Maurício Sousa
Curriculum Vitae

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SHORT BIO

I am a Postdoctoral Fellow at the DGP Lab, Department of Computer Science of the University of Toronto working with Professor Tovi Grossman. Previously, I was a researcher at the Visualization and Intelligent Multimodal Interfaces Group (VIMMI) under the supervision of Professor Joaquim Jorge. Received my PhD (2020), MSc (2014) and BSc (2012) degrees in Computer Science and Engineering. In my research, I have been designing and evaluating novel interaction techniques for the engineering, architecture and medical fields, focussing on computer supported remote collaborative work in Mixed Reality environments.

I also have experience in 3D user interfaces, interactive spaces, touch and mid-air gestures. And I have been fortunate to see my research published in top international conferences and journals, such as ACM CHI, ACM ISS, ACM IUI, ACM VRST, INTERACT, IJHCS, and IEEE TVCG. I am currently a member of the organising committee of the international conferences ACM ISS and IEEE VR.

RESEARCH AND TEACHING INTERESTS

Human-Computer Interaction, 3D User Interfaces, collocated and remote collaboration using multiple interactive surfaces, holograms, and Mixed Reality.

EDUCATION

INSTITUTO SUPERIOR TÉCNICO • UNIVERSITY OF LISBON

2020 **Ph.D. in Computer Science and Engineering**
Thesis: *Perception Manipulation for Seamless Face-to-face Remote Collaboration*
Advisor: Prof. Joaquim Jorge
Grade: Summa Cum Laude (highest honour for Doctoral Degree)
Thesis committee: Prof. Anthony Steed, Prof. Pedro Campos, Prof. Carlos Martinho, Prof. Miguel Sales Dias, and Prof. Pavão Martins

2014 **MSc in Information Systems and Computer Engineering**
Thesis: *Remote Proxemics for Collaborative Virtual Environments*
Advisors: Prof. Joaquim Jorge, and Prof. Alfredo Ferreira
Grade: 18
Thesis committee: Prof. Carlos Duarte, and Prof. Pedro Sousa

2012 **BSc in Information Systems and Computer Engineering**

EXPERIENCE

2020 - Present **DGP LAB, Dep COMPUTER SCIENCE, UNIVERSITY OF TORONTO**
POSTDOCTORAL FELLOW • Researching, designing and evaluating novel interaction techniques, while supporting and advising undergrad and graduate students.

2018 - 2020 **CHAMPALIMAUD CENTER FOR THE UNKNOWN**
RESEARCHER • Researching, designing and evaluating novel mixed reality interaction techniques for minimally invasive laparoscopic surgery.

2012 - 2020 **INESC-ID, VISUALIZATION AND INTELLIGENT MULTIMODAL INTERFACES GROUP**
RESEARCHER • Researching, designing and evaluating novel interaction techniques in 3D user interfaces for collocated and remote collaboration using head-mounted displays, walls, tabletops, mobiles, large scale displays, and wearables. I also helped maintaining VIMMI's media lab.

2017/18 **INSTITUTO SUPERIOR TÉCNICO, UNIVERSITY OF LISBON**
TEACHING ASSISTANT • Summer Semester • Human-Computer Interaction

STUDENTS

Master Students

2020 - Carlos McGregor Muro*, University of Toronto. Co-Advisor to Tovi Grossman.*
Thesis: *TBD*

2019 - 2020 Catarina Gonçalves Fidalgo, *Instituto Superior Técnico, University of Lisbon. Co-Advisor to Joaquim Jorge.*
Thesis: *MAGIC: Manipulating Avatars and Gestures to Improve Remote Collaboration*

2016 - 2017 Francisco Venda*, Instituto Superior Técnico, University of Lisbon. Unofficial Co-Advisor to Joaquim Jorge.*
Thesis: Safe Walking in VR

2014 - 2015 João Vieira*, Instituto Superior Técnico, University of Lisbon. Unofficial Co-Advisor to Joaquim Jorge and Artur Arsénio.*
Thesis: *SleeveAR: Augmented Reality for Rehabilitation Using Realtime Feedback*

Undergrad Researchers

2020 Kevin Huang*, University of Toronto. Co-Advisor to Tovi Grossman.*

ACADEMIC SERVICE

Senior Program Committee:

ACM International Conference on Multimodal Interaction (ICMI): **2020**

Conference Organization:

IEEE Conference on Virtual Reality and 3D User Interfaces (VR) **2021**: Organising Committee member
ACM International Conference on Interactive Surfaces and Spaces (ISS) **2020**: Organising Committee member
Eurographics **2016**: Organising Committee member

Peer Reviewer:

ACM Conference on Human Factors in Computing Systems (CHI): **2018, 2020, 2021**
ACM Symposium on Spatial User Interaction (SUI): **2017, 2020**
ACM Symposium on Virtual Reality Software and Technology (VRST): **2017, 2018, 2020**
ACM International Conference on Interactive Surfaces and Spaces (ISS): **2016, 2017, 2018, 2019, 2020**
ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW): **2020**
IEEE International Symposium on Mixed and Augmented Reality (ISMAR): **2017, 2018, 2019, 2020**
Elsevier Computers & Graphics: **2018, 2019, 2020**
ACM Symposium on User Interface Software and Technology (UIST): **2020**
ACM International Conference on Tangible, Embedded and Embodied Interaction (TEI): **2018, 2020**
ACM ACM International Conference on Multimodal Interaction (ICMI): **2018, 2019**
ACM Conference on Designing Interactive Systems (DIS): **2016**
IEEE Consumer Electronics Magazine (CEM): **2016**

REFERENCES

Available upon request.

FULL LIST OF PUBLICATIONS

16 conference proceedings, 6 journal articles
260+ citations, h-index 10 (Google Scholar)

Peer-reviewed Conference Proceedings

C16 **"Grip-that-there": An Investigation of Explicit and Implicit Task Allocation Techniques for Human-Robot Collaboration.** Karthik Mahadevan, Mauricio Sousa, Anthony Tang, Tovi Grossman. ACM Conference on Human Factors in Computing Systems (CHI), 2021. Conditionally Accepted

C15 **Negative Space: Investigating Workspace Awareness in 3D Face-to-face Remote Collaboration**. Maurício Sousa, Daniel Medeiros, and Joaquim Jorge. ACM SIGGRAPH International Conference on Virtual-Reality Continuum and its Applications in Industry (VRCAI), 2019

C14 **Safe Walking in VR.** Maurício Sousa, Daniel Medeiros, and Joaquim Jorge. ACM SIGGRAPH International Conference on Virtual-Reality Continuum and its Applications in Industry (VRCAI), 2019

C13 **Adventures in Hologram Space: Exploring the Design Space of Eye-to-eye Volumetric Projection-based Telepresence.** Rafael Kuffner dos Anjos, Maurício Sousa, Daniel Medeiros, Daniel Mendes, Mark Billinghurst, Craig Anslow and Joaquim Jorge. ACM Symposium on Virtual Reality Software and Technology (VRST), 2019

C12 **WARPING DEIXIS: Distorting Gestures to Enhance Collaboration.** Maurício Sousa, Rafael Kuffner Dos Anjos, Daniel Mendes, Mark Billinghurst, and Joaquim Jorge. ACM Conference on Human Factors in Computing Systems (CHI), 2019
✱ Featured in the 'Best of CHI 2019' event by IndiaHCI

C11 **Using Custom Transformation Axes for Mid-Air Manipulation of 3D Virtual Objects.** Daniel Mendes, Maurício Sousa, Rodrigo Lorena, Alfredo Ferreira, and Joaquim Jorge. ACM Symposium on Virtual Reality Software and Technology (VRST), 2017

C10 **Creepy Tracker Toolkit for Context-aware Interfaces.** Maurício Sousa, Daniel Mendes, Rafael Kuffner dos Anjos, Daniel Medeiros, Alberto Raposo, Alfredo Ferreira, João Pereira, and Joaquim Jorge. ACM Interactive Surfaces and Spaces (ISS), 2017

C9 **VRRRRoom: Virtual Reality for Radiologists in the Reading Room.** Maurício Sousa, Daniel Mendes, Soraia Paulo, Nuno Matela, Joaquim Jorge, and Daniel S. Lopes. ACM Conference on Human Factors in Computing Systems (CHI), 2017

C8 **PRECIOUS! Out-of-reach Selection using Iterative Refinement in VR.** Daniel Mendes, Daniel Medeiros, Eduardo Cordeiro, Maurício Sousa, Alfredo Ferreira, and Joaquim Jorge. IEEE Symposium on 3D User Interfaces (3DUI), 2017

C7 **Mid-air Modelling with Boolean Operations in VR.** Daniel Mendes, Daniel Medeiros, Maurício Sousa, Ricardo Ferreira, Alberto Raposo, Alfredo Ferreira, and Joaquim Jorge. IEEE Symposium on 3D User Interfaces (3DUI), 2017

C6 **Effects of Speed and Transitions on Target-based Travel Techniques.** Daniel Medeiros, Eduardo Cordeiro, Daniel Mendes, Maurício Sousa, Alberto Raposo, Alfredo Ferreira and Joaquim Jorge. ACM Symposium on Virtual Reality Software and Technology (VRST), 2016

C5 **Perceiving Depth: Optical versus Video See-through.** Daniel Medeiros, Maurício Sousa, Daniel Mendes, Alberto Raposo, and Joaquim Jorge. ACM Symposium on Virtual Reality Software and Technology (VRST), 2016

C4 **SleeveAR: Augmented Reality for Rehabilitation using Realtime Feedback.** Maurício Sousa, João Vieira, Daniel Medeiros, Artur Arsenio, and Joaquim Jorge. ACM Intelligent User Interfaces (IUI), 2016

C3 **From Tecton to Teknos: Going back to the Classical Roots of Architecture.** Daniel Mateus, Maurício Sousa, Rui de Klerk, Sandra Gama, Joaquim Jorge, and José Duarte. Education and Research in Computer Aided Architectural Design in Europe (eCAADe), 2015

C2 **Eery Space: Facilitating Virtual Meetings Through Remote Proxemics.** Maurício Sousa, Daniel Mendes, Alfredo Ferreira, João Madeiras Pereira, and Joaquim Jorge. Human-Computer Interaction—INTERACT, 2015

C1 **Beyond Post-It: Structured Multimedia Annotations for Collaborative VEs.** João Guerreiro, Daniel Pires, Maurício Sousa, Daniel Mendes, Ismael Santos, Alberto Raposo, and Joaquim Jorge. Eurographics Symposium on Virtual Environments(EGVE), 2014

P1 **ThumbCam: Returning to single touch interactions to explore 3D virtual environments.** Daniel Mendes, Maurício Sousa, Alfredo Ferreira, and Joaquim Jorge. ACM Interactive Tabletops and Surfaces(ITS), 2014

Journal Articles

J6 **Laparoscopy with Augmented Reality Adaptations.** Ezequiel Zorzal, José Miguel Gomes, Maurício Sousa, Pedro Belchior, Pedro G da Silva, Nuno Figueiredo, Daniel S. Lopes, and Joaquim Jorge. Elsevier Journal of Biomedical Informatics, 2020

J5 **Anatomy Studio: a Tool for Virtual Dissection Through Augmented 3D Reconstruction Sessions.** Ezequiel Zorzal, Maurício Sousa, Daniel Mendes, Rafael K dos Anjos, Soraia F. Paulo, Pedro Rodrigues, José Mendes, Vincent Delmas, Jean-Francois Uhl, José Mogorrón, Daniel S. Lopes, and Joaquim Jorge. Computers & Graphics, 2019

J4 **Magic Carpet: Interaction Fidelity for Flying in VR.** Daniel Medeiros, Maurício Sousa, Alberto Raposo, and Joaquim Jorge. IEEE Transactions on Visualization and Computer Graphics (TVCG), 2019
✱ Recipient of the Encarnação Award 2020 from The Portuguese Computer Graphics Group

J3 **Design and evaluation of novel out-of-reach selection techniques for VR using iterative refinement.** Daniel Mendes, Daniel Medeiros, Maurício Sousa, Eduardo Cordeiro, Alfredo Ferreira, and Joaquim Jorge. Computers & Graphics, 2017

J2 **Hip-directed walking-in-place using a single depth camera.** Luís Bruno, Maurício Sousa, Alfredo Ferreira, João Madeiras Pereira, and Joaquim Jorge. International Journal of Human-Computer Studies (IJHCS), Elsevier, 2017

J1 **Expeditious Illustration of Layer-Cake Models On and Above a Tactile Surface.** Daniel S. Lopes, Daniel Mendes, Maurício Sousa, and Joaquim Jorge. Computers & Geosciences (in press), 2016

Book Chapters

B1 **Remote Proxemics.** Maurício Sousa, Daniel Mendes, Daniel Medeiros, Alfredo Ferreira, João Madeiras Pereira, and Joaquim Jorge. Book chapter in Collaboration Meets Interactive Spaces, Springer, 2016

Other Peer Reviewed Publications

O8 **Demo hour.** Paden Shorey, Audrey Girouard, Sang Ho Yoon, Yunbo Zhang, Ke Huo, Karthik Ramani, Maurício Sousa, Daniel Mendes, Soraia Paulo, Nuno Matela, Joaquim Jorge, Daniel S. Lopes, Dirk Wenig, Johannes Schöning, Alex Olwal, Mathias Oben, and Rainer Malaka. Demo hour. interactions 24, 6 (October 2017), 8-11.

O7 **Evaluation of Travel Techniques for Virtual Reality.** Eduardo Cordeiro, Daniel Medeiros, Daniel Mendes, Maurício Sousa, Alberto Raposo, Alfredo Ferreira, and Joaquim Jorge. Portuguese Meeting of Computer Graphics (EPCG), 2016

O6 **Beyond Eery Space: Applying Gradual Engagement to Remote Proxemics.** Maurício Sousa, Daniel Medeiros, Alberto Raposo, and Joaquim Jorge. Collaboration meets Interactive Surfaces Workshop, ACM Interactive Tabletops and Surfaces(ITS), 2015

O5 **Augmented Reality for Rehabilitation Using Multimodal Feedback.** João Vieira, Maurício Sousa, Artur Arsénio, and Joaquim Jorge. REHAB2015 Workshop, 2015

O4 **Enabling Remote Proxemics through Multiple Surfaces.** Daniel Mendes, Maurício Sousa, João Madeiras Pereira, Alfredo Ferreira, and Joaquim Jorge. Collaboration meets Interactive Surfaces Workshop, ACM Interactive Tabletops and Surfaces(ITS), 2014

O3 **Eery Proxemics: Proximidade à Distância usando Múltiplas Superfícies.** Maurício Sousa, Daniel Mendes, João Madeiras Pereira, Alfredo Ferreira, and Joaquim Jorge. Portuguese Meeting of Computer Graphics (EPCG), 2014

O2 **Binding a Handheld Device with its Owner.** Maurício Sousa and Joaquim Jorge. Collaboration meets Interactive Surfaces Workshop, ACM Interactive Tabletops and Surfaces(ITS), 2013

O1 **Collaborative 3D Visualization on Large Screen Displays.** Daniel Mendes, Maurício Sousa, Bruno Araújo, Alfredo Ferreira, Hildegardo Noronha, Pedro Campos, Luciano Soares, Alberto Raposo, and Joaquim Jorge. Powerwall Workshop, SIGCHI Conference on Human Factors in Computing Systems(CHI), 2013

Theses

T2 **Perception Manipulation for Seamless Face-to-face Remote Collaboration.** *Maurício Sousa. Ph.D. Thesis. Instituto Superior Técnico, University of Lisbon. 2020*

T1 **Remote Proxemics for Collaborative Virtual Environments.** Maurício Sousa. M.Sc. Thesis. Instituto Superior Técnico, University of Lisbon. 2014

SELECTED PUBLICATIONS

S10 **Laparoscopy with Augmented Reality Adaptations**,
Ezequiel Zorzal, José Miguel Gomes, Maurício Sousa, Pedro Belchior, Pedro G. da Silva, Nuno Figueiredo, Daniel S. Lopes, and Joaquim Jorge.
Elsevier Journal of Biomedical Informatics, 2020

S9 **Magic Carpet: Interaction Fidelity for Flying in VR**,
Daniel Medeiros, Maurício Sousa, Alberto Raposo, and Joaquim Jorge,
IEEE Transactions on Visualization and Computer Graphics (TVCG), 2019
∗ **Recipient of the Encarnação Award 2020 from The Portuguese Computer Graphics Group**

S8 **WARPING DEIXIS: Distorting Gestures to Enhance Collaboration**,
Maurício Sousa, Rafael K. Dos Anjos, Daniel Mendes, Mark Billinghurst, and Joaquim Jorge,
ACM Conference on Human Factors in Computing Systems (CHI), 2019
∗ **Featured in the 'Best of CHI 2019' event by IndiaHCI**

S7 **Using Custom Transformation Axes for Mid-Air Manipulation of 3D Virtual Objects**,
Daniel Mendes, Maurício Sousa, Rodrigo Lorena, Alfredo Ferreira, and Joaquim Jorge,
ACM Symposium on Virtual Reality Software and Technology (VRST), 2017

S6 **Creepy Tracker Toolkit for Context-aware Interfaces**,
Maurício Sousa, Daniel Mendes, Rafael Kuffner dos Anjos, Daniel Medeiros, Alberto Raposo, Alfredo Ferreira, João Pereira, and Joaquim Jorge,
ACM Interactive Surfaces and Spaces (ISS), 2017

S5 **VRRRRoom: Virtual Reality for Radiologists in the Reading Room**,
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S4 **Design and evaluation of a novel out-of-reach selection technique for VR using iterative refinement**,
Daniel Mendes, Daniel Medeiros, Maurício Sousa, Eduardo Cordeiro, Alfredo Ferreira, and Joaquim Jorge,
Elsevier Computers & Graphics, 2017

S3 **Hip-directed walking-in-place using a single depth camera**,
Luís Bruno, Maurício Sousa, Alfredo Ferreira, João Madeiras Pereira, and Joaquim Jorge,
International Journal of Human-Computer Studies (IJHCS), Elsevier, 2017

S2 **SleeveAR: Augmented Reality for Rehabilitation using Realtime Feedback**,
Maurício Sousa, João Vieira, Daniel Medeiros, Artur Arsénio, and Joaquim Jorge,
ACM Intelligent User Interfaces (IUI), 2016

S1 **Eery Space: Facilitating Virtual Meetings Through Remote Proxemics**,
Maurício Sousa, Daniel Mendes, Alfredo Ferreira, João Madeiras Pereira, and Joaquim Jorge,
Human-Computer Interaction—INTERACT, 2015

REFERENCES

R1 **Tovi Grossman, Ph.D.**
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R2 **Joaquim Jorge, PhD**
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Senior Researcher, Inesc-ID

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R3 **Graig Anslow, PhD**
Lecturer (Assistant Professor)
School of Engineering and
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