

## **Projectaanvraag Internationalisering Geesteswetenschappen 2007-2010**

### *1. Project information*

Forms and Functions of Prosodic Structure

### *2. Abstract*

The network's objective is to make an internationally supported effort to propose a EUROCORES programme on the roles of linguistic prosody. These roles are subdivided into (i) encoding information structure, (ii) parsing the acoustic continuum, (iii) signalling speaker and group identity, and (iv) neuro-processing of prosody. In addition, it aims to organize an international conference on functional aspects of linguistic prosody to attend the start of the projects in the EUROCORES programme. To this end, a bid will be made to host the 4th TIE Conference on Tone and Intonation. Consultation. Planning will take place during three scientific meetings on the themes of the project.

### *3. Main applicant*

Prof. dr C.H.M. Gussenhoven

### *4. Institutional setting*

Chair of General and Experimental Phonology  
Department of Linguistics, Radboud University Nijmegen  
Centre for Language Studies

### *5. Subsidy period*

1 September 2007 - 1 September 2010  
Co-applicant: Dr. Yiya Chen (Radboud University Nijmegen)

### *6. Resubmitted proposal*

Not applicable

### *7. Continuation of previous proposal*

Not applicable

### *8. International research groups and participants*

Department of Linguistics and Basque Studies  
Filologia eta Geografia-Historia Fakultatea, EHU-U, Basque Country  
Unibertsitateen Ibilbidea 5, 01006 Vitoria-Gasteiz (Spain)

**Dr. Gorka Elordieta** [gorka.elordieta@ehu.es](mailto:gorka.elordieta@ehu.es)

Dr. Elordieta is a leading researcher in the phonetics and phonology of intonation, in particular of Basque. He has done research on the interaction between lexical accentuation, intonational features, phrasing, and the expression of information structure in varieties of Basque. In addition, he is collaborating with other researchers on prosodic phrasing in Iberian languages.

Faculdade de Letras da Universidade de Lisboa  
Centre for Language Studies (Onset-CEL)  
Departamento de Linguística Geral e Românica  
Alameda de Universidade  
1600-214 Lisboa (Portugal)

**Dr. Sónia Frota** [sonia.frota@mail.telepac.pt](mailto:sonia.frota@mail.telepac.pt)

Dr. Frota is a leading researcher in the area of the prosodic phrasing and intonation, in particular of varieties of Portuguese. She has worked on the rhythmic structure of Brazilian and European Portuguese, the intonational structure of standard and northern European Portuguese, and collaborated with other researchers on the phrasing of Romance languages. She is the organizer of third TIE Conference on Tones and Intonation (Lisbon, 2008).

Fachgruppe Sprachwissenschaft  
Geisteswissenschaftliche Sektion  
Universität Konstanz  
Postfach 5560 D 186  
D-78457 Konstanz

**Prof. dr. Aditi Lahiri** [aditi.lahiri@uni-konstanz.de](mailto:aditi.lahiri@uni-konstanz.de)

For her research in phonetics and phonology, Professor Lahiri was awarded the Leibniz Prize in 1999. She has led a *Sonderforschungsbereich* for the DfG (*Variation und Entwicklung im Lexikon*) since 1998. Her research concerns synchronic and diachronic aspects of phonological representations and the interaction between phonology and morphology. She was among the earliest researchers to apply psycholinguistic and neurolinguistic experimental techniques to sophisticated issues in phonology.

Departament de Filologia Catalana  
Universitat Autònoma de Barcelona  
Despatx: B9/116  
Edifici B, Campus de la UAB  
08193 Bellaterra (Cerdanyola del Vallès) (Spain)

**Dr. Pilar Prieto** [pilar.prieto@uab.es](mailto:pilar.prieto@uab.es)

Dr. Prieto is a leading researcher in the phonetics and the phonology of intonation, in particular of Catalan and Spanish. She has done research on the factors involved in the detailed timing of pitch movements, on the factors determining intonational phrasing, and on the intonational phonology of Iberian languages generally.

Institutionen för Nordiska Språk  
Stockholms Universitet  
SE-106 91 Stockholm (Sweden)

**Prof. dr. Tomas Riad** [tomas.riad@nordiska.su.se](mailto:tomas.riad@nordiska.su.se)

Professor Riad is a leading researcher in the phonology of intonation, in particular of the interaction between the lexical and intonational tones of varieties of Swedish. His research has targeted the historical development of the Scandinavian tone system, including the Danish *stød*, the typology of varieties of Scandinavian, and the phonology of stress and rhythm. He is currently a research fellow at the Swedish Academy.

Department of Linguistics  
226 South College  
University of Massachusetts  
Amherst MA 01003 (USA)

**Prof. dr. Lisa Selkirk** [selkirk@linguist.umass.edu](mailto:selkirk@linguist.umass.edu)

Professor Selkirk is a leading researcher in the phonology of intonation, in particular the relation between syntax and phonology. Among many ground-breaking results, she established the prosodic hierarchy, and notably the metrical foot, in phonological theory, while developing her theory of prosodic phrasing. Recent research concerns the expression of information structure and the phonological nature of prominence.

## 9 Short project description

### 9.1 Aim

The aim is to draft a proposal for an ESF EUROCORES programme, to draft projects for the programme and to provide a focal point for the start of the programme projects through an international open-call conference on tone and intonation. The theme will concern the functional roles of the prosodic structure of languages. These may involve the contribution of prosodic structure to (i) the expression of information structure within the wider context of the language's grammar, (ii) the interpretation of acoustic continua, as established in phonetic and psycholinguistic experiments, (iii) individual or group identity marking, and (iv) language processing as established through the registration of brain activation. Brief exemplifications are given below.

Subtheme (i) is a widely studied area, but also one of the hardest fields of inquiry in the structure and use of language. The strength we seek to bring to this field is a solid understanding of the prosodic structures involved in the expression of information structure. We give (1) as a simple example of the involvement of the wider grammar, from Lekeitio Basque (LB). The sentences are replies to 'What possession of the friends (1a)/of your brother (1b) did you give to the teacher'? LB has lexically accented and unaccented words, for which reason LB may be classed as a tone language (Elordieta 2007). Focus (indicated by square brackets) can be expressed if the word in focus is a prosodic phrase (indicated by parentheses). The semantic focus for 'books' in 'my friends' books' can be expressed in (1a), but not in 'my brother's books' (1b), because unaccented *nebien* 'of my brother' cannot be phrasally separated from *liburúak* 'the books'.

- (1) a. (maixuári) (lagúnen) ([liburúak]<sub>FOC</sub>) emon dotzaras  
teacher-DAT friends-GEN books give AUX  
'I gave my friends' BOOKS to the teacher'  
b. (maixuári) (nebien [liburúak]<sub>FOC</sub>) emon dotzaras  
'I gave my brother's BOOKS to the teacher'

Subtheme (ii) is a well-established field of inquiry, in particular within phonetics. Psycholinguistic research has tended to concentrate on 'disambiguation' by prosody, where the 'ambiguity' concerns pairs of unarticulated identical strings of words. For instance, high and low attachment of right-branching constituents in NPs have different preferred interpretations in different languages. In *Someone shot the servant of the actress who was on the balcony*, it is either the servant or the actress who was on the balcony. Prosody would appear to determine the choice. The interpretation of visually presented sentences that is apprehended fastest is the one that goes with the default prosody, a position recently shown to be applicable to Korean (Jun, forthcoming). A recent phonetic interest concerns effects of subtle differences in the timing of intonational pitch movements. The interpretation of a speech signal that is ambiguous between English *Norma Nelson* or *Norman Elson* can be influenced by altering the timing of the pitch rise before the second word (Ladd & Schepman 2003), and a similar effect has been established for Neapolitan Italian for *nono* 'ninth' and *nonno* 'grandfather' by D'Imperio, Petrone & Nguyen (forthcoming). In the latter case, the perceptual boundary between word pairs depended on whether the sentence was interpreted as a statement or a question.

Research on subtheme (iii) has focused on the identification of language varieties, and to a lesser extent on social roles, sexual orientation and speaker identity, on the basis of prosody.

Research techniques include the manipulation of natural speech, for instance by low-pass filtering signals, which creates the effect of unintelligible speech as heard from behind a wall. Alternatively, the original pitch contour may be replaced with pitch contours taken from other speakers. For instance, van Leyden (2004) showed that the recognition of Orkney English by speakers of Shetland English and vice versa can take place on the basis of the timing of the pitch peaks relative to accented syllables. The research groups involved in this application have no experience with the role of prosody in speaker identification, but this would obviously be an eligible topic (cf. Nolan 1983, Abberton & Fourcin 1995).

Subtheme (iv) is a recent development. One of the first results from brain imaging experiments is the establishment of a Closure Positive Shift, associated with prosodic boundaries (Steinhauer, Alter & Friederici 1999). Studies of brain activation resulting from processing melodic aspects have had a diffuse hypothesis at their core about the lateralization of lexical tone contrasts in the left hemisphere and the processing of non-linguistic pitch in the right hemisphere (e.g. Gandour, Wong, Hsieh, Weinzapfel, Van Lancker & Hutchins 2000; Gandour, forthcoming). A recent experiment on the processing of lexical tone and intonation in the dialect of Roermond has shown that Roermond-speaking listeners, but not standard Dutch speaking listeners, take some time to process intonational contrasts in the right hemisphere before showing activation in the left. This difference may reflect the more complex task that Roermond listeners face in comparison to the control group, for whom all contrasts are intonational (Fournier, Jensen, Gussenhoven, Hagoort, in preparation).

In addition to the EUROCORES proposal, the network will publish selected contributions to the Fourth Conference on Tone and Intonation (TIE) (September 2010) as a monograph or a journal issue.

### *9.2 Feasibility and relevance*

Two circumstances have an impact on the feasibility of the project. One is the wider scientific environment, and the other the participants' role in and commitment to the project. Research in the prosody of language (stress, rhythmic structure, lexical tone and intonation) has gained an unprecedented momentum in the last fifteen years, mainly through the seminal work by Janet Pierrehumbert and colleagues (Bruce 1977, Pierrehumbert [1980] 1990, Pierrehumbert & Beckman 1988). Integrative works like Ladd (1996), Yip (2000) and Gussenhoven (2004) have synthesized work on intonation, lexical tone and the co-occurrence of such systems within the same language, and bear witness to the new insights into the relation between phonetics and phonology, the separation between structural intonation and paralinguistic intonation, and the interaction between lexical tone and intonational tone. Earlier paradigms have conflated phonetics and phonology, making it impossible to formulate the tonal grammars of languages as systems of contrasts. In the newer approach, lexical and intonational tones are phonologically indistinguishable. Indeed, they interact regardless of function, which has become particularly clear in work on European languages that combine extensive intonation systems with lexical tone (Bruce 1977, Elordieta 1997, Riad 1998, 2003 Gussenhoven & van der Vliet 1999, Gussenhoven & Peters 2004). The ESF Network *Tone and Intonation in Europe* (2001-2004) played a significant role in creating this coherence in the European research field, as witnessed for instance by the biannual series of conferences on Tone and Intonation, the first of which was the closing event of the ESF Network (2004).

The participants have made significant contributions to this research effort, and are set to continue their contribution. The network will provide an essential element in the integration of their research through three scientific meetings: *Prosody and Information Structure* (Sept

2007, Nijmegen), *Third TIE Conference on Tone and Intonation* (Lisbon 2008), and *Variation in Prosodic Structure* (2008, Spain). A sustained effort to define and draft a EUROCORES programme falls well within their competence, and a replacement award for the main applicant will make this practically possible. In addition, a bid for the 4th TIE Conference on Tone and Intonation with a functional theme is likely to be successful, given the existing interest in the themes of the projected EUROCORES programme.

### 9.3 Programmatic cohesion

All primary and secondary network participants work within the Autosegmental-Metrical framework indicated in section 9.2, which lends considerable cohesion to their work. Results are directly comparable, and opportunities for cross-language and cross-dialect research are plentiful. In fact, many are involved in collaborative research, such as the phrasal and tonal properties of the major Iberian languages (Elordieta, Prieto, Frota, Vigário). The subthemes we envisage, which seek to track down phenomena of a quite varied nature, are unified in their source of the effects, a coherent structure defining spoken forms of language. Indeed, functional aspects that are studied without regard for the role of prosody are at a significant disadvantage to the extent that the prosodic structure forms a core part of language.

### 9.4 Significance and added value of network

The significance of the project is that it will focus the work of a number of research centres in Europe through a clear definition of goals that currently underlie their work only to varying extents. Collaboration will amount to mutual assistance in the joint research effort. It will moreover help towards a maximization of the impact of recent gains in our understanding of the prosodic structures of languages. This impact is likely to be felt in many fields, such as psycholinguistics, human-machine interaction, neurolinguistics, sociolinguistics, forensic linguistics and dialectology. It is also likely to have a beneficial effect on the quality of language description, where on average prosody still lags behind other aspects of language structure.

### 9.5 Quality of research international participants

All participants are internationally highly respected. They are leading researchers in their field. They are involved in international research projects, and are active as supervisors of PhD projects and post-doc projects.

10. Word count 1489 words.

### 11. Intended results

Sept 2007	Workshop Netherlands (Nijmegen)
June 2008	EUROCORES theme proposal <i>Forms and Functions of Prosodic Structure</i>
Sept 2008	Third TIE Conference (Lisbon)
June 2009	EUROCORES call for proposals
June 2009	Workshop Spain
Sept 2010	Fourth TIE Conference on Functions of Tone and Intonation
Post-network	Monograph or journal issue based on Conference

### 12. Short cv of main applicant

Carlos Gussenhoven has worked on the phonology and phonetics of Dutch and English since 1980, specializing in intonation. His dissertation (Nijmegen 1984, *On the Grammar and Semantics of Sentence Accents*) is still widely cited. In 1996 he was awarded a personal chair

at the Radboud University Nijmegen in General and Experimental Phonology. Many of his PhD students hold academic positions (M. van der Haagen, Nijmegen; B. Post, Cambridge UK; E. Marsi, Tilburg; E. Grabe, Oxford UK; A. Chen, MPI, Nijmegen). He held a position as Professor of Linguistics at the Linguistics Department of Queen Mary, University of London in 2004, where he still holds an affiliation. He is a standing guest professor at the University of Konstanz, and was Chief Convenor of the ESF network *Tone and Intonation in Europe* 2001-2004. He has published widely, including *The Phonology of Tone and Intonation* (2004, Cambridge University Press), *Understanding Phonology* (with Haïke Jacobs, 1998, Hodder Arnold. 2nd edition 2005; Chinese edition 2000; Korean translation 2002), as well as articles in *Phonology, Language, Journal of Linguistics, Phonetica, Journal of Phonetics* and *Linguistics*. He taught a full load of courses at UC Berkeley in 1991, where he was also a visiting scholar in the fall terms of 1996 and 2005, and spent 1981/2 at the University of Edinburgh and 1986/7 at Stanford University. He actively collaborates with other researchers (Berkeley, London, Konstanz, Stockholm, Utrecht). [www.let.ru.nl/gep](http://www.let.ru.nl/gep)

### 13. Project budget

2 meetings (workshops)	10,000	
2 TIE conferences	10,000	
publication costs conference	3,000	
Exchange expenses 4 x 6 researchers	19,200	
Exchange expenses young researchers	5,800	
Startup, secretarial assistance	6,000	
Replacement fund 0,2fte 9 mo	9,000	
Research costs	3,000	
<b>Total</b>	<b>66,000</b>	
NWO share	49,500	
Matching Prieto		5,000 (workshop Spain)
Matching Riad		5,800 (exchange costs; pending decision Bank of Sweden Tercentenary Fund)
Matching Frota		2,700 (TIE3)
Matching Elordieta		3,000 (exchange costs)
Matching 25%	16,500	

## References

- Abberton, Evelyn & Adrian J. Fourcin (1995). Intonation and speaker identification. *Language and Speech* 21, 305-318.
- Bruce, Gösta (1977). *Swedish word accents in sentence perspective*. Lund: Gleerup.
- D'Imperio, Mariapaola, Catrina Petrone & Noël Nguyen (forthcoming). Effects of tonal alignment on lexical identification in Italian. In Carlos Gussenhoven & Tomas Riad (eds.), *Tones and Tunes II: Experimental Approaches to Word and Sentence Prosody*. Berlin: Mouton de Gruyter.
- Elordieta, Gorka (1997) Accent, tone and intonation. In F. Martínez-Gil and A. Morales-Front (eds.), *Issues in the Phonology and Morphology of the Major Iberian Languages*. Washington DC: Georgetown University Press. 4-78.
- Eldordieta, Gorka (2007). Constraints on intonational prominence of focalized constituents. In Chungmin Lee, Matthew Gordon & Daniel Büring (eds.), *Topic and Focus: Cross-linguistic Perspectives on Meaning and Intonation*. Dordrecht: Springer. 1-22.
- Fournier, Rachel, Ole Jensen, Carlos Gussenhoven & Peter Hagoort (in prep.) Tonal and intonation processing in the Dutch dialect of Roermond.
- Gandour, Jack, Donald Wong, Li Hsieh, Brett Weinzapfel, Diana Van Lancker & Gary D. Hutchins (2000). A cross-linguistic PET study of tone perception. *Journal of Cognitive Neuroscience* 12, 207-222.
- Gussenhoven, Carlos (2004). *The Phonology of Tone and Intonation*. Cambridge UK: Cambridge University Press.
- Gussenhoven, Carlos & Peter van der Vliet (1999). Tone and intonation in the Dutch dialect of Venlo. *Journal of Linguistics* 35, 99-135.
- Gussenhoven, Carlos & Jörg Peters (2004). A tonal analysis of Cologne *Schärfung*. *Phonology* 21, 252-285.
- Jun, Sun-Ah (forthcoming). The Intermediate Phrase in Korean intonation: Its role in sentence processing. In Carlos Gussenhoven & Tomas Riad (eds.), *Tones and Tunes II: Experimental Approaches to Word and Sentence Prosody*. Berlin: Mouton de Gruyter.
- Ladd, D. Robert & Astrid Schepman (2003). 'Sagging transitions' between high pitch accents in English: Experimental evidence. *Journal of Phonetics* 31, 81-112.
- Leyden, Klaske van (2004). *Prosodic characteristics of the Orkney and Shetland dialects: An Experimental Approach* Utrecht: LOT.
- Nolan, Francis (1983). *The Phonetic Bases for Speaker Recognition*. Cambridge: Cambridge University Press.
- Pierrehumbert, Janet B. (1990 [1980]). *The Phonetics and Phonology of English Intonation*. PhD Dissertation. MIT. Published New York, Garland.
- Pierrehumbert, Janet B. & Mary E. Beckman (1988). *Japanese Tone Structure*. Cambridge MA: MIT Press.
- Riad, Tomas (1998). The Origin of Scandinavian Tone Accents. *Diachronica* 15, 63-88.
- Riad, Tomas (2003). Diachrony in the Scandinavian accent typology. In Paula Fikkert & Haike Jacobs (eds.) *Development in Prosodic Systems*. Berlin: Mouton de Gruyter. 91-144.
- Steinhauer, Anton, Kai Alter & Angela Friederici (1999). Brain potentials indicate immediate use of prosodic cues in natural speech processing. *Nature Neuroscience* 2, 191-196.
- Yip, Moira (2000). *Tone*. Cambridge UK: Cambridge University Press.