

Annual report 2015 of ACLC research group:

Coordinator:

Michiel van den Brekel

Web page:

<http://aclc.uva.nl/research/groups/groups/groups/content/folder/oncology-related-communication-disorders/oncology-related-communication-disorders.html>

Current external funding:

75.000 Euro through Verwelius Foundation

100.000 Euro through ATOS Medical (industry)

100.000 Euro (for Assisto project): Sta op tegen Kanker (ELIS-Gent)

Participants in 2015:

Prof. Dr. Michiel van den Brekel (ACLC/AVL), senior researcher, coordinator

Prof emeritus Dr. Frans Hilgers (ACLC/AVL), senior researcher

Dr. Rob van Son (AVL/ACLC), senior researcher

Dr. Lisette van der Molen (AVL), senior researcher

Renee Clapham (ACLC), PhD candidate on Rob van Son's project

subproject: "Automatic evaluation of voice and speech intelligibility after treatment of head and neck cancer", September 2010 – September 2016;

Klaske van Sluis (ACLC/AVL) on Rob van Son's project

Subproject: "Predicting substitute voice source characteristics after laryngectomy", May 2015 – Manon van der Laak (ACLC) on Michiel van den Brekel's project.

Sophie Kraaijenga: PhD candidate on project on swallowing rehabilitation in head and neck cancer.

Olga Fisher (ACLC), senior researcher

Anne Bannink (ACLC), senior researcher

Catherine Middag (ELIS- UZ Gent): Postdoc on project ASISTO Development of online training and assessment tool for pathologic voices. See: <http://asisto.elis.ugent.be>

Jean-Pierre Martens: Professor at ELIS - UZ Gent: Project leader ASISTO

Fons Balm (NKI), senior researcher Virtual therapy project (subproject: prediction and modeling of voice and speech after treatment of head and neck cancer)

Ludi Smeele (NKI, AMC), senior researcher Virtual therapy project

Ferdi van der Heijden (U Twente) senior researcher Virtual therapy project

Description of the research group:

The research group, mainly located in the Netherlands Cancer Institute, but with close ties to the ACLC focuses on research in the field of function in head and neck cancer patients. This used to be mainly speech and voice in laryngectomized patients, but currently also encompasses swallowing as well as speech and voice after other treatment modalities in head and neck cancer.

With regard to this focus, projects on machine learning using automatic speech recognition systems, together with the University of Gent (ELIS) as well as the university hospital of Antwerp are conducted. In a project called "ASISTO" a web based assessment and training tool is being developed to objectively assess voice and speech in these patients and offer training programs for SLP's and patients.

In a collaboration with the University of Twente, the AMC, and the NKI-AVL, the voice after laryngectomy and movements of the tongue and lips for swallowing and speech are modelled based on muscle anatomy and physiology combined with details of nerve innervations and functioning. The dynamical model will include the effects of surgery and chemo-radiation therapy on the anatomy and physiology of the muscles and nerves. Swallowing and speech are simulated, where speech can be made audible using articulatory synthesis. Speech and voice modeling and prediction after laryngectomy is also studied within this project. Klaske van Sluis started to work as a PhD candidate on this project (also supervised by Prof. Paul Boersma)

In a project together with Olga Fisher and Anne Bannink from ACLC, we study patient – doctor communication using conversation analysis as well as other techniques. The influence of the “lastmeter” a short questionnaire on psychosocial and physical well-being is studied. Manon van der Laak is the PhD candidate working on this project.

Research highlights in 2015:

A study of patient recordings since the mid 1990s showed that the voice quality of the speech from patients who use a voice prosthesis after laryngectomy remained stable over long periods of time, up to 18 year, the maximum duration we could test.

Valorisation

We participate in a consortium with the University of Ghent and the University Hospital Antwerpen that has developed an online eTherapy tool for speech and language pathologists and their patients. With this tool, patients can perform speech exercises at home with automatic feedback. This tool will be presented in a special workshop in Antwerp in May 2016 “ASISTO & de rol van e-Health tools binnen spraakrevalidatie” (<https://asisto.elis.ugent.be>).

Completed PhD projects

- [The Intelligibility of tracheoesophageal speech: an analytic and rehabilitation study.](#) P. Jongmans (2008).
- [Multidimensional Assessment of Voice Quality.](#) C.J. van As (2001).

Recent Publications

- Clapham, R. P., Martens, J. P., van Son, R. J., Hilgers, F. J., van den Brekel, M. M., & Middag, C. (2016). Computing scores of voice quality and speech intelligibility in tracheoesophageal speech for speech stimuli of varying lengths. *Computer Speech & Language*, 37, 1-10.
- S.A.C. Kraaijenga, I.M. Oskam, R.J.J.H. van Son, O. Hamming-Vrieze, F.J.M. Hilgers, M.W.M. van den Brekel, L. van der Molen (in Press). "Assessment of voice, speech, and related quality of life in advanced head and neck cancer patients 10-years+ after chemoradiotherapy, *Oral Oncology*, ISSN 1368-8375, doi:10.1016/j.oraloncology.2016.02.001, p24-30.
- Clapham Renee P., van As-Brooks Corina J., van Son Rob J. J. H., Hilgers Frans J. M., and van den Brekel Michiel W. M. (2015). "The Relationship Between Acoustic Signal Typing and Perceptual Evaluation of Tracheoesophageal Voice Quality for Sustained Vowels, *Journal of Voice*, 29 (4), July 2015, Pages 517.e23-517.e29, ISSN 0892-1997, doi:10.1016/j.jvoice.2014.10.002.
- Schuller B, Steidl S, Batliner A, Nöth E, Vinciarelli A, Burkhardt F, van Son R, Weninger F, Eyben F, Bocklet T, Mohammadi G. (2015). "A Survey on perceived speaker traits:

Personality, likability, pathology, and the first challenge". *Computer Speech & Language*.29 (1), January 2015: 100-31. doi:10.1016/j.csl.2014.08.003

- Clapham R, Middag C, Hilgers F, Martens, J-P, van den Brekel M, van Son R (2014). "Developing automatic articulation, phonation and accent assessment techniques for speakers treated for advanced head and neck cancer", *Speech Communication*, 59, April 2014, Pages 44-54. doi:10.1016/j.specom.2014.01.003
- C. Middag, R.P. Clapham, R.J.J.H. van Son & J-P. Martens. Robust automatic intelligibility assessment techniques evaluated on speakers treated for head and neck cancer. *Computer Speech & Language*, (in press, online November 2012).
- R.P. Clapham, L. van der Molen, R.J.J.H. van Son, M.W.M. van den Brekel & F.J.M. Hilgers (2012). NKI-CCRT Corpus: speech intelligibility before and after advanced head and neck cancer treated with concomitant chemoradiotherapy. LREC: 23-25 May, 2012, Istanbul, Turkey (pp. 3350-3355).
- R.P. Clapham, F.J.M. Hilgers, M.W.M. van den Brekel & R.J.J.H. van Son (2011). An Exploration into Automatic Phonological Feature Evaluation of Tracheoesophageal Speech. In W. Zonneveld, H. Quené & W. Heeren (Eds.), *Sound and Sounds*. Studies presented to M.E.H. Schouten (pp. 69-80).
- Renee P. Clapham, Corina J. Van As-Brooks, Michiel W.M. Van den Brekel, Frans J.M. Hilgers, and Rob J.J.H. Van Son (2013). "Automatic tracheoesophageal voice typing using acoustic parameters", *Proceedings of INTERSPEECH 2013*, Lyon, France, 2162-2166
- Clapham R, Middag C, Hilgers F, Martens, J-P, van den Brekel M, van Son R (2014). "Developing automatic articulation, phonation and accent assessment techniques for speakers treated for advanced head and neck cancer", *Speech Communication*, 59, April 2014, Pages 44-54
- F.J.M. Hilgers & M.W.M. van den Brekel (2010). Vocal and speech rehabilitation following laryngectomy. In P.W. Flint, B.H. Haughey, V.J. Lund, J.K. Niparko, M.A. Richardson, K.T. Robbins & J.R. Thomas (Eds.), *Cummings otolaryngology: head & neck surgery*. - 5th ed (pp. 1594-1610). Philadelphia, PA: Mosby Elsevier.
- Björn Schuller, Stefan Steidl, Anton Batliner, Elmar Nöth, Felix Burkhardt, Rob van Son, Felix Weninger, Florian Eyben, Tobias Bocklet, Gelareh Mohammadi, Benjamin Weiss (2012). "The interspeech 2012 speaker trait challenge", *Proceedings of INTERSPEECH 2012*, Portland, OR, USA.