



FAU

FRIEDRICH-ALEXANDER
UNIVERSITÄT
ERLANGEN-NÜRNBERG
TECHNISCHE FAKULTÄT

Project Flat-Panel CT Reconstruction

Motivation

A. Maier, J. Maier, B. Bier, A. Preuhs, C. Syben

Pattern Recognition Lab (CS 5), FAU Erlangen

17.10.2017



Organization

Time and place:

- Tuesday, 10:00-12:00
- 0.01-142 Huber-CIP



Prof.
Andreas Maier

Supervisors:



Jennifer
Maier



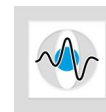
Bastian
Bier



Christopher
Syben



Alexander
Preuhs



Hochschul - Forschungs - Praktikum

Hochschulpraktikum (5 ECTS)

- Attend course
- Finish all exercise sheets in groups of two
- Individual presentation about one exercise sheet

Hochschul- & Forschungspraktikum (5+5 ECTS)

- Additional Individual research project
+ 6 page report

Important: What we expect



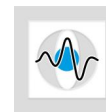
You will not be able to finish the exercises on time if you only work during our sessions
→ You have to work between sessions



You have to write your own code
→ If you copy code, we will find out



We will ask questions regarding your code
→ They might be asked again at final presentation
→ Take notes



Timetable exercise sheets

Oktober							
kw	Mo	Di	Mi	Do	Fr	Sa	So
39							1
40	2	3	4	5	6	7	8
41	9	10	11	12	13	14	15
42	16	17	18	19	20	21	22
43	23	24	25	26	27	28	29
44	30	31					

November							
kw	Mo	Di	Mi	Do	Fr	Sa	So
44			1	2	3	4	5
45	6	7	8	9	10	11	12
46	13	14	15	16	17	18	19
47	20	21	22	23	24	25	26
48	27	28	29	30			

Dezember							
kw	Mo	Di	Mi	Do	Fr	Sa	So
48					1	2	3
49	4	5	6	7	8	9	10
50	11	12	13	14	15	16	17
51	18	19	20	21	22	23	24
52	25	26	27	28	29	30	31

Januar							
kw	Mo	Di	Mi	Do	Fr	Sa	So
1	1	2	3	4	5	6	7
2	8	9	10	11	12	13	14
3	15	16	17	18	19	20	21
4	22	23	24	25	26	27	28
5	29	30	31				

Februar							
kw	Mo	Di	Mi	Do	Fr	Sa	So
5				1	2	3	4
6	5	6	7	8	9	10	11
7	12	13	14	15	16	17	18
8	19	20	21	22	23	24	25
9	26	27	28				

Exercise1

Exercise2


Exercise3

Exercise4

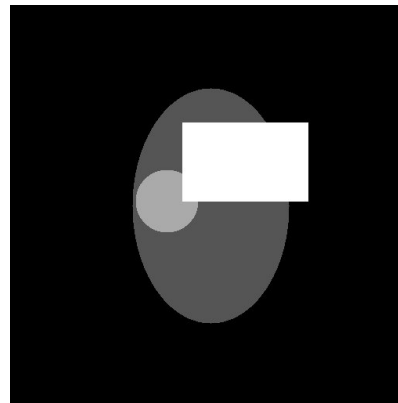
Exercise5

Deadline

Exercise 1/5 – CONRAD Basics

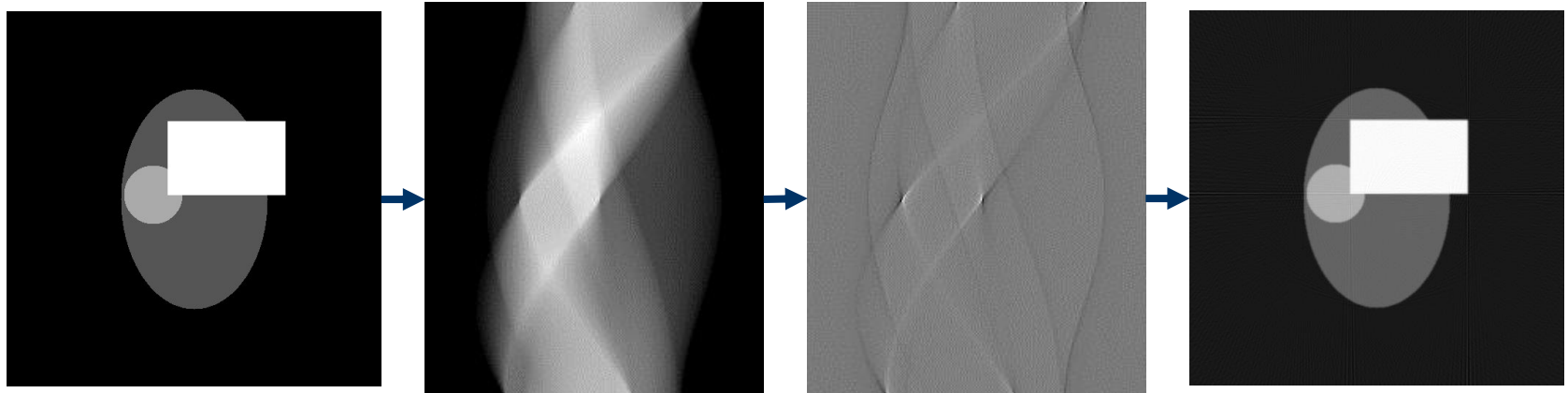
- Work with  **GitHub**
- World coordinates \leftrightarrow Pixel coordinates
- Implement a phantom with 3 different geometric objects

Example:



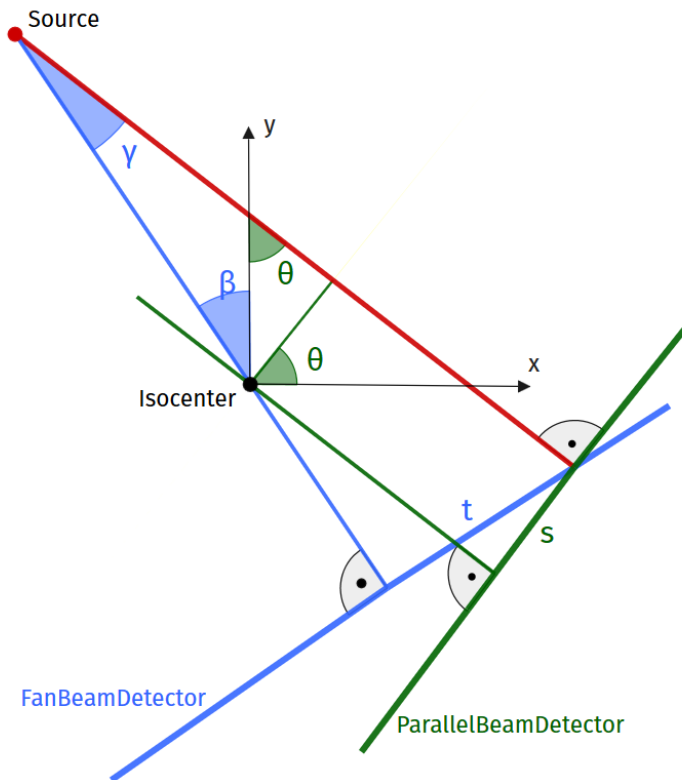
Exercise 2/5 – Parallel-Beam

- Parallel-beam sinogram
- Parallel-beam back-projection
- Ramp & RamLak filter in spatial and Fourier domain



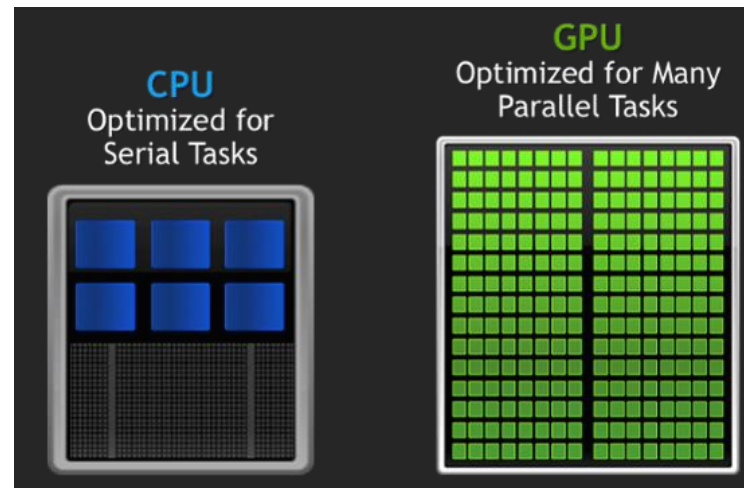
Exercise 3/5 – Fan-Beam

- Fan-beam sinogram
- Rebinning:
Fan-beam short-scan
→ Parallel-beam



Exercise 4/5 – OpenCL

- Comparison of CPU and GPU runtime
- Parallel-beam back-projection on GPU



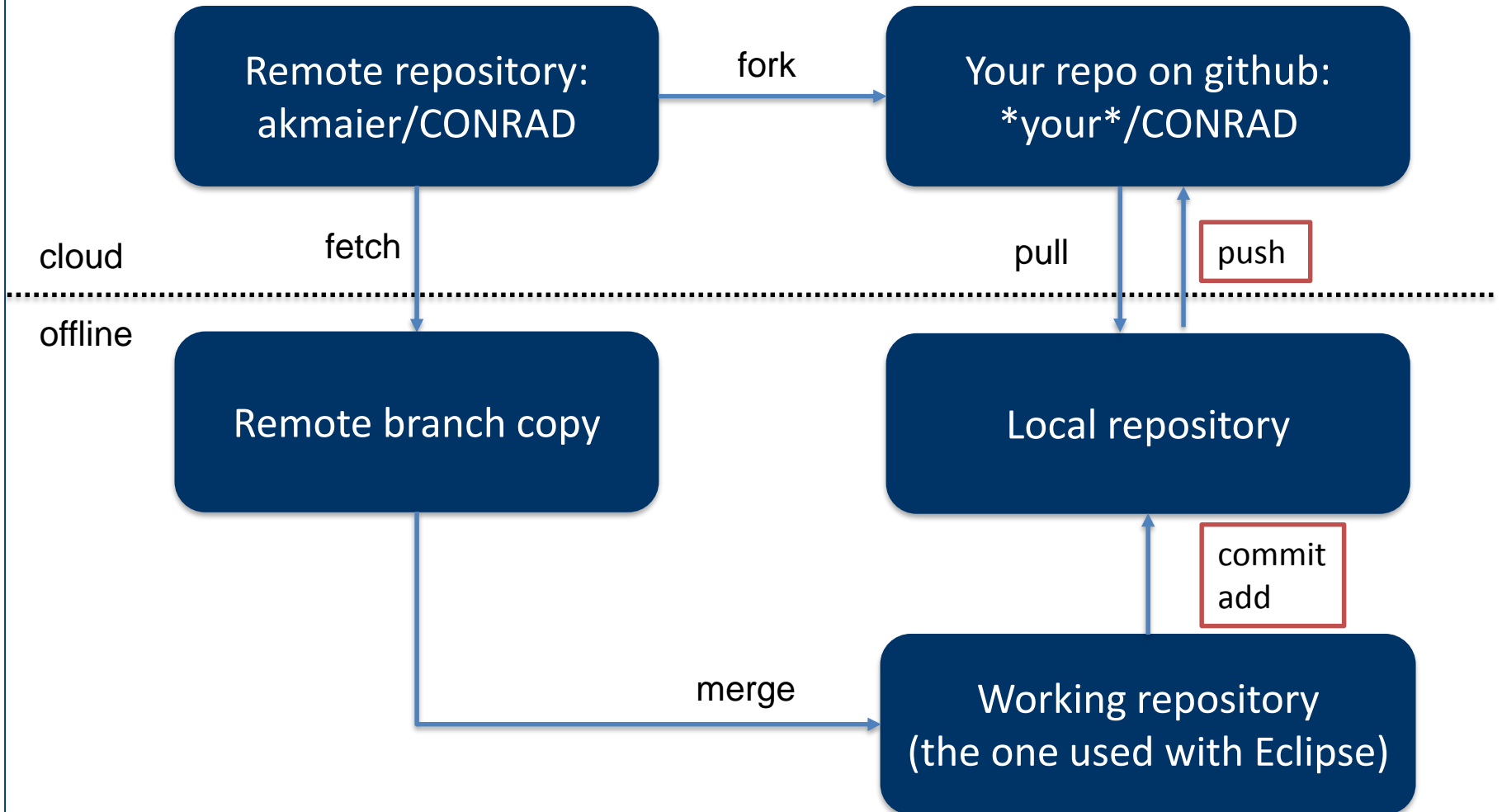
whitehatvirtual.com

Exercise 5/5 - Cone-Beam

- Cone-beam reconstruction of real data



Working with Git



Installation of CONRAD

conrad.stanford.edu

- Simulation of basic processes in x-ray imaging
- Performing image reconstruction



<https://www5.cs.fau.de/lectures/ws-1718/projekt-flat-panel-ct-reconstruction-projfcr/excercises/>

Note: Replace “C:/Reconstruction” with
“/proj/i5fpctr/YOUR_OWN_DIRECTORY”