

VITA

Petros Ioannou

Petros A. Ioannou received the B.Sc. degree with First Class Honors from University College, London, England, in 1978 and the M.S. and Ph.D. degrees from the University of Illinois, Urbana, Illinois, in 1980 and 1982, respectively.

During the period 1975-1978, he held a Commonwealth Scholarship from the Association of Commonwealth Universities, London, England. He was awarded several prizes, including the Goldsmid Prize and the A. P. Head Prize from University College, London. From 1979 to 1982 he was a research assistant at the Coordinated Science Laboratory at the University of Illinois.

In 1982, Dr. Ioannou joined the Department of Electrical Engineering-Systems, University of Southern California, Los Angeles, California. He is currently a Professor in the same Department and the Director of the Center of Advanced Transportation Technologies. He also holds a courtesy appointment with the Department of Aerospace and Mechanical Engineering. He is the Associate Director for Research for the University Transportation Center METRANS at the University of Southern California since 2006. His research interests are in the areas of adaptive control, neural networks, nonlinear systems, vehicle dynamics and control, intelligent transportation systems and marine transportation. He was visiting Professor at the University of Newcastle, Australia and the Australian National University in Canberra during parts of Fall of 1988, the Technical University of Crete in summer of 1992 and Fall of 2001 and served as the Dean of the School of Pure and Applied Science at the University of Cyprus in 1995. As the Dean, member of the Senate and member of some vital for the University of Cyprus committees he pioneered the establishment of the School of Engineering at the University of Cyprus.

In 1984 he was a recipient of the Outstanding Transactions Paper Award for his paper, "An Asymptotic Error Analysis of Identifiers and Adaptive Observers in the Presence of Parasitics," which appeared in the IEEE Transactions on Automatic Control in August 1982. Dr. Ioannou is also the recipient of a 1985 Presidential Young Investigator Award for his research in Adaptive Control. He has been an Associate Editor for the IEEE Transactions on Automatic Control, the International Journal of Control, Automatica and IEEE Transactions on Intelligent Transportation Systems. He also served as a Member of the Control System society on IEEE ITS Council Committee and his center on advanced transportation technologies was a founding member of IVHS America which was later renamed ITS America. He is currently Associate Editor at Large of the IEEE Transactions on Automatic Control and Chairman of the IFAC Technical Committee on Transportation Systems. He is a member of the Board of Governors of the IEEE Intelligent Transportation Society. He is one of the founders of the Mediterranean Control Association and a member of the Board of Governors. He was one of the founders of the IEEE Mediterranean Control Conference which has been taking place annually since 1992. He was one of the founders of the University Transportation Center, METRANS, at the University of Southern California and California State University Long Beach.

Dr. Ioannou is a Fellow of IEEE, Fellow of International Federation of Automatic Control (IFAC) and the author/co-author of 8 books and over 150 research papers in the area of controls, neural networks, nonlinear dynamical systems and intelligent transportation systems.

PETROS A. IOANNOU, Ph.D.

BACKGROUND/EXPERIENCE

Educational Record

1. University of Illinois, College of Engineering, Urbana, Illinois. 1/80 - 8/82, Ph.D. in Electrical Engineering, Thesis title: "Robustness of Adaptive Schemes with Respect to Modeling Errors."
2. University of Illinois, College of Engineering, Urbana, Illinois. 8/78 - 12/79 M.S. Thesis title: "Microprocessor Control of Double Magnet Suspension System."
3. University of London, University College, London. 9/75 - 6/78, B.Sc. in Mechanical Engineering, June 1978. Thesis title: "Calibration of the Water Wave Tank."

Work Experience/Accomplishments

- University of Southern California, Department of Electrical Engineering-Systems: Assistant Professor from Fall 1982 to Spring 1987. Associate Professor from Spring 1987 to 1992.
- Full Professor from Fall 1992 to present
- Joint Appointment with the Department of Aerospace and Mechanical Engineering, 2004-present
- Founder of the Southern California Center of Advanced Transportation Technologies, 1991
- Director of the Southern California Center of Advanced Transportation Technologies, 1991 to present.
- Associate Director for Research, METRANS 2006-present
- Visiting Professor, Technical University of Crete, Chania, Greece, Summer 1992, Fall 2001
- Visiting Professor at the University of Newcastle, Australia, Fall 1988
- Visiting Professor at the Australian National University in Canberra Fall of 1988,
- Dean of the School of Pure and Applied Science at the University of Cyprus in 1995/1996 where he pioneered the establishment of the School of Engineering at the University of Cyprus
- One of the founders of the Mediterranean Control Association, 1998
- One of the founders of the IEEE Mediterranean Conferences which started in 1992 and became an annual event

- One of the founders of the University Transportation Center METRANS at the University of Southern California/California State University Long Beach, 1999
- Controls Group Leader 2004-2008

Consulting

- ACORN Technologies, Technical Consultant, 1999 to 2002
- Lockheed Company Technical Consultant, 1985 to 1993.
- Ford Motor Company Design and implementation of an intelligent cruise control system on a Lincoln Towncar, June 1992 to 1994.
- Project Trilby, General Motors Research Laboratories: A successful design and implementation of a steer-by-wire control system, July 1988.
- Rockwell International, 12214 Lakewood Boulevard, Downey, CA 90241: Technical Consultant, 1985.
- HR TEXTRON, Systems Engineering Division, Irvine, CA 92714: Technical Consultant, May and June 1985.
- Dynamic Systems, 2014 Silver Court West, Urbana, Illinois: Technical Consultant from October 1980 to September 1984.
- General Electric Company, One River Road, Schenectady, NY 12435: Technical Consultant, 15 days, July - December 1981.
- Ford Motor Company, P. O. Box 2053, Dearborn, MI 48121: Technical Consultant, 2 days in November 1980, 7 days in November 1981.

Professional Activities

- Organizer and National Organizing Committee Chair 12th IFAC Symposium on Transportation Systems, September 2-4, 2009
- Organizer and General Chair of the 2008 International Trade and Freight Transportation Conference, September 1-3, 2008, Ayia Napa, Cyprus
- Technical Program Chair of the 2007 IEEE Intelligent Vehicles Symposium, June 13-15, 2007, Istanbul, Turkey
- Technical Program Chair of the 2nd Annual National Urban Freight Conference, Dec. 5-7, 2007
- Associate Editor for the 2008 IFAC Congress, July 2008, Korea
- Chair of the IEEE Fellow committee of the IEEE Intelligent Transportation Society 2006-present
- Associate Editor at Large of the IEEE Transactions on Automatic Control, 1999 to present
- IEEE Control System Society External Member IEEE-USA Transportation Policy
- Chairman of the IFAC Technical Committee on Transportation Systems, 2005 to present
- Member of the Board of Governors of the IEEE Intelligent Transportation Systems Society, 2005-present
- Member of the Board of Governors of the Mediterranean Control Association, 1998-present
- Organizer of the Workshop on Modeling and Control of Complex Systems, June 30-July 2, 2005, Ayia Napa, Cyprus
- Invited participant to FHWA Advanced Research Think Tank Meeting, Berkeley, CA October 26-27, 2006
- Steering Committee Chair IEEE 13th Mediterranean Conference, June 2005, Limassol, Cyprus
- Technical Program Chairman IEEE 12th Mediterranean Conference, June 2004, Kusadaci, Turkey
- Session Chair at IEEE Conference on Decisions and Control and European Control Conference, Dec. 2005, Seville Spain
- Session Chair at IEEE Conference on Intelligent Transportation Systems, Sept. 2005, Vienna Austria
- Control System Society Member on IEEE ITS Council Committee, 1997 to 2005
- Control System Society Chair Member of Technical Activities Board, 2000 to 2005

- Guest Editor on Special Issue on Adaptive Cruise Control, IEEE Transactions on Intelligent Transportation Systems, Sept. 2003, Vol. 4, No. 3
- External Committee Member on IEEE-USA Transportation and Aerospace Technology Policy, 2000-2005
- Vice-Chairman of the IFAC Technical Committee on Transportation Systems, 2000 to 2005
- Associate Editor for the IEEE Transactions on ITS 1999- 2004
- Associate Editor for Automatica, December 1993 - 1995.
- Associate Editor for the IEEE Transactions on Automatic Control, 1987 - 1990.
- Member of the Editorial Board for the International Journal of Control. 1990-1995
- Member of the Technical Review Panel for the IVHS-IDEA program of the Transportation Research Board, 1992- present.
- Member of the Steering Committee on Advanced Vehicle Control Systems of IVHS America, 1992- present
- Member of the Advisory Group on Highway Electrification and Automation Technologies Project for the Southern California Association of Governments.
- Session Chairman: The Third Yale Workshop on Applications of Adaptive Systems Theory, June 1983; 1984, 1989, 1992, 1993, 1996, 1997 American Control Conference; 1986, 1987, 1988, 1989, 1993, 1996, 1997, IEEE Conference on Decision and Control.
- Co-Organizer of the Montana Summer Institute on Current Issues in Adaptive Control, August 1984, 1985.
- Session Organizer: 1986, 1990, 1992 IEEE Conference on Decision and Control.
- Program Committee Member: 1987, 1992, 1997 IEEE Conference on Decision and Control.
- Program Committee Member: IFAC 7th Symposium on Transportation Systems: Theory and Application of Advanced Technology, China 1994.
- International Program Committee Member: IFAC Workshop on Robustness Issues in Adaptive Control, New South Wales, Australia, August 1988.
- Program Committee Member: International Conference on Vehicle Navigation and Information Systems, Ottawa, Canada, October 1993.
- General Chairman and Organizer of the Third IEEE Mediterranean Symposium on New Directions in Control and Automation, July 11-13, 1995, Limassol, Cyprus
- Member of the IEEE Control System Society, Fellow Nominating Committee

- Finance Chairman and Organizer of the 5th IEEE Mediterranean Symposium on Control and Systems, July 21-23, 1997, Paphos, Cyprus
- International Program Committee Member: International Conference on Advances in Vehicle Control and Safety, AVCS'98, Amiens-France, July 1-3, 1998
- Program Chairman of the 3rd IEEE Conference on Intelligent Transportation Systems, 2000

University Services/Committees

Current

- Director of the Center for Advanced Transportation Technologies 1992-present
- Member of executive committee of METRANS 1999-present
- Associate Director for Research for METRANS 2006-present
- Chair of Merit Review Department Sub-Committee 2004-2006
- Controls group leader 2004-2008
- Member of the Engineering Faculty Council 2004-2008

2004-2005

- Chair of the Faculty Merit Review Committee of the Engineering Faculty Council 2005
- Chair of the Department Research Merit Committee for 2004 evaluation
- Engineering Faculty Subcommittee on Dean's Evaluation, 2004/2005
- Associate Chairman of Engineering Faculty Council 2004-2005
- Member of University Faculty Senate 2004-2005
- Member of University Research Committee 2004-2005
- Member of Executive Committee for Appointment, Promotion, and Tenure, School of Engineering, 2003-2005
- Chair of Research Merit Committee 2005

2001-2003

- EE-Systems Department Strategic Guidance Committee Member 2001-present
- Chair of Research Merit Committee , 2001
- Chair of Research Merit Committee , 2002
- Member of Search Committee for EE-Systems Department Chair, 2002-03
- Member of the EE-Systems Department Curriculum Committee 2002-present
- METRANS Executive Committee Member 2000-present
- Director Center for Advanced Transportation Technologies 1992-present
- Member of Executive Committee for Appointment, Promotion, and Tenure, School of Engineering, 2003
- Member of EE-Systems Nomination for Awards Committee 2003-present

AWARDS AND HONORS

- Fellow of the Institute of Electrical and Electronic Engineers (IEEE) since 1992
- Fellow of the International Federation of Automatic Control since 2006
- Outstanding Teacher of the Year, The Latter-day Saint Student Association, March 2007
- Plenary Speaker at the 17th Mediterranean Conference on Control and Automation, June 24-26, 2009, Makedonia Palace, Thessaloniki, Greece
- Semi-Plenary Speaker at the 47th IEEE Conference on Decision and Control, Dec. 9-11, 2008 Cancun, Mexico
- Invited to be a Keynote Speaker at the 2nd IEEE Conference on Industrial Electronics & Applications, 23-25 May, 2007
- Plenary Speaker at the 11th IFAC Symposium on Control in Transportation Systems, August 28-September 1st, 2006, Delft, Netherlands
- Plenary Speaker IEEE International Conference on Vehicular Electronics and Safety, Oct. 14-16, 2005, Xi'an, China
- 1985 Presidential Young Investigator Award, The White House, February 14, 1985. A five-year award.
- Outstanding Transactions Paper Award for the best paper published in the IEEE Transactions on Automatic Control during 1982, 1983.
- Best Paper Presentation at the Session on "Numerical Methods in Analysis and Design of Control Systems" at the 1991 American Control Conference.
- Best Paper Presentation at the Session TA1 on "Robust Adaptive Control" at the 1989 American Control Conference.
- Best Paper Presentation for the paper "Identification and Control of Aircraft Dynamics Using Radial Basis Function Neural Networks" in the 1992 AIAA Guidance, Navigation and Control Conference.
- Commonwealth Scholarship, April 1975 - July 1978, The Association of Commonwealth Universities, London, England.
- Sessional Prize, A Goldsmid Prize, for the sessions 1975-1976, 1976-1977, University College, London, England.
- P. Head Prize, June 1978, University College, London, England; Most Outstanding graduate from Mechanical Engineering Department.

TEACHING

1. Courses Taught

- "Parameter Identification and Adaptive Control" (EE 599, EE 685)
- " Nonlinear Control Systems" (EE 587)
- "Linear Control Systems" (EE 482)
- "Digital Control Systems" (EE 543a, EE485)
- "Digital Control Laboratory Experiments" (EE 543bL -- Lab course)
- "Feedback Systems: Input-Output Properties" (EE 599)
- "Probability and Statistics" (EE364)
- Linear Algebra and Differential Equations (Math 225)
- Ordinary Differential Equations (ENG499)

2. Courses Developed

- "Parameter Identification and Adaptive Control" (EE 685)
- "Digital Control Systems" (EE 543a)
- "Digital Control Laboratory Experiments" (EE 543bL)
- Re-organized "Nonlinear Control Systems" (EE 587)
- Combine EE685 and EE587 into one course Nonlinear and Adaptive Control (EE587)

3. Programs Developed

- Aerospace Controls Program for Masters students
- Masters Degree Program in Financial Engineering

4. Short Courses

- "Traffic Flow Modeling and Control and Intelligent Vehicle and Highway Systems," Crown Sterling Suites, Los Angeles, June 1-4, 1993.
- "Intelligent Vehicle and Highway Systems" Lake Buena Vista, FL., December 1994.
- " Robust Adaptive Control Designs for Linear and Nonlinear Plants" 13th IFAC World Congress, San Francisco, CA, June 30- July 5, 1996
- " Control Issues in Intelligent Vehicle Highway Systems" 13th IFAC World Congress, San Francisco, CA, June 30- July 5, 1996
- " Robust Adaptive Control " IEEE Intern. Conf. on Control Applications, Dearborn, MI, Sept. 15-18, 1996
- "Design of Robust Adaptive Systems" 36th IEEE Conf. On Decision and Control, San Diego, CA, Dec. 8, 1997
- " Control Issues in Intelligent Vehicle Highway Systems" 36th IEEE Conf. On Decision and Control, San Diego, CA, Dec. 9, 1997.

- "Mathematics of the Internet" Department of Computer Science, University of Cyprus, June 2004
- 'Robust Adaptive Control' NASA Glen Research Center, Cleveland Ohio, June 2005

5. Invited Talks (other than conference papers. Selected list)

1985-86

- "Robustness Issues in Adaptive Control," at Montana Summer Institute on Current Issues in Adaptive Control, August 1984, 1985.
- "Adaptive Control: Theory and Applications," at AIAA Orange County Section, November 1985.
- "Robust Adaptive Control," General Motors Research Laboratories, Project Trilby, November 1985.
- "Robust Adaptive Tuning of Controllers," Ford Motor Company, June 1986.
- "Robust Adaptive Tuning of Controllers," General Motors Research Laboratories, Project Trilby, June 1986.
- 6. "Theory and Design of Robust Adaptive Control Schemes," Oxford University, Department of Engineering Science, Oxford, England, July 1986.
- "Robust Adaptive Control," USC Industrial Associates Research Review, 1983, 1985.

1987

- "Adaptive Control of Time-Varying Plants," Workshop on Robust and Adaptive Control, Oaxaca, Mexico, December 2-4, 1987.

1988

- "Robust Adaptive Control: Theory, Applications, Limitations," Ford Motor Company, Electrical Engineering Division, July 28, 1988.
- "Design, Implementation and Testing of the Steer-by-Wire Control System," Project Trilby, General Motors Research Labs, July 27, 1988.
- "Adaptive Control of Time Varying Plants," Australian National University, November 1, 1988; and University of Newcastle, October 1988.
- "Time and Frequency Domain Uncertainty Bounds in Robust Adaptive Control," Australian National University, October 31, 1988; and University of Newcastle, October 1988.

1989

- "Robust Adaptive Control for Linear Plants," SIAM Conf. on Control in the 90's: Achievements, Opportunities and Challenges, May 17-19, 1989, San Francisco, CA.
- "Robust Adaptive Control," University of California at Santa Barbara, May 1989.

1990

- "Robust Adaptive Control: A Unified Approach," the 1990 Grainger Lectures on Foundations of Adaptive Control, University of Illinois, September 28 - October 1, 1990.

- "Decentralized Indirect Adaptive Control of Interconnected Systems," Rockwell International, Thousand Oaks, CA, October 11, 1990.
- "Learning and Convergence Analysis of Structured Networks," Rockwell International, Thousand Oaks, CA, October 11, 1990.

1991

- "Performance Improvement versus Robust Stability in Model Reference Adaptive Control", Berkeley Center for Systems and Control, University of California Berkeley, California, April 12, 1991.
- "Indirect Adaptive Control " University of California at Santa Barbara, May 28, 1991.

1992

- "Adaptive Identification and Control Using On-line Approximators: Neural Networks and Beyond," Distinguished Speaker Series, Dept. of Electrical Engineering, Texas A & M University, April 28, 1992.
- "Intelligent Highways," Center for Control Engineering & Computation, University of California at Santa Barbara, Nov. 3, 1992.

1993

- "Intelligent Vehicle on Automated Highways," Ford Motor Company, Sponsored by the IEEE Signal Proc. and Control Societies, May 13, 1993.
- "Classes of Model Reference Adaptive Control Schemes," Institute of Mathematics and Its Applications, University of Minnesota, April 12-16, 1993.

1998

- "Vehicle and Traffic Flow Control" , Georgia Institute of Technology, January 20, 1998, Distinguished Lecture Series

2000

- "The Use of Position Error Signal Measurements from Data and Servo Sectors for Disk Drive Servo Control" February 2, 2000, University of California Santa Barbara

2001

- "The Effect of Intelligent Cruise Control Vehicles in Mixed Traffic on the Environment and Traffic Flow Characteristics", Advanced Transportation Technologies Seminar Series, Intelligent Transportation Systems Institute, Center for Transportation Studies, University of Minnesota, October 9, 2001
- "Effects of ICC Vehicles on Mixed Traffic Flow" PATH Program-Wide Research Meeting, October 18, 2001

2002

- 'Adaptive Cruise Control (ACC) for Passenger Vehicles and Trucks: Effect on Traffic Flow Characteristics and Environment' University of California at Riverside, Department of Electrical Engineering

2007

- ‘From Robust Adaptive Control to Practical Adaptive Control’ University of California in Santa Barbara, Nov. 2, 2007

RESEARCH

Research Interests

- **Control Systems and Applications:** Robust Adaptive Control, Nonlinear and Adaptive Control, Neural Networks, Decentralized Control, Failure Detection, Isolation and Control Reconfiguration
- **Control Applications:** Control of Large Scale Structures, Control of Segmented Telescopes, Control of Disk Drives, Intelligent Flight Control Systems, Congestion Control in Computer and Communication Networks
- **Transportation Systems:** Vehicle Dynamics and Control, Adaptive Cruise Control, Collision Avoidance Systems, Automated Highway Systems, Traffic Flow Modeling and Control, Automated Container Terminals, Vehicle Routing and Dispatching, Advanced Transportation Technologies

Research Grants and Contracts

- **Faculty Research and Innovation Fund, Univ. of So. California**
Period: 6/83 - 6/84, Amount: \$2,200.00
Title: Robust Decentralized Adaptive Controllers
- **National Science Foundation**
Period : 9/84 – 9/85 Amount: \$58,334.00
Title :Development of Control Algorithms for Electrical Stimulation of the Human Leg (Subcontract under Rancho Los Amigos Hospital)
- **National Science Foundation**
Period: 1/84 - 1/87 Amount: \$75,000.00
Title: Asymptotic Analysis and Robust Design of Adaptive Control
- **NSF Presidential Young Investigator Award**
Period: 8/85 - 8/90 Amount: \$125,000.00
- **NSF Presidential Young Investigator Award and General Motors Matching Funds**
Period: 12/85 - 6/91 Amount: \$500,000.00
Title: Development of Robust Adaptive Control Techniques for Large Scale Systems
- **Ford Motor Company**
Period: 12/85 - 12/87 Amount: \$17,500.00
Title: Adaptive Control Algorithms
- **AT & T**
Period: 12/85 - 12/87 Amount: \$50,000.00
Title: Control Techniques for Packet Switching Networks
- **Collaborative Faculty Research and Innovation Fund, Univ. of So. California**

Period: 1/85 - 1/86 Amount: \$43,347.00
Title: Development of Laboratory for Modeling and Control
With Co-PIs G. Shiflett and H. Flashner

- **Sun Microsystems, Inc.**
Period: 10/86 - 10/87 Amount: \$14,600.00
Sun Workstation
- **Rockwell International**
Period: 6/87 - 8/88 Amount: \$154,607.00
Title: Adaptive Roll Control Studies of the ATW Wind Tunnel Model
(With M. Safonov as co-PI)
- **AT & T Information System**
Period: 7/88 - 7/90 Amount: \$145,000.00
Title: Adaptive Routing and Learning Automata in Networks
- **National Science Foundation**
Period: 9/88 - 7/89 Amount: \$11,551.00
Title: Development of Appropriate Adaptive Control Laws for Time-Varying Plant
- **Caltrans/PATH**
Period: 9/91-5/95 Amount: \$2,124,898.00
Title: Automated Vehicle Control
- **Ford Motor Company**
Period: 6/92 - 6/93 Amount: \$75,000.00
Title: Autonomous Intelligent Cruise Control
- **National Science Foundation**
Period: 8/92 - 8/94 Amount: \$100,000.00
Title: Adaptive Control: Design Trade-Offs, Robustness, Performance
- **FHWA**
Period: 10/93-9/94 Amount: \$586,000.00
Title: Precursor Systems Analysis of Automated Highway Systems
- **Taiwan Ministry of Economic Affairs**
Period: 7/93-6/96 Amount: \$450,000.00
Title: Identification and Control of Nonlinear Systems using Neural Networks
- **Caltrans/PATH**
Period: 2/95-7/97 Amount: \$175,000.00
Title: Evaluation and Analysis of Automated Highway System Concepts and Architectures
- **USTRANSCOM/California State University Long Beach**
Period: 10/95-9/96 Amount: \$187,415.00
Title: Center for Commercial Deployment of Transportation Technologies
- **Caltrans/PATH**

Period: 2/95-7/96 Amount: \$277,363.00

Title: Development and Experimental Evaluation of Autonomous Vehicles for Roadway/Vehicle Cooperative Driving

- **PATH**

Period: 1/95-12/95 Amount: \$49,000.00

Title: National AHS Consortium

Co-PI with R. Hall

- **Caltrans/PATH**

Period: 3/96-2/97 Amount: \$167,056.00

Title: Field Test of Vehicle-Mounted, Forward-Looking Range & Relative Velocity Sensor in Closed-Loop AVCS” (With Amerigon)

- **NASA/California State University Los Angeles**

Period: 9/96-8/99 Amount: \$300,000.00

Title: The Use of decentralized Control in Design of a Large Segmented Space Reflector

- **Caltrans/PATH**

Period: 10/96- 9/97 Amount: \$86,000.00

Title: Evaluation of Automated/Mixed Traffic

- **Caltrans/PATH**

Period: 11/01/97-06/30/98 Amount: \$42,000.00

Title: Evaluation and Analysis of Automated Highway System Concepts and Architectures

- **Caltrans/PATH**

Period: 01/01/98-08/31/99 Amount: \$78,356.00

Title: Mixed Automated and Manual Traffic

- **USTRANSCOM/California State University Long Beach**

Period: 3/1/98- 12/1999 Amount: \$450,000.00

Title: Center for Commercial Deployment of Transportation Technologies

- **USTRANSCOM/California State University Long Beach**

Period: 9/1999-8/00 Amount: \$427,000.00

Title: Center for Commercial Deployment of Transportation Technologies

- **National Science Foundation**

Period: 5/1/99-4/30/2002 Amount: \$240,000.00

Title: On-Line Learning and Control of Partially-Known and Unknown Non-Linear Systems

- **Caltrans/PATH**

Period: 9/01/99-6/30/2001 Amount: \$190, 217.00

Title: Evaluation of the Effects of Intelligent Cruise Control Vehicles in Mixed Traffic

- **Caltrans**

Period: 1/99-1/2000 Amount: \$274,400

Title: Cooperation on Transportation Research

(Co-PI with R. Hall, J. Moore, E. Axelband and G. Giuliano)

- **DOT/METRANS**
 Period: 7/1/99-8/31/2000 Amount: \$50,000
 Title: Modeling and Route Guidance of Trucks in Metropolitan Area
- **NASA/California State University Los Angeles**
 Period: 1/2000-12/2002 Amount: \$162,420.00
 Title: Control of a Large Segmented Space Reflector Test Bed
- **DOT/METRANS**
 Period: 9/1/2000-8/31/2001 Amount: \$47,000
 Title: Dynamic Optimization of Cargo Movement by Trucks in Metropolitan Areas with Adjacent Ports
- **Caltrans/PATH**
 Period: 1/01/01-6/30/2003 Amount: \$232,845
 Title: Control of Heavy Duty Vehicles; Environmental and Fuel Economy Considerations
- **Air Force/California State University Los Angeles**
 Period: 8/1/01- 7/31/04 Amount: \$800,000
 Title: Multidisciplinary Analyses and Control of High Performance Air Vehicles
 (Co-PI with M. Mirmirani, H. Boussalis and C. Wu)
- **DOT/METRANS**
 Period: 7/1/2001-8/31/2002 Amount: \$50,000
 Title: Automated Trucks on Dedicated Lanes for Cargo Movement
- **National Science Foundation/USDOT**
 Period: 1/01/02-12/31/02 Amount: \$99,933
 Title: Dynamic Cargo Assignment and Route Planning in the Trucking Industry
 (Co-PI with R. Hall and M. Dessouky)
- **PATH/Caltrans**
 Period: 10/01/03- 6/30/06 Amount: \$416,338.00
 Integrated Roadway/Adaptive Cruise Control System: Safety, Performance, Environmental and Near Term Deployment Considerations
- **NASA/ California State University Los Angeles**
 Period: 03/01/03-02/28/08 Amount: \$3,000,000
 Title: Intelligent Flight Control
 (with M. Mirmirani)
- **METRANS**
 Period: 8/1/2003-3/31/2005 Amount: \$190,000
 Title: Cooperative Optimum Time Window Generation for Cargo Delivery/Pick up with Application to Container Terminals
 (with A. Chassiakos)
- **METRANS**
 Period: 8/15/2003-8/14/2004 Amount: \$90,000

Title: A Novel Approach to Routing and Dispatching Trucks Based on Partial Information in a Dynamic Environment
(with M. Dessouky)

- **DOT University Center**
Period: 10/21/98-06/30/07 Amount: \$4,957,200.00
Title: Metropolitan Transportation Center (METRANS)
(with G. Giuliano (PI), R. Hall, J. Moore)
- **CALTRANS University Center**
Period: 06/01/99-06/30/07 Amount: \$4,285,200.00
Title: Metropolitan Transportation Center (METRANS)
(with G. Giuliano (PI), R. Hall, J. Moore)
- **METRANS**
Period: 10/01/2004-12/05/2005 Amount: \$150,000
Title: Development of Methods for Handling Empty Containers with Applications in the Los Angeles/Long Beach Port
(with A. Chassiakos)
- **METRANS**
Period: 09/01/2005-08/31/2006 Amount: \$150,000
Title: Simulation Test bed and Evaluation of Truck Movement Concepts on Terminal Efficiency and Traffic Flow
(with A. Chassiakos)
- **National Science Foundation**
Period: 08/15/05-07/31/2008 Amount: \$240,000
Title: GOALI: Nonlinear Adaptive Control and Sensing for Precision Control with Application to Servo Control of Disk Drives
(with Alvin Despain)
- **US DOT Research and Special Projects Administration**
Period: 07/01/05-06/30/06 Amount: \$780,000.00
Title: Metropolitan Transportation Center (METRANS)
(with G. Giuliano (PI), J. Moore, M. Dessouky)
- **California Department of Transportation**
Period: 07/01/05-06/30/06 Amount: \$780,000.00 (matching funds)
Title: Metropolitan Transportation Center (METRANS)
(with G. Giuliano (PI), J. Moore, M. Dessouky)
- **US DOT Research and Special Projects Administration**
Period: 07/01/06-06/30/07 Amount: \$860,000.00
Title: Metropolitan Transportation Center (METRANS)
(with G. Giuliano (PI), J. Moore, M. Dessouky)
- **California Department of Transportation**
Period: 07/01/06-06/30/07 Amount: \$860,000.00 (matching funds)
Title: Metropolitan Transportation Center (METRANS)

(with G. Giuliano (PI), J. Moore, M. Dessouky)

- **US DOT Research and Special Projects Administration**
Period: 07/01/07-06/30/10 Amount: \$3,000,000.00
Title: Metropolitan Transportation Center (METRANS)
(with G. Giuliano (PI), J. Moore, M. Dessouky)
- **California Department of Transportation**
Period: 07/01/07-06/30/10 Amount: \$3,000,000.00 (matching funds)
Title: Metropolitan Transportation Center (METRANS)
(with G. Giuliano (PI), J. Moore, M. Dessouky)
- **METRANS**
Period: 02/01/2007-01/31/2009 Amount: \$359,507.00
Title: Reconfiguration Strategies for Mitigating the Impacts of Port Disruptions
(with A. Chassiakos)
- **Foundation for Research Promotion/University of Cyprus**
Period: January 2007- December 2008, Amount:\$178,000
Title: TrafficNet
(with A. Pitsillides)
- **NASA/ California State University Los Angeles**
Period: 03/01/07-02/28/09 Amount: \$442,500
Title: Intelligent Flight Control
(with M. Mirmirani)
- **METRANS**
Period: 09/01/2008-08/31/2009 Amount: \$90,000
Title: Security and Vulnerability of Major Infrastructure, and Safety and Risk Mitigation
(with J.P. Bardet and J. Moore)
- **California Department of Transportation**
Period: 10/01/06-09/30/11 Amount: \$1,659,600
Title: Metropolitan Transportation Center (METRANS), Grant DTRT07-G-0060
(with G. Giuliano (PI), J. Moore, M. Dessouky)

Ph.D Students

Graduated a total of 24 PhD students as of November 2008,
11 are in Academia and 4 are Fellows of IEEE. See list below:

1. **Manuel de Ponte**
"Decentralized Adaptive Control for Large Scale Systems"
Graduated July 1988
2. **Kostas Tsakalis**
"Adaptive Control of Time Varying Plants"
Graduated August 1988
Professor at Arizona State University
3. **John Reed**
"Robust Adaptive Control of Robotic Manipulators"
Graduated August 1988
4. **Jing Sun**
"Robust Adaptive Tuning of Controllers"
Graduated August 1989
Professor University of Michigan Ann Arbor
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5. **Gang Tao**
"Model Reference Adaptive Control: Stability, Robustness and Performance Improvement"
Graduated August 1989
Professor at University of Virginia in Charlottesville
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6. Anastasios Economides
"A Unified Game-Theoretic Methodology for the Joint Load Sharing, Routing and Congestion Control Problem"
Graduated December 1990
Professor at University of Macedonia
7. Aniruddha Datta
"Quantitative Analysis and Robust Design of Adaptive Control Systems: Robustness Performance Tradeoffs"
Graduated August 1991,
Professor at Texas A&M University
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8. **Marios Polycarpou**
"Artificial Neural Networks for Control Applications"
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Professor at University of Cyprus
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9. **Farid Ahmed-Zaid**
Control and Adaptation of Time Varying Nonlinear Systems"
Graduated summer 1993
With Ford Motor Company
10. **Michael Demetriou**
"Robust Adaptive Control for Infinite Dimensional Systems"
Graduated summer 1993
Professor at Worcester University
11. **C.C. Chien**
"Intelligent Vehicles and Highway Systems"
Graduated summer 1994
Professor in Taiwan
12. **Youping Zhang**
" Robustness of Nonlinear Adaptive Control "
Graduated summer 1996
USA
13. **Humair Raza**
"Infrastructure Managed Vehicle Following: A Control Perspective"
Graduated summer 1997
Systems Architect
Transparent Networks Inc
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"Automated Highway Systems: Concepts, Spacing Requirements and Performance"
Graduated December 2000
Research Engineer
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15. **Arnab Bose**
"Design, Analysis and Evaluation of Semi-Automated Vehicles in Mixed Traffic"
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16. **Kun Li**
"Modeling and Overlapping Decentralized Control of a Large Segmented Telescope Test Bed"
Graduated August, 2001
17. **Chin I Liu**
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20. Baris Fidan

“Nonlinear and Adaptive Control of Time Varying and Multivariable Systems”

Graduated December 2002

Research Associate

Australian National University

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Intelligent Congestion Control for Computer Networks

Graduated October 2005

University of Cyprus

22. Jianlong Zhang

‘Practical Adaptive Control: Theory and Applications’

Graduated February 2006

Advertising.com, San Jose, California

23. Manorama Gollakota

‘GPS Receiver Improvements for Low Signal-to-Noise Ratio Applications’

Graduated December 2006

Aerospace Corporation, El Segundo, CA

24. Nazli Kahveci ‘Robust Adaptive Control for Unmanned Aerial Vehicles’

December 2007

Ford Motor Company

PhD Guidance Committee Member (not main advisor, most recent)

2007

• **Yann Daniel Staelens**

Study of Belly-Flaps to Enhance Lift and Pitching Moment Coefficient of a Blended-Wing-Body Airplane in Landing and Take off Configuration

Department of Aerospace and Mechanical Engineering,

December 2007

• **Serkan Kalender**

Robust Control of Periodically Time-Varying Systems

Department of Aerospace and Mechanical Engineering,
August 2007

- **Jeffrey Miller**
'Algorithms and Data Structures for the Real-Time Processing of Traffic Data'
Department of Computer Science
April 2007

2006

- **Babak Mokaberi-Nezhad**
Uncertainty Compensation and Automated Nanomanipulation with Atomic Force Microscopes
Fall 2006
- **Ken Suwarno Susanto**
Design, Modeling and Analysis of Piezoelectric Forceps Actuator
December 2006

2005

- **Paul Ayanendu**
Multi-Controller Adaptive Control (MCAC): Cost Detectability, Stability and Some Applications
August 2005
- **Rengrong Wang**
Applications and Stability of Unfalsified Adaptive Control Using Multiple Controllers
August 2005
- **Margareta Stefanovic**
Safe Switching Adaptive Control: Stability and Convergence
May 2005
- **Serkan Kalender**
Control of Periodically Time-Varying Systems with Applications in Mechanical and Aerospace Engineering Problems
June 2005
- **Yann Staelens**
Study of Novel Pitch Control Effectors for a Blended Wing Body Airplane in Takeoff and Landing Configuration
January 2006

2004

- **Nicholas Oleng**
"Decentralized Adaptive Control"
Yale University, March, 2004

2002

- **Lydie Nouveliere**
"Commandes Robustes Appliquees Au Controle Assiste D'un Vehicule A basse Vitesse"
LIVIC, Paris, France, Dec. 5, 2002
- **Hakan Kizilocak**
"Coordinated Multi-Agent Pursuit Using Probabilistic Maps"
Univ. of Southern Calif., Sept. 12, 2002
- **Hsing-Han Meng**
"Stability Analysis and Robust Control Synthesis with Generalized Multipliers"

Univ. of Southern Cal. June 26, 2002

2003

- **Ahmed Mazen Wahbeh**
“Analytical and Experimental Studies in Nonlinear Structural Health Monitoring and System Identification”
Univ. of Southern Calif., Dept. of Civil Engineering, October 2003

PUBLICATIONS

A. Books

1. P. A. Ioannou and P. V. Kokotovic, Adaptive Systems with Reduced Models, Springer-Verlag, 1983.
2. K. S. Tsakalis and P. A. Ioannou, Linear Time Varying Plants: Control and Adaptation, Prentice-Hall, 1993.
3. P. A. Ioannou and J. Sun, Robust Adaptive Control, Prentice Hall, 1996
4. P.A. Ioannou and B. Fidan, Adaptive Control Tutorial, SIAM – Society for Industrial & Applied Mathematics, TJ217.I628, ISBN 0-89871-615-2, 2006.

B. Edited Books

5. Khallil, H., J. Chow and P. Ioannou, Proceedings of Workshop on Advances in Control and its Applications, Springer Verlag, Lecture Notes in Control and Information Sciences, Vol.208, 1996
6. P.A. Ioannou, Automated Highway Systems, Plenum, 1997
7. P.A. Ioannou Intelligent Freight Transportation, CRC Press, 2008
8. P. A. Ioannou and A. Pitsillides Modelling and Control of Complex Systems, CRC Press, 2007

C. Chapters in Books

1. P. A. Ioannou, "Design of Decentralized Adaptive Systems," in Advances in Large Scale Systems-- Theory and Applications, Vol. 1, edited by J. B. Cruz, 1984, pp. 117-141.
2. 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, pp. 73-87.
3. P. A. Ioannou and A. Datta, "Robust Adaptive Control: Design, Analysis and Robustness Bounds," in Grainger Lectures, edited by P. V. Kokotovic, Springer-Verlag, 1991.
4. A. Datta and P. A. Ioannou, "Decentralized Adaptive Control," in High Performance Systems Techniques and Applications, Academic Press, Vol. 53, edited by C. T. Leondes, 1992.

5. G. Tao and P. A. Ioannou, "Stability and Robustness of Multivariable Model Reference Adaptive Control Schemes" in High Performance Systems Techniques and Applications, Academic Press, Vol. 53, edited by C. T. Leondes, 1992.
 6. Polycarpou M. and P. Ioannou, "Stable Nonlinear System Identification Using Neural Network Models", in Neural Networks in Robotics, pp. 147-164, Eds. G. Bekey and K. Goldberg, Kluwer Academic Publishers, 1993
 7. P. Ioannou, "Model Reference Adaptive Control" in The Handbook of Brain Theory and Neural Networks Ed. M. Arbib, The MIT Press, 1995
 8. P. Ioannou, "Model Reference Adaptive Control" in The Control Handbook, Ed. W. Levine, CRC Press and IEEE Press, 1996
 9. P. Ioannou and A. Bose, "Automated Vehicle Control" Handbook of Transportation Science, Ed. R. Hall, pp.187-233, 1999, Kluwer Academic Publishers
 10. P. Ioannou and E. Kosmatopoulos, "Adaptive Control", Encyclopedia of Electrical and Electronics Engineering, Ed. J.G. Webster, John Wiley and Sons, 1999
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11. Haojian Xu, Pirre Leung, Maj Mirmirani, Helen Boussalis and Petros Ioannou, 'Adaptive Sliding Mode Control of a Hypersonic Flight Vehicle' Ed. L. D'Amario, L. Sackett, D. Scheeres and B. Williams, Vo. 108, Part II Advances in the Astronautical Sciences, American Astronautical Society, pp. 1947-1961
 12. Petros Ioannou and Arnab Bose 'Automated Vehicle Control' Handbook of Transportation Science, Ed. R. Hall, pp.193-241, 2002 2nd Edition , Kluwer Academic Publishers
- 2005**
13. P. Ioannou and A. Bose 'Automated Vehicle Control' in The Future of Automated Freight Transport: Concepts, Design and Implementation Eds R. Konings, H. Priemus and P. Nijkamp, Edward Elgar Publishing, Inc. 2005, pp.113-129
- 2007**
14. P. Ioannou, Y. Wang and H. Chang 'Modeling, Simulation and Control of Transportation Systems' Chapter 13 pp.407-437 in the book Modeling and Control of Complex Systems, CRC Press, 2007 ed. P. Ioannou and A. Pitsillides, 2007
 15. M. Lestas, A. Pitsillides and P. Ioannou, 'Congestion Control in Computer Networks' Chapter 7 pp.203-246 in the book Modeling and Control of Complex Systems, CRC Press, 2007 ed. P. Ioannou and A. Pitsillides, 2007

D. Refereed Journal Papers

1980

1. M. H. Patel and P. A. Ioannou, "Comparative Performance Study of Paddle-and Wedge-Type Wave Generators," Journal of Hydronautics, Vol. 14, No. 1, January 1980, pp. 5-9.

1981

2. P. A. Ioannou, "Robustness of Absolute Stability," International Journal of Control, 1981, Vol. 34, No. 5, pp. 1027-1033.

1982

3. P. A. Ioannou and P. V. Kokotovic, "An Asymptotic Error Analysis of Identifiers and Adaptive Observers in the Presence of Parasitics," IEEE Trans. on Automatic Control, Vol. 27, No. 4, August 1982, pp. 921-927.

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15. J. Reed and P. A. Ioannou, "Discrete-Time Decentralized Adaptive Control," Automatica, Vol. 24, No. 3, pp. 419-421, 1988.
16. G. Tao and P. A. Ioannou, "Strictly Positive Real Matrices and the Lefschetz-Kalman-Yakubovich Lemma," IEEE Trans. on Automatic Control, Vol. 33, No. 12, pp. 1183-1185, December 1988.

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21. J. S. Reed and P. A. Ioannou, "Instability Analysis and Robust Adaptive Control of Robotic Manipulators," IEEE Journal of Robotics and Automation, Vol. 5, No. 3, pp. 381-386, June 1989.
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23. G. Tao and P. A. Ioannou, "Robust Stability and Performance Improvement of Discrete-Time Multivariable Adaptive Control Systems," Int. J. of Control, Vol. 50, No. 5, pp. 1835-1855, 1989.

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Invited Conference Papers

1981

1. P. A. Ioannou and C. R. Johnson, Jr., "Reduced-Order Performance of Parallel and Series-Parallel Identifiers of Two-Time Scale Systems," Proc. of the Workshop on Applications of Adaptive Systems Theory, Yale University, May 1981, pp. 169-175.

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2. P. A. Ioannou and P. V. Kokotovic, "Reduced-Order Adaptive Control," IFAC Workshop on Singular Perturbations and Robustness of Control Systems, Lake Ohrid, Yugoslavia, July 1982.
3. P. A. Ioannou and P. V. Kokotovic, "Singular Perturbations and Robust Redesign of Adaptive Control," The 21st Conference on Decision and Control, Orlando, FL, December 1982.

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4. P. A. Ioannou, "Robust Redesign of Adaptive Control in the Presence of Disturbances and Unmodeled Dynamics," The IFAC Workshop on Adaptive Systems in Control and Signal Processing, June 1983 (presented at the Plenary Session). Invited paper.
5. P. A. Ioannou, "Adaptive Control of Interconnected Systems in the Presence of Disturbances," The Third Yale Workshop on Applications of Adaptive Systems Theory, June 1983, pp. 164-167.
6. P. A. Ioannou and P. V. Kokotovic, "Improvement of Robustness of Adaptive Schemes," The Third Yale Workshop on Applications of Adaptive Systems Theory, June 1983. Invited paper, pp. 148-153.

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7. P. A. Ioannou and M. DePonte, Jr., "Adaptive Control Techniques for a Class of Large-Scale Systems," American Control Conference, San Diego, CA, June 1984.
8. P. A. Ioannou, "Robust Adaptive Control," American Control Conference, San Diego, CA, June 1984.
9. P. A. Ioannou, "Robust Direct Adaptive Control," The 23rd Conference on Decision and Control, December 1984.

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10. P. A. Ioannou and J. Sun, "Robust Adaptive Tuning of Controllers," Proc. 25th IEEE Conf. on Decision and Control, Athens, Greece, December 1986.

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11. J. Sun and P. A. Ioannou, "The Theory and Design of Robust Adaptive Controllers," Proc. Fifth Yale Workshop on Applications of Adaptive Systems Theory, May 1987.

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12. J. S. Reed and P. A. Ioannou, "Instability Analysis and Robust Adaptive Control of Robotic Manipulators," Proc. 27th IEEE Conf. on Decision and Control, pp. 1607-1611, December 1988.
13. P. A. Ioannou and K. S. Tsakalis, "The Class of Unmodeled Dynamics in Robust Adaptive Control," American Control Conference, Atlanta, Georgia, pp. 337-342, June 1988.
14. K. S. Tsakalis and P. A. Ioannou, "Parameter Estimation and Pole-Placement Control of Time-Varying Plants," American Control Conference, Atlanta, Georgia, pp. 1636-1641, June 1988.

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16. A. Chassiakos, A. Pak and P. A. Ioannou, "Non-linear Robust Adaptive Control of a SCARA Manipulator," Proc. 1989 American Control Conference, Pittsburgh, PA, June 1989, pp. 1469-1475.
17. P. A. Ioannou and J. Sun, "Robust Adaptive Control: A Unified Approach," Proc. 28th IEEE Conf. on Decision and Control, December 1989, Tampa, FL.

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18. J. Sun and P. A. Ioannou, "Parameter Convergence of Modified Adaptive Laws with Persistent Excitation," Proc. 1990 American Control Conference, San Diego, CA, May 1990, p. 565-566.
19. P. Ioannou, "Robust Adaptive Control," The Sixth Yale Workshop on Applications of Adaptive Systems Theory, August 1990, p. 32-39.

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20. C. C. Chien and P. A. Ioannou, "Automatic Vehicle-Following," Proc. 1992, American Control Conference, Chicago, IL, June 1992, pp. 1748-1752.
21. P. A. Ioannou, C. C. Chien, and J. Hauser, "Autonomous Intelligent Cruise Control," Proc. of the IVHS America 1992 Annual Meeting, Newport Beach, CA, May, 1992, pp. 97-112.
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3. Review of the book Adaptive Control of Systems with Actuator and Sensor Nonlinearities by Gang Tao and Petar Kokotovic, Automatica 37, 2001, pp1685-1687

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1. 'Servo Control and Method Using Absolute Value Input Signals. Petros Ioannou, Elias Kosmatopoulos, Alvin Despain. Patent Number US 6, 545,836 B1, April 2003