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Newsletter of the International Association for Pattern Recognition Inc  
(An affiliate member of the International Federation for Information Processing)

## SPECIAL MILLENNIUM EDITION



Jake Aggarwal and Larry Davis with Shanti and Joan

IAPR  
is pleased to publish  
this special edition  
to celebrate

the birth of the  
21<sup>st</sup> Century

*and*

a most successful  
15<sup>th</sup> ICPR

15<sup>th</sup> ICPR Barcelona

was a time to meet

old friends and to

forge new

collaborations

and friendships



Herb and Joan Freeman celebrate his attendance at every ICPR since the beginning.  
Herb is, we think, the only member who can claim this record.  
Unless you know otherwise?



# FORTHCOMING IAPR CONFERENCES, WORKSHOPS AND EVENTS

2000	Event	Location	Deadlines	Contact
27-29 Nov	Image & Vision Computing 2000	Hamilton	Abstract Final Manuscript	Fax: +64 7 838 4219 m.cree@waikato.ac.nz www2.phys.waikato.ac.nz/ivcnz00
IVCNZ	New Zealand Conference	N Z	Deadline Passed 20/10/2000	
28-30 Nov	Seventh Workshop on Machine Vision Applications	Tokyo	Deadlines passed	Fax: +81 3 3401 1433 kie@is.u-tokyo.ac.jp www.eti.go.jp/eti/gazo/mva2000/
MVA	Vision Applications	Japan		
8 Dec	Workshop on Stereo Image & Video Processing	Sydney	Abstract Final Manuscript	philip.ogunbona@motorola.com extra.cmis.csiro.au/IA/changs/aprs/wsyp.htm
WSIVP	Video Processing	Australia	Deadline passed 15/10/2000	
13-15 Dec	9th Discrete Geometry for Computer Imagery	Uppsala	Deadlines Passed	Fax: +46 18 55 34 47 ingela@cb.uu.se www.cb.uu.se/~dgc12000
DGCI	Computer Imagery	Sweden		
2001	2001	2001	2001	2001
16-18 Feb	Robot Vision 2001	Auckland	Abstract Final Manuscript	Fax: +64 9 373 7001 r.klette@auckland.ac.nz www.tcs.auckland.ac.nz/~robvis01
RobVi	Robot Vision	NZ	Deadline Passed 10/11/2000	
11-14 Mar	International Conference on Advances in Pattern Recognition	Rio de Janeiro, Brazil	Abstract Final Manuscript	Fax: +44 1392 264066 espaa@essex.ac.uk www.utp.br/icapr2001
ICAPR	Advances in Pattern Recognition		Deadline Passed 15/10/2000	
15-17 May	6th Int. Conference on P and Information Processing	Minsk	Full Paper	prip@newman.bas-net.minsk.by www.bas-net.by/iec/conferen.htm
PRIP	Information Processing	Belarus	15/11/2000	
23-25 May	3rd Workshop Graph Based Representations	Ischia	Abstract Final Manuscript	gbr@amalfi.dis.unina.it amalfi@dis.unina.it/gbr2001
GBR	Representations	Italy	19/12/2000 15/04/2001	
28-30 May	4th International Workshop on Visual Form	Capri	Abstract Final Manuscript	Fax: +39 0815267 654 iwvf4@inagm.cib.na.cnr.it amalfi.dis.unina.it/iwvf4/
IWVF4	Visual Form	Italy	Deadline Passed 15/02/2001	
6-8 June	Audio & Video Based Biometric Person Authentication	Halmstead	Abstract Final Manuscript	avbpa@h.se http://www.h.se/avbpa
AVBPA	Person Authentication	Sweden	15/01/2001 10/04/2001	
11-14 June	12th Scandinavian Conference on Image Analysis	Bergen	Abstract Final Manuscript	Fax: +47 5183 1750 ivar.Austvoll@tn.his.no www.his.no/scia2001/
SCIA	Image Analysis	Norway	06/11/2000 19/03/2001	
2-4 July	Multiple Classifier Systems	Cambridge	Abstract Final Manuscript	Fax: +44 [0]1483 259554 j.kittler@ee.surrey.ac.uk
MCS	Multiple Classifier Systems	UK	01/02/2001 10/04/2001	
6-7 July	Workshop on Pattern Recognition in Information Systems	Setubal	Abstract Final Manuscript	Fax: +351 21 841 8472 afred@lx.it.pt www.iceis.org
WPRIIS	Workshop on Pattern Recognition in Information Systems	Portugal	10/01/2001 05/04/2001	
25-27 July	Int Workshop on Machine Learning and Data Mining in PR	Leipzig	Abstract Final Manuscript	ibaiperner@aol.com www.members.aol.com/ibaiperner/mldm2.htm
MLDM	Learning and Data Mining in PR	Germany	01/03/2001 15/05/2001	
3-5 Sept	3rd Int Workshop on Energy Minimization Methods	France	Abstract Final Manuscript	Fax: +33 492 38 76 4 Marie-Helene.Zeitou@sophia.inria.fr
EMMCVPR	Minimization Methods		03/02/2001 31/05/2001	
10-13 Sept	6th International Workshop on Document Analysis	Seattle	Abstract Final Manuscript	Fax: +1 206 543 3842 Haralick@ee.washington.edu http://george.washington.edu
ICDAR	Document Analysis	USA	15/02/2001 15/06/2001	
26-28 Sept	11th International Conference on Image Analysis & Processing	Palermo	Abstract Final Manuscript	Fax: +39 091 238256 ardizzon@unipa.it http://dijkstra.cere.pa.cnr.it/ICIAP
ICIAP	Image Analysis & Processing	Italy	28/02/2001 31.05.2001	



# FROM

# THE



This is the last *From the ExCo* report of the 1998-2000 Executive Committee and, at the same time, the first of the 2000-2002 Executive Committee.

## President

*Dr G Sanniti di Baja* ➤



## First Vice President

➤ *Professor R Kasturi*



## Second Vice President

*Dr H S Baird* ➤

**Membership.** We are pleased to inform you that all Member Societies did provide the English version of their Constitution and Bylaws. Unfortunately, not all lists of individuals have been provided yet. Six (out of thirty-seven) Member Societies have not accomplished this duty yet. We stress once more the importance for the IAPR to receive these lists and hope they will soon become available.

**Web Page.** The IAPR web site (<http://www.iapr.org/>) has been extensively used in preparation of the Governing Board meeting. Activity reports from Standing Committees, Technical Committees and other documents relevant to GB discussion have been placed in a GB-reserved area of the IAPR web page. The IAPR web site will be even more widely used in the future, e.g. as a reference site and repository for research reports and extended versions of conference papers, software, associated datasets, and other resources. This will possibly require contracting with an Internet Service Provider, with sufficient disk space and high speed Internet connectivity.

**Barcelona ICPR.** A new record was set in Barcelona with respect to the number of ICPR participants (and the weight of the proceedings!). ICPR in Barcelona was an excellent meeting; attendees were relaxed and interested and stayed until the very last minute of the last conference day. We commend the organisers for a job well done.

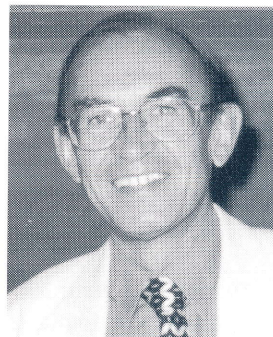
**GB Meeting.** Among the issues discussed during the Governing Board meeting, held on September 5, we mention the election of IAPR Officers for the term 2000-2002 and the selection of the venue for ICPR'2004. Gabriella Sanniti di Baja (President), Rangachar Kasturi (1st Vice President), Henry Baird (2nd Vice President), Walter Kropatsch (Treasurer) and Karl Tombre (Secretary) were elected. In addition to these elected offices, IAPR Executive Committee also includes the past president as a member. Unfortunately, due to the death of our past president, this slot was open. At the request of the ExCo, the Governing Board authorised co-opting Professor Bunke, our past Acting President, to the Executive Committee. The venue for ICPR'2004 will be Cambridge, UK.

**ExCo Plans for the Biennium 2000-2002.** We plan to make IAPR grow in size, activities and reputation. IAPR has currently 37 Member Societies (representing a total of about 7,500 individual members). Other potential member societies, especially from Latin America, are expected to join IAPR soon. We would also like to welcome scientific communities in various research and application areas in which pattern recognition plays an important role to join IAPR. Such affiliation would be facilitated through existing technical committees, whenever possible, and new technical committees would be created when appropriate. Through such efforts IAPR visibility would grow further.

The Executive Committee also proposes to enhance its internet presence and possibly create a repository for research reference. The Executive Committee intends to work closely with the IAPR community to facilitate activity co-ordination and close communication at all times. A first step in this direction has already been taken: for each committee, a non-voting liaison person from the ExCo has been appointed.

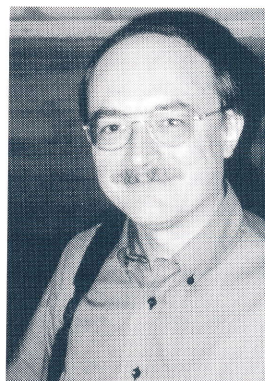
## Past Acting President

➤ *Professor Dr H Bunke*



## Secretary

*Professor K Tombre* ➤



## Treasurer

➤ *Professor W G Kropatsch*

*Details of appointments to Standing Committees and Technical Committees will be published in full in the next edition.*





## 15 ICPR BARCELONA



The four days of ICPR2000 were each organised into four tracks together with their associated poster sessions. All the tracks included a selection of invited papers presented by keynote speakers, setting the scene for their various sessions. The *IAPR Newsletter* publishes here comments from the track chairmen on their respective sessions

All the morning and afternoon sessions started with plenary sessions comprising lectures by internationally recognised speakers. The first plenary session, which opened with introductory remarks and a welcome from the organisers and guests from the Barcelona community, was then devoted to the King-Sun Fu Prize Lecture, delivered by the prize winner, Professor Theo Pavlidis (see *IAPR Newsletter* Vol 22 No 3). Professor Pavlidis's talk was notable for its common sense and pragmatism and, mercifully, was almost totally free from the baffling mathematics that renders so many conference papers virtually unintelligible. It was given a warm reception.

### Computer Vision and Image Analysis

The overall impression of the conference and the track was that of being overwhelmed with information. I had this personal feeling of mine confirmed many times. Walking through the bustling activity in the poster room gave a vivid impression of a very active field. In short, the conference was very successful in providing an image of the state-of-the-art in the computer vision and image processing fields, as well as in pattern recognition.

Two interesting and appreciated features should be mentioned first. One was the large number of well-selected plenary speakers. The computer vision area was in fact represented by two eminent researchers on human vision. Semir Zeki gave an excellent overview of existing knowledge about the visual areas of the brain and their function, knowledge that he has been instrumental in developing and that has influenced many of us working in computer vision.

In a second talk Brian Wandell introduced us to colour vision and discussed constancy phenomena. These have always posed problems in computer processing of colour, but both in the plenary talk and in the colour sessions we were told about technical and computational progress to address them. Colour image processing may become a much more useful tool than before, if some of these promises are fulfilled.

Also Alexander Pentland's talk dealt with important computer vision problems. I found his work on using low resolution imagery to estimate context and situations very interesting. Such techniques could be crucial for attempts to create vision systems functioning in realistic environments, e.g. being able to recognise objects in the real world, not only on table tops. Knowledge about context may then play a key role. The second nice feature was that almost all the oral sessions began with an invited speaker, an expert in the field, who



presented both a perspective on it and new insights from his/her own work. These invited talks set the tone of the sessions in a very interesting way, especially since they in many cases highlighted the central problems.

So, what can be said more generally about the contents of the track? My impression was that the contributions overall were of high quality, poster papers as well as orals. Hence, the conference gave a rather good picture of the situation and the trends in the field. The fact that it's difficult to point to any real breakthroughs just indicates that we're working in a reasonably mature area, and that incremental insights are what should be expected. Many interesting results were undoubtedly presented and there's no better way to find them than by reading the proceedings. What can be done in a few paragraphs is to look at the trends and the emphasis of what's going on.

The conference presented a representative selection of what I believe is the research worldwide today. One area that is currently quite active is object recognition. We heard about learning, feature and appearance based techniques, as well as of 2D and 3D model based techniques. An impression I got was that little was said about issues on representations and memory (and learning). Most recognition work seem to lack a context: what's the system that recognises? Of course, this was not the case for the application papers. Neither was it the case for the abundance of papers with multimedia connections. With that I mean the topics of image retrieval, face recognition and tracking, and video processing. These areas are, as pointed out in the report on Applications, attracting enormous interest for commercial reasons. Many interesting results were presented. However, hot commercial areas are not always an ideal playground for researchers. New technology is likely to be developed in such areas and then the problems may change drastically. This is not to say that computer vision researchers shouldn't continue dealing with these areas, just that they should focus on what the underlying problems are.

Video processing, which was a major topic at the conference, concerns not only recognition, but also the analysis of motion and using motion to understanding action. Several good papers were presented on these central problems. The motion area is closely related to how one can infer structure and geometry, and how one can reconstruct the world, from multiple images. This has been a thoroughly studied field for more than 10 years, especially in Europe, and now we saw that there's still an intense activity in it, and many problems, especially on robustness are still unsolved. With the ubiquity of video cameras - static, mobile and handheld - the applicability of such results is considerable. However, again, if this is of such great commercial interest, competing techniques are likely to appear. At this conference we heard about omnidirectional cameras. Range sensors have existed for a long time. Cameras also providing full 3D are emerging. The future development of this application area will of great interest, but it may not remain at the heart of computer vision, even if analysis of motion and geometry always will.

A detail: there were at least three papers dealing with the analysis of soccer games. Is the soccer referee an endangered species?

Traditional areas, such as segmentation, contour analysis, and super-resolution, to name a few, were also (and not surprisingly well) represented. An observation was that some experiments used several images appearing in the field in the 1970s. Not everything is brand new in the field and, as Theo Pavlidis indicated in his great keynote speech, many of the deep problems have been attacked for decades and true progress is fairly slow.



*Theo receives his certificate from Horst*

This snapshot overview shows that a large number of things were covered at the conference. Anything missing? Yes, maybe some more fundamental work on shape and more general work on what I would like to call *seeing systems*. I don't know if I could have taken in more information, but if someone asks.....

*Jan-Olof Eklundh*

### Participants from Industry at the ICPRs

A note from the retiring Chairman of the Industrial Liaison Committee, Professor Gerd Maderlechner

ICPR	Total Participants	% from Industry
1990	319	14
1992	(No information available)	
1994	546	11
1996	1046	9.6
1998	595	11
2000	1198	9



# Pattern Recognition & Neural Networks

*Dick de Ridder, Robert P.W. Duin, Ela Pekalska, Marina Skurichina and David M J Tax - with thanks to Josef Kittler*

Track 2 of the 15th ICPR was the track concerned with traditional pattern recognition. Although the title of the conference would lead one to expect this to be the largest track, in fact the number of contributions was just slightly more than 25% of the conference total. Perhaps this is indicative of the strong emphasis on application of pattern recognition techniques, rather than theoretical development. Even so, the number of contributions was impressive.

In total, about 250 papers were presented, of which roughly 120 focussed on an application, 100 dealt with statistical pattern recognition, and some 30 contained work in the area of structural and syntactic pattern recognition. The majority of these papers, more than 80%, were presented as posters. Although this offered the possibility of having good discussions with the authors, it also meant that visits had to be planned well, as poster and oral sessions overlapped and each poster session contained around 25 posters in track 2 alone. As for the oral sessions, a new feature was the invited talk. Most of these were very good, but only some (Bunke, Torras) showed a broad overview of work in a certain area and not all had a clear connection to the topic of the session.

In the area of applications, a subject traditionally receiving much attention is document analysis and OCR. Especially recognising non-western characters (Chinese, Kanji, Farsi, Ghuzuri, Devanagari) is still an active research area. There was also a fair share of medical applications and many papers were presented on various forms of biometrics. Notably, a few applications on signals (audio, speech).

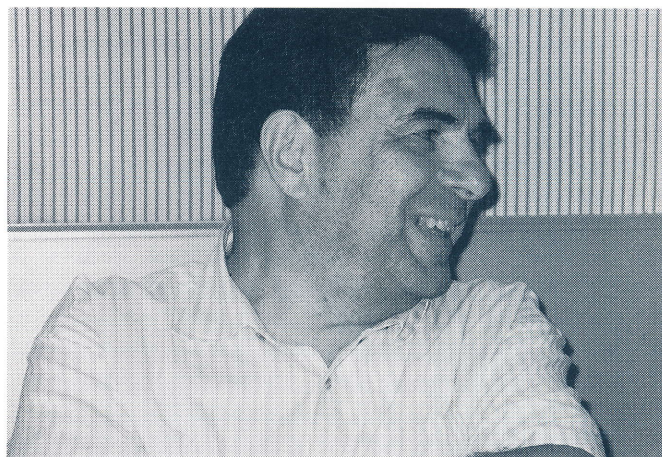
In applications, there seemed to be a general interest in hierarchical methods, e.g. combining various levels of density estimation and/or classification (e.g. Chou and Shapiro; Vinokourov and Girolami; Zhang, Ding and Liu). For density estimation, the EM-trained mixture-of-Gaussians model seems to become the *de facto* standard, although not all authors seem to recognise equally well the limitations the model assumptions impose on their applicability (the most often heard question, therefore, being 'How do you choose K?'). Some novel, i.e. non-Gaussian work included the use of mixtures of Bernoulli distributions (Grim, Pudil and Somol) and Poisson distributions (Kaban and Girolami).

As for the more basic research, our impression is that many researchers still find there is some ground to cover in traditional areas such as feature extraction/selection, cluster analysis and k-nearest neighbour speedup. Combination of experts, not only of classifiers but also of clustering (Qian and Suen) is also a topic still generating interest. In general however, many of the techniques presented in these areas were improvements on existing work rather than new methods. Significantly less authors focussed on more fundamental problems. An interesting presentation in this area was given by Ho and Basu, which went back to the basics of pattern recognition to discuss possible measures of classification problem complexity.

In some cases, it was interesting to see how rather old methods can still spark new ideas. For example, variations on the nearest neighbour theme were proposed for classification (Mitani and Hamamoto) and outlier detection (Tax and Duin) and an interesting modification of the Parzen algorithm was discussed by Muto, Nagase and Hamamoto. In contrast, there was little theoretical development on newer research topics such as neural networks, support vector machines or Bayesian methods. Some interesting work in neural networks was presented on pruning (Messer and Kittler), the use of prior weights (Raudys) and neural networks for performing canonical correlation analysis or CCA (Fyfe and Lai). Support vector machines were used, or reformulated, successfully by some authors to perform tasks they were not originally designed for: clustering (Ben-Hur et al.), feature selection (Hermes and Buhmann) or ranking (Kim, Hwang and Lee).

For neural networks and SVMs, the lack of theoretical development is understandable: both can now be applied quite well off-the-shelf. For newer developments such as Bayesian methods (and graphical models, discussed in an excellent tutorial and plenary by Bishop), the lack of interest is more of a mystery. Is the ICPR community simply slow to catch on, or is there a genuine lack of interest in these areas? If the latter is true, do we run the risk - as Andrew Blake put it in a lecture a few days after ICPR, at BMVC 2000 - of being 'overtaken' by communities such as the NIPS one? Perhaps not.

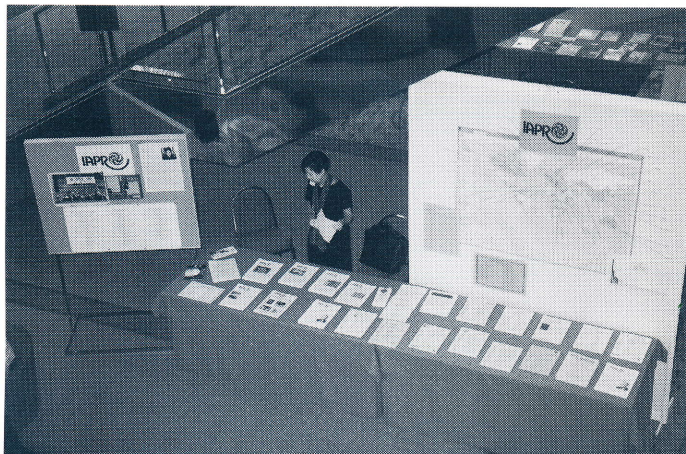
The strength of the ICPR seems to lie in bringing together researchers interested in using methods (possibly developed elsewhere) in real-world applications. Consequently, we might see the emphasis at the ICPR shift from classifier development to issues such as representation, feature extraction/selection and selection/combination of methods, always in relation to the application at hand. But we should be careful not to lose touch with theoretical developments.



**Track 2 Invited Speaker Theo Pavlidis**  
*Computer Interface – Two-dimensional Symbolologies*



## IAPR MEMBERSHIP STAND BARCELONA



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### DEADLINE WINTER EDITION

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#### Editorial Office

66 Weston Park, Thames Ditton Surrey KT7 OHL, UK

#### Editor

Michael Duff

[mjbduff@cs.com](mailto:mjbduff@cs.com)

#### Book Reviews Editor

Petra Perner

[ibaiperner@aol.com](mailto:ibaiperner@aol.com)

#### Distribution/Layout

Susan Duff

[SusanMDuff@cs.com](mailto:SusanMDuff@cs.com)

#### Web Site Director

Michal Haindl

[haindl@utia.cas.cz](mailto:haindl@utia.cas.cz)

### Regional Correspondents

#### North America

Kevin Bowyer

[kwb@csee.usf.edu](mailto:kwb@csee.usf.edu)

#### Far East

Horace Ip

[cship@cityu.edu.hk](mailto:cship@cityu.edu.hk)

#### Eastern Europe

Sergey Ablameyko

[abl@newman.bas-net.by](mailto:abl@newman.bas-net.by)

#### Russian Federation

Igor Gurevich

[igourevi@ccas.ru](mailto:igourevi@ccas.ru)

#### Western Europe

Vito Di Gesù

[digesu@ipamat.math.unipv.it](mailto:digesu@ipamat.math.unipv.it)

#### Nordic

Gunilla Borgefors

[gunilla@cb.uu.se](mailto:gunilla@cb.uu.se)

#### Australasia-Pacific

Anthony Maeder

[a.maeder@qut.edu.au](mailto:a.maeder@qut.edu.au)

#### Indian Sub Continent

Babu Mehre

[mehre@cmcltd.com](mailto:mehre@cmcltd.com)

## Image, Speech, and Signal Processing

**T**RACK THREE, SIGNAL PROCESSING TASKS, (in particular image and speech processing) can be put into three categories:

- Coding, representation, compression
- Enhancement, restoration, reconstruction
- Analysis: Segmentation, feature extraction (texture, shape, etc.)

Of the 12 sessions (6 oral and 6 posters), only 1.5 sessions are on speech and audio, all the rest are on images and video. In fact, looking at the entire program (all four tracks), one sees mostly image and vision papers. The same can be said of the IEEE Trans. on Pattern Analysis and Machine Intelligence, which in spite of its rather general title, publishes essentially only image and vision papers. We presume that most of the speech processing and recognition papers appear elsewhere; and the journals and conferences where the speech and audio papers appear, probably there are no image and vision papers. This segregation of speech/audio and image/vision is unfortunate, since many of today's important applications involve multimedia.

It would be worthwhile to organized intensive Workshops which bring the researchers in the two camps together so cross-fertilization would occur. Various conferences on multimedia do not accomplish this goal, because typically they are too diffuse.

There has been considerable research activity in the field of image processing. However, most of the work is on algorithms, and most rather *ad hoc*. It is hard to find real solid theory. Even though *ad hoc* algorithms may work very well for specific applications, it would be nice to see elegant (and useful) theoretical results. This trend is certainly reflected at this Conference as well.

**Tom Huang**



**Petra Perner**

**Newsletter**

**Book**

**Reviews**

**Editor**



# The ICPR Gala Dinner



For IAPR, the social occasion of the biennium is always going to be the ICPR banquet: a cross between a prize giving and a respectable orgy, together with friends that many have not seen for at least two years. Barcelona was no disappointment. The food, supplied by Prats i Fatjó, was superb (King prawn goat's cheese salad, Conserve of Duck with Puigcerdà pears, Vanilla parfait with strawberry and raspberry coulis, and apparently limitless quantities of wine) and the location spectacular (the Sala Marqués de Comillas in the Drassanes Reials, a sort of gothic shipyard which defies description).

Early arrivals were allowed a private visit to the Maritime Museum connected to the banquet hall but were soon enticed out into the forecourt where drinks and tapas were served. At 9pm what seemed like a thousand hungry pattern recognisers surged into the hall and seated themselves at the beautifully presented round tables.



The proceedings were opened by the General Co-Chairs (from left to right above) **Juan José Villanueva** and **Alberto Sanfeliu**, accompanied by the Local Organising Committee Co-Chairs **Maria Vanrell** and **René Alquézar**.

IAPR's Acting President **Horst Bunke**, seen below with his wife **Helga**, then took the floor and thanked and congratulated all those responsible for the organisation of the ICPR, well deserved praise considering how smoothly all the arrangements had been executed and also taking note of the fact that this ICPR had attracted the largest number of participants of any so far.



The first prize of the evening went to Marime Lhuillier for the Best Student Paper, awarded by the Education Committee and presented by its Chairman, Steve Tanimoto. The next was for the Best Industrial Paper and was presented to Gopal Pingali, Agata Opalach and Yves Jean by the Chairman of the Industrial Liaison Committee, Gerd Maderlechner.

**J**osef Kittler, Chairman of the Fellow Committee, then presented framed certificates to the 22 new IAPR Fellows. These fellowships (listed on a later page) are awarded on the basis of a complicated formula which takes into account either or both of scientific achievement and service to IAPR. As there are now some 7,500 individuals in the IAPR membership, these fellowships are regarded as great honour.



**Luigi & Agnese Cordella with George Nagy**



# *Drassanes, Barcelona 6 September 2000*



Two special Certificates of Appreciation were then awarded: one to an astounded Sue Duff for her 'excellent secretariat services and maintenance of the IAPR archives' and the other to **Michal Haindl** (shown below) 'for excellent service and management of the IAPR website'.



The prize for the Best Paper in the journal Patter Recognition was presented to L.J.Latecki and A.Rosenfeld by Blaire Mossman, Managing Editor of the journal.

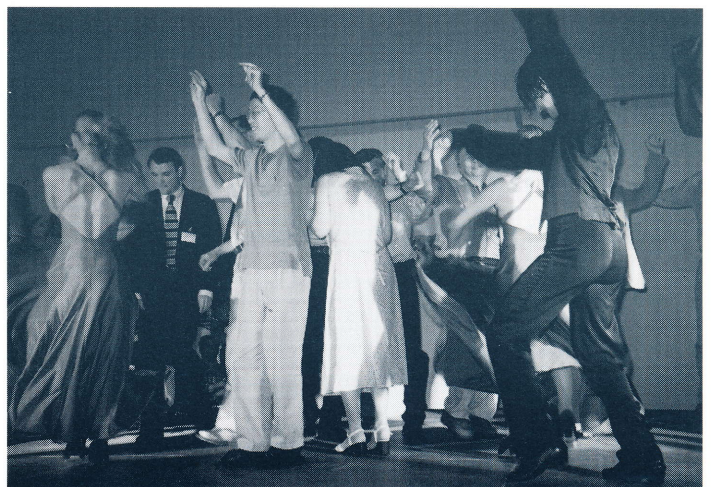
The other IAPR business of the evening was the announcement of the members of the new Executive Committee, lead by the President for the next two years,

Gabriella Sanniti di Baja, a popular appointment following her sterling work as Secretary for the last six years. The venue for the 2004 ICPR was also announced, following the Governing Board selection from three competing bids (Calcutta, Hong Kong and Cambridge, England). This conference will be held in the United Kingdom.

The serious business over and food consumed, the banquet rapidly got out of control. Flamenco dancing by Compañía Carmen-Traga, accompanied by a singer/guitarists Javier van Beethoven (his real name!) and Javier Garcia was both pleasing and harmless but the writer of this report felt severely threatened when one of the flamenco dancers descended from the stage and grabbed his hand expectantly.....



Using the excuse of the need to take a photograph for this newsletter of **Linda Shapiro** (above), he escaped but others (below) were not so lucky (and, in fact, seemed to be enjoying themselves immensely).



Like Cinderella, when midnight struck we all went home in busses thoughtfully provided by organisers, ready but not optimally prepared for a 9am start the next morning.



# Applications Robotics Systems & Architectures

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## HANDWRITING RECOGNITION AND OCR GO GLOBAL WHILE IMAGE INDEXING AND OBSERVATION OF HUMAN ACTION PREPARE RAPID GROWTH.

Statistical pattern recognition has become a fundamental tool for autonomous robotics and computer vision. Thus, when the technical program committee was formed five years ago, we expected that the hot applications areas for ICPR 2000 would be in these areas. In particular, we planned for a program with strong ensemble of results in autonomous systems, architectures and methods for computer vision systems. Reality decided otherwise.

As the conference approached, it became clear that the communities had not followed our script. The applications area with the greatest interest at ICPR 2000 appears to have been the automatic analysis of documents and, in particular, the recognition of hand written characters in different cultures and languages (Oral Sessions O41A, and O42A, Poster Sessions P41B, P42A, and P42B, and contest session P52B). This reflects the continual spread and maturation of the use of pattern recognition for document analysis.

In retrospect, this direction makes sense; it reflects the economics of the accelerating take-up of information technology on a global scale. Such applications were among the first to demonstrate the commercial potential of combining pattern recognition with image processing. Since the mid 1970s, the number of commercial machines in North America and Europe has undergone steady exponential growth, in a self-reinforcing process of innovation and exploitation. ICPR 2000 has shown that the market potential driving this process is far from exhausted.

While early growth in document analysis came from adapting the technologies to Euro-American economic practices and writing styles, the new growth areas reflect the challenges of adapting to the styles and practices of India, Asia and the Southern Hemisphere. Practical systems have been developed for isolated characters, current research concerns more difficult cases such as non-isolated or non-regular characters. Written languages such as Chinese and Kanji appear to be particularly well suited for such applications.

A second area of rising interest concerned image data base systems (Oral Sessions O41B and Poster Session P41A ). Growth in this area is driven by the Internet, the web, and the economic potential of the convergence of pattern recognition and image analysis with digital television. The ubiquitous television pours streams of images into homes throughout the world. Replacing hard-wired analog signal processing with programmable digital processing offers fantastic potential for new services. These services typically revolve around indexing, organising and cataloguing.

An important problem is how to bridge the semantic gap between users and visual information retrieval systems. Currently, attempts are made for two-dimensional object retrieval by matching features of a model object to those in target images. Developing database manipulation techniques for large image databases will enormously extend the powers of television. Even a small profit becomes astronomical when multiplied by the number of televisions. The potential is magnified by including the Internet and the world wide web. Simple economics predicts that such applications will take an important role in future conferences.

A third area of growing interest is the observation of human action (Oral sessions O44A and O44B, Poster sessions P42A, P43A, P43B and contest P52B). Classically, development of such techniques has been driven by visual surveillance applications, chiefly for security. While some countries, such as the UK, have embraced the widespread installation of unmanned surveillance cameras in public areas, this has not led to significant applications of pattern recognition.

Growth in commercial surveillance systems is driven by systems cost rather than by innovative recognition techniques. The hot subjects in observation of human action stem from novel applications for entertainment and for man-machine interaction. As with image databases, an important driving force is provided by the expected arrival of digital television and its convergence with the Internet. Most of the content of television concerns human activity. Recognising individuals and activities can potentially provide many desirable services for entertainment.



Similar economic considerations drive development of systems for tracking such things as a tennis ball. Human tracking is useful not only for surveillance or obstacle avoidance but also for recognition of postures or faces while tracking. One current trend is from stationary to moving cameras. Moving objects are detected by matching. Available computing power permits systems to run on-line without special hardware.

Innovation in observation of human action is also driven by the search for new modes of man-machine interaction. The GUI (Graphical User Interface) invented in the 1970s led to a dramatic revolution in the usability of information technology. Current efforts seek to surpass GUI with PUI (Perceptual User Interfaces). Observation and analysis of human activity can potentially allow the computer and its interface to disappear into the environment, and to adapt to human methods of communication. Much activity is directed to endowing ordinary artifacts and environments with awareness and communication abilities. Scientific activity for this quest is found primarily in the ACM - CHI as well as IEEE Face and Gesture conferences. However, these techniques are important applications of Pattern Recognition.

Medical image analysis has enjoyed continued interest and popularity as ever growing computational power enables image analysis instruments of surprising abilities (Session O42B, P41B and various related papers in other sessions). In biomedical image processing, an important problem is how to get good images because of the demand for detail observation.

For example, bone tissue is classified into healthy and tumour regions, and tumour is further classified to viable and nonviable tumour tissues using many features from MR perfusion images. For registration of different kind of images, basic image processing techniques are modified and used such as ridges and valleys of images. The classical areas of visual inspection (P4.4A) and remote sensing (P4.1A) also attracted applications papers.

An interesting session called "Contest" consists of four invited papers which report the results of contests: face verification, line drawing recognition systems, algorithm performance, and range image segmentation algorithms. It is useful to compare pattern recognition methods using a large common database.

As for robotics and autonomous systems, the future is still tomorrow. Sessions O4.3A, P4.2B, P4.3B document the use of appearance based methods, geometric invariants and the continued convergence of modern control with robotics and vision. Over the decade, the paradigms employed in these areas have fundamentally shifted to recognition and learning methods grounded geometry, probability theory and neural networks. This paradigm shift is driven by performance. Systems built using these techniques tend to display superior performance. The scientific field has recently seen important innovations which would appear to enable dramatic growth in applications and autonomous systems. Unfortunately, the exponent of the growth curve does not yet appear to have changed.

*James L. Crowley*



*ICPR Poster Sessions were lively, innovative and always well attended.*





# IAPR 2000 FELLOWS

The IAPR Fellowship is conferred on persons in recognition of their outstanding contributions to IAPR, by way of research or service, and to the field of pattern recognition. The recipients selected for 2000 were honored with a certificate presented at the 15th ICPR Dinner in Barcelona

**Professor Bir Bhanu**

For contributions to pattern recognition and computer vision

**Professor Josef Bigun**

For contributions to image understanding and for service to IAPR

**Professor Alberto Del Bimbo**

For contributions to image database management and for service to IAPR

**Professor Dov Dori**

For contributions to document analysis recognition

**Professor Marco Ferretti**

For contributions to parallel architectures for image processing and service to IAPR

**Dr Hiromichi Fujisawa**

For contributions to document analysis and for service to IAPR

**Professor Edwin Hancock**

For contributions to structural and statistical pattern recognition, and computer vision

**Dr Jonathan J Hull**

For contributions to document image analysis and for service to IAPR

**Professor Seiji Inokuchi**

For contributions to 3D computer vision and service to IAPR

**Professor Jin H Kim**

For contributions to handwritten oriental scripts recognition

**Professor Yasuaki Nakano**

For contributions to recognition of handwritten characters, document analysis and for service to IAPR

**Dr Hirobumi Nishida**

For contributions to structural pattern recognition and for service to IAPR

**Professor Shinji Ozawa**

For contributions to motion analysis and for service to IAPR

**Professor Maria Petrou**

For contributions to image processing and for service to IAPR

**Dr Pavel Pudil**

For contributions to statistical pattern recognition and for service to IAPR

**Dr Gabriella Sanniti di Baja**

For exceptional service to IAPR and for contributions to image analysis

**Professor Linda G Shapiro**

For contributions to computer vision and structural pattern recognition

**Professor Arnold W M Smeulders**

For contributions to image analysis and content-based image database retrieval

**Professor Steven L Tanimoto**

For contributions to image processing

**Dr Torfinn Taxt**

For contributions to multispectral image analysis

**Professor Hong Yan**

For contributions to document image analysis

**Professor Ian T Young**

For contributions to image analysis and pattern recognition

***Recipients are entitled to use the initials  
FIAPR***





# IBEROAMERICAN FORUM FOR PATTERN RECOGNITION AND IMAGE PROCESSING

As a joint workshop to the ICPR2000, the  
*Iberoamerican Forum for PR and IP (Foro2000)*  
was held on September 8<sup>th</sup> in Barcelona.

The main goal of this Forum was the presentation  
and exchange of ideas among the most important groups in  
**Pattern Recognition in Iberoamerica - Central and South America, Spain and Portugal.**

The Forum was organised in short speeches, posters and in a Panel. The short speeches were oriented to explain the specific research topics of each group, its projects and resources. The posters were used to complement the short speeches to help the participants to get to know each other and to establish new collaborations.

In the Panel entitled *Promotion of Pattern Recognition in Iberoamerica*, four topics were presented: the history of the Spanish association (in order to present an example of the difficulties in creating an association in Pattern Recognition, a Spanish journal "Electronic Computer Vision" (as a vehicle to share Iberoamerican scientific papers in Spanish), a description of a Government Co-operative Iberoamerican Program (CYTED) and how to join IAPR.

The Panel included some discussion about how to promote the topic *Iberoamerica* and more importantly, it was decided to look for a collaboration among the countries under the creation of a thematic net granted by CYDET. The other important issue that was discussed was the creation (or the guidelines for the creation) of national associations under the auspices of IAPR.

The participants came mainly from the ICPR but a few arrived in Barcelona exclusively to attend the Forum. 60 attendees participated in the Forum and there were 30 presentations about their respective research groups. The groups came from Spain, Portugal, Cuba, Mexico, Venezuela, Colombia, Brazil and Chile.

The Forum was held in the Schools of Informatics of Barcelona at the Polytechnical University of Catalonia (UPC), kindly offered by its Dean and also, thanks to the collaboration of ICPR2000 chairmen, the registration was free.

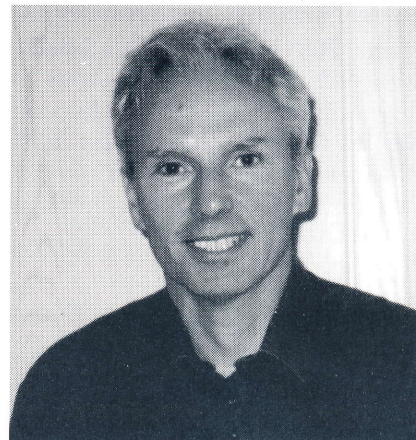
The different presentations were compiled in a Proceedings book of the Forum, under the title of *"Pattern Recognition Advances in Iberoamerica"* freely distributed among the attendees. The event finished with a lunch to which all the participants were invited to take part in a very comfortable atmosphere.

*Antoni Grau (UPC) Chairman of the Forum*  
*Alberto Sanfeliu (UPC) Scientific Co-Chair*  
*Jaun José Villanueva (UAB) Scientific Co-Chair*  
*Jesús Galcerán (UPC) Local Arrangements*

## PIERRE DEVIJVER AWARD

Upon the initiative of the ExCo, TC1 discussed thoroughly ways of commemorating Pierre Devijver, one of the founders of Statistical Pattern Recognition.

It was decided that the best way to commemorate this outstanding scientist who left us all in 1996 would be to set up the Pierre Devijver Award Lecture, to be presented at regular TC1 workshops on Statistical Pattern Recognition. The presenter would be selected from among outstanding scientists who had contributed significantly to the field of Statistical Pattern Recognition.



The first ever winner of this award is Josef Kittler. He presented the Award Lecture during the joint SPR & SSPR Workshop in Alicante, held prior to ICPR 2000 in Barcelona. The TC1 decision was unanimous since Josef Kittler is not only an outstanding scientist but had also been the closest collaborator of Pierre Devijver.

*Pavel Pudil*



# FORTHCOMING SPONSORED CONFERENCES

## Pattern Recognition in Practice VII *Cancelled*

The Organising Committee of *Pattern Recognition in Practice VII*, scheduled for June 2001 has had some internal and external discussions as to whether this conference should be continued after the Chairman, Edzard Gelsema, passed away last February. The series *Pattern Recognition in Practice* was initiated by Edzard Gelsema in 1980. In the years thereafter it was organised with irregular time intervals. In 1994, 1997 and 1999 the beautiful isle of Vlieland was chosen for its location. During these conferences it was clearly visible how Edzard loved this place. As a consequence the participants had a great time, both because of the social environment as well as the well organised, stimulating scientific discussions. For that reason, many of the participants became regular visitors of the series.

The Organising Committee has faced the fact that Edzard left a strong personal mark on the conferences and that this was exactly what people appreciated. For that reason a continuation seems inappropriate. A different style would spoil the memory. Moreover, it would not serve a clear goal, as there are many initiatives in closely related areas. It is good to make room for something new.

As a consequence, *Pattern Recognition in Practice VII*, scheduled for June 2001 is cancelled. The Organising Committee and many of the former participants cherish their memories of the series and its Chairman, Edzard Gelsema.

*Laveen Kanal, Jifke Veenland  
Guus Beckers, Bob Duin*

## Audio & Video-Based Biometric Person Authentication (AVBPA) 6-8 June 2001 - Halmstad Sweden

The explosive growth of Internet and mobile telephone use have contributed to an interest in the need for security and automatic authentication of persons can play an important role. AVBA aims to bring together leading researchers in an attempt to contribute robust solutions.

### Topics will include:

- Biometrics of face and voice
- Biometrics of fingerprints
- Still and multiple image based features
- Audio and lip movements
- Audio-visual speech recognition
- Gesture interpretation
- Resolution and colour in recognition

### Submit:

Papers (maximum 6 pages) with 200 word abstract electronically on templates available at:  
[www.springer.de/comp/lncs/authors.html](http://www.springer.de/comp/lncs/authors.html)

Accepted papers will be published in proceedings with Springer Verlag (LNCS).

### For further details:

[avbpa@hh.se](mailto:avbpa@hh.se)  
<http://www.hh.se/avbpa>

**Submission deadline:** 15.01.01  
**Camera ready paper:** 10.04.01

## Workshop on Pattern Recognition in Information Systems (WPRIS) 6-7 July 2001 - Setúbal Portugal

The aim of the workshop is to bring together researchers, practitioners and potential systems users in a range of multidisciplinary topics. Proceedings will be available from ICEIS Press

### Submissions should be related to:

- Pattern recognition
- Biometrics & personal identification
- Multimedia storage & retrieval
- Data mining
- Machine learning

### For further details:

[afred@ix.it.pt](mailto:afred@ix.it.pt)  
[www.iceis.org](http://www.iceis.org)

**Submission deadline:** 10.01.2001  
**Camera ready paper:** 05.04.2001

## Second International Workshop on Multiple Classifier Systems (MCS) 2-4 July 2001 - Cambridge UK

MCS 2001 is the second workshop of a series aimed to create a common international forum for researchers of the diverse communities working in the field of multiple classifier systems. A report on the first MCS workshop held in Cagliari, will be printed in the next edition of this Newsletter and details can be found on [www.diee.unica.it/mcs](http://www.diee.unica.it/mcs).

### Original papers on the following topics are welcome:

- Foundations of multiple classifier systems
- Methods for classifier fusion
- Design of multiple classifier systems
- Neural network ensembles
- Bagging and boosting
- Mixtures of experts

### Submit:

Three hard copies (maximum 15 A4 pages) to Prof J Kittler, Center for Vision, Speech & Signal Processing, University of Surrey, GU2 5XH, UK



## **ALWAYS CHECK INDIVIDUAL WEB SITES FOR UP-TO-DATE SUBMISSION DETAILS**

In addition, participants should submit an electronic version (PostScript or PDF) to [mcs2001@eim.surrey.ac.uk](mailto:mcs2001@eim.surrey.ac.uk)

**Full details** for submitting papers and updated information can be found on the website: <http://www.diee.unica.it/mcs>

**Submission deadline:** 01.02.01  
**Camera ready paper:** 10.04.01

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### **International Workshop on Machine Learning and Data Mining in Pattern Recognition 25-27 July 2001 - IBaI Leipzig Germany**

**The aim of the workshop** is to bring together researchers from all over the world dealing with machine learning for image processing, image interpretation and computer vision to discuss the recent status of research and to direct further developments in machine learning for image related topics. Researchers from the machine learning community are invited to present new topics in learning.

**Paper submissions** should be related, but not limited to:

- inductive learning including decision tree and rule induction learning
- conceptual learning
- case-based learning
- statistical learning
- neural net based learning and
- organisational learning
- probabilistic information retrieval

Researchers from the machine learning community are invited to present new topics in learning, which might be interesting to our research field.

**Submit** three copies, maximum 15 pages, double-spaced to:  
Institut für Bildverarbeitung und angewandte Informatik,  
Arno-Nitzsche-Str. 45, 04277 Leipzig, Germany.  
Also submit an electronic version to: [ibaiperner@aol.com](mailto:ibaiperner@aol.com)  
Details: [www.members.aol.com/ibaiperner/mldm2.htm](http://www.members.aol.com/ibaiperner/mldm2.htm)

**Paper submission deadline:** 01.03.01  
**Camera ready paper:** 15.05.01

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### **Sixth International Conference on Document Analysis and Recognition (ICDAR) 10-13 September 2001 - Seattle USA**

This conference is an international forum for furthering the state-of-the-art in document recognition, understanding, management and retrieval.

**Topics include:**

- Performance metrics
- Text recognition

- Handwriting recognition
- Image processing
- Graphics recognition
- Document understanding
- Document databases
- Research & developments environments
- Document analysis systems

**Full details** for submitting papers will be posted on the website: <http://isl.ee.washington.edu/IAPR/ICDAR01>

**Submission deadline:** 15.02.01  
**Camera ready paper:** 15.06.01

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### **11th International Conference on Image Analysis and Processing (ICIAP) 26-28 September 2001 - Palermo, Italy**

**Topics include:**

#### **Early vision and image analysis**

Visual processing starts from measurements (feature extraction and representation) on which image operators are applied to extract shape and motion primitives, texture and colour information. In this phase the active vision paradigm plays a relevant role in image segmentation and grouping as well in image and video sequence analysis.

#### **Pattern recognition and image inference**

Higher level of visual processing regards statistical, structural and syntactic pattern recognition. Neural networks are considered useful tools for learning and classification. Genetic algorithms are becoming of great interest in the search of global solutions. Model acquisition, digital geometry and shape reconstruction techniques are important for 2D and 3D object recognition. Spatial reasoning needs new spatial data structure and flexible inference rules.

#### **Visual processing for communication**

Multimedia databases, digital and video libraries need efficient image and video methods for compression and coding. Image databases and video processing require suitable indexing and retrieval solutions. Visual languages allows the natural and optimised formulation of visual computing. Both visual communication and human-computer interaction are based on advanced visual interfaces.

#### **Applications**

Wide spectra of image analysis applications are welcome (astronomy, biology and biomedicine, cultural heritage, OCR and document analysis, mobile robots and visual navigation, remote sensing and GIS, surveillance, smart sensors and dedicated architectures, visual inspection and quality control). More emphasis will be given to real cases and working prototypes.

**Full details:** <http://www.cere.pa.cnr.it/ICIAP>  
**Submit:** full papers (10 pages)

**Submission deadline:** 28.02.01  
**Camera ready paper:** 31.05.01



# BARCELONA - 15<sup>TH</sup> ICPR

**CITY OF 2000 YEARS OF HISTORY, VIBRANT AND DYNAMIC TODAY  
CITY OF CULTURE AND GAUDI, FUN AND LIFE**



Gabriella, Sergey and Stina



▲ Monument a Colom



Gaudí's Sagrada Família ▲ and La Pedrera ▼



Gala Dinner Drassanes ▲



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