Biographic Information

Dr. NIKOLAOS G. BOURBAKIS

2012

Table of Context

CAREER SYNOPSIS

Nikolaos Bourbakis received a ***BSc*** in mathematics from National University of Athens, Athens, Greece, a ***Certificate*** in electrical engineering (4 years) from University of Patras, Greece, and a ***Doctoral Degree*** in computer engineering and informatics (*awarded with excellence*), Dept. of Computer Engineering & Informatics, University of Patras, Patras, Greece.

♦ Professional Positions in Ohio

- **Visiting Research Professor,** Ohio State University (OSU), ECE Dept., (2011-present), working as an essential co-PI on major NSF project--proposals (EFRI, CPS, IGERT, SHWB, STC, IUPC);
- **OBR Distinguished Professor of IT** (Feb. 2001 - present) teaching, advising, graduating students and promoting excellence on research and education;
- **Director of the Assistive Technologies Research Center** (ATRC) (2007 - present) developing advanced devices and methodologies for people with disabilities and people at risk;
- **Professor with Jnt. Appointment, Dept of Geriatrics, School of Medicine** (2010 – present) collaborating and developing devices and technologies for people at risk and the elderly;
- **Visiting Research Professor** at TUC, Chania, Greece (2006 - present) promoting collaboration with European Universities (Greece, Italy, Germany, Spain) on research and educational issues;
- **Associate Dean for Research**, College of Engineering (3 years appointment, 2007-2009), Wright State University promoting and conducting research and creating partnerships among academia, industry for research and development;
- **Director** of the Information Technology Research Institute (ITRI), (six years 2001-2006) promoting and developing partnerships with industry and Government for economic development and education;
- **Director** of the CSE PhD Program at Wright State University (2001-2006) promoting research initiatives for graduate education in Computer Sciences in collaboration with the Ohio Board of Regents (OBR) and the Dayton Graduate Institute (DAGSI);

Previous working places:

- **Professor** (1996-2000) in Electrical Engineering Dept. & Computer Science Dept. (SUNY); and **Director** of the research labs (Intelligent Robotics & Applied AI, Image-Video Processing & Machine Vision (1992-2000) (SUNY). *His major activities and responsibilities were to contacting research on applied AI and biomedical informatics, graduating students, receiving external funding, teaching and developing courses, and providing service to university and to professional scientific societies.*
- **Associate Director** (1995-2000) of the Center of Intelligent Systems, (SUNY) *responsible for partnerships in academia.*
- **Professor** (1999-2000 sabbatical) at the Technical University of Crete (TUC), Greece, and **Director** (1999-2000) of the Intelligent Systems Research Lab. *His major activities and responsibilities were to contacting research on applied AI and biomedical informatics, teaching and developing courses, and providing service to university and to professional scientific societies.*
- **Associate Researcher**, Air Force at Rome Research Lab, NY 1997, *responsible for developing a research project for automatic tracking targets from video.*
- **Staff Scientist,** (1989-1991) IBM in SSPD for Performance Evaluation of the I/O Systems, collaboration with the Expert Systems Division and Almaden Research Center, S. Jose California. *His responsibility was the SPN modeling and simulation of I/O subsystems and the automatic generation of code from specs.*
- **Assistant Professor** at GMU *responsible for research and teaching on Machine Vision and Image Processing (1984-89).*
- **Lecturer** (1983-86) at the University of Patras *responsible for research and development in*

multiprocessor Retina-based Vision Systems.

- **Graduate Research Assistant** (1978-83) at the University of Patras *responsible for research studies on Digital Image and Vision Systems.*

♦ Academic and Professional Leadership and Vision

Researcher- Educator:

He has published more than 365 articles (*120 Journal papers*) in refereed Int. Journals, Conference Proceedings, and book-chapters. His research work has recognized and cited by other researchers. He has developed and taught 21 courses (EE, CS, CSE), participated or chaired university curriculum committees, and served as an external curriculum evaluator of several CS and CSE Dept. He has directed and completed 19 PhDs (5 in progress) and 40 Masters in the areas Computing, Applied AI, Assistive Technologies and Bio-Engineering. He is an author, co-author or editor of 10 books.

Research Activities and Interests:

The last 27 years his research activities (two major thrusts) cover:

Assistive Technologies, Biomedical & Healthcare Engineering, Intelligent Wearable Systems and Robotic Assistants*: Designing, modeling and developing intelligent high performance computing machines emulating "vision", "hearing",* and *"learning*"; *methodologies for human-like navigation and planning (using SPNG plans) in unknown environments with 2-D/3-D space maps generation and fusing different sensory data; Wearable computing devices for people with disabilities (blind) and health monitoring devices and robotic assistants for people at risk; Neuromorphic human brain modeling using autonomous SPNG modules; L-G graph methods for OCR, fingerprint, face, body position recognition, brain biometrics, and 3-D representation, of human organs (brain, intestine); robotic multi-fingered hands for paraplegic people; Digital based retina processors; Methods for detection of pathological patterns from spoken natural language applicable to aphasic and schizophrenic patients; Methods for representing the transformation of benign cells to malignant (bio-signatures) in digital video; WCE 3D methods for detecting polyps, ulcers, bleeding in the small intestine;*

Information Security, Secure Processors, Digital Systems: *Developing real-time (software languages, and ASIC/FPGA hardware) spatial based formal methods for information security (encryption, compression (lossless or lossy) and hiding) and secure processors for trustworthy networking and computing; Developing reverse engineering methods for cryptanalysis, steganoanalysis and program flow hijacking detection methods; Developing wearable systems and surveillance methodologies for extracting patterns of behavior and for healthcare monitoring and secure healthcare information exchange; Designing, modeling and simulating several computing systems based on either RISC processors or ASICs for distributing high performance computing and special purpose processing; Application specific formal languages for efficient processing, systems data flow evaluation, CAD VLSI floor-planning, synthesis and compaction.*

Notable Research Projects

Dr. Bourbakis has been recognized for significant research contributions in the areas of *space filling algorithms for 2D data accessing and information security, intelligent wearable systems for people with disabilities*, *distributed autonomous systems, agents based navigation in unknown space for autonomous robots, and image analysis*.

In particular, in the area of ***space filling curves***, he has developed a novel formal language-based methodology (called SCAN, with more than 1000 citations & refs) for the automatic generation of the **(nxn)!** space filling curves (or accessing or scanning algorithms) without writing these algorithms. *This was an "open" computational problem from 70s (Dr. Ramamoorthy 1970)*. The solution of this problem has opened the "door" for a great variety of applications" (*Dr. Klinger 1988*), especially for information security

(*encryption-hiding, where he has published the image encryption-hiding work (1988-1992*). The SCAN method was also successfully used for floor-planning, compact placement, cellular navigation, DNA representation, etc. He has received several recognitions of high prestige for the SCAN methodology.
He has also developed a ***wearable*** prototype (Tyflos (1996, with more than 2000 refs) used by visual impaired and blind individuals as a *reader, navigator and face recognizer*. Tyflos consists of a pair of dark glasses on which two tiny cameras, a microphone, an ear-speaker are attached and with a 2D vibration array are connected to a portable computer. This system uses image processing-analysis-recognition (OCR, segmentation, Local-Global graphs) and visual navigation (SPNG) methodologies developed by Dr. Bourbakis and his graduate students. Also, he has developed a wearable prototype (Prognosis, 2007) for monitoring and early detection of the elderly health conditions. This device consists of a set of wireless sensors attached to the human body or the cloth and selects valuable body signals and other symptoms interactively and makes a decision regarding the current health condition of human user.
He has also developed a unique methodology for **detecting pathological patterns (polyps, ulcers, bleeding)** in endoscopic imaging. This methodology has been used by several gastroenterologists and lately GivenImaging Inc. has expressed interesting to use it in its products. In addition, a recent paper in *Nature* (*JULY 2012 | VOLUME 9, pp. 392-405*) has characterized Dr. Bourbakis work as follows: "*3D imaging could improve discrimination of textural abnormalities. True 3D capability traditionally has required dual video images; inclusion of two cameras within a VCE device to create a stereo image might, however, be unwieldy. Rather, by comparing consecutive image frames from a video capsule recording for shading differences it has been demonstrated that 3D images can be generated*".
His OCR methodology was highly regarded and referenced by *Dr. Netravali (Director of the AT&T research labs, 1989).* Also, his fuzzy regions growing image segmentation and the **L-G graphs** techniques have been widely cited by other researchers. In a paper published in *Pattern Recognition 2008*, the authors report that "… [37] demonstrated an interesting work in which they proposed a novel facial expression recognition method based on Local-Global Graphs (LGG). The LG Graph embeds both the local information (the shape of facial feature is stored within the local graph at each node) and the global information (the topology of the face). Facial expression recognition from the detected face images is obtained by comparing the LG Expression Graphs with the existing LG expression models present in the LGG database. Each facial feature region forms a node, which is connected to other neighboring features by means of Delaunay Triangulations (DT). This topology is used for their aim to provide an invariant recognition system...". The use of this method for face detection received the best paper award ICTAI-12.
In the area of ***autonomous systems*** he has designed, modeled and simulated two vision system architectures (Hermes and Kydon) based on multi-layer array-processors (RISC, ASIC). The Kydon system emulates the perception of the human retina.

His research work has been directly associated (PI or co-PI) with **$8M** research funds from industry and government (Europe, USA) and granted with high prestigious international awards. His educational efforts have also directly associated, as PI or co-PI, with **$5.8M** in graduate and undergraduate educational research funding.

Professional Leadership:

He is/was:

- **Founder** and the **Editor-in-Chief** of the *International Journal on Artificial Intelligence Tools,* World Scientific Publisher, 1992 -present;
- **Editor-in-Charge** of a *Research Series of Books in Artificial Intelligence (World Scientific Publisher) 1992-2002;*
- **Founder** and the **Editor–in-Chief** of the *International Journal on Monitoring and Surveillance Research: Healthcare-Safety*, IGI Global Publisher, starting Jan 2013;
- **Founder and the Editor in Chief** *of the International Journal on Bioengineering & Bioinformatics, BAIF;*
- **Founder and General Chair** of IEEE Computer Society Conferences, Symposia and Workshops

(*Tools with AI (ICTAI 1989-present), Intelligent Tools (1992-93), AI in Automation (1994), Intelligence in Neural and Biological Systems (INBS-95), Intelligence in Automation and Robotics (IAR-96), Intelligence in Image, Speech, Natural Language Processing and Understanding (IISNL-96), Intelligence and Systems (I&S-98) and Information, Intelligence and Systems (II&S-99*), *Bio-Informatics and Bio-Engineering (BIBE-2000-present), Assistive Technology Research (ATR-07), Monitoring & Surveillance : Healthcare & Safety (MS-HSS 2011-12), Information, Intelligence, Systems & Applications (IISA-2013*). *He was the first to introduce the bioinformatics and assistive technology meetings in the IEEE Computer Society.*

He is/was also:

- **Associate Editor** in *IEEE Trans. Knowledge and Data Engineering, IEEE Multimedia, Int. Journal Engineering Applications of Artificial Intelligence, Int. Journal on Pattern Recognition and AI, Int. Journal Cooperative Information Systems, Journal on Pattern Recognition, Int. Journal on Intelligent and Robotic Systems, Int. Journal on Pattern Analysis & Applications, Int. Journal on Neural Systems, Int. Journal on Web Semantics, Int. Journal on Computational Intelligence in Bioinformatics; International Journal on Computational Biology and Drug Design.*
- **Guest Editor** *in more than 19 special issues in IEEE and Int. Journals* related with his research interests.
- **Founder** and the **President** of the *Biological & Artificial Intelligence Society (BAIS 2006-2011), later renamed as a Foundation* (BAIF) 2011 - present.

♦ Managerial Experience, Leadership and Vision

Dr. Bourbakis has more than 27 years research and managerial experience by respecting individuals, efficiently and effectively motivating and working with people of different background and qualifications and under different environments (university, conferences, journals, industry, government). He has the ability to leading people using his vision and motivation skills for working in teams, building coalitions for developing new technologies, utilizing available resources and using results-performance driven policy for achieving goals. His managerial skills are expressed by various levels:

Director:

Dr. Bourbakis is the Director of the Assistive Technologies Research Center (ATRC, 2007- present) at Wright State University. ATRC is a new research center at Wright State University with main *goals for promoting/conducting basic and applied research for assisting and improving the life of people with disabilities and elderly; developing partnerships with academia and industry for technology transfer; and supporting assistive technology programs*.

As the Director of the ATR Center he has organized a new International Symposium on Research for Assistive Technologies, a new IEEE Conference on Monitoring and Surveillance: Healthcare & Safety; several team (education and research) proposals and is directing PhD students funded by his grants.

Dr. Bourbakis was the Director of the ITRI (Information Technology Research Institute, 2001-2006) at Wright State University. ITRI was a near $2M annually research institute for (2001-2006) with main *goals for assisting/conducting basic and applied research, developing partnerships with academia and industry for technology transfer, and enhancing the CSE PhD program*. The ITRI goals were also the main responsibilities for its Director. The ITRI main areas of research are: Software Engineering and Data-Mining/Database Systems, Human Computer Interaction Multimedia, Intelligent Information Systems, Parallel/Distributed Systems and Networking, Bioinformatics and Bioengineering, where 6 ITRI employees (2 women) and more than 40 professors and researchers were associated with it.

Accomplishments at WSU:

At ITRI-WSU, he had a leading involvement in several levels of management such as, enhancing the research graduate program (~$400K annually OBR funding) and *interfacing academia, government and industry* at the research and development levels. During his directorship (2001-04) ITRI has tripled its

research external funding, increased the number of PhD students and developed a new research track on Bioinformatics and Bioengineering. In addition, he had essentially assisted junior and senior faculty members for successfully obtain grants, partnerships and professional assignments.

He has also developed and leaded of a team *for the development and implementation of a Research Consortium (AIG)* at ITRI-WSU as a coalition among Academia, Industry and Government partners for economic development 2001-02. This particular effort in conjunction with the Secure Knowledge Management (SKM) project were instrumental and had mainly contributed to the $11M (State of Ohio) and $28M (local industry) successful award of a Wright Center of Innovation on IT for WSU, in which Dr. Bourbakis was one of the 10 original participant-contributors, who had initiated WCI project. Also, he had implemented several partnerships with industry and AFRL for various research projects (SKM-I $1.35M for 2003 funded and SKM-II $436K for 2004 funded). His performance, as the ITRI Director (2001-06 years), was evaluated as ***outstanding*** by the Dean (Brandeberry) of College of Engineering & Computer Science. The ITRI Director reported to the Dean of Engineering.

His ***leadership*** has exceeded the borders of Dayton, by creating funding research teams including Ohio based and non-Ohio based universities, such as WSU, OSU, UD, UC, KSU for the SKM grant, WSU, UMN, MIT, RU, MSU, ASU, TAMU, NTUA for the S&T-NSF center proposal, and lately a team with WSU, UNV, UMBC, GMU for a new NSF proposal on SKM and another team WSU,CIIT AFRL, OSC for an NIH proposal for a Research Center on Computational Toxicology. Recently he is leading a team effort of the Assistive Technology Center (**ATRC**) at WSU. Details are available upon request (www.cs.wright.edu/atrc).

He is the Director of the ***Assistive Technology Research Lab*** *(March 2003 - present)*, which is a part of the ATRC. At the ATR Lab he is *contacting cutting edge research and development on wearable computing devices and sensors for people with disabilities* (blind, deaf and paraplegic). In this lab his researchers and graduate students are implementing state of the art methodologies and devices, such as the Tyflos system and the Kydon retina for visually impaired individuals, the Koufos system for hearing impaired people and the Prognosis system and the robotic arm for paraplegic individuals and the elderly. In his previous employment positions he was the Director of the Applied AI Lab, Image-Video Processing & Machine Vision Lab, Biomedical Informatics Labs, where scientists and graduate students are working with him in software/ hardware projects.

From the post of the Director of the Assistive Technologies Research Lab he was instrumental and has essentially contributed to the success of the NSF-IGERT grant ($3.6M) in which he is a co-PI.

He also was the Associate Director of the Center for Intelligent Systems (1995-2000) responsible to establishing research collaborations with several groups of researchers.

Professional Organizer.

He has successfully found and managed the organization of the *series of the International IEEE Conference on Tools with AI (ICTAI, 1989-present), the series of the International IEEE Conference on Bioinformatics and Bioengineering (BIBE 2000-present) and the new series of the IEEE Symposium on Monitoring & Surveillance: Healthcare & Security* as the founder and the General Chair for a number of years. As a result of this effort, the *IEEE Computer Society gave him the Outstanding Contribution Award 1992.* Under his managerial leadership as a Steering Committee Chair, the TAI Conference has been characterized as one of the successful IEEE CS Meetings, and he received the *TAI Outstanding Award 1993 and the Outstanding Service & Leadership Award 1998.* He has also organized and chaired the IEEE International Symposium on Intelligence in Neural & Biological Systems, 1995; the IEEE CS Symposium on Intelligence in Automation and Robotics 1996; the IEEE CS Symposium on Image, Speech and Natural Language Systems 1996, the IEEE Intelligence and Systems Symposium 1998, where he received the *IEEE IIS Outstanding Leadership Award, 1998,* Int. IEEE Conference on Information, Intelligence & Systems 1999; the Series of the IEEE Computer Society Int. Symposium on Bio-Informatics and Bio-Engineering (BIBE) 2000-04, where he received the *IEEE BIBE Outstanding Leadership Award 2003;* the IEEE & BAIS Symposium on Research Assistive Technology (RAT-07); and the series of Summer Institute on Advanced Computing with themes (Bioinformatics and Data Mining 2001, Visualization-Imaging-

Modeling 2002, Homeland Security Computing 2003) and numerous Workshops on Academia-Industry-Government Partnership. The IEEE meetings have generated more than **$1M** revenue for the IEEE Computer Society and gathered scientists and practitioners from different research fields to exchange knowledge for complex problems.

Editorial Management and Service:

He has found and edited (EIC 1991 - present) a new successful and prestigious SCI indexed International Journal on Artificial Intelligence Tools (World Scientific Publisher) and two new International Journals (Monitoring & Surveillance: Healthcare & Safety, and Bioengineering & Bioinformatics). It includes high quality refereed articles (3-5 reviewers per article with a 25% ratio of acceptance). He has served as General Chair, Program Chair and Steering Committee Chair in 13 IEEE Int. Conferences/Symposia. He is/was also an Associate Editor and a Guest Editor in numerous IEEE and Int. Journals for managing the review of scientific papers and special issues.

University Administrative Service:

He was a co-chair of the task-force for the development of an undergraduate program in computer engineering (1997, SUNY). He has a major contribution in the funding process of an undergraduate program in Bioinformatics at WSU. He also is the PhD program Director of the CS graduate program and the Chairman of the Graduate Studies at WSU. During his term as the Director of the graduate studies in CSE Dept, (2001-04), the number of PhD students has been increased from 31 to 44 due his efforts to bring external funding. He also is/was the chair or a member in various University committees (ABET committee, senate, executive senate committee, committee of the committees, graduate council, membership) and Departmental Committees (USA and Europe), and various Int. IEEE (IEEE CS Awards, IEEE CS Students, etc) and other Committees (BFAC, TUC-NCI, Univ. Property Committee, IT Committee, etc). From his position as the ITRI Director, he had fostered an environment where university professors are working closely with government engineers and industry practitioners. In addition, he is supervising researchers and graduate students for conducting research and administrative assistants for the operational needs of the institute. He has also served as the organizing, financial and registration chair in numerous research workshops (SKM, SIAC, BIO) at the university level. He has participated in the recruiting committees of university professors, chairs and deans, and the evaluation of employees from different organizations etc.

From the post of the ***Associated Dean for Research (ADR)*** at the College of Engineering and Computer Science, he was responsible to foster research activities and develop research partnerships for increasing external funding and research visibility for the college of engineering. More specifically, he had organized and submitted multi-university-industry proposals involving Universities (WSU, VT, U-Pitt, TAMU, UD, AFIT, CMU, UIUC from USA; UF from Germany; NU from Italy; NTUA, TUC, NUA from Greece; AU from Taiwan) and 12 collaborative companies. He had organized major multi-university-industry proposals on safety and medical diagnosis. He has also organized several multi-University teams for NSF, NIH and Homeland Security proposals. During his term as the Associate Dean of Research (3 years 2007-09), he had essentially contributed to the increment (20%) of the research activities in the College of Engineering; he had introduced and promoted the Health Engineering initiative at the Ohio level; and essentially participated, supported and promoted the 4 Engineering Centers of Excellence at the State of Ohio.

Industrial Experience and Leadership:

He is the founder and the Vice President of the AIIS Inc., where he has managed the development of several software products used by Universities, AFRL, ARL and Industry. He was a Staff Scientist in IBM, SSPD lab, CA working SPNs for performance evaluation of the I/O subsystems and the Expert Systems subdivision. He has valuable experience receiving several successful Small Business Technology Transfer (STTR) Phase I and Phase II grants (AFRL, NSF, ARL). He is/was a member of several industrial committees:

- *Greater Dayton Information Technology Alliance Board of Trustees,*

- *Advisory Committee; Commercialization Committee,*
- *ITEC Committee; GDITA Strategic Plan Committee*

Current Research Efforts

Recently, his efforts include the elevation of the ATR Center into a ***Center of National Excellence on Assistive Technologies for People at Risk***. He is forming partnerships and leading teams (research and graduate education) for hunting external funding (Government, Industry).

Summary as an Academic Scholar:

- Visiting Research Professor, Ohio State University, ECE Dept, (2011-present)
- Ohio Board of Regents Distinguished Professor of Information Technology, 2001-present
- J.A. Professor of Geriatrics, WSU, (2010-present)
- Founder-Director of the ATR center at Wright State University, (2007-present)
- Director of the Information Technology Institute (ITRI), Wright State University (2001-2006)
- Director of the Computer Science and Engineering PhD program, (2001-2005)
- 27 years in Academia and 2 years in Industry (IBM)
- 365 Publications in refereed Journals, Book-chapters, Conferences Proceedings
- 10 books as an author, editor or co-author
- 175 invited lectures internationally as a keynote speaker, distinguished speaker, invited lecturer
- 19 PhDs and 40 Masters completed
- $13.8M Funding (NSF, AFRL, DoD, ARL, ONR, Industry), as PI and co-PI
- 21 EE, CS, INT, CEI, CSE graduate and undergraduate courses developed and taught
- Member or chair of more than 45 committees
- EIC and founder in three International Journals
- Associate Editor in 12 IEEE or International Journals
- General Chair and Founder of 13 IEEE International Conferences, Symposia, Workshops.

Also, his research work has been internationally recognized and awarded with high prestigious awards. *Documentation supporting the claims mentioned above are available upon request.*

RESUME: NIKOLAOS G. BOURBAKIS

(IEEE Fellow)

PERSONAL DATA
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http://www.cs.wright.edu/atrc/

EDUCATION

. Doctor of Science & Engineering in ***Computer Science & Engineering***, University of Patras, Dept. of Computer Engineering & Informatics, Greece, 1983, *awarded with excellence.*
. Certificate in ***Electrical Engineering (4-years)***, University of Patras, Dept. EE, Patras, Greece, 1981-84.
. BSc in ***Mathematics***, National University of Athens, Dept. of Mathematics, Athens, Greece,1974
. Certificate of six months intensive studies on ***Computers***, Center of Computer Applications, Athens, Greece 1972.

MAJOR PROFESSIONAL POSITIONS HELD

OBR Distinguished Professor of IT, WSU, College of Engineering, OH, 2001 – present
J. A. Professor, Dept. of Geriatrics, WSU, 2010 – present
Visiting Professor, Ohio State University (OSU), ECE dept., 2011- present
Professor, Dept. of EE Dept. and Computer Science Dept., SUNY-B, NY, 1997- 2000
Associate Professor, EE. Dept., SUNY-B, NY, 1991-96
Staff Scientist, IBM, SSPD, S. Jose, CA, 1989-91
Assistant Professor, GMU, Dept. ECE, SITE, VA, 1984-89

(He had held tenured positions in European Universities)
Professor, Technical University of Crete, Dept. ECE, Chania Crete, Greece, 1999-2000
Assistant Professor, University of Patras, Dept. CE&I, Patras, Greece, 1987
Lecturer, University of Patras, Dept. CE&I, Patras, Greece, 1983-87

RESEARCH AND ADMINISTRATIVE POSITIONS

Associated Dean of Research, College of Engineering, WSU, (3 years, 2007 - 2009)
Director, Information Technology Research Institute, WSU, College of Engineering, 2001-2006
Director, Assistive Technology Research Center, 2007 - present
Associate Director**,** Center for Intelligent Systems**,** SUNY, 1995-2000
Acting Director**,** Center for Intelligent Systems**,** SUNY, 1996-97

OTHER RESEARCH and EDUCATION POSITIONS

Research Associate, Air Force Research Lab**,** Rome Lab, NY 1997
Associated Research Professor**,** Technical University of Crete, Greece, 2006 -
Director, of the PhD program of the CSE Dept., Wright State University, 2001-2006

MAJOR RESEARCH INTERESTS

His research interests are based on the development of conventional and AI-based methodologies and systems applicable to various scientific and engineering problems, especially for computing, security and people at risk.

More specifically, the last 30 years he is contacting research in:

Computer Engineering, Pervasive Computing and Wearable Systems, Information Security, Imaging, Distributed Artificial Intelligence, Biomedical Imaging and Engineering. More specifically**,**

- *Designing, modeling and simulating of several systems based on either RISC processors or ASICs for parallel and distributing high performance computing;*
- *Designing and simulating of unique high performance retina-like vision system architectures and algorithms;*
- *Application Specific Computer Languages for distributed computing systems evaluation and analysis;*
- *Developing a VLSI-CAD language methodology for floorplanning placement, synthesis and compaction;*
- *Developing of pioneering real-time, spatial formal methods for information security (encryption, compression (lossless or lossy) and hiding with confusion functions)*;
- *Biometrics (fingerprints, iris, face, brain patterns);*
- *Developing methods for document processing and understanding;*
- *Wearable systems for visual navigation and human activity understanding in unknown environments with 2-D/3-D space maps generation fusing various sensory data applicable to visually impaired people;*
- *Wearable systems for monitoring health conditions for people at risk;*
- *Modeling the human brain using SPNG modules for representation, seeing, learning, synthesis, and planning; developing planning methodologies based on autonomous intelligent agents;*
- *Designing of robotic multi-fingered hands and "blue jeans" for paraplegic people;*
- *Implementing of 3D-MRI driven neuro-surgery techniques;*
- *Detecting spoken pathological patterns applicable to aphasic patients;*
- *Recording in-vivo cells bio-signatures;*
- *3-D representation of small intestine structures using the L-G graph approach;*
- *Robotic capsule endoscopy-medical imaging;*
- *Robotic Nurse for assisting people at risk;*
- *Image processing languages;*
- *Wearable sensors.*

PROFESSIONAL POSITIONS AND ACTIVITIES

EDITOR IN-CHIEF, (founder) BAI Society Int. Journal on Artificial Intelligence Tools, World Scientific Publisher, 1991- present (IJAIT has 25% ratio of acceptance, SCI indexed).

EDITOR IN-CHIEF, (founder) Int. Journal on Monitoring and Surveillance Research: Healthcare-Safety, IGI Global Publisher, (inauguration Jan 2013).

EDITOR IN-CHIEF, (founder) Int. Journal on Bioengineering and Bioinformatics, BAIF, (inauguration late 2014).

EDITOR of an ADVANCED SERIES of Research Books on Artificial Intelligence, (founder), WS. Publisher, 1992-- 2002

FOUNDER & PRESIDENT of the Biological and Artificial Intelligence Society (2006 -2011) and Biological & Artificial Intelligence Foundation (BAIF) 2011 - present

CHAIR of the IEEE SMC and EMBS chapter in Dayton, Ohio, 2009 - 2011

. ASSOCIATE EDITOR in INTERNATIONAL JOURNALS

- IEEE Trans. on Knowledge and Data Engineering *1996-98*

- IEEE on Multimedia Magazine, *2002 – 2004*
- Int. Journal on Pattern Recognition and Artificial Intelligence, WSP *(1993- 2007)*
- Int. Journal on Engr. Applications of Artificial Intelligence, Elsevier *(1992- 2004)*
- Int. Journal on Intelligent and Cooperative Information Systems, WSP (1992- 2001)
- Int. Journal on Pattern Recognition, Elsevier Publisher *(1994-2012)*
- Int. Journal on Intelligent Systems & Robotics, Kluwer Academic Pub. *(1994- 2006)*
- Int. Journal on Pattern Analysis and Applications (Springer Pub) (2000-2002)
- Int. Journal on Neural Systems, WSP *(2006-active)*
- Int. Journal on Computational Intelligence in Bioinformatics, IPC *(2007-2012)*
- Int. Journal on Semantic Computing, WSP *(2007-active)*
- Int. Journal on Computational Biology & Drug Designs, UK *(2007-2012)*
- Int. Journal of Advanced Intelligence, AIA, *(2009-active)*

. GUEST EDITOR of SPECIAL ISSUES in INTERNATIONAL JOURNALS

1- Int. Journal on Pattern Recognition & Artificial Intelligence (*Learning & Planning Schemes*), vol. 4, No.2, 1990
2- Int. Journal on Pattern Recognition & AI (*Search, Reasoning & Problem Solving*), vol. 7, 1993
3- Int. Journal on Engr. Applications of Artificial Intelligence (*Architectures and Tools for AI*), vol.3, No.1, 1990
4- Int. Journal on Engineering Applications of Artificial Intelligence (*Neural Networks & Parallel Processing*), vol. 5, 3, 1992
5- Int. Journal on Microcomputer Applications (*Parallel and Multiprocessor System Architectures*), Academic Press, vol.16, 1994
6- Int. Journal on Engr. Applications of Artificial Intelligence (*Neural Networks & Appl*ications), vol.8, 1995
7- Int. Journal on Intelligent Systems and Robotics (*Intelligent Robotics*), vol. 1997
8- Int. Journal on Engr. Appl. of Artificial Intel. (*Image, Speech, Signal Processing*), vol. 10,1997
9- IEEE Robotics and Automation (*Walking Robots*), vol.5, 1998
10- Int. Journal on Pattern Recognition and AI (*Computer Vision Architectures*), vol. 12, 1998
11- PR Society Journal on Pattern Recognition (*Image Processing Languages*), vol. 32, 2, 1999
12- IEEE Robotics and Automation (*Bioengineering for people with disabilities*) vol. 8, 2002
13- IEEE Trans. on Systems, Man and Cybernetics (*Bioinformatics, part I*), vol. 33, 2003
13- IEEE Trans. on Systems, Man and Cybernetics (*Bio-imaging, Part II*), vol. 33, 2003
14- IEEE Multimedia, (*Digital Video on Demand*), vol. Sept., 2004
15- Int. Journal on AI Tools, (*Bioinformatics, part I*), June 2005
16- Int. Journal on AI Tools, (*Bioinformatics, part II*), Aug. 2005
17- Int. Journal on AI Tools (*AI Systems for People with Disabilities*), June. 2009
18- Int. Journal on Computerized Medical Imaging and Graphics (*Biomedical - Imaging*), vol. 34, no.6,2010
19- Int. Journal on AI tools, (AI in Bioinformatics & Bioengineering), vol. 23, Dec. 2012
20- Int. Journal on Monitoring and Surveillance Research (*Monitoring Devices and Methods*), (in progress).
21-IEEE Journal on Biomedical and Health Informatics, ***"Computational Solutions to Large-scale Data Management and Analysis in Translational and Personalized Medicine*****,** **(**in progress).
22- International Journal Bioengineering & Bioinformatics, '*Biosensors-Biomarkers"*, in progress

. FOUNDER AND GENERAL CHAIRMAN OF INTERNATIONAL CONFERENCES

Founder

- Int. IEEE Conference on Tools for Artificial Intelligence (ICTAI), 1989
- Int. IEEE Workshop on AI in Automation, 1992
- Int. IEEE Workshop on Intelligent Tools & Applications, 1993
- Int. IEEE Symposium on Intelligence on Neural & Biological Systems, 1995
- Int. IEEE Symposium on Automation and Robotics, 1996
- Int. IEEE Symposium on Image, Speech and Natural Language Systems, 1996

- Int. IEEE Joined Symposia on Intelligent & Systems, 1998
- Int. IEEE Conference on Intelligence, Information & Systems 1999
- Int. IEEE Conference on Bio-Informatics and Bio-Engineering 2000
- Int. IEEE Conference on Bio-Informatics and Biomedical Engineering 2003
- Int. IEEE Symposium on Research on Assistive Technology, 2007
- Int. IEEE Conference on Monitoring and Surveillance Research, 2012
- Int. IEEE Conference on Intelligence, Information & Systems/Applications 2013

General Chairman

- Int. IEEE Conference on Tools for Artificial Intelligence, 1989-91, 2007
- Int. IEEE Workshop on AI in Automation, 1992, 94
- Int. IEEE Workshop on Intelligent Tools & Applications, 1993
- Int. IEEE Symposium on Intelligence on Neural & Biological Systems, 1995
- Int. IEEE Symposium on Automation and Robotics, 1996
- Int. IEEE Symposium on Image, Speech and Natural Language Systems, 1996
- Int. IEEE Symposia on Intelligent & Systems, 1998
- Int. IEEE Conference on Intelligence, Information & Systems 1999
- Int. IEEE Workshop on Knowledge & Data Exchange KDEX-99, 1999 (co-General Chair)
- Int. IEEE Symposium on Bio-Informatics and Biomedical Engineering 2000
- Int. IEEE Symposium on Bio-Informatics and Bio-Engineering 2001,2003, 2005
- Int. IEEE Symposium on Research on Assistive Technology, 2007
- Int. IEEE Workshop on Wearable Systems for Health Monitoring, Athens, Greece, 2008.
- Int. IEEE Conference on Intelligent Information Systems, China, Aug. 2010 (co-General Chair)
- Int. Symposium on Monitoring & Surveillance Research: Healthcare and Safety, Nov. 2011, Florida, USA
- Int. IEEE Conference on Information, Intelligence, Systems and Applications (IISA-13), Athens, Greece 2013

. DIRECTOR of Research Laboratories

- *Director* Assistive Technology Research Laboratory, Dept. CSE, Wright State University, March 2002- present
- *Director* Programming & Engineering of Intelligent Systems Lab, TUC, 1999-2000
- *Director* Applied Image-Video, Robotics Machine Vision and AI Research Lab, Dept. EE, SUNY Binghamton, 1991-2000
- *Director* Biomedical Informatics Research Lab, Dept. EE, SUNY, Binghamton, 1998-2000
- *Director* Machine Vision Research Laboratory, Dept. of ECE, GMU, 1987-1989

. REVIEWER

. In International Refereed JOURNALS:

- IEEE Trans. on Systems, Man & Cybernetics;
- IEEE Trans. on Computers;
- IEEE Trans. on Parallel & Distributed Systems;
- IEEE Trans. on Circuits and Systems;
- IEEE Trans. on Knowledge and Data Engineering;
- IEEE Trans. on VLSI Systems;
- IEEE Trans. on Image Processing;
- IEEE Parallel and Distributed Technology;
- IEEE Journal on Sensors;
- IEEE Computer;
- IEEE Multimedia;

- IEE Proceedings in Signal and Vision Processing;
- IEE Electronic Letters;
- ACM Journal on Information Systems;
- SPIE Journal on Optical Engineering;
- SPIE Journal on Electronic Imaging;
- Journal on Automatica;
- Journal on Engineering Applications of AI;
- Journal on Pattern Recognition & Artificial Intelligence;
- Journal on Artificial Intelligence Tools;
- Journal on Pattern Recognition;
- Journal on MT & Automation Design;
- Journal on Microcomputer Applications;
- Journal on Microprocessors and Microsystems;
- Journal on VLSI Signal Processing;
- Journal on Vision, Speech and Signal Processing;
- Journal on Software Systems;
- Journal on Intelligence & Robotic Systems;
- Journal on Data & Knowledge Engineering;
- Journal on Parallel and Distributed Computing;
- Journal on Pattern Recognition Letters;
- Journal on Fuzzy Systems;
- Journal on Visual Communication and Image Representation;
- Journal on Machine Vision and Applications
- Journal of VLSI Design
- Journal of Intelligent Systems Engineering
- Journal on Information Sciences
- Journal on Bio-Medical Engineering and Computing
- Journal on Intelligent Control
- Assistive Technology Magazine
- Journal of Rehabilitation Research and Development
- Journal on Applied Physics
- Journal on Computerized Medical Imaging and Graphics
- Journal on Computer Communication
- Journal on Research of Textile and Apparel
- Journal on Computers in Biology and Medicine
- Journal on Medical & Biological Engineering & Computing
- Journal on Computer Vision and Image Understanding
- Journal on Computer Engineering Research
- Journal on Medical Engineering & Physics
- Journal on Sensors
- Int. Journal on Monitoring & Surveillance Research Tech,

. In International Refereed CONFERENCES:

- IEEE Conference on Parallel Processing, 1987-92
- IEEE Workshop on Languages for Automation, 1988
- Int. Conference on IMEKO XI, 1988
- IEEE Conference on Computer Languages, 1988
- IEEE Conference on Data Engineering, 1989
- IEEE Conference on Integrated Systems, 1990
- IEEE Conference on Tools for AI, 1989--2000
- IEEE Conference on SMC, 1990, 1993

- IEEE Conference on VLSI Test, 1993
- IEEE Conference on Software Engr. & Knowledge Engr., 1993-95;
- IEEE Symposium on INBS, 1995;
- ACM Workshop on Geographic Information Systems, 1994-97
- IEEE Conference on Application Specific Array Processors, 1993-95;
- IEEE Symposium on I&S 1996-99;
- ACM Conference on CIKM, 1995-97
- IEEE Conference on Computer & Communication. 1995, 1997, 2000
- IEEE Symposium on BIBE 2000, 2001
- Int. Conf. on Biotechnology, 2001
- IEEE Conference on Bioinformatics, 2002, 2003
- Int. Workshop on Biological and Medical Imaging, 2004
- IEEE Int. Conference on TAI-04, Fl, Nov. 2004
- IEEE Symposium on BIBE-05, MN, Oct. 2005
- IEEE Int. Conf. SITIS-05, France, Nov. 2005
- ACM Int. Conf. on SCA-AIISS, France 2006
- Int. European Control Conference, ECC-07, July, Greece, 2007
- IEEE Symposium on DSP, Santorini, Greece 2009
- IEEE Conference on MCS, Thessaloniki. Greece, 2009
- Int. Conf. PETRA, Samos, Greece July 2010
- Int. IEEE Conference on Imaging Tech-Systems, Greece June 2010
- IEEE Symposium on DSP, Corfu, Greece 2011
- IEEE-NIH Workshop on LISSA-11, Bethesda, Oct. 2011
- Int. Conf. PETRA, Samos, Greece June 2011

. In Research PROPOSALS:

- .University Proposals;
- .National Science Foundation (NSF, regular and Centers)
- .NASA, DARPA, NIH, DoE, AFRL
- .National Labs
- .European Research Projects
- Asian Research Projects

. In Publishers:

- .McGraw Hill Pub.; Scott Foresman Pub.; Prentice Hall Pub.;
- .World Scientific Pub.; CRC Press; Kluwer Academic Publisher;
- .John Wiley &sons Publisher
- .Springer Publisher

. EDITOR or Co-EDITOR of Conference Proceedings

- 1st National Conference on Informatics, 1984
- IEEE Workshop on Tools with Artificial Intelligence (TAI)-89
- IEEE Conference on TAI-90, TAI-91, TAI-92, TAI-2006, TAI-2007
- IEEE Symposium on Intelligence in Neural & Biological Systems (INBS)-95
- IEEE Symposium on Intelligence & Systems (I&S)-96
- IEEE Symposium on Intelligence & Systems (I&S)-98
- IEEE Conference on Intelligence, Information and Systems (IIS-99)
- IEEE Symposium/Conference on Bioinformatics & Bioengineering (BIBE-2000, 2001, 2003, 2006, 2007)

. STEERING COMMITTEES

- Chairman IEEE Conference on TAI 89-present
- Chairman IEEE Symposium on INBS 95-96
- Chairman IEEE Symposium on IAR-96
- Chairman IEEE Symposium on ISNL-96
- Chairman IEEE Joint Symposia on Intelligent & Systems 1996-98
- Chairman IEEE Conference on Information, Intelligence and Systems 1999
- Member IEEE Workshop on Knowledge and Data Exchange (KDEX-97-99)
- Chairman IEEE Conference on Bio-Informatics and Bio-Engineering 2000-09
- Member IEEE Conference on Semantic Computing, 2007
- Chairman IEEE Symposium on Monitoring and Surveillance Systems, 2011-12
- Chairman IEEE Conference IISA-13, 2013.

. ORGANIZING CHAIR and/or FINANCIAL CHAIR of Int. Conferences

- IEEE Workshop on Languages For Automation 1988
- IEEE Workshop on Tools with AI 1989
- IEEE Workshop on AI & Automation 1992 & 1993
- IEEE Symposium on INBS 1995
- IEEE Symposium on I&S 1996
- IEEE Symposium on Information and Intelligent Agents 1999
- IEEE ICTAI 1990-95, 97,99
- IEEE Symposium on RAT, April. 2007
- Int. IEEE ICTAI-08, Dayton Ohio, 2008
- Int. IEEE ICTAI-09, Newark, NJ, 2009
- Int. IEEE-NIH Workshop LISSA, Bethesda MD, 2010
- Int. IEEE Conference on BIBE-10, PA, 2010
- National Workshop on Host Computer Security, Oct 3-4, Chicago, IL 2010
- Int. IEEE ICTAI-12, Athens, Greece 2012

. PROGRAM CHAIR International Conferences

- IEEE Symposium on Intelligence in Neural & Biological Systems (INBS)-1995
- IEEE Symposium on Intelligence in Autonomous Robotics-1996
- IEEE Symposium on Intelligence in Speech and Natural Language-1996
- IEEE Symposium on INBS-96
- IEEE Symposium on BioInformatics and BioEngineering (BIBE)-2000
- ACM Workshop on Biometrics and Applications, 2003 (co-Program Chair)
- IEEE Symposium on BIBE-06, (co-Program Chair)
- IEEE Conference on Tools with Artificial Intelligence(TAI)-2006 (co-Program Chair)
- IEEE Conference on Computational Science & Engineering, CSE-2010 Hong Kong, (Vice Program Chair)
- IEEE NAECON Conference, Dayton 2010, (Track-Chair)
- Int. 3rd Conf. Wireless Mobile Communication & Healthcare, Paris, France 2012 (co-Program Chair)
- Int. Symposium on Monitoring & Surveillance Research: Healthcare and Safety, Athens Nov. 2012 (jointly with ICTAI-12).

. MEMBER OF PROGRAM COMMITTEES in International Conferences

- IEEE Conference on Computer Languages, Miami, Florida,1988
- IEEE Conference on Integrated Systems, NJ, 1989
- IEEE Conference on Tools for Artificial Intelligence, 1991-97
- Int. Workshop on VLSI Neural and AI architectures, England, 1992

- Int Conference on Cooperative Information Systems, Holland, 1992
- IEEE Conference on Software Engineering Knowledge Engineering, 1993, 1995
- IEEE Conference on Application Specific Array Processors, 1993-94-95
- ACM Conference on Intelligent Systems, Nevada, 1994
- ACM Workshop. on Geographic Information Systems, 1995-96-97
- IEEE Conference on Intelligent Vehicles, Detroit, MI, 1995
- IEEE Conference on Computer Communication, AZ, 1995;
- IEEE Symposium on Assembly Tasks & Planning, Pitt. PA, 1995
- ACM Conference on Information & Knowledge Management, 1995 & 97
- IEEE Conference on Image Processing, 1995, VA
- IEEE Symposium on Intelligent & Systems, MD, 1996, & 1998
- IEEE Symposium on Assembly Tasks & Planning, 1997
- SPIE Symposium on Image Compression and Encryption, 1998
- Int. Conference EURISCON-98, GR, June 1998
- Int. ACVIS-2000 Conference, France, 2000
- Int. ACVIS-2000 Conference, France, 2001, 2006
- Int. Symposium on Computational Biology, Genomics & Biotechnology, NC 2001
- Int. Symposium on Bio-Technology, GR, 2001
- IEEE Workshop on Non-visible Vision, Hawaii, 2001
- IEEE Conference on Bioinformatics, Palo Alto, CA, 2003
- Int. IMACS-05, World Congress, Paris, France, 2005
- Int. Symposium on Visual Computing, Reno, NV, Dec. 2005
- Int. Conf. on IC-SITIS-05, France, Nov., 2005
- ACM SAC-ASIIS-06, Dijon, France, April 2006.
- IEEE Conference on ANN-06, Athens, Greece, 2006
- Int. Symposium on Visual Computing, Reno, NV, Dec. 2006
- Int. Conference on ANN-06, Mexico City, Mexico, Nov. 2006
- Int. Conference on IC-SITIS-05, Korea, Nov., 2007
- Int. Conf. on ECC, Greece, July 2007
- Int. Conf. on CIB, Las Vegas, NV, 2007
- Int. Symposium on Visual Computing, Reno, NV, Dec. 2007
- Int. Symposium on Verbal and Non-verbal Communication, Patras, Greece, Oct. 2007
- IEEE Conf. on Multimodal Interfaces, Chania, Crete, Greece, Oct. 2008
- IEEE Conference. On DSP, Santorini, Greece, July 2009
- Int. ICST Conference on Wireless Mobile Communication and Healthcare (MobiHealth 2010).
- Int. ACM Conference on PETRA, Samos, Greece, June 2010
- IEEE-NIH Workshop on LISSA-10, Bethesda, Oct. 2010
- Int. IEEE Conf. NAECON-10, Dayton, OH, 2010
- Int. IEEE Workshop on Assistive Computer Vision, 2010
- Int. IEEE Conference on Imaging Techniques and Systems, July 2010, Greece
- Int. IEEE Conference on DSP-11, Corfu, Greece, 2011
- Int. IEEE Conference on Imaging Techniques and Systems, 2011, Malaysia
- ACM Computer Security Applications Conference 2011, Dec. Florida
- IEEE Conference on Mobile Health, Oct. 2011, Kos, Greece
- Int. Workshop on AI Applications in Biomedicine, Greece Sept. 2012.

. SESSION CHAIRMAN or SESSION ORGANIZER in Int. Conferences

- Int. Symposium on Modeling, Identification & Control,1982,Davos, Switzerland
- Int. IMACS on Digital Techniques on SCC,1984,Patras, Greece.
- Int. AFIPS Conference on Computers,1987, Chicago, Illinois.

- IEEE Workshop on Languages for Automation,1987,Vienna, Austria.
- IEEE Conference on Systems, Man & Cybernetics,1987, Virginia.
- IEEE Workshop on Languages for Automation,1988, Maryland.
- IEEE Conference on Computer Languages, 1988, Miami, Florida.
- IEEE Conference on Data Engineering, 1989, Los Angeles, California.
- IEEE Conference on Tools with AI-91, S. Jose, CA 1991 (panel)
- IEEE Conference on Tools with AI-93, Boston, MA
- IEEE Conference on Data Engineering, 1992, Temple, Arizona
- Int. Workshop on VLSI for AI and Neural Nets, England,1992
- IEEE Conference on Tools with AI-92, VA,1992 (panel)
- IEEE Conf. on Tools with AI-94, LA, (panel), TAI-99 (panel)
- IEEE Conference on Software Engr. Knowledge Engr 1993,CA;
- IEEE Conference on Computer, Communication, 1994, Phoenix, AZ
- ACM Workshop on Geographic Information Systems-94,MD, (panel)
- IEEE Conference on Tools with AI, CA, 1997-99
- IEEE Conference on Systems, Man & Cybernetics,1997, Florida.
- SPIE Symposium on MICE, 1998, S. Diego, CA
- SPIE Symposium on MICE, 1999, S. Denver, CO
- SPIE Symposium on MICE, 2000, S. Diego, CA
- Int. Symposium Computational Biology, Genomics & Biotechnology, 2001, Durham, NC
- Int. IEEE Conf. on Tools with AI-02, Arlington, VA, 2002
- Int. IEEE Conf. on Tools with AI-03, Sacramento, CA, 2003
- Int. IEEE Conf. on Tools with AI-04, Florida, 2004
- IEEE Symposium Bioinformatics & Bioengineering (BIBE), Minneapolis, MN, Oct. 2005
- IEEE Symposium, BIBE-06, Arlington, VA, Oct. 2006
- Int. IEEE Conf. on Tools with AI-06, Arlington, VA, Nov. 2006
- Int. IEEE Conf. on Tools with AI-07, Patras, Greece, Oct. 2007
- IEEE Conf. on Tools with AI, Dayton OH, USA, Nov. 2008
- IEEE Conf. on Tools with AI, Newark, NJ, USA, Nov. 2009
- IEEE Conf. on Bioinformatics & Bioengineering, Phil, PA, June 2010
- IEEE Conf. on Tools with AI, Arras, France, Oct. 2010
- IEEE Conf. on Tools with AI, Nov 2011, Boca Raton, FL

INDUSTRIAL EXPERIENCE & CONSULTING

- ***Founder and Vice President*** of the AIIS Inc.
  He is responsible for the research and development of the AIIS activities. He has designed and developed several software methodologies (*SCAN, HAS, HVP, ATR, OCR, Tyflos*) for AIIS funded by AFRL.
- ***S. Scientist*** IBM, S. Jose, CA. He was responsible for the simulation and the SPN modeling of disk arrays performance and using AI for automatic generation of code for the I/O subsystems.
- ***Consulting****:* E-Systems, VA; Daniel Co. MD; VRC, WDC; Soft-Sight Inc. NY

SCIENTIFIC ACHIEVEMENTS, AWARDS AND LISTINGS

Achievements

- ***US Academy of Achievements, Official Nominator of Computer Science Programs 1990***
- ***Member of the IEEE Computer Society Merwin Scholarship Committee 1993***
- ***US Academy of Achievements, Official Nominator of Computer Engr. Programs, 1993-94***
- ***IEEE Computer Society Board of Students Activities 1993-96***
- ***External Evaluator in several University Faculty Promotion Committees (1992-95) (CMU,***

Duke U, KSU, CNY, UP, Purdue U, ASU, USF, Drexel U, SUNY, UTSA, FU, Wayne SU, U Wisconsin, Tulane U, UNV-Reno, etc.)

- ***Keynote Speaker, International Conference on AI, June 1994, NV***
- ***NSF Research Programs Evaluator,***
- ***NSF University Research Programs & Centers Evaluator,***
- ***State of the Art Speaker in Int. IEEE Conference TAI-95, Nov. 1995, VA***
- ***Keynote Speaker in ACM Symposium on GIS, MA, Dec.1995***
- ***IEEE Computer Society Distinguished Speaker 1996-2000***
- ***IEEE Computer Society Golden Core Member 1996***
- ***Invited Speaker ACM CIKM-97, Nov.1997, NV***
- ***Member, IEEE Computer Society Awards Committee, 1999***
- ***IEEE Computer Society CTP program 2000 - 02, Distinguished Speaker***
- ***Invited Speaker Int. Symposium Computational Biology, Genomics & Biotechnology, 2001***
- ***Invited Speaker, Int. Conference Biotechnology, 2001***
- ***Member, IEEE CS Virtual Intelligence Task Force, 1998 –2001***
- ***Invited Speaker, Int. Conf. on Bioinformatics Education, VA April 2002***
- ***IEEE Member of the Engineering in Medicine & Biology Society,***
- ***IEEE Member of the Systems, Man & Cybernetics Society,***
- ***IEEE Member of the Computational Intelligence Society,***
- ***External Evaluator of CSE Programs (ASU, CSE Dept., Oct. 2002)***
- ***Chair of the Technical Committee on Bioinformatics, IEEE Neural Networks Society.2003***
- ***Reviewer of the Texas Higher Education Coordinating Board, 2003***
- ***Panel Reviewer of the AFRL Award for Best Director (Computational Analysis), 2003,2004***
- ***Keynote Speaker in International Conferences: IEEE I&S, May 1998, MD; BIBE-05 MN; HAI-06 Italy, NN- 06 Greece; COST-07, Greece; ICCS-08, Greece, AIAI-09 Greece, ICTAI-09 NJ, NLP-KE, China 2010, IEEE-IST-10, IC-SIGMAP-10, Greece, ICSTS-10 England, MobileHealth-11, Kos-Greece, Asia University, Taiwan 2011, ICKSE-12, Rhodos, etc.***
- ***External Evaluator of the Informatics Dept., AUTH, Thessaloniki, Greece, Sept. 2011***
- ***External Evaluator of the Economics and Informatics Dept., University of Athens, Greece, March 2012***

Awards- Recognition

- ***IEEE Fellow Member Dec. 1995, Class 1996.***
  (for outstanding-pioneering contribution to image scanning algorithms, SCAN)
- ***Papers selection, Int. Journal on EAAI, 1988-90, Pergamon Press***
- ***IBM Author Recognition Award , May & July, San Jose, CA, IBM, 1991***
  (he was the first to receive the award in SSPD-IBM)
- ***IEEE Computer Society Outstanding Contribution Award 1992***
- ***Outstanding Contribution Award IEEE ICTAI, 1993***
- ***IEEE Computer Society Appreciation Award for Student Newsletter 1994***
- ***Recognition Award of an Outstanding Paper, IEEE Conf. ATC-94, Sept.1994, CA (Scan-Geometria languages cooperation for blocks floorplanning/placement)***
- ***Best Paper Award, IEEE AT Conference, Aug. 1995, GA***
- ***IEEE Computer Society Technical Research Achievement Award, 1998***
  *(*This is an award of high prestige annually given to IEEE CS researchers for outstanding and pioneering research contributions for the past 10 but no more than 15 years. Dr. Bourbakis received this award for unique contributions *in spatial formal methodologies for 2-D digital image processing for information security, and visual navigation with space-map generation in unknown environments)*
- ***IEEE I&S Outstanding Contribution Award, 1998***
- ***IEEE ICTAI Service & Leadership Award, 1998***

- ***IEEE ICTAI ten years Research Outstanding Contribution Award 1999***
  (for contribution in intelligent techniques applicable to machine vision)
- ***Pattern Recognition Society Journal, best papers selection for 1999***
  (A fractal-based image processing language: formal modeling)
- ***IEEE CS Appreciation Award for Outstanding Service*** *as the BIBE General Chair* ***2001***
- ***IEEE Symposium on BIBE Outstanding Leadership Award, 2003***
- ***ASC Outstanding Scientists & Engineers Research Award-2005***
  (for unique research contributions to learning with assistive technology, the Tyflos project)
- ***SETN Research Recognition-2006***
  (for research contributions to applied artificial intelligence)
- ***Diploma of Honor and Recognition-2007,*** University of Patras, Greece
  (for outstanding research contributions to artificial intelligence field)
- ***IEEE Organization Award*** *for organizing ICTAI-08 in Dayton Ohio,* 2008
- ***IEEE Computer Society Organization Award*** *as the BIBE Steering Chair* 2009
- ***Dr. Fritz J. Russ Bio-Engineering Award, (****for contributions to Biomedical Engineering) IEEE Dayton Ohio, 2010*
- ***Pattern Recognition Society Journal "Most Cited Article for 2006-2010"*** *(A survey on color skim adaptation and detection,)*
- ***IJAIT best papers selection for the years 2006-2010*** *(3D object recognition using synthesis of views)*
- ***IEEE BIBE-Keynote Speaker Recognition Award*** *Mobile-health, Taichung, Taiwan, 2011*
- ***Outstanding Service Award***, *WSU*, 2001-2012
- ***CV Ramamoorthy ICTAI best paper Award****, (A Methodology for Detecting Faces from Different Views) IEEE ICTAI-12, Piraeus, Greece*

Listings

- *American Men and Women of Science*
- *Who's Who in Computer; in Technology; in Science and Engineering*
- *Who's Who in American Education; in Intellectuals; in Information Technology, Who's Who in the World, etc.*
- *Outstanding People of 21 Century*
- *International Man of 1997-98*
- *Distinguished Editors*
- ***Member of the New York Academy of Science***

MEMBER OF PROFESSIONAL SOCIETIES (past/current)

1. Institute of Electrical & Electronics Engineers (CS, SMC, EMBS, CI)
2. Association for Computing Machinery
3. Euromicro Society
4. Eurographics Association
5. Pattern Recognition Society
6. Sigma Xi
7. Mathematical Society
8. American Association for Artificial Intelligence
9. SPIE Society
10. AIAA Society
11. AAAS Society
12. Design Process Society
13. Electrical Engineers TC Camber W-Greece
14. BAIS (BAIF)

MEMBER OF ACADEMIC AND INDUSTRIAL COMMITTEES

Academic Committees

1. Member of the Curriculum Committee
2. Chairman & Member of the Library Committee
3. Chairman of the Budget Committee
4. Chairman of the Computer Lab Committee
5. Member of the Computer Committee
6. Member of the Computer Technology Committee
7. Member of the Graduate Admission Committee
8. Member of the Computer Graphics Committee
9. Member of the Committee of the University Committees
10. Member of the Evaluation of the Foreign Institutions Committee
11. Chairman of the Technical Reports Committee
12. Chairman of the Undergraduate Committee
13. Member of the Academic Affairs and Research Committee
14. Organizer of Invited Research Seminars
15. Chairman of the Professional and Social Activities Committee
16. Member of the University Committee for Excellent in Professional Service
17. Member of the University Faculty Senate Executive Committee
18. EE Undergraduate Advisor
19. Member of the Dean's Evaluation Committee
20. Member of the EE Chair Search Committee
21. Member of the Engineering School ABET Committee
22. Chair of the ABET-EE Assessment Subcommittee
23. Secretary of the Senior Internal Promotion Committee (EE and CS Depts.)
24. Member of the Engr. School 5 years Plan
25. Advisor EE MEng Master in Computer Engineering
26. Chairman of an Undergraduate Curriculum Committee for CE program (1997-98)
27. Member of the University Property Committee, 1999-2000
28. Member of the Networks and Digital Communication Institute Committee, 2000
29. Member of the Faculty Senate 1999-2000
30. Chairman of the BIBE Committee, 1999 –2000
31. Member of the RIT Committee, 2000
32. Director of the Graduate PhD Studies, CSE Dept., WSU, 2001-2005
33. Member of the Dean Executive Committee, 2001- 2009
34. Graduate PhD Advisor, CSE Dept., WSU, 2001-2006
35. Member of the Graduate Council, WSU, 2001- 2009
36. Member of the Graduate University membership Committee, 2002 – 2005
37. Member of the Graduate Studies Committee, Engineering College, 2002-2004
38. Chair of the Graduate Studies Committee, CSE Dept., 2003- 2005
39. Member of the Central State University, OH, External Advisory Board, 2003 - 2005
40. Member (sitting for the Dean) University Strategic Planning Committee, 2007-08
41. Member of the Dayton Graduate Studies Institute (DAGSI), 2001-2006
42. Member of the Deans of Ohio Council (sitting for the Dean), 2008-09
43. Member of the Engineering College Steering Committee, 2010-11.
44. Chair of the Tenure and Promotion Committee, CSE Dept 2012

Industrial Committees

1. Member of the Industrial IT Alliance Board of Trustees, Dayton, 2001-2005
2. Member of the Industrial IT Advisory Committee, Dayton, 2001-2002
3. Member of Industrial IT Commercialization Committee, Dayton, 2001-2003

4. Member of the ITEC Advisory Board 2002 – 2003
5. Vice President and Secretary, AIIS Inc. 1999 - present
6. Member of the IT Strategic Planning Committee 2003

RESEARCH : INDIVIDUAL CONTRIBUTIONS & PROJECTS

Dr. Bourbakis has been recognized for significant contributions in the areas of *space filling algorithms 2D/3D data accessing and information security, wearable for healthcare and people with disabilities, distributed autonomous systems, image processing-analysis, 3D navigation in unknown space using intelligent agent based systems*. He has designed, modeled and simulated high performance array processor vision system architectures based on RISC and ASIC processors. He has developed a methodology for fMRI guided surgery and designed the surgical tool for it. He has developed a formal language based methodology (SCAN) to automatically analyze and generate (nxn)**!** accessing algorithms for a 2D array by efficiently combining space filling curves (1986). This was an *open computational problem in 70s (Ramamoorthy 1970)* and its solution has internationally created a great variety of applications (*Klinger 1988*), especially on multimedia information security, where his methodology SCAN is pioneer work (1988). He has also developed unique methodologies for people with disabilities (*the Tyflos project has significant recognition and impact since 1996*), methods for extracting and modeling bio-signatures of invivo cells and SPNG distributed agent models for simultaneous representation and integration of structural and functional information and knowledge. His unique methodology for 3D WCE endoscopic imaging for polyps, ulcers and bleeding detection has received a significant and high respectable recognition from the endoscopic community *(like Nature July 2012).* In the image analysis-recognition field his work on OCR has been characterized by *Dr. Netravalli (Bell Labs) 1989* as original and his fuzzy based segmentation with LG graphs have been recognized and cited as original work with unique applications to face-facial expression recognition (*Pattern Recognition 2008*), wireless capsule endoscopy, wearable systems for health monitoring, etc. His research work and programs development have been directly associated with funding from industry and government in Europe and USA (**$8M + $5.8M = $13.8M**), and cited by other researchers. Details for funding proposal will be provided upon request.

. Distributed Monitoring-Surveillance: Image-Video Analysis-Understanding

This project deals with the development of real-time, software-hardware based distributed image processing-analysis methods, called DIAS. DIAS is a multiple granularity modular system capable of performing in real-time multiple computing tasks (image processing, image analysis, pattern recognition, image understanding) on image data, either on a single image, or video or multiple images. In particular, DIAS system supports or is able to emerge several architectural configurations (granularities) for parallel, pipeline processing. A hardware design and certain levels of performance evaluations of the DIAS system using a formal language have been done. DIAS was among the first hardware solution of real-time surveillance systems 1986-89. Also a software version of DIAS, called *Eikones*, which is an Application Specific formal language for image processing-analysis has been implemented in C++ (7K lines code). Eikones is promoted by AIIS Inc as software product. Application: *high security building, statistical analysis of images, real-time image compression-encryption*, *computer vision, 3-D graphics, ATR, Biometrics*, *Surveillance systems*, etc.

Grants and Proposals:

$25,000, E-Systems Corp., 1987, co-Investigator, (GMU, CS Dept. PI), funded;
$35,000, E-Systems,1988, senior participant, (GMU, CS Dept. PI), funded;
$50,000, E-Systems,1989, participant, (GMU, CS Dept. PI), funded;
$35,000, ECC, co-PI, European, 1995-96, (U-Patras), funded;
$25,000, AFRL,1997, PI, (Summer Fellowship) funded;
$630,105 MRC-ARPA, co-PI, 1998-2000, (MRC Corp., PI), funded;
SPIR-Soft-Sight, PI, 1998-99, BU-NY State, internal fund;
SPIR, PI, 2000, SS, BU-NY State, internal fund;

$100,000, NSF-STTR, co-PI, 2001, (SS Inc., PI), funded;
$498,500, NSF-STTR, co-PI, 2003-04, (SS Inc., PI), funded;
$50,000, ITRI, PI, 2003-04, WSU, funded;
$20,000, BAIF, PI, 2012, funded;
PhD Students: A. Tsitsoulis (2013), P. Yuan 2002, R. Andel 1999, D. Goldman 1997
Master Students: 7 master theses completed

. Brain Surgery 3D fMRI, Detecting Brain Changes fMRI, Brain Mapping PET

The first project deals with (1) the development of an intelligent visualization process that mimics the surgeon's behavior and decision making for tumor extraction from a human brain. A 3-D fMRI model is used to visualize and evaluate the tumor's location, shape and color. A "best" path planning strategy is also used to calculate the best path that a surgical tool has to follow to successfully extract the tumor with minimum cost, (2) the second project deals the detection of changes in the brain due aging by using 3D LG graph models on fMRL images, (3) the third project deals with the brain location for mapping 3D space sensations for the blind.

Proposals Grants:
$15,000, PI, 1999-2000, AIIS Inc., funded; $25,000 BAIF, PI, 2011 funded;
$1,500,000 tbs, NIH, (PI, collaboration with NIA)
$900,000, NSF, Cognitive-Neuro Program, PI, tbs
PhD Students: K. Michalopoulos (new), M. Awad 1998
Master Students: 1 master thesis completed 1 in progress

. Intelligent Methods and Wearable Devices for Assisting People with Disabilities and Monitoring the Health Conditions of People at Risk; Smart Homes

This project is based on original ideas and methodologies from pervasive computing, intelligent robotics, computer vision pattern recognition, speech understanding integrated together for the development of intelligent wearable assistants for visually impaired, deaf and paraplegic people (1996). The intelligent wearable assistants offer to people with disabilities a degree of "independence" and new learning challenges with assistive technology devices, such as the Tyflos project for the blind and visual impaired, the Koufos project for the deaf kids and the project for paraplegic people (*Paralytos*), which has been characterized as a unique idea by NSF reviewers. His project Prognosis (a wearable prototype for monitoring the health status of a human 24/7) has been developed and is under evaluation in a group of 3000 elderly people at the Dayton area in collaboration with the Geriatrics Dept, where Dr. Bourbakis is a Professor).

Additional information on this matter is available upon request.

Grants Proposals:
$50,000, AIIS, PI, 1995-97, funded;
$1,100,000, NSF-ITR, co-PI, 2003-07, (ASU, PI), funded
$2,000,000 NSF-EFRI, co-PI, (OSU, PI), pending
$2,000,000 NSF-SHWB, PI, pending
$450,000 NIH, co-PI, R21, pending
PhD Students: M. Tsakalakis (new), R. Kefeer 2011, A. Pantelopoulos, 2010, D. Dakopoulos 2009, A.Tascillo 1995.
Master Students: 3 master theses completed

.A Neuromorphic Brain Model for Intelligent & High Performance Computing

This project deals with the development of a Neuromorphic Brain Model (NBM) for high performance intelligent computing. The NBM is based on a synergistic modeling of different AI modalities (image, video, natural language, speech, sound, data, etc) by using isomorphic mapping of SPNGs into NNs. This project is strongly related with the human activities recording and recognition using the L-G – SPNG - NN models developed by Dr. Bourbakis since 1990.

Grants:
$60, 000, AFRL, PI, 1998, funded;
$100,000, OSC, PI, Cluster, 2003, funded;
$450,000, NSF-Germany, co-PI, (UoF, PI) tbs
PhD Students: 1 new PhD student.
Master Students: 1 master thesis completed

. Endoscopic Imaging, Medical Imaging and Applications
This project deals with the development of synergistic methodologies and a Robotic WCE capsule applicable to biology and medical fields offering solutions to important health problems, such as endoscopic abnormalities (bleeding, polyps, ulcers), skin cancer, etc. (Collaboration with Dr. Pouagare MD, Digestive Specialists, Dayton OH). It is also an on going on research on fusion of CT and MRI images for non-invasive detection of heart arteries stenosis.
Proposals: $1,900, 000, NSF, PI, tbs;
PhD Student : New student, A. Karargyris 2010.
Master Students: 1 master thesis in progress

. Automatic Recording of cell Bio-signatures and Molecular 3-D Representations
This project deals with the development of a synergistic approach for monitoring and understanding benign cells structural-functional behavior and their transformation to cancerous ones, with a future development of a reverse bioengineering process. An additional goal of this project is the 3-D representations of the molecular structure of a cell by using the L-G graph approach. The purpose is the appropriate classification and correlation of these patterns for a detailed recording of the human cells functional and structural behavior.
Proposals: $200,000, NSF, co-PI, tbs (CMU, PI)
Master Students: 1 master thesis completed

. Recognizing Pathological Patterns from Spoken Natural Language
This project deals with the detection and recognition of pathological pattern from spoken natural language using SPNGs. Pathologic speech patterns vary in tonality, expressions, volume, rate and massive equality or prosody. Clearly a human observer/expert develops an impression that is knowledge base. But, what limits the human expert to fully analyze all the different type of variability and nuances in language pathologies is the enormous demand on his/her time as well as managing a large database with precision and accuracy. This is where a natural language processing system may play a significant role in furthering our understanding of language pathologies, which may not only lead to develop better treatment modalities, but also help us to understand the natural language production more thoroughly. Applications: Diagnosis of aphasic, schizophrenic patterns.
Grant: $10,000, AIIS, PI, 1998-99, funded (collaboration, R. Roy, MD, NY); $5,000, AIIS, co-PI, 2006, funded (collaboration with Dr. Esposito, Italy)

. Formal Methods for Information Processing & CyberSecurity
This project deals with a spatial based formal methodology (SCAN languages), which generates the (nxn)! permutations (or scan orders or fractals accessing algorithms) of a 2-D or 3-D array. It was an open computational problem since 70s and solved by Dr. Bourbakis in 1985. SCAN can efficiently also 1) generate any size of hierarchical array data structures (pyramids, trees); 2) detect objects in binary images; 3) encrypt digital arrays by using the size of (nxn)! permutations and a dynamic confusion function that provide a complexity of 10^{75000} pair of keys for 512x512 arrays; 4) compress (lossless or by request lossy) digital images; 5) guide the floorplanning process for a compact placement; 6) index images for storage and retrieval images into/from I/O disks; 7) solve the traveling salesman problem; 8) hide information in arrays, etc. His research work on the SCAN methodology has been recognized by others as a pioneering work. In particular, the SCAN language has been internationally used as an information processing tool (UCLA,

UNLV,UP, GMU,ASU, WC,AIS,BU, AFRL in USA), (GU, UP, NTAU, TUC in Europe), (NTU, SU, KU in Asia) and others. SCAN has also been selected and registered by the Computer Institute in Seattle, WA, as a new computer language, in 1987, and received an Outstanding Paper Award IEEE ATC 1994. SCAN is promoted by AIIS as a commercial lossless compression encryption software tool with information hiding capabilities. SCAN has also been implemented by several researchers using cellular automata, FPGAs, VLSI methodologies for a variety of applications.

Grants and Proposals:
$45,600, ECC, 1984-86, PI, European, (U-Patras), funded;
$SPIR-AIIS,PI,2000,SUNY, Internal fund;
SPIR-AIIS, PI, 2000, BU-NY State, Internal fund;
$150,000, Veridian, PI, 2003,funded;
$100,000, co-PI, ARL,2006, (CGO Inc., PI), funded;
$414, 000, ONR, PI, 2012-14, funded;
PhD Students: A. Psarologou (new), A. Trikalinou (new)**,** A. Rwabutaza 2009**,** S. Maniccam 2000, C. Alexopoulos 1988.
Master Students: 6 master theses completed

. Secure Knowledge Management

This project deals with R&D of software methodologies for the secure management of knowledge, trust-security-privacy discovered by data mining and integrated by fusion techniques and preparedness-prevention-planning for terrorists' attacks. It is a multi-university effort sponsored by AFRL-WBI and organized by ITRI-WSU.

Grants:
$1,350,000, PI, AFRL, 2003-04, funded;
$436,000, PI, AFRL, 2004-05, funded;
A new proposal is underway for developing a new cyber-infrastructure for WSU and other Ohio based Universities.
Master Students: 2 master theses completed

. Parallel, Multiprocessor-Multi-layer Autonomous Retina based Vision Systems

This project deals with the development of two real-time multiprocessor, hybrid, autonomous vision system architectures. The first one (Hermes) is a flat quadtree structure was introduced by Dr. Bourbakis in 1980, with the following unique features: 1) it receives images directly from the environment by using a 2-D parallel photo-array of NxN cells designed by him; thus no intermediate storage is required; 2) it functions in an asynchronous, parallel-hierarchical (up, down) manner; 3) it includes hardware-software mechanisms for image loss recovery, if failures occur on the nodes; 4) it is autonomous (no host computer is needed); 5) it uses 32-bit RISC processors designed by him as processing nodes,1992. The RISC processor presents a best performance among the RISC processors with the same bits size. The Hermes' prototype has been constructed by using 4 nodes, and with a size of 256 nodes it can theoretically execute 78.6 GIPS and 25.6 GFLOPS. In additional, Hermes system can be used as a general purpose computing system, where its KB and the operating system are "sitting" on the top of its hierarchy.

The second one (Kydon) is a multiple layer array processor based on hexagonal processing elements (PE). The unique features of this system are: 1) it receives images directly from the environment by using a 2-D parallel photo-array of NxN cells; thus no intermediate storage is required; 2) it functions in a synchronous, parallel-hierarchical (up, down) manner; 3) it is autonomous (no host computer is needed), since each PE includes its own control unit; 4) it can process 1,000 images per sec at the lower three layers; 5) it uses a distributed knowledge base at the upper levels to learn and recover from certain nodes failures. The Kydon's upper array processors use as a PE the Kydon-RISC processor, designed by him, to speed up the overall system's performance. In addition, General Electric expressed an interest in building the Hermes vision machine. The Hermes' prototype was constructed at the GE labs, VA. Also, AIIS has expressed a strong interest of developing the Kydon system as a digital retina for blind individuals. Kydon's lower layers

are used for the implementation of ***a retina-like processor*** for lower vision. The VLSI design of Kydon's low layers and their simulation have been completed 1995.
Grants and Proposals:
$20,000, EMC, co-I, European, 1996-97, (NTUA, PI), funded;
$25,000 AFRL, PI, 1998 funded;
$2,000, FRG, 2000, PI, SUNY-B, funded;
PhD Students : S. Mertoguno 1995. **Master Students**: 7 master theses completed

. Deep level Secure Processors with Biometric Features

This project deals with the design, the performance evaluation and the extended instruction set of the SCAN secure processor. The SCAN secure processor is a modified SparcV8 processor architecture with a new instruction set to handle lossless image compression, encryption and information hiding based on the SCAN methodology. The modules for image compression, encryption and information hiding are synthesized in reconfigurable logic and the results of the FPGA synthesis are presented. These modules provide to the SCAN-SP fast crypto capabilities. We have implemented the above modules in an off-chip FPGA. The SCAN-SP will offer a SCAN based encryption and decryption of 32 bit instructions and data. In addition the SCAN-SP carries Biometric FPGAs that offered authentication-authorization capabilities based on iris, voice and fingerprint. The SCAN-SP architecture offers benchmark applications for cyber infrastructures.
Grants and Proposals: GCO Inc. $25,000, PI, 2007, funded; $23,000, PI, ONR, 2010, funded; $45,000, ONR, PI, 2011, funded;
PhD students: R. Kannavara 2009

. A Packet Loss Recovery Methodology for Video Streaming over IP Networks

In this project we study issues relevant to large amounts of data and limited bandwidth that are always at odds for digital video streaming over Internet Protocol (IP) networks. Packets could possibly be delayed or lost. Sender-based recovery techniques for packet loss generate redundant information that causes lower compression ratio and consumes additional bandwidth. In order to address this issue, a novel information hiding-based recovery methodology has been developed. The basic idea is that the redundant information used for error recovery is embedded within the frames of the original video contents, by means of high bitrate information hiding techniques. In the receiver end, the hidden information is extracted for lost-packet recovery. Experimental results show that the damaged macro-blocks can be recovered with a higher quality using the proposed methodology, as compared to spatial extrapolation used in H.264/AVC reference software. The main contributions of the proposed methodology are: (1) the delivery of redundant information does not increase bandwidth requirement significantly under the same media quality, bringing out advantages in practical applications; (2) the structures of encoder and decoder do not need to be changed in the case of intra-only coding mode.
Grants and Proposals: PI, ITRI-WSU. $25,000, 2005 funded;
$410,000, NSF, co-PI, tbs (Dr. Yang, PI)
PhD students: Ming Yang 2006

. OCR, Document Processing-Synthesis, Biometrics & NL Understanding

This project deals with the design and development of OCR, handwritten recognition methods used for document processing and biometrics (fingerprints). It has been characterized by AT&T Labs (Director Dr. Netravali) as a pioneering contribution, 1989. It is a letter driven OCR method based on the reduction of the character's size, evaluation of the main and secondary features of a character and classification of the character by combining HVP and Graph methodologies. The results of his work are: 1) 99.1% accurate recognition of handwritten characters with minor defects; 2) 86% correct recognition of continuous handwriting words (with no use of a dictionary), skewed, overlapping and broken characters. The extension of his OCR work has also found an application to document processing (redundancy removal), mobile computing and NL understanding (separating images from text, labeling-indexing, document summarization)

and biometrics for mobile computing. In particular the uses of the SPNG modules are used for NL understanding.
Grants and Proposals:
$15,000 ECC, 1996-97, co-PI, European, (NTUA), funded;
$102,000, AFRL, PI, 1998-99, funded $65, 000, AFRL, PI, 2003, funded;
PhD Students: M. Mills 2012, K. Praveen 2006
Master Students: 5 master theses completed

. 3-D Space Maps Generation, Navigation & Planning (Robotic Nurse and Disasters)
This project deals with the development of 3-D space maps methodology applicable to blind people's navigation. This methodology has been considered by NASA-Houston Intelligent Systems Division, NTAU-Robotics Lab & CIV Corp. CA, as a pioneering contribution in autonomous robots visual navigation and maps generation in unknown environments, 1994. It makes autonomous robots able to detect other moving "objects"; estimate their velocity, direction, perceived shape; avoid collision by defining traffic priorities; and extract the map of the unknown space by traveling a short distance. It is applicable to the Mars exploration program, Dept. of Energy (Sandia Nat. Labs) and Biosphere program (NASA). FORD is interested to commercialize his methodology on smart cars. An application of this project is to visually assist people with disabilities during navigation in 3-D space and record human activities using the L-G graph and SPNGs, and smart cars.
Grants and Proposals:
$5,000, FRP, 1992-93, PI, SUNY-B, funded;
$180,600, NTAU, 1996-97, External-Investigator, European, funded;
$2,500, FRG, PI, 1996, SUNY-B, funded; $5,500, PI, MG, 1997 and 2000, SUNY-B, funded;
$1,250,000, PI, NSF-NRI, pending
PhD Students: I. Ktistakis (new);
Master Students: 3 master theses completed

. Autonomous Distributed Intelligent Agents
This project deals with the development of a model, which analyzes the behavior of autonomous intelligent agents when they exchange, convert, integrate, abstract and process information (or knowledge) distributed to them in a random way. An environment with four heterogeneous knowledge bases is used as a prototype. The agents have anticipatory responses to the environment changes for maximizing their gain. This project is a collaborative effort (Purdue U. PI)
Grants & Proposals:
$18,000 ECC, External-Investigator, 1999-2000, European, funded; $100, 000, AFRL, PI, 2003, funded;
$1,216,000, NSF, co-PI, 2007-2010, (Purdue U., PI), funded;
PhD Students: J. Gattiker 1996

. A software environment for assembly programs conversion and evaluation
This project deals with the development of an environment for converting and evaluating assembly languages. The aim of this effort was the design of more efficient microprocessor architectures.
Grants: $52,000, CTI, PI, 1986-88, European, (U-Patras), funded;
$16,000, IBM, PI, 1991-92, funded
Master Students: 1 master thesis completed

. Software Metrics Evaluation
This project deals with the development of a neuro-expert system for the automatic evaluation of software metrics. The result of this work has been used by US Army.
Grants :
$47,902, KAMAN Corp., 1993-94, PI, funded; $41,058, USARMY 1994-95, PI, funded;
$50,012, ARL, PI, 1995-96, funded; $45,000, USARMY, 1996-97, PI, funded;

. Visual Reverse Engineering of damaged PC Boards and VLSI Placement

This project deals with the development of visual reverse engineering methods applicable to damaged PC Boards, and it has been recognized as pioneering by TALIS Inc. and received an IEEE AT Conference best paper award. The motivation behind this work is the speed up of the PCBs repairing time and reducing the repairing cost.

Grants: $126,200, GE-NSF,1990-91,co-PI, (UMD, PI), funded; $650K, Universal, Research Equipment, PI, 1992, funded;

PhD Students : A. Moghaddamzadeh 1995, M. Mortazavi 1995.

Master Students: 1 master thesis completed

FUNDING FOR EDUCATIONAL AND INDUSTRIAL PROGRAMS

. Priorities in Graduate Education

This project deals with the support and enhancement of the CS graduate program (PhD). The OBR provides seed money for research at the graduate level. Accumulative amount (from 2001 to 2006) is **$1,900,000** for ITRI, Dr. Bourbakis was the PI.

. Undergraduate Program on Bioinformatics

This project, **($550,000**) funded NSF 2001-2003, deals with the development of an undergraduate program for bioinformatics associated with other undergraduate courses. Dr. Bourbakis was the instrumental associated faculty investigator (senior participant), who was instrumental for this effort at WSU.

. Summer Institute on Advanced Computing

This project **($35,000**) funded by Ohio Supercomputing Center, deals with organization of an research education four days program on supercomputing with a specific theme Bioinformatics & Data Mining, WSU, Aug. 27-30,2001. Dr. Bourbakis organizer and co-PI.

. Summer Institute on Advanced Computing

This project **($35,000**) funded by Ohio Supercomputing Center, deals with organization of an research education four days program on supercomputing with a specific theme Visualization, Imaging and Modeling at WSU, Aug. 28-31, 2002. Dr. Bourbakis is the organizer and co-PI.

. Summer Institute on Advanced Computing

This project **($35,000**) funded by Ohio Supercomputing Center, deals with organization of an research education four days program on supercomputing with a specific theme Homeland Security Computing at WSU, Aug. 27-29, 2003. Dr. Bourbakis (PI) organizer.

. IGERT graduate program on Tech-based on Learning with Disabilities

This project **($3,300,000**, funded NSF, 2005-10) deals with the development of an inter-disciple graduate program on PhD in technology based learning with disabilities at Wright State University. Dr. Bourbakis was a co-PI.

. IGERT Graduate Program Tech based Healthcare Innovators for People at Risk

This project, **($3,600,000**, NSF, OSU-co-PI, tbs), and deals with the development of a graduate PhD program on Advanced Technologies for secure information exchange in healthcare systems.

FUND RAISING

He has an essential participation in the fund raising effort for the **Joshi *Engineering Building***, **$250,000**, Ohio Dept. of Education, 2004. Dr. Bourbakis is a co-PI.

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3. N.Bourbakis, **8-bit microcomputers programming**, Univ. of Patras,1983, Greece, 145 pages, (textbook)
4. N.G.Bourbakis, **Applications of Learning and Planning Methods**, World Scientific Pub. edited, March 1991, 365 pages
5. N.Bourbakis, **Artificial Intelligence Methods and Applications**, WS Pub. Dec. 1992, edited, 705 pages
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15. N.Bourbakis, **Bio-Imaging : Methods and Applications,** Springer Pub.**,** 230 pages, (textbook approved by Springer)
16. M. Yang and N.Bourbakis, **Multimedia Information Recovery over IP,** Springer Pub., 162 pages, (monograph)
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He has written more than 50 technical report papers. Some on speech processing are:
1- T. Chhith, T.Pribadi and N.Bourbakis, ***Computer Voice Synthesizer***, GMU-ECE-TR-03-1988
2- H.Phan and N.Bourbakis, ***MC68000 based Voice recognition controlled System***, GMU-ECE- TR-06-1988
3- M.Hammett, D.Maurer, M.Neel, D.Wheeler, N.Bourbakis, ***Text Image to Speech Processing***, GMU-ECE-TR-09-1988
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2. **Hermes RISC processor**,1992
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4. **Kykloforia – a robots traffic method for collision avoidance**,1994
5. **An array processor for real-time skeletonization**, 1995
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7. **An automatic text reading system**, (Patent Number 7,017,113)
8. **G-SCAN a method for 2-D/3D data accessing & processing**,(patent filed 2000,)
9. **A methodology for a 3-D map generation**, 1995
10. **An ASIC image (video) processor**, 1995
11. **Boumer learning model**, 1995
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15. **A methodology for PCB reverse engineering**, 1999
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18. **The SCAN Encryption processor (**2004)
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22. **SCAN Secure processor** (patent filed 2009)
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L2 : Design of a robot eye,Aug.1982, Univ. of MD, Dept. of EE, Maryland.
T3 : Microprocessors in Energy saving, Dec.1982,Patras,TC of W-Greece.
L4 : Robot vision systems and learning machines, April 1984,CUA, Dept. Elect. Engr, Washington DC.
L5 : Pyramid data structure and regular decomposition, April 1984, George Mason U, Dept. of ECE, VA
T6: Assembly languages and microcomputers applications, June 1984,CP, Patras, Greece.
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L10: HERMES-A real-time, multibit, multiprocessor vision system architecture, Oct. 1988, GMU, Center of PC,VA
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L12: Knowledge-driven vision architectures, March 1988,3m,VA.
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L17: A neural-type, multilevel vision architecture, July 1989, IBM Almaden, Dept. of Computer Science, CA
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L166: A Computational Methodology for Associating Body Signals and fMRI Brain Changes for Aging, National Institute of Aging, Baltimore, MD, April 2010
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L171: A Crypto-biometric Scheme for Secure Transactions, ICITST, London, Nov-2010
L172: Tyflos-Reader and Navigator Assistant, Univ of Dayton, Distinguished Speakers Series, March 2011
L173: MobileHealth: Monitoring and Security, IEEE Conf. Health Comm., Oct 2011, Kos, Greece
L174: Research Projects on ATR, AFRL, Oct. 2011
L175: Monitoring Health Conditions of People at Risk, Asia University, Oct 2011, Taiwan
L176: Securing Health Information Exchange, Athens, July 2012, Greece
L177: Assistive BioMed Technologies & Future Directions, Aug. 2012, OSU, OH, USA
L178: Intelligent Interfaces for Blind Users, Rhodos, Aug. 2012, Greece
L179: MobileHealth: Monitoring and Privacy, IEEE Dayton Chapter, Oct 16, 2012
L180: Detecting faces from different views, IEEE Dayton Chapter, Dec. 2012

DIRECTOR AND ADVISOR OF GRADUATE STUDENTS

Post-Doc and Research Scholars (director or collaborator)
Two post-doc and two research scholars are working in various research projects under his supervision.
Dr. Sokratis Makrogiannis 2003-05
Dr. Robert Bryll, 2004
Dr. Ming Yang, 2006
Dr. P. Kakumanu, 2006
Dr. Anna Esposito, Italy, 2004-07 (Professor, research scholar)
Dr. Apostolos Dollas, Greece, 2005-06 (Professor, research scholar)
Dr. S. Mertoguno, USA, 2008-2009 (Senior Researcher)
Dr. D. Dakopoulos, ATRC, (Post-doc), 2009
Dr. A. Karagyris, ATRC (Postdoc), 2010

. PhD theses (director and advisor)
1. *A language for sequential data accessing*, Univ. of Patras, Dept. of Computer Engr., Greece,1986-88, C.Alexopoulos, (Professor, Univ. of Patras, Greece)
2. *A neurofuzzy control of a robot hand*, 1993-95, Anya Getman (Tacsillo), University of Nevada-Reno
3. *An autonomous, neuromorphic vision system architecture*, S.Metroguno, 1992-95, ONR, Washington DC.
4. *Reverse Engineering using Image Processing & Understanding*, 1992-95, Ali Zadeh, Talis Corporation
5. *VLSI floorplacement, synthesis and compaction*, M.Mortazavi, 1991-95, Cadence Corp.
6. *An SPN methodology for S&F representation of knowledge*, 1992-96 J. Gattiker, Los Alamos National Labs
7. *An expert system for image processing*, D. Goldman, 1993-97, SSI Inc.
8. *An image processing-analysis language*, R. Andel, 1995-99, Lockheed Martin Corporation, NY
9. *Information security*, S.Maniccam, 1998-2000, (Associate Professor) E. Michigan University. MI
10. *Recognizing 3-D objects in images*, X.Yuan, 1998-2002, IBM
11. *Securing video-audio on demand*, M.Yang 2001-2005, (Associate Professor), SPSU, GA.
12. *Detecting facial expressions for blind,* K. Praveen 2003-2006, S-Scientist, Med-Imaging, OH
13. *A new device for independent navigation for blind,* D. Dakopoulos, May 2009, Greece
14. *A Secure Processor with crypto and biometric based authentication capabilities*, R. Kannavara, Aug. 2009, Princeton University, NJ and Intel Corp.
15. *A Study on Cryptanalysis Methodologies,* A. Rwabutaza, Dec. 2009
16. *Detecting Abnormal Patterns in WCE Images,* A. Karargyris, March 2010, NIH
17. *Prognosis: Wearable Health Monitoring Systems for Early Prognosis for People at Risk,* A. Pantelopoulos, West Wearable Health Institute (associated with UCSD), Aug. 2010
18. *An automatic document reading system for the blind*, R. Keefer, April 2011, Pomient Inc, Dayton Ohio
19. *Natural Language Understanding with SPNs*, M. Mills, Dec 2012

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20. *An SPN-based Body Language Methodoly for recognizing body activities*, June 2013, A. Tsitsoulis
21. *A methodology for Detecting Hijacking of the Program Flow*, A. Trikalinou
22. *Modeling and detection of changes in human brains in time*, K. Michalopoulos
23. *Implanted Sensors and Biomarkers for early Health Prognosis*, M. Tsakalakis
24. *Amina - Architecture for Secure Detection and Protection from PFH*, A. Psarologou
25. *Extracting Facial Expressions Emotional Micro-features for Early Detection of Seizure's Patterns in People with Disabilities*, D. Kavraki

. Member of PhD Committees
He has been a member or an external examiner in numerous PhD committees

. MASTER theses (director, advisor)

1.*Image algorithms for hierarchical data structures*, GMU,ECE,VA, June 1986,T.Beck,Gov.
2. *A hierarchical, multiprocessor vision system architecture*, GMU, ECE, VA, Aug. 1986, D.Fotakis, NSC
3. *Design & modeling of a multiprocessor WHT system using PNs*, GMU,ECE,VA,Dec. 1986, S.Nguyen,PR Inc.
4. *Hardware implementation of the pipelined WHT system*, GMU, ECE,VA,May 1987, M. Ghods, PR Inc.
5. *Microprogramming of an autonomous navigation system*, GMU, ECE,VA,July 1987, H. Hamidi, PR Inc.
6. *Rule-based analysis/synthesis of images*, GMU, ECE, VA, Dec.1987, H.Nguyen, Contel Inc.
7. *Hardware design, test and fabrication of a multiprocessor quartet kernel using 8088 processors*, GMU,ECE,VA, Nov.1988, D.Smith, GE Corp.
8. *SHEDIO-A knowledge-based environment for VLSI system architectural design: Geometric transformation for optimum VLSI layout placement*, GMU,ECE,VA, Nov.1988, Y.Savvides.
9. *A low level structural design and evaluation of the DIAS multi-level picture information system*, GMU, ECE,VA, Nov.1988, D.Thurston, NRL
10. *Performance evaluation and failures recoveries of the HERMES multiprocessor structure*, GMU, ECE, VA, March 1989, F.Barlos, Thinking Machines Corp.
11. *Testing OCR methods for the design of a text reading system*, GMU,ECE,VA,March 1989, M.Burton, TRW
12. *RISC processors: Design and Evaluation*, S.Metroguno, SUNY,EE, July 1992
13. *Design of a character driven OCR system*, N.Perriera, Intel, May 1993
14. *Development of a frame for assembly languages evaluation*, Robert K., May 1993
15. *Performance evaluation of a data flow array processor*,P.Shaileh,May 1993,NJ, Bank
16. *VLSI design of KYDON's lower level array-processors*, Brikam Saha, Dec.1993, Sun Microsystems.
17. *A neural network model for stock prediction*, Sept. 1994, A.Hobbs, NCB Corp.
18. *A VLSI parallel thinning array processor*, N.Stefensen, May 1994, Motorola
19. *Hardware design of an ASIC image compression system*, W.Tariq, Summer 1994
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22. *Fusing laser & image data for 3D modeling of the free space*, M.Maas, Fall 1997, Kodak Corp.
23. *Heuristic testing of VLSI circuits,* J.Watkins, Fall 1997, IBM Corp.
24. *Hardware implementation of the Scan language*, G.Drort, Fall 1997
25. *Implementation of an intelligent robotic hand,* Steve Spano Fall 1997, FRD Corp.
26. *Design and simulation of a distributed system for an autonomous robot*, M. Irvin, May 1998, IBM
27. *Evaluation and design of the Kydon RISC processor*, Y.Yang, Fall 1997, Fujitsu Corp.
28: *AI techniques in ATM Control*, X. Lu, May 1998, Bright Corp.
29. *Image lossless compression using the SCAN language*, S.Maniccan, Dec. 1998
30. *The Scan generator in Java*, A. Tannu, Oracle Corp. Dec. 1998, co-advisor
31. *3-D functional MRI images for robotic surgery*, S. Mariette, IBM VT, May 1999
32. *Digital Video Technology*, L.Zong, May 1999
33. *Sensors and fusion: issues and applications*, L.Chao, May 2002
34. *Curve fitting using NNs and GAs*, H. Sreehari, May 2002
35. *Secure Knowledge Management : A comparative study*, A. Ali, Aug. 2004
36. *Improving the objects shape in embroidery images,* A. Yuksel, 2004
37. *Visual Representation Language for Patterns and Changes*, P.Patil, Nov. 2006
38. *A Comparative Survey on Cryptanalysis Methodologies*, A. Rwabutaza, Sept. 2006
39. *A Surveillance system for Smart Homes*, R. Patrick, June 2010
40. Automated generation of encryption techniques, T. Olaes, AFRL, in progress

. Member of Master Thesis Committees

He has been a member or an external examiner in numerous master thesis committees

. BS Senior projects

He has also directed more than 65 senior projects related with digital systems design, software development, image, speech and robotics.

. PhD Graduate Advisor (2001-2006)

From the post of the PhD advisor, he has initiated a new evaluation procedure based on the NRC criteria. The CSE PhD students have evaluated his performance from very good to excellent.

Exceptional research-service performance as a scholar 2010-2011, CSE Dept.

TEACHING (1980-2000 and 2007-present)

He is a high caliber teacher (Dean of the Engineering School, SUNY, 1997)
He has the enthusiasm and the way of motivating students (Students evaluation, Engineering School, SUNY, 1999)
Outstanding Teaching Performance (CSE Dept. WSU, 2010-11)
(Some comments from undergraduate students from his classes)
*"He is using the **what-why-how** approach for teaching his courses, and he always challenges his students' learning capabilities by motivating them and assigning to them individual or team projects for problem solving".*
"He creates a pleasant and creative atmosphere for the students in his classes".
"His friendly character gains the trust of his students for increasing their performance".
"His students are always the major participants during his lectures".
"He is an outstanding teacher capable to motivate his audience to listen and learn"
"He is a digital guru".

Teaching: He has more than 20 years teaching experience for efficiently and effectively:
◦ Teaching or developing courses on computer engineering, machine vision, image processing, applied AI, wearable systems for people with disabilities, monitoring techniques and systems, biomedical informatics.
◦ Developing of educational initiatives.
◦ Exploring possibilities of improving essential teaching quality by efficiently using the *what-why-how* methodology and challenging students for excellence.

Teaching Philosophy
Dr. Bourbakis teaching style is mainly guided by the teaching methodology of **"what-why-how".**
Under the term **"what"** he explains to the students the topic of each lecture. In particular,
what the meaning of the title of the topic is;
what category of problems this topic deals with;
what connections the current topic has with the previous and future topics;
what the objectives of the current lecture are;
Under the term **"why"** he provides to the students the necessary explanations for making the lecture worthy to be attended and studied. In particular,
why this topic was selected, or developed, or designed to solve a particular problem;
why researchers, scientists, engineers, practitioners, etc. spend their time for this topic;
why the students have to learn and study this topic;
Under the term **"how"** he presents and explains the steps of the methodology related with the particular topic for achieving the objectives defined in the beginning of the lecture.
During his presentation, he always maintained the use of "what-why-how" scheme in a hierarchical way associated with the subject of study, and he associates it with previous and future lectures.
The involvement of the students during the lecture is a must, and he guides and actively motivates them through this teaching scheme to learn in depth the ideas behind the subject of study. He uses individual and

team assignments for improving and increasing participation and stimulating thinking in problem solving scenarios.

Undergraduate Courses Taught (Overall teaching performance above 90%)

1. CEI Computer Programming, Spring 83, 84 (2nd semester)
2. CEI Microcomputer AIM-65, Fall 83 (5th semester)
3. CEI Assembly Languages, Spring & Fall 82 (1&2 semesters)
4. EE Computer Structure & Organization, Spring 81 (2nd semester)
5. EE Programming in FORTRAN, Fall 78-81 (3rd semester)
6. ECE Automata & Formal Languages, Fall 80 (8th semester)
7. EE Logic Design, Spring & Fall 80 (6th semester)
8. EE Numerical Analysis with Computer, Spring 79,81 (4th semester)
9. ECE 331 Digital Electronics & Logic Design, Fall 86 Spring 85
10. ECE 445 Computer Organization and Design, Fall 85-89
11. CS 365 Computer Architecture, Fall 87
12. CS 498 Picture Languages, Fall 86
13. EE 351 Digital Systems, Fall 1991-95 & 2000
14. EE 480 Data Structures and Algorithms for Engineers, Spring 1998 (NA)
15. ECE 220 Data Structures and Algorithms, Fall 1999
16. ECE 410 Artificial Intelligence, Spring 2000, (TUC)
17. ECE 230 Fundamental of Programming Languages, Spring 2000 (TUC)
18. CEG-260 Digital Computing Hardware/Switching Circuits, Fall 2009 (WSU)
19, CEG-320/520 Computer Organization, Winter 2010 (WSU)

Undergraduate labs experience

1. CEI Experimental Programming with AIM-65, Fall 83 (5th semester)
2. EE Programming Applications with FORTRAN, Spring & Fall 78-81
3. ECE 435 Digital Circuits & Systems, Fall 84
4. ECE 301 Digital Electronics, Fall 84,85
5. ECE 449 Design of Computer System Architectures, Fall 86,
6. EE 484 Design of an autonomous walking robot, Spring 1992
7. EE 351 Digital Systems, Fall 1995

Graduate Courses Taught (overall teaching performance 95%)

1. ECE 644 Computer Image Processing, Fall 85, 86, 87 (Master level)
2. ECE 744 Computer Vision & Expert Systems, Spring 86,87 (Master level)
3. ECE 590 Facsimile Systems, Summer 86, (Master level, ind. studies)
4. ECE 590 Languages & Algorithms, Spring 87, (Master level, ind. studies)
5. ECE 590 Rule-based VLSI System Design, Spring 88, (Master level, ind.st.)
6. ECE 590 Performance Evaluation of Multiprocessor systems, Sp.88 (master level)
7. ECE 590 Tools for Data Security, Fall 88,(master, ind. studies)
8. INFT 835 Knowledge-based Vision Architectures, Spring 89 (PhD)
9. INFT 844 Pattern Recognition, Fall 89, (PhD level) (NA)
10. EE 559 Image Processing & Machine Vision, Spring 1992-98 (master level)
11. EE 656 Performance Evaluation of Multiprocessor Systems, Spring,1992-99(PhD)
12. EE 697 Knowledge based VLSI placement, Spring 1992 (ind. studies, PhD)
13. EE 659 Engr. Appl. of AI, Fall 1992-98 (PhD level)
14. EE 699 Image Watermarking, Fall 1999 (ind. Studies)
15. CSE 790 Image Processing, Fall 2006 (new graduate course)
16. CSE 890 Applied AI and Intelligent Robotics, Spring 2007 (new seminar-course)
17.CSE 890a Wearable Systems and their Applications, Fall 2007 (new seminar-course)

18. CSE 790 Image Computing, Spring, 2011, (new course)
19. CSE 790-3 Monitoring and Surveillance Methods/Systems Spring 2012, (new course)

Courses and Curriculum Development

He has developed the following courses and labs:

1. CEI Microcomputer AIM-65, Univ. of Patras, Dept. CEI
2. CEI Architecture and Assembly Languages Programming, Univ. of Patras, Dept. CEI
3. ECE 644 Architectures & Algorithms for Image Processing, GMU, Dept. ECE
4. ECE 645 Performance Evaluation of Multiprocessor Structures, GMU (master.)
5. ECE 744 Computer Vision & Expert Systems, GMU, Dept. ECE (master)
6. INFT 835 Knowledge-based Vision Architectures, GMU, SITE (PhD)
7. INFT 844 Pattern Recognition, GMU, SITE (PhD)
8. INFT 935 Applied Computational Linguistics, GMU, SITE (PhD)
9. EE 559a Digital Image Processing, SUNY-EE (master)
10. EE 656 Performance Evaluation of Multiprocessor Systems, PhD, SUNY
11. EE 559b Machine Vision & Pattern Recognition (master) SUNY-EE
12. EE 659 Engineering Applications of AI, (PhD) SUNY
13. EE 351 Digital Systems Design (undergraduate lab) SUNY
14. ECS 656B Digital Video Processing, (graduate), SUNY
15. EE 480 Data Structures and Algorithms for Engineers (undergraduate), SUNY
16. ECE 517 Math for Computer Engineers, (master level course), SUNY
17. CSE 790 Arch.-Lang.-Alg. for Image Processing, Fall 2006 (new graduate course)
18. CSE 890 Applied AI and Intelligent Robotics, Spring 2007 (new graduate course-seminar)
19. CSE 890a Wearable Systems and their Applications, Fall 2007 (new graduate course-seminar)
20. CSE 890b Machine Vision Systems, Spring 2008, (new graduate course-seminar)
21. CSE 790-2 Image Computing, Spring 2011, 2012 (new graduate course)
22. CSE 790-3 Monitoring and Surveillance Methods and Systems 2012 (new graduate course)
23. CSE 790x Medical Imaging Challenges, 2012, (graduate course) tbt