

NTUEE 大學部專題說明會 • 4 August 2023

# Music and AI Lab

## Lab Intro



**Yi-Hsuan Yang** Ph.D.

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<sup>1</sup> National Taiwan University

<sup>2</sup> Taiwan AI Labs

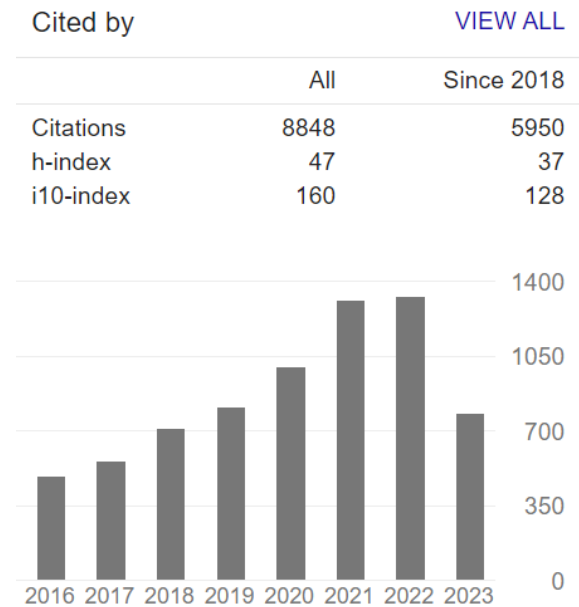
<sup>3</sup> Research Center for IT Innovation, Academia Sinica



# About Me

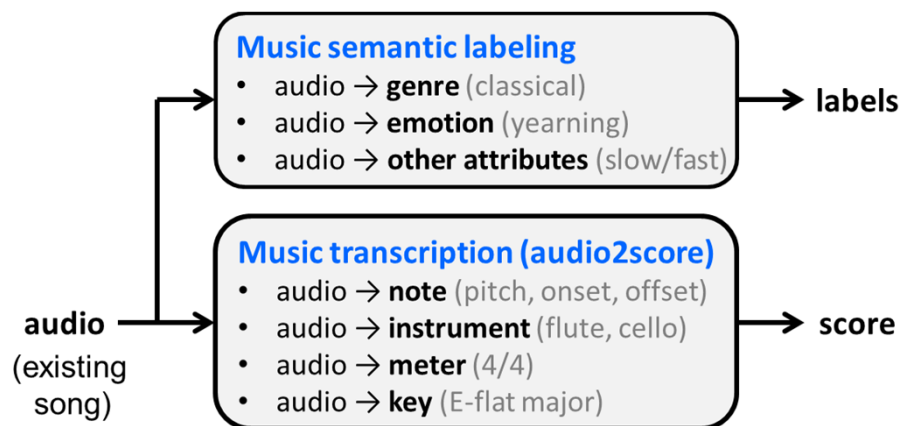
2010 **Ph.D.** National Taiwan University (B91; D95)  
 2011-2023 **PI, Music & AI Lab, Academia Sinica**  
 2019-2023 **Chief Music Scientist, Taiwan AI Labs**  
 since Feb 2023 **PI, Music & AI Lab, National Taiwan University**

<input type="checkbox"/>	TITLE	CITED BY	YEAR
<input type="checkbox"/>	<a href="#">A regression approach to music emotion recognition</a> YH Yang, YC Lin, YF Su, HH Chen Audio, Speech, and Language Processing, IEEE Transactions on 16 (2), 448-457	574	2008
<input type="checkbox"/>	<a href="#">MuseGAN: Multi-track sequential generative adversarial networks for symbolic music generation and accompaniment</a> HW Dong, WY Hsiao, LC Yang, YH Yang Thirty-Second AAAI Conference on Artificial Intelligence	550	2018
<input type="checkbox"/>	<a href="#">MidiNet: A convolutional generative adversarial network for symbolic-domain music generation</a> LC Yang, SY Chou, YH Yang ISMIR	519	2017
<input type="checkbox"/>	<a href="#">Pop music transformer: Beat-based modeling and generation of expressive pop piano compositions</a> YS Huang, YH Yang Proceedings of the 28th ACM international conference on multimedia, 1180-1188	199 *	2020



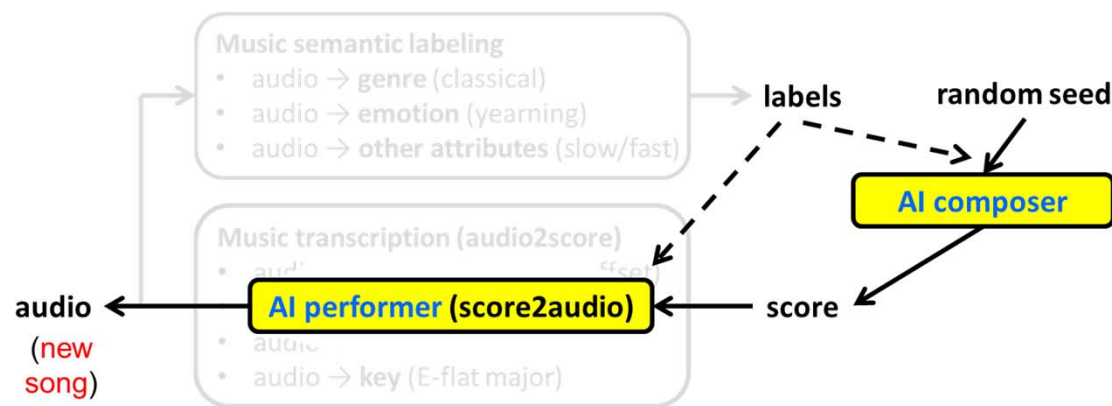
# Music AI; or Music Information Research (MIR)

- **Music analysis**



- music understanding
- music search
- music recommendation

- **Music generation**



- MIDI generation
- audio generation
- MIDI-to-audio generation

# About the Lab

<https://affige.github.io/lab.html>

Information for prospective students

Prerequisites

- **Deep interest in music**
- **Good background in machine learning and mathematics** (e.g., have taken courses such as Machine Learning, Deep Learning, Signals and Systems, Digital Signal Processing, Linear Algebra, Probability and Statistics)
- **Good coding experience in python and a deep learning framework** such as PyTorch



# More Info About Me & the Lab

AI人物誌


音樂與人工智慧的無限可能—專訪楊奕軒

<https://case.ntu.edu.tw/blog/?p=38833>



## 台大電機精專獎得獎心得

音樂科技研究的心路歷程

 施貽仁 · Follow  
Aug 15, 2022

<https://medium.com/@ato950231/%E5%8F%B0%E5%A4%A7%E9%9B%BB%E6%A9%9F%E7%B2%BE%E5%B0%88%E7%8D%8E%E5%BE%97%E7%8D%8E%E5%BF%83%E5%BE%97-7f6fd93ecc67>

# New Course

80489	GRADUATE INSTITUTE OF COMMUNICATION ENGINEERING	CommE5070	<a href="#">Deep Learning for Music Analysis and Generation</a>		3.0	942 U0840	Half	Elective	<a href="#">Yi-Hsuan Yang</a>	2	Thu 7,8,9 <a href="#">E.E. BLDG. NO.2 ROOM NO.229</a> (電二 229).
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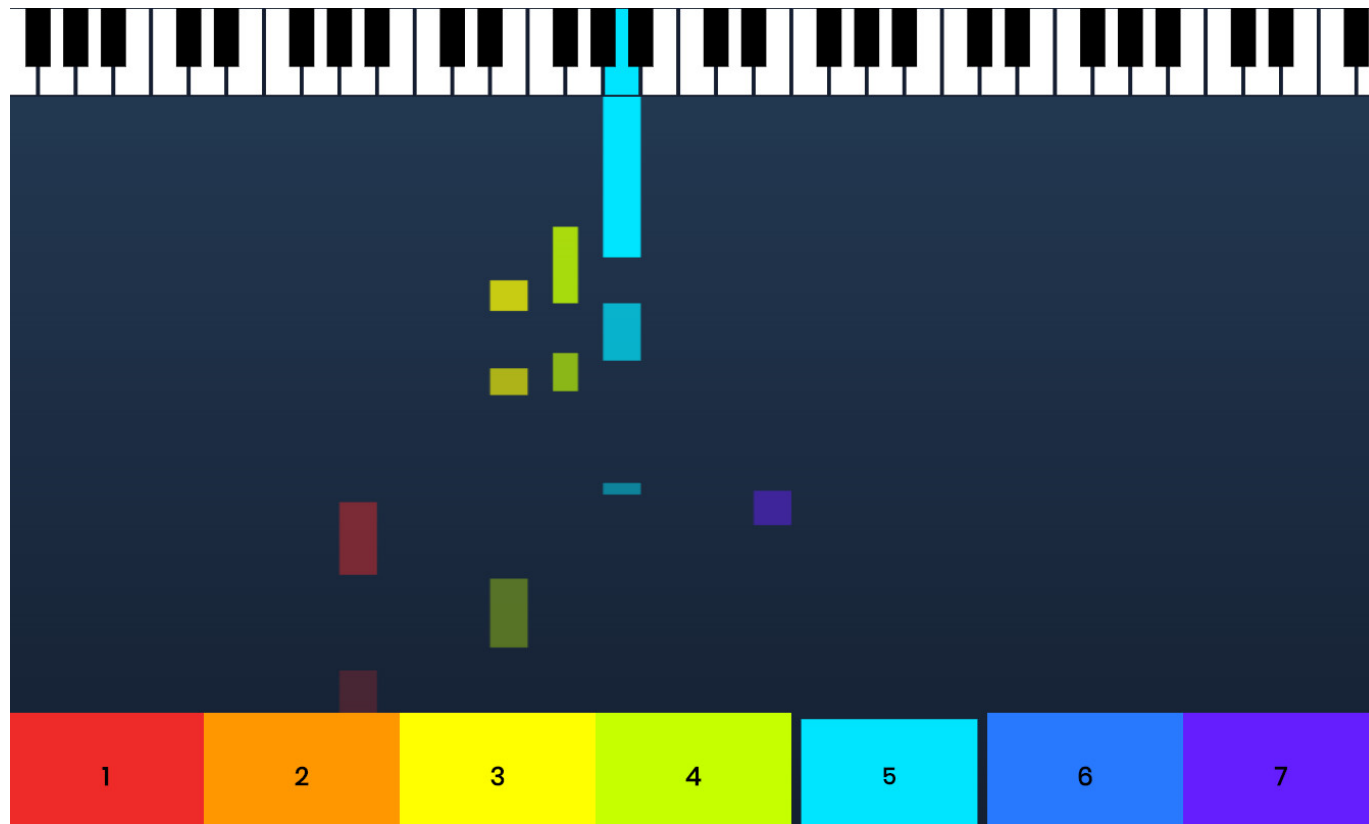
# Global Interest in Music AI



(Slide from Rujing Huang, Bob L. T. Sturm, and Andre Holzapfel, "De-centering the West: East Asian Philosophies and the Ethics of Applying Artificial Intelligence to Music," ISMIR 2021)

# Demo 1: Piano Genie

<https://magenta.tensorflow.org/pianogenie>





# Demo 2: Tone Transfer

<https://sites.research.google/tonetransfer>

The image shows a screenshot of a web interface for a 'Tone Transfer' demo. On the left, under the heading 'INPUT', there is a list of audio sources: 'Acapella singing' (selected with a blue circle), 'Birds chirping', 'Carnatic singing', 'Cello performing', 'Pots and pans clanging', and 'Synthesizer riffing'. Below this list is a '+ Add your own' button. In the center, there is a photograph of a violin and its bow, set against a light purple, irregular background. Three small purple circles with white symbols are overlaid on the violin: one on the body, one on the neck, and one on the bow. On the right, under the heading 'TRANSFORMATION', there is a list of instrument options: 'None', 'Flute', 'Saxophone', and 'Trumpet'. Below this list, the text 'Classical Violin' is displayed in a large, purple, sans-serif font. At the bottom of the interface, there is a decorative purple wavy line with a small circle in the center.


## Demo 3: Text-to-Music

<https://ai.honu.io/papers/musicgen/>

<https://huggingface.co/spaces/facebook/MusicGen>

### MusicGen

This is the demo for [MusicGen](#), a simple and controllable model for music generation presented at: [“Simple and Controllable Music Generation”](#).

 **Duplicate Space** for longer sequences, more control and no queue.

Describe your music

peaceful gospel music played by organ

 Generated Music 



0:00 / 0:15



## Demo 4: AI MV

<https://www.ziaxaza.com/>



## Demo 5: KaraSinger

<https://jerrygood0703.github.io/KaraSinger/>

Lyrics:

In this paper we propose  
a novel neural network model  
called Karaoke singer for a less studied  
singing voice synthesis task  
named score-free SVS  
in which the prosody and melody are  
spontaneously decided by machine.

## Demo 6: AI Sandee



<https://www.youtube.com/watch?v=nWTuZIRU80A>

「音樂製作人的工作是無法被取代的」。AI vocal 要怎麼唱，能唱得多好，終究需要專業音樂製作人，以人類的美學和經驗去引導 AI，要如何將 AI 昇華到情感面，終究還是需要製作人的能力，以及對音樂的想像力。

作為一個仍在線上的歌手與製作人，由我親自處理自己的 AI vocal，讓這首歌傳達出「創作者、歌者不怕 AI 的挑戰」、「我們擁有自己聲音的控制權」等訊息，同時也是「人類的思考和意志，才是人之所以為人」的巨大宣示。

透過聆聽《教我如何做你的愛人》，試著探討：「若 AI 已經能模擬原唱的一切，那麼原唱歌手的價值會是什麼？」

當 AI 真正學會唱歌之後，就是創作人與歌手，重新理解自身價值的時候了。....by公主

SandeeChan · 陳珊妮 公主粉絲團 ✓  
1d · 🌐

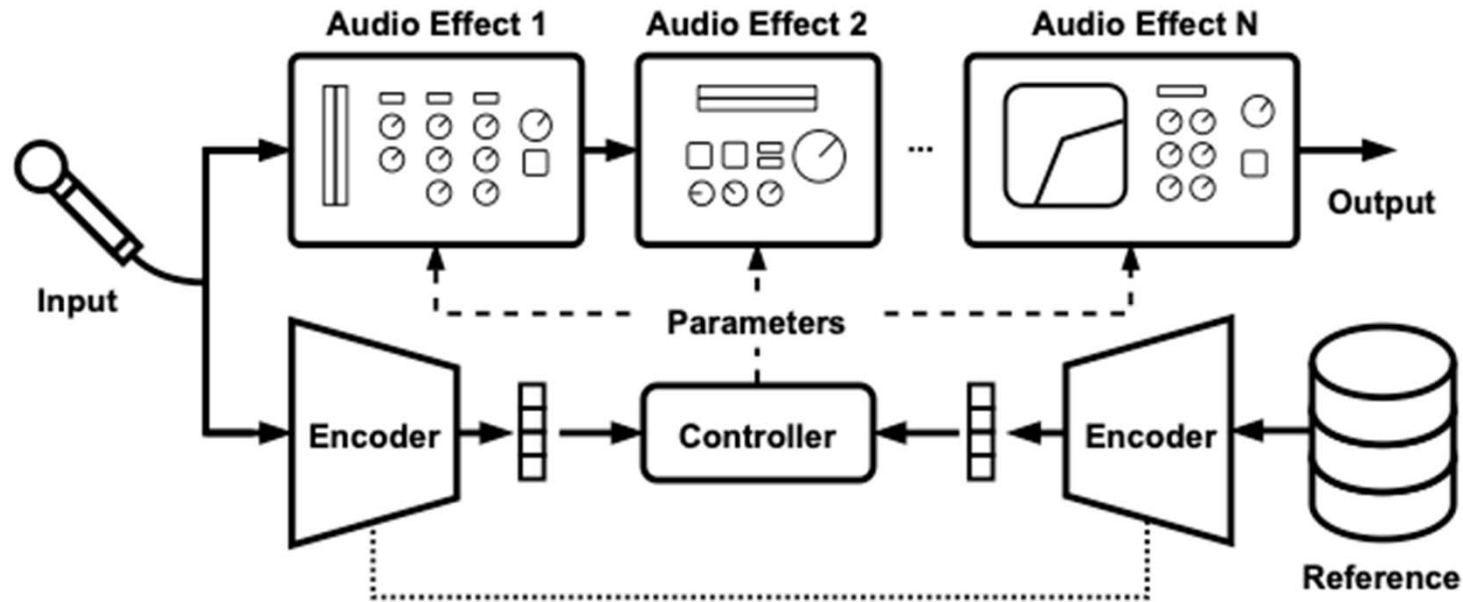
今天終於能夠揭示這個真相：《教我如何做你的愛人》是陳珊妮的 AI 模型演唱，以及我選擇在白色情人節上架的原因。

順帶一提，MV 今天上線了！（還不快去看）

在 AI 發展熱議的當下，希望透過這首歌，與所有關心創作的人一起思考——如果 AI 的時代必將到來，創作人該在意的或許不是「我們是否會被取代」，而是「我們還可以做些什麼」。... [See more](#)

# Demo 7: Mixing Style Transfer

<https://csteinmetz1.github.io/DeepAFx-ST/>



# Lab Culture

<https://affige.github.io/lab.html>

- Work as a team rather than lots of individual projects
- Work on meaningful projects that are related to the lab and that can have some impact rather than random ideas
- Aim high yet set milestones along the way
- Open source code
- Open to collaboration with the industry
- Open to collaboration with labs around the world (via internships or remote collaboration; we have many papers with international collaborators)

**Write to Me:** `yhyangtw@ntu.edu.tw`

With a **CV** and/or some description of

- Yourself
- Your connection with **music**
- Your background in **ML/DL**



# Appendix: How If I Know Nothing About Deep Learning?

- Do your homework...

<https://speech.ee.ntu.edu.tw/~hylee/index.php>