

Available PhD position:

Speech signal analysis in neuroscience

Czech Technical University in Prague
Faculty of Electrical Engineering
Czech Republic

Supervisor

Ing. Jan Rusz, PhD

CV: <http://sami.fel.cvut.cz/janrusz.htm>

Team: <http://sami.fel.cvut.cz/>

Project description

4 year full-time (100%) DPhil studentship, starting in March or September

Research area

This doctoral studentship is interdisciplinary collaboration between Czech Technical University in Prague (Faculty of Electrical Engineering) and Charles University (First Faculty of Medicine, Department of Neurology). The academic supervisor will be Jan Rusz.

Until recently, the methods of objective monitoring of speech were limited to perceptual tests, with a limited accuracy depending on the examiner's skills. Recent advances in automated methods of mathematic analysis of speech thus represent a significant breakthrough. They have become possible thanks to the advances in computer engineering and to multifold increase in computational power that is approaching the target point of online analysis and differentiation of abnormal speech patterns. In the near future, when novel therapies will appear to address the biological substrates of neurodegeneration, the fate of patients with Parkinson's disease and other related neurodegenerative diseases may substantially change if diagnostic markers are available, allowing identification of respective diseases in their prodromal phases. Automated speech analysis can thus become the most readily tool to recognize neurodegeneration in its earliest stage allowing for early initiation of an effective therapy. Already in today's clinical practice, objective measures of speech can help to precisely evaluate the severity of speech impairment and moreover, they may serve as surrogate disease markers, helping to estimate the extent of overall patients' disability as well as to monitor the effects of therapy and rate of disease progression. Moreover, better understanding of processes underlying speech involvement can be essential for correct choice of pharmacological treatment, optimization of stimulation parameters during surgical procedures or optimization of speech therapy, and therefore improving the quality of patients' life.

Job description

Main responsibility:

- Research and publishing activities focused on signal analysis in neuroscience.

- Participation in realization of research projects.
- Presentation of results at international congresses.

Secondary responsibility:

- Practicing 2 courses per semester (i.e. 4 hours per week) during the first and second year of PhD study (can be arranged individually or transferred to different educational needs such as preparation of educative materials).
- Study of 4 doctoral courses (i.e. 2 hours per week) in the field of engineering during the first and second year of PhD study.
- Possible involvement in research project funding seeking.

Award value

- The salary represents at least 240,000 CZK per year (mostly covered by stipend and tax-free maintenance student project).
- Department provides additional rewards for excellent publications.
- Continuous possibility to join the additional solved research projects for part-time load is available.
- Additional salary can be earned by lecturing, leading the diploma theses or additional department's administrative help.
- Accommodation bursaries are available.

Eligibility

The studentship is open to students of any nationality. However, students that will not be able to study in Czech language would need to pay additional scholarship of 70,000 CZK per year.

Candidate requirements

Candidate has to obtain master degree (M.Sc. or equivalent) in Engineering, Physics or a related field. Prospective candidates will be judged according to how well they meet the following criteria:

- Understanding the basic of digital signal processing.
- Ability to undertake programming (Matlab is preferred but not demanded).
- Creative thinking, the ability to work systematically.
- Ability to comprehension of literature written in English.
- Active attitude to work.

The following skills are desirable but not essential:

- Experience with statistical analysis.
- Experience with speech signal processing.
- Experience with programming in C/C++, Python, etc.
- Advanced knowledge of written and spoken English language.
- Basic knowledge of spoken Czech language.
- Oral and written communication skills to present results.

- Ability to work in team.
- Previous research experiences.

We offer

- Interdisciplinary research in biomedicine, collaboration with physicians in real medical practice.
- Research team with strong scientific background and many international partners.
- Interesting, varied, timely and responsible work.
- Flexible working time.
- Possibility to technologically contribute to improving the quality of life of patients suffering from neurodegenerative diseases.
- Possibility of international collaboration and internships.
- Possibility to travel to various interesting locations in the course of congresses.
- Possibility of accommodation in a university dormitory.
- Language courses and possibility to attend educational lectures from various field of engineering.

Application procedure

In the first instance, interested candidates are encouraged to make an informal enquiry to Dr. Jan Ruzs (ruszjan@fel.cvut.cz) with the following documents:

- Brief CV.
- Brief covering letter explaining your suitability for the studentship, what you hope to achieve from the doctorate, and your research/industry experience to date.
- Evidence of completion of education (or planned date of completion of education).

In case of the second round, candidates will be required to undergo personal interview (or skype interview for abroad candidates). The selected candidate for position will have to submit official form according to the rules of Czech Technical University in Prague (<https://www.fel.cvut.cz/en/education/phd/study.html>).