of Hippocampal and Cortical Sleep EEG During Various Vigilance States," *Proc. 40th Int. Conf. IEEE Engineering in Medicine and Biology Society* pp.3064-3067, Honolulu, Hawaii, July 17-21, 2018.
- T. Ning**, CH Huang, J. A. Jensen, V. Wong, and H. Chan, "Optical Emission Spectrum Processing Using Wavelet Compression During Wafer Fabrication," *IEEE Trans. on Semiconductor Manufacturing*, vol.30 pp. 380-387, Nov. 2017.
- P. Dahal, M. Avagyan, J. H. Blaise, P. S. Skardal, and **T. Ning**, "Characterizing Chaotic Behavior of REM Sleep EEG Using Lyapunov Exponent," *Proc. 10th Int. Congress on Image and Sig. Proc. BioMed. Eng. and Informatics* (CISP-BMEI 2017), Shanghai, China, Oct.14-16, 2017.

- K. Chen, F. Guajardo Garza Barrera, L. Cheng, and **T. Ning**, “Unsupervised Detection of Heart Sounds and Clicks with Murmurs,” *Proc. 10th Int. Congress on Image and Sig. Proc. BioMed. Eng. and Informatics (CISP-BMEI 2017)*, Shanghai, China, Oct.14-16, 2017.
- A. Mudvari and **T. Ning**, “Respiration Estimation and Apnea Detection Using Fuzzy Logic,” *Proc. 39th Int. Conf. IEEE Engineering in Medicine and Biology Society*, pp.2818-2821, Jeju Island, South July 11-15, 2017.
- P. Dahal, J. H. Blaise, and **T. Ning**, “An Investigation of Nonlinear Dynamics of Hippocampal REM Sleep EEG Using Lyapunov Exponent,” *Proc. 43rd Northeast Bioengineering Conf.*, NJIT, New Jersey, March 31- April2, 2017.
- B. Mudvari and **T. Ning**, “Respiration Monitoring and Sleep Apnea Detection Using Fuzzy Logic,” *Proc. 43rd Northeast Bioengineering Conf.*, NJIT, New Jersey, March 31- April2, 2017.
- T. Ning**, L. Cheng, and K.S. Hsieh, “Identification and Features Extraction of Systolic and Diastolic Murmurs,” *to appear in the Proc. 13th IEEE Int. Conf. on Signal Processing*, pp.271-276, Chengdu, China, Nov.6-10, 2016.
- T. Ning**, J. Harry Blaise, M. Avagyan and P. Dahal, “Developmental Differences of Dimension Complexity of Hippocampal EEG during REM Sleep,” *Proc. 38th Int. Conf. IEEE Engineering in Medicine and Biology Society*, pp.2851-2854, Orlando, FL, , Aug.16-22, 2016
- J. Harry Blaise** and **T. Ning** “AR Modeling,” *Proc. 38th Int. Conf. IEEE Engineering in Medicine and Biology Society*, pp.3171-3174, Orlando, FL, Aug.16-22, 2016
- D. Wensberg, D. Roberts, and **T. Ning**, “Real Time First and Second Heart Sound Detection with Embedded System,” *Proc. 42nd Northeast Bioengineering Conference*, Binghamton University, April 5-7, 2016
- T. Ning**, C. H. Huang, J. A. Jensen, V. Wong and H. Chan, “Optical Emission Spectrum Processing Using Discrete-Wavelet Transform Compression,” *Proc. 2016 SEMI Advanced Semiconductor Manufacturing Conf.*, pp.403-406, Saratoga Springs, New York, May 16-19, 2016
- T. Ning**, C. H. Huang, J. A. Jensen, V. Wong and L. Sheet, “Application of Discrete-Wavelet Transform Compression in Wafer Fabrication,” *Proc. 12th IEEE Int. Conf. on Signal Processing*, pp.2272-2276, Hangzhou, China, Oct.19-23, 2014
- T. Ning**, and J. F. Wei, “Helicopter Rotary and Fixed System Dynamics During Hover and High Speed Flights,” *Proc. 12th IEEE Int. Conf. on Signal Processing*, pp.2277-2281, Hangzhou, China, Oct.19-23, 2014
- T. Ning** and K.S. Hsieh, “Automatic Heart Sounds Detection and Systolic Murmur Characterization Using Wavelet Transform and AR Modeling,” *Proc. 35th Int. Conf. IEEE Engineering in Medicine and Biology Society*, pp.255-258, Osaka, Japan, July 3-7, 2013
- T. Ning**, J. Ning, N. Atanasov, and KS Hsieh, “A Fast Heart Sounds Detection and Heart Murmur Classification Algorithm,” *Proc. 11th IEEE Int. Conf. on Signal Processing*, pp.1629-1932, Beijing, China, Oct.21-25, 2012

- K. Huang, S. Petkovsek, B. Poudel, and **T. Ning**, "A Human-Computer Interface Design Using Automatic Gaze Tracking," *Proc. 11th IEEE Int. Conf. on Signal Processing*, pp.1633-1635, Beijing, China, Oct.21-25, 2012
- T. Ning**, K. Huang, B. Poudel, "Nonlinear Dynamical Analysis of Developmental Changes in Hippocampal REM Sleep EEG," *Proc. IEEE 37th Annual Northeast Bioeng. Conf.*, pp.128-129, Troy, NY, April 1-3, 2011.
- T. Ning**, C-W Huang, R-H, Chen, T-Y, Ho, K-S Hsieh, "Heart Murmur Detection and Configuration Estimation using Wavelet Transform and Linear Fit," *Proc. 10th IEEE Int. Conf. on Signal Processing*, pp.1730-1733, Oct.24-28, 2010 Beijing, China
- T. Ning**, J. F. Wei, R. H. Chen, C. W. Huang, and T. Y. Ho, "Helicopter Flight Dynamics Using Linear and Nonlinear Analyses," *Proc. 10th IEEE Int. Conf. on Signal Processing*, pp.9-12, Oct.24-28, 2010 Beijing, China
- T. Ning**, A. Grare, J. Ning, "Comparing Developmental Changes of Hippocampal EEG During REM Sleep Using Correlation Dimension," *International Journal of Bioelectromagnetism*, Vol. 12, No. 4, pp. 170 - 176, 2010
- T. Ning**, A. Grare, and J. Ning, "A Comparison of Linear and Chaotic Measures for Rat Hippocampal EEG during Different Vigilance States," *Proc. 31st Int. Conf. IEEE Engineering in Medicine and Biology Society*, pp.3437-3440, Minneapolis, Minnesota, Sept.2-6, 2009.
- J. Ning, N. Atanasov, and **T. Ning**, "Quantitative Analysis of Heart Sounds and Systolic Heart Murmurs Using Wavelet Transform and AR Modeling," *Proc. 31st Int. Conf. IEEE Engineering in Medicine and Biology Society*, pp.958-961, Minneapolis, Minnesota, Sept.2-6, 2009 .
- T. Ning**, A. Grare, and J. Ning, "Comparing Developmental Changes of Hippocampal EEG during REM Sleep Using Correlation Dimension," *Proc. 6th Int. Workshop on Biosignal Interpretation (BSI 2009)*, pp.104-107, New Haven, Connecticut, June 24-26, 2009.
- T. Ning** and F. S. Wei, "Multichannel Spectral and Coherence Analysis of Servo-Flap Main Rotor Blade," *J. American Institute of Aeronautics and Astronautics (JIAA)*, Vol.47, No.4, pp.933-941, April 2009
- T. Ning**, F. S. Wei and A. Suen, "Servo-flap rotor design parameters identification via spectral analysis of flight data," *Proc. 46th AIAA Aerospace Sci. Meeting and Exhibit*, Reno, Nevada, Jan. 7-10, 2008.
- T. Ning** and F. S. Wei, "Chaotic behavior of servo-flap vibratory data during flight," *Proc. Int. Congress on Image and Sig. Proc.*, pp.108-112, Hainan, China, May 27-30, 2008
- T. Ning**, J. V. Tranquillo, A. C. Grare and A. Saraf, "Computing correlation integral with the Euclidean distance normalized by the embedding dimension," *Proc. the 9th Int. Conf. on Sig. Proc. ICSP'08*, pp 2708-2712, Beijing, China, Oct.26-29, 2008
- N. Atanasov and **T. Ning**, "Isolation of systolic murmurs using wavelet transform and energy index," *Proc. Int. Congress on Image and Sig. Proc.*, pp.216-220, Hainan, China, May 27-30, 2008.
- T. Ning**, S. Bhandari, and N. Atanasov, "Restoration of multi-channel spectral estimation affected by sampling jitters," *Proc. IEEE 33rd Annual Northeast Bioeng. Conf.*, pp.128-129, Stony Brook, NY,

March 10-11, 2007.

- N. Atanasov and **T. Ning**, “Quantitative delineation of heart murmurs using features derived from autoregressive modeling,” *Proc. IEEE 33rd Annual Northeast Bioeng. Conf.*, pp.167-168, Stony Brook, March 10-11, NY, 2007.
- M. I. Restrepo, S.Bhandari and **T. Ning**, “Classification of respiration episodes using fuzzy logic,” *Proc. IEEE 32nd Annual Northeast Bioeng. Conf.*, pp.133-134, Lafayette College, PA, April 1-2, 2006.
- B. Marinkovic and **T. Ning**, “Real-time image processing with FPGA,” *Proc. 14th Annual Connecticut Symposium on Microelectronics & Optoelectronics (CMOC)*, pp. 48-49, Yale University, New Haven, CT, March 17,2005.
- B. Marinkovic, M. Gillette, and **T. Ning**, “FPGA implementation of respiration signal classification using a soft-core processor,” *Proc. IEEE 31st Annual Northeast Bioeng. Conf.*, pp.56-57, Hoboken, NJ, April 2-3, 2005.
- C. M. Lee, and **T. Ning**, “Detection of developmental changes in hippocampal EEG during REM sleep through ICA and Eigen analysis,” *Proc. IEEE 31st Annual Northeast Bioeng. Conf.*, pp.239-240, Hoboken, NJ, April 2-3, 2005.
- D. J. Ahlgren and **T.Ning**, “Integration of CPLD/FPGA technology in the undergraduate engineering curriculum,” *Proc. Int. Conf. on Engineering Education*, pp. 607-612, Gliwice, Poland, July 25-29, 2005.
- F. J. Wei and **T.Ning**, “Performance analysis for the servo-flap rotor,” *Proc. 2nd Int. Basic Research Conference on Rotorcraft Technology*, pp.424-433, Nanjing, China, Nov.7-9, 2005.
- T. Ning** and N. Trinh, “Cross-spectral and cross-bispectral analysis of hippocampal EEG with ICA processing,” *Proc. IEEE 30th Annual Northeast Bioeng. Conf.*, pp.102-103, Springfield, MA, April 17-18, 2004.
- T. Ning**, “An ensemble average approach to remove adverse effects on power spectral estimation due to sampling jitters,” *Proc. IEEE Int. Symposium Circuits & Systems (ISCAS)*, pp.585-588, Vancouver, Canada, May 23-26, 2004.
- T. Ning**, “Coherence estimation of the hippocampal EEG through fast multichannel orthogonal projection,” *Proc. 26th Int. Conf. IEEE Engineering in Medicine and Biology Society (EMBS)*, pp.125-128, San Francisco, CA, September 1-5, 2004.
- N. Trinh and **T. Ning**, “SOPC implementation of real-time image processing” *Proc. 13th Annual Connecticut Symposium on Microelectronics & Optoelectronics (CMOC)*, pp. 68-69, University of Connecticut, Storrs, CT, April 7, 2004.
- T. Ning** and N. Trinh, “Application of independent component analysis (ICA) in multichannel spectral estimation of hippocampal EEG,” *Proc. IEEE 29th Annual Northeast Bioeng. Conf.*, pp., 5.6.0-1, NJIT, NJ, March 22-23, 2003.
- T. Ning** and P. Yoon, “Independent component analysis of multichannel hippocampal EEG during REM

- sleep," *Proc. 5th IASTED Int. Conf. Sig. and Image Processing*, pp. 513-516, Honolulu, Hawaii, Aug.13-15, 2003.
- T. C. Nadeau, M. J. Potoczak, **T. Ning** and J. D. Bronzino, "Quantification of the interrelationship between CA1 and the dentate gyrus during REM Sleep in maturing rats," *Proc. IEEE 29th Annual Northeast Bioeng. Conf.*, pp. 11.6.0-12, NJIT, Newark, NJ, March 22-23, 2003.
- T. Ning**, W. Yorns, and J. D. Bronzino, "Cross-bispectral analysis of developing hippocampal formation," *Proc. IEEE 28th Annual Northeast Bioeng. Conf.*, pp.285-286, Drexel Univ., Philadelphia, PA, April 20-21, 2002.
- T. Ning** and F. S. Wei, "Multichannel coherence analysis of helicopter vibrations," *Proc. 6th Int. Conf. on Signal Processing*, pp.1774-1777, Beijing, China, August 26-30, 2002.
- E. Biegeleisen, K. Nepal and **T. Ning**, "Real-time analysis of biomedical signals using a high speed DSP board," *Proc. IEEE 28th Annual Northeast Bioeng. Conf.*, pp.133-134, Drexel Univ., Philadelphia, PA, April 20-21, 2002.
- K. Nepal, E. Biegeleisen and **T. Ning**, "Apnea detection and respiration rate estimation through parametric modeling," *Proc. IEEE 28th Annual Northeast Bioeng. Conf.*, pp.277-278, Drexel Univ., Philadelphia, PA, April 20-21, 2002.
- T. Ning**, A. Tamrakar, and K. Nepal, "Bispectral analysis using the ADSP-21062 EZ-LAB," *Proc. SHARC Int. DSP Conf.*, pp.106-109, Northeastern Univ., Boston, MA, September 10-11, 2001.
- T. Ning**, "Dimensional complexity of the hippocampal EEG," *Proc. IEEE 26th Annual Northeast Bioeng. Conf.*, pp.27-28, Univ. of Conn., Storrs, CT, April 8-9, 2000.
- T. Ning**, "Multichannel autoregressive modeling through orthogonal projection," *Proc. 5th Int. Conf. on Signal Processing*, pp.181-184, Beijing, China, October 21-25, 2000.
- T. Ning** and J. D. Bronzino, "Quadratic phase coupling as a quantitative measure for the developing hippocampal formation," *Annals of Biomedical Engineering*, Vol.26, pp.688-693, 1998.
- M. Guillorn and **T. Ning**, "A Real-time finite impulse response filter," *Proc. Annual Connecticut Symposium on Microelectronics & Optoelectronics (CMOC)*, Yale University, pp.26-27, New Haven, March 1997.
- T. Ning** and M. Guillorn, "Linear prediction through orthogonal transform," *Proc. 8th Int. Conf. on Signal Processing Applications & Technology*, pp.726-729, San Diego, CA Sept 12-14, 1997.
- J. V. Tranquillo and **T. Ning**, "Chaotic behavior of respiration signals," *Proc. IEEE 23rd Annual Northeast Bioeng. Conf.*, pp.50-51, Durham, NH, May 22, 1997.
- T. Ning**, Y. S. Kung, and F.S. Wei, "Detection of distributed gear faults with a new bispectral analysis," *Proc. 22nd Annual Int. Conf. of IEEE Industrial Electronics Society*, vol.3, pp1960-1965, Taipei, Taiwan, Aug. 5-9, 1996.
- T. Ning** and W. Huang, "Computation of autoregressive model coefficients through orthogonal projection," *Proc. 3rd Int. Conf. on Signal Processing*, pp.189-192, Beijing, China, October 14-18, 1996.

- T. Ning**, J. V. Tranquillo, and J. D. Bronzino, "Quadratic phase coupling of the maturing hippocampal EEG," *Proc. 18th Annual Int. Conf. IEEE Engineering in Medicine and Biology Society (EMBS)*, vol.4, pp.1564-1565, Amsterdam, Netherlands, Oct.31-Nov.3, 1996.
- J. V. Tranquillo and **T. Ning**, "Maturation of non-linear interactions: bispectral analysis of CA1 and the dentate gyrus," *Proc. 22nd IEEE Annual Northeast Bioeng. Conf.*, pp.99-100, New Brunswick, New Jersey, March 14-15, 1996.
- J. V. Tranquillo, **T. Ning** and J. D. Bronzino, "The correlation dimension in CA1: a promising measure of theta rhythm maturation," *Proc. 18th Annual Int. Conf. IEEE Engineering in Medicine and Biology Society (EMBS)*, vol.4 1571-1572, Amsterdam, Netherlands, Oct.31-Nov.3, 1996.
- Sylvester Chen and **T. Ning**, "Cruising on the information highway-behind the screen," *Proc. 4th Southern New England Science and Technology Exchange Conference*, Trinity, Hartford, CT, Nov.16-17, 1996.
- T. Ning** and K.S. Hsieh, "Delineation of systolic murmurs by autoregressive modeling," *Proc. 21st IEEE Annual Northeast Bioeng. Conf.*, pp.19-21, Bar Harbor, Maine, May 22-23, 1995.
- T. Ning** and J. D. Bronzino, "The bicoherence index: a measure of developing neuronal relationships," *Proc. 17th Annual Int. Conf. IEEE Engineering in Medicine and Biology Society (EMBS)*, pp.232-233, Montreal, Canada, Sept.20-23, 1995.
- S. Kao, **T. Ning**, C. Wu and H. Peng, "Extraction of the focused object in an image by filtering out the defocused background," *IEEE Int. Symposium on Speech Image Processing & Neural Networks*, pp.53-56, Hong Kong, April 14-16, 1994.
- N. Palmer, **T. Ning**, and J. D. Bronzino, "The correlation dimension as an index to differentiate between vigilance states," *Proc. 16th Annual Int. Conf. IEEE Engineering in Medicine and Biology Society (EMBS)*, pp.1128-1129, Baltimore, MD, Nov.3-6, 1994.
- T. Ning** and S. Ning, "A Comparison of linear and nonlinear modeling of the hippocampal EEG," *Proc. 16th Annual Int. Conf. IEEE Engineering in Medicine and Biology Society (EMBS)*, pp.221-222, Baltimore, MD, Nov.3-6, 1994.
- T. Ning** and J. D. Bronzino, "Nonlinear analysis of the hippocampal subfields of CA1 and the dentate gyrus," *IEEE Trans. Biomedical Engineering(BME)*, pp.870-876, Vol.40, No.9, Sept. 1993.
- T. Ning** and J. D. Bronzino, "Nonlinear analysis of the sleep EEG at hippocampal subfields," *Proc. 14th Annual Int. Conf. IEEE Engineering in Medicine and Biology Society (EMBS)*, pp. 2642-2643, Paris, France, Oct. 29- Nov.1, 1992.
- T. Ning** and S. M. Gao, "Detection of amplitude modulation using bispectra," *Proc. 1992 IEEE Int. Conf. Acoustics, Speech, and Signal Processing*, Vol.5, pp.469-472, San Francisco, CA, March 23-26, 1992.
- T. Ning** and J. D. Bronzino, "Cross-bispectra of the rate eeg during REM sleep," *Proc. 13th Annual Int. Conf. IEEE Engineering in Medicine and Biology Society (EMBS)*, Vol.13, No.1, pp. 447-448, Orlando, FL, Oct 31-Nov 3, 1991.

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- T. Ning** and J. D. Bronzino, "Autoregressive and bispectral analysis techniques: EEG applications," *Special Issue on Biomedical Signal Processing for IEEE Engineering in Medicine and Biology Magazine*, Vol.9, No.1, pp.47-50, March 1990.
- T. Ning** and S. M. Whiting, "Autoregressive power spectrum estimation via the orthogonal transformation," *Proc. 1990 IEEE Int. Conf. on Acoustics, Speech, and Signal Processing*, pp.2523-2526, Albuquerque, NM, April 1990.
- T. Ning** and C. L. Nikias, "Power spectrum estimation with randomly spaced correlation samples," *IEEE Trans. on Acoustics, Speech, and Signal Processing*, Vol.38, No.6, pp.991-998, June 1990.
- T. Ning** and J. D. Bronzino, "Bispectral analysis of the rat EEG during REM sleep," *Proc. 12th Annual Int. Conf. IEEE Engineering in Medicine and Biology Society (EMBS)*, Vol.12, No.5, pp.2041-2042, Philadelphia, PA, Nov. 1990.
- S. M. Whiting, **T. Ning** and J. D. Bronzino, "Data length effects on the coherence estimate of EEG," *Proc. 15th IEEE Annual Northeast Bioeng. Conf.*, pp.93-94, Boston, MA, March 1989.
- T. Ning** and J. D. Bronzino, "Bispectral analysis of the rat EEG during various vigilance states," *IEEE Trans. on Biomedical Engineering*, Vol.36, No.4, pp.497-499, April 1989.
- T. Ning** and J. D. Bronzino, "Bispectral analysis of the EEG in developing rats," *Proc. of the Workshop on Higher-Order Spectral Analysis*, pp.235-238, Vail, Colorado, June 1989.
- M. I. Cuevas and **T. Ning**, "Applications of computer analysis in biomedical data," *IX Int. Conf. of the Chilean Computer Science Society and XV Latin American Conf. on Informatics*, Santiago, Chile, July 1989.
- T. Ning** and J. D. Bronzino, "Automatic classification of respiratory signals," *Proc. 11th Annual Int. Conf. IEEE Engineering in Medicine and Biology Society (EMBS)*, pp.669-670, Seattle, WA. Nov. 1989.
- T. Ning** and J. D. Bronzino, "Detecting phase coupling of sleep EEG via bispectra," *Proc. 14th IEEE Annual Northeast Bioeng. Conf.*, pp. 198-199, Durham, New Hampshire, March 1988.
- M. Grewal, **T. Ning** and J. D. Bronzino, "Coherence analysis of EEG via multichannel AR modeling," *Proc. 14th IEEE Annual Northeast Bioeng. Conf.*, pp. 245-248, Durham, New Hampshire, March 1988.
- D. Zendzian, **T. Ning** and J. D. Bronzino, "Detection and separation of multi-unit spike trains," *Proc. 14th IEEE Annual Northeast Bioeng. Conf.*, pp. 238-239, Durham, New Hampshire, March 1988.
- T. Ning** and J. D. Bronzino, "Bispectral analysis of rat EEG during maturation," *Proc. 10th Annual Int. Conf. IEEE Engineering in Medicine and Biology Society (EMBS)*, pp.1218-1219, New Orleans, LA, Nov. 1988.

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