Professor Dr.-Ing. Hermann Ney
21-Aug-2021

EDUCATION:

1977	Diplom	Physics	University of Göttingen, Germany
1982	Dr.-Ing.	Electrical Engineering	University of Braunschweig, Germany

PROFESSIONAL POSITIONS:

1977 – 1993	**Philips Research Laboratories,** Hamburg and Aachen, Germany;
1993 – today	**RWTH Aachen University**, Aachen, Germany.

RESEARCH AREAS:

- machine learning and data-driven approaches to speech and language processing;
- speech recognition and machine translation of written and spoken language;
- handwriting recognition, sign language recognition and translation.

PUBLICATIONS:

- 800+ papers in international conferences/workshops and journals;
- h-index of 100+ and 70000+ citations (based on *Google Scholar*;
  30000+ citations in 2014-today, i. e. era of deep learning).

AWARDS:

- fellow: ISCA (2009), IEEE (2011) and ACL (2020);
- distinguished lecturer: ISCA (2012/3) and IEEE (2016/7);
- 2005 IEEE Signal Processing Society: Technical Achievement Award:
  ... for contributions to the advancement of the theory and performance of speech and language technology, including language modeling, search algorithms and machine translation;
- 2013 IAMT Award of Honour (IAMT = Int. Association of Machine Translation):
  ... for his lifelong contributions to the field of machine translation, especially in the area of statistical machine translation, and for his leadership of the influential Human Language Technology and Pattern Recognition Group of the Computer Science Department at RWTH Aachen;
- 2016 Advanced Grant (topic: *sequence processing for speech recognition and machine translation*)
  of the European Research Council (ERC);
- 2019 IEEE James L. Flanagan Speech and Audio Processing Award:
  ... for pioneering contributions to statistical and computational modeling for speech recognition and machine translation;
- 2021 ISCA Medal for Scientific Achievement:
  ... for pioneering and seminal contributions to data-driven methods for automatic speech recognition and machine translation.

SELECTED CONTRIBUTIONS TO SCIENCE AND TECHNOLOGY:

- 1990 *dynamic programming beam search* for large-vocabulary continuous speech recognition:
  based on dynamic construction of the search space using a lexical prefix tree, which allowed real-time recognition on standard hardware at that time and which is still used today in form of weighted finite state transducers.

- 1993 *Philips Vienna:* commercial product for text dictation;
  first product for large-vocabulary continuous speech recognition.

- 1995 *Kneser-Ney smoothing* for language modelling:
  until 2012, this was the best performing language model and is still widely used today.

- 1997 *Philips Dialogue Systems*: first commercial deployments
  of spoken dialogue systems over the telephone (based on Harald Aust's PhD Thesis: *Speech Understanding and Dialog Modelling in Natural Language Information Systems*, RWTH, July 10, 1998).

- 1999 data-driven *phrase based machine translation*:
  introduction of bilingual word groups as basic units rather than single words as in IBM's approach; this approach was later called *phrase based approach* and led to a revolution in the field.

- 2001 *public toolkit GIZA++* for word alignment in machine translation:
  this toolkit lowered the entrance barrier for new teams and is still widely used.

- 2005 *speech translation* in EU project TC-STAR:
  first research protoype for *unlimited-domain* translation of spoken language for *real-life data* like speeches given in the EU parliament.

- 2008 *Google's translation service*:
  Franz Och and more former PhD students from RWTH joined Google research and utilized the *phrase based approach* for this service.

- since 2012 *deep neural networks* for speech and language technology:
  – LSTM-RNN for language modelling (Sundermeyer et al., Interspeech 2012):
    until today, this is the best method for language modelling.
  – DNN-based feature extraction from speech waveform
    (Tueske et al., Interspeech 2014).
  – acoustic modelling using various DNN types (Luescher et al., Interspeech 2019):
    best recognition results on *Switchboard* and *Librispeech*.
  – DNN-based hidden Markov models for machine translation
    (Sundermeyer et al., EMNLP 2014; Wang et al., ACL 2018).