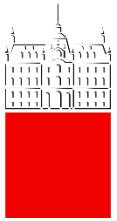
Institut
"Jožef Stefan"
Ljubljana, Slovenija

Univerza *v Ljubljani*
Fakulteta za *matematiko in fiziko*



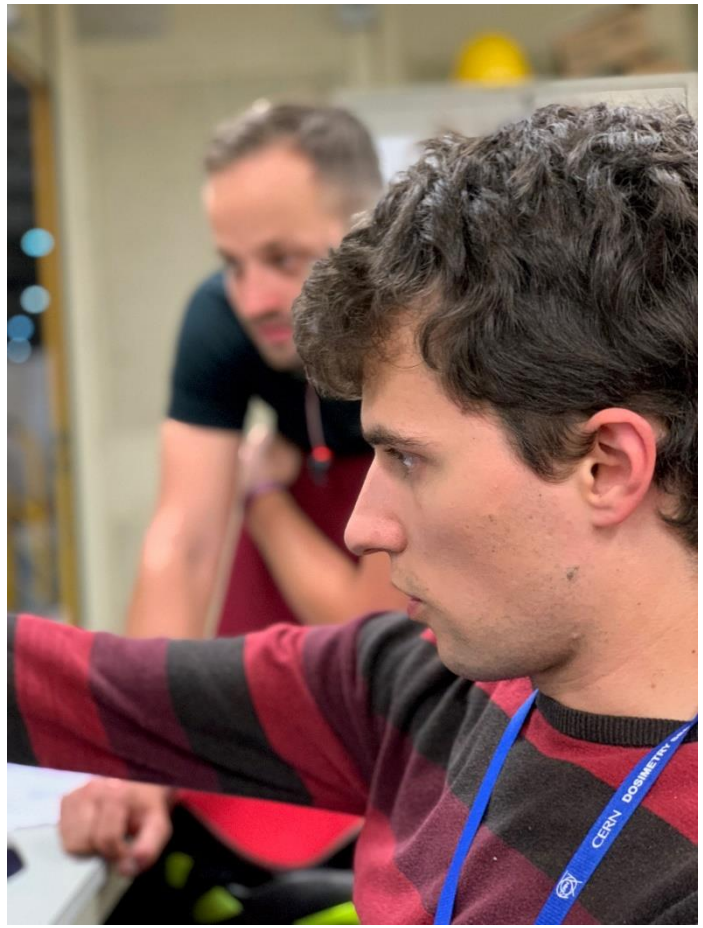
Student's perspective

RECFA visit to Slovenia, Ljubljana, 05.04.2019

Bojan Hiti, F9, Jozef Stefan Institute

About myself

- PhD Student at Jozef Stefan Institute (JSI) and University of Ljubljana (4th year)
- Young Researcher PhD programme (MR – Mladi raziskovalec)
  - Experimental particle physics department
  - Study of CMOS detectors for ATLAS phase II upgrade
- Assistant teacher for an electronics course at Faculty for Mathematics and Physics (University of Ljubljana)



The presentation is from an experimentalist perspective – likely biased and not completely representative

Undergraduate physics study in Slovenia

- **Bachelor's degree (6 semesters)**
  - General courses
  - No written thesis at the end

- **Master's degree (4 semesters)**
  - Specialised programmes and courses
  - Master's thesis (≤ 1 semester)
  - HEP programmes in Universities of Ljubljana and Nova Gorica

- Study of Computing sciences is also a possible entry point
- Often undergraduate students decide to work as **Student Assistants** for more hands-on experience in the lab
  - Mostly in lecture free periods or during extra years

PhD study in Slovenia

- **3 – 4 years**
- **Mandatory thesis**
- **1 mandatory published paper**
- **Courses in the 1st year** – overview seminars for all physics PhD students
- **Mandatory school** – min. 1x one week, but more easily possible
- **No mandatory teaching**
  - But possible if desired

- State funded **Young Researcher** (MR) programme
  - Salary 1.4 k€ gross per month (80 % of Slovenian avg. salary), subsidised housing by JSI
- Occasionaly other funding sources (mostly EU programmes)
- ≈ 25 % female PhD students in HEP

PhD positions at Slovenian HEP groups

- **Three** Slovenian institutes with PhD positions in HEP:

- **Jozef Stefan Institute**
  - Experimental particle physics department – **ATLAS, Belle 2** — 1 – 2 positions per year
  - Theoretical particle physics department — 1 – 2 positions per year
- **University of Ljubljana**
  - Medical physics (detector development) — < 1 position per year
- **University of Nova Gorica**
  - Astroparticle physics programme – **Auger and others** — 1 – 2 positions per year

- Total ≈ 4 – 5 PhD positions per year

Undergraduate students

No Bachelor's thesis

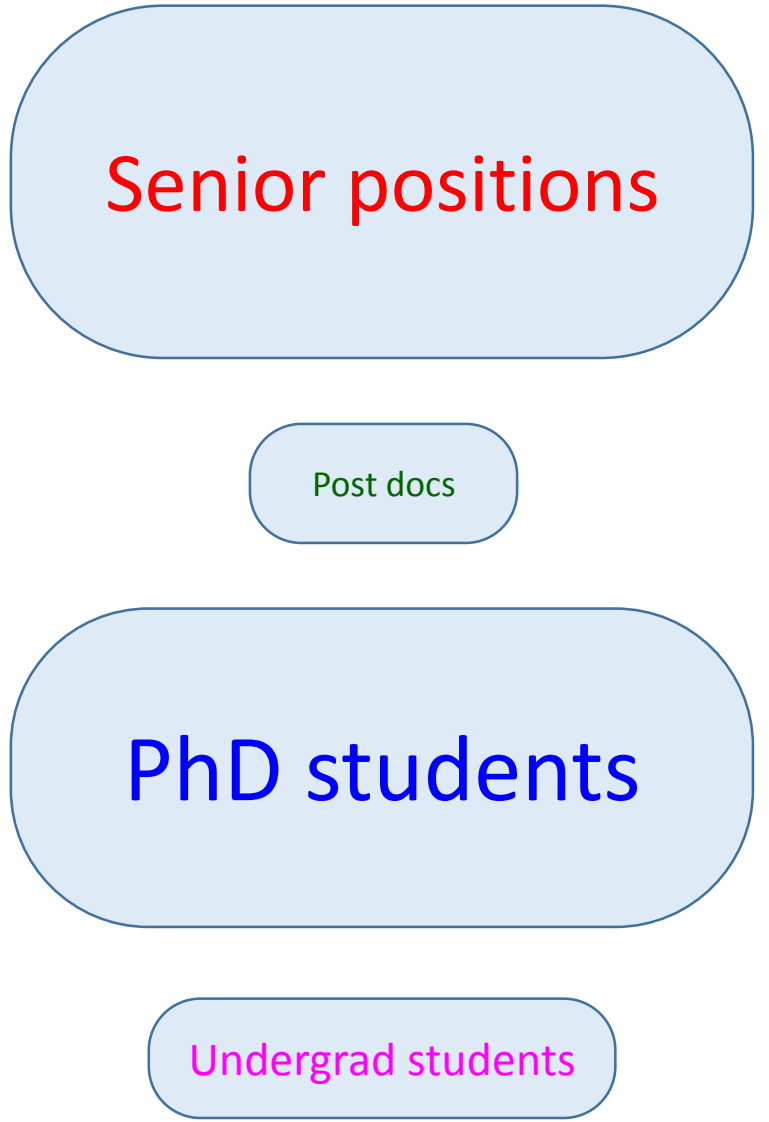
Extent of Master's thesis only allows small projects

What does it mean?

- Little to moderate contact with research groups before starting the PhD
  - Contact *required* only after 9 semesters (Master's thesis)
- Short time to decide what next
- Not familiar with tools
- Student assistant positions a way to work in the group before that
  - But requires student's own engagement in their free time
- Groups have to use different channels to attract students
  - Classes, informal, promotion of summer schools ...

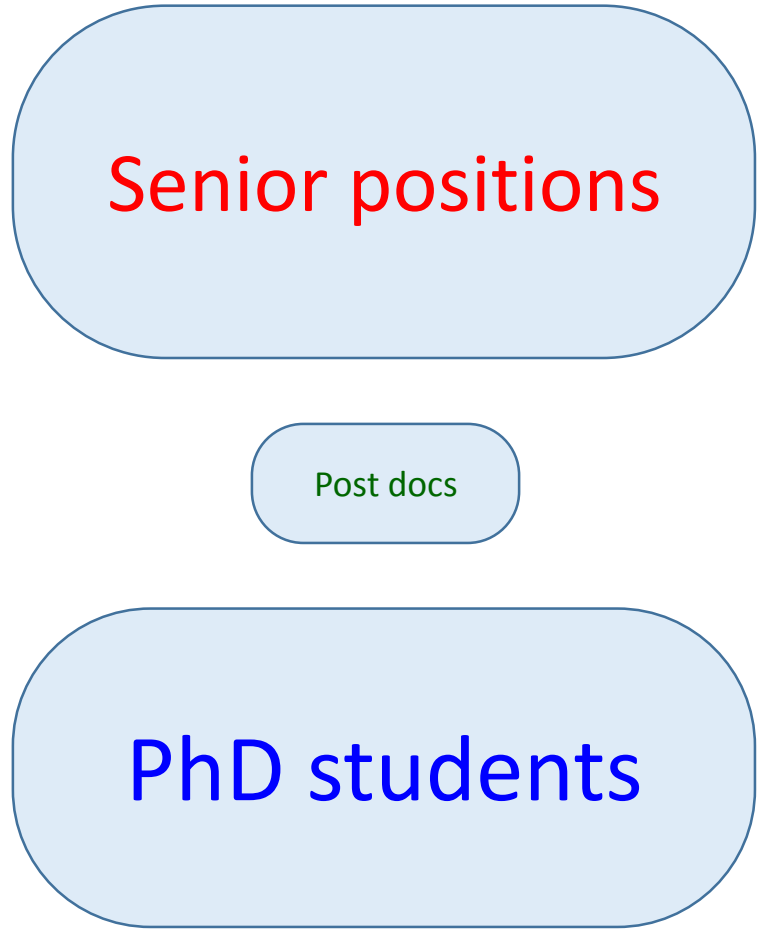
Research positions in Slovenia

- Slovenian research system is quite specific
- Based on (PhD) students and long term positions
- Almost non-existent post doc positions
  - At least in the experimental group, in the theoretical the situation is a bit different



What does it mean for PhD students?

- Absence of post doc positions not a direct problem for future career – take a post doc abroad
- **It is an issue from technical/support side**
  - Senior advisors not so much involved in low level
- Also makes the group more nationally closed
- **We see international collaboration as essential**
  - Improved scientific and personal development, team work
  - Fortunately not difficult in HEP
  - A good supervisor/advisor vital to help establish contacts
  - However, collaboration often on higher levels



I do not intend to grade different approaches. **For PhD students it mostly works well with good recognition in the community.**

Work as a PhD student

- Work in international collaborations
- Encouraged to travel
  - Research (CERN, KEK, ...)
  - Service tasks & shifts at the experiments
  - Workshops, conferences, schools
  - Travel costs covered from the group's common pool, no fixed funds allocation per person
  - **Flexibility**, amount of time abroad according to personal preferences (10 % – >50 %)
- Outreach
  - School visitors, Open days, International Masterclasses etc.
- Work – Life balance: with some management it is quite OK

Career prospects in Slovenia

In academia

- Very limited number of institutes
- At the same time high proportion of permanent positions (right/lucky timing)
- Gender inequality increases at more senior positions; ≈ 10 % permanent positions by women
- Summary: to some extent predictable career opportunities

Outside academia

- There are a few high tech companies with specific demands for HEP skills
- Other areas (engineering, software, finance, government agencies ...)
- Unfortunately very few direct spin-off companies
- Overall not bad prospects for PhD graduates

Conclusions

- In general HEP PhD study in Slovenia is a good option
- Participation in cutting edge international collaborations
- Good opportunities for travel – research, conferences, schools
- Some issues on technical side
  - Few post doc advisors → sometimes lack of support
  - Little contact with groups prior to PhD
- Salary below Slovenian average
- High proportion of permanent positions in academia, but planning for a position still difficult

Thank you!