

Arts & Theater

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Making snow on demand for science



Liz Hafalia, Chronicle

Tosh Chiang, exhibits electronics engineer, watches visitors interact with the snow machine he made for the Academy of Sciences.

By Julian Guthrie

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As visitors to the California Academy of Sciences delighted in the snow falling inside the building, exhibit engineer Tosh Chiang studied the four snowblowers positioned on 13-foot-high trusses.

Chiang, 31, is responsible for the automation, hardware integration and programming of the snow. He created a graphical user interface so academy technicians can change the program on demand, making it snow for longer or shorter periods, and synchronize it to music one day and a light show the next.

"We have a commercial product that uses surfactants," said Chiang, delighted with the "snow" landing on his face and revealing itself as bubbles. "It's a secret mixture, a commercial snow unit." The "surfactant," Chiang explained, is a nontoxic, biodegradable soap that is forced

through a sieve with a high-volume fan.

The mixture comes premade, but is turned into snow twice an hour as a part of the academy's "Tis the Season for Science" exhibit, to run through Jan. 5. It includes live reindeer and an immersive digital dome theater, shaped like a snowman, featuring child-friendly, science-oriented films.

Chiang is part of the academy's audio-visual and electronics engineering team that builds the systems to automate all of the permanent and special exhibits. He and 11 full-time engineers work in the windowless basement of the vast building in Golden Gate Park. Their electronics-filled room is next to the temperature-controlled server room and the freight elevator, and down the hall from specimen-laden laboratories and offices devoted to ichthyology (the study of fish), herpetology (study of amphibians and reptiles), and anthropology.

Born in San Francisco, Chiang went to Stuart Hall for Boys and the Phoenix Country Day School for Boys in Arizona. He earned his bachelor's degree in sociology and integrated arts from Bard College, choosing Bard because of its "really good music scene." When he's not working late nights at the academy, he plays guitar and bass in a punk band, and fixes amps, guitars and PA systems for his friends and also for free for touring bands.

Worked in theater

While at Bard, Chiang, whose father is a retired train engineer at BART and whose mother was in accounting and administration at IBM, worked as a theater electrician and sound designer on campus. Two of his uncles are engineers.

"Working at Bard in theater and sound design gave me an understanding of how to build something, to read a schematic," Chiang said, leaving the snow room to tour various parts of the science museum.

Chiang has been in the academy's audio-visual department for six years and seven months. The department is divided into three subgroups: exhibits, events and planetarium.



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Sofia Tibbitts, 4, makes a snowman in front of the academy from snow made by Chiang and his crew to introduce the academy's yearly "Tis the Season for Science" exhibit.

"That was the first exhibit I did here," Chiang said, pointing to the Galapagos finch cladogram, a schematic showing the species' origin and relationships.

Research for the finch exhibit was done by Jack Dumbacher, the academy's chairman and curator of the department of ornithology, and the video content was produced by the in-house visualization studio, with the overall design done by the exhibits department. Chiang programmed the exhibit and wired up the button console. The software handles the button inputs and triggers synchronized video playback among three computers.

NightLife fantasy

Eyeing the exhibit, he admitted to fantasizing about "accidentally making it become a

synthesizer at NightLife," the after-hours Thursday night parties for adults.

Heading into the popular Tusher African Hall, featuring the live South African penguins and the animal dioramas behind glass, Chiang ticked off which of his colleagues did the electronics and programming for the "Human Odyssey" exhibits at the opposite end of the hall.

The "Faces From the Past" display was done by Jean-Pierre Jolivet and looks at skull casts of three early human species, using optical illusions to show fleshed-out reconstructions of their faces. The interactive human migration map, programmed and wired by Jon Britton, employs touch-screen stations to trace human migration from its African origins. Chiang did the "walking with Lucy" exhibit, which compares the distinctive gaits of a chimpanzee, *Australopithecus afarensis* (the species of the famous "Lucy" skeleton), and a modern human.

Chiang is also proud of his work on the "Shake House" exhibit, which simulates the feel of an earthquake from inside a 1906 Victorian home. He remembers going to the original shake house in the former Academy of Sciences site. The exhibit was done by his boss and mentor, Dean Do.



Liz Hafalia, Chronicle

A snowman in front of the California Academy of Sciences was made by the academy's tech team using "a secret mixture" with a commercial snow unit.

'Magical for me'

"I loved the old one, so it was very cool to work on the new one," Chiang said, standing inside the Victorian as it shook side to side. "It was kind of magical for me to work on this, and be able to ask Dean questions."

The job has taught him that "a good engineer is good at finding mistakes."

Walking back into the piazza, just off the front entrance, Chiang opened up a panel in a corner to show the software that drives the snow, with audio, timing and snow status. He smiled as snow flurries fell, and said of his job: "This is a dream."

The California Academy of Sciences, 55 Music Concourse Drive, Golden Gate Park. (415) 379-

8000. Regular hours: Daily, 9:30 a.m. to 5 p.m.; Sunday, 11 a.m. to 5 p.m. The academy's annual holiday exhibit runs through Jan. 5.

Julian Guthrie is a San Francisco Chronicle staff writer. E-mail: **jguthrie@sfchronicle.com**

Twitter: **[@JulianGuthrie](https://twitter.com/JulianGuthrie)**

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