

Seminar on Inpainting-based Image Compression (IBIC)

Joachim Weickert

Winter Term 2025/2026

<https://www.mia.uni-saarland.de/Teaching/ibic25.shtml>

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Organisational Issues

When, where, and what?

- ◆ (main) seminar for students of VC, mathematics, CS, DSAI ...
- ◆ Wednesday, 16:15-18:00, online via Zoom ([this link](#))
- ◆ introductory lecture on November 26, 2025
- ◆ 12 talks by students from December 3, 2025 until January 21, 2026

Prerequisites

- ◆ undergraduate knowledge in mathematics required, e.g.
 - Mathematik für Informatiker I–III
- ◆ knowledge about image processing and computer vision recommended, e.g.
 - Image Processing and Computer Vision
 - Differential Equations in Image Processing and Computer Vision
- ◆ knowledge of English

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What is Important?

- ◆ regular attendance
- ◆ active participation in the discussions
- ◆ compulsory meeting with Joachim Weickert in the week before the talk;
make appointment two weeks before
- ◆ talk:
 - 30 minutes plus 15 minutes discussion
 - slides and presentation in English
- ◆ written report:
 - due three weeks after end of lecturing period (Sunday, March 1, 2026, 23:59)
 - e-mail to Joachim Weickert (weickert@mia.uni-saarland.de)
 - only in pdf format, max. 5 pages including references
(in the style of a scientific paper)
 - Obey the scientific standards and avoid plagiarism!

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Organisational Issues (3)



- ◆ Strictly avoid a no-show at the date of your talk!
 - highly unsocial
 - We will exclude you from future seminars of our group.
 - only exception: illness (medical certificate immediately required)

Grading Criteria

- ◆ The mark will take into account:
 - your active participation in the seminar
 - your presentation
 - the quality of your report

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Criteria for a Good Talk

- ◆ Central criterion: **Would you like to attend your talk?**
- ◆ Strictly obey the time limits.
- ◆ Avoid too many slides and too many formulae.
Omit unnecessary things.
Feel free to skip some parts of the paper and include other things instead.
- ◆ Only key words, no full sentences. If possible, not more than one line per idea.
- ◆ Use whatever medium is most helpful (videos, digital whiteboard, ...).
- ◆ Involve the audience, e.g. by posing questions.
- ◆ Give proper credits when borrowing pictures etc., **directly when you use them.**
- ◆ Motivate what you are doing.
Discussing the contents before the motivation is not helpful.
- ◆ Use colours, slide numbering, image captions for structuring your talk.

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How to Become a Great Audience

- ◆ **Your** active participation is a key to a good seminar.
- ◆ Give critical and constructive feedback.
We all want to learn how to improve our talks.
Only praising your fellow students deprives them of this chance.
- ◆ Vice versa, do not take criticism on your talk personally.
We want to help you to become better and better.
- ◆ Please switch your cameras on, at least during the discussion phase.
Also seeing the reactions in your face is a form of valuable feedback.
We do have the bandwidth.

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Proposed Paper Assignment

Contour-based Approaches

1. S. Carlsson:

Sketch Based Coding of Grey Level Images.

Presenter: Hafsa ZUBAIR (second preference)

Date: 03/12/2025

2. M. Mainberger, A. Bruhn, J. Weickert, S. Forchhammer:

Edge-Based Compression of Cartoon-Like Images with Homogeneous Diffusion.

Presenter: Shreyansh CHAKRABORTY (second preference)

Date: 03/12/2025

3. F. Jost, P. Peter, J. Weickert:

Compressing Piecewise Smooth Images with the Mumford-Shah Cartoon Model.

Presenter: Sahar RADKHORRAMI (first preference)

Date: 10/12/2025

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Proposed Paper Assignment (2)



Data Optimisation

4. M. Mainberger, S. Hoffmann, J. Weickert, C. H. Tang, D. Johannsen, F. Neumann, B. Doerr:
Optimising Spatial and Tonal Data for Homogeneous Diffusion Inpainting.
Presenter: Tran Anh Dang LE (first preference)
Date: 10/12/2025
5. L. Karos, P. Bheed, P. Peter, J. Weickert:
Optimising Data for Exemplar-Based Inpainting.
Presenter: Melih AKSOY (second preference)
Date: 17/12/2025
6. F. Jost, V. Chizhov, J. Weickert:
Optimising Different Feature Types for Inpainting-Based Image Representations.
Presenter: Kaixin ZHANG (second preference)
Date: 17/12/2025

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Proposed Paper Assignment (3)



Basic Codecs and Efficient Algorithms

7. C. Schmaltz, P. Peter, M. Mainberger, F. Ebel, J. Weickert, A. Bruhn:
Understanding, Optimising, and Extending Data Compression with Anisotropic Diffusion.

Presenter: Moidul Huda QADRI (second preference)

Date: 07/01/2026

8. P. Peter, C. Schmaltz, N. Mach, M. Mainberger, J. Weickert:
Beyond Pure Quality: Progressive Modes, Region of Interest Coding, and Real Time Video Decoding for PDE-Based Image Compression.

Presenter: Chongbiao WANG (first preference)

Date: 07/01/2026

9. N. Kämper, J. Weickert:
Domain Decomposition Algorithms for Real-Time Homogeneous Diffusion Inpainting in 4K.

Presenter: Ali Azlan AZIZ (second preference)

Date: 14/01/2026

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Applications Beyond Still Image Coding

10. M. Mainberger, C. Schmaltz, M. Berg, J. Weickert, M. Backes:
Diffusion-Based Image Compression in Steganography.
Presenter: Achyut RAJ (first preference)
Date: 14/01/2026
11. P. Peter, J. Contelly, J. Weickert:
Compressing Audio Signals with Inpainting-based Sparsification.
Presenter: Vaishnavi Anil BORSE (second preference)
Date: 21/01/2026
12. S. Andris, P. Peter, J. Weickert:
A Proof-of-Concept Framework for PDE-Based Video Compression.
Presenter: Enes ULUS (first preference)
Date: 21/01/2026

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Overview Lecture on November 26

- ◆ I am going to give an overview on inpainting-based image compression first.
- ◆ This will happen on November 26 (one week before the first student talks).

Your Next Steps

- ◆ Read your paper and prepare your presentation.
- ◆ Contact me for an appointment, two weeks before your talk.
It will take place in the week before your talk.

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