# DOMINIK RIVOIR

**PhD Student in Computer Vision for Computer-assisted Surgery working on Video Understanding and Neural Rendering for Surgical Applications.**

Dresden, Germany | @ dominik.rivoir@gmail.com | dominikrivoir.github.io | https://www.linkedin.com/in/dominik-rivoir-542764200/
https://scholar.google.de/citations?user=MBADUf0AAAAJ | @DominikRivoir | gitlab.com/users/dmri/contributed

## RESEARCH INTERESTS & PROJECTS

### Surgical Procedural Video Understanding

- **Goal:** Investigating domain-specific challenges of procedural video understanding for surgical videos.
- **Interests:** End-to-end spatio-temporal modeling; Pitfalls of BatchNorm; Online recognition; Sparse events/annotations in untrimmed videos

4 publications [1,3,4,5] | 2 awards [h,i] | </> public code [e,k]

### Unsupervised Neural Rendering for Video Synthesis

- **Goal:** Rendering realistic, view-consistent and diverse video sequences from simulated surgical 3D scenes in unpaired/unsupervised learning settings.
- **Interests:** Neural 3D representations; Unpaired image translation

ICCV publication [2] | </> public code [a,b] | public dataset [c]
part of *"Best of ICCV"* selection in *Computer Vision News* [d]

## EDUCATION & POSITIONS

### PhD Student

**National Center for Tumor Diseases (NCT)**

June 2019 – ongoing, full-time | Dresden, Germany

- Advisor: **Prof. Dr. Stefanie Speidel**
- Topic: "**Adapting Procedural Video Understanding and Video Synthesis for Surgical Computer Vision**"
- Published at: ICCV | MedIA | MICCAI | MICCAI-W
- Reviewed for: CVPR | ICCV | ECCV | MedIA | MICCAI | IPCAI | ...

### Diploma in Computer Science (equiv. to M.Sc.)

**TU Dresden** | **GPA: 1.0** | **Awarded TUD's Best CS Graduate**

Oct 2013 – Apr 2019 | Dresden, Germany

- Focus: Machine Learning | CS Theory | Databases
- Thesis: "**Learning Representations for RSD Prediction through Unsupervised Temporal Video Segmentation**", published at MICCAI workshop [4].

**Student Computer Vision Engineer @ T-Systems MMS**

Apr 2017 – Mar 2018 | Dresden, Germany

**Semester Abroad @ Boston University**

Sep 2016 – Dec 2016 | Boston, USA

## ACTIVITIES

### Organizer

**CVPR Workshop "Data Curation & Augmentation in Medical Imaging"**

Jun 2024 | Seattle, USA

https://dca-in-mi.github.io/ | article in *Computer Vision News* [l]

### Organizer

**Summer School "AI Applications in Medicine"**

Sep 2023 | Dresden, Germany

https://www.secai-ceti-summerschool.de/

## AWARDS

**Outstanding Reviewer Award** 2022
at MICCAI 2022
(12 out of 1242 awarded) [f]

**Best Reviewer Award** 2022
at IPCAI 2022
(2 out of >100 awarded) [g]

**Best Paper Award** 2019
at MICCAI 2019 workshop "OR 2.0" for *"Unsupervised temporal video segmentation as an auxiliary task for predicting the remaining surgery duration"* [h]

**Best Paper Award (2nd author)** 2019
at IPCAI 2019 for *"Active learning using deep Bayesian networks for surgical workflow analysis"* [i]

**Lohrmann Medal** 2019
as best graduate of TU Dresden's Computer Science department [j]

## SKILLS

**Machine Learning**

- pytorch, tensorboard, opencv (very good)
- numpy, sklearn, pandas, matplotlib (very good)
- tensorflow, keras (basic)

**Programming Languages**

- Python (very good)
- C++, Java (good)
- Rust, SQL, OWL, Cypher, Prolog (basic)

**Other Technologies**

- Git, LaTeX, Blender, html, css, kivy

## LANGUAGES

English — 2 years in USA '99–'01; 1 year in UK '12–'13; 4 months in USA '16; TOEFL iBT score: 114/120

German — Native

## OTHER INTERESTS

Baseball | Arthouse Cinema | Guitar

## REFERENCE

**Stefanie Speidel (advisor)**
stefanie.speidel@nct-dresden.de

## SELECTED PUBLICATIONS


[1] *Rivoir, Dominik*, et al. "On the Pitfalls of Batch Normalization for End-to-End Video Learning: A Study on Surgical Workflow Analysis." Medical Image Analysis. 2024.

MedIA (Impact Factor 10.7)

[2] *Rivoir, Dominik*, et al. "Long-term temporally consistent unpaired video translation from simulated surgical 3d data." IEEE/CVF International Conference on Computer Vision. 2021.

ICCV

[3] *Rivoir, Dominik*, et al. "Rethinking anticipation tasks: Uncertainty-aware anticipation of sparse surgical instrument usage for context-aware assistance." International Conference on Medical Image Computing and Computer-Assisted Intervention. Springer, Cham, 2020.

MICCAI

[4] *Rivoir, Dominik*, et al. "Unsupervised temporal video segmentation as an auxiliary task for predicting the remaining surgery duration." OR 2.0 Context-Aware Operating Theaters and Machine Learning in Clinical Neuroimaging. Springer, Cham, 2019.

Best Paper

[5] Bodenstedt, Sebastian, *Rivoir, Dominik*, et al. "Active learning using deep Bayesian networks for surgical workflow analysis." International journal of computer assisted radiology and surgery. 2019.

Best Paper


## LINKS

[a] https://gitlab.com/nct_tso_public/surgical-video-sim2real

[b] https://gitlab.com/nct_tso_public/demo-video-sim2real

[c] http://opencas.dkfz.de/video-sim2real/

[d] rsipvision.com/ComputerVisionNews-2021November/24/

[e] https://gitlab.com/nct_tso_public/ins_ant

[f] https://conferences.miccai.org/2022/en/OUTSTANDING-REVIEWER-AWARDS.html

[g] sites.google.com/view/ipcai2022/awards

[h] https://twitter.com/SpeidelStefanie/status/1183310832580481024

[i] https://ipcai2019.github.io/#news

[j] https://tu-dresden.de/tu-dresden/newsportal/news/talente-frueh-unterstuetzen-tud-ehrt-beste-absolvent-innen

[k] https://gitlab.com/nct_tso_public/pitfalls_bn

[l] https://www.rsipvision.com/ComputerVisionNews-2024May/42/