

Education

UFPE (Federal University of Pernambuco)

BACHELOR OF COMPUTER SCIENCE

Recife, Brazil

Jan. 2016 - May 2021

- **Bachelor's thesis:** *Real-Time 6DoF Tracking of Rigid 3D Objects Using a Monocular RGB Camera* ([click to open underlined links](#))

Experience

Voxar Labs

COMPUTER VISION RESEARCH ASSISTANT

Recife, Brazil

Jan. 2018 - Present

The lab works with mixed realities, computer vision, image processing, artificial intelligence, robotics, and human-computer interaction.

Partnerships with HP Inc. (under NDA)

- **HP Expressive Avatars (Oct. 2020 - Feb. 2021):** responsibilities involved performing and documenting systematic literature reviews on the current state-of-the-art, as well as using computer vision to quickly prototype end-to-end ways to augment human interactions in real time.
- **HP Federated Learning (Mar. 2020 - Jul. 2020):** responsibilities involved academic writing on federated learning.
- **HP Nonflat AR (Jan. 2018 - Mar. 2020):** responsibilities involved general state-of-the-art research on real-time augmented reality, including systematic literature reviews, attempting to replicate techniques and results from articles, prototyping original ideas, and academic writing.

UFPE

TEACHING ASSISTANT

Recife, Brazil

Aug. 2016 - Jul. 2019

- **Virtual and Augmented Reality (Jan. 2019 - Jul. 2019):** about 20 students, undergraduate as well as M.Sc. and Ph.D.
- **Graphics Processing (Aug. 2018 - Jul. 2019):** about 100 undergraduate students.
- **Linear Algebra and Analytic Geometry (Aug. 2016 - Jan. 2018):** over 200 undergraduate students.
- **Algorithms and Data Structures (Jan. 2017 - Jul. 2017):** about 50 undergraduate students.

PET Informática

VOLUNTEER (SEP. 2016 - JAN. 2017), SCHOLARSHIP HOLDER (FEB. 2017 - JAN. 2018)

Recife, Brazil

Sep. 2016 - Jan. 2018

PET is the Brazilian government's special training program for high-achieving students. It has three pillars: teaching, research, and extension.

- **Organized blood donations** with HEMOPE (blood donor center of the state of Pernambuco). Over 300 donations.
- **Management and graphic design** for the 2016 and 2017 editions of OPEI (Informatics Olympiad of Pernambuco). More than 740 participants.
- **Teacher on free courses to the local community.** Contents included Microsoft Word, PowerPoint, and Windows 7. Over 150 total students.

Sigtunaskolan Humanistiska Läroverket (SSHL)

VOLUNTEER PROGRAMMING LOGIC TEACHER

Sigtuna, Sweden

Jan. 2014 - Apr. 2014

Part of the CAS component of the International Baccalaureate Diploma. Programming logic course taught in C/C++ to about a dozen students.

Publications

Real-Time Monocular 6DoF Tracking of Textureless Objects using Photometrically-Enhanced Edges

VISAPP 2021

LUCAS VALENÇA, LUCA SILVA, THIAGO CHAVES, ARLINDO GOMES, LUCAS FIGUEIREDO, LUCIO COSSIO, SEBASTIEN TANDEL, JOÃO PAULO LIMA, FRANCISCO SIMÕES, VERONICA TEICHRIEB

Novel, real-time 6DoF monocular RGB tracking approach aimed at textureless, pigmented objects. It achieved state-of-the-art precision (as of 2020) while having an orders-of-magnitude-smaller memory footprint and faster runtime. It was the only one in its category shown to work on mobile devices as well as desktop. A qualitative dataset with challenging scenes for textureless objects was also proposed.

- **My contributions:** literature review; conception and implementation of the approach; evaluations; paper writing; design of pictures and charts.
- **Availability:** [full paper](#) on the SciTePress digital library, [demo video](#) on YouTube, [3DPO dataset](#) on GitHub.

A Study on the Impact of Domain Randomization for Monocular Deep 6DoF Pose Estimation

SIBGRAPI 2020

KELVIN CUNHA, CAIO BRITO, LUCAS VALENÇA, FRANCISCO SIMÕES, VERONICA TEICHRIEB

This work evaluated how different physical cameras behaved under different challenges (e.g., illumination changes and occlusion) when using deep learning to perform 6DoF detection of a textureless object. Training varied between using real and synthetic sequences with domain randomization. All annotated synthetic and real datasets were made public.

- **Best Paper Award - Main Track:** invited for an extended version on the Elsevier *Pattern Recognition Letters* journal (underway).
- **My contributions:** capturing sequences; creating tools to automatically render, segment, perform domain randomization, and annotate the 6DoF poses of real and synthetic frames; re-writing and formatting the original manuscript draft; design of pictures, charts, and diagrams.
- **Availability:** [full paper](#) on the IEEE Xplore digital library, [oral presentation](#) on YouTube, [datasets](#) on GitHub.

GoThrough: a Tool for Creating and Visualizing Impossible 3D Worlds Using Portals

SBGames 2020

LUCA SILVA, LUCAS VALENÇA, ARLINDO GOMES, LUCAS FIGUEIREDO, VERONICA TEICHRIEB

Public tool for Unity that enabled the user to easily create 3D scenes with rectangular portals. The paper also contained a brief history of portals, described implementation details, outlined pitfalls, and provided an evaluation of isolated aspects, both human and technical.

- **2nd Best Paper Award - Computing Track:** invited for an extended version on the Elsevier *Entertainment Computing* journal (underway).
- **My contributions:** literature review; elaboration and execution of evaluations; paper co-writing; design of pictures, charts, and diagrams.
- **Availability:** [full paper](#) on the IEEE Xplore digital library, [oral presentation](#) on YouTube, [code](#) on GitHub.

Patents

Read Curved Visual Marks

Patent #85018577

LUCAS FIGUEIREDO, JOÃO TEIXEIRA, JOÃO PAULO LIMA, LUCAS MAGGI, THIAGO CHAVES, FRANCISCO SIMÕES, **LUCAS VALENÇA**, VERONICA TEICHRIEB, LUCIO COSSIO
Submitted to the United States Patent and Trademark Office in partnership with HP Inc. Details under NDA until patent is made public.

Selected Unpublished Works

Inertia

Voxar Labs, UFPE

LUCAS VALENÇA, LUCAS FIGUEIREDO, EDUARDO VELLOSO, VERONICA TEICHRIEB

Mar. 2018 - Present

A technique that uses face tracking and IMU sensors to severely alleviate car sickness. User testing was halted due to the COVID-19 pandemic and is expected to resume after authorization is obtained from UFPE's Research Ethics Committee. Current target for publication: ACM SIGCHI 2022.

Page Turner

Voxar Labs, UFPE

LUCAS VALENÇA, GIORDANO CABRAL, LUCAS FIGUEIREDO

Oct. 2020 - Present

An Android tablet application that uses real-time RGB face and head tracking to enable musicians to turn sheet music without needing to stop playing. User testing was halted due to COVID-19. To be released for free as soon as possible. Current target for publication: SVR 2021.

CaLib

GitHub

LUCAS VALENÇA

Jan. 2021 - Present

Small, [open-source](#) library header in C++ that uses OpenCV to facilitate uniform camera calibration for teams working remotely.

CUDA Path Tracer

UFPE

LUCAS VALENÇA, HEITOR FELIX

Nov. 2019

Consists of a CUDA port of the path tracer detailed in the *Ray Tracing in a Weekend* trilogy. Using a GTX 1080 Ti GPU, the path tracer ran at interactive frame rates when rendering smaller images in scenes such as a *Cornell box*.

Security Token Offering

Wikipedia

LUCAS VALENÇA, OTHERS (PUBLIC)

Nov. 2019

Wikipedia article containing legal information on STOs from around the world. Though most of the article remains as it was originally written by me, it has since been updated by many users and gained great visibility.

Monocular RGB Projector Adjustment

UFPE

LUCAS VALENÇA, EDJAN MICHILES

Nov. 2017

Consists of an application that adjusts a crooked projector's output in real-time by calculating homographies with the aid of an RGB webcam and applying them to every image fed to the projector.

Languages

Selected Skills & Software

Portuguese Native proficiency

Major Skills C/C++, OpenCV, CUDA, Android NDK, OpenGL, Python, Blender scripting

English Fluent proficiency

Minor Skills Unreal, ArUco, ARKit, Keras, Horovod, Bash, Java, AWT, Swing, Haskell, SQL

Spanish Full working proficiency

Frequent Tools CMake, Visual Studio, MeshLab, Anaconda, WSL2, Git, LaTeX, Grammarly

Swedish Limited working proficiency

Multimedia Adobe Photoshop, Blender, Final Cut Pro, Adobe Premiere Pro, Logic Pro X

Selected Certificates & Honors

2020	119 out of 120 points on TOEFL iBT (Home Edition) , Educational Testing Service (ETS)	Online
2020	Best Paper Award , Brazilian Symposium on Computer Graphics and Image Processing (SIBGRAPI)	Online
2020	2nd Best Paper Award , Brazilian Symposium on Games and Digital Entertainment (SBGames)	Online
2020	Student Volunteer , IEEE International Symposium on Mixed and Augmented Reality (ISMAR)	Online
2020	Student Volunteer , Brazilian Symposium on Computer Graphics and Image Processing (SIBGRAPI)	Online
2020	Student Volunteer , Brazilian Symposium on Games and Digital Entertainment (SBGames)	Online
2020	Fundamentals of Accelerated Computing with CUDA C/C++ , NVIDIA Deep Learning Institute	NVIDIA GTC, Online
2020	Fundamentals of Accelerated Computing with CUDA Python , NVIDIA Deep Learning Institute	NVIDIA GTC, Online
2020	Fundamentals of Deep Learning for Multi-GPUs , NVIDIA Deep Learning Institute	NVIDIA GTC, Online
2020	Fundamentals of Deep Learning , NVIDIA Deep Learning Institute	NVIDIA GTC, Online
2019	Motorcycle Sports Pilot Level 1 , AGB Racing School (Ayrton Senna Racetrack)	Caruaru, Brazil
2016	82nd out of 1013 , Brazilian Informatics Olympiad (OBI)	Brazil
2016	C Programming Language , Integrated Center of Information Technology (Citi)	Recife, Brazil
2016	Django Framework , Integrated Center of Information Technology (Citi)	Recife, Brazil
2012	Advanced Java Programming , Qualiti Software Processes	Recife, Brazil
2012	Basic Java Programming , Qualiti Software Processes	Recife, Brazil
2012	Programming Logic , Qualiti Software Processes	Recife, Brazil