

Project Group Presentation

Summer Term 2022

Master Computer Science & Master Computer Engineering

Matthias Fischer

- Monday, February 7th, 4:15pm,
- Video Conference via BigBlueButton

- Please: mute microphone, no camera please!

Agenda

One Session for all Students CS & CE

16:15 Why Project Groups? Registration and Requirements

16:30 CS Project Groups (2)

16:50 CE Project Groups (3)

17:20 Mixed Project Groups (6)

- Each advisor will present his project group in a short presentation (approx. 10 minutes).
- The presentations will take place immediately one after the other, questions are not allowed.
- Please: mute microphone, no camera!
- BBB-room: <https://bbb.imt.upb.de/b/mat-f6t-d2q> (this room, here we are)

Mixed Project Groups (2x10 ECTS, 2x9 ECTS)

accept both
Computer Science and
Computer Engineering
students

CS Project Groups (2x10 ECTS)

accept
Computer Science
students

CE Project Groups (2x9 ECTS)

accept Computer
Engineering students
(and EE students, not
the concern today)

CS Project Groups (2x10 ECTS)

16:30	Explainable Artificial Intelligence II Data Science
16:40	Fact Validation Ensemble Learning Data Science

CE Project Groups (2x9 ECTS)

16:50	Reinforcement Learning for Energy Conversion Applications Power Electronics and Electrical Drives
17:00	Brain-controlled robot navigation using EEG signals Signal and System Theory
17:10	Disaster Response Robots GET Lab - Cognitive Systems Engineering

Mixed Project Groups (2x10 ECTS, 2x9 ECTS)

17:20	Autonomous Car Swarm with Hardware-accelerated ROS Programming Computer Engineering Group
17:30	An extension of the GERBIL benchmarking platform Data Science
17:40	Virtual Technologies in Engineering Advanced Systems Engineering
17:50	Accelerating Programmable Matter Theory of Distributed Systems
18:00	Development of an autonomous and modular electric Racecar Advanced Systems Engineering
18:10	Adaptive Virtual Chemistry Laboratory for Study Preparation Algorithms and Complexity

Agenda

Discussion Sessions (multiple, all take place simultaneously)

approx. 18:20 (after ALL presentations)

- If you plan to take part in a group in Summer Term 2022, please stay!
- There will be individual discussions in groups with the students and the advisors.
- Build small groups for questions, discussion, declare personal interest.

How ?

- Each project group advisor has its own BBB room.
- You can visit any BBB room in any order.

Where are the BBB-links of the project group advisors?

- Below the name of the project group on the website:
<http://www.upb.de/cs/pg>

CS Projektgruppen

- Titel der PG: **Explainable Artificial Intelligence II (XAI II)**
Kontaktperson: **Stefan Heindorf**
Fachgruppe: Data Science
BBB Videoraum für individuelle Gespräche nach den Vorträgen
- Titel der PG: **Fact Validation Ensemble Learning (FaVEL)**
Kontaktperson: **Michael Röder**
Fachgruppe: Data Science
BBB Videoraum für individuelle Gespräche nach den Vorträgen

CE Projektgruppen

- Titel der PG: **Reinforcement Learning for Energy Conversion Applications (LEARL)**
Kontaktperson: **Wilhelm Kirchgässner, Maximilian Schenke, Daniel Weber, Oliver Wallscheid**
Fachgruppe: Power Electronics and Electrical Drives
BBB Videoraum für individuelle Gespräche nach den Vorträgen
- Titel der PG: **Brain-controlled robot navigation using EEG signals (EEG-SST)**
Kontaktperson: **Isabell Lehmann, Tanuj Hasija**
Fachgruppe: Signal and System Theory
BBB Videoraum für individuelle Gespräche nach den Vorträgen
- Titel der PG: **Disaster Response Robots (DRR)**
Kontaktperson: **Dirk Fischer, Bärbel Mertsching**
Fachgruppe: GET Lab - Cognitive Systems Engineering
BBB Videoraum für individuelle Gespräche nach den Vorträgen

CS + CE Projektgruppen

- Titel der PG: **Autonomous Car Swarm with Hardware-accelerated ROS Programming (AutonomROS)**
Kontaktperson: **Christian Lienen**
Fachgruppe: Computer Engineering Group
BBB Videoraum für individuelle Gespräche nach den Vorträgen
- Titel der PG: **An extension of the GERBIL benchmarking platform (GERBIL)**
Kontaktperson: **Michael Röder**
Fachgruppe: Data Science
BBB Videoraum für individuelle Gespräche nach den Vorträgen
- Titel der PG: **Adaptive Virtual Chemistry Laboratory for Study Preparation (VirtuChemLab)**
Kontaktperson: **Matthias Fischer, André Graute**
Fachgruppe: Algorithms and Complexity
BBB Videoraum für individuelle Gespräche nach den Vorträgen
- Titel der PG: **Virtual Technologies in Engineering (VirTEng)**
Kontaktperson: **Florian Dyck, Ulf Könemann**
Fachgruppe: Advanced Systems Engineering
BBB Videoraum für individuelle Gespräche nach den Vorträgen
- Titel der PG: **Accelerating Programmable Matter (APM)**
Kontaktperson: **Andreas Padalkin, Daniel Warner, Christian Scheidele**
Fachgruppe: Theory of Distributed Systems
BBB Videoraum für individuelle Gespräche nach den Vorträgen
- Titel der PG: **Development of an autonomous and modular electric Racecar (Racecar)**
Kontaktperson: **Ruslan Bernjzavov, Fabian Wyrwich, Tobias Seidenberg, Sebastian von Enzberg**
Fachgruppe: Advanced Systems Engineering
BBB Videoraum für individuelle Gespräche nach den Vorträgen

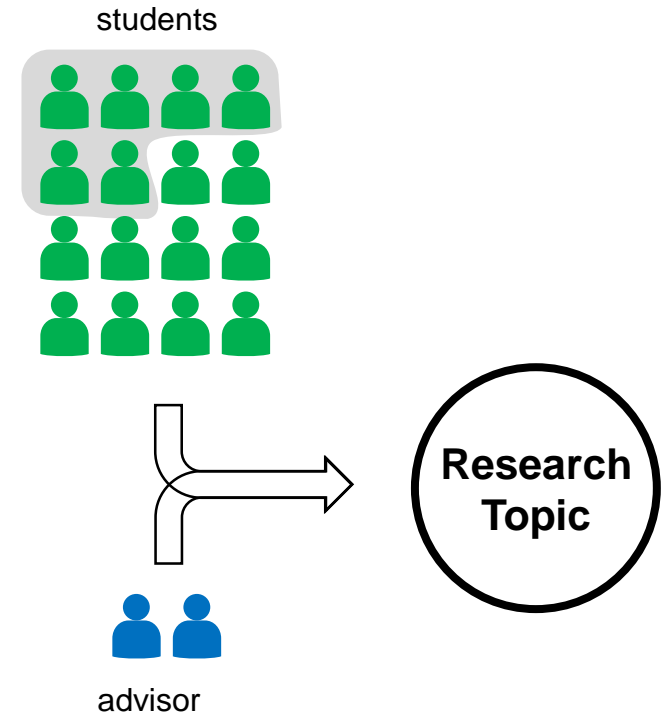
Definition

Project Group

Group of about 8 – 16 students working together on a research-related project

- Upper limit 16 holds for all groups!
- Lower limit 6 in particular situations!

Research topics
from the advisor's field of interest



Duration: **one year** (two terms)

Default language is English.

If all participating students agree, the group can be held in German.

Aims: Improvement of character building (1/2)

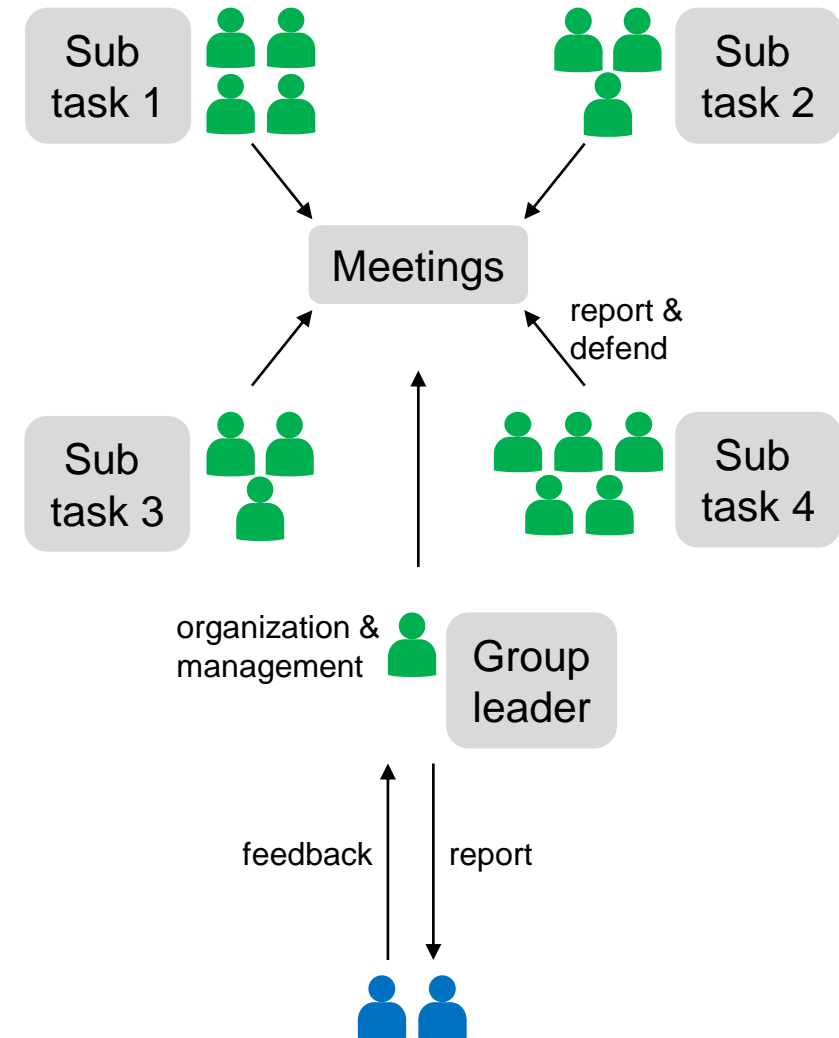
Project Group

Practical experience in **teamwork** and **organization** of a project

- Build your own **personnel structure**, similarly to an industrial team
- **Delegation** of sub tasks and responsibilities to subgroups

Division of tasks involves

- the necessity to **report** at regular intervals
- and to **defend** the own work

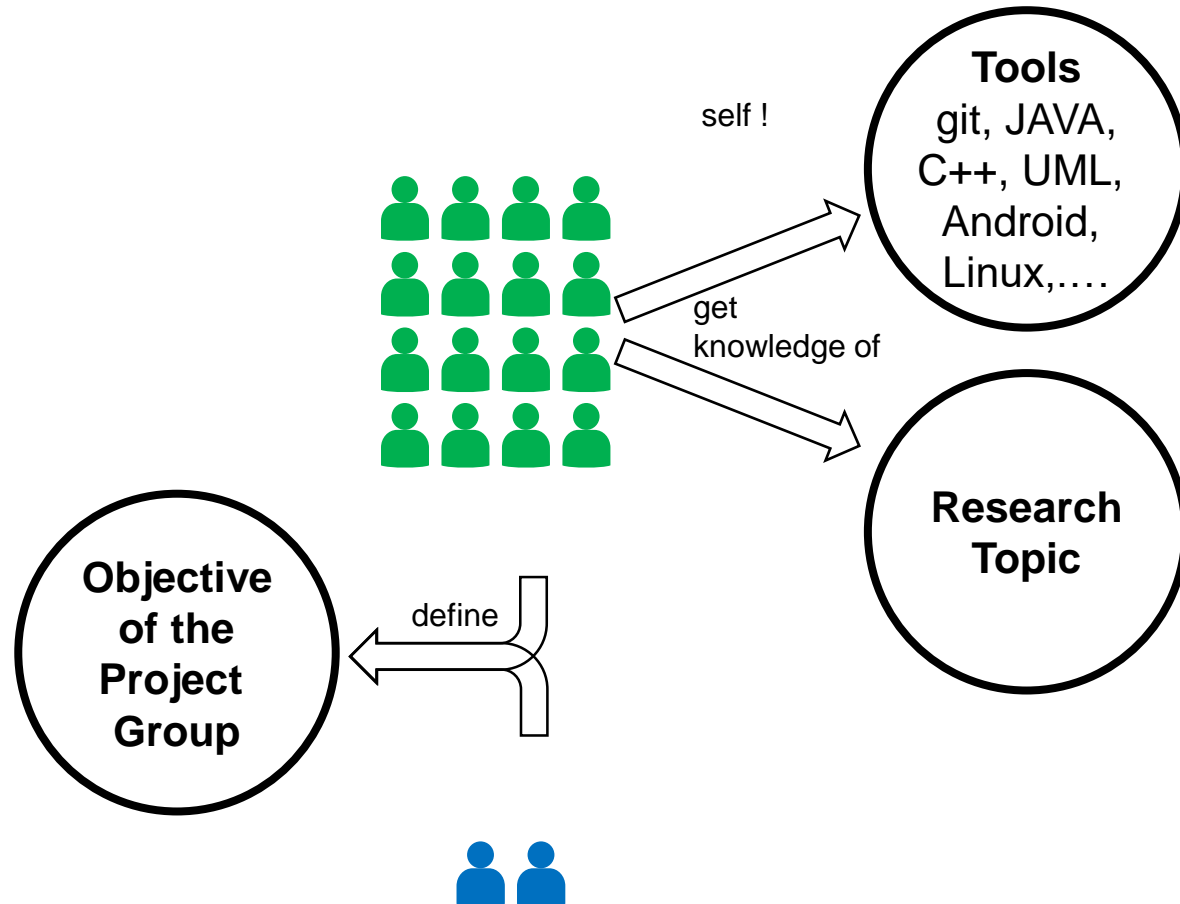


Aims: Improvement of character building (2/2)

Project Group

Self-organization

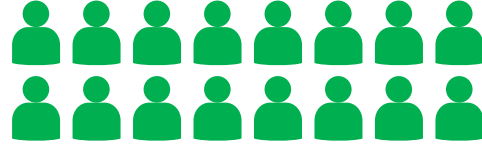
- **Define the aims** on your own together with the advisors
- **Self training** with necessary tools, methods and approaches



Outcome

Project Group

Your our outcome



You learn

- systematic and methodic working
- comprehensive development processes (including final report and documentation)

You

- will be intensively prepared for industrial practice
- approach current research topics
(often students write their **master's theses** in the same field and research topic)

Advisor's outcome



- Project groups are a means for research
- Implementation and execution of research

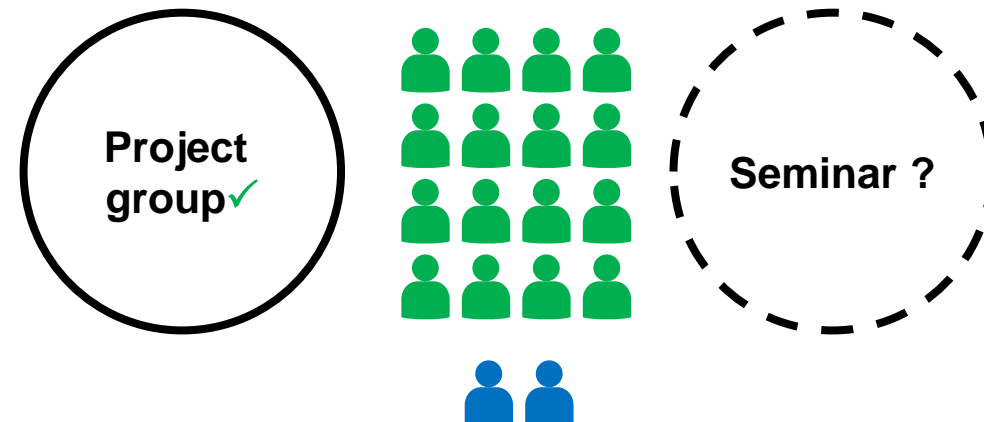
Seminar

Project Group

Seminar as parallel course

- the organizer can provide a seminar parallel to the project group
- the seminar is a separate course
- the organizer determines whether participation is mandatory or optional
- the organizer decides whether such a seminar is available or not

Please note the announcements of the organizer



Requirements for Participation

Project Group

Project group **can only be started** when the **bachelor's degree** has been successfully **completed**

Bachelor's degree is successfully **completed**, when

- all examinations have been passed and
- the thesis' 4.0 confirmation is handed over to the examination secretariat (Lessmann, Guhlich,...)
 - by **31 March** (PGs starting summer term) and
 - by **30 September** (PGs starting winter term)

Bachelor Students who cannot apply electronically via PAUL due to missing master status register as follows in the period of **Phase 1**:

Send e-mail to: To: paul@upb.de CC: mafi@upb.de

Subject: "Anmeldung All Project Groups Summer Term 2022"

E-mail body: Hallo,
ich möchte mich zu diesem Kurs anmelden: All Project Groups Summer Term 2022
Name: ??? Matrikelnummer: ??? Uni-E-Mail: ??? IMT-Benutzername: ???

Requirements for Participation

Project Group

Project group **can only be started** when the **enrollment in the master's program** has been **completed**

Students of the bachelor's program,

- who reach the 4.0 confirmation or examinations only on the 31st of March or on the 30th of September,
- must therefore enroll for the Master's program in the relevant period of the change of studies (**by 21 March, see uni webpage!**)
<https://www.upb.de/zv/3-3/formalitaeten/studiengangwechsel/uebergang-bachelormaster>
- you can submit proof of successful completion of your studies (Bachelor's certificate and deed or a corresponding certificate from the office responsible for issuing the deed) **by 23 April, see uni webpage!**
<https://www.upb.de/zv/3-3/formalitaeten/studiengangwechsel/uebergang-bachelormaster>

How to Get a Project Group

Method to Match Students to Project Groups

Method consist of 4 phases:

- **Phase 1: PAUL registration**
21 February - 27 February (timely registration)
28 February - 24 March (late registration)
- **Phase 2: Assignments & Preferences**
1 March - 17 September
- **Phase 3: Stable Marriage**
25 March
- **Phase 4: Result's Notification & Decision**
1 April (PAUL registration by administration & email notification)
- Advisor final grading: 21 - 24 March
Autograding: 18 March



How to Get a Project Group

PAUL registration

Phase 1 – PAUL registration

- You register only for one course:
“**L.079.07099 All Project Groups Summer Term 2022**”
- The course captures the registration for all project groups, here you cannot choose your preferred group!
- You can see all project groups in the Course Catalogue, but you can't register for them

How to Get a Project Group

PAUL registration

"Phase 1: PAUL Registration" consists of two registration periods directly following each other.

Timely registration

- You will receive a project group/seminar in any case
- You can start Phase 2 on time



Late registration

- You will receive a project group/seminar in any case
- the registration in PAUL is only synchronized once a week with the access to Jupyter
- If you register in PAUL **during Phase 2** (Assignments & Preferences)
 - you can **complete all assignments and preferences**
 - late access to Jupyter may cause you to **miss interview appointments** that were scheduled in Phase 2 (applies only to organizers who are conducting interviews)
- If you register in PAUL **after Phase 2**
 - you will **not be able to do any assignments** and you will be graded to the lowest rank in the grading of all organizers
 - but **you can still set your preferences** in any case, this will go until the beginning of Phase 3 (Stable Marriage).

How to Get a Project Group

PAUL registration

Registration in PAUL is only possible

- if the **re-registration (renewal of matriculation)** for the winter semester has been completed before then!
- The re-registration is done by paying the enrollment fee <https://www.upb.de/zv/3-3/formalitaeten/rueckmeldung>

Please note!

- Bank transfer takes a few days.
- The university's administration also takes a few days to book the money.
- Registration for project groups is only possible once both have been completed.

We therefore highly recommend that you re-register and renew your matriculation, i.e. pay the enrollment fee **NOW !**

(CE students: The one-week registration phase is only valid for PGs of ET organizers participating in this procedure. This does not apply to others PGs of ET organizers!)

How to Get a Project Group

Assignments & Preferences

Phase 2 – Assignments & Preferences

Consist of 2 steps:

Step 1

- Students state the preferences for all project groups
- All means all and not just 1 or 2 or just the one you like!

Do students have to participate in a project group they do not like?

→ No! See below

How to Get a Project Group

Assignments & Preferences

Phase 2 – Assignments & Preferences

Consist of 2 steps:

Step 2

- Project group advisors provides an "assignment"
- Used to test student's suitability for a given project group
- Students fill in these assignments for the project group they are interested in

Assignment can be

- Empty (e.g., if the organizers do not require a precondition for participation)
- Programming assignments
- Free-text answers
- Placeholder for a personal interview
- ... or whatever the organizer needs

How to Get a Project Group Assignments & Preferences

Phase 2 – Assignments & Preferences

Consist of 2 steps:

Both Steps

- Where? → Tool chain by Jupyter and nbgrader extension
- You can log in starting on **1 March**

For how many project groups should I take the test?

Recommendation

- Minimum: 3
- Better: 4 - 5
- More than five?
→ May be waste of time

What if I decide not to participate in any PG
while the assignment phase is running?

→ **Deregister** in PAUL L.079.07099

All Project Groups Summer Term 2022 !

How to Get a Project Group

Stable Marriage

Phase 3: Stable Marriage

- The project group advisors score the assignments of the students with points
- The more points a student gets from the advisor, the greater the chance of a project group place

Now we apply the Stable Marriage algorithm

- Scores rank students from project groups advisor's perspective
- Preferences of the students rank the project group from student perspective
- Based on both, we compute a stable marriage
- The Stable Marriage algorithm matches students to project groups
- Each student gets a project group!

How to Get a Project Group

Stable Marriage

Stable Marriage - Wikipedia

“ A matching is a mapping from the elements of one set to the elements of the other set.

A matching is not stable if:

1. There is an element A of the first matched set which prefers some given element B of the second matched set over the element to which A is already matched, and
2. B also prefers A over the element to which B is already matched.

In other words, a matching is stable

when there does not exist any match (A, B)
by which both A and B would be individually better
off than they are with the element to which they are currently matched. “

Stable Marriage Algorithm is a deterministic algorithm !

How to Get a Project Group

Notification & Decision

Phase 4: Notification & Decision

- The students are informed which project group they have been assigned (by PAUL and Jupyter system)
- Final result will be entered into PAUL, students move
from: the course L.079.07099 All Project Groups Summer Term 2022
to: the actual course
by PAUL administration

How to Get a Project Group

Notification & Decision

Phase 4: Notification & Decision

Do students have to participate in a project group they do not like?

1. No, they can refuse the assigned project group!
However, they will not get another project group in Summer Term 2022!
2. The only exception is:
 - two students wish to swap seats and receive the approval from both advisors, they can do so
 - Seats become available (e.g., because students have cancelled) and advisors agree

How is this organized?

- Students ask me by email: mafi@upb.de
- Advisors email me free places

More Information, Webpages, Links, pdf Files

Main web page for project groups: <http://www.upb.de/cs/pg>

- **Listing** of all project groups (each listed group points to advisor's PG web page)
- Information of the overall **registration and notification process**
<https://cs.upb.de/studium/studienelemente/projektgruppen/zuordnungsverfahren>
<https://cs.upb.de/en/studies/study-elements/project-groups/matching-method>
- **Guidelines for project groups**
follow the links
„guidelines for project groups“ <https://cs.upb.de/en/studies/study-elements/general-guidelines/project-groups>
Rahmenrichtlinien für Projektgruppen“ <https://cs.upb.de/studium/studienelemente/rahmenrichtlinien/projektgruppen>
- Please read it before you start a project group!

Thank you for listening!