

## RESEARCH GROUP CONTACT >>

Božetěchova 2, 612 66 Brno, Czech Republic  
<http://speech.fit.vutbr.cz/en>

HEAD Assoc. Prof. Jan Černocký  
PHONE +420 541 141 284  
E-MAIL [cernocky@fit.vutbr.cz](mailto:cernocky@fit.vutbr.cz)



## THEMATIC RESEARCH FOCUS >

### RESEARCH AREA

Speech Processing – speaker and language identification, speech recognition and keyword spotting

### EXCELLENCE

- » Speaker and language identification, speech recognition, and keyword spotting
- » The best phone recognition system in the world
- » Feature extraction and acoustic modelling for LVCSR (posterior features, discriminative training and transforms)

### MISSION

We aim to strengthen our position in the European Research Area and establish a Centre of Excellence in speech and language research at our Faculty. We wish to ensure professional development of our research staff, providing the means to the mobility of researchers and Ph.D. students. We plan to spread our excellence by organizing international workshops and conferences. We shall increase the technology transfer activities and strengthen our position in current and future EU funded projects. Management of our group will also focus on improving our relationship with our current and future industrial partners.

## DEVELOPED TECHNOLOGIES >

### CONTENT OF RESEARCH

- » Robust speaker verification technology, including fast scoring
- » Robust language recognition technology
- » Large vocabulary continuous speech recognition (LVCSR) systems for several languages

- » Keyword spotting (both acoustic and based on word/subword speech recognition)
- » Indexing and search engine for spoken documents
- » Lecture browser with speech indexing and search, available at <http://www.superlectures.com>
- » Resources for speech processing (design, collection and validation of speech corpora)

### MAIN CAPABILITIES

Cutting edge research, development and testing of advanced algorithms for speech recognition. The accent is on robust techniques for speech, speaker and language recognition. The group extensively investigates data-driven techniques and use of artificial neural networks for speech recognition. From the application point of view, BUT Speech@FIT is known to be close to the users (mainly from the security and defence community), and tailors its technologies to their needs. The group is also known for its open-source software development.

### ACHIEVEMENTS

- » Excellent results in NIST Language Recognition Evaluation 2005, 2007 and NIST Speaker Recognition Evaluation 2006, 2008 and 2010
- » BUT Speech@FIT researchers are regularly invited to prestigious events, such as JHU summer workshops (already three times; Lukas Burget was the leader of JHU2008's group on speaker verification)

### FIELDS OF RESEARCH RESULTS APPLICATION

- » Security and defence (analysis of massive amounts of speech recording, speech analytics)
- » Call-centres (seeking for individuals and keywords of interest)
- » Consumer applications (dictation, personal memories, IP telephony)
- » Academic and commercial research (speech recognition tools and toolkits)



## ALUMNI PROFILE

Graduates of the group have an overall knowledge of state of the art in speech technologies and are specialized in one or more areas including:

- » Speaker recognition
- » Language recognition
- » Speech transcription, keyword spotting and spoken term detection
- » Machine learning (statistical models and neural networks for speech processing)
- » Software development and graphical user interfaces

Thanks to participation in international conferences and research workshops, graduates are familiar with and often have strong personal relations with the world's leading academic and industrial laboratories in our field.

## NUMBER OF RESEARCH POSITIONS ↘

### SENIOR RESEARCH STAFF

8

### JUNIOR RESEARCH POSITIONS (INCL. PH.D. STUDENTS)

8

## KEY RESEARCH EQUIPMENT ↘

### LIST OF DEVICES

- » Computer Systems with more than 500 CPUs including 3 IBM-Blade centres, all running Linux
- » File servers with total capacity of more than 20 Terabytes
- » Speech and language databases
- » Audio equipment

## BUDGET ↘

### TOTAL (MIL. CZK/ MIL. EUR)

13 / 0.52

### PART OF THE TOTAL BUDGET FROM PRIVATE RESOURCES (%)

20

### PART OF THE TOTAL BUDGET FROM FOREIGN RESOURCES (%)

60

## MAIN PROJECTS ↘

**2009–2013:** Lingea-BUT (project FR-TI1/034 – MPO financed by the Ministry of Trade and Industry of the Czech Republic)

**2008–2010:** MOBIO - Mobile Biometry (EU FP7 IST – 214324)

**2007–2010:** Overcoming the language barrier complicating investigation into financing terrorism and serious financial crimes (project VD 20072010B16 financed by the Ministry of Interior of the Czech Republic)

**2006–2010:** DIRAC - Detection and Identification of Rare Audio-visual Cues (EU FP6 IST – 027787)

**2006–2009:** AMIDA – Augmented Multi-party Interaction with Distance Access (EU-FP6-IST – 033812)

## MAIN COLLABORATING PARTNERS ↘

### COLLABORATION WITH ACADEMIC PARTNERS

- » Johns Hopkins University (Baltimore, MD, US)
- » Oregon Graduate Institute (Portland, US)
- » McGill University, Department of ECE (Montreal, CA)
- » Saarland University (DE)
- » Politecnico di Torino (IT)
- » Universidad de Zaragoza (ES)
- » Bogazici University (TR)
- » Indian Institute of Technology Madras, Department of Electrical Engineering (Chennai, IN)
- » Technical University of Liberec, Speech Lab (Liberec, CZ)
- » University of West Bohemia, Department of Cybernetics (Plzeň, CZ)

### COLLABORATION WITH COMPANIES

- » Agnitio (ES, ZA)
- » CRIM – Centre de Recherche Informatique de Montreal (CA)
- » Microsoft Research (Redmond, WA, US)
- » Go-Vivace Inc. (Virginia, US)
- » SVOX Deutschland GmbH (München, DE)
- » IDIAP, Research Institute (Martigny, CH)
- » Loquendo S.p.A., a Telecom Italia Group Company (Torino, IT)
- » Lingea, s.r.o. (Brno, CZ)
- » Phonexia s.ro. (Brno, CZ)
- » OptimSys, s.r.o. (Olomouc, CZ)

## EXPECTATIONS ↘

### REQUIREMENTS

- » Obtaining corporate sponsorship of core research

### OFFERS

- » Joint participation in EU and US-funded projects
- » Custom-based research and development
- » Licences of production-grade software