



# 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

### 2025-now **Meta Reality Labs | Imaging Experiences Architecture Team**

Sr. Staff Architect Leading perception-first development and strategy for hardware and software across Meta product lines. Driving the industry forward via standards and publications.

### 2023-2025 **Meta Reality Labs | Applied Perception Science Team**

Staff Researcher 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 **Apple Inc., Cupertino | Core Display Incubation Team**

Senior Display Engineer Helped identify and cultivate new display technologies and associated experiences 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 Researcher In parallel with my doctoral studies, worked on industry display and perception 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	<b>Masters' Degree in Applied Mathematics   Visgraf Laboratory</b>
institution	Institute of Pure and Applied Mathematics (IMPA), Rio de Janeiro, Brazil
thesis title	<i>Improving Mobile Video</i>
supervisors	Prof. Paulo Cezar Pinto Carvalho. Co-Advisor: Prof. Luiz Velho
2007–2009	<b>Undergraduate Degree in Mathematics</b>
institution	Federal University of Juiz de Fora (UFJF), Juiz de Fora, Brazil
thesis title	<i>An Introduction to Degree Theory</i>
supervisors	Prof. Luiz Faria, Marcelo Bernardes Vieira
2016-2016	<b>Dolby Laboratories   Applied Vision Science Group</b>
Intern	Conducted research on the human visual system guided by business unit needs

## Mentorship

**2025** Intern manager manager for Yunxiang Zhang (New York University)

Upcoming

**2024** Postdoctoral mentor of Krzysztof Wolski (Meta)

Ongoing

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

Ongoing

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

Resulting in a SIGGRAPH 2025 submission

**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	<b>2025</b> IS&T HVEI, Perception in Augmented/Virtual/360° Env., session chair
	<b>2024</b> IS&T HVEI, Perception of XR session co-chair
	<b>2023</b> ACM Symposium on Applied Perception, conference program co-chair
	<b>2023</b> ACM Transactions on Applied Perception, journal special edition guest editor
	<b>2023</b> IS&T HVEI, AR/VR special session co-chair
Committees	<b>2025</b> Eurographics international program committee
	<b>2025</b> IS&T HVEI international program committee
	<b>2024</b> Eurographics international program committee
	<b>2024</b> IS&T HVEI international program committee
	<b>2023</b> IS&T HVEI international program committee
	<b>2021</b> SIBGRAPI Journal Track international program committee

**2019 SIBGRAPI journal track international program committee**

**2018 SIBGRAPI international program committee**

Reviewing *SIGGRAPH (2025, 2024, 2023, 2022, 2021, 2019, 2017, 2015), SIGGRAPH Asia (2024, 2022, 2016, 2015), Transactions on Graphics (2023), Eurographics (2025, 2024, 2020, 2019, 2018), Nature Scientific Reports (2025), HVEI (2025, 2024, 2023), Transactions on Applied Perception (2024), IEEE TVCG (2022, 2015), 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), CG Forum (2014), 3DV (2012)*

## Invited Talks, Panels, and Presentations

- Keynote **Predicting visible differences in virtual and augmented reality.**  
presentation: IS&T HVEI 2025, Burlingame/USA, invited by Damon Chandler and Rafal Mantiuk
- 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, 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 [**Best paper award honorable mention**]  
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\* (\* = equal contribution)

**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, Heinze, 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, Heinze, 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, Heinze, 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 Differential 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

- Nov.2024 **Invited Lecture**, *Computer Graphics - Color and Perception*, NYU.  
Hosted by Prof. Qi Sun
- Nov.2019 **Invited Lecture**, *Computer Graphics - Color and Perception*, TU Delft.  
Hosted by Prof. Elmar Eisemann
- 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 exam, Mathematics, 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

- 2011-2013 **Participant**, European Commission Program FP7.
- 2010-2011 **Awarded**, Master program fellowship, CNPq.
- 2009 **Awarded**, Undergraduate research scholarship, FAPEMIG.
- 2008 **Awarded**, Undergraduate research scholarship, CNPq.
- 2007-2008 **Awarded**, Scholarship for winners OBMEP 2006 mathematics olympics, CNPq.
- 2006-2007 **Awarded**, Scholarship for winners OBMEP 2005 mathematics olympics, CNPq.
- 2005-2005 **Awarded**, High-school research scholarship, CNPq.
- o Obs.: CNPq is the Brazilian national funding agency. FAPEMIG is the funding agency for the state of Minas Gerais, Brazil