

Tomislav Pejsa

Ph.D.

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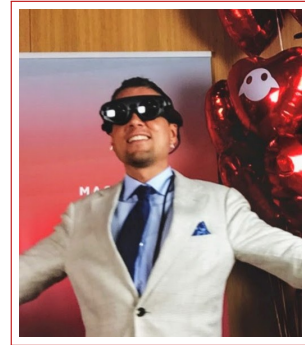
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GitHub: <https://github.com/tpejsa>

<https://github.com/uwgraphics/Leap>



Summary

Software engineer, researcher, prototyper, and tech lead. Specialist in AR/VR, computer graphics, computer animation, UI/UX, avatars, virtual agents, telepresence.

Education

2016 **Ph.D. in Computer Science**, *Department of Computer Sciences, University of Wisconsin-Madison, USA.*

Advisors: Michael Gleicher, Bilge Mutlu

2007 **B.Sc. in Computing**, *Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia.*

Employment

May 2020–present **Software Engineer**, *Meta, Menlo Park, CA, USA.*

- Prototyping AI-powered features for next-generation AR glasses in collaboration with research scientists and product designers.
- Building a synthetic data generation framework for CV models powering next-generation Meta VR devices. Implemented critical capabilities that enabled training production face tracking models for the Meta Quest Pro with synthetic data.

Mar. 2019–Apr. 2020 **Lead Software Engineer**, *Magic Leap, Sunnyvale, CA, USA.*

- Technical lead for Magic Leap Avatars. Led the team that delivered Avatar animation, rendering, user customization, and asset creation, across multiple client apps and platforms (Social, Meetings, native SDK, Unity SDK). Directed R&D efforts to advance Avatar facial and gesture animation, rendering quality, performance, and user customization capabilities, resulting in 3 US patent filings.

Jan. 2017–Feb. 2019 **Senior Software Engineer**, *Magic Leap, Plantation, FL, USA.*

- Developed platform features and apps for the Magic Leap Augmented Reality device. Owned Avatar animation and user customization features in the Social suite of apps, and enabled 3D artists to create avatar assets.

- 2011–2016 **Research Assistant**, *Department of Computer Sciences, University of Wisconsin-Madison, USA.*
- Invented new methods for synthesis of dynamic motion for virtual humans. Developed 3D animation algorithms, engines, and tools. Published 5 first-author journal and conference papers. <https://git.io/viO0z>, <https://git.io/viO08>
- Summer 2014 **Research Intern**, *Microsoft Research, Redmond, WA, USA.*
Natural Interaction Research Group (Supervisors: Hrvoje Benko, Eyal Ofek, Andrew Wilson)
- Developed Room2Room, an AR telepresence system utilizing novel projection mapping technology in a room-scale setup with multiple color-depth cameras. Recipient of Best Paper Award at CSCW 2016. Produced US patent 10216982. <http://y2u.be/tRzOqTRxoek>
- Spring 2014 **Research Intern**, *Microsoft Research, Redmond, WA, USA.*
Adaptive Systems and Interaction Group (Supervisors: Michael Cohen, Dan Bohus, Eric Horvitz)
- Worked on Monica, a virtual assistant system capable of conversing with multiple situated users. Developed mechanisms to detect conversational uncertainties and resolve them using natural communication. <https://vimeo.com/107514035>
- 2007–2011 **Research Assistant**, *Department of Telecommunications, Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia.*
- Researcher and software engineer on visage|SDK, an animation toolkit for virtual humans. <http://visagetechnologies.com/>

Publications

Books

- **Pejsa, T.** (2016). *Effective Directed Gaze for Character Animation* (Doctoral dissertation). University of Wisconsin-Madison.
- Pandzic, I.S., **Pejsa, T.**, Matkovic, K., Benko H., Cerekovic, A., and Matijasevic, M. (2011). *Virtualna Okruzenja: Interaktivna 3D Grafika i Njene Primjene*. [*Virtual Environments: Interactive 3D Graphics and Its Applications*.] Element, Zagreb, Croatia.

Journal Articles

- **Pejsa, T.**, Rakita, D., Mutlu, B., and Gleicher, M. (2016). Authoring Directed Gaze for Full-Body Motion Capture. *ACM Transactions on Graphics (Proceedings of SIGGRAPH Asia 2016)*, 35(6), 161:1-161:11.
- **Pejsa, T.**, Andrist, S., Gleicher., M., and Mutlu, B. (2015). Gaze and Attention Management for Embodied Conversational Agents. *ACM Transactions on Interactive Intelligent Systems*, 5(1), Article 3, 34 pages.
- **Pejsa, T.**, Mutlu, B., and Gleicher., M. (2013). Stylized and Performative Gaze for Character Animation. *Computer Graphics Forum (Proceedings of EUROGRAPHICS 2013)*, 32(2), 143-152.
- **Pejsa, T.**, and Pandzic, I.S. (2010). State of the Art in Example-Based Motion Synthesis for Virtual Characters in Interactive Applications. *Computer Graphics Forum*, 29(1), 202-226.

- Cerekovic, A., **Pejsa, T.**, and Pandzic, I.S. (2009). A Controller-based Animation System for Synchronizing and Realizing Human-like Conversational Behaviors. *Development of Multimodal Interfaces: Active Listening and Synchrony, Lecture Notes in Computer Science*, 5967, 80-91.
- Brkic, M., Smid, K., **Pejsa, T.**, and Pandzic, I.S. (2008). Towards Natural Head Movement of Autonomous Speaker Agent. *Lecture Notes in Artificial Intelligence*, 5178(2), 73-80.

Full Conference Papers

- **Pejsa, T.**, Gleicher, M., and Mutlu, B. (2017). Who, Me? How Virtual Agents Can Shape Conversational Footing in Virtual Reality. *Intelligent Virtual Agents (IVA) 2017*, 347-359.
- **Pejsa, T.**, Kantor, J., Benko, H., Ofek, E., and Wilson, A.D. (2016). Room2Room: Enabling Life-size Telepresence in a Projected Augmented Reality Environment. In *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW 2016)*, San Francisco, CA. **Best Paper Award.**
- **Pejsa, T.**, Bohus, D., Cohen, M.F., Saw, C., Mahoney, J.M., and Horvitz, E. (2014). Natural Communication about Uncertainties in Situated Interaction. In *Proceedings of the 16th ACM International Conference on Multimodal Interaction (ICMI 2014)*, Istanbul, Turkey.
- Andrist, S., **Pejsa, T.**, Mutlu, B., and Gleicher, M. (2012). Designing Effective Gaze Mechanisms for Virtual Agents. In *Proceedings of the 30th ACM/SIGCHI Conference on Human Factors in Computing (CHI 2012)*, Austin, TX.
- **Pejsa, T.**, Pandzic, I.S. (2009). Architecture of an Animation System for Human Characters. In *Proceedings of the 10th International Conference on Telecommunications (ConTEL 2009)*, Zagreb, Croatia.

Short Conference Papers & Posters

- Rakita, D., **Pejsa, T.**, Mutlu, B., and Gleicher, M. (2015). Inferring gaze shifts from captured body motion. In *ACM SIGGRAPH 2015 Posters*, Los Angeles, CA.
- **Pejsa, T.** (2014). Authoring Communicative Behaviors for Situated, Embodied Characters. In *Proceedings of the 16th International Conference on Multimodal Interaction (ICMI 2014) Doctoral Consortium*, Istanbul, Turkey.
- Cerekovic, A., **Pejsa, T.**, and Pandzic, I.S. (2009). RealActor: Character Animation and Multimodal Behavior Realization System. In *Proceedings of the 9th International Conference on Intelligent Virtual Agents (IVA 2009)*, Amsterdam, The Netherlands.

Workshop Papers

- Andrist, S., **Pejsa, T.**, Mutlu, B., and Gleicher, M. (2012). A Head-Eye Coordination Model for Animating Gaze Shifts of Virtual Characters. In *Proceedings of the 4th Workshop on Eye Gaze in Intelligent Human-Machine Interaction held at the International Conference on Multimodal Interfaces*, Santa Monica, CA.

Patents

- **Pejsa, T.**, Vasilevski, D., Ng-Thow-Hing, V., Mori, K. (2023). *Privacy Preserving Expression Generation for Augmented or Virtual Reality Client Applications* (U.S. Patent No. 11568610). Washington, DC: U.S. Patent and Trademark Office.

- Schliemann, F., Lopez-Fresquet, F., Ng-Thow-Hing, V., **Pejsa, T.** (2022). *Multi-modal Hand Location and Orientation for Avatar Movement* (U.S. Patent No. 11487366). Washington, DC: U.S. Patent and Trademark Office.
- **Pejsa, T.**, Mori, K., Bailey, R. (2021). *Audiovisual Presence Transitions in a Collaborative Reality Environment* (U.S. Patent Application No. 17/308897). Washington, DC: U.S. Patent and Trademark Office.
- **Pejsa, T.**, Wilson, A., Benko, H., Ofek, E., Kantor, J. (2016). *Projecting a Virtual Copy of a Remote Object* (U.S. Patent No. 10216982). Washington, DC: U.S. Patent and Trademark Office.

Skills

- C++, C#, Unity, Python, Autodesk Maya, Cg, GLSL, OpenGL, Lumin, Android
- Computer graphics; computer animation; graphics engine architecture; AR/VR; UI/UX; mobile
- 3D math; linear algebra; numerical methods; statistical data analysis

Languages

English Fluent, TOEFL iBT 119/120

German Intermediate, Deutsches Sprachdiplom (DSD) Stufe II

Croatian Native