

Alberto Boem, Ph.D.

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PROFESSIONAL EXPERIENCE

Tateito Inc.

R&D

Tokyo, Japan

04/2019-now

I joined Tateito Inc. for researching a developing a new system (Non-disclosure Agreement) based on cloud computing and AI, and the user experience and interactions.

YCAM InterLab

R&D - Israel & Isral

Yamaguchi, Japan

11/2017-02/2019

I took part to the creation of a new production of YCAM in collaboration with Israel Galvan, an internationally renowned flamenco dancer. In this context I have worked as a researcher on gestural-based interfaces and sonic interactions.

STEIM

R&D Assistant

Amsterdam, Netherlands

02/2015-08/2015

I worked under the METABODY framework, an European Union founded research project aimed to investigate the relations between the human body and emerging technologies. My role in the team of STEIM was to investigate novel wearable interfaces oriented music and interactive architecture (Hyperbody, TU/Delft) and rehabilitation. In addition, I have worked on the development of a programmable digital sound synthesizer for embedded application.

Interface Cultures

Teaching and Technical Assistant

Linz, Austria

10/2012-02/2014

Student assistant of Prof. Christa Sommerer. During this period I was responsible of the organization and maintenance of the lab equipment and archive. I was also the main technical manager of the digital fabrication facilities. I provided technical support and coordination for exhibitions at the Ars Electronica Festival.

Freelancer

Media Design

Italy / Austria

2005-2014

Direction of music videos and documentaries, design and deployment of interactive systems for performing arts (theater, contemporary music), creation of contents for tv productions. In addition, I have developed a series of workshops for creative use of digital media oriented to children (8-12 years).

EDUCATION

University of Tsukuba, Tsukuba (JP)

Ph.D. - Program for Leading Graduate Schools
Empowerment Informatics, Virtual Reality Lab
Supervisor: Prof. Iwata Hiroo

04/2016-03/2019

University of Art and Design, Linz (AT)

M.A., Interface Cultures
Thesis Supervisor: Prof. Martin Kaltenbrunner

10/2011-10/2014

Vote: 1/1

University of Udine, Udine (IT)

Master in Languages and Techniques of New Media

10/2007-04/2010

Vote: 100/100 honors

University of Padova, Padova (IT)

B.A., Media Design and Theory

10/2004-09/2007

Vote: 100/100

**ACADEMIC
EXPERIENCE**

Reviewer 2018-on
Reviewer for several international conferences such as ACM TEI, IEEE VR, NIME, World Haptics, INTERACT.

Supervisor for Master Thesis 04/2017-10/2017
Student: Dan Xu, Ms.C. in Media Technology, University of Leiden (NL)

Visiting Student 04/2014-07/2014
IAMAS - Institute for Advanced Media Art and Sciences, Ogaki (JP)

Visiting Student 09/2008-01/2009
Pompeu Fabra University, Barcelona (SP)

**TECHNICAL
SKILLS**

Software
C++, C, Java, Faust, Max/MSP-Jitter, Pure Data, R, HTML, Visual Studio, Xcode, Unity3D, Python, Autodesk Fusion 360, EyesWeb, Cinema 4D, Eagle CAD, Adobe Creative Suite, AWS Cloud, Github. Windows, Mac OSX, Linux.

Hardware
Digital fabrication and prototyping: 3D printing (Stratasys systems, Maker-Bot), circuit design and fabrication, microcontrollers (ATMEL, Arduino, ESP8266).

**RESEARCH AND
DEVELOPMENT
SKILLS**

- Design, implementation, and evaluation of interactive systems and interfaces for Virtual Reality and HCI, with a special focus on sensors and actuators for tactile interactions.
- Extensive experience in design of new interfaces for musical expression. Knowledge of different aspects of real-time sound synthesis and DSP.
- Six years of experience in production, direction, and editing of music videos, experimental movies, and TV commercials
- Research methods for User Experiences and Psychophysics.

**LANGUAGE
SKILLS**

Italian (native), English (professional), Japanese (basic), Spanish (basic), German (basic).

OTHER SKILLS

Musical theory and basics of composition, sketching and drawing, guitar playing, oil and acrylic painting, design of analog synthesizer, shooting and editing with Super-8mm cameras.

**SELECTED
PROJECTS
(project leader)**

Shape-changing Interfaces for Virtual Reality Musical Instruments: Musical expression is a topic rarely addressed in the field of Virtual Reality. However, apart from sound and visual feedback, haptic feedback represents a fundamental aspect of playing a musical instrument. For this we propose to investigate of deformable haptic interfaces, a method that has never received a proper consideration in the design of virtual musical instruments. I'm exploring such idea by developing a novel deformable interface by using the Volfex technology, an original system developed at the Virtual Reality Lab of the University of Tsukuba. (*In progress*)

Vital+Morph: Vital+Morph is an novel shape-changing interface for remote connection and awareness of clinical data. It enables users located in different places to monitor and feel the vital signs measured from a hospitalized person through shape-change. Through this study, we aim to contribute to the design of remote monitoring systems by providing a novel approach for displaying clinical data that consider the richness of the physical world. In today's information-driven society, we should not just focus on how abstract

data are collected and analyzed, but also on how it can be presented and incorporated into our daily lives. (*Completed: 2017*)

SculpTon: SculpTon is an original malleable interface oriented to musical expression. I have developed an original sensor system to detect deformations, and explored different mappings between manipulation and sound. SculpTon was selected as one of the finalists for the 2015 Margarth Guthman Musical Instrument Competition (USA). Web magazines such as Creators Project and Popular Science have defined SculpTon as one of the "instruments of the future". (*Completed: 2014*)

Auditory Displays for Motor Rehabilitation: During my studies at the University of Udine I have developed a series of systems for interactive sonification (based on speech synthesis) of human movements as an alternative to robot-based motor rehabilitation systems. (*Completed: 2010*)

(teamwork)

TelePaSee: TelepaSee aims to re-invent communication, not limited to speech, language difference, or disabilities; to have a world where we can interact with people and devices using signals generated by our brain. We aim to develop a novel portable EEG device that combines image and sound capture together with Deep Learning. (*In progress*)

Life in the Space-Age: Experiments of Art and Technology in Zero-G: In 2016 the Empowerment Informatics Program (University of Tsukuba) started a unique research activity in collaboration with the Japan Space Forum and JAXA. I developed a prototype for a tangible protein that can be folded in zero-gravity. It was then tested during a parabolic flight. (*Completed: 2017*)

Sounding Popables: Research project on paper driven sonic narratives. Exploring how pop-up books can be enriched through interactive sound. Organized by IUAV (IT), SAMPL (IT) and MIT Media Lab (USA). Role: interaction and sound design. (*Completed: 2011*)

**JOURNAL
ARTICLES**

1. Boem, A., Iwata, H. (2017). "It's like holding a human heart": the design of Vital + Morph, a shape-changing interface for remote monitoring. *AI & Society Journal*, Nov. 2018, Issue 4, pp. 599-619. Springer, 2018. <https://doi.org/10.1007/s00146-017-0752-1>

**CONFERENCE
PROCEEDINGS
AND
PRESENTATIONS**

1. Boem, A., Troiano, G. (2019). *Non-Rigid HCI: A Review of Deformable Interfaces and Input*. In In Proc. of the 2019 ACM Conference on Designing Interactive Systems (DIS'19), San Diego (USA), 2019. (to be published)
2. Boem, A., Enzaki, Y., Yano, H, Iwata, H. (2019). *Human Perception of a Haptic Shape-changing Interface with Variable Rigidity and Size*. In Proc. of IEEE Virtual Reality Conference 2019, Osaka (JP), 23-27/03/2019. (to be published)
3. Boem, A., Iwata, H. (2018). *Encounter-type Haptics for Virtual Reality Musical Instruments*. In Proc. of IEEE Virtual Reality Conference 2018, Reutlingen (DE), 16-23/03/2018. <https://doi.org/10.1109/VR.2018.8446549>
4. Valderrama, A., Maezono, S., Sakamoto, K., Boem, A., Takatori, H., Takuma, Y., Honda, T. (2018). TelePaSee: proposal for a new communication device using EEG. Hyper Interdisciplinary Conference, Tokyo

(JP), 2-3/03/2018. (Best Poster Award) (Start-up Award)

5. Valderrama, A., Sakamoto, K., Boem, A. (2017). *Internet of things: interdisciplinary applications and social perspectives*. Tsukuba Global Science Week, Tsukuba (JP), 25-27/09/2017. (Best Poster Award)
6. Boem, A., Sasaki K., Kano, S. (2017). *Vital+Morph: A Shape-changing Interface for Remote Biometric Monitoring*. In Proc. of ACM Conference on Tangible, Embedded, and Embodied Interaction (TEI'17), Yokohama (JP), 20-23/03/2017.
<https://doi.org/10.1145/3024969.3025083>
7. Boem, A. (2014). *SculpTon: a Malleable Tangible Interface for Sound Sculpting*. In Proc. of Joint ICMC+SMC 2014 (International Computer Music Conference + Sound and Music Computing Conference), Athens (GR), pp. 737-743, 14-20/09/2014, ICMA, San Francisco, USA
8. Boem, A. (2013). *Sculpton: a malleable tangible object for musical expression*. In Proc. of ACM Conference on Tangible, Embedded and Embodied Interaction (TEI'13), Barcelona (SP), 10-13/02/2013.
9. Boem, A., Canazza, S., Rodà, A. (2010). *Design e Implementazione di un'Auditory Display per la riabilitazione motoria* (engl. *Design and Implementation of an Auditory Display for Motor Rehabilitation*). XVIII CIM - Colloquio di Informatica Musicale, Sound and Music Computing Italy, pp. 186-188, 5-8 October 2010, Torino (IT).

**SCHOLARSHIPS
GRANTS**

Special Ph.D. Fellowship for Leading Graduate Schools, JSPS	2016-2019
EMP Challenge Grant, University of Tsukuba	2017
Guthman Musical Instrument Competition Student Grant (USA)	2015
Auslandsstipendium der Kunstuniversität Linz (AT)	2014
European Union Erasmus Program Fellowship (EU-IT)	2008-2009
Homo Sapiens Scholarship for Meritorious Students (IT)	2004-2010

**EXHIBITIONS
(selected)**

Ars Electronica Festival 2012 / 2013 / 2014 / 2016 / 2017, Linz (AT)
Tsukuba Media Art Festival, Tsukuba (JP) 2016 / 2018
Austrian Cultural Forum, Digital Design Week, 2017, London (UK)
Margareth Guthman Musical Instrument Competition 2015, Atlanta (USA)
All Frontiers 2014, Gradisca d'Isonzo (IT)
Piksel Festival 2014, Bergen (NO)
MAMbo-Museum of Modern Art, 2014, Bologna (IT)
Sónar Festival - SONAR+D 2014, Barcelona (SP)
MNAC-National Museum of Contemporary Art, 2014, Bucharest (RO)
European Capital of Culture, 2012, Maribor (SLO)
Live Performers Meeting, 2011, Roma (IT)
Rome International Film Festival, 2010, Roma (IT)