

FH-Prof. Dr. David C. Schedl, MSc

13th January, 1986

Paracelsusstraße 13a
4020 Linz, Austria

+43 (0) 664 515 3376
david.schedl@gmail.com
www.david-schedl.com



SHORT BIO

David C. Schedl is a professor of Visual Computing at the University of Applied Sciences Hagenberg. He was a post-doctoral researcher at the Institute of Computer Graphics at the Johannes Kepler University Linz until 2021. In 2018, he finished his Ph.D. degree at the Johannes Kepler University Linz. He joined the Rendering group at the Vienna University of Technology, in 2012. In 2011, he graduated from the master's program Interactive Media at the University of Applied Sciences in Hagenberg.

His research interests include computer vision, computational photography, machine learning, and drones. He is particularly interested in optimal sampling strategies and novel algorithms for multi-view data such as light fields.

EXPERIENCE



| | |
|--|------------------|
| University of Applied Sciences Hagenberg , Austria <i>Professor of Visual Computing</i> , Digital Media Department | since 2021 |
| Johannes Kepler University Linz , Austria <i>Postdoctoral researcher</i> , Institute of Computer Graphics | 2018–2021 |
| University of Applied Sciences Hagenberg , Austria <i>Lecturer</i> | 2016–2018 & 2020 |
| Johannes Kepler University Linz , Austria <i>Predoctoral fellow</i> , Institute of Computer Graphics | 2012–2018 |
| Vienna University of Technology , Austria <i>Research associate</i> , Institute of Computer Graphics | 2012 |



EDUCATION



| | |
|---|-----------|
| Doctoral Degree (Dr.techn.): Faculty of Engineering & Natural Sciences, Johannes Kepler University Linz, Austria Supervisor and Reviewers: Prof. Oliver Bimber, and Prof. Ren Ng (UC Berkeley) | 2012–2018 |
| Master of Science: Interactive Media, University of Applied Sciences, Hagenberg, Austria | 2009–2011 |



| | |
|---|-----------|
| Exchange Semester: Media Technology & Games, IT University of Copenhagen, Denmark | 2010–2011 |
| Bachelor of Science in Engineering: Media Technology & Design, University of Applied Sciences, Hagenberg, Austria | 2006–2009 |
| University-Entrance Diploma: Electronic Data Processing & Organization, HTL Pinkafeld, Austria | 2001–2005 |

PUBLICATION HIGHLIGHTS

Search and Rescue with Airborne Optical Sectioning 2020 & 2021
 Airborne Optical Sectioning applies camera drones for synthetic aperture imaging, to computationally remove occluding vegetation for revealing hidden objects. We have presented its principles in our previous work in the journals *Journal of Imaging*, *IEEE Sensors Journal*, *Remote Sensing*, and *IEEE Geoscience and Remote Sensing Letters*. In our recent publications, we show that automated person detection under occlusion conditions significantly improves with Airborne Optical Sectioning. Finding lost or injured people in dense forests becomes practical with thermal recordings and our technique. Our findings lay the foundation for effective future search and rescue technologies that can be applied in combination with autonomous or manned aircraft. Our articles are published in the journals *Nature Machine Intelligence* and *Science Robotics*.  

Airborne Optical Sectioning for Nesting Observation 2020
 Here, we applied Airborne Optical Sectioning to monitor birds' nesting behavior at Austria's largest heron colony. Thermal sensors record the radiated heat signals of animals. Occluded birds can be made visible by integrating multiple recordings from slightly different perspectives. Ornithologists can use our technique to count and monitor birds. This work has been published in *Nature's Scientific Reports*.  

Optimized Sampling for View Interpolation in Light Fields with Overlapping Patches 2018
 This work focuses on angular superresolution approaches for light fields captured with sparse camera arrays. One of the project's result is an optimal sampling mask, which is used to directionally upsample a recorded light-field, by using local dictionaries, extracted directly from the scene. These principles also apply to reflectance data, and the method applies to arbitrary scenes because the need for depth reconstruction is avoided, which often fails for complex scene effects such as transparency and reflections. This article was presented at Eurographics 2018 and is based on our two previous publications, presented at the International Conference on Computational Photography (ICCP) 2015 and in the journal *Computer Vision and Image Understanding* in 2017.  

Compressive Volumetric Light-Field Excitation 2017
 This publication shows how to concentrate light simultaneously at multiple selected volumetric positions and presents our follow-up work. Both articles have been published in the *Nature* journal *Scientific Reports* in 2016 and 2017. We use a light-field microscope to record a volume and subsequently illuminate individual probe particles utilizing a four-dimensional illumination light field. One of our contributions is a temporal coding strategy, which significantly improves scanning time for scattering and non-scattering probes.  

PUBLICATIONS

- Christoph Praschl, David C. Schedl, Maria Fleischer, and Andreas Stöckl. **Assessment of Wildlife Accident Risk using a Drone-based Population Monitoring System.** In *The 11th European Conference on Injury Prevention and Safety Promotion (EU-Safety)*, Oct 2023. (accepted)
- Christoph Praschl and David C. Schedl. **Towards an Automated Biodiversity Modelling Process for Forest Animals using Uncrewed Aerial Vehicles.** In *International Workshop on Simulation for Energy, Sustainable Development & Environment*, Sept 2023
- Samuel Zühlke, Andreas Stöckl, and David C. Schedl. **Touch Sensing on Semi-Elastic Textiles with Border-Based Sensors.** In *Human Systems Engineering and Design: Future Trends and Applications*, volume 112, Sept 2023
- Christoph Praschl, Leopold Böss, Kathrin Probst, and David C. Schedl. **Towards a Multispectral Airborne Light Field Dataset of Forest Animals.** In *3rd International Workshop on Camera traps, AI, and Ecology*, September 2023
- Rakesh John Amala Arokia Nathan, Indrajit Kurmi, David C. Schedl, and Oliver Bimber. **Through-Foliage Tracking with Airborne Optical Sectioning.** *Journal of Remote Sensing*, 2022:9812765, Apr 2022
- Indrajit Kurmi, David C. Schedl, and Oliver Bimber. **Combined person classification with airborne optical sectioning.** *Scientific Reports*, 12(1):3804, March 2022
- David C. Schedl, Indrajit Kurmi, and Oliver Bimber. **An autonomous drone for search and rescue in forests using airborne optical sectioning.** *Science Robotics*, 6(55):eabg1188, June 2021
- David C. Schedl, Indrajit Kurmi, and Oliver Bimber. **Search and rescue with airborne optical sectioning.** *Nature Machine Intelligence*, 2(12):783–790, December 2020
- Indrajit Kurmi, David C. Schedl, and Oliver Bimber. **Pose Error Reduction for Focus Enhancement in Thermal Synthetic Aperture Visualization.** *IEEE Geoscience and Remote Sensing Letters*, pages 1–5, 2021
- David C. Schedl, Indrajit Kurmi, and Oliver Bimber. **Airborne Optical Sectioning for Nesting Observation.** *Scientific Reports*, 10(1):7254, April 2020
- Indrajit Kurmi, David C. Schedl, and Oliver Bimber. **Fast Automatic Visibility Optimization for Thermal Synthetic Aperture Visualization.** *IEEE Geoscience and Remote Sensing Letters*, 2020
- Indrajit Kurmi, David C. Schedl, and Oliver Bimber. **Thermal Airborne Optical Sectioning.** *Remote Sensing*, 11(14), 2019
- Indrajit Kurmi, David C. Schedl, and Oliver Bimber. **A Statistical View on Synthetic Aperture Imaging for Occlusion Removal.** *IEEE Sensors Journal*, pages 1–1, 2019
- David C. Schedl, Indrajit Kurmi, and Oliver Bimber. **Voxelizing Light-Field Recordings.** In *Eurographics – Posters*, 2019
- Oliver Bimber and David C. Schedl. **Light-Field Microscopy: A Review.** *Journal of Neurology & Neuromedicine*, 4(1):1–6, 01 2019

- Oliver Bimber, Indrajit Kurmi, David C. Schedl, and Mike Potel. **Synthetic Aperture Imaging With Drones**. *IEEE Computer Graphics and Applications*, 39(3):8–15, 2019
- Indrajit Kurmi, David C. Schedl, and Oliver Bimber. **Micro-lens aperture array for enhanced thin-film imaging using luminescent concentrators**. *Opt. Express*, 26(22):29253–29261, 2018
- Indrajit Kurmi, David C. Schedl, and Oliver Bimber. **Airborne Optical Sectioning**. *J. Imaging*, 4(8), 2018
- David C. Schedl and Oliver Bimber. **Optimized Sampling for View Interpolation in Light Fields with Overlapping Patches**. In *Eurographics – Short Papers*, 2018
- David C. Schedl, Clemens Birklbauer, and Oliver Bimber. **Optimized sampling for view interpolation in light fields using local dictionaries**. *Computer Vision and Image Understanding*, 168:93 – 103, 2018 (online 2017)
- David C. Schedl, Clemens Birklbauer, and Oliver Bimber. **Optimized sampling for view interpolation in light fields using local Dictionaries**. In *ACM SIGGRAPH Posters*, 2017
- David C. Schedl and Oliver Bimber. **Compressive Volumetric Light-Field Excitation**. *Scientific Reports*, 7, 2017
- David C. Schedl and Oliver Bimber. **Volumetric Light-Field Excitation**. *Scientific Reports*, 6, 2016
- Clemens Birklbauer, David C. Schedl, and Oliver Bimber. **Nonuniform spatial deformation of light fields by locally linear transformations**. *ACM Transactions on Graphics*, 35(5), 2016
- David C. Schedl, Clemens Birklbauer, Johann Gschnaller, and Oliver Bimber. **Generalized Depth-of-Field Light-Field Rendering**. In *Computer Vision and Graphics*, pages 95–105, 2016
- David C. Schedl, Clemens Birklbauer, and Oliver Bimber. **Directional Super-Resolution by Means of Coded Sampling and Guided Upsampling**. In *IEEE International Conference on Computational Photography*, 2015
- Alexander Koppelhuber, Sean Fanello, Clemens Birklbauer, David C. Schedl, Shahram Izadi, and Oliver Bimber. **Enhanced learning-based imaging with thin-film luminescent concentrators**. *Optics Express*, 22(24), 2014
- David C. Schedl, Clemens Birklbauer, and Oliver Bimber. **Coded Exposure HDR Light-field Video Recording**. *Computer Graphics Forum*, 33(2):33–42, 2014
- David C. Schedl, Clemens Birklbauer, and Oliver Bimber. **Coded Exposure HDR Light-field Video Recording**. In *ACM SIGGRAPH Posters*, 2013
- David C. Schedl and Michael Wimmer. **Simulating partial occlusion in post-processing depth-of-field methods**. In Wolfgang Engel, editor, *GPU Pro 4: Advanced Rendering Techniques*. A K Peters, 2013
- David C. Schedl and Michael Wimmer. **A layered depth-of-field method for solving partial occlusion**. *Journal of WSCG*, 20(3):239–246, 2012
- Julian Togelius, Emil Kastbjerg, David C. Schedl, and Georgios N. Yannakakis. **What is Procedural Content Generation?: Mario on the Borderline**. In *Proceedings of the 2nd International Workshop on Procedural Content Generation in Games*, pages 3:1–3:6, 2011

THESES

David C. Schedl. **Coded Light-Field Sampling**. *PhD Thesis*. Supervision and Primary Reviewer: Prof. Dr. Oliver Bimber; Secondary Reviewer: Prof. Ren Ng (University of California, Berkeley). 2018

David C. Schedl. **A layered depth-of-field method for solving partial occlusion in computer renderings**. *Master's Thesis*. Supervision: Prof. (FH) Dr. Wilhelm Burger. 2011

David C. Schedl. **jCuda** (GPGPU computing with Nvidia's CUDA for ImageJ). *Bachelor's Thesis*. Supervision: Prof. (FH) Dr. Wilhelm Burger. 2009

FUNDED PROJECTS

BAMBI: Biodiversity Airborne Monitoring Based on Intelligent UAV sampling 2022-2025
(FO999892231) The Austrian Research Promotion Agency (FFG)

SARAOS: Search and Rescue by Airborne Optical Sectioning 2020-2022
(LIT-2019-8-SEE-114) Linz Institute of Technology (LIT) / Land Oberösterreich

Wide Synthetic Aperture Sampling 2019-2021
(P 32185-NBL) Austrian Science Fund (FWF) / State of Upper Austria /
Nationalstiftung für Forschung, Technologie und Entwicklung

LumiConCam: Towards a Flexible, Scalable, and Transparent Thin-Film Camera 2017-2019
Linz Institute of Technology (LIT) / State of Upper Austria

Directional Super-Resolution through Coded Sampling and Guided Upsampling 2016-2018
(P 28581-N33) Austrian Science Fund (FWF)

TEACHING

Artificial Intelligence, Master's level since 2022
University of Applied Sciences, Hagenberg
An introduction to artificial intelligence and techniques, such as unsupervised learning, linear classifiers, reinforcement learning, and supervised learning with neural networks.

Real-Time Graphics, Master's level 2016-2018 & since 2020
University of Applied Sciences, Hagenberg
This course focuses on real-time computer-graphics techniques such as ray tracing, global illumination, visualization, and physically correct shading. Students implement advanced techniques in projects using OpenGL. The course was formerly known as Advanced Computer Graphics.

Visual Computing, Master's level since 2021
University of Applied Sciences, Hagenberg
This course provides an introduction to computer vision including fundamentals of image formation, perception, feature detection and matching, multiview geometry, classification, and deep learning. The course focuses on understanding the intuitions and mathematics of computer vision methods and how to apply them in practice. The course was formerly known as Computer Vision.

- Graphics and Object-Oriented Programming**, Bachelor's level since 2022
 University of Applied Sciences, Hagenberg
 A general introduction into object-oriented programming and computer graphics.
- Introduction to Programming**, Bachelor's level since 2021
 University of Applied Sciences, Hagenberg
 This course provides a general introduction into programming.
- Computer Graphics**, Bachelor's level 2021
 University of Applied Sciences, Hagenberg
 Students learn basic computer-graphics concepts as used in games and movies and apply them in OpenGL.
- Computer Graphics**, Johannes Kepler University Linz 2016–2020
 Students learn the basic concepts of Computer Graphics such as transformations, the rendering pipeline, scenegraphs, and animations, and practically apply them in an OpenGL/WebGL framework.
- Computer Vision**, Johannes Kepler University Linz 2019–2020
 The course gives insights into image analysis and image understanding for tasks such as object recognition, camera calibration, and structure from motion. In a project, students apply and implement computer vision methods independently.
- Visual Computing for Virtual Anatomy**, Johannes Kepler University Linz 2013
 Students learn the basics of medical imaging techniques such X-ray, computer tomography, and ultrasound, and how to process recorded data.

TUTORING & MENTORING

- Supervision Projects & Theses** at the University of Applied Sciences, Hagenberg since 2021
 Supervising students on Bachelor and Master levels of the Digital Media Department at the University of Applied Sciences, Hagenberg.
- Supervision and Co-supervision** at the Johannes Kepler University Linz 2012–2022
 Supervision of bachelor and master projects. Supporting and supervising PhD students at the Institute of Computer Graphics.
- Young Computer Scientists Workshops** at the Johannes Kepler University Linz 2017–2021
 The workshop takes students aged 15-18 on an immersive exploration through computer graphics.
- Tomorrow's Experts in Computing (TEC)** at the Johannes Kepler University 2016–2021
 The workshop's aim is to interest students in computer science.
- Visual Computing Club** at the Johannes Kepler University Linz 2015–2021
 I am acting as the contact person for the student club at the Institute of Computer Graphics.
- Supervision Master's Theses** at the Vienna University of Technology 2012
 Supervision of theses at the Institute of Computer Graphics.
- Computer Science Tutor** at the University of Applied Sciences, Hagenberg 2009–2011
 Tutor for the courses Digital Media Technology, Computer Graphics, and Algorithms and Data Structures.

SKILLS

Programming

Python, PyTorch/Tensorflow, OpenCV, OpenGL, GLSL, CUDA, JavaScript, Java, C++

Operating Systems

Microsoft Windows, Linux, Android

Software

Visual Studio (Code), JetBrains IDEs, Adobe Creative Cloud, Inkscape, Blender

LANGUAGES

German: mother tongue

English: fluent