



Alexandre Chapiro

I am interested in perception and computer graphics, especially anything involving computational display and psychophysics. Prior work involved perceptual metrics, brightness and color, stereo 3D, and display topics like virtual and augmented reality, frame rate, high dynamic range and more.

Professional Experience

- 2023-now **Meta Reality Labs | Applied Perception Science Team**
Staff Technical lead working on a range of product-oriented research projects. Perception-
Researcher first focus for hardware and algorithm design.
- 2020-2023 -
Senior Advance understanding of perception through targeted research and publications.
Researcher Apply learnings to product paths, work cross-functionally to support product needs
- 2018-2020 **Apple Inc., Cupertino | Core Display Incubation Team**
Senior Display Helped identify and cultivate new display technologies and associated experiences
Engineer to surprise and delight Apple product users
- 2017-2018 **Dolby Laboratories | Applied Vision Science Group**
Researcher Conducted research and obtained experimental results on perceptual factors, mainly
focusing on cinema and home theater applications
- 2011-2016 **Disney Research, Zurich | Stereo and Displays Group**
Student In parallel with my doctoral studies, worked on industry display and perception
Researcher topics resulting in four patent applications and several publications

Education

- 2011-2015 **PhD in Computer Science | Computer Graphics Laboratory**
institution Federal Institute of Technology Zurich (ETHZ), Zurich, Switzerland
thesis title *Perceptual Enhancements for Novel Displays*
supervisors Prof. Markus Gross. Co-Advisor: Dr. Aljoša Smolić
- 2010-2011 **Masters' Degree in Applied Mathematics | Visgraf Laboratory**
institution Institute of Pure and Applied Mathematics (IMPA), Rio de Janeiro, Brazil
thesis title *Improving Mobile Video*

supervisors Prof. Paulo Cezar Pinto Carvalho. Co-Advisor: Prof. Luiz Velho

2007–2009 **Undergraduate Degree in Mathematics**

institution Federal University of Juiz de Fora (UFJF), Juiz de Fora, Brazil

thesis title *An Introduction to Degree Theory*

supervisors Prof. Luiz Faria, Marcelo Bernardes Vieira

2016–2016 **Dolby Laboratories | Applied Vision Science Group**

Intern Conducted research on the human visual system guided by business unit needs

Mentorship

2024 *Doctoral dissertation committee for Avinab Saha (UT Austin)*
Upcoming

2024 *Returning intern manager for Kenneth Chen (New York University)*
Ongoing

2023 *Intern manager for Kenneth Chen (New York University)*
Resulting in a SIGGRAPH 2024 paper, best paper award honorable mention

2022 *Intern manager for Taimoor Tariq (University of Lugano)*
Resulting in a SIGGRAPH Asia 2023 paper

2021 *Intern manager for Krzysztof Wolski (Max-Planck Institut)*
Resulting in a SIGGRAPH Asia 2022 paper

Academic Service

Organizing **2024** *IS&T Human Vision Electronic Imaging, Perception of XR session co-chair*
2023 *ACM Symposium on Applied Perception, conference program co-chair*
2023 *ACM Transactions on Applied Perception, journal special edition guest editor*
2023 *IS&T Human Vision Electronic Imaging, AR/VR special session co-chair*

Committees **2025** *Eurographics international program committee*
2025 *IS&T Human Vision Electronic Imaging international program committee*
2024 *Eurographics international program committee*
2024 *IS&T Human Vision Electronic Imaging international program committee*
2023 *IS&T Human Vision Electronic Imaging international program committee*
2021 *SIBGRAPI Journal Track international program committee*
2019 *SIBGRAPI journal track international program committee*
2018 *SIBGRAPI international program committee*

Reviewing *SIGGRAPH (2024, 2023, 2022, 2021, 2019, 2017, 2015), SIGGRAPH Asia (2024, 2022, 2016, 2015), Transactions on Graphics (2023), Eurographics (2024, 2020, 2019, 2018), Transactions on Applied Perception (2024), HVEI (2024, 2023), IEEE TIP (2020, 2019, 2017, 2016), SIBGRAPI (2021, 2019, 2018), Pacific Graphics (2017, 2014), Graphics Interface (2016), JOSA (2016), ICIP (2015), IEEE CG&A (2015), IEEE TVCG (2022, 2015), CG Forum (2014), 3DV (2012)*

Invited Talks, Panels, and Presentations

- invited talk: **Visible Difference Predictors: Metrics Based on Perception Science.**
Display Week 2024, San Jose/USA, invited by William Klein and David Hoffman
- invited talk: **Visible Difference Predictors: Metrics Based on Perception Science.**
Frontiers in Optics 2023, Tacoma/USA, invited by Kaan Akşit and Douglas Lanman
- panel **Best Practices for Assessing Quality in Near-Eye Displays.**
discussion: SPIE Photonics West 2023, San Francisco/USA, hosted by Ryan Ong
- invited talk: **Perceptual Modeling for AR/VR Applications.**
IS&T Imaging for XR workshop 2023, San Francisco/USA, hosted by Bennett Wilburn
- panel **XR Display Visual Quality.**
discussion: IS&T Imaging for XR workshop 2023, San Francisco/USA, hosted by Abhijit Sarkar
- panel **Special session on AR/VR.**
discussion: IS&T HVEI 2023, San Francisco/USA, hosted by Nicko Caluya
- paper talk: **Critical Flicker Frequency (CFF) at high luminance levels.**
IS&T HVEI 2023, San Francisco/USA (featured in EI 2023 highlights)
- paper talk: **Realistic Luminance in VR.**
SIGGRAPH Asia 2022, Daegu/South Korea
- invited talk: **VR-HDR.**
Frontiers in Optics 2022, Rochester/USA, invited by Kaan Akşit and Douglas Lanman
- invited talk: **Echoes of SIGGRAPH'20.**
IMPA 2020, Rio de Janeiro/Brazil, hosted by Luiz Velho
- paper talk: **A Luminance-Aware Model of Judder Perception.**
SIGGRAPH 2020, online conference
- invited talk: **Perceptual Enhancements for Novel Displays.**
TU Delft 2019, Delft/Netherlands, hosted by Elmar Eisemann
- invited talk: **Cinematic Motion.**
NAB show 2018, Las Vegas/USA, invited by Jaclyn Pytlarz
- invited talk: **Perceptual Enhancements for Novel Displays.**
IBM 2017, Rio de Janeiro/Brazil, hosted by Emilio Vital Brazil
- invited talk: **Computer Graphics, (popular lecture).**
IF Sudeste MG 2017, Juiz de Fora/Brazil, hosted by Elena Konstantinova
- invited talk: **Computer Graphics, (popular lecture).**
IF Sudeste MG 2016, Rio Pomba/Brazil, hosted by Lucas Lattari
- invited talk: **Perceptual Enhancements for Novel Displays.**
Dolby Laboratories 2016, Sunnyvale/USA, hosted by Timo Kunkel
- invited talk: **Perceptual Enhancements for Novel Displays.**
Technicolor 2015, Rennes/France, hosted by Erik Reinhard
- invited talk: **Perceptual Enhancements for 3D Displays.**
Max Planck Institut 2015, Saarbrücken/Germany, hosted by Piotr Didyk
- paper talk: **Stereo from Shading.**
EGSR 2015, Darmstadt/Germany

paper talk: **Perceptual Evaluation of Cardboarding in 3D Content Visualization.**

SAP 2015, Vancouver/Canada

paper talk: **Optimizing Stereo-to-Multiview Conv. for Autostereo. Displays.**

Eurographics 2015, Strasbourg/France

Publications

Papers

Subjective and Objective Quality Assessment of Rendered Human Avatar Videos in Virtual Reality

Transactions on Image Processing 2024

Chen, Saha, Chapiro, Hane, Bazin, Qiu, Zanetti, Katsavounidis, Bovik

FaceMap: Distortion-Driven Perceptual Facial Saliency Maps

SIGGRAPH Asia 2024, conference track

Jiang, Venkateshan, Nam, Chen, Bachy, Bazin, Chapiro

AR-DAVID: Augmented Reality Display Artifact Video Dataset

SIGGRAPH Asia 2024, journal track

Chapiro, Kim, Asano, Mantiuk

ColorVideoVDP: A visual difference predictor for image, video and display distortions

SIGGRAPH 2024, journal track

Mantiuk, Hanji, Ashraf, Asano, Chapiro

PEA-PODs: Perceptual Evaluation of Algorithms for Power Optimization in XR Displays

SIGGRAPH 2024, journal track [Best paper award honorable mention]

Chen, Wan, Matsuda, Ninan, Chapiro*, Sun*

castleCSF - A Contrast Sensitivity Function of Color, Area, Spatio-Temporal Frequency, Luminance and Eccentricity

Journal of Vision, 2024,

Ashraf, Mantiuk, Chapiro, Wuerger

Perceptually Adaptive Real-Time Tone Mapping

SIGGRAPH Asia, 2023, conference track

Tariq, Matsuda, Penner, Jia, Lanman, Ninan, Chapiro

Skin-Screen: A Computational Fabrication Framework for Color Tattoos

SIGGRAPH 2023, journal track

Piovarci, Chapiro, Bickel

Critical Flicker Frequency (CFF) at High Luminance Levels

IST Human Vision and Electronic Imaging (HVEI), 2022

Chapiro, Matsuda, Ashraf, Mantiuk

Modelling Contrast Sensitivity of Discs

IST Human Vision and Electronic Imaging (HVEI), 2022

Ashraf, Mantiuk, [Chapiro](#)

Geo-metric: A Perceptual Dataset of Distortions on Faces

SIGGRAPH Asia 2022, journal track

Wolski, Trutoiu, Dong, Shen, MacKenzie, [Chapiro](#)

Realistic Luminance in VR,

SIGGRAPH Asia 2022, conference track

Matsuda*, [Chapiro](#)*, Zhao, Smith, Bachy, Lanman (* = equal contribution)

stelaCSF-A Unified Model of Contrast Sensitivity as the Function of Spatio-Temporal Frequency, Eccentricity, Luminance and Area,

SIGGRAPH 2022, journal track

Mantiuk, Ashraf, [Chapiro](#)

FovVideoVDP: A visible difference predictor for wide field-of-view video

SIGGRAPH 2021, journal track

Mantiuk, Denes, [Chapiro](#), Kaplanyan, Rufo, Bachy, Lian, Patney

A Luminance-Aware Model of Judder Perception,

ACM Transactions on Graphics, Presented at SIGGRAPH 2020

[Chapiro](#), Atkins, Daly

Influence of Screen Size and Field of View on Perceived Brightness

ACM Transactions on Applied Perception (TAP) , 2018

[Chapiro](#), Kunkel, Atkins, Daly

Unfolding the 8-bit Era,

European Conference on Visual Media Production 2015

Zund, Berard, [Chapiro](#), Schmid, Ryffel, Bermano, Gross, Sumner

Art-Directable Continuous Dynamic Range Video

Computers & Graphics, Elsevier, 2015

[Chapiro](#), Aydin, Stefanoski, Croci, Smolic, Gross

Video Content and Structure Description Based on Keyframes, Clusters and Storyboards

IEEE International Workshop on Multimedia Signal Processing, Xiamen-China, 2015

Junyent, Beltran, Farre, Pont-Tuset, [Chapiro](#), Smolic

Stereo from Shading

Eurographics Symposium on Rendering, Darmstadt-Germany, 2015, E&I track

[Chapiro](#), O'Sullivan, Jarosz, Gross, Smolic

Perceptual Evaluation of Cardboarding in 3D Content Visualization,
ACM Symposium on Applied Perception, Vancouver-Canada, 2014, short paper
Chapiro, Diamanti, Poulakos, O'Sullivan, Smolic, Gross

Optimizing Stereo-to-Multiview Conversion for Autostereoscopic Displays
Eurographics, Strasbourg-France, 2014
Chapiro, Heinzle, Aydin, Poulakos, Zwicker, Smolic, Gross

Towards Mobile HDR Video,
Eurographics, Llandudno-UK, 2011. (Extended abstract)
Castro, Chapiro, Cicconet, Velho

Detection of High Frequency Regions in Multiresolution
International Conference on Image Processing, Cairo-Egypt, 2009
Mota, Perez, Castro, Chapiro, Vieira

High Frequency Assessment from Multiresolution Analysis
International Conference on Computational Science, Baton Rouge-USA, 2009
Castro, Perez, Mota, Chapiro, Vieira, Freire

Patents

Authentic Eye Region Capture through Artificial Reality Headset
US Patent 20240073376 A1, 2024
Bazin, Chapiro

Eyewear with display-optimized lenses
US Patent US11803060 B1, 2023
Wilburn, Moisant-Thompson, Chapiro, Hunter, Lyngnes, Bonnier

Electronic devices with color sampling sensors
US Patent US11735126 B1, 2023
Roland, Bonnier, Chapiro, Doyle, Lestoquoy, Moisant-Thompson

Peripheral luminance or color remapping for power saving
US Patent US0011858 A1, 2022
Yang, Chapiro, Agaoglu, Bonnier, Huang, Wang, Watson, Mascarenhas

Frame rate conversion metadata
US Patent US11019302 B2, 2020
Pytlarz, Atkins, Pieri, Chapiro, Daly

Luminance adaption to minimize discomfort and improve visibility
US Patent US 20200202814 A1, 2020
Chapiro, Atkins, Daly

Virtual reality cinema-immersive movie watching for headmounted displays

US Patent US10769754 B2, 2020

Chapiro, Atluru, Chun, Haricharan, Rozzi, Ruggieri, Ninan

Systems and methods for automatic key frame extraction and storyboard interface generation for video

US Patent US9552520 B1, 2017 (Related to our 2015 paper)

Smolic, Martin, Pont-Tuset, Chapiro, Guiu

Methods for creating and distributing art-directable continuous dynamic range video

US Patent US20160353164 A1, 2016 (Related to our 2015 paper)

Smolic, Chapiro, Croci, Aydin, Stefanoski, Gross

Visual salience of online video as a predictor of success

US Patent US20170061235 A1, 2015 (Related to our 2015 poster)

Frey, Accardo, Sumner, Huber, Chapiro

Depth modification for display applications

US Patent US20150348273 A1, 2015 (Related to our 2014 paper)

Chapiro, Aydin, Poulakos, Heinzle, Smolic

Four additional patents currently in review

Other

Visible Difference Predictors: A Class of Perception-Based Metrics

SID Display Week 2024, invited paper

Chapiro, Hanji, Ashraf, Asano, Mantiuk

HDR VR

E-tech demo, SIGGRAPH 2022 [**Best-in-show award**]

Matsuda, Zhao, Chapiro, Smith, Lanman

Image Domain Warping for Advanced 3D Video Applications

IEEE COMSOC MMTC E - Letter, 2014, invited letter

Smolic, Wang, Lang, Stefanoski, Farre, Greisen, Heinzle, Schaffner, Chapiro, Sorkine-Hornung, Gross

Computational Photography

IMPA, Rio de Janeiro-Brazil, 2011, technical report

Castro, Chapiro, Velho

Posters

The Influence of Visual Salience on Video Consumption Behavior A Survival Analysis Approach,

ACM Web Science, Oxford-United Kingdom, 2015
Huber, Scheibehenne, Chapiro, Frey, Sumner

Filter Based Deghosting for Exposure Fusion Video

SIGGRAPH, Vancouver-Canada, 2011. *Student Research Competition Semi-Finalist*
Chapiro, Cicconet, Velho

Towards Mobile HDR Video

International Conference on Computational Photography, Pittsburg-USA, 2011
Castro, Chapiro, Cicconet, Velho

Mountain's Pass Theorem

Minas-Gerais Meeting of Partial Diferential Equations, Itajuba-Brazil, 2009
Chapiro, Pereira

Languages

Portuguese	Fluent	<i>Native speaker</i>
Russian	Fluent	<i>Native speaker</i>
English	Fluent	<i>TOEFL iBT 117/120, Cambridge FCE and CAE exams with A grades</i>
Spanish	Fluent	<i>3 years of school in Spain</i>
French	Advanced	<i>Alliance Française DELF diplome - 2005</i>

Teaching

- Feb.2014 **Teaching assistant**, *Math. Foundations of Computer Graphics and Vision*, ETHZ.
to Jun.2014 Graduate class teaching mathematical techniques in visual computing
- Feb.2015 **Teaching assistant**, *Math. Foundations of Computer Graphics and Vision*, ETHZ.
to Jun.2015
- Feb.2012 **Teaching assistant**, *Informatik 1*, ETHZ.
to Jun.2012 Undergraduate class teaching fundaments of informatics to engineering students
- Feb.2013 **Teaching assistant**, *Informatik 1*, ETHZ.
to Jun.2013

Academic Honors As a Student

- 2015 Second youngest PhD to ever graduate from the CS department at ETH Zurich
- 2011 Finished 2-year Master's program at the National Institute of Pure and Applied Mathematics in 18 months
- 2009 Finished 4-year undergraduate program in Mathematics at the Federal University of Juiz de Fora in 3 years with the highest GPA in the graduating class
- 2007 Ranked 1st in admission examinations, Federal University of Juiz de Fora
- 2006 Gold Medalist, Brazilian Astronomy Olympiad

- 2006 Gold Medalist, Brazilian Mathematics Olympiad for Public School Students. 95th place among approximately 5.3 million students
- 2005 Gold Medalist, Brazilian Mathematics Olympiad for Public School Students. 9th place among approximately 3.8 million students

Scholarships and Grants

Oct.2011 **Participant**, *European Commission Program FP7*.
to Oct.2013

Mar.2010 **Awarded**, *Master program fellowship, CNPq*.
to Jul.2011

Jan.2009 **Awarded**, *Undergraduate research scholarship, FAPEMIG*.
to Dec.2009

Jan.2008 **Awarded**, *Undergraduate research scholarship, CNPq*.
to Dec.2008

Mar.2007 **Awarded**, *Scholarship for winners OBMEP 2006 mathematics olympics, CNPq*.
to Jan.2008

Mar.2006 **Awarded**, *Scholarship for winners OBMEP 2005 mathematics olympics, CNPq*.
to Jan.2007

Jan.2005 **Awarded**, *High-school research scholarship, CNPq*.
to Dec.2005

- Obs.: CNPq is the Brazilian national funding agency. FAPEMIG is the funding agency for the state of Minas Gerais, Brazil