



Introduction to the *Special Issue: Proceedings of Si15* by the Guest Editors

PerMagnus Lindborg^{*}, Suzy J. Styles[†]

^{*}Interactive Media, School of Art, Design, and Media

[†]Division of Psychology, School of Humanities and Social Sciences

Nanyang Technological University, Singapore

permagnus@ntu.edu.sg

1. Special Issue

Welcome to this **Special Issue of *Array: Proceedings of Si15, the 2nd International Symposium on Sound and Interactivity***.

The articles in the present issue originated in the **Si15 Soundislands Festival**, which was held in Singapore 18–23 August 2015. The festival events included five invited artist performances, two scientific keynotes and two days of proceedings, a commissioned sound installation, an afternoon of public talks, an internet panel, two pedagogic workshops, a concert with young performers, and more than fifty artworks and scientific papers in numerous forms and formats selected from an open call (<http://soundislands.com/si15>).

We are thrilled to present 20 articles, by 31 authors, emanating from Si15. The articles have been extended and thoroughly revised for this special issue of *Array*. They cover a range of topics related to aesthetics, perception, technology, and sound art. We hope that you will enjoy the fruits of the authors' labour and therein discover many a stimulating thought.

2. Theme of Si15

While starting as separate ideas, the fates of Soundislands Festival 2015 and the Si15 Symposium gradually intertwined, and eventually joined under the theme “~sound:senses”. This somewhat cryptic notation expresses the in-

tersection between the arts of sound and the sciences of psychology. The swung dash (~) indicates a dependency and the colon (:) specifies a co-variation between variables. Thus, the focus is on the interaction between physical sound and human senses. Yet, one might interrogate: “*What does the interaction denote? What is on the other side of this function?*”; and the reply must be: “*You!*”

Sound is a medium that acts as a glue between the senses. Hearing is deeply intertwined with vision and movement, and beyond that, researchers and artists are mapping out cross-modal associations with touch, smell, feel, and taste, leading to new and fascinating multimodal designs and experiences, as well as a veritable coral reef of artworks. Much remains unknown as to how sensory integration works. Perhaps intuitively, artists rely on the principle of stimulus and sensation to optimise designed experiences; this is the focus of the science of psychophysics. Throughout history, technical means were developed to extend human capacities in all sensory modalities, both receptive and expressive: recent enabling technologies include film, games, virtual reality, data perceptualisation (e.g. visualisation, sonification, physicalisation), and immersive, smart architecture. Contemporary art represents a stream of possibilities, yet beneath a surface of flamboyance, some artworks might have sprung from confident intuition rather than theoretically grounded and empirically validated research.

Sound artists and musicians have always been inclined towards intermediality (cf. ancient rites, dance, opera, cinema). The first computer artworks were musical compositions. In numerous fields of application, sound integrates with other media, often in a supportive yet essential capacity. Sound and music have provided fertile grounds for research in perceptual psychology and computer science. The fluency of sound, its invisible and intangible nature – and because it can only happen inside time – might be key to an understanding the human condition: brain, body and soul.

The art-science loop needs to be closed. There are many questions to which answers can only come through an interdisciplinary approach. For example: *Can designers profit from a deeper involvement in the perceptual sciences? Can researchers use art and design more convincingly as hypothesis-generators or test-beds for experiments? Can artists tell better stories by distinguishing between innate sensory interactions and culturally acquired yet subconscious interaction experiences? Can a line be drawn between normal and pathological synaesthesia?*

3. Articles in the Issue

The first three articles are based on the invited keynote papers and the opening address at Si15 Soundislands Festival.

Vibeke Sorensen is Chair of the School of Art, Design, and Media (ADM), which hosted several of the events at Soundislands Festival. In her opening address, "Sound, Media Art, and the Metaverse", she sets the tone by reviewing synaesthesia as a concept to understand transmodal multimedia art and design forms. **Charles Spence** is head of the Cross-modal Research Laboratory at Oxford University. His article, "Sound Bites & Digital Seasoning", probes recent research involving the sense of taste, in particular how it is affected by concurrently listening to music. **Stefania Serafin**, director of the Multisensory Experience Lab which at Aalborg University Copenhagen. As outlined in her studio report, "Sonic Interactions in Multimodal Virtual Environ-

ments", the Lab is set up for research in audio-visual and haptic simulations.

After the keynotes, articles are organised under the headings of aesthetics, perception, technology, and sound art.

Aesthetics

The performing arts scene in Singapore has been growing strongly over the past decade. Art is generally seen as an important component in the development of a national identity, and scholars look both to local and external practices in trying to explain what is currently happening. **Joseph Tham's** contribution "Beyond Sound in Sound Art: Society and Politics in the Art of Yasunao Tone and Akio Suzuki", contextualises performance art in Japanese post-1950s society and its interdependency with Western sound artists. In general, the influence of Japanese sound art in Singapore has been substantial. From an equatorial vantage point, looking north is also key to the work by **Natalie Alexandra Tse** and **Andy Chia**. Their article "Performing Sounds Using Ethnic Chinese Instruments with Technology: SA" takes their own practice as a starting point to examine Singaporean contemporary art politics and socio-cultural perspectives.

Perception

Suzy Styles is director of the Brain, Language and Intersensory Perception Lab (BLIP Lab), in the division of Psychology at NTU in Singapore. In "The Language of Dance: Testing a Model of Cross-Modal Communication in the Performing Arts", she discusses how multisensory processing may lie at the heart of some forms of artistic expression, in the context of an investigation into crossmodal matching between spoken syllables such as 'bu' and 'ki' and physical expressions of sound in dance. Members and collaborators of the BLIP Lab also contributed reports testing perceptual linkages between sounds and other senses: **Nora Turoman** asks "How well do Humans Capture the Sounds of Speech in Writing?", and in her article describes their 'science in action' exhibition at Soundislands Festival, where visitors at the ArtScience Museum matched vowel sounds to graphic symbols in a playful way. **Joel Lim**, in "Super-Normal Integration of

Sound and Vision in Performance", delves into crossmodal correspondences involving 'guitar faces' people make when playing air-guitar while listening to music; this was demonstrated in an audience participatory event at the Museum. **Nan Shang** explores the associations between visual shapes and vowel sounds articulated in Mandarin Chinese through "An Implicit Association Test on Audio-Visual Cross-Modal Correspondences". **Shao-Min Hung** and **Po-Jang Hsieh** from Duke NUS Graduate Medical School explore "Pre-conscious Automaticity of Sound-Shape Mapping", in an experiment testing early crossmodal binding between the sounds of written words and abstract shapes.

Two additional contributions round out the Proceedings' section on perception: **Rachel Chen**, presently based in France, contributes an article called "Colors in Silence – The Journey of a Synesthete in Understanding the Senses". It is a case-study probing specific crossmodal bindings between musical pitch, colour, and texture experienced by one individual. US-based **Yago de Quay** works with technologically enabled performance art. In "Same Time, Same Place, Keep it Simple, Repeat: Four Rules for Establishing Causality in Interactive Audio-Visual Performances", he outlines a framework to analyse how audiovisual and spatial cues may establish the illusory perception of a common cause.

Technology

The three articles in the technology section describe projects exploring new methods for artistic expression in performance and installation. A central topic in each case is how to develop strategies for parameter mapping in human-computer interaction. **Stefano Fasciani** is a researcher in audio technology, previously in Singapore and now in Dubai. In "Interactive Computation of Timbre Spaces for Sound Synthesis Control", he pursues an approach to voice-controlled synthesis based on machine-learning techniques. Fasciani regularly uses his system in stage performance, for example at Si13 (<http://soundislands.com/si13>). **Jingyin He** is originally from Singapore and now based in New Zealand. Together with **Jim Murphy**, **Ajay Kapur**, and **Dale A. Carnegie**, he writes about their ongoing practice-based

research on "Parametrically-Dense Motion Sensing Devices and Robotic Musical Instruments". Finally in the section on technology, **Rafael Ramirez** and his team from Barcelona consisting of **Sergio Giraldo** and **Zacharias Vamvakousis** present their approach to "Brain-Computer Music Interface for Music Expression". Focussing on emotion and using only low-cost EEG equipment, Ramirez's group takes creative music performance as a springboard to develop systems with applications in therapy.

Sound art

The five articles on sound art are all based in the authors' own practice, which they performed and demonstrated at events at ADM, The Arts House, and ArtScience Museum. From Japan, **Yoichi Nagashima** describes in "Assembling Music" a series of pieces created by hacking and building electronics from scratch. His compatriots **Shumpei Tamura** and **Yasuo Kuhara** explain the construction of an inventive interactive installation piece in "Spandex Shoji Synthesizer Transforming Elastic Interaction into Images and Sounds". **Dirk Johan Stromberg** and **Robert Casteels** certainly win the trophy for most catchy paper title: "Having a Ball With the Sphere". It aptly describes a custom-built instrument for audiovisual performance, showcased in their recent multimedia performances in Singapore. Working as an audiovisual design duo, based in Melbourne, **Paul Fletcher** and **Mark Pollard** introduce their project on site-specific installations and performances in "Resonating Spaces". Finally, the article by **PerMagnus Lindborg** and **Joyce Beetuan Koh** describe their generative sound installation "When We Collide", presented at Soundislands Festival. The approach was collaborative, employing audio material by the authors and four commissioned composers: Dirk Stromberg, Stefano Fasciani, Seongah Shin, and Andrián Pertout.

4. Acknowledgements

Si15 Soundislands Festival was organised in close partnership with ArtScience Museum. The Si15 2nd International Symposium on Sound and Interactivity received core funding

from the Centre for Liberal Arts and Social Sciences (CLASS) at Nanyang Technological University (NTU). The events were supported by School of Art, Design (ADM), National Art Council, Bollywood Veggies, Italian Cultural Institute in Singapore, and New Zealand Art Council. We gratefully acknowledge peer support from Asia Computer Music Project and International Computer Music Association.

Keynote speakers were interaction design specialist Stefania Serafin and crossmodality researcher Charles Spence. Invited artists were audiovisual performer Ryoji Ikeda, film-maker and choreographer Daniel Belton, and electronica duos CLUBbleu (Felix Leuschner & Julia Mihály) and Black Zenith (Brian O'Reilly & Darren Moore).

The core organisation team consisted of PerMagnus Lindborg, Suzy Styles, Joyce Beetuan Koh, and Stefano Fasciani. Invaluable contributions to producing concerts and installations were made by Ross Williams, Dirk Stromberg and Yong Rong Zhao.

Our institutional partners, represented by Honor Harger, Anna Salaman, Nina Ernst, Stacy Lim, Ivy Singh-Lim, Veronica Manson, Luke Kang Kwong Kapathy, Vibeke Sorensen, and Michael Walsh, made the events possible in the first place. Also, many thanks to NTU staff, including Lucas Jodogne, Poh Zhuang Yi, Hong Bee Kuen, Lim Pheng Yew, Muhammad Mustajab Bin Mohamad, Lau Kheng Hock, Shukor, Bharat Singh, Michelle Tan, and Magdalene Lim for their contributions, and many others at

Nanyang Academy of Fine Arts, The Arts House, Bollywood Veggies, and ArtScience Museum.

Importantly, warm thanks to our students Liew Kongmeng and Nurul Syarfiquah, who together with Valentia Chew, Sandra Soh, Isaac Ting, Wong Jinpei, and Woon Fei Ting, who provided much assistance in running the events.

We are indebted to Si15 session chairs Sara Lenzi, Stephen Lim, Naotoshi Osaka, Randall Packer, Mark Wong, and Lonce Wyse, who also acted as double-blind peer reviewers of the open call submissions; in this effort they were joined by Renick Bell, Anders Elowsson, Emma Frid, Nicolas Jaquot, Joleen Loh, Antonio Pessotti, Seongah Shin, and Lindsay Vickery. Thank you all.

Last but not least, we would like to express our gratitude to all the authors for their patience during the editing process and conscientious work in revising the manuscripts. As editors, we hope that, through the authors' efforts, the merits of each and every work in this Issue is plain to see, and that any editorial oversight will not cloud the overall impression.

We wish the readers a great time with the Special Issue of *Array: Proceedings of Si15*. We hope you will join us for the future installments of the Soundislands Festival and International Symposium on Sound and Interactivity: *Si17* and beyond!