

Tokyo



December 1-2, 2009

International Workshop on Spoken Language Translation

Evaluation Campaign on Spoken Language Translation

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Related Events

- IUCS 2009 (Dec 3-4)
- IWSLT 2010
- IWSLT 2011
- NEW!**
- IWSLT 2012 will be held in Hong Kong on December 6-7, 2012

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Theme

The International Workshop on Spoken Language Translation (IWSLT) is a [yearly](#), open evaluation campaign for spoken language translation followed by a scientific workshop, in which both system descriptions and scientific papers are presented. IWSLT's evaluations are not competition-oriented, but their goal is to foster cooperative work and scientific exchange. In this respect, IWSLT proposes challenging research tasks and an open experimental infrastructure for the scientific community working on spoken and written language translation.

Evaluation Campaign

The 6th International Workshop on Spoken Language Translation will take place in Tokyo, Japan in December 2009. The focus of this year's evaluation campaign will be the translation of task-oriented human dialogs in travel situations. The speech data was recorded through human interpreters, where native speakers of different languages were asked to complete certain travel-related tasks like *hotel reservations* using their mother-tongue. The translation of the freely-uttered conversation was carried-out by human interpreters. The obtained speech data was annotated with dialog and speaker information. For the **Challenge Task**, IWSLT participants will have to translate both, the Chinese and English, outputs of the automatic speech recognizers (lattice, N/1BEST) into English and Chinese, respectively.

Like in previous IWSLT events, a standard **BTEC Task** will be provided. However, the BTEC Task will focus on text input only, i.e. no automatic speech recognizer results (lattice, N/1BEST) have to be translated. In addition to the Arabic-English and Chinese-English translation tasks, this year's evaluation campaign features Turkish as a new input language.

Each participant in the evaluation campaign is requested to submit a paper describing the MT system, the utilized resources, and results using the provided test data. Contrastive run submissions using only the bilingual resources provided by IWSLT as well as investigations in the contribution of each utilized resource are highly appreciated. Moreover, all participants are requested to present their papers at the workshop.

Scientific Paper

In addition to the evaluation campaign, the IWSLT 2009 workshop also invites scientific paper submissions related to spoken language technologies. Possible topics include, but are not limited to:

- Spoken dialog modeling
- Integration of ASR and MT
- SMT, EBMT, RBMT, Hybrid MT
- MT evaluation
- Language resources for MT
- Open source software for MT
- Pivot-language-based MT
- Task adaptation and portability in MT

Evaluation Campaign

The evaluation campaign is carried out using BTEC (*Basic Travel Expression Corpus*), a multilingual speech corpus containing tourism-related sentences similar to those that are usually found in phrasebooks for tourists going abroad. In addition, parts of the SLDB (*Spoken Language Databases*) corpus, a collection of human-mediated cross-lingual dialogs in travel situations, are provided to the participants of the *Challenge Task*. Details about the supplied corpora, the data set conditions for each track, the guidelines on how to submit one's translation results, and the evaluation specifications used in this workshop are given below.

Please note that compared to previous IWSLT evaluation campaigns, the guidelines for how to use the language resources for each data track have changed for IWSLT 2009. Starting in 2007, we encouraged everyone to collect out-of-domain language resources and tools that could be shared between the participants. This was very helpful for many participants and allowed many interesting experiments, but had the side-effect of the system outputs being difficult to compare because it was impossible to find out whether certain gains in performance were triggered by better suited (or simply more) language resources (*engineering aspects*) or by improvements in the underlying decoding algorithms and statistical models (*research aspects*). After the IWSLT 2008 workshop, many participants asked us to focus on the *research aspects* for IWSLT 2009.

Therefore, **the monolingual and bilingual language resources that should be used to train the translation engines for the primary runs are limited to the supplied corpus for each translation task**. This includes all supplied development sets, i.e., you are free to use these data sets as you wish for tuning of model parameters or as training bitext, etc. All other languages resources besides the ones for the given translation task, should be treated as "additional language resources". For examples, any additional dictionaries, word lists, bitext corpora such as the ones provided by LDC. In addition, some participants asked whether they could use the BTEC TE and BTEC AE supplied resources for the BTEC CE task. These should also be treated as "additional resources". Because it is impossible to limit the usage of linguistic tools like word segmentation tools, parsers, etc., those tools are allowed to preprocess the supplied corpus, but we kindly ask participants to describe in detail which tools were applied for data preprocessing in their system description paper.

In order to motivate participants to continue to explore the effects of additional language resources (model adaptation, OOV handling, etc.) we **DO ACCEPT contrastive runs based on additional resources**. These will be evaluated automatically using the same framework as the primary runs, thus the results will be directly comparable to this year's primary runs and can be published by the participants in the MT system description paper or in a scientific paper. Due to the workshop budget limits, however, it would be difficult to include all contrastive runs into the subjective evaluation. Therefore, we kindly ask the participants for a contribution if they would like to obtain a human assessment of their contrastive runs as well. If you intend to do so, please contact us as soon as possible, so that we can adjust the evaluation schedule accordingly. Contrastive run results will not appear in the overview paper, but participants are free to report their findings in the MT system description paper or even a separate scientific paper submission.

Corpus Specifications

BTEC Training Corpus:

- data format:
 - each line consists of three fields divided by the character '\'
 - sentence consisting of words divided by single spaces
 - format: <SENTENCE_ID>\01\<MT_TRAINING_SENTENCE>**
 - Field_1: sentence ID
 - Field_2: paraphrase ID
 - Field_3: MT training sentence
- example:
 - TRAIN_00001\01\This is the first training sentence.
 - TRAIN_00002\01\This is the second training sentence.
- Arabic-English (AE)
- Chinese-English (CE)
- Turkish-English (TE)
 - 20K sentences randomly selected from the BTEC corpus
 - coding: UTF-8
 - text is case-sensitive and includes punctuations

BTEC Develop Corpus:

- text input, reference translations of BTEC sentences
- data format:
 - each line consists of three fields divided by the character '\'
 - sentence consisting of words divided by single spaces
 - format: <SENTENCE_ID>\<PARAPHRASE_ID>\<TEXT>**
 - Field_1: sentence ID
 - Field_2: paraphrase ID
 - Field_3: MT develop sentence / reference translation
- text input example:
 - DEV_001\01\This is the first develop sentence.
 - DEV_002\01\This is the second develop sentence.
- reference translation example:
 - DEV_001\01\1st reference translation for 1st input
 - DEV_001\02\2nd reference translation for 1st input
 - ...
 - DEV_002\01\1st reference translation for 2nd input
 - DEV_002\02\2nd reference translation for 2nd input
 - ...
- Arabic-English
 - CSTAR03 testset: 506 sentences, 16 reference translations
 - IWSLT04 testset: 500 sentences, 16 reference translations

- IWSLT05 testset: 506 sentences, 16 reference translations
- IWSLT07 testset: 489 sentences, 6 reference translations
- IWSLT08 testset: 507 sentences, 16 reference translations
- Chinese-English
 - CSTAR03 testset: 506 sentences, 16 reference translations
 - IWSLT04 testset: 500 sentences, 16 reference translations
 - IWSLT05 testset: 506 sentences, 16 reference translations
 - IWSLT07 testset: 489 sentences, 6 reference translations
 - IWSLT08 testset: 507 sentences, 16 reference translations
- Turkish-English
 - CSTAR03 testset: 506 sentences, 16 reference translations
 - IWSLT04 testset: 500 sentences, 16 reference translations

BTEC Test Corpus:

- Arabic-English
- Chinese-English
- Turkish-English
 - 470 unseen sentences of the BTEC evaluation corpus
 - coding: → see *BTEC Develop Corpus*
 - data format: → see *BTEC Develop Corpus*

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CHALLENGE Training Corpus:

- TXT data format:
 - each line consists of three fields divided by the character '\'
 - sentence consisting of words divided by single spaces
 - format: <SENTENCE_ID>\01\<MT_TRAINING_SENTENCE>**
 - Field_1: dialog ID
 - Field_2: sentence ID
 - Field_3: MT training sentence
 - example:
 - TRAIN_00001\This is the first training sentence.
 - TRAIN_00002\This is the second training sentence.
 - ...
- INFO data format:
 - each line consists of three fields divided by the character '\'
 - sentence consisting of words divided by single spaces
 - format: <SENTENCE_ID>\01\<SPEAKER_TAG>**
 - Field_1: dialog ID
 - Field_2: sentence ID
 - Field_3: speaker annotations ('a': agent, 'c': customer, 'i': interpreter)
 - example:
 - train_dialog01\01\a
 - train_dialog01\02\i
 - train_dialog01\03\a
 - ...
 - train_dialog398\20\i
 - train_dialog398\21\i

- train_dialog398\22\c
- Chinese-English (CE)
- English-Chinese (EC)
 - 394 dialogs, 10K sentences from the SLDB corpus
 - coding: UTF-8
 - word segmentations according to ASR output segmentation
 - text is case-sensitive and includes punctuations

CHALLENGE Develop Corpus:

- ASR output (lattice, NBEST, 1BEST), correct recognition result transcripts (text), reference translations of SLDB dialogs
- data format:
 - **1-BEST**
 - each line consists of three fields divided by the character '\'
 - sentence consisting of words divided by single spaces
format: <SENTENCE_ID>\01<RECOGNITION_HYPOTHESIS>
 - Field_1: sentence ID
 - Field_2: paraphrase ID
 - Field_3: best recognition hypothesis
 - example (input):
IWSLT09_CT.devset_dialog01_02\01\best ASR hypothesis for 1st utterance
IWSLT09_CT.devset_dialog01_04\01\best ASR hypothesis for 2nd utterance
IWSLT09_CT.devset_dialog01_06\01\best ASR hypothesis for 3rd utterance
...
 - **N-BEST**
 - each line consists of three fields divided by the character '\'
 - sentence consisting of words divided by single spaces
format: <SENTENCE_ID>\01<RECOGNITION_HYPOTHESIS>
 - Field_1: sentence ID
 - Field_2: NBEST ID (max: 20)
 - Field_3: recognition hypothesis
 - example (input):
IWSLT09_CT.devset_dialog01_02\01\best ASR hypothesis for 1st utterance
IWSLT09_CT.devset_dialog01_02\02\2nd-best ASR hypothesis for 1st utterance
...
IWSLT09_CT.devset_dialog01_02\20\20th-best ASR hypothesis for 1st utterance
IWSLT09_CT.devset_dialog01_04\01\best ASR hypothesis for 2nd utterance
...
 - **word lattices** → [HTK Standard Lattice Format \(SLF\)](#)
 - **reference translations**
 - each line consists of three fields divided by the character '\'
 - sentence consisting of words divided by single spaces
format: <SENTENCE_ID>\lt;PARAPHRASE_ID>\<REFERENCE>
 - Field_1: sentence ID
 - Field_2: paraphrase ID
 - Field_3: reference translation
 - example:
IWSLT09_CT.devset_dialog01_02\01\1st reference translation for 1st input
IWSLT09_CT.devset_dialog01_02\02\2nd reference translation for 1st input
...

IWSLT09_CT.devset_dialog01_04\01\1st reference translation for 2nd input
IWSLT09_CT.devset_dialog01_04\02\2nd reference translation for 2nd input

...

- Chinese-English
 - IWSLT05 testset: 506 sentences, 16 reference translations (read speech)
 - IWSLT06 devset: 489 sentences, 16 reference translations (read speech, spontaneous speech)
 - IWSLT06 testset: 500 sentences, 16 reference translations (read speech, spontaneous speech)
 - IWSLT08 devset: 245 sentences, 7 reference translations (spontaneous speech)
 - IWSLT08 testset: 506 sentences, 7 reference translations (spontaneous speech)
 - IWSLT09 devset: 10 dialogs, 200 sentences, 4 reference translations (spontaneous speech)
- English-Chinese
 - IWSLT05 testset: 506 sentences, 16 reference translations (read speech)
 - IWSLT08 devset: 245 sentences, 7 reference translations (spontaneous speech)
 - IWSLT08 testset: 506 sentences, 7 reference translations (spontaneous speech)
 - IWSLT09 devset: 10 dialogs, 210 sentences, 4 reference translations (spontaneous speech)

CHALLENGE Test Corpus:

- Chinese-English
 - 27 dialogs, 405 sentences
 - coding: → see *CHALLENGE Develop Corpus*
 - TXT data format: → see *CHALLENGE Develop Corpus*
 - INFO data format: → see *CHALLENGE Training Corpus*
- English-Chinese
 - 27 dialogs, 393 sentences
 - coding: → see *CHALLENGE Develop Corpus*
 - TXT data format: → see *CHALLENGE Training Corpus*
 - INFO data format: → see *CHALLENGE Training Corpus*

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Translation Input Conditions

Spontaneous Speech

- Challenge Task
 - Chinese-English
 - English-Chinese

→ ASR output (word lattice, N-best, 1-best) of ASR engines provided by IWSLT organizers

Correct Recognition Results

- Challenge Task
 - Chinese-English
 - English-Chinese
- BTEC Task
 - Arabic-English
 - Chinese-English
 - Turkish-English

Evaluation

Subjective Evaluation:

- Metrics:
 - **ranking**
(= official evaluation metrics to order MT system scores)
→ all primary run submissions
 - **fluency/adequacy**
→ top-ranked primary run submission
 - **dialog adequacy**
(= adequacy judgments in the context of the given dialog)
→ top-ranked primary run submission
- Evaluators:
 - 3 graders per translation

Automatic Evaluation:

- Metrics:
 - **BLEU/NIST** (NIST v13)
→ bug fixes to handle empty translations and IWSLT supplied corpus can be found [here](#).
 - **METEOR** (meteor_0.8.3)
 - **GTM** (gtm-1.4)
 - **TER** (tercom-0.7.25)
 - **WER/PER**

→ up to 7 reference translations
→ all run submissions
- Evaluation Specifications:
 - *case+punc*:
 - case sensitive
 - with punctuation marks tokenized
 - *no_case+no_punc*:
 - case insensitive (lower-case only)
 - no punctuation marks
- Data Processing Prior to Evaluation:
 - *English MT Output*:
 - simple tokenization of punctuations (see 'tools/ppEnglish.case+punc.pl' script)
 - *Chinese MT Output*:
 - segmentation into characters (see 'tools/splitUTF8Characters' script)



Organizers

Organizers

- Alex Waibel (CMU, USA / UKA, Germany)
- Marcello Federico (FBK, Italy)
- Satoshi Nakamura (NICT, Japan)

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- Eiichiro Sumita (NICT, Japan; **Workshop**)
- Michael Paul (NICT, Japan; **Evaluation Campaign**)
- Marcello Federico (FBK, Italy; **Technical Paper**)

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Local Arrangements

- Mari Oku (NICT, Japan)

Supporting Organizations

 National Institute of Information and Communications Technology

 The Scientific and Technological Research Council of Turkey (TUBITAK) National Research
 Institute of Electronics and Cryptology (UEKAE)

Keynote Speeches

Keynote Speech 1

Human Translation and Machine Translation



[Philipp KOEHN](#) (University of Edinburgh, UK)

While most of recent machine translation work has focus on the gisting application (i.e., translating web pages), another important application is to aid human translators. To build better computer aided translation tools, we first need to understand how human translators work. We discuss how human translators work and what tools they typically use. We also build a novel tool that offers post-editing, interactive sentence completion, and display of translation options (online at www.caitra.org). We collected timing logs on interactions with the tool, which allows detailed analysis of translator behavior.

Keynote Speech 2

Two-way Speech-to-Speech Translation for Communicating Across Language Barriers



[Premkumar NATARAJAN](#) (BBN Technologies, USA)

Two-way speech-to-speech (S2S) translation is a spoken language application that integrates multiple technologies including speech recognition, machine translation, text-to-speech synthesis, and dialog management. In recent years, research into S2S systems has resulted in several modeling techniques for improving coverage on broad domains and rapid configuration for new language pairs or domains. This talk will highlight recent advances in S2S area that range from improvements in component technologies to improvements in the end-to-end system for mobile use. I will also present metrics for evaluating the S2S technology, a methodology for determining the impact of different causes of errors, and future directions for research and development.

Keynote Speech 3

Monolingual Knowledge Acquisition and a Multilingual Information Environment



[Kentaro TORISAWA](#) (NICT, Japan)

Large-scale knowledge acquisition from the Web has been a popular research topic in the last five years. This talk gives an overview of our current project aiming at the acquisition of a large scale semantic network from the Web, and in the talk I explore its possible interaction with machine translation research. Particularly, I

would like to focus on two topics; multilingual corpora as source of knowledge and the applications of machine translation enabled by our technology. I will discuss a framework of bilingual co-training that gives a marked improvement in accuracy of the acquired knowledge by using two corpora written in two different languages. Also, I will show our technology can enable a new type of tasks for machine translation in Web applications.

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Program

December 1, 2009

09:00	09:30	workshop registration
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Workshop Opening

09:30	09:40	Welcome Remarks
		Satoshi NAKAMURA (NICT, Japan)

Evaluation Campaign: "Overview Talk"

09:40	10:10	Overview of the IWSLT 2009 Evaluation Campaign
		Michael PAUL (NICT, Japan)

coffee  break

Evaluation Campaign: "Challenge Task"

10:30	11:00	Two methods for stabilizing MERT: NICT at IWSLT 2009
		Masao UTIYAMA, Hirofumi YAMAMOTO, Eiichiro SUMITA (NICT, Japan)
11:00	11:30	Low-Resource Machine Translation Using MaTrEx: The DCU Machine Translation System for IWSLT 2009
		Yanjun MA, Tsuyoshi OKITA, Özlem ÇETINOGLU, Jinhua DU, Andy WAY (Dublin City University, Ireland)
11:30	12:00	The CASIA Statistical Machine Translation System for IWSLT 2009
		Maoxi LI, Jiajun ZHANG, Yu ZHOU, Chengqing ZONG (National Laboratory of Pattern Recognition, Institute of Automation, Chinese Academy of Sciences; China)

lunch  break

Invited Talk

13:00	14:00	Human Translation and Machine Translation
		Philipp KOEHN (University of Edinburgh, UK)

Technical Paper: "Oral I"

14:00	14:30	Morphological Pre-Processing for Turkish to English Statistical Machine Translation
		Arianna BISAZZA, Marcello FEDERICO (FBK-irst, Italy)
14:30	15:00	Enriching SCFG Rules Directly From Efficient Bilingual Chart Parsing
		Martin CMEJREK, Bowen ZHOU, Bing XIANG (IBM, USA)

15:00	15:30	A Unified Framework for Phrase-Based, Hierarchical, and Syntax-Based Statistical Machine Translation
		<i>Hieu HOANG, Philipp KOEHN, Adam LOPEZ (Univ. Edinburgh, UK)</i>

coffee ☕ break

Evaluation Campaign: "Poster I"

15:50	16:50	The TÜBITAK-UEKAE Statistical Machine Translation System for IWSLT 2009
		<i>Coskun MERMER, Hamza KAYA, Mehmet Ugur DOGAN (TÜBITAK-UEKAE, Turkey)</i>
15:50	16:50	The UOT System: Improve String-to-Tree Translation Using Head-Driven Phrasal Structure Grammar and Predicate-Argument Structures
		<i>Xianchao WU, Takuya MATSUZAKI, Naoaki OKAZAKI, Yusuke MIYAO, Jun'ichi TSUJII (University of Tokyo, Japan)</i>
15:50	16:50	The GREYC Translation Memory for the IWSLT2009 Evaluation Campaign: one step beyond translation memory
		<i>Yves LEPAGE, Adrien LARDILLEUX, Julien GOSME (University of Caen, France)</i>
15:50	16:50	The ICT Statistical Machine Translation Systems for the IWSLT 2009
		<i>Haitao MI, Yang LIU, Tian XIA, Xinyan XIAO, Yang FENG, Jun XIE, Hao XIONG, Zhaopeng TU, Daqi ZHENG, Yanjuan LU, Qun LIU (Institute of Computing Technology, Chinese Academy of Sciences; China)</i>
15:50	16:50	The University of Washington Machine Translation System for IWSLT 2009
		<i>Mei YANG, Amittai AXELROD, Kevin DUH, Katrin KIRCHHOFF (University of Washington, USA)</i>
15:50	16:50	Statistical Machine Translation adding Pattern based Machine translation in Chinese-English Translation
		<i>Jin'ichi MURAKAMI, Masato TOKUHISA, Satoru IKEHARA (Tottori University, Japan)</i>

Demo Session

16:50	17:20	Network-based Speech-to-Speech Translation
		<i>Chiori HORI, Sakriani SAKTI, Michael PAUL, Satoshi NAKAMURA (NICT, Japan)</i>

Banquet

18:00	20:00	Restaurant " LA TERRE " (Miraikan, 7F)
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December 2, 2009

09:00	09:30	workshop registration
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Invited Talk

09:30	10:30	Two-way Speech-to-Speech Translation for Communicating Across Language Barriers
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Premkumar NATARAJAN (BBN Technologies, USA)

coffee ☕ break

Technical Paper: "Oral II"

10:50	11:20	Structural Support Vector Machines for Log-Linear Approach in Statistical Machine Translation <i>Katsuhiko HAYASHI</i> (University of Doshisha, Japan); <i>Taro WATANABE, Hajime TSUKADA and Hideki ISOZAKI</i> (NTT, Japan)
11:20	11:50	Online Language Model Adaptation for Spoken Dialog Translation <i>Germán SANCHIS-TRILLES</i> (Universitat Politècnica de València, Spain); <i>Mauro CETTOLO, Nicola BERTOLDI, Marcello FEDERICO</i> (FBK-irst, Italy)

lunch 🍽️ break

Invited Talk

13:00	14:00	Monolingual Knowledge Acquisition and a Multilingual Information Environment <i>Kentaro TORISAWA</i> (NICT, Japan)
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Evaluation Campaign: "Poster II"

14:00	15:00	AppTek Turkish-English Machine Translation System Description for IWSLT 2009 <i>Selçuk KÖPRÜ</i> (Apptek Inc., Turkey)
14:00	15:00	LIG approach for IWSLT09 : Using Multiple Morphological Segmenters for Spoken Language Translation of Arabic <i>Fethi BOUGARES, Laurent BESACIER, Hervé BLANCHON</i> (LIG, France)
14:00	15:00	Barcelona Media SMT system description for the IWSLT 2009: introducing source context information <i>Marta R. COSTA-JUSSA, Rafael E. BANCHS</i> (Barcelona Media, Spain)
14:00	15:00	FBK @ IWSLT-2009 <i>Nicola BERTOLDI, Arianna BISAZZA, Mauro CETTOLO, Marcello FEDERICO</i> (FBK-irst, Italy); <i>Germán SANCHIS-TRILLES</i> (Universitat Politècnica de València, Spain)
14:00	15:00	LIUM's Statistical Machine Translation Systems for IWSLT 2009 <i>Holger SCHWENK, Loïc BARRAULT, Yannick ESTÈVE, Patrik LAMBER</i> (University of le Mans, France)
14:00	15:00	I²R's Machine Translation System for IWSLT 2009 <i>Xiangyu DUAN, Deyi XIONG, Hui ZHANG, Min ZHANG, Haizhou LI</i> (Institute for Infocomm Research, Singapore)

coffee ☕ break

Evaluation Campaign: "BTEC Task"

15:20	15:50	The NUS Statistical Machine Translation System for IWSLT 2009 <i>Preslav NAKOV, Chang LIU, Wei LU, Hwee Tou NG</i> (National University of Singapore, Singapore)
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15:50	16:20	The UPV Translation System for IWSLT 2009 <i>Guillem GASCÓ, Joan Andreu SÁNCHEZ</i> (Universitat Politècnica de València, Spain)
16:20	16:50	The MIT-LL/AFRL System for IWSLT 2009 <i>Wade SHEN, Brian DELANEY, Arya Ryan AMINZADEH</i> (MIT Lincoln Laboratory, USA); <i>Timothy ANDERSON, Raymond SLYH</i> (Air Force Research Laboratory, USA)
Workshop Closing		
16:50	17:00	Closing Remarks <i>Marcello FEDERICO</i> (FBK-irst, Italy)

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