

Alberto Boem, Ph.D.

Merveille B 202
1-18-23 Tarumachi Kohoku-Ku
222-0001 Yokohama, Japan

email: boem.alberto@gmail.com
phone: 070-4470-7571 (JP)
website: <http://www.albertoboem.com>

PROFESSIONAL EXPERIENCE

Tateito Inc.

R&D - Software Engineer

Tokyo, Japan

05/2019-now

Lead the research and development of a novel automatic video editing tool for the RUUUN online learning platform. Such tool aims to support editors in identifying and cut sequences of long videos of seminars. I have worked with Tateito's editors to identify needs and understand their practice of editing such videos contents. Biggest challenge: develop and implement a suitable scene detection. The final version is developed with Python, using OpenCV for image analysis and ffmpeg for video encoding. For more accurate scene detection, a custom object-recognition model was trained using TensorFlow. The tool is now used internally, and it will be released as a AWS cloud service.

Ponoor Experiments Inc.

R&D - Interaction Designer (Contractor)

Tokyo, Japan

02/2019-05/2019

I designed the first prototype of a new interactive installation for Shibuya Sky Building commissioned by Rhizomatiks Design (to be completed in Nov. 2019). The installation is based on a series of moving platforms synchronized with projected video content. I implemented the moving platforms (custom made linear actuator based on micro-pulses stepper motors) and touch-based interaction techniques (with embedded force sensor). The prototype was critical for showing to designers and engineers of Rhizomatiks how to proceed in the creation of the final version of the system.

YCAM InterLab

R&D - Engineer Residency

Yamaguchi, Japan

11/2017-02/2019

I took part in the creation and development of a new production of YCAM named "Israel & イスラエル" in collaboration with Israel Galvan, an internationally renowned flamenco dancer. The aim of the performance was to investigate a new type of expression between traditional dance (flamenco) and generative AI systems (developed by Qosmo Inc.). My main role was the development of wireless gestural interfaces for real-time sound generation (ESP8266, Faust, Max/MSP), and prototyping the interactions between the dancer and the AI system that performs with him. I was involved in this project from the beginning until the World Premiere of the performance as a stage crew member. The performance resulted collective effort of several artists, engineers, sound designers, AI experts, and stage designers coordinated by YCAM InterLab.

STEIM

R&D - Assistant

Amsterdam, Netherlands

02/2015-08/2015

I worked under METABODY, an EU research funded project. My role at STEIM was to investigate and prototype novel wearable interfaces oriented to live performance. This was done also through the organization of workshops on e-textiles, and through a collaboration with the department of architecture of TU/Delft. I also collaborated on the development of a programmable digital sound synthesizer for embedded applications (based on ATMEL ATtiny84). The results of my work have been presented at the METABODY symposium in July 2015.

Interface Cultures Lab*Student and Technical Assistant*

Linz, Austria

10/2012-02/2014

During this period I was responsible for the organization and maintenance of the lab equipment and archive of the Interface Cultures Lab. I provided technical support and coordination for exhibitions at the Ars Electronica Festival, and assist the organizational activities of Prof. Christa Sommerer.

Freelancer*Media Designer*

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)

04/2016-03/2019

Ph.D. - Human Informatics (人間情報学)

Virtual Reality Lab, supervised by Prof. Iwata Hiroo

University of Art and Design, Linz (AT)

10/2011-10/2014

M.A., Interface Cultures

Vote: 1/1

University of Udine, Udine (IT)

10/2007-04/2010

Master in Languages and Techniques of New Media

Vote: 100/100 honors

University of Padova, Padova (IT)

10/2004-09/2007

B.A., Media Design and Theory

Vote: 100/100

**ACADEMIC
EXPERINECE****Reviewer**

2018-on

Reviewer for several international conferences such as ACM TEI, IEEE VR, ISMAR, World Haptics, NIME, INTERACT, ACM CHI PLAY.

External Supervisor for Master Thesis

04/2017-10/2017

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++, Python, C#, Faust, Max/MSP-Jitter, Pure Data, R, Unity3D, C, Visual Studio, Xcode, Autodesk Fusion 360, OpenCV, Processing, OpenFrameworks, EyesWeb, Cinema 4D, Eagle CAD, Adobe Creative Suite (AE, Premiere, Illustrator, Photoshop), Android Studio, CHAI3D, AWS (S3, Lambda), Github, Windows, OSX, Linux.

Hardware: Digital fabrication and prototyping tools such as 3D printing (Stratasys, MakerBot), laser cutters (Epilog). Circuit design, and development of embedded electronic systems (using sensors and actuators) with the Arduino and Raspberry PI platforms.

**LANGUAGE
SKILLS**

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

OTHER SKILLS

Musical theory and basics of composition, sketching and drawing, basics of AI and DSP, painting, knowledge of the main techniques for creating with wood, metal, clay, and silicone.

**SELECTED
PROJECTS
(project leader)**

Voflex++: a shape-changing haptic interface that can generate the physical characteristics, such as shape and rigidity, of virtual objects using an array of newly developed non-expandable balloons. Voflex++ aims to show that soft robotic structures with controllable materiality and shape-change can be combined with Virtual Reality to create new physical-virtual objects. I contributed in the development of the mechanisms, deformable and inflatable surfaces, control software (C++), and designing interactive applications. I also conducted a user study of the haptic perception of the change of size and rigidity using methods from Psychophysics. The results have been presented at international top-tier conferences such as IEEE VR. *(Completed: 2019)*

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. In today's information-driven society, and with IoT technologies 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. I have overseen the entire project from concept to implementation. I also conducted user studies using mixed methods to understand the impact of shape-changing interfaces for representing data in daily environments. *(Completed: 2017)*

SculpTon: SculpTon is a novel deformable tangible interface oriented to musical expression. I developed an original sensor system to detect deformations, the sound synthesis software, and explored different mappings between manipulation and sound. 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 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: aims to re-invent communication between people through wearable 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. The project is a collective effort of a team composed of researchers from HCI, neuroscience, AI, and biology. We participated in several competitions for start-ups (i.e. Leave A Nest) and won an encouragement award at Tokyo HyperInterdisciplinary Conference. My role is in envisioning the interaction scenario, UX, and designing feasibility and user studies. *(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. To better disseminate the results of the workshop (and also the one of 2017) I organized and curated two exhibitions in Japan and Austria. *(Completed: 2018)*

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)*

**PEER-REVIEWED
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.

**PEER-REVIEWED
CONFERENCE
PROCEEDINGS**

1. Boem, A., Troiano, G. (2019). *Non-Rigid HCI: A Review of Deformable Interfaces and Input*. In In Proc. of ACM Conf. on Designing Interactive Systems (DIS'19), San Diego (USA), 23-28/06/2019.
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 Conf. 2019, Osaka (JP), 23-27/03/2019.
3. Boem, A., Iwata, H. (2018). *Encounter-type Haptics for Virtual Reality Musical Instruments*. In Proc. of IEEE Virtual Reality Conf. 2018, Reutlingen (DE), 16-23/03/2018.
4. Boem, A., Sasaki K., Kano, S. (2017). *Vital+Morph: A Shape-changing Interface for Remote Biometric Monitoring*. In Proc. of ACM Conf. on Tangible, Embedded, and Embodied Interaction (TEI'17), Yokohama (JP), 20-23/03/2017.
5. Boem, A. (2014). *SculpTon: a Malleable Tangible Interface for Sound Sculpting*. In Proc. of Joint ICMC+SMC 2014 (International Computer Music Conf. + Sound and Music Computing Conf.), Athens (GR), pp. 737-743, 14-20/09/2014, ICMA, San Francisco, USA

**POSTER
PRESENTATIONS**

1. 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 Conf., Tokyo (JP), 2-3/03/2018. (Best Poster Award) (Start-up Award)
2. 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)
3. 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.
4. 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*). In Proc. of 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 (SI)
Live Performers Meeting, 2011, Roma (IT)
Rome International Film Festival, 2010, Roma (IT)