

Nikos A. Aspragathos

Professor

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Professor Nikos A. Aspragathos
Robotics Group
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Professor Nikos A. Aspragathos leads the Robotics Group in Mechanical and Aeronautics Engineering Department, University of Patras, Greece. His main research interests are robotics, intelligent motion planning and control for mobile robots and dextrous manipulation, metamorphic manipulator design, knowledge-based design, industrial automation, and computer graphics.

He is reviewer in more than 30 Journals and more than 20 conferences, member of the editorial board of the Mechatronics Journal, ROBOTICA, and ISRN Robotics. He published more than 65 papers in Journals, more than 130 in conference proceedings and several book chapters. His work cited 822 times (Scopus) and 1030 times (Google Scholar). Proposals reviewer or Jury member in Greece and abroad. Member of Advisory Group for New Robotics Engineering Book Series, ASME Press.

He was and is currently involved in research projects funded by Greek and European Union sources.

ACADEMIC QUALIFICATIONS

1975 Diploma of Electrical Engineer, School of Engineering, University of Patras, Greece.

1982 PhD, School of Engineering, University of Patras, Greece.

SCHOLARSHIPS AND AWARDS

Greek Government (1974-75),

Technical Chamber of Greece (1973-74 and 1974-75).

INDUSTRIAL EXPERIENCE

1973-74 Assistant engineer, construction of Kardia-Ptolemais Power Station.

1975-76 Corp of Engineers of the Greek Armed Forces, Engineer.

1977-79 Maintenance Engineer, Asbestos-Cement Plant AMIANTIT, Patras.

1977-88 Consulting Engineer for the Industry.

TEACHING AND RESEARCH EXPERIENCE

1977-82 Research Assistant, Machine Design Laboratory, School of Engineering of the University of Patras.

1982-86 Lecturer, Department of Mechanical Engineering, University of Patras.

1983 for three months, visiting fellow, Department of Mechanical Engineering of University of New Castle Upon-Tyne, UK.

1986-1993 Assistant Professor, Department of Mechanical Engineering, University of Patras.

1987-88 Sabbatical at Mechanical and Manufacturing Systems Engineering, UWIST, Cardiff, UK.

1993-2001 Associate Professor, Department of Mechanical Engineering and Aeronautics.

2001- Professor, Department of Mechanical Engineering and Aeronautics.

2011-2012, For 5 months Visiting Researcher in CEA-LIST, Fontenay-aux-Roses, Paris

RESEARCH INTERESTS

Robot Motion Planning.

Motion planning of redundant or non-redundant robots and robot control based on Artificial Intelligence using Genetic Algorithms, Neural Networks, Multi-agent and Computational Geometry. Trajectory generation under accuracy constraints. Optimal robot motion planning and task scheduling strategies in environments cluttered with obstacles. Robot fine motion in contact with the environment with applications in assembly automation. Manipulation of microparts towards parallel microassembly automation.

Robot Control.

Intelligent robot control for handling of non-rigid materials. Intelligent control for rehabilitation. Control for grasping of fragile objects based on Fuzzy Logic and tactile feedback. Robot modularization and reconfigurability. Robots with elastic joints. Hybrid adaptive and sliding mode force/position control.

Mechatronic Design of production systems and machines.

Knowledge-based systems for designing of mechatronic systems and devices. Introduction of new indices for the evaluation of design solutions. Design of metamorphic manipulators.

Flattening of non-developable surfaces. Representation and transformation of object models based on line geometry and screw theory.

Modeling the dynamic behavior of electromechanical systems.

Friction models and calculation of the fatigue life for gears and shafts. Backlash and stick-slip modeling and investigation. Computer Aided Design of electromechanical systems. Identification of cracks.

RESEARCH PROJECTS

- “A Software Package for Robot Simulation and Off-Line Programming”, General Secretariat for Research and Technology, 89EΔ299.
- “Development of a Software Package for Shoe Design”, General Secretariat for Research and Technology-ELKEDE, 89ΠΣ58.
- “Introduction of Advanced Technology in Textile and Cloth Industry”, General Secretariat for Research and Technology, TEXTILE/STRIDE 269
- "Advanced Robot Assembly (ROBAS)", COPERNICUS Project CP94/00510.
- "Handling of Non-Rigid Materials with Robots", HOMER, PL964438, INCO-COPERNICUS
- Development of a CAD/CAM system for Shoe manufacturing. EAKEDAE 1997.
- Advanced Product-Support Technologies Network, APOST, ASIA IT&C, 2001.
- XROMA, “Robot handling of Non-Rigid Materials of Sheet Form”, General Secretariat for Research and Technology, PENED 2001.
- Optimal Robot Path Planning based on Computational Geometry, University of Patras, 2003.
- Development of a Methodology for the Systematic Conceptual Mechatronics Design, Pythagoras, University of Patras. Development of Computational Intelligent Methods for the Rehabilitation of the Lower Limbs, PEP of Western Greece.
- INTERWELD, Intelligent Robotic Laser Welding and Hardening Cell, MANUNET ERA-NET, 2012

NETWORKS OF EXCELLENCE

- IPROMS, Innovative PROduction Machines and Systems
- 4M, Multi-Material Micro Manufacture: Technologies and Applications
- EURON, EUropean RObotics research Network

TEACHING EXPERIENCE

Courses

1. "Electrical Engineering I and II", 3rd and 4th semester, Mechanical Engineering and Aeronautics Dpt, University of Patras, 1982 to present.
2. "Vibrations of Mechanical Systems", 9th semester, Mechanical Engineering and Aeronautics Dpt, University of Patras, 1983-1985.
3. "Computer Aided Design", 10th semester, Mechanical Engineering and Aeronautics Dpt, University of Patras, 1983-87, 2001-2002
4. "Robotics", 9th semester, Mechanical Engineering and Aeronautics Dpt, University of Patras, 1986 to present.
5. "Descriptive Geometry", 1st semester, Mechanical Engineering and Aeronautics Dpt, University of Patras, 1983-84.
6. "Control Systems", 8th semester, Mechanical Engineering and Aeronautics Dpt, University of Patras, 1988 to 1992.
7. "Hydraulic and Pneumatic Automation", EEC supported Seminar.
8. "CNC Machines", Mechanical Engineering and Aeronautics Dpt, University of Patras, 1994
9. "Kinematics of Mechanisms and Machines", Mechanical Engineering and Aeronautics Dpt, University of Patras, 1994
10. "Industrial Automation", Mechanical Engineering and Aeronautics Dpt, University of Patras, 1996 to present.
11. "Advanced Robotics", Postgraduate Course, Mechanical Engineering and Aeronautics Dpt 1998 to present
12. "Mechatronics", Mechanical Engineering and Aeronautics Dpt
13. "Applications of Artificial Intelligence in Engineering" Mechanical Engineering and Aeronautics Dpt

Invited Lectures and Seminars

- Seminar on «Genetic Algorithms and Applications in Optimization», IPROMS Network of Excellence, April 2006
- Lecture on «Handling of Non-Rigid Materials with Robots», Ritsumeikan University, Kyoto, Japan September 2009
- Lecture on "Microassembly", 4M, Network of Excellence,
- Lecture on "Micro-Manipulation and micro-assembly Techniques", Seoul National University, October 2007.
- Seminar in 5 Courses on "Introduction to Fuzzy Logic and Fuzzy Logic Control", CEA, Fontenay aux Roses, Paris, 2011-2012
 - Intelligent and conventional control
 - Fuzzy Control: A Tutorial Introduction
 - General Fuzzy Systems Theory
 - Fuzzy Identification and Estimation
 - Adaptive Fuzzy Control
 - Fuzzy Supervisory Control
- Seminar in one Course on Genetic Algorithms and Applications, CEA, Fontenay aux Roses, Paris, January 2012
- Lecture on "Mission planning and manipulation of non-rigid objects", Department of Precision Instruments and Mechanology, Tsinghua University, Beijing, July 2012.
- Invited presentation of proposal idea 'Interactive robot handling of non-rigid materials (fabrics and cloths)', Turkey Enabling Technologies, May 2012.
- Mission planning of robots and intelligent control of robots for manipulation of non-rigid objects, Department of Engineering Cybernetics, Norwegian University of Science and

Technology, 2013

PhD and final year projects advisor

- a) Seven (7) finished PhDs.
- b) Supervising 6 PhD Students and
- c) A considerable number of final year projects was supervised is currently supervising.

External examiner of PhD

- A number of Greek University
- NORWEGIAN UNIVERSITY OF SCIENCE AND TECHNOLOGY Department of Engineering Cybernetics, Trondheim, Norway

EDITORIAL BOARDS AND CONFERENCE COMMITTEES

Editorial board of Journals

- Mechatronics Journal, Elsevier
- International Journal of Automation and Control till 2012
- ROBOTICA
- ISRN Robotics

Member of Advisor Group

- Member of Advisory Group for New Robotics Engineering Book Series, ASME Press

Conference Committees

- Vth International Conference on Systems Engineering, Coventry, 13-15 September, 1988.
- Programme Committee, Conference on Advance Manufacturing Technology, Rouse, May 1993.
- Programme Committee, EURICSON'98, Athens, June 1998
- European Workshop on Service and Humanoid Robots
- IEEE Conference on Industrial Informatics, INDIN 2003
- IEEE International **Conference on Mechatronics 2004**
- Proceedings of the Second International Conference on Informatics in Control, Automation and Robotics, Barcelona, Spain, September 14-17, 2005, ICINCO 2005,
- Intelligenet Production Machnes and Systems Conference, IPROMS 2005, 2006, 2007, 2008, 2009.
- European Control Conference, ECC'07
- 17th Mediterranean Conference on Control and Automation (MED'09-13)
- Symposium on Robotics Control, SYROCO 2006 and 2009
- International Conference on Control, Automation and Systems (ICCAS) 2006 and 2008
- European Conference on Knowledge | Service | Production, September 2007 | Stuttgart, Germany
- International Conference on Advancements on Information Technology (IAIT2007)
- ASME/IEEE International Conference on Reconfigurable Mechanisms and Robotics, ReMAR2009 and ReMAR2012
- The 2011 International Conference on Intelligent Robotics and Applications, ICIRA11

SPECIAL ISSUES AND SPECIAL SESSIONS

- Moulianitis, V.C ., Aspragathos, N.A., Introduction to the special issue on Theories and Methodologies for Mechatronics design, Mechatronics 20 (8), pp. 825-826, 2010

- Special IPROMS session on “Intelligent Control in Manufacturing”, European Control Conference, 2007
- Special session on “Methods for multiple mobile robots control”, SYROCO 09
- Special session VI: Handling and manipulation of non-rigid objects using robots, ICIRA 11

Reviewer for Journals, Conferences and Research Projects

Journals

Reviewer for about 40 Journals such as

- Mechanical Systems and Signal Processing
- Robotica
- IEEE Transactions on Systems Man and Cybernetics
- IEEE/ASME Transactions on Mechatronics
- IEEE Transactions on Industrial Informatics?
- IEE
- IMech Proceedings on Systems and Control
- Imech Proceedings on Mechanical Engineering
- Mechanisms and Machine Theory
- Robots and Autonomous Systems
- Operational Research Spectrum

Conferences

Reviewer for more than 30 conferences such as the aforementioned ones.

Proposals reviewer or Jury member Invited Expert

- Member of the Jury for Equipex 2011, Agence National de la Recherche, ANR, Paris.
- European Commission
- Reviewer for Basic research proposals, National Technical University of Athens
- Reviewer of proposals for PhD Scholarships, National Agency for Scholarships, IKY, Greece
- Extract-IT workshop 12&13 June 2013

CITATIONS

Scopus (822)

(Two codes are assigned to my name)

<http://www.scopus.com/authid/detail.url?origin=resultslist&authorId=7003803146&zone=>
<http://www.scopus.com/authid/detail.url?origin=resultslist&authorId=55708892000&zone=>

Web of Knowledge (564):

http://apps.webofknowledge.com/CitationReport.do?product=WOS&search_mode=CitationReport&SID=Z1oI69od3GinGDaiO15&page=1&cr_pqid=1&viewType=summary

Collaboration with Centers of Excellence

He has close collaboration with well-known laboratories in International Universities and research Institutes such as

- University of Cardiff
- University of Napoli
- University of Portsmouth
- University of Birmingham
- University of Montpellier II
- King's College

- CEA, Fontenay-aux-Roses, Paris
- University of Freiburg