

## **STUART J. SHELLEY, Ph.D.**

### **Principal**

Etegent Technologies, Ltd

### **VITA**

Dr. Shelley is a Principal of Etegent Technologies, Ltd., a small, high technology, R&D focused company conducting state-of-the-art research in a range of areas including automatic target recognition utilizing radar, LADAR, image, vibrometry and other data types; health monitoring of turbine engines and other assets; nondestructive inspection data management and mining; mechatronic product development, and other areas. In his role as one of two founding and managing Principal Founders Dr. Shelley is responsible for overall management of the Etegent R&D Division, including his first love, contributing to the technical guidance of various R&D projects.

Prior to forming Etegent Technologies (formerly Sheet Dynamics Ltd) Dr. Shelley conducted research and consulting in a wide range of technologies and applications. This included development and commercialization of technology for improving system dynamics of industrial and military systems and processes with emphasis on manufacturing and processing of rolled sheet metal and sheet paper product. Dr. Shelley conducted extensive research and consulting in the area of testing, modeling, control and design of dynamic systems. This work has encompassed applications in machine tools, paper processing, sheet steel coating and rolling, rotating equipment in many process industries, aircraft, space structures, civil structures, tracked and wheeled vehicles, process instrumentation, and others. Dr. Shelley was involved with the University of Cincinnati, Structural Dynamics Research Laboratory (UC-SDRL) for 14 years as a graduate student, Post Doctoral Researcher, and Research Assistant Professor. He has consulted with 40 national and international companies and government organizations and has conducted sponsored research for numerous corporations and funding agencies.

### **EDUCATION**

Ph.D. 1991 University of Cincinnati

MSME 1985 University of Cincinnati

BSME 1980 University of British Columbia

### **EXPERIENCE**

1996-Present, Principal, Etegent Technologies Ltd., (formerly Sheet Dynamics, Ltd.)

1992-1997 University of Cincinnati - Structural Dynamics Research Laboratory,  
Research Asst. Professor,

1992 University of Cincinnati - Structural Dynamics Research Laboratory, Post Doctoral  
Assistant

1986-1992 University of Cincinnati - Structural Dynamics Research Laboratory,  
Research Assistant

1986-1997 Engineering Consultant – Vibration, Rotating Equipment, Structural  
Dynamics, Controls

1985-1986 General Motors, CPC Noise and Vibration, Engineering Consultant

1983-1986 University of Cincinnati, Structural Dynamics Research Laboratory -  
Research Assistant

1981-1983 Brown Boveri Howden, Service Engineer

### **CONSULTING CLIENTS**

1997 Cincinnati Incorporated, Inc.  
1996-1997 PCB Piezotronics Ltd.  
1996-1997 MicroMotion Inc.  
1995 AMTRAK  
1995 Engineering Design Systems  
1995 Army Research Laboratory, Adelphi  
1995 Monarch Machine Tool  
1995-1996 Abitibi Price, Inc.  
1995 M&M, Inc  
1995 Systems Research Laboratories  
1994-1995 TMS Inc.  
1995 Institute of Advanced Manufacturing Sciences, Inc/Jacobs Chuck  
1994-1996 Institute of Advanced Manufacturing Sciences, Inc/LTV Steel Co.  
1994-1995 Steven Schaefer Associates, Inc.  
1994 Army Research Laboratory  
1993 International Techne Group Inc.  
1992 Cincinnati Milacron  
1989 deHavilland Aircraft Co./Anatrol Corp.  
1989 International Techne Group Inc.  
1989 Leland Electrosystems, Inc.  
1988-1989 Ingersol Milling Machine Co./Ford Motor Co.  
1988 Wright Patterson Air Force Base  
1988 Cincinnati Test Laboratories  
1988-1989 Quixote Measurement Dynamics, Inc.  
1985-1986 General Motors Corp.  
1985 B.F. Goodrich Ltd. / O'Donnel and Associates, Inc.  
1985 Metaltech Ltd. / O'Donnel and Associates, Inc.  
1985 Ideal Electric Co. / O'Donnel and Associates, Inc.  
1985 Metcut Research Associates Inc.  
1985 Applied Research Inc. / U.S. Army, Redstone Arsenal  
1984 Shawinigan Consultants Inc.

### **PUBLICATIONS**

1. Shelley, S.J., Moore, K.R., Sharp, T.D., "Active Vibration Control of Optical Space Systems," 18'th International Modal Analysis Conference (IMAC), San Antonio, Texas, February 7-10, 2000.
2. Sharp, T.D., Shelley, S.J., "Simulating the Dynamics of a Cold Roll Tension Reel System," 18'th International Modal Analysis Conference (IMAC), San Antonio, Texas, February 7-10, 2000.
3. Sharp, T.D., Shelley, S.J., Denoyer, K.K., "The Application of Adaptive Spatio-Temporal Filtering Based Control to the Middeck Active Control Experiment II," Proceedings of the AIAA Space Technology Conference & Exposition,

- Albuquerque, NM, September 28-30, 1999. Note: This paper was published in the proceedings with the incorrect title, "Robust Line-of-Sight Stability and Jitter Compensation using Spatio-Temporal Filtering Based Control Approaches".
4. Bosse, A.B., Sharp, T.D., Shelley, S.J., Denoyer, K.K., Erwin, R.S., "Control of the UltraLITE Precision Deployable Test Article using Adaptive Spatio-Temporal Filtering Based Control," Proc. SPIE Vol 3668, p. 462-472, Smart Structures and Integrated Systems, Norman Wereley; Editor, March 1999.
  5. Shelley, S.J., Sharp, T.D., Denoyer, K.K., "Robust Line-of-Sight Stability and Jitter Compensation using Spatio-Temporal Filtering Based Control Approaches," Proc. SPIE Vol. 3430, p. 236-247, Novel Optical Systems and Large-Aperture Imaging, Kevin C. Bell; Michael K. Powers; Jose M. Sasian; Eds. Dec. 1998.
  6. Schultze, J.F., Rost, R.W., Shelley, S.J., "Adaptive Modal Space Control of Flexible Structures: Applications," 15'th International Modal Analysis Conference (IMAC), Orlando, Florida, Feb 3-6, 1997
  7. Shelley, S.J., Vold, H., Mains, M., Sharp, T.D., "Structural Control and Monitoring Using Adaptive Spatio-Temporal Filtering," 15'th International Modal Analysis Conference (IMAC), Orlando, Florida, Feb 3-6, 1997
  8. Shelley, S.J., Pickrel, C.R., "New Concepts for Flight Flutter Parameter Estimation," 15'th International Modal Analysis Conference (IMAC), Orlando, Florida, Feb 3-6, 1997
  9. Stebbins, M.A., Blough, J.R., Shelley, S.J., Brown, D.L., "Multi-Axis Load Cell Calibration and Determination of Sensitivities to Forces and Moments," 15'th International Modal Analysis Conference (IMAC), Orlando, Florida, Feb 3-6, 1997
  10. Shelley, S.J., Zwart, J., Fournier, A., "New Insights into Calender Barring Prevention," Canadian Pulp and Paper Association, Technical Section, Annual Meeting, Montreal, Canada, January, 1997
  11. Schultze, J.F., Rost, R.W., Shelley, S.J., "Adaptive Modal Space Control of Flexible Structures: Theory," International Conference on Identification in Engineering Systems, University of Wales, Swansea, March 27-29, 1996
  12. Bosse, A., Shelley, S., Lim, Tae., "On the Feasibility of Adaptive Vibration Control of a Space Truss Using Modal Filters and a Neural Network," 1996 Symposium on Smart Structures and Materials, SPIE Vol. 217, Paper #55, San Diego, CA, Feb, 1996
  13. Stebbins, M.A., Blough, J.R., Shelley, S.J., Brown, D.L., "Measuring and Including the Effects of Moments and Rotations for the Accurate Modeling of Transmitted Forces," 14'th International Modal Analysis Conference (IMAC), Dearborn, Michigan, Feb 12-15, 1996
  14. Schultze, J.F., Rost, R.W., Shelley, S.J., "Adaptive Modal Space Control of Flexible Structures: Theory," 14'th International Modal Analysis Conference (IMAC), Dearborn, Michigan, Feb 12-15, 1996
  15. Aktan, A.E., Farhey, D.N., Hunt, V.J., Helmicki, A.J., Brown, D.L., Shelley, S.J., "Objective Bridge Condition Assessment," International Symposium on Non-Destructive Testing in Civil Engineering, Berlin, Germany, Sept. 26-28, 1995.
  16. Shelley, S.J., Lee, K.L., Aksel, T., Aktan, A.E., "Active Control and Forced Vibration Studies on a Highway Bridge", ASCE Journal of Structural

- Engineering, Vol. 121, No. 9, Sept. 1995
17. Helmicki, A., Shelley, S., Aktan, E., Brown, D., "Issues in Implementation of Structural Control to Constructed Facilities for Serviceability with Damage Considerations", 14<sup>th</sup> American Control Conference, Seattle, WA, June, 1995.
  18. Aktan, A.E., Hunt, V.J., Lally, M.J., Shelley, S.J., "Field Laboratory for Modal Analysis and Condition Assessment of Highway Bridges", 13<sup>th</sup> International Modal Analysis Conference (IMAC), Nashville, Tennessee, Feb 13-16, 1995.
  19. Li, S., Shelley, S.J., Brown, D.L., "Perturbed Boundary Condition Testing Concepts", 13<sup>th</sup> International Modal Analysis Conference (IMAC), Nashville, Tennessee, Feb 13-16, 1995.
  20. Li, T.H., Shelley, S.J., "Determination of the Dynamic Radial Stiffness of Tank Projectiles Using Modal Analysis", 13<sup>th</sup> International Modal Analysis Conference (IMAC), Nashville, Tennessee, Feb 13-16, 1995.
  21. Frydman, A., Li, D., Shelley, S. Poland, J., "Managing a Large-Scale Modal Test", Hewlett-Packard Realtime Update Newsletter, Winter, 1994.
  22. Schultze, J.F., Shelley, S.J., Rost, R.W., "Independent Modal/Rate Feedback Control of a Cantilever Beam Applying Reciprocal Modal Filter Vectors", Proceedings of the 19<sup>th</sup> International Seminar on Modal Analysis, Leuven, Belgium, Sept. 12-14, 1994.
  23. Shelley, S.J., Aktan, A.E., Brown, D.L., Allemang, R.J., "University of Cincinnati Experience with Implementing Active Structural Vibration Control", Proceedings of the 1<sup>st</sup> World Conference on Structural Control, Los Angeles, CA, Aug 3-5, 1994.
  24. Shelley, S.J., Aktan, E.A., Lee, K.L., "Modal Filter Based Structural Control of a Highway Bridge", Proceedings of the Eleventh Conference on Analysis and Computation, ASCE Structures Congress XII, Atlanta, Georgia, April 24-28, 1994.
  25. Shelley, S.J., Aktan, A.E., Brown, D.L., Allemang, R.J., "Teaching Bridges to Fight Back with Active Vibration Control", Hewlett-Packard Realtime Update Newsletter, Spring, 1994.
  26. Shelley, S.J., Aktan, A.E., Brown, D.L., Allemang, R.J., "Active Control of Vibration in Civil Engineering Structures", Proceedings of the 12<sup>th</sup> International Modal Analysis Conference (IMAC), Honolulu, Hawaii, Jan. 31 - Feb 3, 1994.
  27. Schultze, J.F., Shelley, S.J., Rost, R.W., "Independent Modal Space Control of a Cantilever Beam Utilizing State Feedback", Proceedings of the 12<sup>th</sup> International Modal Analysis Conference (IMAC), Honolulu, Hawaii, Jan. 31 - Feb 3, 1994.
  28. Shelley, S.J., Aktan, A.E., Frederick, N., "Active Vibration Control of a 250 Foot Span Steel Truss Highway Bridge", Second IEEE Conference on Control Applications, Vancouver, B.C., September 13-16, 1993.
  29. Shelley, S.J., Aktan, A.E., Frederick, N., "Active Vibration Control of a 250 Foot Span Steel Truss Highway Bridge", Proceedings of the 2<sup>nd</sup> IEEE Conference on Control Applications, Vancouver, Canada, Sept. 13-16, 1993
  30. Shelley, S.J., Allemang, R.J., Slater, G.L., "Application of Discrete Modal Filtering to Control and Identification", Second Conference on Active Control of Sound and Vibration, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, April 28-30, 1993.

31. Shelley, S.J., Allemang, R.J., Slater, G.L., Schultze, J.F., "Active Vibration Control Utilizing an Adaptive Modal Filter Based Modal Control Method", 11'th International Modal Analysis Conference, Kissimmee, FL, Feb 1-4, 1993.
32. Shelley, S.J., Freudinger, L.C., Allemang, R.J., "Development of an On-Line Modal State Monitor", 11'th International Modal Analysis Conference, Kissimmee, FL, Feb 1-4, 1993..
33. Slater, G.L., Shelley, S.J., "Health Monitoring of Flexible Structures Using Modal Filter Concepts", Proceedings of the 1993 North American Conference on Smart Structures and Materials, Albuquerque, New Mexico, Jan. 31 - Feb. 4, 1993.
34. Slater, G.L., Shelley, S.J., Jacobson, M., Analysis, "Design and Test of a Low Cost Direct Force Command Linear Proof Mass Actuator for Structural Control", 5'th NASA/DoD CSI Technology Conference, Lake Tahoe, Nevada, March, 1992.
35. Shelley, S.J., Schultze, J.F., Rost, R.W., Allemang, R.J., "Active Vibration Control Utilizing a Discrete Modal Filter Based Control Technique", The 17'th International Seminar on Modal Analysis and Structural Dynamics, Katholieke Universiteit Leuven, Belgium, September, 1992.
36. Shelley, S.J., Allemang, R.J., "Calculation of Discrete Modal Filters Using the Modified Reciprocal Modal Vector Method", Proceedings of the 10'th International Modal Analysis Conference (IMAC), San Diego, CA, Feb 3-8, 1992, pp. 37-45.
37. Shelley, S.J., Freudinger, L.C., Allemang, R.J., "Development of an On-Line Parameter Estimation System Using the Discrete Modal Filter, Proceedings of the 10'th International Modal Analysis Conference (IMAC), San Diego, CA, Feb 3-8, 1992, pp. 173-183.
38. Raghavendrchar, M., Shelley, S.J., Aktan, A.E., "Multi-Reference Impact Testing for Bridge Diagnosis", Proceedings of the International Conference on New Dimensions in Bridges and Flyovers, Singapore, June 27-28, 1991.
39. Zhang, Q., Shelley, S.J., Allemang, R.J., "Active Damping Design of Flexible Structures Based on Noncollocated Sensor-Actuator Velocity Feedback", ASME J. Dynamic Systems, Measurement & Control, v113 n2 Jun 1991, pp. 259-266.
40. Shelley, S.J., Freudinger, L.C., Allemang, R.J., Zhang, Q. "Implementation of a Modal Filter on a Five Meter Truss Structure", Proceedings of the 9'th International Modal Analysis Conference (IMAC).
41. Allemang, R.J., Shelley, S.J., "Discrete Modal Filters: Numerical Implementation and Application", Presented at the Pre-Imac 9 Symposium: "Recent Advances in Modal Analysis" University of California, Irvine, February 1, 1991.
42. Shelley, S.J., Allemang, R.J., "Experience with Experimentally Modeling Structure-Actuator-Sensor Systems for Control Design", Proceedings of the 15'th International Seminar on Modal Analysis and Structural Dynamics, Katholieke Universiteit Leuven, Belgium, 15 pp., 1990.
43. Allemang, R.J., Shelley, S.J., Brown, D.L., Zhang, Q., "Practical Experience with Identification of Large Flexible Structures", Proceedings, 1990 American Control Conference, San Diego California, 4 pp., May 23-25, 1990.
44. Zhang, Q., Shelley, S.J., Luo, X.N., Allemang, R.J., Brown, D.L., "Experimental Study of Active Vibration Control of Flexible Structures Subject to Forced

- Vibration", Proceedings, International Modal Analysis Conference, pp. 926-933, 1989.
45. Aktan, A.E., Baseheart, T.M., Shelley, S.J., Ho, I.K., "Forced-Excitation Testing and Identification of a Mid-Rise RC Building to Evaluate Vulnerability", Proceedings of the Fourth U.S. National Conference on Earthquake Engineering, 1989.
  46. Zhang, Q., Shelley, S.J., Luo, X.N., Allemang, R.J., "Modal Control with Application to Vibration Suppression of Flexible Structures", Proceedings of the 13'th International Seminar on Modal Analysis, Katholieke Universiteit Leuven, Belgium, 18 pp., 1988.
  47. Shelley, S.J., Zhang, Q., Luo, X.N., "Investigation and Modeling of Shaker Dynamic Effects", Proceedings of the 13'th International Seminar on Modal Analysis, Katholieke Universiteit Leuven, Belgium, 18 pp., 1988.