

Preface

It is our great pleasure to welcome you to the 18th International Society for Music Information Retrieval Conference (ISMIR 2017). The annual ISMIR conference is the world's leading research forum on processing, analyzing, searching, organizing, and accessing music-related data. This year's conference takes place at the National University of Singapore Research Institute (NUSRI) in Suzhou, China, from October 23-27, 2017. It is organized by National University of Singapore.

Music Information Retrieval (Music-IR) is a highly interdisciplinary field, incorporating elements from the disciplines of signal processing, machine learning, psychology, musicology, electrical engineering, computer science, music librarianship, and many more. This conference aims to cover the broad range of Music-IR topics, enabling researchers, developers, students, educators, and other professionals to exchange ideas, share results, and gain new perspectives from each other. The conference in turn provides opportunities to foster collaborations and encourage new developments in the field.

The present volume contains the complete manuscripts of all peer-reviewed papers presented at ISMIR 2017. A total of 226 submissions were received before the deadline, of which 190 complete and well-formatted papers entered the review process. Special care was taken to assemble an experienced and interdisciplinary review panel comprising people from many different academic and industrial institutions worldwide. As in previous years, reviews were double-blinded (i.e., both the authors and the reviewers were anonymous) with a two-tier review model involving a pool of 275 reviewers, including a program committee (PC) of 63 members. Each paper was assigned to a PC member and three reviewers. Reviewer assignments were based on topic preferences, bidding on papers, and PC member assignments. Following the review phase, PC members and reviewers entered a discussion phase aiming to homogenize acceptance versus rejection decisions.

Handling four submissions on average, each PC member was asked to adopt an active role in the review process by conducting an intensive discussion phase with the other reviewers and providing a detailed meta-review. Final acceptance decisions were based on 758 reviews and meta-reviews. Of the 190 reviewed papers, 97 were accepted, resulting in an acceptance rate of 51.0%. The table shown on the next page summarizes the ISMIR publication statistics over the history of the conference.

The mode of presentation of the accepted papers was determined after the accept/reject decisions and has no relation to the quality of the papers or to the number of pages allotted in the proceedings. From the 97 accepted contributions, 24 papers were chosen for oral presentation to achieve a broad coverage of Music-IR topics, while the other 73 were chosen for poster presentation. Each oral presentation has a 20-minute slot (including setup and questions/answers from the audience) and each poster presentation takes place over two sessions on a given day, during lunch and in the afternoon, for a total of 3 hours.

The ISMIR 2017 conference runs for a 5-day period. Accepted papers are presented over a period of 3.5 days, preceded by a day of tutorials and followed by a half day of Late-Breaking & Demo (LBD) and Unconference sessions. The main academic program also

includes the Women in Music-IR (WiMIR) annual meeting, keynote talks, panel sessions, and social events.

In addition, ISMIR 2017 provides a musical program. This program includes a diverse selection of music, from western classical standards to traditional music of the Suzhou area, and also focuses on music incorporating aspects of Music-IR. In this way we hope to encourage the use of such techniques in the creation of new music, as well as to explore music which can lead to novel research ideas in the field.

ISMIR 2017 also features four major social events, including the Welcome Reception, a Grand Canal cruise, a concert at the Master of Nets Garden, and the ISMIR 2017 Banquet with music performances from our community.

Finally, ISMIR 2017 offers three satellite events before and after the main conference: Hacking Audio and Music Research (HAMR), the China Conference on Sound and Music Technology (CSMT), and the Digital Libraries for Musicology (DLfM) workshop.

We believe this is an exciting and engaging program reflecting the breadth and depth of activities across our community.

Year	Location	Oral	Poster	Total Papers	Total Pages	Total Authors	Unique Authors	Pages/ Paper	Authors/ Paper	Unique Authors/ Paper
2000	Plymouth	19	16	35	155	68	63	4.4	1.9	1.8
2001	Indiana	25	16	41	222	100	86	5.4	2.4	2.1
2002	Paris	35	22	57	300	129	117	5.3	2.3	2.1
2003	Baltimore	26	24	50	209	132	111	4.2	2.6	2.2
2004	Barcelona	61	44	105	582	252	214	5.5	2.4	2
2005	London	57	57	114	697	316	233	6.1	2.8	2
2006	Victoria	59	36	95	397	246	198	4.2	2.6	2.1
2007	Vienna	62	65	127	486	361	267	3.8	2.8	2.1
2008	Philadelphia	24	105	105	630	296	253	6	2.8	2.4
2009	Kobe	38	85	123	729	375	292	5.9	3	2.4
2010	Utrecht	24	86	110	656	314	263	6	2.	2.4
2011	Miami	36	97	133	792	395	322	6	3	2.4
2012	Porto	36	65	101	606	324	264	6	3.2	2.6
2013	Curitiba	31	67	98	587	395	236	5.9	3	2.4
2014	Taipei	33	73	106	635	343	271	6	3.2	2.6
2015	Málaga	24	90	114	792	370	296	7	3.2	2.6
2016	New York	25	88	113	781	341	270	6.9	3.0	2.4
2017	Suzhou	24	73	97	716	324	248	7.4	3.3	2.6

Tutorials

Five tutorials take place on Monday, providing a balance between culture and technology. Two 3-hour tutorials are presented in parallel on Monday morning, and three 3-hour tutorials are presented in parallel on Monday afternoon.

Morning Sessions:

Tutorial 1: Bayes and Markov Listen to Music

George Tzanetakis, University of Victoria, Canada

Tutorial 2: Leveraging MIDI Files for Music Information Retrieval

Colin Raffel, Google Brain, USA

Afternoon Sessions:

Tutorial 3: A Basic Introduction to Audio-Related Music Information Retrieval

Meinard Müller, International Audio Laboratories Erlangen, Germany

Stefan Balke, International Audio Laboratories Erlangen, Germany

Christof Weiss, International Audio Laboratories Erlangen, Germany

Tutorial 4: So You Want to Conduct a User Study in MIR?

Andrew Demetriou, Delft University of Technology, Netherlands

Audrey Laplante, Université de Montréal, Canada

Sally Jo Cunningham, University of Waikato, New Zealand

Cynthia Liem, Delft University of Technology, Netherlands

Tutorial 5: Machine-Learning for Symbolic Music Generation

François Pachet, SONY CSL, France

Jean-Pierre Briot, Paris VI - SONY CSL, France

Keynote Speakers

We are honored to have three distinguished keynote speakers:

Structures: Performed, Perceived and Constructed

Prof. Elaine Chew

Professor of Digital Media, School of Electronic Engineering and Computer Science, Queen Mary University of London, UK

From Stanford to Smule: Reflections on the Nine-Year Journey of a Music Start-Up

Dr. Jeffrey C. Smith

Co-founder, Chairman, and CEO, Smule, Inc., USA

Does MIR Stop at Retrieval?

Prof. Roger B. Dannenberg

Professor of Computer Science, Art & Music, Carnegie Mellon University, USA

WiMIR Annual Meeting

Women in Music-IR (WiMIR) is a group of people in the Music-IR community dedicated to promoting the role of, and increasing opportunities for, women in the field. Participants meet to network, share information, and discuss in an informal setting the goal of building a community that supports women – and more broadly, diversity – in the field of Music-IR.

WiMIR has held annual meetings at the ISMIR conference since 2012, garnering a high turnout of both female and male attendees. For the first time in 2016, WiMIR has organized a mentoring program connecting female students, postdocs, and early-stage researchers to more senior females and male allies in the field, and has also received substantial financial support which enables more female researchers to attend the ISMIR conference.

This year's WiMIR session is hosted by Preeti Rao (Indian Institute of Technology Bombay, India) and Zhongzhe Xiao (Soochow University, Mainland China). Apart from a presentation on the ongoing diversity initiatives, the WiMIR session at ISMIR 2017 features a talk by Shawn Carney, Head of Global IT at Spotify on promoting diversity, with the competitive edge it provides in an increasingly interdependent and interconnected world.

Bye Bye Bias: Promoting Diverse Teams

Shawn Carney

Head of Global IT at Spotify, USA

Panels

ISMIR 2017 features two panels: the ISMIR Industry Panel, and the Future of Music-IR Research panel.

Industry Panel

The Industry Panel is moderated by Blair Kaneshiro (Stanford University, USA). The panel brings together five distinguished members of industry for a discussion of current topics as well as Q&A with the audience:

- Junqi Deng, KuGou, Mainland China
- Anssi Klapuri, Yousician, Finland
- Matthew McCallum, Gracenote, USA
- John Neuharth, Microsoft, USA
- Avery Wang, Shazam, USA

Future of Music-IR Research Panel

The Future of Music-IR Research panel focuses on novel and creative research directions (e.g., neuroscience, deep learning, Music-IR & health, Music-IR & education). It is moderated by the ISMIR 2017 General Chair, Ye Wang (National University of Singapore, Singapore). The panel features young researchers who have already made an impact on our community:

- Kat Agres, Agency for Science, Technology & Research (A*STAR), Singapore
- Cynthia Liem, Delft University of Technology, Netherlands
- Brian McFee, New York University, USA
- Gus (Guangyu) Xia, NYU Shanghai, Mainland China

Late-Breaking/Demo & Unconference

Friday afternoon is dedicated to late-breaking papers and Music-IR system demonstrations. Abstracts for these presentations are available online. Moreover, as in previous years, we have a special “unconference” session in which participants break up into smaller groups to discuss Music-IR issues of particular interest. This is an informal and informative opportunity to get to know peers and colleagues from around the world.

Music Program and Community Performance

On Wednesday, there is a special concert night in the Master of Nets Garden (网师园). Conference participants enjoy Chinese traditional music and performances in one of the finest gardens in China, and a UNESCO heritage site, along with a docent-led tour of the garden. The program includes Kun opera (昆曲), Pingtan – storytelling and ballad singing in Suzhou dialect (苏州评弹), traditional dances, and instrumental performances such as Qin (古琴), Zheng (古筝), Pipa (琵琶), Di (笛子), and Erhu (二胡).

On Thursday, there is a community performance night following the banquet dinner. The program includes both submitted and invited pieces, including original work that intersects Music-IR technology, traditional Chinese music, and music ensemble with sensors. This includes seven music pieces:

1. Etudes-Tableaux No. 1, by Dr. Jeffrey C. Smith.
2. Ancient Pipa Solo Piece “Ambush from Ten Sides”, by Shuqi Dai.
3. Fibonacci-sequence based composition: Carnatic Classical performance, by Venkata Subramanian Viraraghavan.
4. A Trip to Suzhou, by Roger B. Dannenberg, Gus Xia, and Shuqi Dai.
5. Informatics Philharmonic Concert, by Christopher Raphael.
6. Liuyang River, by Zhengshan Shi.
7. Motion Initiated Music Ensemble with Sensors (MIMES), by the NUS Sound and Music Computing Lab.

Social Events

In addition to the academic focus of ISMIR, we have aimed to provide a number of unique social events. The social program provides participants with an opportunity to relax after meetings, to experience Suzhou City, and to network with other ISMIR participants. The social program includes:

Welcome Reception

Welcome reception happens at the NUSRI cafe on Monday, October 23, from 6pm to 8pm. Hors d’oeuvres and drinks are provided.

WiMIR/Diversity Reception

Amazon Music presents a reception at the NUSRI cafe on Tuesday, October 24, from 6pm to 7:30pm to recognize WiMIR and the diversity initiatives of the ISMIR 2017 conference. All registered conference attendees are welcome. Hors d’oeuvres and drinks are provided.

Grand Canal Cruise

On Wednesday, October 25, from 7pm to 8pm, conference participants take a cruise on the Suzhou Ancient Grand Canal (苏州古运河). The Grand Canal is the oldest and longest man-made waterway in the world. Parts of this canal between Hangzhou and Beijing date back more than 2000 years. The canal starts from Beijing in the north and ends at Hangzhou in the south. The Grand Canal measures 1700 kilometers in length.

Garden Concert

After the Grand Canal Cruise, from 9pm to 10pm on Wednesday, October 25, conference participants visit the Master of Nets Garden (网师园) and enjoy Chinese traditional music and performances. Details of the concert can be found in the “Music Program and Community Performance” section above.

ISMIR Banquet + Community Performance

The Annual ISMIR Banquet takes place at Songhe Lou Culture and Arts Center Restaurant (松鹤楼科文中心饭店). There is a ISMIR community performance. The program comprises a selection of submitted and invited pieces, as detailed in the “Music Program and Community Performance” above.

Satellite Events

ISMIR 2017 has expanded its offering of satellite events to three, emphasizing two very important themes: the bridge between academia and industry and diversity in our community.

Hacking Audio and Music Research (HAMR) is an event series which applies the hackathon model to the development of new techniques for analyzing, processing, and synthesizing audio and music signals. This is in contrast to traditional hackathons and hack days, which generally emphasize prototyping commercial applications, but have proven to be an effective way for entrepreneurs and hobbyists to spend a concentrated period of time doing preliminary work on a new project.

The **China Conference on Sound and Music Technology (CSMT)** has the aim of promoting the research of Chinese traditional music in the field of sound and music technology, and the use of computational methods in Chinese traditional music research, as well as creating a space for dialog and debate among engineers, musicologists, and musicians who have interest in this music tradition.

The **Digital Libraries for Musicology (DLfM)** workshop presents a venue specifically for those working on, and with, Digital Library systems and content in the domain of music and

musicology. This includes bibliographic and metadata for music, intersections with music Linked Data, and the challenges of working with the multiple representations of music across large-scale digital collections such as the Internet Archive and HathiTrust.

Host City

Suzhou has a rich history of over 2500 years. The city's old village canals, stone bridges, pagodas, and meticulously designed UNESCO World Heritage gardens draw millions of domestic and overseas tourists each year. Suzhou's culture is famous across China and beyond; Marco Polo himself once described Suzhou as the "Venice of the East".

The conference venues are all close to the National University of Singapore Research Institute (NUSRI) in Suzhou, which is the first overseas research institute of NUS. NUSRI is located at the Suzhou Industrial Park (SIP) within the Higher Education Town (HET) with many campuses from local and overseas universities which is rich with dining options. It offers convenient public transportation (e.g., subway) to many tourist attractions in the ancient Suzhou city.

Acknowledgments

We are very proud to present to you the proceedings of ISMIR 2017. The conference program was made possible thanks to the hard work of many people including the members of the organizing committee, the many reviewers and meta-reviewers from the program committee, as well as the leadership and administrative staff of National University of Singapore (NUS) and the National University of Singapore Research Institute (NUSRI) in Suzhou.

Special thanks go to this year's sponsors:

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We also gratefully acknowledge the sponsors who contributed specifically to Women in Music Information Retrieval (WiMIR) initiatives and Student Travel awards:

- Amazon Music
- Gracenote
- iZotope
- Microsoft
- Smule
- Spotify
- Steinberg

Last but not least, the ISMIR program is possible only thanks to the excellent contributions of our community in response to our Call for Participation. The biggest acknowledgment goes to you, the authors, reviewers, researchers, and participants of this conference. We wish you a productive and memorable stay in Suzhou.

Sally Jo Cunningham, University of Waikato, New Zealand

Xiao Hu, University of Hong Kong, Hong Kong

Douglas Turnbull, Ithaca College, USA

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