

Daniel Kurz

[Website](#)[Email](#)[LinkedIn](#)[Google Scholar](#)

Engineer and Manager in Machine Learning, Computer Vision, and Augmented Reality

Daniel's teams at Apple have shipped ARKit features in iOS, delivered large-scale high-fidelity data collection and processing tools for Apple's LiDAR scanner, and introduced 3D scene understanding and product fitting algorithms to visionOS and Vision Pro.

He currently contributes to the development of a modern, LLM-based Siri. Before Apple, Daniel conducted Spatial AR research at universities in Germany and Japan and built Mobile AR algorithms and products at the pioneering AR startup Metaio.

Experience

Apple · Cupertino · 2015 — Present

Senior Engineering Manager · *LLM Response Generation, Siri Core Modeling* 2025 — Present

- Ran a team focussed on context engineering and model training for LLM-based Siri responses.
- Owned evaluation coverage and response quality for Search-powered use cases across multiple domains.

Senior Engineering Manager · *CVML Algorithms for Apple Vision Pro, Vision Products Group* 2019 — 2025

- Drove the delivery of visionOS features including environment light estimation for coherently lit virtual content, room analysis for spatial audio, video pass-through improvements for camera regions and surroundings zoom, and the algorithm for finding the right fit for Vision Pro.
- Directed the team designing and building tools for large-scale in-the-wild data collections for 3D scene understanding algorithms, including ARKitScenes and datasets that enabled launching Apple's LiDAR Scanner in iPad Pro.

Engineering Manager · *CVML Algorithms for ARKit and Apple Vision Pro, Vision Products Group* 2015 — 2019

- Led a team developing ARKit algorithms enhancing visual coherence and realism. Shipped ambient light estimation, face tracking-enabled directional light estimation, coherent camera noise, and GAN-based realistic reflections in iOS.
- Spearheaded the camera and compute requirements engineering for algorithms on Vision Pro.

Metaio · Munich · 2010 — 2015

Head of Advanced Technologies Group · *Augmented Reality R&D* 2014 — 2015

- Founded and led the Advanced Technologies Group, researching and innovating in Augmented Reality, Computer Vision, Computer Graphics, Sensor Fusion, and Human Computer Interfaces to strengthen Metaio's IP portfolio and increase visibility as a technology leader, leading to its acquisition.

Senior Software Engineer · *Augmented Reality R&D* 2012 — 2014

- Invented new Computer Vision and Sensor Fusion methods for camera localization, addressing outdoor challenges and low-texture objects. Led iOS app development for customers (e.g. Audi eKurzinfo) and Metaio Toolbox. Designed and implemented custom algorithms for Volkswagen, Red Bull, and more.

Software Engineer · *Augmented Reality R&D* 2010 — 2012

- Designed, implemented, and optimized novel and efficient Computer Vision algorithms for real-time visual object detection and tracking on mobile devices. These algorithms became integral components of the MetaioSDK.

Education

Technical University of Munich · *Prof. Gudrun Klinker, Ph.D.* 2012 — 2014

Doctor of Science, Computer Science (*Summa cum laude*)

Dissertation: Sensor-Aided Visual Camera Localization and Tracking for Handheld Augmented Reality

Bauhaus-University Weimar · *Prof. Dr. Ing. Oliver Bimber* 2007 — 2010

Master of Science, Media Systems (*Excellent with honors*)

Osaka University · *Prof. Kiyoshi Kiyokawa, Ph.D.* 2007 — 2008

Special Research Student

Bauhaus-University Weimar · *Prof. Dr. Ing. Oliver Bimber* 2003 — 2007

Bachelor of Science, Media Systems

Publications and Patents

23 publications and 43 patents and patent applications with over 2,400 citations. Full lists below; see also Google Scholar.

Publications

- [23] **Reconstructing training data from diverse ML models by ensemble inversion**
Qian Wang, [Daniel Kurz](#)
Proc. IEEE/CVF Winter Conference on Applications of Computer Vision, 2022 ([@arXiv](#))
- [22] **ARKitScenes: A diverse real-world dataset for 3d indoor scene understanding using mobile RGB-D data**
Gilad Baruch, Zhuoyuan Chen, Afshin Dehghan, Tal Dimry, Yuri Feigin, Peter Fu, Thomas Gebauer, Brandon Joffe, [Daniel Kurz](#), Arik Schwartz
NeurIPS Datasets and Benchmarks, 2021 ([@arXiv](#))
- [21] **HDR environment map estimation for real-time augmented reality**
Gowri Somanath, [Daniel Kurz](#)
Proc. IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2021 ([@arXiv](#))
- [20] **Leveraging the user's face for absolute scale estimation in handheld monocular SLAM**
Sebastian B Knorr, [Daniel Kurz](#)
Proc. IEEE International Symposium on Mixed and Augmented Reality (ISMAR), 2016 (Preprint) ([@IEEE](#))
- [19] **Real-time illumination estimation from faces for coherent rendering**
Sebastian B Knorr, [Daniel Kurz](#)
Proc. IEEE International Symposium on Mixed and Augmented Reality (ISMAR), 2014 (Preprint) ([@IEEE](#))
- [18] **Thermal touch: Thermography-enabled everywhere touch interfaces for mobile augmented reality applications**
[Daniel Kurz](#)
Proc. IEEE International Symposium on Mixed and Augmented Reality (ISMAR), 2014 (Preprint) ([@IEEE](#))
- [17] **[Poster] Towards mobile augmented reality for the elderly**
[Daniel Kurz](#), Anton Fedosov, Stefan Diewald, Jörg Gürtier, Barbara Geilhof, Matthias Heuberger
Proc. IEEE International Symposium on Mixed and Augmented Reality (ISMAR), 2014 (Preprint) ([@IEEE](#))
- [16] **[Poster] A Mobile Augmented Reality System to Assist Auto Mechanics**
Darko Stanimirovic, Nina Damasky, Sabine Webel, Dirk Koriath, Andrea Spillner, [Daniel Kurz](#)
Proc. IEEE International Symposium on Mixed and Augmented Reality (ISMAR), 2014 (Preprint) ([@IEEE](#))
- [15] **[Poster] Smartwatch-aided handheld augmented reality**
Darko Stanimirovic, [Daniel Kurz](#)
Proc. IEEE International Symposium on Mixed and Augmented Reality (ISMAR), 2014 (Preprint) ([@IEEE](#))
- [14] **Absolute spatial context-aware visual feature descriptors for outdoor handheld camera localization**
[Daniel Kurz](#), Peter Georg Meier, Alexander Plopski, Gudrun Klinker
Proc. International Conference on Computer Vision Theory and Applications (VISAPP), 2014 (Preprint) ([@SciTePress](#))
- [13] **An outdoor ground truth evaluation dataset for sensor-aided visual handheld camera localization**
[Daniel Kurz](#), Peter Georg Meier, Alexander Plopski, Gudrun Klinker
Proc. IEEE International Symposium on Mixed and Augmented Reality (ISMAR), 2013 (Preprint) ([@IEEE](#))
- [12] **Representative feature descriptor sets for robust handheld camera localization**
[Daniel Kurz](#), Thomas Olszowski, Selim Benhimane
Proc. IEEE International Symposium on Mixed and Augmented Reality (ISMAR), 2012 (Preprint) ([@IEEE](#))
- [11] **Handheld augmented reality involving gravity measurements**
[Daniel Kurz](#), Selim Benhimane
Computers & Graphics, 2012 ([@Elsevier](#))
- [10] **Benchmarking inertial sensor-aided localization and tracking methods**
[Daniel Kurz](#), Sebastian Lieberknecht, Selim Benhimane
Proc. TrakMark Workshop (ISMAR), 2011 (Preprint)
- [9] **Gravity-aware handheld augmented reality**
[Daniel Kurz](#), Selim Benhimane
Proc. IEEE International Symposium on Mixed and Augmented Reality (ISMAR), 2011 (Preprint) ([@IEEE](#))
- [8] **Inertial sensor-aligned visual feature descriptors**
[Daniel Kurz](#), Selim Benhimane
Proc. IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2011 (Preprint) ([@IEEE](#))
- [7] **Color invariant chroma keying and color spill neutralization for dynamic scenes and cameras**
Anselm Grundhöfer, [Daniel Kurz](#), Sebastian Thiele, Oliver Bimber
The Visual Computer, 2010 (Preprint) ([@Springer](#))
- [6] **Fast and robust CAMShift tracking**
David Exner, Erich Bruns, [Daniel Kurz](#), Anselm Grundhöfer, Oliver Bimber
Proc. IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR) Workshops, 2010 ([@IEEE](#))
- [5] **Closed-loop feedback illumination for optical inverse tone-mapping in light microscopy**
Oliver Bimber, Daniel Klöck, Toshiyuki Amano, Anselm Grundhöfer, [Daniel Kurz](#)
IEEE Transactions on Visualization and Computer Graphics, 2010 ([@IEEE](#))
- [4] **Projected light microscopy**
Oliver Bimber, Anselm Grundhöfer, [Daniel Kurz](#), Sebastian Thiele, Ferry Häntsch, Toshiyuki Amano, Daniel Klöck
SIGGRAPH 2009: Talks, 2009 ([@ACM](#))
- [3] **Improving Interaction Performance for Ray Tracing**
[Daniel Kurz](#), Christopher Lux, Jan P Springer, Bernd Fröhlich
Eurographics (Short Papers), 2008 (Preprint) ([@Eurographics](#))
- [2] **Mutual occlusions on table-top displays in mixed reality applications**
[Daniel Kurz](#), Kiyoshi Kiyokawa, Haruo Takemura
Proc. ACM Symposium on Virtual Reality Software and Technology (VRST), 2008 (Preprint) ([@ACM](#))
- [1] **Laser pointer tracking in projector-augmented architectural environments**
[Daniel Kurz](#), Ferry Häntsch, Max Große, Alexander Schiewe, Oliver Bimber
Proc. IEEE and ACM International Symposium on Mixed and Augmented Reality (ISMAR), 2007 (Preprint) ([@IEEE](#))

Patents

- [43] **Device seal light leakage correction**
Praveen Gowda Ippadi Veerabhadre Gowda, Frank Bollack, Shiuli Das, Yuri Pekelny, Thomas Berton, Ransen Niu, Daniel Kurz
US Patent Application 19/318,596 · 2026
- [42] **Dynamic frame selection for scene understanding**
Daniel Kurz
US Patent 12,536,737 · 2026
- [41] **Specular surface mapping**
Luke A Pillans, Aleksandr M Movshovich, Nicholas C Soldner, Daniel Kurz, Arthur Y Zhang
US Patent 12,373,969 · 2025
- [40] **Shared event recording and rendering**
Daniel Kurz, Michael J Rockwell
US Patent Application 18/807,283 · 2025
- [39] **Immersive virtual display**
Mark B Rober, Sawyer I Cohen, Daniel Kurz, Tobias Holl, Benjamin B Lyon, Peter Georg Meier, Jeffrey M Riepling, Holly Gerhard
US Patent 12,347,047 · 2025
- [38] **Image-based detection of surfaces that provide specular reflections and reflection modification**
Peter Meier, Daniel Kurz, Brian Chris Clark, Selim Benhimane
US Patent 11,900,569 · 2024
- [37] **Method and system for presenting a digital information related to a real object**
Daniel Kurz, Anton Fedosov
US Patent 12,039,644 · 2024
- [36] **Transparent insert identification**
Daniel Kurz, Anselm Grundhoefer, Tushar Gupta
US Patent 11,948,043 · 2024
- [35] **Method and device for eye tracking using event camera data**
Branko Petljanski, Raffi A Bedikian, Daniel Kurz, Thomas Gebauer, Li Jia
US Patent 12,105,280 · 2024
- [34] **Method and device for detecting a touch between a first object and a second object**
Daniel Kurz
US Patent 11,797,132 · 2023
- [33] **Global reference direction detection for orienting three-dimensional models**
Daniel Kurz
US Patent 11,935,263 · 2024
- [32] **Method and system for generating at least one image of a real environment**
Sebastian Knorr, Daniel Kurz
US Patent 11,877,086 · 2024
- [31] **Light probe placement for displaying objects in 3D environments on electronic devices**
Daniel Kurz, Gowri Somanath, Tobias Holl
US Patent 12,002,165 · 2024
- [30] **Detecting specular surfaces**
Anselm Grundhoefer, Selim Benhimane, Daniel Kurz
US Patent 12,073,533 · 2024
- [29] **Multiple device model augmentation**
Daniel Kurz
US Patent Application 18/441,274 · 2024
- [28] **Method and system for determining at least one property related to at least part of a real environment**
Darko Stanimirovic, Daniel Kurz
US Patent 11,727,661 · 2023
- [27] **Method of and system for projecting digital information on a real object in a real environment**
Peter Meier, Selim Benhimane, Daniel Kurz
US Patent 11,652,965 · 2023
- [26] **Method and system for determining spatial coordinates of a 3D reconstruction of at least part of a real object at absolute spatial scale**
Sebastian Knorr, Daniel Kurz
US Patent 11,741,624 · 2023
- [25] **Environment synthesis for lighting an object**
Daniel Kurz, Gowri Somanath, Tobias Holl
US Patent 11,694,392 · 2023
- [24] **Partial image completion**
Daniel Kurz, Gowri Somanath, Tobias Holl
US Patent 11,636,578 · 2023
- [23] **Devices and methods for motion planning of computer characters**
Daniel Kurz, Novaira Masood, Shem Nguyen, Jeremy R Bernstein
US Patent Application 18/174,560 · 2023
- [22] **Training a network to inhibit performance of a secondary task**
Daniel Kurz, Thomas Gebauer, Dewey H Lee, Muhammad Ahmed Riaz, Qian Wang
US Patent 11,734,570 · 2023
- [21] **Posture detection and correction**
Daniel Kurz
US Patent 11,544,865 · 2023
- [20] **Classification for image creation**
Gowri Somanath, Daniel Kurz
US Patent 11,423,308 · 2022
- [19] **Immersive display of motion-synchronized virtual content**
Mark B Rober, Sawyer I Cohen, Daniel Kurz, Tobias Holl, Benjamin B Lyon, Peter Georg Meier, Jeffrey M Riepling, Holly Gerhard
US Patent 11,321,923 · 2022

- [18] **Rendering objects to match camera noise**
Daniel Kurz, Tobias Holl
US Patent 11,308,652 · 2022
- [17] **Deformable object tracking**
Peter Kaufmann, Daniel Kurz, Brian Amberg, Yanghai Tsin
US Patent 11,379,996 · 2022
- [16] **Generating a computer graphic for a video frame**
Daniel Kurz
US Patent 11,282,171 · 2022
- [15] **Federated learning using local ground truth estimation**
Daniel Kurz, Muhammad Ahmed Riaz
US Patent 11,507,836 · 2022
- [14] **Postponing the state change of an information affecting the graphical user interface until during the condition of inattentiveness**
Sebastian Knorr, Daniel Kurz
US Patent 11,334,156 · 2022
- [13] **Modeling a geographical space for a computer-generated reality experience**
Daniel Kurz
US Patent 11,488,352 · 2022
- [12] **Rendering virtual objects with realistic surface properties that match the environment**
Bradley W Peebler, Daniel Kurz
US Patent 10,930,049 · 2021
- [11] **Rendering virtual content with coherent visual properties**
Daniel Kurz
US Patent 11,182,978 · 2021
- [10] **Method of detecting and describing features from an intensity image**
Daniel Kurz, Peter Meier
US Patent 10,607,350 · 2020
- [9] **Method of providing image feature descriptors**
Selim Benhimane, Daniel Kurz, Thomas Olszowski
US Patent 10,528,847 · 2020
- [8] **Augmented virtual display**
Mark B Rober, Sawyer I Cohen, Daniel Kurz, Tobias Holl, Benjamin B Lyon, Peter Georg Meier, Jeffrey M Riepling, Holly Gerhard
US Patent 10,825,255 · 2020
- [7] **Depth-based touch detection**
Lejing Wang, Daniel Kurz
US Patent 10,572,072 · 2020
- [6] **Method of providing a descriptor for at least one feature of an image and method of matching features**
Daniel Kurz, Selim Benhimane
US Patent 10,650,546 · 2020
- [5] **Method and system for determining a model of at least part of a real object**
Daniel Kurz, Lejing Wang
US Patent 10,297,083 · 2019
- [4] **Augmented safety restraint**
Daniele Casaburo, Daniel Kurz, Sebastian Knorr
US Patent 10,189,434 · 2019
- [3] **Method and system for providing information associated with a view of a real environment superimposed with a virtual object**
Daniel Kurz, Lejing Wang
US Patent Application 15/100,355 · 2016
- [2] **Method of matching image features with reference features**
Daniel Kurz, Peter Meier
US Patent 9,400,941 · 2016
- [1] **Method for registering at least one part of a first and second image using a collineation warping function**
Selim Benhimane, Daniel Kurz
US Patent 9,213,908 · 2015