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

Education

2011-2015 institution thesis title supervisors	**PhD in Computer Science | Computer Graphics Laboratory** Federal Institute of Technology Zurich (ETHZ), Zurich, Switzerland *Perceptual Enhancements for Novel Displays* Prof. Markus Gross. Co-Advisor: Dr. Aljoša Smolić
2010-2011 institution thesis title	**Masters' Degree in Applied Mathematics | Visgraf Laboratory** Institute of Pure and Applied Mathematics (IMPA), Rio de Janeiro, Brazil *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-Plank 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 discussion:	**Best Practices for Assessing Quality in Near-Eye Displays**. 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 discussion:	**XR Display Visual Quality**. IS&T Imaging for XR workshop 2023, San Francisco/USA, hosted by Abhijit Sarkar
panel discussion:	**Special session on AR/VR**. 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, Saarbrucken/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
Compters & 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

Eye tracking based on vergence
US Patent US12056276 B1, 2024
Chapiro, Ninan

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
Smolic, Martin, Pont-Tuset, Chapiro, Guiu

Methods for creating and distributing art-directable continuous dynamic range video
US Patent US20160353164 A1, 2016
Smolic, Chapiro, Croci, Aydin, Stefanoski, Gross

Visual salience of online video as a predictor of success
US Patent US20170061235 A1, 2015
Frey, Accardo, Sumner, Huber, Chapiro

Depth modification for display applications
US Patent US20150348273 A1, 2015
Chapiro, Aydin, Poulakos, Heinzle, Smolic

Six additional patent applications 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

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

Teaching

Nov.2024	**Invited Lecture**, *Title to be announced*, NYU.	
	Hosted by Prof. Qi Sun	
Nov.2019	**Invited Lecture**, *Computer Graphics - Color and Perception*, TU Delft.	
	Hosted by Prof. Elmar Eisemann	
Feb.2014 to Jun.2014	**Teaching assistant**, *Math. Foundations of Computer Graphics and Vision*, ETHZ. Graduate class teaching mathematical techniques in visual computing	
Feb.2015 to Jun.2015	**Teaching assistant**, *Math. Foundations of Computer Graphics and Vision*, ETHZ.	
Feb.2012 to Jun.2012	**Teaching assistant**, *Informatik 1*, ETHZ. Undergradute class teaching fundaments of informatics to engineering students	
Feb.2013 to Jun.2013	**Teaching assistant**, *Informatik 1*, ETHZ.	

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 to Oct.2013	**Participant**, *European Commission Program FP7.*
Mar.2010 to Jul.2011	**Awarded**, *Master program fellowship, CNPq.*
Jan.2009 to Dec.2009	**Awarded**, *Undergraduate research scholarship, FAPEMIG.*
Jan.2008 to Dec.2008	**Awarded**, *Undergraduate research scholarship, CNPq.*
Mar.2007 to Jan.2008	**Awarded**, *Scholarship for winners OBMEP 2006 mathematics olympics, CNPq.*
Mar.2006 to Jan.2007	**Awarded**, *Scholarship for winners OBMEP 2005 mathematics olympics, CNPq.*
Jan.2005 to Dec.2005	**Awarded**, *High-school research scholarship, CNPq.*

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