Publications

Kostas S. Tsakalis

March 22, 2008

Summary: 1 Book, 3 Book Chapters, 40 Journal Papers, 7 Patents, 93 Conference papers.

Over 415 Journal-only citations (321 distinct excluding self-citations). Source: ISI Web of Science, March 2008.

I. Books

1. K. S. Tsakalis and P. A. Ioannou, *Linear Time-Varying Systems: Control and Adaptation*, Prentice-Hall, Englewood Cliffs, New Jersey, 1993.

II. Book Chapters

1. S. Sabesan, L. Good, N. Chakravarthy, K. Tsakalis, P.M. Pardalos, L.D. Iasemidis, "Global optimization and spatial synchronization changes prior to epileptic seizures," Eds. C.J.S. Alves, P.M. Pardalos, L.N. Vicente, Optimization in Medicine, Coimbra, Portugal, July 20-22, 2005, Springer Series in Optimization and its Applications, Springer, pp. 103-125, 2008.

2. S. Sabesan, K. Narayanan, A. Prasad, L.D. Iasemidis, A. Spanias and K. Tsakalis, "Information flow in coupled nonlinear systems: Application to the epileptic human brain," In: *Data Mining in Biomedicine*, Series: Springer Optimization and Its Applications , Vol. 7, 483-504, P. Pardalos, V. Boginski, A. Vazacopoulos (Eds.), 2007.

3. P.A. Ioannou and K.S. Tsakalis, "Robust Discrete-Time Adaptive Control," in *Adaptive and Learning Systems: Theory and Applications*, Plenum Press, edited by K. S. Narendra, 1986.

III. Journal Papers

1. Venkatraman Atti, Andreas Spanias, Kostas Tsakalis, Constantinos Panayiotou, Leon Iasemidis and Visar Berisha "Gradient Projection-Based Channel Equalization Under Sustained Fading," *Signal Processing,* Vol. 88, 2, 236-246, February 2008.

2. Kostas Tsakalis and Sachi Dash "Multivariable controller performance monitoring using robust stability conditions," *Journal of Process Control,* Vol. 17, 9, 702-714, October 2007.

3. Niranjan Chakravarthy, S. Sabesan, L.D. Iasemidis, K. Tsakalis, "Controlling synchronization in a neuron-level population model," *Intern. Journal of Neural Systems*, Vol. 17, No. 2, 123 - 138, April 2007.

4. A. Spanias, K. Huang, A. Natarajan, R. Ferzli, H. Kwon, V. Atti, V. Berisha, L. Iasemides, H. Krishnamoorthi, P. Spanias, S. Misra, M. Banavar, K. Tsakalis, S. Haag, "Interfacing Java-DSP with a TI DSK for use in a Signal Processing Class," ASEE Computers in Education Journal, Vol. XVII, No. 3, pp. 27-35, Issue: July-Sep. 2007.

5. Kostas Tsakalis and Leon Iasemidis, "Control Aspects of a Theoretical Model for Epileptic Seizures," *International Journal of Bifurcation and Chaos.* Special Issue "Complexity: A Unifying Direction in Science," Vol. 16,7, 2006.

6. K. Tsakalis, Niranjan Chakravarthy, S. Sabesan, L.D. Iasemidis, P.M. Pardalos, "A feedback control systems view of epileptic seizures," *Cybernetics and Systems Analysis*, vol. 42, pp.483-495, 2006.

7. Niranjan Chakravarthy, Kostas Tsakalis, Leon D. Iasemidis, Andreas Spanias, "A Multi-dimensional Scheme for Controlling Unstable Periodic Orbits in Chaotic Systems," *Physics Letters A,* Nonlinear Science, 349, 116-127, 2006.

8. Awadhesh Prasad, Leon D Iasemidis, Shivkumar Sabesan and Kostas Tsakalis "Dynamical hysteresis and spatial synchronization in coupled non-identical chaotic oscillators," *PRAMANA - Journal of Physics*, Vol.64, No.4, 513-523, Apr. 2005.

9. L.D. Iasemidis, D-S Shiau, P.M. Pardalos, W.Chaovalitwongse, K. Narayanan, A. Prasad, K. Tsakalis, P. Carney and J.C. Sackellares, "Long-term prospective on-line real-time seizure prediction", *Clinical Neurophysiology*, Elsevier, 116, 532-544, Jan. 2005.

10. L.D. Iasemidis, K. Tsakalis, J.C. Sackellares, and P.M. Pardalos, "Comment on "Inability of Lyapunov Exponents to Predict Epileptic Seizures," *Physical Review Letters* 94, 019801, week ending 14 Jan. 2005.

11. H. Wu, K.S. Tsakalis, G.T. Heydt, "Evaluation of Time Delay Effects to Wide-area Power System Stabilizer Design," *IEEE Transactions on Power Systems*, V.19, 4, 1935–1941, Nov. 2004.

12. K.S. Tsakalis and J.C. Palais, "Improving a School's *U.S. News and World Report* Ranking," *Journal of Engineering Education*, V.93, 3, 259-263, July 2004.

13. B. Veeramani, K. Narayanan, A. Prasad, L.D. Iasemidis, A.S. Spanias, K. Tsakalis, "Measuring the direction and the strength of coupling in nonlinear Systems-a modeling approach in the State space," *Signal Processing Letters,* IEEE, V. 11, 7, 617-620, July 2004.

14. T. Ogasawara, K. Tsakalis, C. Hornberg, "Improving Low-Temperature Control on a Vertical Furnace Using Model-Based Temperature Control," *Semiconductor Manufacturing,* Semi, V. 5, 2, 161-166, Feb. 2004.

15. N. Chakravarthy, A. Spanias, L. D. Iasemidis, and K. Tsakalis, "Autoregressive Modeling And Feature Analysis Of DNA Sequences," *EURASIP* Jasp 2004:1 (2004) 13-28.

16. L.D. Iasemidis, D.-S. Shiau, W. Chaovalitwongse, J.C. Sackellares, P.M. Pardalos, J.C. Principe, P.R. Carney, A. Prasad, B. Veeramani, and K. Tsakalis, "Adaptive Epileptic Seizure Prediction System," *IEEE Transactions on Biomedical Engineering*, 50, 5, 616-627, May 2003.

17. K. Tsakalis, S. Dash, A. Green and W. MacArthur, "Loop-shaping controller design from input-output data: application to a paper machine simulator," *IEEE Transactions on Control Systems Technology,* Vol. 10, No. 1, 127-136, Jan. 2002.

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19. Suttipan Limanond and K.S. Tsakalis, "Adaptive and non-adaptive 'pole-placement' control of multi-variable linear time-varying plants," *Int. J. Control*, 74, 5, 507-523, 2001.

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21. E. Grassi and K. Tsakalis, "PID Controller Tuning by Frequency Loop-Shaping: Application to Diffusion Furnace Temperature Control," *IEEE Trans. Contr. Systems Technology*, 8, 5, 842-847, Sept. 2000.

22. M. Beaudoin, E. Grassi, S.R. Johnson, K. Ramaswamy, K. Tsakalis, T.L. Alford and Y.H. Zhang, "Real-time composition control of InAlAs grown on InP using spectroscopic ellipsometry," *J. Vac. Sci. Technol. B* 18(3), pp. 1435-1438 , May/Jun 2000.

23. Elena Grassi, Shane R. Johnson, Mario Beaudoin, and Kostas S. Tsakalis, "Temperature-composition determination based on modeling of optical constants of III-V compound semiconductors measured by spectroscopic ellipsometry," *J. Vac. Sci. Technol. B* 17(3), pp. 1223-1226 , May/Jun 1999.

24. S.R. Johnson, E. Grassi, M. Beaudoin, M.D. Boonzaayer, K.S. Tsakalis, and Y.H. Zhang, "Closed-loop control of composition and temperature during the growth of InGaAs lattice matched to InP," *J. Vac. Sci. Technol. B* 17(3), pp. 1237-1240 , May/Jun 1999.

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39. P.A. Ioannou and K.S. Tsakalis, "A Robust Direct Adaptive Controller," *IEEE Trans. Automat. Contr.*, AC-31, No. 11, pp. 1033 – 1043, Nov. 1986.

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IV. Patents

• Recent Filings

– Gaikwad; Sujit V.; Dash; Sachi K.; Tsakalis; Konstantinos S. "On-demand auto-tuner for a plant control system," *United States Patent Application 20070073422*, Publication Number: WO/2007/040953 Publication Date: 12.04.2007

– Jassemidis, Leonidas, D; Tsakalis, Konstantinos, S; "Pacemaker for treating physiological system dysfunction," Publication Number: WO/2006/01982 Publication Date: 23.02.2006

1. S.V. Gaikwad, S.K. Dash, K.S. Tsakalis, and G. Stein, "Auto-tuning controller using loop-shaping," *U.S. Patent No. 7,024,253*, April 4, 2006.

2. K.D. Stoddard, B.D. Schulze, and K. Tsakalis, "Run-to-run controller for use in microelectronic fabrication," *U.S. Patent No. 6,587,744*, July 1, 2003.

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4. K. Stoddard, P.R. McHugh, and K. Tsakalis, "Temperature Control System for a Thermal Reactor," *U.S. Patent No. 6,222,164 B1*, April 24, 2001.

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V. Conference Papers (Refereed and Invited)

1. Niranjan Chakravarthy, Shivkumar Sabesan, Andreas Spanias, Leon Iasemidis and Kostas Tsakalis, "A feedback systems approach to modeling neural firing-rate homeostasis," *46th IEEE Conference on Decision and Control*, 602 - 608, New Orleans, 12-14 Dec. 2007.

2. Kostas Tsakalis, Sachi Dash, "Adaptive PID Control using Filter-Banks and Frequency Loop Shaping," *European Control Conference 2007,* 1340-1347, Kos, Greece, July 2-5, 2007.

3. Charles Zhan and Kostas Tsakalis, "System Identification for Robust Control," *American Control Conference, 2007*, 846 - 851, New York, 9-13 July 2007.

4. L. Yang, J. Si, K. Tsakalis, A. Rodriguez, "Performance Analysis of Direct Heuristic Dynamic Programming using Control-Theoretic Measures," *International Joint Conference on Neural Networks, IJCNN 2007* 2504 - 2509, 12-17 Aug. 2007.

5. Vlassopoulos, N.; Reisis, D.; Lentaris, G.; Tombras, G.; Prosalentis, E.; Ritas, N.; Tsakalis, K.; "An approach for efficient design of digital amplifiers," *Proc. IEEE International Symposium on Circuits and Systems, ISCAS 2006,* 4 pp., 21-24 May 2006.

6. Natarajan, A.; Atti, V.; Spanias, A.; Tsakalis, K.; Iasemidis, L.; "A transform-domain G-PrOBE algorithm," *Proc. IEEE International Symposium on Circuits and Systems, ISCAS 2006,* 4 pp., 21-24 May 2006.

7. Kostas Tsakalis and Sachi Dash, "Implementation of controller performance monitoring on a MIMO example," *Proc. American Control Conference,* 5 pp., Minneapolis, 14-16 June 2006 (Invited).

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9. Kostas Tsakalis, "Closed-Loop Brain Stimulation: Simulation Studies and Insight for Control of Epileptic Seizures," *Second International Workshop on Seizure Prediction,* Session 4, National Institute of Neurological Disorders and Stroke, Hyatt Regency Bethesda, April 8 - 11, 2006 (Invited).

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11. K. Tsakalis, N. Chakravarthy, and L. Iasemidis, "Theoretical Concepts of Control with Applications to Epilepsy," *3rd European Medical and Biological Engineering Conference (EMBEC)*, Prague, Nov. 2005.

12. S. Sabesan, L. Good, L. Iasemidis, K. Tsakalis and D. Treiman, "Epileptic Brain Dynamics and Information Flow," *3rd European Medical and Biological Engineering Conference (EMBEC)*, Prague, Nov. 2005.

13. L.D. Iasemidis, S. Sabesan, K. Tsakalis, L. Good, and D. Treiman, "Prediction and control of epileptic seizures: The basis for brain pacemakers in epilepsy", *3rd European Medical and Biological Engineering Conference (EMBEC)*, Prague, Nov. 20-25, 2005.

14. C. Hornberg, K. Tsakalis, A. Spanias, and K. Stoddard, "Improving Wafer Temperature Response in a Semiconductor Diffusion Furnace using Wafer Optimized Profile Temperature Controller," 6th European Advanced Equipment Control/Advanced Process Control (AEC/APC) Conference, Dublin, Ireland, April 6-8, 2005.

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35. D. Collins, J.-J. Flores-Godoy, F. Hoppensteadt, K. Tsakalis, "Minimum Inventory Variability Dispatching Policies - MIVP," *ASEE2000*, Session 2563, St Louis, 2000.

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59. K.S. Tsakalis, J.J. Flores-Godoy and A.A. Rodriguez, "Hierarchical Modeling and Control of Re-Entrant Semiconductor Fabrication Lines: A Mini-Fab Benchmark," *Proc. 6th IEEE Int. Conference on Emerging Technologies and Factory Automation*, 508–513, Los Angeles, Sept. 1997.

60. K.S. Tsakalis and K.D. Stoddard, "Integrated Identification and Control for Diffusion/CVD Furnaces" *Proc. 6th IEEE Int. Conference on Emerging Technologies and Factory Automation*, 514–519, Los Angeles, Sept. 1997.

61. M.K. ElAdl, A.A. Rodriguez and K.S. Tsakalis, "Hierarchical Modeling and Control of Re-Entrant Semiconductor Manufacturing Facilities," *Proc. 35th Conference on Decision and Control,* 1736–1742, Kobe, Japan, Dec. 1996.

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71. K.S. Tsakalis, "Control and Identification of Linear Time-Varying Plants Using I/O Methods," *Proc. 34th Conf. on Decision and Control,* 2527–2532, New Orleans, Dec. 1995. (Invited)

72. P.E. Crouch, T.S. Cale, S. Shen, L. Song and K.S. Tsakalis, "Optimal Control for LPCVD Processes," Proc. 7th Sematech AEC and APC Workshop, New Orleans, Nov. 1995.

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75. K.D. Stoddard, P.E. Crouch, M. Kozicki and K.S. Tsakalis, "Application of Feed-Forward and Adaptive Feedback Control to Semiconductor Device Manufacturing," *Proc. American Control Conference*, 892–896, Baltimore, 1994.

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77. S. Limanond and K.S. Tsakalis, "Model Reference Adaptive and non-Adaptive Control of Multivariable Linear Time-Varying Plants: The Exact Matching Case," *Proc. 32nd Conf. on Decision and Control*, 3072–3077, San Antonio, Dec. 1993.

78. K.S. Tsakalis and S. Limanond, "On Certain Performance Issues Arising in Adaptive Control," *Proc. American Control Conf.*, San Francisco, June 1993.

79. K.S. Tsakalis, "On the Identification and Control of Linear Time-Varying Systems," *Proc. 1993 American Control Conf.*, San Francisco, June 1993. (Invited)

80. K. S. Tsakalis and P. E. Crouch, "A Simple Adaptive Controller for an Oxidation Process," *Proc. American Control Conf.*, Chicago 1992.

81. K. S. Tsakalis, M. Deisher and A. Spanias, "Adaptive FIR Filtering Based on Bounded Error Constraints," *Proc. 26th Asilomar Conference on Signals, Systems and Computers*, V.1, 15–19, Oct. 1992.

82. K. S. Tsakalis and S. Limanond, "Adaptive Control of Time-Varying Systems: An Application to the Attitude-Momentum Control of the Space Station," *Proc. 31st Conf. on Decision and Control*, 1285–1286, Tucson, Dec. 1992.

83. K.S. Tsakalis and P.E. Crouch, "A Simple Adaptive Controller for an Oxidation Process," presented at the *NSF-Washington University Workshop on Nonlinear Control,* St. Louis, May 1992. (Invited)

84. K. S. Tsakalis, "The σ-modification in the Adaptive Control of Linear Time-Varying Plants," *Proc. 31st Conf. on Decision and Control*, 694–698, Tucson, Dec. 1992. (Invited)

85. K. S Tsakalis, "Adaptive Control of Linear Time-Varying Plants: The Case of "Jump" Parameter Variations," *Proc. American Control Conf.*, 1235–1236, Boston, June 1991.

86. K. S. Tsakalis, "Robustness of Model Reference Adaptive Controllers: Input-Output Properties," *Proc. 28th Conf. on Decision and Control*, 1025–1030, Tampa, Dec. 1989. (Invited)

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88. P. A. Ioannou and K. S. Tsakalis, "The Class of Unmodeled Dynamics in Robust Adaptive Control," in *Proc. American Control Conf.*, 337–342, Atlanta, 1988. (Invited)

89. K. S Tsakalis and P. A. Ioannou, "A New Indirect Adaptive Control Scheme for Time-Varying Plants," in *Proc. 27th Conf. on Decision and Control*, 2419–2424, Austin, Dec. 1988. (Invited)

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91. K. S. Tsakalis and P. A. Ioannou, "On the Model Reference Adaptive Control of Time-Varying Plants," in *Proc. 26th Conf. on Decision and Control*, 354–359, Los Angeles, 1987.

92. K. S. Tsakalis and P. A. Ioannou, "Adaptive Control of Linear Time-Varying Plants," *Proc. 2nd IFAC Workshop on Adaptive Systems in Control and Signal Processing*, 233–238, Lund, 1986.

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Sponsored Research Projects

1. K. Tsakalis (PI), L. Iasemidis, and D. Treiman, "Cyber Systems: Closed-Loop Control of Brain Dynamics in Epilepsy ," National Science Foundation, ECS-0601740, June 1, 2006 - May 31, 2009 $240,000.

2. K. Tsakalis (PI), J. Si, and A. Rodriguez, "Embedded Control Systems II," Consortium for Embedded Systems, 11/1/2005-12/31/2006 (5/15/2007), $43,013.

3. L. Iasemidis (PI), K. Tsakalis, and D. Treiman, "Seizure Control by Closed Loop Feedback in a Rat Model of Chronic Temporal Lobe Epilepsy," Epilepsy Foundation, July 1, 2005 - June 30, 2006 $100,000.

4. A. Rodriguez, (PI), K. Tsakalis, D. Allee, J. Si, "Rapid Prototyping for Embedded System Applications Via High Level Development Tools," NSF, DUE 0443133, 5/1/2005-4/30/2007, $75,000

5. J. Si (PI), A. Rodriguez, K. Tsakalis, "A Control-Theoretic Approach to Learning and Approximate Dynamic Programming (ADP) with Applications to High Performance Racing," NSF, 5/1/04-4/30/07, $190,000.

6. A. Rodriguez (PI), J. Si, K. Tsakalis, "A Flexible Embedded System Architecture and Methodology for Integrated Real-Time Helth Monitoring, Modeling, Control Law Design, and Implementation," Consortium for Embedded and Internetworking Technologies, 8/25/04-8/24/05, $75,137.

7. K. Tsakalis (PI), J. Si, and A. Rodriguez, "Embedded Control Systems: Undergraduate Course Development," Consortium for Embedded and Internetworking Technologies, 1/1/04-12/31/04, $56,588.

8. A. Spanias (PI), T. Duman, L. Karam, A. Papandreou, and K. Tsakalis, "On Line Undergraduate Laboratories in Signal and Image Processing, Communications, and Controls," NSF DUE 0089075, 1/1/01 – 12/31/03, $425,000.

9. K.S. Tsakalis, "Advanced Process Control in Semiconductor Manufacturing," SEMY Engineering/Brooks Automation, 8/15/95 – 8/14/03, $188,027.

    — Equipment Donation, 1999-2001, $325,000.

10. A.A. Rodriguez (PI), W. Higgins, J. Si, K.S. Tsakalis, and F. Hoppensteadt, "MOSART: A Model Undergraduate Multidisciplinary Controls Laboratory," NSF DUE 9851422, 8/15/98 – 7/31/01, $95,442.

11. K.S. Tsakalis, "Advanced Process Control In Paper Production," Honeywell Technology Center, Phoenix, 9/1/98–8/31/99, $24,999.

12. K. Tsakalis (PI) and A. Rodriguez, "Integrated Multi-Sensor Control for MBE Control of III-V Nanostructures." ARPA, 7/7/95–9/28/98, $150,041. (ASU, Sensor group; part of a multi-univeristy/industry proposal)

13. K.S. Tsakalis (PI) and D.E. Rivera, "A Control-Theoretic Approach to Scheduling of Semiconductor Fabrication Processes," INTEL Research Council, 1/1/95–12/31/97, $111,000.

14. D.E. Rivera (PI) and K.S. Tsakalis, "Benefits of Advanced Process Control Methods in Semiconductor Manufacturing," Motorola SPS, 2/1/96–5/31/96, $15,732.

15. P.E. Crouch (PI), T.S. Cale, G.B. Raupp, D.K. Ferry, M.N. Kozicki, K.S. Tsakalis and C. Ringhofer, "Mathematical Modeling for Simulation and Control of Semiconductor Processing," DoD-URI (ARPA), 10/1/92–5/31/96, $693,000.

16. W.T. Higgins (PI), P.E. Crouch, A.A. Rodriguez and K.S. Tsakalis, "Undergraduate Control Systems Design Laboratory," NSF, USE-9251934, 5/1/92–10/31/94, $50,232.

17. K.S. Tsakalis, "Parameter Estimation In Adaptive Control," NSF-RIA, ECS-9111346 9/1/91–2/28/94, $59,956.

18. D. Rivera (PI) and K.S. Tsakalis, "Robust Adaptive Process Control of Chemical Processes with Implementation on the TDC 3000," (within the "ASU-Honeywell Control Systems Engineering Program" by D. Shunk and D. Rivera) Honeywell Industrial Automation and Controls Division; 3/26/93–3/25/94 and 4/16/92–8/7/92, $12,284 (Summer support).

Internal Grants

1. L. Iasemidis (PI), J. Si, A. Spanias and K. Tsakalis, "Dynamical Modeling and Control of Epileptic Seizures," Fulton School of Engineering, Seed Funding Award, $48,000, June 2003-June 2004.

2. K.S. Tsakalis, ASU-RIA on the project "Design of Estimators for Adaptive Controllers with Robust Performance," 9/5/89–9/4/90, $20,000 (funds from VPR and EE Dept).

3. K.S. Tsakalis, "Design of Robust Adaptive Controllers," DWR-B594, ASU-FGIA, 1/1/89–12/31/89, $3,285.

4. K.S. Tsakalis, "Performance Issues in Adaptive Control," DWR-B677, ASU-FGIA, 1/1/90–12/31/90, $3,000.

Graduated Students

Ph.D.

- C. Zhan (expected May 2008): System Identification for Robust Control.

- S. Sabesan (May 2008): Spatiotemporal Brain Dynamics In Epilepsy: Application To Seizure Prediction And Focus Localization.

- N. Chakravarthy (May 2007): Modeling and Controlling Epileptic Seizures - A Feedback Control Systems Perspective

- J.J. Flores-Godoy (Dec. 2002): Nonlinear identification for diffusion/Chemical Vapor Deposition furnaces.

- E. Grassi (Dec. 1999): Proportional-integral-derivative controller tuning by frequency loop-shaping.

- G. Nair (Apr. 1998, with A. Spanias): Fast adaptive algorithms using eigenspace projections.

- L. Song (May 1997): Optimal control problems in chemical vapor deposition.

- A. Abdalla (May 1996): Control of linear time-varying systems.

- S. Limanond (Aug. 1994): Adaptive and non-adaptive control of multivariable linear time-varying plants.

M.S.

- Harikrishnan Raghunathan (Dec. 2007): Observer techniques for nonlinear systems.

- Manikandan Ponnuswamy (Dec. 2005, with L. Iasemidis): Dynamical Analysis Of Epileptic Seizures Using Synchronization-Based Measures.

- C. Hornberg (Dec. 2004): Wafer Optimized Pprofile Temperature Control of a Semiconductor Diffusion Furnace

- T. Thrasyvoulou (Aug. 2003, with A. Spanias): Adaptive beamforming using a complex bounding ellipsoid algorithm with gradient projections.

- Aris Papadopoulos (Dec. 2002): Swinging up the inverted pendulum by energy adaptive proportional-integral-derivative control.

- Kaushik Bhatt (Dec. 2002): Performance Monitoring of Controllers.

- J. Kristof (May 2000, with T. Cale): Optimal programmed rate chemical vapor deposition of tungsten.

- J. Frigo (Dec. 1996): An analog neural network control method proposed for use in spacecraft systems.

- C. Alexander (May 1995): System modeling and control of an inverted pendulum: an input-output approach.

- K. Stoddard (Sep. 1994, with P. Crouch and M. Kozicki): Application of feedforward and adaptive feedback control to semiconductor device processing.

- C.C. Kok (May 93): Application of neural network in the control of an oxidation process.

- Y.N. Liao (May 1992): Constrained parameter estimation in model reference adaptive control.

- S. Limanond (Dec. 1991): Decentralized adaptive linear quadratic control for time-varying systems.