



# Alexandre Chapiro

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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 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**  
Senior 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**  
Researcher In parallel with my doctoral studies, conducted research on 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 **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

**2023** Intern manager for Kenneth Chen (New York University)

Current

**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 **2023** ACM Symposium on Applied Perception program 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 **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  
AR/VR special session co-chair

**2021** SIBGRAPI Journal Track international program committee

**2019** SIBGRAPI journal track international program committee

**2018** SIBGRAPI international program committee

Reviewing SIGGRAPH (2023, 2022, 2021, 2019, 2017, 2015), SIGGRAPH Asia (2022, 2016, 2015), Transactions on Graphics (2023), Eurographics (2024, 2020, 2019, 2018), 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.**

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

#### **Perceptually Adaptive Real-Time Tone Mapping**

SIGGRAPH Asia, 2023, conference track

Tariq, Matsuda, Penner, Jia, Lanman, Ninan, [Chapiro](#)

#### **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**

ACM Transactions on Graphics, Proceedings of SIGGRAPH Asia 2022

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,**

ACM Transactions on Graphics, Proceedings of SIGGRAPH 2022

Mantiuk, Ashraf, [Chapiro](#)

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

ACM Transactions on Graphics, Proceedings of SIGGRAPH 2021

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

### **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**

US20160353164 A1, 2016 (Related to our 2015 paper)

Smolic, Chapiro, Croci, Aydin, Stefanoski, Gross

### **Visual salience of online video as a predictor of success**

US20170061235 A1, 2015 (Related to our 2015 poster)

Frey, Accardo, Sumner, Huber, Chapiro

### **Depth modification for display applications**

US20150348273 A1, 2015 (Related to our 2014 paper)

Chapiro, Aydin, Poulakos, Heinzle, Smolic

*Five additional patents currently in review*

## Book Chapters

### **Discrete Wavelets on Edges**

InTech open publisher, 2011

Chapiro, Knop, Mota, Perez, Bernardes, Freire

## 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

## Other

### 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

## 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 fundamentals 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