

OHSU School of Medicine

Department of Biomedical Engineering Computer Science and Electrical Engineering Programs

The Department of Biomedical Engineering's Center for Spoken Language Understanding (CSLU) investigates the application of computer science and electrical engineering techniques to biological and medical problems.

We offer courses and degree programs that educate a new generation of engineers who will transform the biohealth industry through inventing new algorithms for health care and beyond. Our students learn from an internationally respected faculty, work with industry as well as clinical professionals on real-world projects, and develop the skills and expertise crucial for success in this competitive and rapidly changing environment.

Speech, Language and Interactive Systems

The Speech, Language, and Interactive Systems Technology Track teaches students the theory and technology of building systems that can understand, process, and interact with people using speech and language. Students can gain a thorough grounding in all aspects of speech, language and interactive systems, including speech signal processing, automatic speech recognition, text-processing, semantic interpretation, dialogue management, speech synthesis, and human-computer interaction.

Students will learn both the theory behind how speech and language

is processed, and will gain practical experience in building algorithms and applications. Students will also gain a solid understanding of machine learning techniques.

Machine Learning and Adaptive Systems

This track provides a modern foundation for work drawing on statistical techniques including adaptive signal processing, statistical pattern recognition, time series analysis and prediction, and image processing. The curriculum provides a strong basis in statistical fundamentals as well as a variety of classical and modern tools such as neural networks, and genetic algorithms.



www.ogi.edu/bme/cslu



CSLU Faculty

Jan van Santen (Vice-Department Chair)

Lois Black

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For more information on faculty research and interest areas please check out the following websites:

www.ogi.edu/bme/cslu/people

Want to Know More?

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Speech and Language Processing

The Ph.D. and M.S. programs in Computer Science or Electrical Engineering at Oregon Health & Science University (OHSU), offer the chance to work within a unique research organization focused on basic and applied research in speech and language processing. The Center for Spoken Language Understanding (CSLU) has been a part of the Oregon Graduate Institute (OGI, now merged into OHSU) for over a decade, and has ten faculty in speech and language processing. This is a graduate-only institution, hence focused heavily on research. Unlike other speech and language research groups of similar size, our applied research includes significant efforts in biomedical research areas such as computational biology and the nascent field of neurobehavioral engineering, which encompasses topics as diverse as augmentative and alternative communication (AAC) and the discovery of new behavioral “markers” of neurological disorders such as autism and early-phase Alzheimer’s disease.

Current projects include novel text input mechanisms for individuals with severe motor impairments, to enable communication via noninvasive braincomputer interfaces; measurement of prosodic anomalies in autism

using new prosodic modeling methods; and detection of pathological cognitive change in aging using “markers” derived via natural language processing (NLP). While we continue to work in more traditional application areas for our technologies, graduate students will have a unique opportunity to work on technologies used to improve the quality of life of impaired populations, while also (and often at the same time) addressing fundamental basic level research questions in NLP or speech.

- Speech recognition and processing
- Natural language processing (NLP)
- Computational linguistics
- Computational biology
- Speech synthesis
- Computer-assisted neurocognitive assessment
- Augmentative and alternative communication (AAC)
- Speech signal processing
- Speech production, acoustics and prosody

CSLU has a large portfolio of projects funded through the National Institutes of Health (NIH), National Science Foundation (NSF), Defense Advanced Research Projects Agency (DARPA), and many other agencies and foundations. Ph.D. students work closely with individual faculty members on both basic and applied projects.

Visual representations of speech.

