

# CHRISTIAN RICHARDT

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**Skype** christianrichardt

## RESEARCH & WORK EXPERIENCE

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- Aug. 2016 **Lecturer (Assistant Professor)** – Department of Computer Science, University of Bath, England  
– now I am working on video processing for 360-degree video, light fields, and for user-centric applications.
- Mar. 2014 **Postdoctoral Fellow** – Intel Visual Computing Institute and MPI Informatik, Saarbrücken, Germany  
– Jul. 2016 I worked on user-centric video processing and motion capture in mobile scenarios, with a focus on reconstructing dynamic scenes from a few handheld cameras. With Christian Theobalt
- Oct. 2012 **Postdoctoral Fellow (16 months)** – Inria Sophia Antipolis – Méditerranée, Sophia Antipolis, France  
– Feb. 2014 I worked on perceptually-based techniques for image-based rendering and vector graphics. With George Drettakis & Adrien Bousseau
- Summer 2012 **Research Intern (5 months)** – Disney Research, Zurich, Switzerland  
I worked on creating high-resolution, high-quality stereoscopic panoramas based on omnidirectional stereo (patented). Published as oral presentation at CVPR 2013. Host: Alexander Sorkine-Hornung
- 2010 – 2011 **Visiting Scholar (7 months)** – MPI Informatik, Saarbrücken, Germany  
In this project, I built a prototype Kinect-like RGBZ video camera and devised algorithms to upsample, denoise and smooth the depth data to create high-resolution coherent RGBZ videos. These enable video processing effects that go beyond what is possible using just a colour video. Host: Christian Theobalt
- Summer 2008 **Research Intern (3 months)** – Disney Research, Zurich, Switzerland  
and Walt Disney Animation Studios, Burbank, California, United States of America  
I researched approaches for compensating ‘ghosting’ artefacts caused by crosstalk in stereoscopic 3D projection setups. The resulting perceptually-based compensation technique can greatly improve the viewing experience of stereoscopic 3D imagery. Hosts: Markus Gross & Rasmus Tamstorf
- Summer 2007 **Software Engineering Intern (4 weeks)** – Mindquarry, Potsdam, Germany  
I assisted in the design and development of a simple one-click Subversion client for novice users, which involved user interface design in SWT/JFace, and analysis and fixing of bug reports.
- Summer 2006 **Summer Intern (3 months)** – The MathWorks, Cambridge, England  
My work investigated techniques for integrating highly optimised signal processing routines into a code-generation software environment based on model-based design (Simulink); I presented my findings to about 20 engineers in the UK and US.

## EDUCATION

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- 2012 **PhD in Computer Science** – University of Cambridge, England  
Dissertation: Colour videos with depth – acquisition, processing and evaluation  
My research investigated the full life cycle of videos with depth (RGBZ videos): from their acquisition, via filtering and processing, to the evaluation of stereoscopic display. Supervisor: Neil A. Dodgson
- 2011 **Master of Arts** – University of Cambridge, England
- 2007 **Bachelor of Arts (Honours) in Computer Science** – University of Cambridge, England  
First class honours (highest honours), ranked 3rd out of 72 in final year (Part II)  
Final-year dissertation: Flash-exposure high dynamic range imaging  
My project extended HDR imaging techniques and showed useful computational photography applications like virtual photography and an intelligent flash. Supervisor: Rahul Vohra
- 2004 **Allgemeine Hochschulreife (Abitur)** – Albert-Schweitzer-Gymnasium, Erfurt, Germany  
Average mark: 1.0 (highest honours); majored in mathematics and computer science

## PUBLICATIONS

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→ See also my profiles on *Google Scholar* and *DBLP*.

- 2018 Parallax360: Stereoscopic 360° Scene Representation for Head-Motion Parallax**  
Bicheng Luo, Feng Xu, **Christian Richardt** and Jun-Hai Yong  
*IEEE Transactions on Visualization and Computer Graphics*, 24(4), 2018 [pdf] [doi]
- Cutting-Edge VR/AR Display Technologies**  
George-Alex Koulieris, Kaan Akşit, Rafał Mantiuk, **Christian Richardt** and Katerina Mania  
Tutorial at *IEEE Conference on Virtual Reality and 3D User Interfaces (VR)*, 2018
- Live Intrinsic Material Estimation**  
A. Meka, M. Maximov, M. Zollhöfer, A. Chatterjee, **Christian Richardt** and C. Theobalt  
*arXiv*, 2018 [website] [pdf]
- 2017 Undoing Instagram Filters**  
Padraig Boulton and **Christian Richardt**  
Short Paper at *European Conference on Visual Media Production (CVMP)*, 2017 [pdf]
- Dynamic Mixed-Reality Compositing with Unity**  
Joanna Tarko, **Christian Richardt** and Peter Hall  
Short Paper at *European Conference on Visual Media Production (CVMP)*, 2017 [pdf]
- Predictor Combination at Test Time**  
Kwang In Kim, James Tompkin and **Christian Richardt**  
*International Conference on Computer Vision (ICCV)*, 2017 [pdf] [doi]
- Live User-Guided Intrinsic Video For Static Scenes**  
Abhimitra Meka\*, Gereon Fox\*, Michael Zollhöfer, **Christian Richardt** and Christian Theobalt  
*IEEE Transactions on Visualization and Computer Graphics*, 23(11), 2017 [website] [pdf] [doi]
- Video for Virtual Reality**  
**Christian Richardt**, James Tompkin, Jordan Halsey, Aaron Hertzmann, Jonathan Starck, Oliver Wang  
*SIGGRAPH Course*, 2017 [website] [doi]
- InverseFaceNet: Deep Single-Shot Inverse Face Rendering From A Single Image**  
Hyeongwoo Kim, Michael Zollhöfer, Ayush Tewari, Justus Thies, **Christian Richardt**, Christian Theobalt  
*arXiv*, 2017 [website] [pdf]
- 2016 EgoCap: Egocentric Marker-less Motion Capture with Two Fisheye Cameras**  
H. Rhodin, **Christian Richardt**, D. Casas, E. Insafutdinov, M. Shafiei, H.-P. Seidel, B. Schiele, C. Theobalt  
*ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia)*, 35(8), 2016 [website] [pdf] [doi]
- Dense Wide-Baseline Scene Flow From Two Handheld Video Cameras**  
**Christian Richardt**, Hyeongwoo Kim, Levi Valgaerts and Christian Theobalt  
*International Conference on 3D Vision (3DV)*, 2016 (**oral presentation**) [website] [pdf] [doi]
- Video Depth-From-Defocus**  
Hyeongwoo Kim, **Christian Richardt** and Christian Theobalt  
*International Conference on 3D Vision (3DV)*, 2016 [website] [pdf] [doi]
- Real-time Halfway Domain Reconstruction of Motion and Geometry**  
Lucas Thies, Michael Zollhöfer, **Christian Richardt**, Christian Theobalt and Günther Greiner  
*International Conference on 3D Vision (3DV)*, 2016 [website] [pdf] [doi]
- General Automatic Human Shape and Motion Capture Using Volumetric Contour Cues**  
Helge Rhodin, Nadia Robertini, Dan Casas, **Christian Richardt**, Hans-Peter Seidel, Christian Theobalt  
*European Conference on Computer Vision (ECCV)*, 2016 (**spotlight presentation**) [website] [pdf] [doi]
- Live Intrinsic Video**  
Abhimitra Meka, Michael Zollhöfer, **Christian Richardt** and Christian Theobalt  
*ACM Transactions on Graphics (Proceedings of SIGGRAPH)*, 35(4), 2016 [website] [pdf] [doi]

- 2015 **A Versatile Scene Model with Differentiable Visibility Applied to Generative Pose Estimation**  
Helge Rhodin, Nadia Robertini, **Christian Richardt**, Hans-Peter Seidel and Christian Theobalt  
*International Conference on Computer Vision (ICCV)*, 2015 [website] [pdf] [doi]
- User-Centric Computational Videography**  
**Christian Richardt**, James Tompkin, Jiamin Bai and Christian Theobalt  
*SIGGRAPH Course*, 2015 [website] [doi]
- 4D Model Flow: Precomputed Appearance Alignment for Real-time 4D Video Interpolation**  
Dan Casas, **Christian Richardt**, John Collomosse, Christian Theobalt and Adrian Hilton  
*Computer Graphics Forum (Proceeding of Pacific Graphics)*, 2015 [website] [pdf] [doi]
- 2014 **Vectorising Bitmaps into Semi-Transparent Gradient Layers**  
**Christian Richardt**, Jorge Lopez-Moreno, Adrien Bousseau, Maneesh Agrawala and George Drettakis  
*Computer Graphics Forum (Proceeding of EGSR)*, 33(4), 2014 [website] [pdf] [doi]
- Temporally Coherent Video De-Anaglyph**  
Joan Sol Roo and **Christian Richardt**  
Talk and Poster at *SIGGRAPH*, 2014 [website] [pdf] [doi]
- 2013 **Megastereo: Constructing High-Resolution Stereo Panoramas**  
**Christian Richardt**, Yael Pritch, Henning Zimmer and Alexander Sorkine-Hornung  
*Proceedings of CVPR*, 2013 (**oral presentation, 3.3% acceptance rate**) [website] [pdf] [doi]
- Perception of Perspective Distortions in Image-Based Rendering**  
Peter Vangorp, **Christian Richardt**, Emily Cooper, Gaurav Chaurasia, Martin Banks, George Drettakis  
*ACM Transactions on Graphics (Proceedings of SIGGRAPH)*, 32(4), 2013 [website] [pdf] [doi]
- 2012 **Coherent Spatiotemporal Filtering, Upsampling and Rendering of RGBZ Videos**  
**Christian Richardt**, Carsten Stoll, Neil A. Dodgson, Hans-Peter Seidel and Christian Theobalt  
*Computer Graphics Forum (Proceedings of Eurographics)*, 31(2), 2012 [website] [pdf] [doi]
- Random Discrete Colour Sampling**  
Henrik Lieng, **Christian Richardt** and Neil A. Dodgson  
*Computational Aesthetics*, 2012 [website] [pdf] [doi]
- 2011 **Layered Photo Pop-Up – Winner of the ACM SIGGRAPH Student Research Competition**  
Lech Świrski, **Christian Richardt** and Neil Dodgson  
Poster at *SIGGRAPH*, 2011 [website] [pdf] [doi]
- Predicting Stereoscopic Viewing Comfort Using a Coherence-Based Computational Model**  
**Christian Richardt**, Lech Świrski, Ian P. Davies and Neil A. Dodgson  
*Computational Aesthetics*, 2011 [website] [pdf] [doi]
- 2010 **Real-Time Spatiotemporal Stereo Matching Using the Dual-Cross-Bilateral Grid**  
**Christian Richardt**, Douglas Orr, Ian Davies, Antonio Criminisi and Neil A. Dodgson  
*European Conference on Computer Vision (ECCV)*, 2010 [website] [pdf] [doi]
- Stereo Coherence in Watercolour Rendering**  
**Christian Richardt**, Jan Eric Kyprianidis and Neil A. Dodgson  
Poster at the symposia on *NPAP* and *Computational Aesthetics*, 2010 [pdf]
- 2009 **Proteus – Semi-Automatic Interactive Structure-from-Motion**  
Malte Schwarzkopf and **Christian Richardt**  
Poster at the *Vision, Modelling, and Visualization (VMV)* workshop, 2009 [website] [pdf]
- Voronoi Video Stylisation**  
**Christian Richardt** and Neil A. Dodgson  
*Computer Graphics International (short papers)*, 2009 [website] [pdf] [doi]

## ACADEMIC EXPERIENCE

**Service** Publicity Chair for the Expressive/CAe-SBIM-NPAR joint symposia in 2011, 2013, 2014, and 2015 and 2016, and member of the programme committee 2013–2015 and 2017.

**Public speaking** **3D photography: from the Victorians to Virtual Reality**

Pint of Science (Bath), May 2017

**Invited talks** **Reconstructing Visual Information from Images and Videos**

Oslo and Akershus University College of Applied Sciences, November 2015

Graphics, Vision & Interaction Group at Harvard University, August 2014

Computer Graphics Group at MIT, August 2014

**Techniques for Creating High-Quality Visuals**

Computer Graphics Lab at TU Berlin, September 2013

Visual Computing Lab at University of California, Berkeley, May 2013

Graphics Laboratory at Stanford University, May 2013

**Constructing High-Resolution Stereo Panoramas**

Nvidia Research, Santa Clara, July 2013

**Coherent Depth in Stereo Vision**

Adobe Advanced Technology Labs Seattle, August 2011

Microsoft Research Redmond, August 2011 [\[website\]](#)

Google Seattle, August 2011

**Predicting Stereoscopic Viewing Comfort**

GrUVi Lab at Simon Fraser University, Vancouver, August 2011

**Flash-Exposure HDR Imaging**

ETH Zurich Graphics Lunch, November 2007

**Reviewing** **Journals:**

ACM Transactions on Graphics	2013, 2016, 2017
IEEE Transactions on Pattern Analysis and Machine Intelligence	2011, 2014
IEEE Transactions on Image Processing	2014, 2015
IEEE Transactions on Circuits and Systems for Video Technology	2015, 2016
IEEE Transactions on Visualization and Computer Graphics	2011, 2013, 2014, 2015, 2016, 2017
IEEE Computer Graphics & Applications	2017
IEEE Signal Processing Letters	2014
Computer Graphics Forum	2013
Computer Vision and Image Understanding	2012
Journal of Visual Communication and Image Representation	2012
The Visual Computer	2016, 2017
Optical Engineering	2017
Computer Graphics & Applications	2015, 2016, 2017
Computers & Graphics	2013, 2014, 2015, 2016, 2017
EURASIP Journal on Image and Video Processing	2015
Journal of Electronic Imaging	2013

**Conferences:**

ACM SIGGRAPH	2013, 2016, 2017
ACM SIGGRAPH Asia	2016, 2017
Eurographics	2012, 2014, 2015, 2016, 2017
Computer Vision and Pattern Recognition (CVPR)	2011, 2014, 2015, 2016
International Conference on Computer Vision (ICCV)	2015, 2017
ACM Conference on Human Factors in Computing Systems (CHI)	2017
European Conference on Computer Vision (ECCV)	2014
Eurographics Symposium on Rendering (EGSR)	2015
Pacific Graphics	2016
Expressive Symposium on CAe, SBIM and NPAR	2014, 2015, 2017
Symposium on Non-Photorealistic Animation and Rendering (NPAR)	2012
German Conference on Pattern Recognition (GCPR)	2014
Computer Graphics International (CGI)	2012
IEEE Virtual Reality (VR)	2014, 2017
Graphics Interface (GI)	2014

## SUPERVISING & MENTORING STUDENTS

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### Supervised & co-supervised PhD/EngD students

2017 – Phuc Te: *Light field reconstruction*

2017 – Joanna Tarko: *Augmented reality*

2016 – Tobias Bertel: *Light field editing*

### Mentored PhD students

2015 – Abhimitra Meka: *Intrinsic video*

2014 – Hyeongwoo Kim: *Video refocusing, inverse rendering for faces*

2015 – 2016 Helge Rhodin: *Unconstrained motion capture*

2015 – 2016 Lucas Thies: *Real-time scene flow*

2014 Hamid Sarmadi: *Intrinsic video*

### Supervised Masters students

2017 Alex Baer: *Stabilising time lapses*

Padraig Boulton: *Inverting Instagram filters*

Andrew Shin: *Foreign exchange technical analysis*

Summer 2013 Joan Sol Roo: *Video de-anaglyph*

2009 – 2010 Lech Świrski: *Stereoscopic pop-up*

### Supervised Interns

Summer 2009 Douglas Orr: *Real-time stereo vision*

### Supervised Bachelor students

2017 – 2018 Liam Berrisford: *Underwater scene reconstruction*

Freddie Millman: *Undoing image enhancements*

2016 – 2017 Oliver Shannon-Lepper: *Hands in VR*

2011 – 2012 Joseph Seaton: *Shader compositor*

2010 – 2011 James Neve: *Converting anaglyph 3D to stereoscopic 3D*

Ludwig Schmidt: *Streaming videos of solar imaging data*

2009 – 2010 Mark Wheeler: *Lecture voting system*

Rubin Xu: *A GPU-enabled real-time video processing library*

2008 – 2009 Aloysius Han: *Panorama viewfinding*

Malte Schwarzkopf: *Interactively guided structure-from-motion*

Lech Świrski: *Automatic people removal from photographs*

## TEACHING

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### Lecturing

2016 – 2018 **Fundamentals of Visual Computing** (CM20219, University of Bath)

*This second-year undergraduate course is an introduction to the theoretical and mathematical foundations of image processing, computer graphics and computer vision. The course is attended by 110 computer science and electrical engineering students.*

**Visual Understanding 1** (CM50248, University of Bath)

*This intensive, coursework-heavy Masters-level course (15 hours of lectures in 3 weeks) provides a solid coverage of the fundamentals of image processing, computer vision and multi-view geometry that are required for visual understanding tasks.*

## Seminar

2014 – 2016 **Computer Vision for Computer Graphics** with Christian Theobalt (at Saarland University)  
*In this seminar with 8–11 students, each student gives a half-hour presentation about two state-of-the-art papers from computer vision and graphics, which is followed by an hour of group discussion. In 2016, the students ranked our seminar as the best computer science seminar offered in the semester.*

## SIGGRAPH Courses

2017 **Video for Virtual Reality** at SIGGRAPH 2017  
*I co-organised this half-day course on fusion of video and virtual reality technology with James Tompkin. The course provides an overview of three aspects of this promising fusion: technical foundations, current systems in practice, and the potential for future systems of VR video.*

2015 **User-Centric Computational Videography** at SIGGRAPH 2015  
*I organised a half-day course on user-centric video techniques with James Tompkin, Jiamin Bai and Christian Theobalt. We covered state-of-the-art techniques that aim to improve the quality and flexibility of capturing, editing and exploring of consumer videos.*

## Tutoring (Cambridge ‘Supervisions’)

2007 – 2012 *I have taught groups of 2–3 undergraduates for around 350 hours, mostly on computer graphics, image processing and computer vision, but also on information theory, algorithms, probability, and type theory.*

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## MEDIA COVERAGE

2017 “Augmented Reality in real”, [Technology Review](#) (Germany), 23 March 2017

2013 “Disney Research Creates Megastereo – Panoramas With Depth”, [Slashdot](#), 23 June 2013

“Team creates techniques for high quality, high resolution stereo panoramas”, [Phys.org](#), 21 June 2013

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## QUALIFICATIONS, AWARDS & ACHIEVEMENTS

2017 Best Poster Award for “EgoCap” at Motion in Games (MIG) conference [\[website\]](#)

2016 Busy Beaver Award (best CS seminar at Saarland University in summer semester 2016)

2012–2014 Inria Post-doctoral Research Fellowship

2011 Winner of the ACM SIGGRAPH Student Research Competition (SRC)

Associate of the Higher Education Academy (AHEA)

2007–2011 EPSRC Doctoral Training Studentship

2007 Data Connection Dissertation Prize

Honorary Cambridge European Trust Scholar

2006 The MathWorks Bursary in Computer Science

2005–2007 Senior Scholar of Gonville & Caius College

2004–2007 Cambridge European Trust Bursary

2004 Forth prize in “Jugend forscht” (Germany-wide competition for school-aged ‘researchers’) for an optical 3D measurement system (using structured light)

2000–2004 Distinctions in German Mathematics competitions, top 16 in Germany

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## PATENT

2016 “Stereoscopic panoramas” – US Patent 9,398,215

## ADDITIONAL SKILLS

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**Languages** German (native), English (fluent), [French](#) (basic conversational)

**Programming** **Scientific** C/C++ (Visual Studio, Xcode), Python (Jupyter Notebook), C#, Matlab

**GPGPU** GLSL, [CUDA](#)

**Scripting** Python, [batch files](#), [shell scripts](#)

**Libraries** OpenCV, NumPy, SciPy, Matplotlib, OpenGL, Qt, [TensorFlow](#), [OpenNI](#)

**Web sites** HTML, CSS, PHP, WordPress, [jQuery](#), [Apache](#), [MySQL](#)

**Computing** **Office software** Microsoft Word, Excel, PowerPoint, Outlook & [Publisher](#); Apple Keynote, Pages & [Numbers](#);  $\LaTeX$  with [TikZ](#); [OpenOffice/LibreOffice](#)

**Digital media** Adobe Photoshop, Premiere, Acrobat, Lightroom & Illustrator; VirtualDub; [AviSynth](#); [PhotoLine](#); [Autodesk Maya](#); [Blender](#)