Ph.D. Christian **Arzate Cruz**

PH.D. COMPUTER SCIENCE

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Professional Experience

Scientist
Japan

HONDA RESEARCH INSTITUTE JP *2023/04 - present*

- **Social Robotics Lab**
- I'm working on interactive reinforcement learning algorithms for social robotics applications. My colleagues and I are making robots that develop bonds through empathy by responding to human emotions with rich expressiveness.

Assistant Professor
Japan

RITSUMEIKAN UNIVERSITY *2022/04 - 2023/03*

- **Reality Media Lab**
- I worked on human augmentation through artificial intelligence and human-computer interaction methods. My collaborators and I designed human-computer interaction methods to transform and expand human perception.

Researcher
Japan

THE UNIVERSITY OF TOKYO *2019/04 - 2022/03*

- **Takeo Igarashi Lab**
- I worked on AI and human-computer interaction methods that minimize the needed human feedback and reinforcement learning-based agents that explain their thinking process.

Research Assistant
USA

HEWLETT PACKARD LABS *2012/01 - 2013/03*

- **Mobile and Immersive Experiences Lab**
- I developed artificial vision based technologies aimed to improve the man-machine interaction of Hewlett-Packard systems for the visualization of data on 3D displays in real-time.

Education

Ph.D. in Computer Science
Mexico

TECNOLOGICO DE MONTERREY *2013 - 2018*

- Thesis: HRLB^2: A Game AI Architecture For Believable Bots That Unifies the Elements of Flow and Reinforcement Learning
- Thesis Advisor: Jorge Adolfo Ramirez Uresti
- Description: My work is aimed towards maximizing the player's enjoyment through artificial intelligence techniques in real-time. Specifically, my thesis' main objective was to create non-player characters that behave in a human-like manner. Our approach to achieve this goal is based on reinforcement learning techniques.

M.Sc. in Computer Science
Mexico

TECNOLOGICO DE MONTERREY *2010 - 2011*

- Graduated with honors
- Thesis: Body Part Detection Using a Low Cost Depth Camera
- Thesis Advisor: Isaac Rudimín Goldberg
- Description: The main objective of my dissertation was to design and implement real- time algorithms to detect body parts using the Kinect depth camera. Our algorithms make use of parallel computing – they were coded in the GPU (CUDA). The principal application of the proposed algorithms was the generation of human-like crowd behaviors.

B.Sc. Mechatronics Engineering
Mexico

TECNOLOGICO DE MONTERREY *2004 - 2009*

- Graduated with honors
- Specialization: Automotive engineering
- Description: For my specialization in automotive engineering, I took courses of mechanical vibrations and the finite element method.

Honours & Awards

JST CREST	**AIP Challenge**, a $10,000$ dollars support for young researchers by the Japan Society for the Promotion of Science.	*2021*
COMECYT	**Studies Financial Support**, living expenses support throughout the duration of Ph.D. studies.	*2017 - 2018*
Tec de Monterrey	**Tuition Scholarship**, full tuition support as a student of Ph.D. program in Computer Science.	*2013 - 2018*
CONACyT	**National Studies Financial Support**, living expenses support throughout the duration of Ph.D. studies.	*2013 - 2016*

Invited Talks

Conference Talk *Japan*

ISID 2023 *2023*

- Invited talk at the International Symposium on Intelligence Design (ISID) 2023 on designing interactive reinforcement learning applications.

Teaching Experience

Part-Time Faculty Member *Mexico*

Universidad Mexicana de Innovación en Negocios *2016*

- Teacher of undergraduate students on *operating systems* and *computational architecture courses.*

Selected Publications

2021	**Interactive Reinforcement Learning for Autonomous Behavior Design**, Christian Arzate Cruz, and Takeo Igarashi. In: Li Y., Hilliges O. (eds) Artificial Intelligence for Human Computer Interaction: A Modern Approach. Human–Computer Interaction Series. Springer, Cham.	*Book Chapter*
2021	**Interactive Explanations: Diagnosis and Repair of Reinforcement Learning Based Agent Behaviors**, Christian Arzate Cruz, and Takeo Igarashi. In the IEEE Conference on Games (CoG).	*Conference*
2020	**MarioMix: Creating Aligned Playstyles for Bots with Interactive Reinforcement Learning**, Christian Arzate Cruz, and Takeo Igarashi. In Extended Abstracts of the Annual Symposium on Computer-Human Interaction in Play (CHI Play).	*Conference*
2020	**A Survey on Interactive Reinforcement Learning: Design Principles and Open Challenges**, Christian Arzate Cruz, and Takeo Igarashi. Designing Interactive Systems Conference (DIS).	*Conference*
2018	**HRLB^2: A Reinforcement Learning Based Framework for Believable Bots**, Christian Arzate Cruz and Jorge Adolfo Ramirez Uresti. Applied Sciences (MDPI).	*Journal*
2017	**Player-centered game AI from a flow perspective: Towards a better understanding of past trends and future directions**, Christian Arzate Cruz and Jorge Adolfo Ramirez Uresti. Entertainment Computing.	*Journal*

Reviewer

PC member	IEEE Conference on Games (CoG).	*Conference*
Reviewer	The ACM Symposium on User Interface Software and Technology (UIST), IEEE Conference on Games (CoG).	*Conference*
Reviewer	IEEE Transactions on Games (ToG), Elsevier Entertainment Computing, and Springer 3D Research.	*Journal*

Technical Skills

Programming Skills

- My background includes parallel computing and, data-driven programming techniques. My main programming languages are: **C**, **C++**, **CUDA**, **OpenCL**, **Matlab**, **Java**, and **Python**. Furthermore, since my work focus on computer graphics and game AI, I have experience in the next programming libraries: **OpenGL**, **OpenCV**, and **PyTorch**.

Languages

English, Spanish, and Japanese (basic level).