



EUROPEAN SPEECH COMMUNICATION ASSOCIATION (ESCA)

5th European Conference on Speech Communication and Technology: EUROSPEECH '97

Title: Eurospeech '97 Proceedings

Subtitle: ESCA 5th European Conference on Speech Communication and Technology

Volumes: 1, 2, 3, 4, 5

Editors: G. Kokkinakis, N. Fakotakis, E. Dermatas

ISSN: 1018-4074

Additional copies may be ordered from:

ESCA - European Speech Communication Association

ICP, Universite Stendhal,

BP 25X, 38040 GRENOBLE Cedex 9, FRANCE

Tel: (+33).4.76.82.43.36

Fax: (+33).4.76.82.43.35

Cover Design: Artemis Kokkinaki-Papapetrou

Edited at: WCL, University of Patras, Greece

Printed by: TYPOFFSET, K. Manouri-Stanidi, Patras, Greece

ESCA PRESIDENT'S MESSAGE

It is with great relief and pride that I welcome at this 5th European Conference on Speech Communication and Technology, for short EUROSPEECH'97, so many new and old colleagues and friends from all over the world. Once the late registration is closed, it may well be that we will go beyond the number of 1,000 participants. This growth from some 840 participants in Berlin for Eurospeech'93 and in Madrid for Eurospeech'95 to the present figure is impressive. The growth is even more impressive if we take into account the number of abstracts being submitted. This grew from 666 in Berlin, to 807 in Madrid and some 1070 this time. Also in terms of number of papers accepted, this will be by far the biggest Eurospeech conference, and for that matter also bigger than any International Conference on Spoken Language Processing (ICSLP) or International Congress of Phonetic Sciences so far.

The Eurospeech International Scientific Committee, that gathered in Athens on March 21 and 22, ultimately accepted 726 papers. With only very few withdrawals and some minor changes, the number of papers that actually will be presented at the conference, and that will be included in the proceedings, is 717. This implies a reject rate of about 30% which, as always, is a compromise between keeping up high standards and the desire to accommodate as many participants as possible, given the fact that many administrations only permit conference participation with an accepted paper. It is also a compromise between what the conference site can practically accommodate, which is quite a lot at the Convention Centre of Rodos Palace Hotel, and what participants can actually absorb. People also become more and more reluctant to carry around with them several kilos of proceedings books. Also for that reason I am very pleased that now also this Eurospeech Proceedings will be available on CD-ROM. We just have to wait for the time that hand-held and intelligent CD-ROM-readers will become available. Another compromise is that between plenary keynote presentations and parallel oral and poster sessions. Upon studying the advance program in the call for participation or the more detailed information on the web-site, you will have seen that there will be 4 oral and 2 poster sessions in parallel each day. This makes the program still rather surveyable. The break on Wednesday afternoon with a

fine excursion and the banquet later that evening, will hopefully also recharge your batteries for the final meeting day of the conference.

I hope and expect that everybody will find enough of his/her flavor in the scientific programme. The diversity may also appeal to you to consume some of the less well known. I also strongly advice you to join the plenary keynote lectures, this will be excellent presentation on carefully selected themes.

Such a major event takes a long time for preparation. More than three years ago ESCA already started collecting bids for this year's event, and in the future we may even have to start this process earlier. The ESCA Board finally chose for Greece for the Eurospeech conference in 1997. Originally the meeting place was announced to be Patras, but for various reasons Professor George Kokkinakis and his organizing committee changed that to Rhodes. The beauty and glamour of this holiday island will certainly have brought some extra participants to this event. This necessary change in meeting place is just one example of the many circumstances that Eurospeech organizers have to face and that sometimes makes the ESCA Board and its president nervous. However, George Kokkinakis as the general chairman, George Carayannis as the vice-chairman, Nikos Fakotakis as the secretary and the whole local organizing committee have done a marvelous job with great efficiency and they deserve our great gratitude.

ESCA is a European-based international membership organization that welcomes everybody active in the broad field of Speech Communication. Similarly the biennial Eurospeech conference and its satellite events intend to be international events with a European flavour. World-wide participation to Eurospeech is evident although certain countries, like from Central and Eastern Europe, are definitely underrepresented. Whenever this is related to the unavoidable high costs of registration and/or living, the conference organizers and ESCA try to find a solution for that. This year's registration form gave the opportunity to apply for a grant. Over 65 people made use of that possibility, and our resources allowed us to (partially) approve some 35 of these requests.

Next to the biennial Eurospeech conference every odd year, ESCA by now is also quite well-known for its workshops (ESCA Tutorial and Research Workshops, ETRWs) on specialized topics, of which some 2 to 4 take place every year. This year two of them are satellite events of Eurospeech'97. One on "Intonation: Theory, models and applications", that will take place in Athens (Sept. 18-20), the other on "Audio-visual speech processing", that will take place in Rhodes (Sept. 27-28). It also became a tradition that the EU Speech Projects Day precedes the main conference on Monday morning (Sept. 22), whereas Cocosda will meet after the main event, most probably in conjunction with a COST workshop. Earlier this year two more, highly successful, ETRWs took place, one on "Robust speech recognition for unknown communication channels" in Pont-a-Mousson (April 17-18), the other in Marseille on "Larynx" (June 18-20). Each time Proceedings are available at the start of the workshop and additional copies can be ordered from the ESCA secretariat (esca@icp.grenet.fr) as long as the stock lasts. Also for 1998 several workshops are being planned. For more information see our NESCA newsletter, the [esca-list](#), the ESCA web-site, or the announcements in the international journal *Speech Communication*.

After the regular all-day Eurospeech sessions on Tuesday Sept. 23, the ESCA General Assembly will take place. On that occasion the newly elected Board members will be installed and we will say farewell to some long-standing Board members that served our association for the maximum period of 8 years. First and foremost this will be our past president Joseph Mariani, who served ESCA and the speech community so eminently, as well as Jens Blauert, who always acted as our financial conscience, and Bjorn Granstrom, who made the ESCA workshops to such a great success. I will also myself resign from the Board and gladly hand over the presidency to one of the new team. Elections took place this spring on the basis of a list of candidates proposed by the present Board. Regular ESCA members had a chance to propose additional candidates, although nobody made use of that possibility. This implies that (in alphabetic order) Gerrit Bloothoof, Rolf Carlsson, Wolfgang Hess, and George Kokkinakis will complete the Board, next to the sitting

members Christian Benoit, Roberto Billi, Paul Dalsgaard, Roger Moore, and Isabel Trancoso. Maria Gosy, furthermore, will act as a non-European-Union observer in the Board.

Although the news has been announced already in NESCA 18 at the end of 1996, many of you may not yet know where Eurospeech in the year 1999 will take place. It is with great pleasure that I can express here again that Hungary has accepted our invitation and that Eurospeech'99 will most probably take place from Sept. 6 to 9, 1999 in the Congress Center Liget in Budapest. The General Chairman of the Organizing Committee will be Professor Geza Gordos, with Professor Maria Gosy as the vice-chairman and dr. Geza Nemeth as the secretary.

Traditionally I have one last pleasant announcement to make and this concerns the ESCA medal. Since 1989 this has been offered to Gunnar Fant, Jim Flanagan, Adrian Fourcin, and Ken Stevens, respectively. This time the distinguished Professor Mario Rossi from the Institute of Phonetics in Aix-en-Provence will receive this medal.

I wish you all a successful conference and a wonderful stay in a sunny Rhodes.

Professor Dr. Louis C. W. Pols

ESCA President

GENERAL CHAIRMAN'S MESSAGE

On behalf of the Organizing Committee of Eurospeech '97, I am glad to welcome you to this biennial event of the European Speech Communication Association (ESCA) and to the beautiful Greek island of Rhodes.

Ancient Greeks used to challenge everybody who boasted to be able to perform an exceptional achievement by saying "ιδού η Ρόδος, ιδού και το πήδημα", which means literally "Here is Rhodes, here you jump", or metaphorically "Prove right now what you pretend to be". This utterance which apparently originated when a boaster claimed that if he were in Rhodes he could make an enormous jump, acquires a special meaning for our conference. As scientists and engineers working in one of the most challenging areas of research and technology, that of man-machine communication by voice, we have to prove that we are able to carry out this endeavour successfully. Eurospeech on the other hand has to prove that it makes substantial progress from event to event so that it is able to efficiently promote the work of its audience in a steadily improving way.

Well, established in 1989 in Paris, Eurospeech enjoyed a spectacular increase in submitted papers and attendees at the events that followed in Genoa (1991), Berlin (1993) and Madrid (1995). This year the number of proposed papers surpassed every expectation jumping from 807 in Madrid to 1076 and that of papers accommodated in the program from 535 to 717. The number of participants is expected to approach

1,100 from 840, an impressive "jump" indeed. I would like to thank all the researchers around the world who submitted their contribution to Eurospeech '97 and the members of the international scientific committee who performed the enormous task of reviewing them in a very short time.

The technical program includes a large spectrum of novel contributions by authors from 49 countries, arranged in 44 oral and 22 poster sessions. Four oral and two poster sessions will run in parallel. Included in the above are two special sessions: One on *Education for Language and Speech Communication* organized by Gerrit Bloothoof and another on *Robust Speech Recognition: Review and Perspectives* organized by Jean-Claude Junqua. In addition, there will be five plenary sessions in which seven distinguished scientists will give keynote speeches: On Monday afternoon, just after the opening ceremony, Mario Rossi will speak on *Is Syntactic Structure Prosodically Recoverable?* On Tuesday and Wednesday morning, Victor Zue and Jan van Santen will speak on *Conversational Interfaces: Advances and Challenges* and *Prosodic Modelling in Text-to-Speech Synthesis*, correspondingly. On Thursday morning in a plenary session on: *Robust Speech Recognition: Review and Perspectives*, Jean-Claude Junqua will speak on *Impact of the Unknown Communication Channel on Automatic Speech Recognition: A Review*, Jerome Bellegarda on *Statistical Techniques for Robust ASR: Review and Perspectives* and Richard Lippmann on *Using Missing Feature Theory to Actively Select Features for Robust Speech Recognition with Interruptions, Filtering and Noise*. Finally, at the closing ceremony on Thursday afternoon, Wolfgang Hess will give a review speech entitled: *Perspectives of Speech Technology Research Highlighted in Eurospeech '97*.

As in previous Eurospeech conferences an accompanying industrial and scientific exhibition of products, books, services and scientific results shown by known firms and institutes, will run from Monday afternoon to Thursday afternoon. A novelty this year is the group presentation of EU-supported projects organized by the EU-project LINGLINK: Promotion and Support for the Application of Language Engineering in Europe. Last but not least, six workshops just before and after the conference including the traditional EU speech projects day, will provide valuable information on recent developments in specific areas.

We are proud that Eurospeech '97 features a series of innovations and additional offerings to the delegates included in the registration fees which have been kept to similar levels to those in the recent past.

CD-ROM proceedings including the papers and audio files in addition to the usual hard copies which have increased to five volumes.

Mailing of the hard-copy proceedings well before the conference.

A hard-copy program including the paper abstracts in addition to the pocket program.

A bus service from Rhodes Airport to the venue and back to the airport on the day before and after the conference.

A half-day excursion to the famous archeological site and the village of Lindos.

Three lunches at Rodos Palace Hotel.

An ESCA membership of one year for non-ESCA members.

Twenty grants to students and young scientists in addition to those offered by ESCA.

A contest for the best student papers and a competition between man-machine dialogue systems over the telephone network named "Olympics" and organized by ELSNET/ ELRA.

Apart from the already mentioned excursion to Lindos, other outstanding events of the conference are the opening ceremony, the welcome reception, the banquet and the closing ceremony. In the opening ceremony the Minister of Development Mrs Vasso Papandreou and the Minister of the Aegean, Mrs Elizabeth Papazoi, who have taken Eurospeech '97 under the auspices of their ministries, and the Mayor of Rhodes Mr George Giannopoulos have been invited to give addresses. Furthermore, a multivision show: *The Dodecanese: A journey in space and time* will be presented by the author Mr Nikos Kasseris and the ESCA medal will be awarded to Mario Rossi by the ESCA president Louis Pols.

The welcome reception will be held by the Mayor of Rhodes at the magnificent Palace of the Grand Masters, the residence of the supreme commanders of the Knights of Saint John's order, who ruled in Rhodes from 1309 to 1522 AD.

The banquet will take place in the Gardens of the Rodos Palace Hotel by the swimming pool organized as a Greek night and will include Greek specialities and wine, barbecue and an orchestra that will play modern and folk music. The highlight of the night will be the ballet performance by the *Nafsika Dance Theatre* consisting of dance pieces from the well known films "Zorba the Greek" and "Never on a Sunday" choreographed by Sofia Smailou.

In the closing ceremony, apart from Wolfgang Hess's review speech and the usual farewell addresses, the awards will be handed to the winners of the ELSNET/ELRA Olympics.

I would like to thank all the members of the organizing committee, especially the secretary Nikos Fakotakis and Evangelos Dermatas, the personnel and the graduate students of WCL, especially Kyriakos Sgarbas, Dimitris Galanis, Despina Krana, Panagiota Bobolas, Sofia Antonakopoulou and Jeanette Smith, the commercial organizer CPR and its director Loukia Simonoviki, the ESCA board and especially its president Louis Pols, who has assisted us in every step, for their tireless efforts to bring this conference to a successful end. Without them, Eurospeech '97 would not have materialized. Furthermore, I would like to extend my best thanks to the many sponsors and supporters of Eurospeech '97:

The University of Patras and WCL in particular
The European Commission
The Ministries of Development, Culture, Education and the Aegean
The City of Rodos
The Hellenic Telecommunications Organization (OTE)
THE firms ERICSSON SA, INTRAKOM SA, SIEMENS SA, STAT SA, ANKO SA

We feel that Eurospeech '97 in Rhodes will be a memorable event and we look forward to sharing it with you.

Professor George Kokkinakis

General Chairman

LOCAL ORGANIZING COMMITTEE

General Chairman

George Kokkinakis (WCL)

Tel: +30 61 991 722

E-mail: gkokkin@wcl.ee.upatras.gr

Co-Chairman

George Carayannis (ILSP)

Tel.: + 30 1 671 2250

E-mail: gcara@ilsp.gr

Secretary

Nikos Fakotakis (WCL)

Tel: +30 61 997 336

E-mail: fakotaki@wcl.ee.upatras.gr

Scientific Program

George Kokkinakis (WCL)

+ 30 61 991 722

E-mail: gkokkin@wcl.ee.upatras.gr

Nikos Fakotakis (WCL)

Tel: +30 61 997 336

E-mail: fakotaki@wcl.ee.upatras.gr

Proceedings

Evangelos Dermatas (WCL)

Tel: +30 61 991 722

E-mail: dermatas@george.wcl2.ee.upatras.gr

Michael Logothetis (WCL)

Tel: +30 61 996 166

E-mail: m-logo@wcl.ee.upatras.gr

Kyriakos Sgarbas (WCL)

Tel.: +30 61 991 722

E-mail: sgarbas@wcl.ee.upatras.gr

Proceedings and CR-ROM (Electronic processing)

Evangelos Dermatas (WCL)

Tel: +30 61 991 722

E-mail: dermatas@george.wcl2.ee.upatras.gr

George Nokas (WCL)

Tel: +30 61 991 722

E-mail: nokas@george.wcl2.ee.upatras.gr

Thanasis Koutras (WCL)

Tel: +30 61 991 722

E-mail: koutras@george.wcl2.ee.upatras.gr

Ioanna Christogianni (WCL)

Tel: +30 61 991 722

E-mail: ioanna@george.wcl2.ee.upatras.gr

Registration/Finances

Panagiota Bobolas (WCL)

Tel: +30 61 997 303

E-mail: bobola@wcl.ee.upatras.gr

Despina Krana (WCL)

Tel.: +30 61 991 722

Email: krana@wcl.ee.upatras.gr

Publicity/Hotel Accommodation

Sofia Antonakopoulou (WCL)

Tel: +30 61 991 722

E-mail: sofia@wcl.ee.upatras.gr

Exhibition

Panagiota Bobolas (WCL)

Tel: +30 61 997 303

E-mail: bobola@wcl.ee.upatras.gr

Social Activities

Vassilis Stylianakis (WCL)

Tel: +30 61 996 166

E-mail: stylian@wcl.ee.upatras.gr

Audio Visual Equipment

John Mourjopoulos (WCL)

Tel: +30 61 997 336

E-mail: mourjop@wcl.ee.upatras.gr

Oral Sessions

Stelios Bakamidis (ILSP)

Tel.: +30 1 671 2250

Vassilis Darsinos (WCL)

Tel: +30 61 991 722

E-mail: darsinos@wcl.ee.upatras.gr

Poster Sessions

Dimitris Galanis (WCL)

Tel: +30 61 991 722

E-mail: galanis@wcl.ee.upatras.gr

Gregory Steinhauer (ILSP)

Tel.: +30 1 671 2250

Sponsors

Dimitris Lymberopoulos (WCL)

Tel: +30 61 997 287

E-mail: dlympero@wcl.ee.upatras.gr

Addresses:

ILSP

Margari Street 22

11525 Athens Greece

Tel.: +30 1 671 2250

+30 1 674 0898

Fax: +30 1 674 1262

Wire Communications Laboratory (WCL)

University of Patras

261 10 Rion, Patras, Greece

Tel.: + 30 61 991 722

Fax: + 30 61 991 855

EUROSPEECH '97 INTERNATIONAL SCIENTIFIC COMMITTEE

B. Atal, AT&T Bell Lab., Murray Hill, NJ, USA

C. Benoit, ICP, Universiti Stendhal, Grenoble, France

R. Billi, CSELT, Torino, Italy

J. Blauert, Ruhr University, Bochum, Germany

L. Boves, Nijmegen University, The Netherlands

A. Bradley, RMIT, Melbourne, Australia

G. Carayannis, Technical University of Athens, Greece

P. Dalsgaard, University of Aalborg, Denmark

V. Digalakis, Technical University of Crete, Greece

N. Fakotakis, WCL, University of Patras, Greece

K. Fellbaum, Techn. University of Cottbus, Germany
H. Fujisaki, Science University of Tokyo, Japan
S. Furui, NTT, Tokyo, Japan
B. Granström, KTH, Stockholm, Sweden
M. Jack, University of Edinburgh, UK
F. Jelinek, Johns Hopkins Univ., Baltimore, MD, USA
G. Kokkinakis, WCL, University of Patras, Greece
Y. Kosarev, Russian Acad. of Scien. St Petersburg, Russia
J. Llisterri, Univ. Autònoma de Barcelona, Spain
H. Mangold, Daimler Benz, Ulm, Germany
J. Mariani, LIMSI-CNSR, Orsay, France
R. Moore, RSRE-DRA, Malvern, UK
J. Mourjopoulos, WCL, University of Patras, Greece
H. Ney, RWTH, Aachen, Germany
J. Ohala, University of California, Berkeley, USA
D. O'Shaughnessy, INSR-Tel. Univ. of Quebec, Canada
J. Pardo, Universidad Politécnica de Madrid, Spain
L. Pols, University of Amsterdam, The Netherlands
C. Sorin, CNET, Lannion, France
I. Trancoso, INESC, Lisboa, Portugal

CONFERENCE SECRETARIAT

CPR Conferences-Public Relations

50, King George Sq.

LOCAL COMMITTEE

Wire Communications
Laboratory

University of Patras

26221 Patras, GREECE

26110 Rion, Patras, GREECE

Tel: 30 61 270388, Fax: 30 61223
335

Tel: 30 61 991722, Fax: 30 61
991855

E-mail: cpr@pat.forthnet.gr

E-mail:
Eurospeech97@wcl.ee.upatras.gr

ACKNOWLEDGEMENT

The Eurospeech '97 Organizing Committee acknowledges with gratitude the sponsoring and support of the conference by the following authorities and firms:

SPONSORS

The University of Patras, Greece

The European Commission

The Hellenic Telecommunications Organization (OTE), Greece

The Ministry of Education, Greece

The Ministry of the Aegean, Greece

The City of Rodos, Greece

ERICSSON SA, Greece

INTRAKOM SA, Greece

SUPPORTERS

The Ministry of Culture, Greece

The Ministry of Development, Greece

(The General Secretariat of Science & Technology)

SIEMENS SA, Greece

STAT SA, Greece

ANKO SA, Greece

ELSNET-ELRA Olympics

ELSNET and ELRA have organized a contest for best student papers presented at Eurospeech '97. Out of 45 submitted papers, the jury, consisting of Isabel Trancoso (Lisbon), Roger Moore (Malvern), Niels Ole Bernsen (Odense), and Joseph Mariani (Orsay) have selected two winners while 11 other papers were awarded the qualification 'excellent student paper'. The two prizes consisted of a free trip to Eurospeech'97.

ELSNET PRIZE

[best student paper]

Kenney Ng, Victor W. Zue

"Subword Unit Representations for Spoken Document Retrieval"

ELRA PRIZE

[best student paper with focus on language resources]

Philip Clarkson, Ronald Rosenfeld

"Statistical Language Modeling using the CMU-Cambridge Toolkit"

Qualification 'EXCELLENT STUDENT PAPER'

Michelle S. Spina, Victor W. Zue

"Automatic Transcription of General Audio Data: Effect of Environment Segmentation on Phonetic Recognition"

Michael K. McCandless, James R. Glass

"MUSE: A Scripting Language for the Development of Interactive Speech Analysis and Recognition Tools"

Wolfgang Minker

"Stochastically-Based Natural Language Understanding Across Tasks and Languages"

Jason Humphries, P.C. Woodland

"Using Accent-Specific Pronunciation Modelling for Improved Large Vocabulary Continuous

Speech Recognition"

Rayman Lau, G. Flammia, C. Pao, V. Zue

"WEBGALAXY - Integrating Spoken Language and Hypertext Navigation"

Jim Huhunin, V.W. Zue

"On the Design of Effective Speech-Based Interfaces for Desktop Applications"

Marcel Riedi

"Modelling Segmental Duration with Multivariate Adaptive Regression Splines"

Chao Wang, J. Glass, H. Meng, J. Polifroni, S. Seneff, V. Zue

"YINHE: A Mandarin Chinese Version of the GALAXY System"

Jacob Goldberger, D. Burshtein, H. Franco

"Segmental Modeling using a Continuous Mixture of Non-Parametric Models"

A.J. Rubio, P. Garcia, Angel de la Torre, J.C.Segura, J. Diaz-Verdejo, M.C. Benitez, V. Sanchez, A.M. Peinado, J.M. Lopez-Soler, J.L. Perez-Cordoba

"STACC: An Automatic Service for Information Access using Continuous Speech
Recognition Through Telephone Line"

Mike Lincoln, S. Cox, S. Ringland

"A Fast Method of Speaker Normalisation using Formant Estimation"

TECHNICAL PROGRAM AT A GLANCE

MONDAY,22	TUESDAY,23	
EU Speech Projects Day	Morning	
Registration	Keynote Speech 2 : <i>Conversational Interfaces:Advances and Challenges</i>	
8:30-9:30	9:00-9:50	
Opening		
George Kokkinakis, Eurospeech, Louis Pols, ESCA,	ORAL SESSIONS	POSTER SESSIONS
Giovanni Battista Varile, EC	10:00-11:30	10:00-13:30
9:30-9:40		
	T1A: <i>Keyword and Topic Spotting</i>	TMA: <i>Feature Estimation II ,</i>
Roadmap of challenges and achievements		<i>Pitch and Prosody</i>
in speech processing, with focus on the contribution	T1B: <i>Robustness in Recognition</i>	
of EU speech projects	<i>And Signal Processing I</i>	
Joseph Mariani, LIMSI-CNRS, Roger Moore, DRA,UK	T1C: <i>Modelling of Prosody</i>	TMB: <i>Speech Synthesis Techniques</i>
9:40-11:00		
Coffee Break	T1D: <i>Microphone Arrays for</i>	
11:00-11:20	<i>Speech Enhancement</i>	
	Coffee Break	
Future EU activities in Language and Speech	11:30-12:00	
Giovanni Battista Varile, European Commission	ORAL SESSIONS	
11:20-11:50	12:00-13:30	
	T2A: <i>Multilingual Recognition</i>	TMC: <i>Technology for S&L Acquisition</i>
The role and contribution of the ELSNet,		<i>Speech Processing Tools</i>
international cooperation,ELRA and EAGLES	T2B: <i>Language Specific Speech</i>	
Steven Krauwer, ELSNet, Khalid Choukri, ELRA, Roger Moore, EAGLES	<i>Analysis</i>	
11:50-12:20	T2C: <i>Feature Estimation I</i>	TMD: <i>Phonetics and Phonology</i>
Questions from the floor	T2D: <i>Speech Coding I</i>	
12:20-12:30		
	Lunch Break	
	13:30-15:00	
	Afternoon	
	ORAL SESSIONS	POSTER SESSIONS
	15:00-16:30	15:00-18:30
Opening Ceremony		
14:30-15:40	T3A: <i>Confidence Measures in ASR</i>	TAA: <i>Speech Analysis & Modelling</i>
	T3B: <i>Speaker and Language</i>	
	<i>Identification</i>	
Keynote Speech 1: <i>Is Syntactic Structure Prosodically Recoverable?</i>	T3C: <i>Perception of Prosody</i>	TAB: <i>Robustness in Recognition</i>
15:40-16:30		<i>and Signal Processing II</i>
	T3D: <i>Applications of Speech</i>	
	<i>Technology I</i>	

Coffee Break		Coffee Break	
16:30-17:00		16:30-17:00	
ORAL SESSIONS	POSTER SESSIONS	ORAL SESSIONS	
17:00-18:30	17:00-18:30	17:00-18:30	
M4A:Acoustic Modelling I	MAA:Training Techniques, Efficient Decoding in ASR	T4A:Spontaneous Speech Recognition	TAC:Acoustic Modelling II
M4B:Dynamic Articulatory Measurements		T4B:Language-Specific Segmental Features	
M4C:Language Identification	MAB:Prosody	T4C:Speaker Recognition I	TAD:Speech Coding II
M4D:NNs for Speech and Language Processing		T4D:Speech Synthesis:Linguistic Analysis	
Welcome Reception		ESCA General Assembly	
19:30-22:30		18:45-19:45	

WEDNESDAY,24		THURSDAY,25	
Morning			
Keynote Speech 3 : <i>Prosodic Modelling in Text-to-Speech Synthesis</i>		Keynote Speech 4 : <i>Robust Speech Recognition: Review and Perspectives</i>	
9:00-9:50		8:35-9:50	
ORAL SESSIONS	POSTER SESSIONS	ORAL SESSIONS	POSTER SESSIONS
10:00-11:30	10:00-13:30	10:00-11:30	10:00-13:30
W1A:Dialogue Systems:Applications	WMA:Speech Recognition in Adverse Environments,	Th1A:Speaker Adaptation I	ThMA:Front-Ends and Adaptation to Acoustics,Speaker
W1B:Speech Production Modelling	CSR and Error Analysis	Th1B:Dialogue Systems:Design and Applications	Adaptation
W1C:Speaker Recognition II	WMB:Multimodal Speech Processing,Emerging	Th1C:Assessment Methods	ThMB:Speech Perception
W1D:Speech Enhancement I	Techniques and Applications	Th1D:Education for Language and Speech Communication	
Coffee Break		Coffee Break	
11:30-12:00		11:30-12:00	
ORAL SESSIONS		ORAL SESSIONS	
12:00-13:30		12:00-13:30	
W2A:Spoken Language Understanding	WMC:Databases, Tools and Evaluations	Th2A:Hybrid Systems for ASR	ThMC:Dialogue Systems:Linguistic Structures, Modelling and Evaluation
W2B:Language Model Adaptation		Th2B:Topic and Dialogue De- pendent Language Modelling	
W2C:Prosody and Speech Reco- gnition/Understanding	WMD:Applications of Speech Technology	Th2C:Lipreading	ThMD:Speaker Recognition and Language Identification
W2D:Wideband Speech Coding		Th2D:Articulatory Modelling	
Lunch Break			

13:30-15:00			
Afternoon			
		ORAL SESSIONS	POSTER SESSIONS
		15:00-16:30	15:00-18:30
		Th3A: <i>Style and Accent Recognition</i>	ThAA: <i>Noise Mitigation,</i>
			<i>Speech Enhancement II</i>
		Th3B: <i>Phonetics</i>	
		Th3C: <i>Towards Robust ASR for Car</i>	ThAB: <i>F0 and Duration Modelling,</i>
		<i>and Telephone Applications</i>	<i>Spoken language processing</i>
		Th3D: <i>Language Specific Systems</i>	
Excursion to Lindos		Coffee Break	
15:00-18:30		16:30-17:00	
		ORAL SESSIONS	
		17:00-18:30	
		Th4A: <i>Pronunciation Models</i>	ThAC: <i>Language Modelling</i>
		Th4B: <i>Auditory Modelling and</i>	
		<i>Psychoacoustics</i>	
		Th4C: <i>Voice Conversion and</i>	ThAD: <i>Auditory Modelling and</i>
		<i>Data Driven F0-Models</i>	<i>Psychoacoustics,</i>
		Th4D: <i>Vocal Tract Analysis</i>	<i>Neural Networks for Speech</i>
			<i>Processing and Recognition</i>
Banquet 21:30 -		Closing Ceremony 18:45-20:00	