Connections

The Newsletter of the IEEE Neural Networks Council

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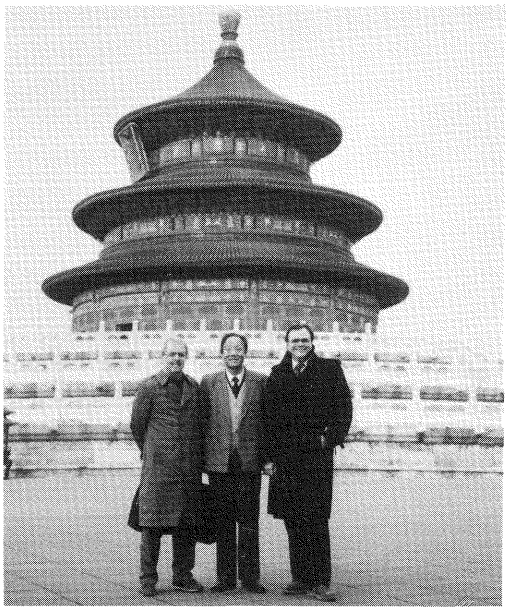

Russ Eberhart, Zong Sha, Chairman of IJCNN Beijing, and Bob Marks (photo courtesy of Bob Marks)

IN THIS ISSUE

CoNNections Newsletter

CoNNections is published quarterly by the Institute of Electrical and Electronics Engineers for individual subscribers to the IEEE Transactions on Neural Networks.
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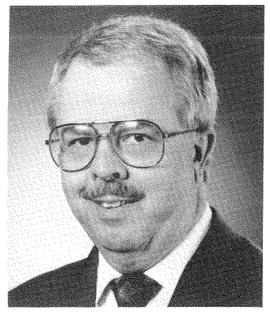
President's Message

Russell C. Eberhart
Research Triangle Institute



This President's Message is being written just a few weeks before the joint **ICNN** and **FUZZ/IEEE** conferences in San Francisco. This is the first time we have combined these meetings, and the synergism between the neural network and fuzzy system technologies guarantees an exciting event. General Chairman **Enrique Ruspini** has done a great job in what have been at times difficult circumstances that included a change in venue.

This September, the NNC will sponsor the **Virtual Reality Annual International Symposium** in Seattle, Washington. General Chairman **Tom Furness** and Program Chairman **Tom Caudell**, assisted by an able conference committee, have assembled what will almost certainly be the most comprehensive technical meeting ever presented in the exciting emerging area of virtual reality.

I am pleased to announce that the **IEEE NNC Virtual Reality Technology Committee** has been established. The President of each IEEE Society that is a member of the NNC has been invited to appoint one voting member to the committee. I have appointed Dr. **Tom Caudell** of Boeing Computer Services in Seattle, Washington, as the committee's chairman. The purpose of the committee is to examine how the IEEE can best serve its members who are involved in VR technology, and make specific recommendations for actions by the NNC. A subcommittee of the NNC Standards Committee is being established for VR technology.

I encourage you to attend the **International Joint Conference on Neural Networks (IJCNN)** being held this October in Nagoya, Japan. This will be the Neural Network Council's first major conference in Japan, and we are excited about the opportunity to learn more about what is happening in neural networks in Asia. Profs. **Toshio Fukuda** and **Shun-ichi Amari** are heading up a hard-working conference committee. Just prior to the IJCNN, two workshops are being held for which the NNC is technical co-sponsor. One focuses on learning and adaptive systems, the other on multiple and distributed robotic systems.

In 1994, the Neural Networks Council is sponsoring a landmark event, the **World Congress on Computational Intelligence.** This exciting congress will include three major conferences: The **International Conference on Neural Networks (ICNN)**, the **FUZZ/IEEE '94 Fuzzy Systems Conference**, and the **1994 Conference on Evolutionary Computation (CEC).** The event will be held at the Walt Disney World Dolphin Hotel in Florida, from June 26 until July 1, 1994. It will occur during the World Cup Soccer competition which is being held in Orlando (the first time it has ever been held in the United States). The Congress Director General is **Charles Robinson.** The three Conference General Chairmen are **Steve Rogers** (ICNN), **Piero Bonissone** (FUZZ/IEEE '94) and **Mike Michalewicz** (CEC). You will be able to attend all three conferences for one registration fee.

The Neural Networks Council now has fifteen Member Societies. The latest to affiliate is the **Social Implications of Technology Society.** I'd like to welcome the Society, and its AdCom representatives **Don Wunsch** and **Rick Alan,** to the Council.

What Do IEEE Members Want from Their Institute?

Troy Nagle
North Carolina State University
IEEE President-Elect

What can we do today to help IEEE better serve its members in the rest of this decade? Which products and services should the Institute provide to its members? What services do the members really want? Can we provide them these services and keep the member dues at current levels? These are a few of the questions that every new IEEE President faces. I will be addressing these questions during my upcoming three year term on the IEEE Board of Directors and Executive Committee.

•THE MAJOR CHALLENGE

I believe that the major challenge for IEEE is member retention. The table below summarizes the number of members in various categories that drop their IEEE membership each year:

Category	Arrears (%)
Fellows	.5
Senior Members	1.5
Members	8.
Institute Average	13.
Associates	20.
Students	25.
Recent Graduates	50.

About 30% of the students enrolled in electrical and computer engineering program join IEEE. Why do we lose half of them upon graduation? The most common reasons stated by those who drop their memberships are: Dues cost too much relative to the perceived value of membership. Many believe IEEE is solely a professional organization (versus a technical one). Others think that membership won't help them progress in their jobs. A frequent complaint is that IEEE journals are too theoretical. Many employers discourage participation because they think participation in IEEE will take them away from their jobs. Young engineers complain that IEEE provides no services, activities, benefits, or publications for them.

If IEEE is to achieve a more prominent position in the profession, we must convince these young members to remain within IEEE. I hope to improve the Institute's ability to provide services to these young members. Here are a few of my personal goals for the period 1993-1995.

•PERSONAL GOALS

- Create a new perception among students that IEEE is essential for career success. This is the most important thing I could accomplish during my term of office.

- Increase emphasis on Continuing Education at all levels in the Institute. By providing a greatly expanded selection of educational materials, IEEE members will be able to keep their job skills at peak performance levels. Keeping our members competitive in the job market is a high priority.

- Make the Section/Chapter a "continuing education" group in the eyes of IEEE members. Our Section/Chapters have been underutilized as a resource in achieving continuing education for our members.

- Make IEEE Press the publisher of choice for IEEE-member authors. A strong IEEE Press will bring many new books to our membership at discounted prices.

- Increase IEEE entity involvement in environmental issues. There is international concern for a clean environment among IEEE members. We should join in efforts to make our products and service environmentally safe.

- Improve mechanisms to measure member satisfaction. The Institute does not have effective methods to measure member satisfaction. If members are dissatisfied, they stop paying their dues. We must develop methods to reach these members before they drop out of the organization.

• PRODUCTS AND SERVICES

In order to provide better service to our members, I have been investigating several possible new products and services.

•Continuing Education

In the Continuing Education area, we are considering having IEEE develop under contract a series of new courses for major industries. These courses would be made available to all IEEE members. Another initiative is underway to find ways for IEEE and the National Technological University to team in joint continuing education courses. NTU has an international satellite broadcast network to more than 450 locations in companies and universities.

•Member Networks

Another idea under exploration is the concept of establishing new entities within the Institute (jointly sponsored by TAB and USAB) that IEEE members can join, similar to our existing Technical Societies. For example, we could create a Consultants Network, an Entrepreneurs Network, an Inventors Network, a Young Engineers Network, or a Retired Engineers Network. Other examples might be design and applications entities such as a Digital Design Group, an Analog Circuits Group, or a Quality Control Group.

•CD-ROM Products

The Technical Activities Board and its Societies are developing new CD-ROM products such as conference proceedings, collections of past publications, and technical compendia. Another idea under consideration is the establishment of IEEE Member/Expert Databases. The Technical Societies would compile the materials for the databases and the IEEE would publish the materials and make them available to industrial and other professions, such as medical and legal organizations.

•Student Services and Programs

1992 IEEE Neural Networks Council Pioneer Awards

Bradley Dickinson
Princeton University
Chair, NNC Awards Committee

Professor Shun-ichi Amari, Professor Walter J. Freeman, and **Dr. David J. Willshaw** were selected to receive the second annual 1992 IEEE Neural Networks Council Pioneer Awards. Presentations were made to Professors Amari and Freeman at 1992 International Joint Conference on Neural Networks in Baltimore, Maryland in June. Prof. Willshaw received his award at IJCNN-Beijing in November.

The IEEE Neural Networks Council Pioneer Awards recognize and honor the vision of those people whose efforts resulted in significant contributions to the early concepts and developments in the neural networks field. The Pioneer Award, is presented annually to outstanding individuals for contributions made at least fifteen years earlier. Previous recipients of the Pioneer Awards are **Stephen Grossberg, Teuvo Kohonen,** and **Bernard Widrow**.

The three individuals receiving Pioneer Awards in 1992 are internationally recognized experts who not only made pioneering technical contributions, but who are also currently active in research and technical leadership in the neural networks field.

Shun-ichi Amari is honored for his work on learning in multilayer neural networks, and for his theory of statistical neurodynamics. Dr. Amari is a Professor with the Faculty of Engineering at the University of Tokyo. He received the B.Eng. and Dr.Eng. degrees from the University of Tokyo in 1958 and 1963, respectively. He was a faculty member at Kyushu University from 1963 to 1967; since then he has been on the faculty at the University of Tokyo.

His pioneering contributions to the field of neural networks include the study of nonlinear cooperative and competitive feedback network behavior, characterization of random networks, analysis of adaptive pattern classification networks, and studies of associative memory networks.

Walter J. Freeman is honored for experimental work and theoretical modeling studies involving cortical networks in the olfactory systems of rabbits and cats. Dr. Freeman is currently Professor of Neurophysiology at the University of California at Berkeley where he has been on the faculty since 1959. He studied Physics at MIT, Mathematics at Hamilton College, and English and Philosophy at the University of Chicago; he received the M.D. degree from Yale University in 1954.

Prof. Freeman is being honored for his pioneering work demonstrating that cortical networks can be modeled as populations of mutually coupled oscillators, that plasticity in the coupling synapses endows cortical networks with associative learning properties, and that dynamical instabilities play a key role in behavioral phenomena. His work has established the neurobiological foundation for much of the modern work on design and analysis of neural networks.

David J. Willshaw honored for his work on associative memory networks and for his studies of topographic map development. Dr. Willshaw holds an appointment on the Scientific Staff, Medical Research Council, at the Centre for Cognitive Science, University of Edinburgh. He received the B.A. from the University of Cambridge in 1967, the Ph.D. in 1971 from the University of Edinburgh, and he also received the M.Sc. in Physiology from University College London in 197.

His pioneering work includes studies of the capacity of associative memory networks and the efficiency of sparse codes; he also studied the application of Hebbian plasticity to the problem of topographic map development in the optic tectum, inspiring much further work on the processes of nervous system development and organization.

IEEE President-Elect Troy Nagle Seeks Feedback From Members (from p.4)

For students and recent graduates, how about their own technical compendia, case studies, and design projects, edited by students and recent graduates, and distributed on electronic media? We need a large variety of international design contests sponsored by major industries. We might also create Student Enterprise Clubs in association with the Entrepreneurs Network mentioned above. Another important student program to be explored are IEEE Student Symposia conducted on University campuses. These Symposia would be an expansion of the existing S-PAC concept to include involvement of the other major boards of the Institute.

•Seeking Member Feedback

I have suggested a few new programs in this article. What are your ideas? What do you think of the suggestions above?

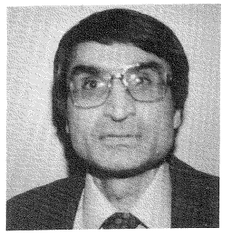
How can IEEE best serve its members? Send your comments to: H. Troy Nagle, IEEE Headquarters, 345 E. 47th St., New York, NY 10017.

New Fellows of the IEEE

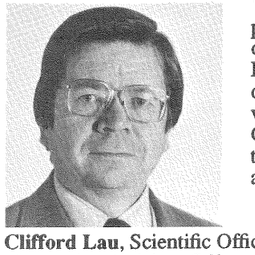
We are proud to recognize the 17 members of the Neural Networks community who have recently been elected Fellows of the IEEE, an honor bestowed each year on fewer than a tenth of one percent of the 320,000 active members of the IEEE. The nomination of Teuvo Kohonen, who was recognized last year with one of the first NNC Pioneer Awards, was evaluated by the Neural Networks Council. The others were evaluated by 11 different societies, which reflects the diversity of applications of Neural Networks and other aspects of Computational Intelligence. Several of these new Fellows have been very active in the Neural Networks Council as well as their member societies, serving as AdCom members and officers, editors and reviewers for NNC journals, and organizing conferences, not to mention teaching and conducting their own research. Congratulations to each of you!

Tri T. Ha, Naval Postgraduate School. *Evaluation:* Aerospace and Electronics Systems Society. *Citation:* Contributions to satellite communications systems.

Suresh M. Joshi, Senior Research Scientist at NASA's Langley Research Center in Hampton, Virginia. *Evaluation:* Aerospace and Electronics Systems Society. *Citation:* Contributions to the analysis and synthesis of control systems for large flexible spacecraft and for leadership in developing design methodologies for advanced space systems.



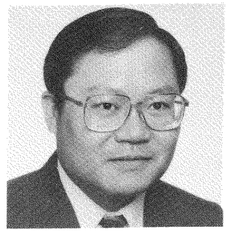
Saleem A. Kassam, Professor and Chairman of the Department of the Moore School Electrical Engineering, University of Pennsylvania, in Philadelphia, PA. *Evaluation:* Information Theory Society. *Citation:* Contributions to the theory and application of signal detection and estimation.



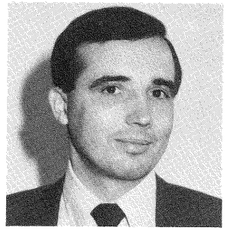
Teuvo Kohonen, Professor of Computer Science, Helsinki University of Technology, Finland, and Research Professor of the Academy of Finland. *Evaluation:* Neural Networks Council. *Citation:* Contributions to and leadership in the field of artificial neural networks and associative memories.

Clifford Lau, Scientific Officer, Electronics Division, Office of Naval Research (ONR). *Evaluation:* Circuits and Systems Society. *Citation:* Technical and managerial contributions in neural networks and electronic system reliability.

David E. Orin, Professor of Electrical Engineering at the Ohio State University. *Evaluation:* Robotics and Automation Society. *Citation:* Contributions to the computation of robot kinematics and dynamics.

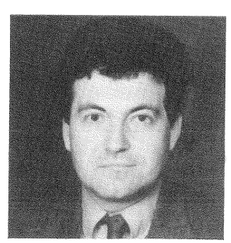


C. S. George Lee, Professor of Electrical Engineering, School of Electrical Engineering, Purdue University. *Evaluation:*Robotics and Automation Society. *Citation:* Contribution to computational algorithms and architectures in robot kinematics and dynamics, and for leadership in robotics education.



Josef A. Nossek, Professor for Circuit Theory and Design, Technical University of Munich. *Evaluation:* Circuits and Systems Society. *Citation:* Contributions to the design of discrete-time networks and for technical leadership in the development of radio communication systems.

Roy S. Nutter, Professor and Chairman Department of Electrical and Computer Engineering at West Virginia University, Morgantown. *Evaluation:* the Industry Applications Society. *Citation*: For introducing the microprocessor and advanced computer technology to applications in the mining industry



Harry Wechsler, Professor of Computer Science at George Mason University. *Evaluation:* the Systems, Man and Cybernetics Society. *Citation:* Contributions to joint spatial/spectral image representations and neural networks, and their theoretical integration and application to human and machine perception.

(continued on back cover)

IEEE-NNC Standards Committee Report

Walter Karplus, UCLA
Mary Lou Padgett, Auburn University

The Standards Committee is now active in many exciting areas. Many people responded to our efforts with suggestions and offers to help. All this increases the effectiveness of the standards groups and directs us in appropriate endeavors. More people willing to work in one or more of the areas of interest are needed, so please contact us stating your interests and concerns.

Two groups, the Working Group on Glossary and Symbols and the Working Group on Performance Measure Methodology have Project Authorization Requests (PAR's) approved by the IEEE Standards Board. In addition, the Software Interfaces Ad Hoc Working Group is in the process of drafting a PAR. The status of these and other groups is summarized below.

•Beijing Workshop

The panel discussion on the formation of an international language and symbology for artificial neural networks was well attended and generated enthusiasm carrying over to this year. Panelists suggested problem areas in communications to be addressed in the attempts to formulate a coherent set of terms to aid communication among peoples of different nations as well as those from different technical backgrounds. Some common misunderstandings that arise from our current, informal usage of neural network terms were highlighted.

Suggestions for a hierarchy of glossaries and appendices were made and welcomed by the committee, headed by Walter J. Karplus, UCLA. Action is being taken to incorporate these suggestions into the existing draft glossary, and to include supplemental information in the appendices. Clearly, this is a project that will grow through the years.

Panelists and contributors to the discussion include: Russell Eberhart, RTI; Robert J. Marks, U. Washington; Harold Szu, NSWC; Paul Werbos, NSF; Shiro Usui, Toyohashi U. T.; Yaotong Li, Beijing Inst. of Automation; Zhong Yixin, Beijing U. of Posts & Telecom; Zhongzhi Shi, Beijing NCIC; Yuan Baozong, N. Jiaotong U.; Cheng Hu, Academia Sinica; Ke You An, Beijing I. T.; and Mary Lou Padgett (Chair), Auburn University. Organizers include Professor Zong Sha, You Shou Wu, Yi Xin Zhong, and Lin Xuduan, from Beijing. Many others contributed ideas that will help this project remain dynamic and useful to the community.

Professor Usui has agreed to sponsor a similar panel this year at IJCNN'93, Nagoya. In addition to the panel, the Beijing conference sponsored a three hour standards tutorial seminar by Padgett. Participants received the executable version of the NASA Nets software and some examples. This tutorial will be extended and an upgrade of the Nets software will be offered in Nagoya.

•Glossary and Symbols

The Working Group on Glossary and Symbols is refining and reorganizing the draft glossary to incorporate suggestions received during the past year at IJCNN'92 Baltimore and IJCNN'92 Beijing, and by mail, email and word of mouth.

A hierarchical structure has been created, and enhancements are planned. Definitions for paradigms will be included, and the appendices will eventually include or reference explanatory material and terms from supporting disciplines. Diagrams and symbols will also be added. Suggestions for such inclusions are very welcome at this time. Consideration is currently being given to the structure of a balloting group. The Working Group plans to have a draft glossary available for distribution at the 1993 ICNN in San Francisco in March. Please come by the standards meetings scheduled there and/or interface with group members at the meeting. Your participation in this activity is welcome and needed. Contact Mary Lou Padgett.

•Performance Methodology

The Performance working group, chaired by Dr. Robert Shelton, NASA Johnson Space Center, is charged with devising benchmarks for assessing the speed and accuracy of neural network implementations. These benchmarks will take the form of standard data sets for processing along with a "use" document to describe the test for which the data would be appropriate. The standards activities will include sessions to which the interested public is invited. In particular, those with opinions concerning the composition of useful benchmark data sets are especially encouraged to attend one of the working group meetings and/or consider becoming a member of the performance working group.

There will be a contest designed to test neural network capabilities and another designed to stimulate paper contributions in the area of comparative performance. The papers may address comparative paradigms, configuration considerations and/or comparative computational AI techniques including fuzzy systems and genetic algorithms. Papers

Standards Calendar

March 28 - April 1, 1993
IEEE-ICNN 1993/IEEE-FUZZ 1993 San Francisco
Sunday, March 28, 1993
2:00-4:30 PM Standards Open House (Come and Go)

Monday, March 29, 1993
7:00-8:00 PM Standards Overview
8:00-10:00 PM Working Group Individual Meetings

Tuesday, March 30, 1993
7:00-10:00 PM Working Group Individual Meetings
(break for conference reception)

July 19-21, 1993 Summer Computer Simulation Conference (SCSC) Boston
Joint meeting with SCS on Neural Networks and Simulation Standards

October 25-29, 1993 IJCNN'93 Nagoya
Panel on International Language and Symbology
Tutorial on Neural Networks Basics: Applications, Examples and Standards
Discussion Groups and Social Events

November 7-10, 1993 SimTec/ WNN/FNN 93 San Francisco
Meetings of all working groups. Tutorials, discussions, tour of NASA/AMES.

RIGs Notes

Rick Alan
TRW Safety Systems
Chair, IEEE-NNC Regional Interest Groups

New Pacific Rim RIGs!

Korea, Hong Kong, South Australia and Seattle, Washington are the newest members of the RIGs family. The Chairmen are:

• Korea RIG
Cheol Hoon Park
Korea Advanced Institute of Science and Technology
Dept. of Electrical Engineering
373-1 Kusong-dong Yusong-gu
Tacjon 305-701 Korea
chp%eve.kaist.ac.kr@daiduk.kaist.ac.kr

• Hong Kong RIG
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The Hong Kong University of Science and Technology
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P.O. Box 3707
M/S 6UHM
Seattle, WA 98124-2207
ctw@bcsl.boeing.com

Congratulations and welcome.

RIGs Distinguished Lecturer Program

The Neural Networks Council Distinguished Lecturer Program is designed to provide reimbursement of travel-related expenses to RIGs sponsoring presentations by significant workers in the field of Computational Intelligence.

Although the Council maintains a list of recommended speakers, RIGs may also petition for support of persons not on it. This petition should be made either to Don Wunsch, chairman of the Distinguished Lecturers Committee or myself. Don's e-mail address is: dwunsch@blake.u.washington.edu.

Standards Report (cont.)

and demonstrations will be presented at SimTec/WNN/FNN 93. Details for submission of candidate problems and contest specifics can be obtained from the group chair:
Robert Shelton
Software Technology Branch (PT4)
NASA Johnson Space Center
Houston, TX. 77058
(713) 483-5901 FAX (713) 244-5698
shelton@gothamcity.jsc.nasa.gov

• Software & Hardware Interfaces

The Working Group on Software and Hardware Interfaces met at SimTec/WNN/FNN 92 in Houston, near NASA/JSC, and briefly at NIPS. Plans were laid to draft a PAR in the software interfaces area. Members of the community are being polled to determine their preferences in this area. Be sure to attend the meetings at ICNN'93 San Francisco and state your opinions. Preliminary feedback from the software neural networks community indicates that settling on some simple protocols will help everyone, and the decisions should be made fairly soon. Please contact group chairs for more information and to give your input.
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Applied Neurodynamics
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P: (619) 944-8859 F:(619) 944-8880
deiss@cerf.net
or
Dr. Harold K. Brown, Software SubGroup Chair
Dept. of Electrical Engineering
Florida Institute of Technology
Melbourne, FL 32901-6988
P: (407) 768-8000 x 7556
F: (407) 984-8461 hkb@ee.fit.edu

•Fuzzy Systems

The IEEE-FUZZ 1993 meeting in San Francisco, March 28-April 1, 1993 will mark the beginning of the group on Fuzzy Systems Glossary. Following suggestions by Lofti Zadeh, Bart Kosko and other leaders in the field, the group will be led by
Dr. Hamid Berenji, Chair
AI Branch, MS 269-2
NASA Ames Research Center
Moffett Field, CA 94035
P: (415) 604-6070

•Terminology for Virtual Reality

Breaking new ground in an exciting area, the Standards Committee will initiate activities in virtual reality. An interdisciplinary area which is rapidly growing, this technology needs a glossary to assist in its orderly growth. Please come by and indicate your interest at the ICNN meeting in San Francisco, or contact:
Richard A. Blade
Physics Department
UCCS
Colorado Springs, CO 80933-7150
Phone: (719) 593-3556 O
H: (719) 471 4476 Fax: (719) 593-3542
email: rablade@uccs.edu

For details, please contact either
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or
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Auburn University, EE Dept.
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Auburn, AL 36830
P: (205) 821-2472/3488
F: (205) 844-1809
mpadgett@eng.auburn.edu

Calendar

Paul Bakker of the University of Queensland, Australia is the new *Connections* Meetings Editor. He has compiled the calendar of upcoming conferences with a Neural Networks component (ordered by date of submission deadline). Please contact the Program Chair to obtain submission criteria before sending papers. Also, deadlines are sometimes extended, so the *-passed-* designation may not be final.

If you have any conference details to add to this list, please send (preferably) a Call For Papers to

Paul Bakker
Computer Science Dept.
The University of Queensland
Queensland QLD 4072
Australia
Fax: +61 7 365 1999
bakker@cs.uq.oz.au or

Format: Conference Title; Date; Place; Submission Deadline; Any 'main topics' that are relevant to neural nets; Contact Address (if known)

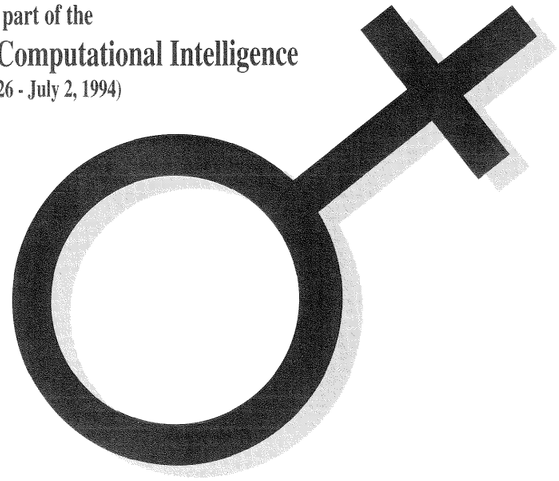
- **IEEE International Workshop on Neuro-Fuzzy Control: Instrumentation and Control Applications.** Muroran, JAPAN. 22-3 March, 1993. *-passed-*Contact: Dr. Toshio Fukuda, Dept. of Mechanical Engineering, Furo-cho, chikusa-ku, Nagoya 464-01, JAPAN, tel: 81-52-781-5111, ext 4478; fax: 81-52-781-9243 or Dr. Yuzo Oshima, Electronics & Information System Div. Group, Nippon Steel, 31-1, Shinkawa, 2-chrome, Chuo-ku, Tokyo 104, Japan. Tel: 81-3-5566-2056; fax: 81-3-5566-2392.
- **IEEE Int'l Conf. on Fuzzy Systems (FUZZ-IEEE'93)** 28 Mar-1 Apr 93 San Francisco, CA, USA *-passed-* "Relations between Fuzzy Logic and Neural Networks" Contact: Meeting Management, San Diego, California (Fax: +1 619 535 3880)
- **IEEE Int'l Conf. on Neural Networks (ICNN'93)** 28 Mar-1 Apr 93 San Francisco, CA, USA *-passed-* Contact: Meeting Management, San Diego, California (Fax: +1 619 535 3880)
- **The Society for the Study of Artificial Intelligence and the Simulation of Behavior Conf. (AISB'93)** 29 Mar.-2 Apr 93 Birmingham, UK *-passed-* "Papers on neural nets or genetic algorithms are welcomed, but should be capable of being judged as contributing to one of the (AI) topic areas". Contact: aisb93-prog@cs.bham.ac.uk
- **3rd Int'l Conf. on Microelectronics for Neural Networks** 6-8 Apr 93 Edinburgh, UK *-passed-* "Hardware implementation of neural networks" Contact: David J Myers myers_d_j@bt-web.bt.co.uk
- **Weightless Neural Network Workshop '93** 6-7 Apr 93 York, UK *-passed-* "N-tuple systems, CMAC, Kanvera's sparse distributed memory, etc." Contact: wnnw@ohm.york.ac.uk (N.M. Allinson)
- **European Symposium on Artificial Neural Networks (ESANN '93)** 7-9 Apr 93 Brussels, Belgium *-passed-* "Emphasis on the basic concepts as well as new or promising research in the field of neural networks" Contact: esann@dice.ucl.ac.be
- **Int'l Conf. on Neural Networks and Genetic Algorithms** 13-16 Apr 93 Innsbruck, Austria *-passed-* "Theoretical and practical aspects of neural networks and genetic algorithms" Contact: NSTEELE@cck.cov.ac.uk
- **SPIE Applications of Neural Networks IV** 16-23 Apr 93 Orlando, FL, USA *-passed-* "Real world applications and recent theoretical developments applicable to current applications." Contact: spie@nessie.wwu.edu
- **SPIE Science of Artificial Neural Networks II** 16-23 Apr 93 Orlando, FL, USA *-passed-* "Recent theoretical developments in ANNs" Contact: spie@nessie.wwu.edu
- **Workshop on Software & Programming Issues for Connectionist Supercomputers** 19-20 Apr 93 Berkeley, CA, USA *-passed-* Contact: beer@icsi.berkeley.edu (Joachim Beer)
- **ANNPS'93: Applications of Neural Networks to Power Systems.** Yokohama JAPAN April19-22 1993.Contact: Prof. Hiroyuki Mori, Dept. of Electrical Engineering, Meiji University, 1-1-1 Higashimita, Tama-ku, Kawasaki 214 JAPAN
- **Pacific Association for Computational Linguistics Conf. (PACLING'93)** 21-24 April 93 Vancouver, Canada *-passed-* "Connectionist approaches and architectures" Contact: fass@cs.sfu.ca
- **Annual Goddard Conf. on Space Applications of Artificial Intelligence** 10-14 May 93 Greenbelt, MD, USA *-passed-* "Neural networks; must describe applicability to space-related problems" Contact: moore@kong.gsfc.nasa.gov
- **IMACS Symposium on Signal Processing and Neural Networks** SPANN'93, Montreal, Canada. May 10-12, 1993 *-passed-Contact*: Prof. Z. Jacyno, Department of Physics, University of Quebec at Montreal, P.O.Box 8888, Station A, Montreal, P. Quebec, Canada, HC 3P8.
- **The 6th Italian Workshop on Neural Nets (WIRN VIETRI-93)** 12-14 May 93 Salerno, Italy *-passed-* Contact: robtag@udsab.dia.unisa.it
- **2nd European Conf. on Artificial Life (ECAL'93)** 24-26 May 93 Brussels, Belgium *-passed-* "Natural and artificial systems governed by simple rules" Contact: sgoss@ulb.ac.be (Simon Goss)
- **IEE 3rd Int'l Conf. on Artificial Neural Networks (ICANN'93)** 25-27 May 93 Brighton, UK *-passed-* "Architecture & Learning Algorithms; Applications & industrial systems; Implementations" Contact: Sheila Griffiths (Fax: +44 71 497 3633)
- **The 8th Scandinavian Conf. on Image Analysis (8SCIA)** 25-28 May 93 Tromsoe, Norway *-passed-* "Pattern Recognition; Parallel Algorithms and Architectures; Neural Nets" Contact: Torfinn Taxt Torfinn.Taxt@cc.uib.no
- **Int'l Workshop on Mechatronical Computer Systems for Perception and Action** 1-3 Jun 93 Halmstad, Sweden *-passed-* "Neural Networks in Real-Time Applications; Biologically Inspired Systems" Contact: mcpa@cca.hh.se (Lars Bengtsson)
- **IEA^{93}AIE: 6th Int'l Conference on Industrial & Engineering Applications of Artificial Intelligence & Expert Systems.** Edinburgh, Scotland.1-4 June 93 *-passed -* S*ponsor:* Int'l Society of Applied Intelligence. *Contact:* Dr. Moonis Ali, General Chair IEA/AIE-93, Dept. of Computer Science, Southwest Texas State Univ., San Marcos, TX 78666-4616 USA, ma04@swtexas.edu
- **Solid State Sensors and Actuators** Yokohama, Japan. June 7-10, 1993 *Sponsors*: Institute of Electrical Engineers of Japan and Japan Science Foundation. Secretariat TRANSDUCERS '93, c/o SANSEI International Inc., Fukide Bldg. No. 2, 1-21 Toranomon 4-chome, Minato-ku, Tokyo, 105 Japan.
- **Int'l Workshop on Artificial Neural Networks (IWANN'93)** 9-11 Jun 93 Sitges, Spain *-passed-* Contact: cabestan@eel.upc.es (Prof. J.Cabestany)
- **13th Int'l Symposium on Forecasting** 10-12 Jun 93 Pittsburgh, PA, USA *-passed-* "Neural network methods" Contact: WG0G@+ANDREW.CMU.EDU (Professor Wilpen L. Gorr)
- **CBMS'93: 6th IEEE Symposium on Computer-Based Medical Systems.** Ann Arbor MI. June 13-16, *-passed-* 93 Contact: Deborah S. Highfield, Diversified Conference Management, PO Box 2508, Ann Arbor MI 48106, 313-665-2535
- **1st European Meeting on Postal Technologies (JET POSTE'93)** 14-16 Jun 93 Nantes, France *-passed-* "Neural nets" Contact: Jean-Claude Burbaud (Fax: +33.40.89.60.00)
- **Parallel Architectures and Languages Europe (PARLE '93)** 14-18 Jun 93 Munich, Germany *-passed-* "Massively parallel systems, neural networks, parallel algorithms" Contact: parle@ecrc.de
- **7th Int'l Symposium on Methodologies for Intelligent Systems (ISMIS'93)** 15-18 Jun 93 Trondheim, Norway *-passed-* "Learning and Adaptive Systems, Approximate Reasoning" Contact: ismis93@idt.unit.no
- **14th Int. Conf. on Application and Theory of Petri Nets** Chicago 19-25 June1993 Contact: Marco Ajmone-Marsan, Dipartimento di Elettronica, Politecnico di Torino, Corso Duca degli Abruzzi 24, I-10129 Torino Italy. Ph 39 11 5644032 Fax 312 413 0024 pn93@bert.eecs.uic.edu.
- **15th Annual Meeting of the Cognitive Science Society** 18-21 Jun 93 Boulder, CO, USA *-passed-* "Cognitive neuroscience; artificial intelligence." Contact: Cogsci@clipr.colorado.edu
- **IMAC'93: Image Management & Communication** 23-24 June, Berlin *-passed-* Contact: Hienz U. Lemke, Technische Universitaet Berlin, Institut fur Technische Informatik, Sekr CG FR 3-3 D-1000 Berlin.
- **Annual Meeting of the Association for Computational Linguistics (ACL-93)** 22-26 Jun 93 Columbus, OH, USA *-passed-* "All aspects of computational linguistics" Contact: acl93@cs.rochester.edu (Lenhart Schubert) or gary@cs.UCSD.EDU (Gary Cottrell)
- **Fifth IFSA World Congress.** Seoul, Korea. July 4-9 '93, Contact: Intelligent Systems: James C. Bezdek, Dept. of Computer Science, Univ. of West Florida, Pensacola FL 32514, jbezdek@uwf.bitnet; Engineering: Prof. K. Hirota, Dept Instrument & Control Engineering, College of Engineering, Hosei University, Kajino-cho, Koganei-city, Tokyo 184 Japan, hirota@hrt.hosei.sc.jp; Mathematical Foundations: R. Lowen, Dept. of Mathematics and Informatics, University of Antwerp, RUCA, Groenenborgeriaan 171, 2020, Antwerpen Belgium, lowen@banrue60.bitnet.; Information Sciences: K.W. Oh, Dept. Computer Science, Sogang University, C.P.O. Box 1142, Seoul, 100-611 Korea, email: kwoh@krsog.bitnet
- **World Congress on Neural Networks (WCNN'93)** 11-15 Jul 93 Portland, OR, USA *-passed-* "Interdisciplinary; emphasizes the dynamic interplay of neurobiological modelling with advanced engineering and technological applications" Contact: WCNN'93 Talley Management Group Inc. (Fax: +1 609 853-0411)
- **IROS 93: Int'l Conf. on Intelligent Robots and Systems.** Yokohama, Japan. July 26-30 Contact: Masatsugu Kidode, Kansai Research Lab., Toshiba Corp., 8-6-26 Motoyama-Minami-cho, Higashinada-ku, Kobe; 658 Japan, tel: 81 78 435 3502; fax 81 78 435 3678 or Tomomasa Sato, Research Center for Advanced Science and Technology, University of Tokyo, 4-6-1 Komaba, Meguro-ku, Tokyo, 153 Japan, Tel 81 3 3481 4479 Fax: 81 3 3481 4584.
- **3rd Int'l Conf. for Young Computer Scientists (ICYCS'93)** 15-17 Jul 93 Beijing, China *-passed-* "Artificial Neural Networks" Contact: ling@csd.uwo.ca (Prof. Charles X. Ling)
- **The Fifth Int'l Conf. on Genetic Algorithms (ICGA-93)** 17-22 Jul 93 Urbana-Champaign,Ill. *-passed-* "Genetic algorithms and their relation to neural networks" Contact: (program & submissions) icga93@unmvax.cs.unm.edu (general) rob@comec4.mh.ua.edu
- **2nd Annual Computation and Neural Systems Meeting (CNS*93)** 31 Jul-8 Aug 93 Washington, D.C., USA *-passed-* Contact: (Chris Ploegaert) cp@smaug.cns.caltech.edu
- **Neural Network Applications to Signal Processing (NNASP'93)** 17-20 Aug 93 Singapore *-passed-* "Speech recognition, image processing, adaptive filtering,." Contact: NNASP'93 Secretariat (fax: +65 292 8596)
- **Int'l Joint Conf. on Artificial Intelligence (IJCAI'93)** 29 Aug 93 Chambery, France *-passed-* Contact: wahlster@cs.uni-sb.de
- **Int'l Conference on Advanced Mechatronics** Yokahama, Japan. August 2-4, '93 *-passed-* Contact: Prof. Jun'ichi Takeno, School of Science and Technology, Meiji University, 1-1-1 Higashi-ita, Tama-ku, Kawasaki-shi, Kanagawa-ken 214, Japan, Tel: 044 934 9454; 044 934 7912 (Japan) International Tel/Fax 81 44 934 2880.
- **EUFIT'93:1st European Congress on Fuzzy and Intelligent Technologies.** 7-10 September '93. Aachen Germany. *-passed-* Contact ELITE Foundation, H.-J. Zimmermann, Korneliuscenter, Promenade 9, 5100 Aachen, Germany. Tel: 49 2408 6969 Fax 49 2408 24582; elite@rmi.de.
- **Int'l Conf. on Artificial Neural Networks (ICANN'93)** 13-16 Sept 93 Amsterdam, Holland *-passed-* "Principles from neurobiology; Physical & mathematical theories; Cognitive connectionism; Robotics; Applications" Contact: icann@mbfys.kun.nl
- **Int'l Symposium on IC Technology, Systems & Applications (ISIC-93)** 15-17 Sept 93 Singapore *-passed-* "Integrated Circuits and Systems: Artificial Neural Networks" Contact: NTUISIC@NTUVAX.BITNET (Ms Annabel Ooi)
- **Virtual Reality Annual Int'l Symposium** (VRAIS'93) 18-22 Sept 93 Seattle, WA, USA *-passed-* "Technical work in virtual reality technology; Neural networks, artificial intelligence, fuzzy logic, parallel processing,..." Contact: Meeting Management, San Diego, California (Fax: +1 619 535 3880)
- **OCEANS'93: IEEE Oceanic Engineering Society Annual Conference**, October 18-21, 1993, Victoria, Canada.*-passed-* Contact: OCEANS'93, c/o Conference Services, University Extension, University of Victoria, P.O. Box 3030, Victoria, British Columbia, Canada, V8W 3N6, Phone: (604)721-8470, Fax:(604)721-8774, E-mail: morourke@sol.uvic.ca
- **Schemas and Neural Networks: Integrating Symbolic and Subsymbolic Approaches to Cooperative Computation** (Workshop). 13-14 Apr 93 Los Angeles, CA,.USA *-passed-* Contact: arbib@pollux.usc.edu (Michael Arbib)
- **IEEE Workshop on Neural Networks for Signal Processing** 7-9 Sept 93 Baltimore, MD, USA *-passed-*Contact: Karin Cermele kic@learning.siemens.com
- **IEEE SMC'93 Conf.** 17-20 Oct 93 Le Touquet, France *-passed-* "Special Session: Applications of Neural Net-

works to Control Problems" Contact: dominique@v31002.decnet.citilille.fr

- **Grammatical Inference: Theory, Applications and Alternatives** 22-23 Apr 93 Colchester, UK ***28 Feb 93*** "Machine Learning, Pattern Recognition, Neural Networks" Contact: sml@uk.ac.essex (Simon Lucas)
- **Workshop on Integration Technology for Real-Time Intelligent Control Systems (IRTICS'93)** 5-7 Oct 93 Madrid, Spain ***28 Feb 93*** "Integrating Expert Systems, Neural Networks, Fuzzy Logic." Contact: CHIOZZA@iic.uam.es (Enrica Chiozza)
- **Workshop on Fundamental Issues in Biological and Machine Learning** 30 May-4 Jun 93 Jerusalem, Israel ***1 Mar 93*** "theoretical, experimental and practical aspects of learning in natural and artificial systems" Contact: learn@galaxy.huji.ac.il
- **NATO Advanced Studies Institute on Statistics and Neural Networks** 21 Jun-2 Jul 93 Les Arcs, France ***1 Mar 93*** "Topics range from theoretical modeling and adaptive computational methods to empirical comparisons between statistical and neural network techniques." Contact: cherkass@ee.umn.edu (Professor Vladimir Cherkassky)
- **2nd Turkish Symposium on Artificial Intelligence and Artificial Neural Networks** 24-25 Jun 93 Istanbul, Turkey ***1 Mar 93*** Contact: yz@trboun.bitnet (Dr. L. Akin)
- **8th IEEE Int'l Symposium on Intelligent Control August 25-27, 1993,** Chicago *15* March, 1993 Contact: Kevin M. Passino, ISIC'93 Dept. Electrical Engineering The Ohio State University 2015 Neil Ave. Columbus, Ohio 43210-1272 phone: (614) 292-5716 email: passino@eagle.eng.ohio-state.edu
- **Simulating Societies** '93 24-26 Jul 93 Siena, Italy ***15 Mar 93*** "Approaches to simulating social phenomena and social processes" Contact: gng@soc.surrey.ac.uk (Prof Nigel Gilbert)
- **1993 Int'l Conf. on Neural Networks and Signal Processing (ICNNSP'93)** 2-5 Nov 93 Guangzhou, China ***15 Mar 93*** Contact: Prof. Zhen-Ya He (Fax: +86 25 714212)
- **1993 Int'l Conf. on Application-Specific Array Processors (ASAP'93)** 25-27 Oct 93 Venice, Italy ***27 Mar 93*** "Applications that Require Specialized Computing Systems: Neural Networks" Contact: dadda@ipmel2.elet.polimi.it (Prof. Luigi Dadda)
- **IEEE/Nagoya University WWW on Multiple/Distributed Robotic Systems: Architecture and Control for Coordination and Cooperation.** Nagoya, Japan. July 30-31 93. ***March 31, 1993*** Travel expenses for the authors of the best papers will be supported by WWW. *Submissions:* Send abstract to Prof Kazuhiro Kosuge, General Chair, WWW on MDRS, Dept. Mechano-Informatics and Systems, Nagoya University, Furo-cho, Chikusa-ku, Nagoya 464-01, Japan, Tel: 81 52 781 5111, Ext. 6783; FAX 81 52 782 9243.
- **NATO Advanced Study Institute: New Advances and Trends in Speech Recognition and Coding** 28 Jun-10 Jul 93 Bubion, Spain ***1 Apr 93*** "Neural Networks for Speech Recognition and Coding" Contact: ASI@hal.ugr.es (Antonio Rubio-Ayuso)
- **5th IEEE Int'l Conf. on Tools with Artificial Intelligence** 8-11 Nov 93 Boston, MA, USA ***15 Apr 93*** "Artificial neural networks" Contact: jm@cs.toronto.ca (John Mylopoulos)
- **1993 Computer Architectures For Machine Perception (CAMP'93) Workshop,** December 15-17, 1993, New Orleans, Louisiana, USA. ***16 April 93.*** Contact: Dr. Larry Davis, UMIACS, A. V. Williams Building, Univ. of Maryland, College Park, MD 20742, USA or Johanna Weinstein by e-mail: camp93@umiacs.emd.edu.
- **Annual Conf. of Japanese Neural Network Society** 21-23 Jul 93 Izuka, Japan ***18 Apr 93*** "Neuroscience, Cognitive Science, Models & algorithms, Hardware, Applications" Contact: yasui@ces.kyutech.ac.jp (Prof. Shozo Yasui)
- **IJCNN '93 : Int'l Joint Conf. on Neural Networks** 25-29 Oct 93 Nagoya, Japan ***30 Apr 93*** Contact: usui@tut.ac.jp (Shiro Usui); Secretariat, TPI Inc., Dai-san shirakawa Bld.6F, 4-8-10 Meieki, Nakamura, Nagoya 450, Japan. Tel 81 52 561 9880 8655 Fax 81 52 561 1241
- **The First New Zealand Int'l Two-stream Conf. on Artificial Neural Networks and Expert Systems (ANNES'93)** 24-26 Nov 93 Dunedin, New Zealand ***30 Apr 93*** Contact: gporteous@otago.ac.nz (Ms Gina Porteous)
- **Int'l Congress on Computer Systems and Applied Mathematics** 19-23 Jul 93 St. Petersburg, Russia ***1 May 93*** "Neural nets" Contact: serge@spfac.lgu.spb.su (Sergey S. Voitenko)
- **Int'l Simulation Technology Conf. 93** (Incorporating **WNN93**, a Neural Networks conference) 7-10 Nov 93 Clear Lake, TX, USA ***1 May 93*** "Parallel and Distributed Processing, Fuzzy Logic, Neural Networks" Contact: mpadgett@eng.auburn.edu
- **1993 Int'l Workshop on Applications of Neural Networks to Telecommunications.** 18-20 October, 1993. Princeton NJ. ***14 May 1993***. Betty Greer, Bellcore, MRE 2)-295, 445 South St., Morristown, NJ 07960. (201)829-4993. Fax:829-5888. Program Chair: Timothy X. Brown timx-b@faline.bellcore.com
- **RO-MAN 93: 2nd IEEE Int'l Workshop on Robot and Human Communcation** 3-5 November '93. Tokyo ***15 May '93*** Contact: Fumio Hara, Dept Mechanical Eng., Science Univ. Tokyo, 1-3 Kagurazaka, Shinjyuku-ku, Tokyo 162, Japan. 81-3-3260-4271 x 3359, Fax: 81 3-3266-0394, mm8793@jpnsut20.bitnet
- **Conf. on Computational Learning Theory (EURO-COLT '93)** 20-22 Dec 93 London, U.K. ***15 May 93*** "Learning algorithms and the theory of machine learning, including artificial and biological neural networks." Contact: john@cs.rhbnc.ac.uk (John Shawe-Taylor)
- **EP'94 3rd Annual Conf. on Evolutionary Programming.** 24-25 February, 1994. San Diego. ***June 30, '93.*** Contact Lawrence J. Fogel ORINCON Corp., 9363 Towne Centre Dr., Sandiego CA 92121
- **1993 IEEE/Nagoya University WWW on Learning and Adaptive Systems** 22-3 October, 1993. Nagoya, Japan. ***1 July, '93*** Contact: Fumihito Arai and Toshio Fukuda, Dept Mechano-Informatics and Systems, Nagoya Univ., Fruo-cho, Chikusa-ku, Nagoya 464-01, Japan, 81-52-781-5111, x4478. Fax 81-52 781-9243
- **12th Int'l Conferences on Pattern Recognition (ICPR)** 9-13 Oct 94 Jerusalem, Israel ***1 Feb 94*** "Pattern Recognition and Neural Networks" Contact: (S. Ullman) shimon@wisdom.weizmann.ac.il
- **Special Issue of *Machine Vision and Applications* on Neural Networks for Machine Vision *July 31, 1993.*** Contact: Swear K. Sethi, Dept of Computer Science, Wayne State University, Detroit MI 48202.FAX 313-577-6868. sethi@cs.wayne.edu

CONFERENCE ON EVOLUTIONARY COMPUTATION

June 29 - July 1, 1994 Orlando, Florida
as part of the
World Congress on Computational Intelligence
(June 26 - July 2, 1994)



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Topics of the Conference include:

- Theory of evolutionary computation
- Applications of evolutionary computation
- Efficiency/robustness comparisons with other direct search algorithms
- Parallel computer applications
- New ideas incorporating further evolutionary principles
  (multi-cellularity, various data structures, subpopulations, etc.)
- Artificial life
- Evolutionary algorithms for computational intelligence
  (optimal neural networks, optimal fuzzy controllers, etc.)
- Comparisons between different variants of evolutionary algorithms
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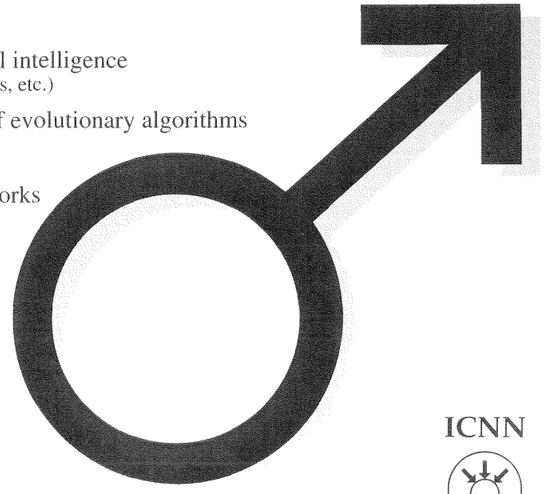
- Evolutionary computation for neural networks
- Fuzzy logic in evolutionary algorithms



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Third IEEE International Conference on Fuzzy Systems

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In recent years, increasing attention has been devoted to fuzzy-logic approaches and their application to the solution of real-world problems.

The Third IEEE International Conference on Fuzzy Systems (FUZZ-IEEE '94) will be dedicated to the discussion of advances in:

- Basic Principles and Foundations of Fuzzy Logic
- Relations between Fuzzy Logic and other Approximate Reasoning Methods
- Qualitative and Approximate-Reasoning Modeling
- Hardware Implementations of Fuzzy-Logic Algorithms
- Design, Analysis, and Synthesis of Fuzzy-Logic Controllers
- Learning and Acquisition of Approximate Models
- Relations between Fuzzy Logic and Neural Networks
- Integration of Fuzzy Logic and Neural Networks
- Integration of Fuzzy Logic And Evolutionary Computing
- Applications to:
  - System Control
  - Intelligent Information Systems
  - Case-Based Reasoning
  - Decision Analysis
  - Modeling
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  - Signal Processing
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Edward J. Berbari, University of Oklahoma. *Evaluation:* Engineering in Medicine and Biology Society. *Citation:* Development in high -resolution electrocardiology.

Martin J. Hasler, Swiss Federal Institute of Technology. *Evaluation:* Circuits and Systems Society. *Citation:* Contributions to research and teaching in nonlinear circuit theory.

Lin-Shan Lee. National Taiwan University *Evaluation:* Communications Society. *Citation:* Contributions to computer voice input/output techniques for Mandarin Chinese and to engineering education.

Toshihiko Namekawa. Japan. *Evaluation:* Consumer Electronics Society. *Citation:* Contributions to information distribution network technology in consumer products

Tamas Roska, Budapest, Hungary. *Evaluation:* Circuits and Systems Society. *Citation:* Contributions to the qualitative theory of nonlinear circuits and the theory and design of programmable cellular neural networks.

Thomas A. Seliga, University of Washington. *Evaluation:* Geoscience and Remote Sensing Society *Citation:* For pioneering work in radar polarimetry applied to meteorology and for contribution to engineering education and research.

Mansoor Shafi., Telecom Corporation of New Zealand. *Evaluation:* Communications Society. *Citation:* Contribution to the propagation modeling of microwave radio paths and for leadership in the deployment of digital radio.

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