Internacionalisace, excellence a "přej a bude Ti přáno" v BUT Speech@FIT

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Lidi !

Celá presentace bude hlavně o lidech – jak je získávat, jak je udržet, jak je motivovat, jak je platit, jak je tlačit k excelenci …

Agenda

- **Obvyklé tahání trička – kdo jsme, co děláme, atd.**
- Nesouvislé poznámky proč to (asi) funguje
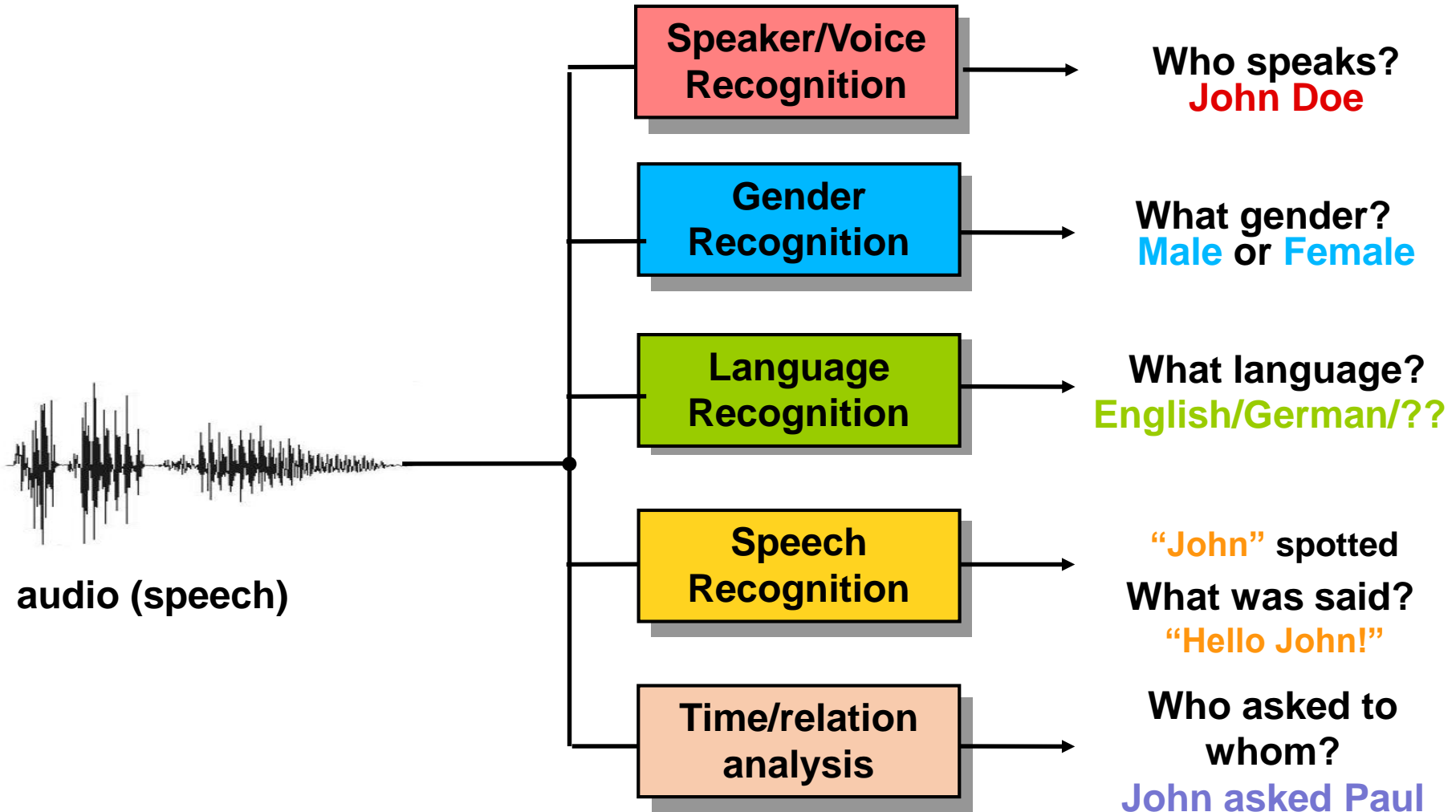- Internacionalisace how-to

Faculty of IT

- Est. 2002, the youngest and most progressive @ BUT

- Campus combining 13th century Carthesian Monastery with modern architecture
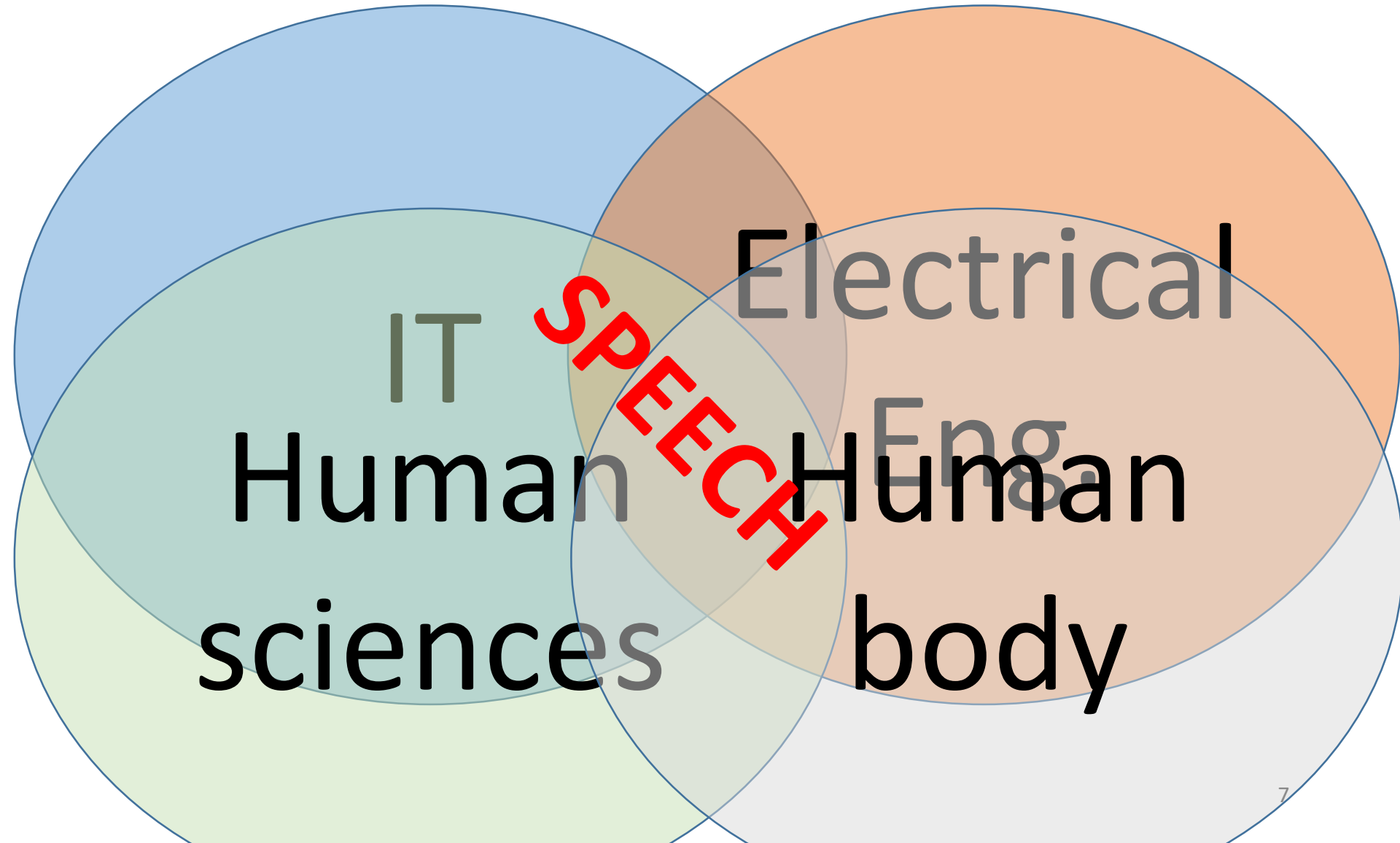
BUT Speech@FIT – est. 1997

Speech data mining

audio (speech)

Speaker/Voice Recognition	Who speaks? **John Doe**
Gender Recognition	What gender? **Male** or **Female**
Language Recognition	What language? **English/German/??**
Speech Recognition	**"John"** spotted / **What was said?** / **"Hello John!"**
Time/relation analysis	Who asked to whom? **John asked Paul**

Where are we ?

IT

Electrical Eng

SPEECH

Human sciences

Human body

Presenting what we are doing …

Artificial intelligence !

Machine learning

Recognition, detection, classification, regression
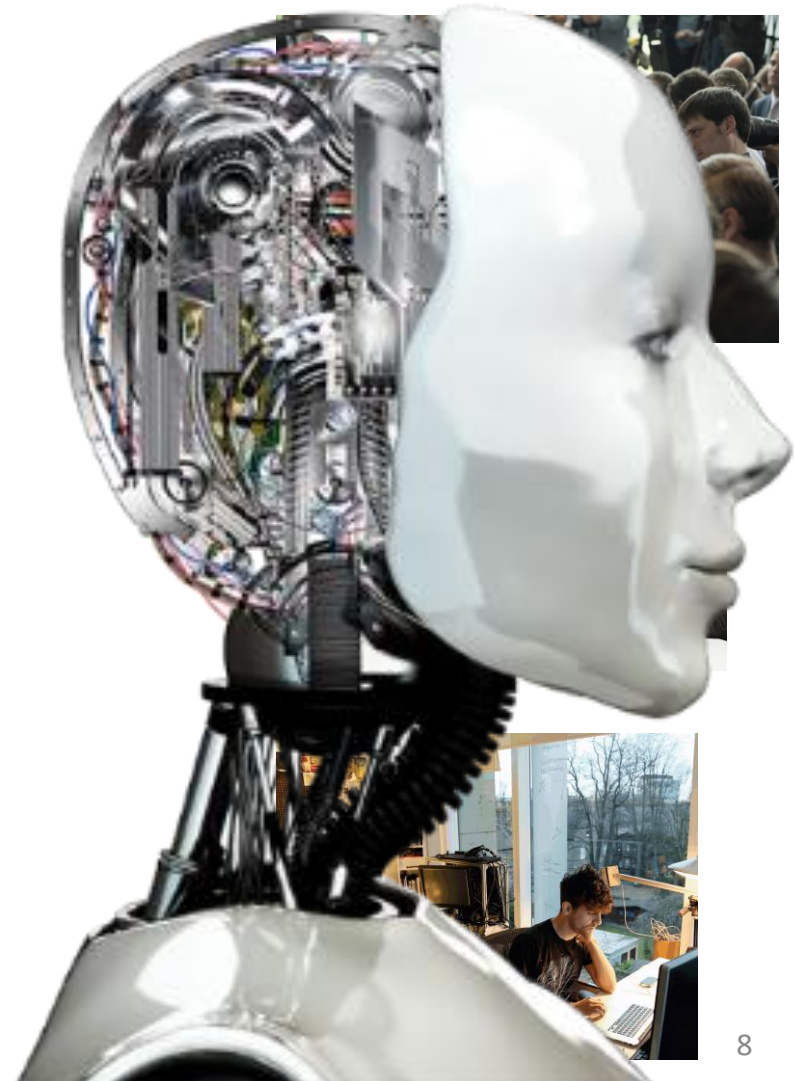
Speech Research

Challenges

- **Multilinguality** – if we have a good system trained on N well resourced languages, how to port it to (N+1)st one with limited or no resources ?

- **Robustness** – for speech recorded over clean telephone lines, some applications are more precise than humans, but how about very noisy military-grade channels with strong background noise ?

- **Far-field microphones** – how to improve performance of speech data mining for one or more distant mikes (assistants, IoT, covert listening, etc.)

- High quality supporting (less "sexy") technologies such as **voice activity detection and diarization**.

Approaches

- **Neural architectures** following the grand directions in machine learning (adversarial, sequence to sequence, encoder-decoder, cycle-consistency, embeddings on different levels, etc).

- **End to end training** – "speech only" and "speech + something else" (for example machine translation).

- **Unsupervised and semi-supervised training** on low-quality data (subtitles, no annotations at all...), incl. confidence estimation

- **Data augmentation** – noising, reverberation and system adaptations for noisy conditions.

- **Probabilistic representations** – using distributions rather than "hard" values, allowing for more reliable scoring and late decision.

- **Adaptations of neural architectures** for speech and language modeling.

- (joint) neural architectures for both **signal processing** (estimation of time-frequency masks) and **speech data mining**.

Application domains

Leaders

Lukáš Burget

Research director and the central brain

Hynek Heřmanský

The guru and US link
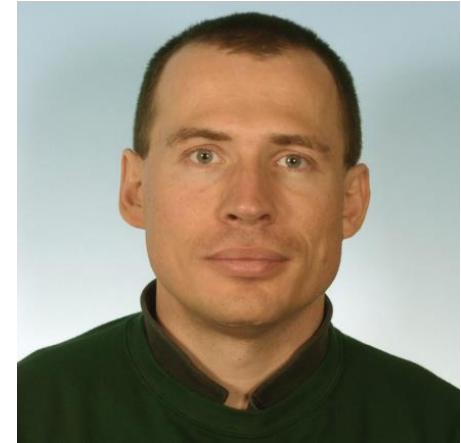
Honza Černocký

Managing director

Senior researchers – Speaker and language recognition

Pavel Matějka

Johan Rohdin

Oldřich Plchot

Ondřej Glembek

Alicia Lozano

Mireia Diez Sanchez

Senior researchers – Automatic speech recognition

Martin Karafiát

Hari Krishna Vydana

Igor Szöke

František Grézl

Karel Veselý

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PhD students

- Murali Karthick Baskar
- Ekaterina Egorova
- Lucas Ondel
- Bhargav Pulugundla
- Anna Silnova
- Santosh Kesiraju
- Federico Nicolás Landini
- Bolaji Yusuf

- Karel Beneš
- Jan Brukner
- Martin Kocour
- Ladislav Mošner
- Ondřej Novotný
- Miroslav Skácel
- Ján Švec
- Kateřina Žmolíková

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- Internacionalisace how-to

Why does it work ?

- Hard work (whose lights are at FIT on Friday 18:00?)

- Luck: meeting right people at right time.

- International experience

- Openess and service to community

- Carefully chosen support staff

Bless and curse of project funding

Bless and curse of project funding +/-25 MCZK/year

- ~15% automatically (FIT)
- ~85% we need to compete for, No reserves, Casino-like

Good
- We're our own masters
- (Relatively) competitive salaries
- The PI (mostly I) manages the money.

Bad:
- The PI (mostly I) manages the money
- Writing proposals all the time, so
  - abandoning my own research (since +/- 2005 ☹)
  - (partially) understanding what people do.
  - censoring publications
- making myself happy from being able to enjoy group's results
- declaring a national holiday when programming.

Publications

Let's publish at these shitty workshops organized by ourselves (or colleagues) to "get our students trained". Do them at touristically interesting spots!

Pushing all, including PhD students to publish at **good conferences right from the start**.

- Better to fail 3 times at a good conference than to have 3 papers at a shitty one.

- Pushing the whole group to publish more in **journals**.

- Pushing people to **read**, as
  - To stay in the top, we should know what is the SotA
  - **Writing improves through reading**.

International evaluations ("challenges")

I do my stuff and declare myself the best ! If I report results, I do so on obscure data with obscure metrics.

Evaluations / challenges / benchmarks – common data, common metrics, common time-frame.

- contributes to open and reproducible science

- 3 types:
  - National Institute of Standards and Technology (NIST) - Speaker recognition, Language Recognition, OpenSat speech recognition
  - Community organized - DIHARD diarization, VoxCeleb , SITW, Voices from a distance …
  - DARPA and IARPA projects

If good results, the word will spread – we did not get famous because of Hynek, but because of excellent results in NIST 2005, 2006 (and following) evaluations.

Everything public

Don't give anything to anyone ! They want to steal it ! If publishing, make it as obscure and as irreproducible as possible. Eventually declare it "secret".

- Papers - include everything, on arXiv before getting published in a conference or journal.

- Code – GitHub

- Data – some is easy (BUT Reverb DB), some is difficult (co-ownership, industrial involvement, …)

- Patents – never brought us a penny, licenses – very little

- But … our `phnrec` was downloaded hundreds of times, cited, used in others' winning systems, and eventually also licensed commercially.

By making things public, we gain much more in the long term than by keeping them secret.

Security / defense

Say that defense/security people are bad, oppressing us, never take any money from them !

- Internet started as an ARPA/DARPA project

- Speech recognition started with DARPA support.

- Cooperation with institutions active in the security and defense business.
  - We are aware of who is the most important customer of speech technologies and are
  - Happy to talk and cooperate with them.
  - Happy to receive MoI and DARPA/IARPA funding.
  - Careful to select "good guys"

Not afraid to say this openly and oppose opinions like "AI should not be used for military purposes".

Girls

Girls are good at the stove, in bed, eventually as secretaries, as students only if they are pretty... definitely not as researchers, research managers and team leaders.

I am very happy to have 5 girls out of +/-25 in my team

- Not too many but that's IT ...

- Katka and Mireia as sub-group leaders.

- Extremely smart, efficient and internationally connected.

- Will be very happy if I have a female successor in case I find myself in grave, hospital, jail or madhouse.

+ additional advantage: guys shower more frequently !

PR

Hrám vděčíme za vyšší výkon počítačů, pornu za rychlost, říká expert na analýzu řeči. Učí roboty „rozumět"

LENKA VRTIŠKOVÁ NEJEZCHLEBOVÁ + Odebírat e-mailem

World will automatically know about your work…

We have to promote actively what we're doing

- Be in touch with FIT and BUT spokespersons

- Have some reasonable web and Facebook / Twitter pages

- Do interviews with journalists. Respond patiently to their (sometimes stupid) questions. Downgrade from academic heights to "babicka z Horni Dolni"

- Proof-read what they write, suppress the desire to kill them and correct (sometimes completely rewrite) it.

- Look cool in photos and find some things to show (difficult for people that work mostly with computers in the cellar …)

- Keep telling kids that STEM (Science, technology, engineering, and mathematics) is cool and that they can have very good life doing it.

Needs to be done, otherwise all the youngsters will do law, politology, musicology, … and we'll be alone in our labs.

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Administrative excellence ?

Your must have the tables filled, information systems well secured, and especially **prevent trouble** with * (complete with "rectorate", "grant agency", "National Audit Office", "Tax Office", …). What you're doing does not matter much.

It's necessary to respect laws and regulations, but…

- We don't need to implement all the admin. rules the first.
- Sometimes we can delay it so long that the respective regulation is cancelled.
- Sometimes it's cheaper to pay a fine rather than implementing costly administrative measures.
- You can (sometimes successfully) dispute the findings of controllers, auditors, etc.

While we DO WANT to be the best in science and education, we DON'T NEED to be the "administrative excellence winners" (also confirmed by international evaluation panel, etc.).

Reasonable risk taking is not a crime !

Administrative support

Do everything yourself and/or keep complaining about inefficient / stupid / lazy / nonexistent administrative staff.

Have your **project support as close as possible to you** and select him/her/them personally.

- Sylva Otahalova – Department secretary but mainly **finances** – translating completely obscure SAP output to human language so that PIs have an idea where they can spend and how.

- Renata Kohlova – contracts, signatures and **support to our foreign colleagues** in all matters.

- Getting support from faculty's project office and a bit from rectorate … but the bulk is on these two ladies.

Sylva graduated from Conservatory and Renca from VSE, but not sure it matters – loyalty and hard work do matter !

Internal group communication

Once I get University position, I stop caring what others are doing, and I don't care whether they know what I'm doing.

One of the strengths of our group is building "renaissance" knowledge of speech processing and machine learning. **People have to listen to each other**

- Ever re-built **system of group and subgroup meetings**. Switching from formal reports to more discussion of interested people. Very time consuming, but seems to pay off, let's see in ½ year.

- Open doors.

- Public documents - Wiki, internal, doc. repository, bunch of google doc pages …

- Mattermost (like slack) – very handy especially in COVID times.

No propaganda ! Have religious, political, etc etc discussions in the Department kitchen but not on group's comm. channels.

Companies

- Definitely fight any creation of spin-off companies by students and employees – the only thing they want is to steal the academic know how, sell it to Chinese or Americans, and buy a big black Mercedes !

- Do not ever cooperate with company guys as they
  - Don't understand what true research means.
  - Are more stupid than we academics are.
  - Have bigger salaries and the only thing they care about is to buy a big black Mercedes !

- Foreign companies are particularly bad as they steal the results of us Czechs (obviously the most clever people), and export them ! They have the black Mercedeses, we don't !

- Google, Microsoft, Amazon, Facebook and Baidu are absolutely the worst ! They should be forbidden / split / bombed …

Spin-offs

- Great place for your excellent graduates (you can't keep them all)

- Shared positions – why not having colleague working 1-2 days/week for a company ?

- Excellent partners for contractual research

- Excellent partners for Czech and European projects.

- Good to know what their customers want.

… but it's good to have a clear line drawn and not to consider company as "application subsidiary of the lab" or vice versa.

BUT should put minimum administrative burden on spin-offs and promote them wherever it can. No-loss strategy!

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Local companies

- Either Czech or subsidiaries of foreign ones, mostly created by speech people with business orientation

Copy-paste:

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- Shared positions – why not having colleague working 1-2 days/week for a company ?

- Excellent partners for contractual research

- Excellent partners for Czech and European projects.

- Good to know what their customers want.

Big shots

- Usually very strong R&D centers – good for
  - Reading their papers !
  - Contractual research
  - Sending students for **summer interns**
  - Common EU projects
- Having there excellent graduates that will
  - accept invitations to speak at seminars
  - sponsor us (well, not yet)
  - Serve as **examples** for the youngsters (Tom Mikolov, Ilya Oparin, Mirko Hannemann …)

Community service

I do nothing for others and will be liked and appreciated by everyone. By doing nothing, will have enough time to make money and grow my h-index.

Helping the community

- Reviews, PhD and other committees, IEEE Senior Member recommendations, …

- Public SW and toolkits …

- Teaching as crazy - signals, speech, classification and recognition

- Organizing events

Community service II

If we help the others, the others will like us and liking means also remembering, so they …

- will invite us to projects

- will tell the industrials if we have a skill they don't

- cite.

… and this DOES bring money and h-index !

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Czechs have good reasons to hate everyone!

- Russia has invaded us, should hate Russians.
- Germany invaded us before, should hate Germans.
- French did not stop Germans from invading us, should hate French.
- Americans stopped at Plzen and have this Trump, should hate them.
- Iranians want to start war with Israel and USA, should hate them.
- Spanish had this Franco, so they must be fascists, should hate them.
- Slovaks separated from Czechia, should hate them.
- China has all this money and communists, and they're too many, should hate them.
- Indians eat food by hands and there're too many of them, should hate them.
- Swedish – wanted to invade Brno in the 30-year war and we have this nonsense noon at 11:00 ever since – should hate them.

Argentina and Nigeria … hmm, not sure right now, but give me 5 minutes and I'll find good reasons to hate them as well.

Find this crazy ? Then:

- Kick your and your colleagues' and students' asses out !
- Receive people from outside.
- Cooperate in international teams.
- Invite people from abroad
  - For seminars – we have VGS-IT, people happy to come http://vgs-it.fit.vutbr.cz/ money does not matter much.
  - For short term – students, interns, Marie Curie …
  - Forever.

To be clear: not speaking about illegal immigrants to Europe but about qualified engineering staff and students.

1: Vyzkoušet to na sobě

- Já osobně
  - Diplomka, DEA, ½ PhD ve Francii (suma cca 3 roky)
  - Post-doc v USA (7 měsíců)
- Členové mé skupiny – skoro všichni na několik měsíců až let v USA, UK, Francii, Japonsku, Německu, …

Nepustím doktoranda na stáž na Oxfordu nebo v Googlu, protože mi musí dělat na grantu.

Prosím Tě jeď ! Budeš dělat s tímto úžasným kolegou. Jak Ti můžu pomoci ? Tvou práci přerozdělím nebo udělám sám. Můžu Ti z projektu přispět i finančně. Pokud se vrátíš, budu rád, bude-li to do mé laboratoře. Pokud zůstaneš v širém světě, budu rád, že tam mám spřízněnou duši.

2: Dát o sobě vědět

- Samozřejmě skvělými výsledky …
- Ale také
  - Účastí na mezinárodních evaluacích (pozor na nedostatek spánku)
  - Aktivní komunikací na konferencích (pozor, méně času na turistiku)
  - Pořádáním konferencí (pozor na nervy)
  - Pořádáním letních škol a workshopů (pozor na nervy)
  - Návštěvami na školách (dá se spojit s konferencí - pozor, méně času na turistiku)
- Aktivní výzvědnou činností
  - "Tvá práce je super a slyšel jsem, že máš nějaký problém se školitelem, nechceš se přesunout do Brna ?"
  - "Ty končíš doktorát, že, co budeš dělat dál ?"

Komunikace s potenciálním zájemcem

Jestli chceš, přijeď, ale VUT je úplně na ho***, jsme ve druhé tisícovce žebříčku a klesáme a mluví se tady jen česky. Brno je díra, kde se nic neděje.

Přijeď ! VUT je dobrá škola, která je v některých oblastech (např. v té naší) na světové špičce. V práci mluvíme anglicky a na ulici se +/- domluvíš také. V Brně nejsou davy turistů a je to moc fajn město, ne skanzen.

Moc pěkné propagační materiály
http://toolbox.brnoregion.com/photobank/home

3: Vybírat

- Na začátku to nebylo jednoduché …

Dear Sir,

      My name is _____ - ____ and I am currently a 3rd year Computer Science and Engineering student of Punjab Engineering College (PEC), India, with a great interest in Artificial Intelligence. It is only the field of AI that makes me to push myself harder and harder to gain as much knowledge so as to get better at it. I also have a course of AI in my college and I constantly score well in it because of my deep passion for the field.

I am writing this mail to get a chance to join a research internship under your guidance so that I can gain the practical and necessary experience in the field. Sir, I believe that under the guidance of your admirable intelligence, I would be able to gain enough experience in the field of AI and also hone my technical skills up to the level where I will be able to design better, more reliable systems and endeavor seamlessly to use my own creativity to solve the 21st century technological problems. My Forwarding

… ale takto jsme vzali naše 3 první indické studenty - 1 výborný, 2 ne.

Už nikdy nebudu brát studenty z Indie, protože jsou hloupí !

Dosáhl bych lepšího skóre kdyby to byli Češi ? Dal jsem si práci s výběrem ?

- Pečlivé čtení dokumentace
- Nejen psaní, **volání** na reference.
- Vyžádání a **čtení** bakalářky, diplomky, článků
- Pokud to jde, osobní setkání (konference)
- Pokud to nejde, dlouhý pohovor po Skype

Ideál: udělat si v cizí zemi kamarády profesory v dobrých laboratořích, kteří jsou pak schopni doporučit / poslat studenty.

4: Komunikovat

- Angličtina = oficiální pracovní jazyk
  - Ve skupině už velmi dlouho.
  - Tlačení fakulty a VUT – něco jde (vědecké oddělení, zápisy z KD), něco ne…
- Angličtina = oficiální nepracovní jazyk
  - Toto nejde vynutit, ale i tak …
  - je-li v místnosti kolega/kolegyně nerozumějící česky, prostě přepnout.

Přijeď, práci vyřídíme, ale jinak se s Tebou anglicky nebude bavit ani noha od stolu. Nauč se česky, maminka taky neumí anglicky !

Přijeď, o práci se s Tebou budou anglicky mluvit všichni a o jiných věcech většina. Pokusíme se přeložit i vtipy o bačovi. Na výuku „češtiny pro přežití" platíme na Ústavu soukromou paní učitelku.

5: Peníze

- Zahraniční pracovníci se dají platit z toho, z čeho všichni, tedy z fakulty (pokud Vám na to fakulta dá) nebo z projektů.

- Většinou **nejsou potřeba větší peníze než pro Čechy!**

- Navíc existuje spousta programů , které jsou cílené na získávání cizinců
  - Erasmus-Socrates – nejen pro ty, kteří do Brna nepřijíždějí chlastat a šu***. Několik lidí se u nás „**upgradovalo**" z E/S na magistra, PhD.
  - Bilaterální programy – např. Španělsko. 0 náklady, skoro 0 admin.
  - H2020 Marie Curie – mnohem větší šance než standardní H2020.
  - SomoPro –JMK, teď Bohu žel přestávka, snad re-start
  - MeMOV – sem i ven.

Trochu problém po skončení těchto projektů, ale na druhé straně máte již zahraničního pracovníka ověřeného.

Komunikace s potenciálním zájemcem

Jestli se ti sem teda chce … stejně Ti nemůžeme dát tolik jako v Googlu. A po půlroce si budeš muset sehnat peníze sám.

Nedáme Ti tolik jako v Googlu, ale budeš tu mít na slušné živobytí a nebudeš se muset prokousávat přes Trumpovy imigrační restrikce. Životní náklady jsou tady nesrovnatelné s N.Y. nebo Silicon Valley. Máme na 1. rok a pokud budeš Ty i my spokojeni, uděláme, co bude v našich silách, abychom Tě tady udrželi co nejdéle. Tvá cena na trhu práce vzroste, takže pak můžeš jít klidně do Googlu za víc $.

6: Zvýšit toleranci

- Proč
    - sedí kolega v bundě v zimě i v kanceláři ?
    - nejí maso nebo ho musí kupovat ve speciálním obchodě?
    - Češi na konferenčním večírku chlastají a on se modlí ?
    - nemůže podat ruku mé manželce ?
    - se na mě dívá divně, když jdu na oběd v 11:30? …

Protože je divnej a kdyby neudělal ty tři publikace, rychle pošupajdí domů!

Protože je prostě odjinud a pokud mě nenutí, abych to dělal jako on, respektuji to a rád se o tom s ním pobavím … a díky moc za ty tři publikace.

7: Praktická pomoc

- VUT ani fakulty nejsou na přijímání cizinců připravené.

- Česká administrativa (víza, povolení, …) je „hell".

Vyřiď si to sám a informace si k tomu najdi také sám.

Našim cizincům pomáháme. Naše projektová manažerka a zahraniční oddělení fakulty Ti pomůžou s policajty, kolejemi, poplatky za odpad, údržbářem, teplotou ve Tvém pokoji, školou, školkou, nemocnicí, divnými sousedy, smlouvami, platovým výměrem, informačním systémem ….

Na závěr I.

- **Lidi** jsou největší bohatství.
- **Internacionalisace** je asi naše jediná šance.
  - není tu dost inteligentních lidí a na ty, co tu jsou, si brousí zuby ostrá konkurence.
  - má obousměrný efekt.
  - má kladnou zpětnou vazbu, je potřeba začít.
  - Stojí to práci (hodně) a peníze, ale vyplatí se to jak pracovně, tak „fun factorem".
  - Na rozdíl od mnoha jiných aktivit, zde **je podpora z VUT** i odjinud (město, kraj, JCMM, Euraxes)

Na závěr II.

- **Excelence** je jen jedna, snaží-li se člověk o ni, vyjde to ve všech Metodikách 17+, CORE, IF, h-indexech, atd.
- **Otevřenost** a služba komunitě se vyplácí
- **Administrativní hujerství** ne

„Přej a bude ti přáno"

Lukáš 6:38: Dávejte, a bude vám dáno; dobrá míra, natlačená, natřesená, vrchovatá vám bude dána do klína. Neboť jakou měrou měříte, takovou Bůh naměří vám.

Díky za pozornost