

Leonardo Pavanatto

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Fourth-year Computer Science Ph.D. student at Virginia Tech, member of the 3D Interaction Group and of the Center for Human-Computer Interaction. My expertise area is Virtual and Augmented Reality within the scope of 3D User Interfaces. Some specific research interests include how to use augmented reality for improving productivity on real-world tasks (with special focus on virtual displays), and how to increase the public's engagement and interest through interactive technologies.

Education

Ph.D. in Computer Science

Aug 2019 - Current

Virginia Tech, GPA: 3.94/4.0

- **Thesis:** Designing Augmented Reality Virtual Displays for Productivity Work (Advisor: Doug Bowman)
- **Qualification:** Human-Computer Interaction (6/6 points awarded)

M.Sc. in Computer Science

Mar 2019

PUCRS, GPA: 9.32/10.0

- **Thesis:** 3D Modeling of Large Structures in Augmented Reality (Advisors: Marcio Pinho, Doug Bowman)

B.Eng. in Computer Engineering

Dec 2016

PUCRS, GPA: 8.82/10.0

- **Thesis:** Evaluating the Efficiency of an Ego-exocentric Technique for Cooperative Manipulation in Virtual Environments
- **Study abroad:** Illinois Tech, GPA: 3.87/4.0

Research Experience

Microsoft Research

Summer 2022

Research Intern

- **Cross Device Interaction:** Designed novel interaction paradigms for transferring UI elements across devices.

Microsoft Research

Summer 2021

Research Intern

- **VR Monitors:** Conducted formal, summative, user studies to understand the effects of replacing physical monitors with VR virtual monitors; presented findings at internal seminars and through a paper (to be published).

Virginia Tech

Aug 2019 - Current

Student and Graduate Research Assistant

- **AR Monitors:** Designed novel approaches for extending or replacing physical monitors with virtual ones to enhance user experience and productivity; results of a formal user study were published at IEEE VR 2021
- **Storytelling:** Led a team submission to the IEEE VR 3DUI Contest 2020 about immersive storytelling and increasing empathy towards people with disabilities through embodiment.
- **Orientation:** Oriented students on their final projects in the Virtual Reality and HCI capstone classes.

PUCRS

Mar 2017 - Feb 2019

Graduate Research Assistant

- **Situated Modeling:** Designed an AR application for situated modeling in architecture, using Unity 3D (C#) and Microsoft HoloLens; results were published at ACM SUI 2019.
- **Mobile AR Game:** Evaluated methods of interaction for an AR game with behavioral animation of virtual characters using mobile devices (iOS and Android).
- **Remote Presentation:** Designed an application to remotely present keynote slides from inside a virtual environment, which was used live at PUCRS Health Tech.

Duke University

Summer 2015

Research Scholar

- **Collaborative Hybrid Interaction:** Designed a technique for using asymmetric viewpoints in cooperative object manipulation in VR, using Unity 3D (C#), Oculus Rift, and UDP/IP network communication; presented our solution at the IEEE 3DUI Contest 2016.

PUCRS

Apr 2012 - Dec 2016

Undergraduate Research Assistant

- **Neurorehabilitation:** Designed games for the Microsoft Kinect using XNA (C#) that were used by elderly people with mild cognitive impairment in a neurorehabilitation study.
- **Maestro:** Designed and deployed an interface for 6 DOF tracking of a conductor's baton during a live orchestral performance.
- **SculptAR:** Developed an application for creating digital sculptures using handheld AR (Android/iOS).

Publications

Journal Papers:

1. Fabris, E., Sangalli, V., **Pavanatto, L.**, Pinho, M. Immersive telepresence on the operation of unmanned vehicles. International Journal of Advanced Robotic Systems. January 2021. [DOI: 10.1177/1729881420978544](https://doi.org/10.1177/1729881420978544)

Conference Papers:

1. **Pavanatto, L.**, C. North, D. Bowman, C. Badea, and R. Stoakley. Do we still need physical monitors? An evaluation of the usability of AR virtual monitors for productivity work. In IEEE Virtual Reality and 3D User Interfaces (VR), 2021, 8 pages. [DOI: 10.1109/VR50410.2021.00103](https://doi.org/10.1109/VR50410.2021.00103)
2. **Pavanatto, L.**, Bowman, D., and Pinho, M. Evaluating the Impact of Point Marking Precision on Situated Modeling Performance. In Proceedings of ACM Symposium on Spatial User Interaction (SUI), 2019, 5 pages. [DOI: 10.1145/3357251.3357586](https://doi.org/10.1145/3357251.3357586)
3. Stahl, B., **Pavanatto, L.**, Sangalli, V., Klein, P., Copstein, R. and Pinho, M. DirectFlow: A Robust Method for Ocular Torsion Measurement. In IEEE 43rd Annual Computer Software and Applications Conference (COMPSAC), 2019, 6 pages. [DOI: 10.1109/COMPSAC.2019.00052](https://doi.org/10.1109/COMPSAC.2019.00052)
4. **Pavanatto, L.**, Kopper, R. and Pinho, M. EGO-EXO: A Cooperative Manipulation Technique with Automatic Viewpoint Control. In 20th Symposium on Virtual and Augmented Reality (SVR), 2018, 6 pages. [DOI: 10.1109/SVR.2018.00023](https://doi.org/10.1109/SVR.2018.00023)
5. **Pavanatto, L.**, Musse, S., Pinho, M. and Boussu, J. Evaluation of Selection Techniques on a Mobile Augmented Reality Game. In 17th Brazilian Symposium on Computer Games and Digital Entertainment (SBGames), 2018, 10 pages. [DOI: 10.1109/SBGAMES.2018.00024](https://doi.org/10.1109/SBGAMES.2018.00024)
6. Copstein, R., Abichequer, V., Andrade, M., Machado, L., Rodrigues, E., **Pavanatto, L.** and Pinho, M. Image Processing Strategies for Automatic Detection of Common Gastroenterological Diseases. In IEEE 42nd Annual Computer Software and Applications Conference (COMPSAC), 2018, 6 pages. [DOI: 10.1109/COMPSAC.2018.00090](https://doi.org/10.1109/COMPSAC.2018.00090)

Other Refereed Publications (posters, workshop papers, demo papers):

1. Lisle L., Lu F., Davari S., Tahmid I., Giovannelli A., Ilo C., **Pavanatto L.**, Zhang L., Schlueter L., and Bowman D. Clean the Ocean: An Immersive VR Experience Proposing New Modifications to Go-Go and WiM Techniques. Manuscript accepted for the doctoral consortium of the IEEE International Symposium on Mixed and Augmented Reality (ISMAR), 2021, 2 pages.
2. **Pavanatto, L.** Designing Augmented Reality Virtual Displays for Productivity Work. Manuscript accepted for the doctoral consortium of the IEEE International Symposium on Mixed and Augmented Reality (ISMAR), 2021, 2 pages.
3. **Pavanatto, L.**, Lu, F., Davari, S., Harris, E., Folino, A., Imamov, S., Chekuri, S., Blustein, L., Lages, W. and Bowman, D. Get the job! An immersive simulation of sensory overload. In IEEE Conference on Virtual Reality and 3D User Interfaces Abstracts and Workshops (VRW), 2020, 2 pages. [DOI: 10.1109/VRW50115.2020.00106](https://doi.org/10.1109/VRW50115.2020.00106)
4. Sangalli, V., Oliveira, T., **Pavanatto, L.** and Pinho, M.S. SculptAR: An augmented reality interaction system. In IEEE Symposium on 3D User Interfaces (3DUI), 2017, 2 pages. [DOI: 10.1109/3DUI.2017.7893371](https://doi.org/10.1109/3DUI.2017.7893371)
5. **Pavanatto, L.**, Pinho, M. and Kopper, R. Design and preliminary evaluation of an EGO-exocentric technique for cooperative manipulation. In IEEE Symposium on 3D User Interfaces (3DUI), 2017, 2 pages. [DOI: 10.1109/3DUI.2017.7893342](https://doi.org/10.1109/3DUI.2017.7893342)
6. **Pavanatto, L.**, Oliveira, T., Sangalli, V., Pinho, M. and Kopper, R. Collaborative hybrid virtual environment. In IEEE Symposium on 3D User Interfaces (3DUI), 2016, 2 pages. [DOI: 10.1109/3DUI.2016.7460081](https://doi.org/10.1109/3DUI.2016.7460081)

Non-refereed Publications:

1. Bogoni, T, **Pavanatto, L.**, Sangalli, V., Pinho, M. Dental Simulator for Endodontic Access Cavity Preparation. Demo at IEEE Virtual Reality (VR), 2016, 2 pages. Available at [website](#).
2. Oliveira, G., **Pavanatto, L.**, Sangalli, V., Pinho, M. A Software Architecture for Distributed AR Applications. Demo at IEEE Virtual Reality (VR), 2016, 2 pages. Available at [website](#).
3. Lykawka, C., Oliveira, T., **Pavanatto, L.**, Sangalli, V., Siqueira, E., Campos, M, Pinho, M. Belt-Based Haptic Device for Representing Scene Depth Information. Demo at Virtual Reality (VR), 2016, 2 pages. Available at [website](#).

Skills

Expertise Areas *Research, Augmented Reality, Virtual Reality, 3D User Interfaces, Human-Computer Interaction, User Studies*

Tools & Technologies *C#, Unity 3D, C, C++, OpenGL, OpenCV, Python, VB.net, Git, Windows APIs*

Honors and Awards

- 2022** *Best 3DUI Contest Entry, from IEEE VR*
- 2017** *Academic Excellence fellowship recipient (2017-2018), from CAPES/PROEX*
- 2016** *Featured Student by the Brazilian Computer Society (SBC), with the highest GPA of class*
- 2014** *Brazil Scientific Mobility Program scholarship recipient (2014-2015), from CAPES*

Activities and Service

- Student Member, IEEE Computer Society, ACM, Virginia Tech's Center for HCI.
- Reviewed submissions for IEEE VR, IEEE ISMAR, ACM CHI, ACM SUI, etc.