

# Statement for Friends of the International Center Fellowship

Hao-Wen Dong

## Qualification

Born and raised in Taiwan, I am fortunate to have the opportunity to pursue my graduate study abroad at UC San Diego. As an international student, I understand how struggling it can be to face the language barriers and culture difference as a foreigner. Fortunately, with all the support I received from my family and fellow international students, I have gradually overcome these challenges and fit in the local community. Further, as a researcher in the field of computer music, I have also been collaborating with international researchers from across the globe in the past few years. I truly appreciate the importance of international friendship in making impactful progress in science and technology. Moreover, I have been mentoring several international students for their graduate school applications and career decision making in the past few years. Motivated by my personal experience as an international student, I will continue contributing to promote international friendship and help international students to overcome any barriers they might encounter through mentoring and experience sharing.

## Research Overview & Future Plans

My research aims to *empower music creation with machine learning*. I build intelligent systems that learn to compose, arrange and synthesize music. My goal is to *lower the barrier of entry for music composition and democratize music creation*. I study a wide range of topics on music and audio signal processing, including multitrack music generation [1–5], automatic instrumentation [6], automatic arrangement [1, 5], automatic harmonization [7], audio synthesis [8, 9], audio source separation [10] and symbolic music processing software [11, 12]. My research can be roughly categorized into three main pillars: 1) *Multitrack music generation*—generating new music contents automatically, 2) *Assistive music creation tools*—assisting humans in creating and performing music, and 3) *Self-supervised learning for audio and music*—learning sound separation and synthesis using unlabeled videos in the wild.

My research has been impactful in the field of music information research. My work on generating multi-instrument music using convolutional generative adversarial networks was the first deep learning model that tackles the challenge of multitrack music generation [1]. This work has inspired much follow-up research that reused our data processing pipeline, dataset, model and evaluation metrics. *Our proposed MuseGAN model led to a commercial implementation in the AWS DeepComposer, an AI-powered keyboard made and sold by Amazon.*<sup>1,2</sup> In addition, my open-source software for symbolic music processing provides a backbone codebase for researchers to build upon and has been used by many researchers in their research.

*I am determined to pursue a career in the academia and continue working on AI-powered music creation.* My future research vision springs from two fundamental questions: 1) *How can AI help musicians or amateurs create music?* 2) *Can AI learn to create music in a way similar to how humans learn music?* With a growing momentum in both academia and industry on generative and creative AI, I am excited about working on multimodal learning for controllable music generation, interactive human-AI music co-creation, and post-production technology for music and audio.

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<sup>1</sup><https://www.amazon.com/dp/B07YGZ4V5B/>

<sup>2</sup><https://aws.amazon.com/blogs/aws/aws-deepcomposer-now-generally-available-with-new-features/>

## Financial Needs & Intended Use of the Award

The lab I currently work in has limited funding in music and audio research. I have been working as a teaching assistant and doing internships to support my PhD study in the past few years. I plan to use the award to attend the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP) and the International Society for Music Information Retrieval Conference (ISMIR). ICASSP and ISMIR are the largest research venue for researchers in the field of signal processing and music information retrieval, respectively. The opportunity to attend these conferences will allow me to build connections with international researchers in the field and establish future research collaborations.

## Contributions to International Friendship


































**Mentoring international students in STEM.** In the past two years, I have been mentoring 10 international students in STEM for career devices through the mentoring programs of Women in Music Information Retrieval (WiMIR) and the Tyra project (Taiwanese Young Researcher Association). I meet regularly with my mentees and provide career advice on topics such as choosing a career in academia or industry, applying to graduate schools, handling work-life balance and making connections at conferences. Moreover, I have been mentoring two international students at UC San Diego, who work in our lab with Prof. Julian McAuley.

**International research collaborations.** I have been collaborating with researchers from all over the world. In particular, I have close collaborations with Prof. Yi-Hsuan Yang (National Taiwan University, Taiwan). Moreover, I have collaborated with Dr. Naoya Takahashi (Sony, Japan) and Dr. Yuki Mitsufuji (Sony, Japan), Dr. Satoru Fukayama (AIST, Japan) and Prof. Tetsuro Kitahara (Nihon University, Japan). I am also involved in an ongoing international collaboration led by Gerard Assayag (IRCAM, France), Prof. Shlomo Dubnov (UC San Diego, USA) and Prof. Tatsuya Harada (The University of Tokyo, Japan). I will continue to seek international collaborations with leading researchers in the field at different institutes around the globe.

**Accessible music creation.** My research aims to lower the barrier of entry for music composition and democratize music creation. Through empowering everyone to create their own music, I want to make music creation accessible to the general public and promote equity and diversity of the field of music creation. I envision that my research will find pedagogical applications that help improve equity and accessibility in music education across the globe.

**Open science for all.** I deeply believe in ‘open science’ that will make science more accessible and approachable. Open science also fosters international collaborations by granting everyone, regardless of their nationality, access to research conducted in different parts of the world. To make my research accessible for all, I make *all* my papers freely available online,<sup>3</sup> make open source the code used in my work,<sup>4</sup> and publish the recordings of my talks on YouTube.<sup>5</sup>

## References

- [1] H.-W. Dong et al., *AAAI*, 2018.   
- [2] H.-W. Dong et al., *ISMIR LBD*, 2017.   
- [3] H.-W. Dong et al., *ISMIR*, 2018.    
- [4] H.-W. Dong et al., *ICASSP*, 2023.   
- [5] H.-M. Liu et al., *GTC Taiwan*, 2018. 
- [6] H.-W. Dong et al., *ISMIR*, 2021.    
- [7] Y.-C. Yeh et al., *JNMR*, 50(1):37–51, 2021. 
- [8] H.-W. Dong et al., *ICASSP*, 2022.    
- [9] H.-W. Dong et al., *submitted to ICML*, 2023.
- [10] H.-W. Dong et al., *ICLR*, 2023.   
- [11] H.-W. Dong et al., *ISMIR LBD*, 2018.   
- [12] H.-W. Dong et al., *ISMIR*, 2020.    

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<sup>3</sup><https://salu133445.github.io/publications>

<sup>4</sup><https://github.com/salu133445>

<sup>5</sup><https://www.youtube.com/@hermandong>