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 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*

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alexandre-chapiro-a8342520

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-Plank Institut).*
Resulting in a SIGGRAPH Asia 2022 paper

Academic Service

2024, *Eurographics international program committee.*

2023, *ACM Transactions on Applied Perception journal special edition guest editor.*

2023, *ACM Symposium on Applied Perception program chair.*

2023, *IS&T Human Vision Electronic Imaging 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 (2020, 2019, 2018), HVEI (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), IST HVEI (2023), 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 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

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
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

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	*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

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