

Dr.-Ing. David Lindlbauer – CV

ETH Zurich – Department of Computer Science
Advanced Interactive Technologies Lab
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Research interests

My research lies in the general area of Human-Computer interaction, with influences from Computer Graphics and Computer Vision. I strive to **understand** how humans perceive and interact with digital information, and to **build technology** that goes beyond the flat displays of PCs and smartphones to advances our capabilities when interacting with the digital world.

My research follows three connected main lines of work: 1) **create and study enabling technologies** that bridge the virtual world and the physical world and allow for a seamless integration of the digital world in our everyday lives, 2) **explore methods to simulate a completely dynamic physical world** to learn how much augmentation users actually want, and 3) **create computational approaches** that control when, where and how virtual content is displayed to increase the usability of AR and VR interfaces.

Personal details

Nationality: Austria
Birthday: March 6th 1986

Academic positions

Postdoctoral researcher at ETH Zurich, Department of Computer Science

Advanced Interactive Technologies (AIT) Lab
Zurich, Switzerland, 09/2018 – current
AIT Lab is headed by Prof. Otmar Hilliges
Funded through personal ETH Zurich Postdoctoral Fellowship (\$229,000 for 2 years)

Education

Doktor der Ingenieurwissenschaften (Dr.-Ing.) at Technische Universität Berlin

Computer Graphics Group
Berlin, Germany, 11/2014 – 09/2018
Advisor: Prof. Marc Alexa
PhD thesis: *Bridging the Virtual World and the Physical World with Optically Dynamic Interfaces*
Thesis committee: Prof. Marc Alexa, Prof. Ravin Balakrishnan, Prof. Jörg Müller, Prof. Olaf Hellwich
Graduated with distinction (summa cum laude)
(* Doctoral degree is comparable to PhD in Anglo-American educational system)

PhD candidate | Teaching and Research Assistant at Technische Universität Berlin
Mobile and Physical Interaction Group
Berlin, Germany, 01/2014 – 11/2014
Advisor: Prof. Jörg Müller (now Bayreuth University, Germany)

PhD candidate | Teaching and Research Assistant at University of Applied Sciences Upper Austria
Media Interaction Lab
Hagenberg, Austria, 11/2012 – 12/2013
Advisor: Prof. Michael Haller

Master of Science at University of Applied Sciences Upper Austria, Campus Hagenberg

Program: Interactive Media
Hagenberg, Austria, 10/2010 – 08/2012,
Master's thesis: *Perceptual Grouping of Digital Sketches*. Advised by Prof. Michael Haller
Graduated with high distinction.
Term abroad at University of Waterloo
Waterloo, Ontario, Canada, 05/2012 – 10/2012
Advisors: Prof. Mark Hancock, Prof. Stacey Scott

Bachelor of Science at University of Applied Sciences Upper Austria, Campus Hagenberg

Program: Media Technology and Design

Hagenberg, Austria, 10/2006 – 08/2009,

Bachelor's thesis: *The OpenSocial API*. Advised by FH-Prof. DI Rimbart Rudisch-Sommer

Graduated with distinction

Research stays

Microsoft Research

Perception and Interaction Group. Internship with Andy Wilson.

Redmond, WA, USA, 06/2017 – 09/2017

Publications

Conference full papers (fully refereed)

Top-tier venues in Human-Computer Interaction are ACM CHI and ACM UIST (acceptance rate 20-25%).

Conference papers are considered premier outlets for publication in HCI, similar to journal articles in other scientific fields.

- [C.17] *Context-Aware Online Adaptation of Mixed Reality Interfaces.*
D. Lindlbauer, A. Feit, O. Hilliges
ACM UIST 2019, New Orleans, LA, USA
- [C.16] *Understanding Metamaterial Mechanisms.*
A. Ion, **D. Lindlbauer**, P. Herholz, M. Alexa, P. Baudisch
ACM CHI 2019, Glasgow, Scotland
<https://doi.org/10.1145/3290605.3300877>
- [C.15] *The Mental Image Revealed by Gaze Tracking.*
X. Wang, A. Ley, S. Koch, **D. Lindlbauer**, J. Hays, K. Holmqvist, M. Alexa
ACM CHI 2019, Glasgow, Scotland
<https://doi.org/10.1145/3290605.3300839>
- [C.14] *TacTiles: Dual-mode Low-power Electromagnetic Actuators for Rendering Continuous Contact and Spatial Haptic Patterns in VR*
V. Vechev, J. Zarate, **D. Lindlbauer**, R. Hinchet, H. Shea, O. Hilliges
IEEE VR 2019, Osaka, Japan
- [C.13] *Remixed Reality: Manipulating Space and Time in Augmented Reality*
D. Lindlbauer, A. Wilson
ACM CHI 2018, Montreal, QC, Canada
<https://doi.org/10.1145/3173574.3173703>
- [C.12] *HeatSpace: Automatic Placement of Displays by Empirical Analysis of User Behavior*
A. Fender, **D. Lindlbauer**, P. Herholz, M. Alexa, J. Müller
ACM UIST 2017, Quebec, QC, Canada
<https://doi.org/10.1145/3126594.3126621>
- [C.11] *Changing the Appearance of Real-World Objects by Modifying Their Surroundings*
D. Lindlbauer, J. Müller, M. Alexa
ACM CHI 2017, Denver, CO, USA.
<https://doi.org/10.1145/3025453.3025795>
- [C.10] *Changing the Appearance of Physical Interfaces Through Controlled Transparency*
D. Lindlbauer, J. Müller, M. Alexa
ACM UIST 2016, Tokyo, Japan.
<https://doi.org/10.1145/2984511.2984556>
- [C.9] *Combining Shape-Changing Interfaces and Spatial Augmented Reality Enables Extended Object Appearance*
D. Lindlbauer, J.E. Grønbæk, M. Birk, K. Halskov, M. Alexa, J. Müller
ACM CHI 2016, San Jose, CA, USA.
<https://doi.org/10.1145/2858036.2858457>

- [C.8] *Influence of Display Transparency on Background Awareness and Task Performance*
D. Lindlbauer, K. Liliya, R. Walter, J. Müller
 ACM CHI 2016, San Jose, CA, USA.
Best Paper Honorable Mention Award
<https://doi.org/10.1145/2858036.2858453>
- [C.7] *GelTouch: Localized Tactile Feedback Through Thin, Programmable Gel*
 V. Miruchna, R. Walter, **D. Lindlbauer**, M. Lehmann, R. von Klitzing, J. Müller
 ACM UIST 2015, Charlotte, NC, USA.
Best Paper Honorable Mention Award
<https://doi.org/10.1145/2807442.2807487>
- [C.6] *Creature Teacher: A Performance-Based Animation System for Creating Cyclic Movements*
 A. Fender, J. Müller, **D. Lindlbauer**
 ACM SUI 2015, Los Angeles, CA, USA.
<https://doi.org/10.1145/2788940.2788944>
- [C.5] *Analyzing Visual Attention During Whole Body Interaction with Public Displays*
 R. Walter, A. Bulling, **D. Lindlbauer**, M. Schuessler, J. Müller
 ACM UBICOMP 2015, Osaka, Japan. Short paper.
<https://doi.org/10.1145/2750858.2804255>
- [C.4] *Tracs: Transparency Control for See-through Displays*
D. Lindlbauer, T. Aoki, R. Walter, A. Höchtl, Y. UEMA, M. Haller, M. Inami, J. Müller.
 ACM UIST 2014, Honolulu, HI, USA.
<https://doi.org/10.1145/2642918.2647350>
- [C.3] *A Chair as Ubiquitous Input Device: Exploring Semaphore Chair Gestures for Focused and Peripheral Interaction*
 K. Probst, **D. Lindlbauer**, M. Haller, B. Schwartz, A. Schrempf.
 ACM CHI 2014, Toronto, Canada.
<https://doi.org/10.1145/2556288.2557051>
- [C.2] *Perceptual Grouping: Selection Assistance for Digital Sketching*
D. Lindlbauer, M. Haller, M. Hancock, S. D. Scott, W. Stuerzlinger.
 ACM ITS 2013, St. Andrews, Scotland.
<https://doi.org/10.1145/2512349.2512801>
- [C.1] *Exploring the Use of Distributed Multiple Monitors Within an Activity-Promoting Sit-and-Stand Office Workspace*
 K. Probst, **D. Lindlbauer**, F. Perteneder, M. Haller, B. Schwartz, A. Schrempf.
 IFIP Interact 2013, Cape Town, South Africa.
https://doi.org/10.1007/978-3-642-40477-1_30

Journal articles

- [J.1] *Measuring Visual Saliency of 3D Printed Objects.*
 X. Wang, **D. Lindlbauer**, C. Lessig, M. Maertens, M. Alexa
 IEEE Computer Graphics and Applications 36/4. Special Issue on Quality Assessment and Perception in Computer Graphics, 2016.
<https://doi.org/10.1109/MCG.2016.47>

Book chapters

- [B.2] *Accuracy of Monocular Gaze Tracking on 3D Geometry.*
 X. Wang, **D. Lindlbauer**, C. Lessig, M. Alexa
 In *Eye Tracking and Visualization. Foundations, Techniques, and Applications*. ETVIS 2015 Springer International Publishing 2017. M. Burch, L. Chuang, B. Fisher, A. Schmidt and D. Weiskopf (Eds.), ISBN 978-3-319-47023-8
- [B.1] *Beyond Prototyping.*
 J. Ängeslevä, I. Nicenboim, J. Wunderling, **D. Lindlbauer**
 In *Rethink! Prototyping*. Springer International Publishing 2016.
 C. Gengnagel, E. Nagy, R. Stark (Eds.), ISBN 978-3-319-24439-6

Other publications

- [EA.3] *Optically Dynamic Interfaces*.
D. Lindlbauer
UIST 2017 Adjunct (Doctoral Symposium). Quebec City, QC, Canada.
- [EA.2] *A Collaborative See-through Display Supporting On-demand Privacy*.
D. Lindlbauer, T. Aoki, A. Höchtl, Y. UEMA, M. Haller, M. Inami, J. Müller
ACM Siggraph 2014 Emerging Technologies, Vancouver, BC, Canada.
- [EA.1] *Rotating, Tilting, Bouncing: Using an Interactive Chair to Promote Activity in Office Environments*.
K. Probst, **D. Lindlbauer**, P. Greindl, M. Trapp, M. Haller, B. Schwartz, A. Schrempf
ACM CHI 2013 Extended Abstracts, Paris, France.
- [W.2] *Accuracy of Monocular Gaze Tracking on 3D Geometry*.
X. Wang, **D. Lindlbauer**, C. Lessig, M. Alexa
Workshop on Eye Tracking and Visualization (ETVIS) co-located with IEEE VIS 2015.
- [W.1] *Exploring the Potential of Peripheral Interaction through Smart Furniture*.
K. Probst, **D. Lindlbauer**, M. Haller, B. Schwartz, A. Schrempf
Workshop on Peripheral Interaction at CHI 2014, Toronto, Canada.
- [TR.1] *Understanding Mid-Air Hand Gestures: A Study of Human Preferences in Usage of Gesture Types for HCI*. R. Aigner, D. Wigdor, H. Benko, M. Haller, **D. Lindlbauer**, A. Ion, S. Zhao, and J.T.K.V. Koh
Microsoft Tech Report MSR-TR-2012-11, Redmond, WA, USA.

Demonstrations & exhibits

- [D.7] *ad infinitum: a parasite that lives off human energy*. Ars Electronica 2017.
- [D.6] *Changing the Appearance of Real-World Objects by Modifying Their Surroundings*, CHI 2017.
- [D.5] *Changing the Appearance of Physical Interfaces Through Controlled Transparency*, CeBit 2017.
- [D.4] *ad infinitum: a parasite that lives off human energy*. Science Gallery Dublin 2017.
- [D.3] *Changing the Appearance of Physical Interfaces Through Controlled Transparency*, UIST 2016.
- [D.2] *Tracs: Transparency Control for See-through Displays*, UIST 2014.
- [D.1] *A Collaborative See-through Display Supporting On-demand Privacy*, SIGGRAPH 2014.

Theses

Bridging the Virtual World and the Physical World with Optically Dynamic Interfaces
2018, PhD thesis, Technische Universität Berlin

Perceptual Grouping of Digital Sketches.
2012, Master's thesis, University of Applied Sciences Upper Austria, Hagenberg.

The OpenSocial API.
2009, Bachelor's thesis, University of Applied Sciences Upper Austria, Hagenberg

Awards & recognitions

Best Paper Honorable Mention Award ACM CHI 2016
Influence of Display Transparency on Background Awareness and Task Performance.

Best Paper Honorable Mention Award ACM UIST 2015
GelTouch: Localized Tactile Feedback Through Thin, Programmable Gel.

Special recognitions for reviewing:
UIST 2014, 2 x CHI 2016, UIST 2016, CHI 2017, UIST 2017, CHI 2018, 3 x CHI 2019

Grants

NSF Grant - Student Innovation Challenge at UIST (2019, Co-writer) \$15,900
Increasing diversity & inclusiveness at UIST. Grant provides funding for 5 teams from underrepresented minorities to participate in the student innovation contest and attend the conference.

SIGCHI Grant - Student Innovation Challenge at UIST (2019, Co-writer) \$18,330
Increasing diversity & inclusiveness at UIST. Grant provides funding for 2 non-US teams from underrepresented minorities to participate in the student innovation contest and attend the conference.

ETH Zurich Postdoctoral Fellowships (2018, Principal investigator) CHF 229,600 / \$229,068
A Computational Framework for Increasing the Usability of Augmented Reality and Virtual Reality.

Shapeways Educational Grant (2015, Co-writer) \$1,000
Exploring Visual Saliency of 3D Objects

Performance scholarship (2011, Awardee) €725 / \$850
One of twelve awardees for performance scholarship by FH Hagenberg (Leistungsstipendium)

Invited Talks

- 2019/08/09 Google Mountain View – Interaction Lab. Hosted by Alex Olwal.
- 2019/08/08 UC Berkeley. Hosted by Björn Hartmann.
- 2019/08/07 Stanford University. Hosted by Sean Follmer.
- 2019/08/02 UCLA. Hosted by Xiang 'Anthony' Chen and Ankur Metha.
- 2019/07/10 MIT Media Lab – Tangible Media Group. Hosted by Hiroshi Ishii.
- 2019/07/10 MIT CSAIL. Hosted by Stefanie Mueller.
- 2019/07/08 Columbia University. Hosted by Steven Feiner.
- 2019/06/15 Swiss Society of Virtual and Augmented Reality, Meetup #HOMIXR
- 2018/05/22 University of Sussex – Interact Lab. Hosted by Diego Martinez.
- 2018/03/02 IST Austria. Hosted by Bernd Bickel.
- 2018/02/21 University of Toronto – DGP. Hosted by Seongkook Heo.
- 2017/12/15 ETH Zurich. Hosted by Otmar Hilliges.
- 2017/12/14 Disney Research Zurich. Hosted by Anselm Grundhöfer.
- 2017/12/12 INRIA Bordeaux. Hosted by Martin Hachet.
- 2017/10/05 Aarhus University. Hosted by Roman Rädle.

Professional activity

Program committee

- Program committee member for CHI 2020
- Program committee member for CHI 2019
- Program committee member for UIST 2018
- Program committee member for ISS 2017

Organizing committee

- SIGCHI Operations committee (since 02/2016)
- Student innovation contest co-chair for UIST 2019
- Student innovation contest co-chair for UIST 2018
- Student volunteers co-chair for UIST 2016
- Video capture chair for CHI 2016, 2017, 2018, 2019, 2020
- Poster chair for PerDis 2016
- Video capture chair for UIST 2015

Outreach

Leading the creation and maintenance of the SIGCHI YouTube channel (since 2016)

The SIGCHI YouTube channel is the largest freely available resource of HCI research videos. The channel has more than 3000 recordings of keynotes and technical paper presentations from conferences such as CHI, UIST and IUI. It has more than 5000 subscribers and attracted over 2 million views in the last 3 years.

Co-chairing of the UIST Student Innovation Contest 2018 and 2019

The UIST Student Innovation Contest is one of the main driving sources to increase participation of students and junior researchers to UIST and HCI. In 2018, more than 35 students participated in the contest. For 2019, I was involved in winning 2 grants to provide full funding to a total of 20 students from underrepresented minorities in STEM to increase the diversity and inclusiveness of the contest and UIST.

Reviewing

2019 CHI, UIST, IEEE VR, TOCHI, SIGGRAPH, Computer Graphics Forum

2018 CHI, UIST, ISS, TEI, IEEE VR, TOCHI

2017 CHI, UIST, ICMI, IMWUT (UbiComp), MobileHCI, DIS, DESFORM

2016 CHI, UIST, ISS, ICMI, SUI, AH, IJHCI

2015 CHI, ICMI, ITS, SUI, PerDis, PERCOMP Journal

2014 CHI, UIST, ICMI, NordiCHI, SUI

Student volunteering

ITS 2014, UIST 2014, CHI 2015

Teaching

Co-supervised Bachelor's and Master's theses

Jonathan Lehner, 2019. Real-Time Hand Tracking from Wrist-Worn RGB Cameras.

Stefan Weber, 2019. Feasibility of the Index of Pupillary Activity.

Tobias Bernard, 2017, *Design and Evaluation of Spatial Interfaces in Virtual Reality.*

Leonardo Hahn, 2017, *Hiding Objects by Creating Camouflage Surroundings.*

Patrick Engelhard, 2016. *3D Modeling using Sparse Sensor Data.*

Klemen Lilija, 2015. *Interaction with Transparent Displays.*

Viktor Miruchna, 2015. *Exploring the Potential Usage of Hydrogels for Tactile Feedback Systems.*

Andreas Fender, 2014. *Design and Implementation of a Performance Based Animation System for Prototyping Non-Humanoid Character Movements.*

Eva-Maria Grossauer, 2013. *Supporting Seamless Integration of Handwritten Casual Notes in Digital Tools Through Semantic Classification.*

Head teaching assistant

Includes organization of courses, teaching and presentation of exercises, and correction of homework and exams.

Winter term 2019, Human-computer interaction, ETH Zurich

Summer term 2019, Seminar on Computation Interaction, ETH Zurich

Winter term 2018, Human-computer interaction, ETH Zurich

Summer term 2018, Computer Graphics 2, TU Berlin

Winter term 2016 / 2017, Computer Graphics 1, TU Berlin

Winter term 2013, Computer Graphics 2, University of Applied Sciences Hagenberg

Student teaching assistant

Correction of homework and exams.

Winter term 2011, Digital Imaging, University of Applied Sciences Hagenberg

Summer term 2011, Hypermedia programming, University of Applied Sciences Hagenberg

Summer term 2010, Computer Graphics (OpenGL), University of Applied Sciences Hagenberg

Project supervision, TU Berlin

Winter and summer term 2016 / 2017 / 2018
semester course, approximately 1 day / week

Rebecca Fribourg (Airbrush, 2016)
Friedrich Meckel, Jeremias Eichelbaum (Camouflage, 2016)
Mirko Greese (AR illusions, 2017)
Maurice Quennet (Control theory + robotic arm, 2018)
Tim Grutzeck (Smartphone-based 3D input device, 2018)
Mike Funk (VR voxel editor, 2018)
Fabian Puch (Mobile AR illusions, 2018)

Selected press

Shiropen (Japan). *ETH Zurich and EPFL announce lightweight and low-power haptic device "TacTiles" that reproduces a sense of touch by pressing a pin against 15 points of one hand.* 2019
Shiropen (Japan). *The Mental Image Revealed by Gaze Tracking.* 2019
MSPowerUser. *Microsoft aims to Remix Reality with new VR technology.* 2018
Virtual Reality Summit. *Microsoft Research Demoing New Remixed Reality Technology.* 2018
VRRoom. *Remixed Reality Manipulates Space & Time In AR.* 2018
Shiropen (Japan). *Remixed Reality.* 2018
Fast Co.Design. *It's Alarmingly Easy For Machines To Control Us.* 2017.
Fast Co.Design. *An Invisibility Cloak for Distracting Gadgets.* 2016.
Vice Motherboard. *Origami-Like' Objects Can Instantly Change Their Transparency.* 2016.
Futurism. *Controlled Transparency Is The Chameleon of Technology.* 2016.
MIT Technology Review. *Make Your Own Buttons with a Gel Touch Screen.* 2015.
Wired Germany. *Berliner Forscher haben einen Weg gefunden, Touchscreens temporäre Tasten zu verpassen.* 2015.
El País. *Teclas en relieve que aparecen y desaparecen de la pantalla del móvil.* 2015.
Engadget. *Gel-filled touchscreen creates real buttons on demand.* 2015.
Gizmodo. *7 Experimental Interfaces That Show the Future of UI Design.* 2014.

Professional experience

Software developer iOS [part time]
Interactive Pioneers (former Powerflasher)
Aachen, Germany, 09/2010 – 02/2012

Software developer iOS [full time]
Interactive Pioneers (formerly Powerflasher)
Aachen, Germany, 10/2009 – 09/2010

Software developer [internship]
Interactive Pioneers (formerly Powerflasher)
Aachen, Germany, 03/2009 – 09/2009
Developer for WPF and Silverlight. Involved in concept & technical planning.

Web developer [internship]
Lomographic Society Vienna
Vienna, Austria, 08/2008 – 09/2008

Screen designer [internship]
Monte Video & Point advertising agency
Linz, Austria, 08/2001 – 09/2001

References

Marc Alexa (PhD Advisor)

Professor, *Electrical Engineering and Computer Science*, Technische Universität Berlin
marc.alex@tu-berlin.de

Otmar Hilliges

Associate Professor, *Computer Science*, ETH Zurich
otmar.hilliges@inf.ethz.ch

Jörg Müller

Professor, *Faculty for Mathematics, Physics and Computer Science*, Bayreuth University
joerg.mueller@uni-bayreuth.de

Ravin Balakrishnan

Professor & Chair, *Computer Science*, University of Toronto
ravin@dgp.toronto.edu

Andrew D. Wilson

Principal Researcher, Microsoft Research Redmond
awilson@microsoft.com