```
Year, Month, Monthly_MSL, Linear_Trend, High_Conf., Low_Conf.
1935,5,-0.263,-0.228,-0.215,-0.242
1935,6,-0.237,-0.228,-0.215,-0.242
1935,7,-0.26,-0.228,-0.214,-0.241
1935,8,-0.205,-0.228,-0.214,-0.241
1935,9,-0.226,-0.227,-0.214,-0.241
1935,10,-0.289,-0.227,-0.214,-0.24
1935,11,-0.046,-0.227,-0.213,-0.24
1935,12,-0.194,-0.226,-0.213,-0.239
1936,1,-0.255,-0.226,-0.213,-0.239
1936,2,-0.18,-0.226,-0.213,-0.239
1936,3,-0.203,-0.225,-0.212,-0.238
1936,4,-0.269,-0.225,-0.212,-0.238
1936,5,-0.291,-0.225,-0.212,-0.238
1936,6,-0.234,-0.224,-0.211,-0.237
1936,7,-0.181,-0.224,-0.211,-0.237
1936,8,-0.281,-0.224,-0.211,-0.237
1936,9,-0.232,-0.223,-0.211,-0.236
1936,10,-0.246,-0.223,-0.21,-0.236
1936,11,-0.339,-0.223,-0.21,-0.236
1936,12,-0.191,-0.223,-0.21,-0.235
1937,1,-0.103,-0.222,-0.209,-0.235
1937,2,-0.076,-0.222,-0.209,-0.235
1937,3,-0.27,-0.222,-0.209,-0.234
1937,4,-0.15,-0.221,-0.209,-0.234
1937,5,-0.224,-0.221,-0.208,-0.234
1937,6,-0.237,-0.221,-0.208,-0.233
1937,7,-0.151,-0.22,-0.208,-0.233
1937,8,-0.309,-0.22,-0.207,-0.233
1937,9,-0.196,-0.22,-0.207,-0.232
1937,10,-0.243,-0.219,-0.207,-0.232
1937,11,-0.238,-0.219,-0.207,-0.232
1937,12,-0.185,-0.219,-0.206,-0.231
1938,1,-0.17,-0.218,-0.206,-0.231
1938,2,-0.168,-0.218,-0.206,-0.231
1938,3,-0.224,-0.218,-0.205,-0.23
1938,4,-0.211,-0.218,-0.205,-0.23
1938,5,-0.184,-0.217,-0.205,-0.229
1938,6,-0.225,-0.217,-0.205,-0.229
1938,7,-0.285,-0.217,-0.204,-0.229
1938,8,-0.266,-0.216,-0.204,-0.228
1938,9,-0.266,-0.216,-0.204,-0.228
1938,10,-0.14,-0.216,-0.203,-0.228
1938,11,-0.226,-0.215,-0.203,-0.227
1938,12,-0.206,-0.215,-0.203,-0.227
```

Data Sonification

Sara Bouchard

FLUXNET artist-in-residence
Adjunct Professor, VCUarts Kinetic Imaging

With special guest and collaborator

Chris Gough

FLUXNET scientist
Professor of Biology at VCU

What is sonification?

```
1937,5,-0.224,-0.221,-0.208,-0.234
1937,6,-0.237,-0.221,-0.208,-0.233
1937,7,-0.151,-0.22,-0.208,-0.233
1937,8,-0.309,-0.22,-0.207,-0.233
1937,9,-0.196,-0.22,-0.207,-0.232
1937,10,-0.243,-0.219,-0.207,-0.232
1937,11,-0.238,-0.219,-0.207,-0.232
1937,12,-0.185,-0.219,-0.206,-0.231
1938,1,-0.17,-0.218,-0.206,-0.231
1938,2,-0.168,-0.218,-0.206,-0.231
1938,3,-0.224,-0.218,-0.205,-0.23
1938,4,-0.211,-0.218,-0.205,-0.23
1938,5,-0.184,-0.217,-0.205,-0.229
1938,6,-0.225,-0.217,-0.205,-0.229
1938,7,-0.285,-0.217,-0.204,-0.229
1938,8,-0.266,-0.216,-0.204,-0.228
1938,9,-0.266,-0.216,-0.204,-0.228
1938,10,-0.14,-0.216,-0.203,-0.228
1938,11,-0.226,-0.215,-0.203,-0.227
1938,12,-0.206,-0.215,-0.203,-0.227
1939,1,-0.249,-0.215,-0.203,-0.227
1939,2,-0.238,-0.214,-0.202,-0.226
```

Can you name these sonification tools?

Listen

Johannes Kepler, *Harmonices Mundi* (1619)

EBook

CAP. V.

helijs verò Jovis, Veneris, & ferè Saturni; quadamtenus verò etiam Telluris; & proculdubio etiam Mercurij. Nam esto, ut jam non aphelius Veneris, sed perihelius 3 *pr.* 3 *sec.* locum *e* capiat; ei proximè accedit etiam perihelius Mercurij 3 *pr.* 0 *sec.* per Disdiapason, per finem capitis IV. Hujus verò perihelij ♀, 3 *pr.* 3 *sec.* pars decima, 18 *sec.* ablata, relinquit 2 *pr.* 45 *sec.* perihelium Jovis, obtinentem locum *d*: & pars quindecima 12 *pr.* addita, cumulat 3 *pr.* 15 *sec.* aphelium Martis ferè, obtinentem locum *f*. & sic in ♮, sequentur eandem ferè tensionem etiam perihelius Saturni & aphelius Jovis. At pars octava 23 *sec.* sumpta quinquies, dat 1 *pr.* 55 *sec.* qui est perihelius Telluris; qui etsi in eandem cum præmissis scalam non quadrat, ut quæ non ordinat intervallum 5. 8. infra *e*, nec 24. 25. supra *G*. tamen si jam perihelius Veneris, & sic etiam aphelius Mercurij, extra ordinem pro *e*, capiant locum *de*, tunc hic perihelius Telluris capiet locum *G*; & consentiet etiam aphelius Mercurij; quia pars tertia 1 *pr.* 1 *sec.* de 3 *pr.* 3 *sec.* sumpta quinquies, fit 5 *pr.* 5 *sec.* cujus dimidium 2 *pr.* 32 *sec* -+. proximè accedit ad aphelium Mercurij, qui in hac extraordinariâ accommodatione obtinebit locum *c*. Sunt igitur hi omnes inter se quidem tensionis ejusdem: aliter tamen Scalam dividit Veneris perihelius; cum tribus (vel quinque) prioribus, eodem sc. genere Harmonico, q. apheli⁹ ejusdem, in tensione suâ, puta genere Duro: aliter etiam ejusdem Veneris perihelius cum duobus posterioribus, eandem dividit: puta, non in Concinna alia, sed saltem in diversum Concinnorum ordinem; qui scilicet proprius est generis Mollis.

Sufficit autem, hoc capite, quid in causâ versetur, ob oculos posuisse: quare verò unumquodque sic fuerit factum, & quæ causæ non tantùm conspirationum, sed etiam dissidentiæ per minima; id luculentissimis demonstrationibus patefiet Cap: IX.

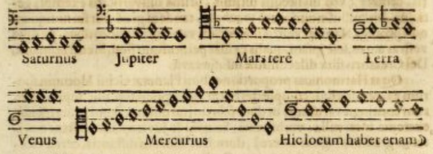
C A P. VI

In Extremitatibus motuum Planetariorum expressos esse quodammodo Modos seu Tonos Musicos.

Sequitur hoc ex antedictis, nec opus est multis verbis, singuli enim planetæ singula quodammodò signant loca systematis, motu perihelio, quatenus datum est singulis, percurrere certum aliquod intervallum in Scala Musica, certis ejus Clavibus, seu locis Systematis comprehensum; cujusque ab illa Clave seu loco inceptum, qui capite præcedenti contigit illius motui aphelio, Saturno quidem & Terræ *G*, at Jovi ♮, quæ in *G* altius transponi potest, Marti *fe*, Veneri *e*; Mercurio *A*, in altiori Systemate. Vide singulos in Notis usitatis. Non formant quidem intermedios locos, quos hic vides notis impletos, articulatè, sicut extremos: quia ab uno extremo, non saltibus & intervallis, sed continuâ tensione nituntur ad oppositum, media omnia

CAP. VI

mnia (infinita in potentiâ) permeantes actu: id quod aliter à me non potuit exprimi, quam per continuam seriem Notarum intermedia-



rum. Venus ferè manet in unisono non æquans tensionis amplitudine vel minimum ex concinnis intervallis.

Atqui signatura duarum in communi Systemate Clavium, & formatio sceleti Octavæ, per comprehensionem certi intervalli concinni, est rudimentum quoddam distinctionis Tonorum seu Modorum: sunt ergò Modi Musici inter Planetas dispertiti. Scio equidem, ad formationem & definitionem distinctorum Modorum requiri plura, quæ cantus humani, quippe intervallati, sunt propria: itaque voce quodammodò sum usus.

Liberum autem erit Harmonistæ, sententiam depromere suam: quem quisque planeta Modum exprimat propiùs, extremis hic ipsi assignatis. Ego Saturno darem ex usitatis Septimum vel Octavum, quia si radicalem ejus clavem ponas *G*, perihelius motus ascendit ad ♮: Jovi Primum vel Secundum; quia aphelio ejus motu ad *G* accommodato, perihelius ad *b* pervenit; Marti Quintum vel Sextum; non eò tantùm, quia ferè Diapente assequitur, quod intervallum commune est omnibus modis: sed ideò potissimùm, quia redactus cum cæteris ad commune systema, perihelio motu *c* assequitur, aphelio ad *f* alludit: quæ radix est Toni seu Modi Quinti vel Sexti: Telluri darem Tertium vel Quartum: quia intra semitonium ejus motus vertuntur; & verò primum illorum Tonorum intervallum est semitonium; Mercurio verò ob amplitudinem intervalli, promiscuè omnes Modi vel Toni convenient: Veneri ob angustiam intervalli, planè nullus; at ob commune Systema, etiam Tertius & Quartus; quia ipsa respectu cæterorum obtinet *e*.

Tell. canit MI FA MI ut vel ex syllaba conjicias, in hoc nostro domicilio MIseriam & FAmem obtinere.

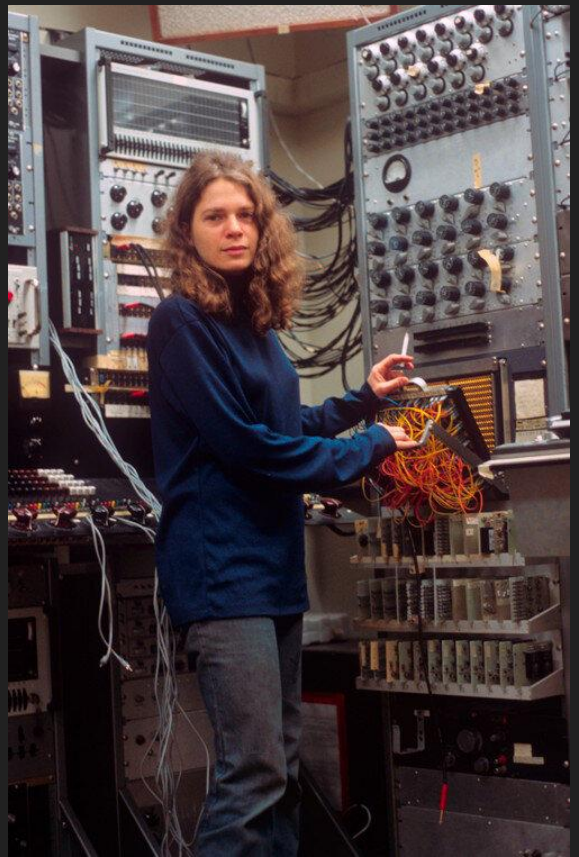
CAPVT VII.

Harmonias universales omnium sex Planetarum, veluti communia Contrapuncta, quadriformia dari.

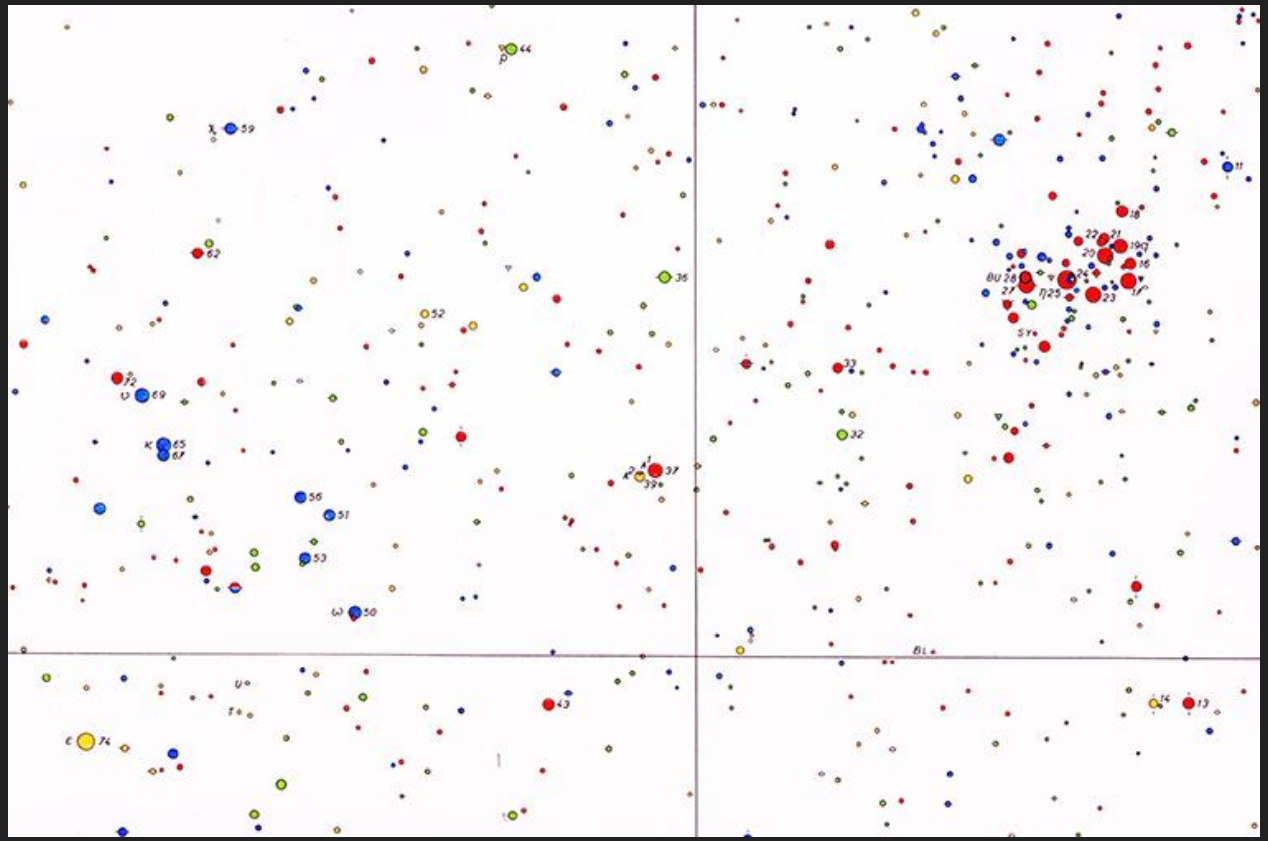
NVnc opus, Vranie, sonitu majore: dum per scalam Harmonicam cœlestium motuum, ad altiora conscendo; quâ genuinus

Laurie Spiegel, *Kepler's Harmony of the Worlds* (1977)

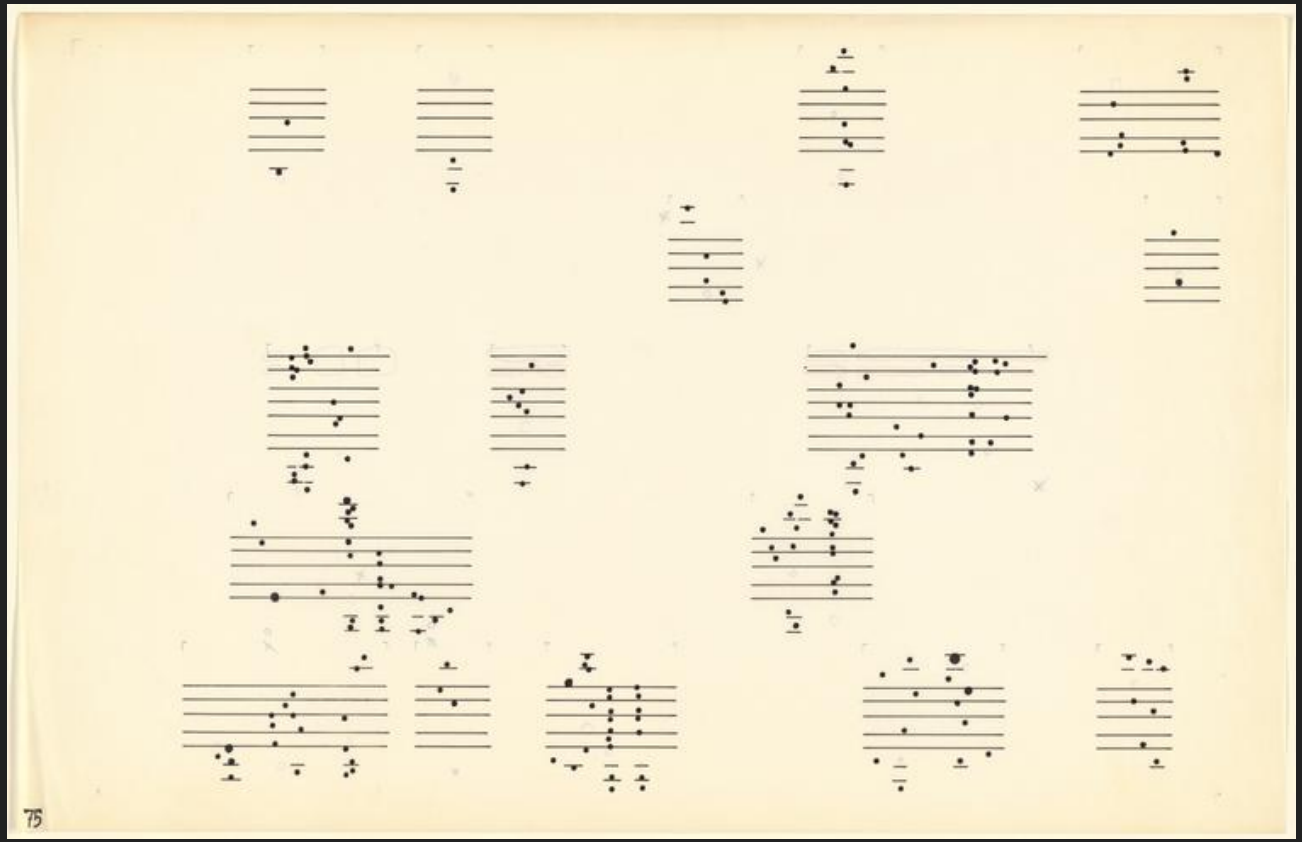
Audio
Video



Atlas of stars by Antonín Bečvář (1958) which inspired…



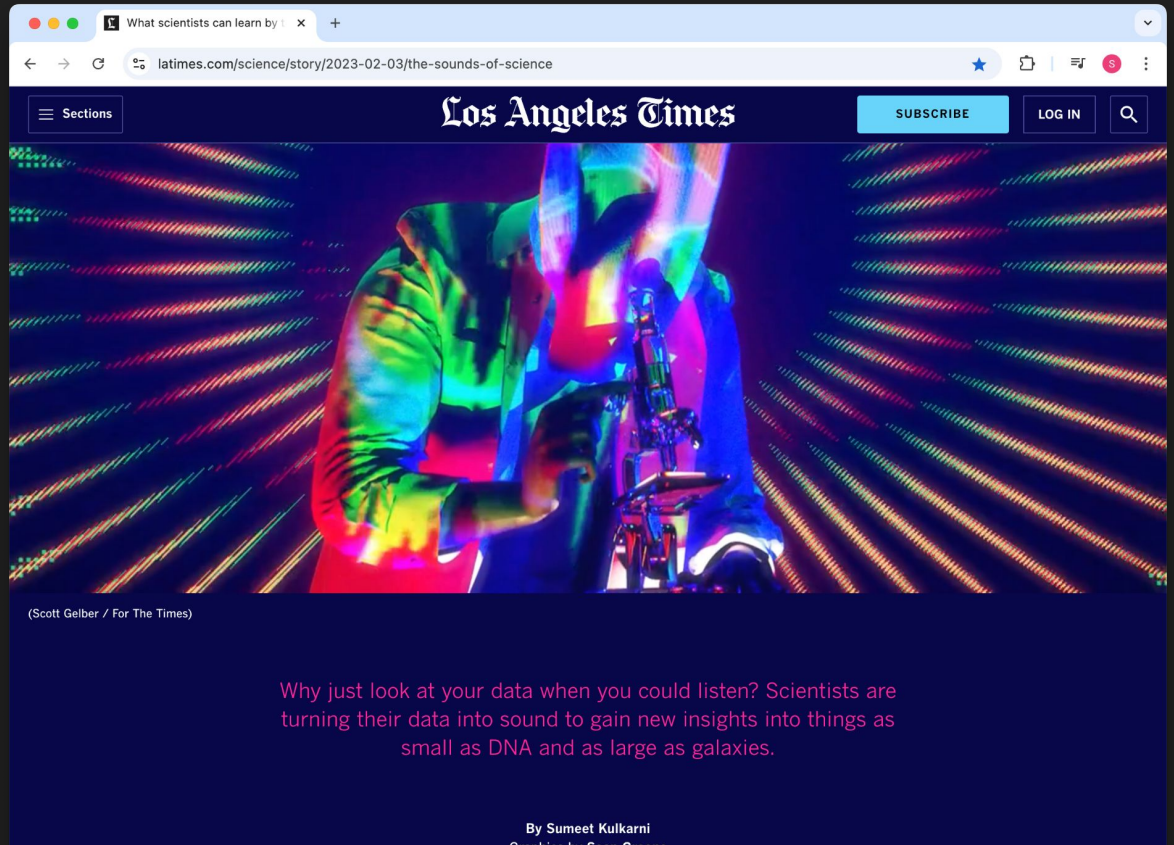
John Cage, *Atlas Eclipticalis* (1961) Watch



NASA’s Chandra X-Ray Observatory: Bullet Cluster Sonification [Link]

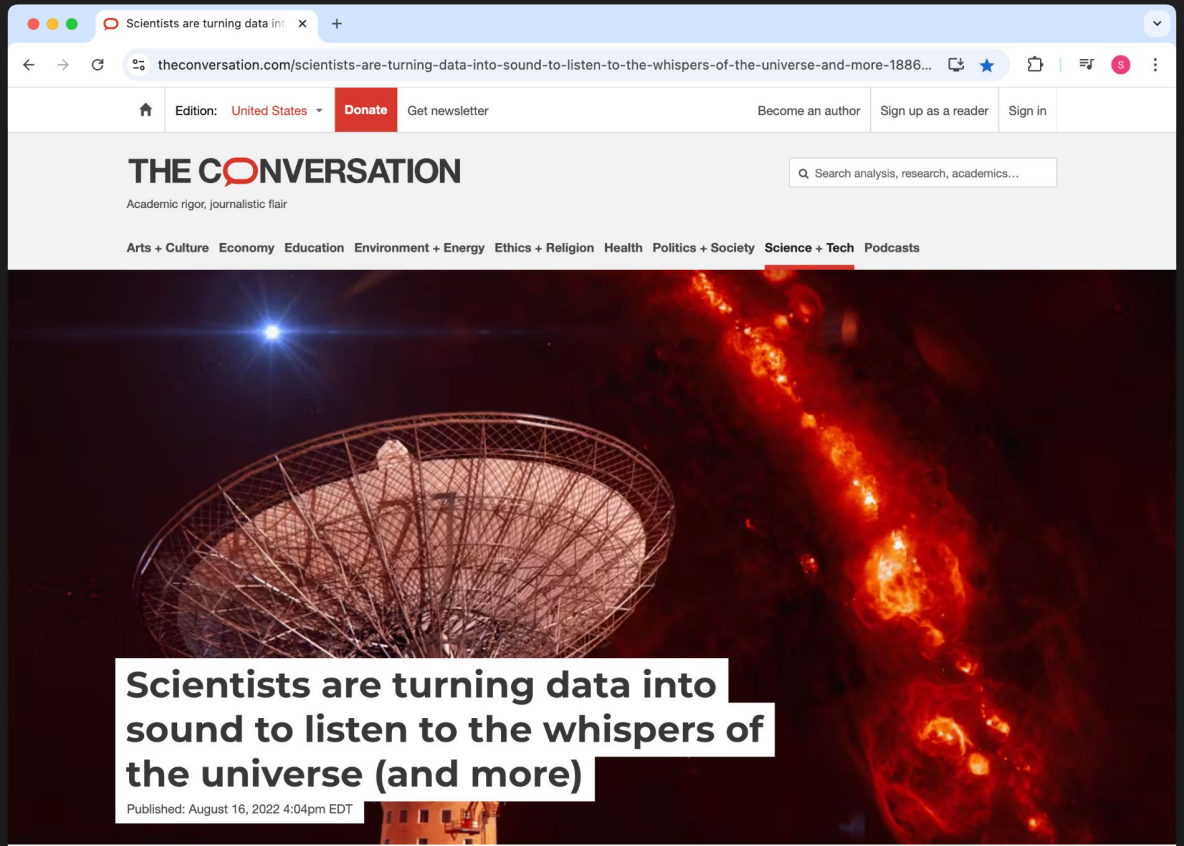
Scientists using sonification in their work

Link



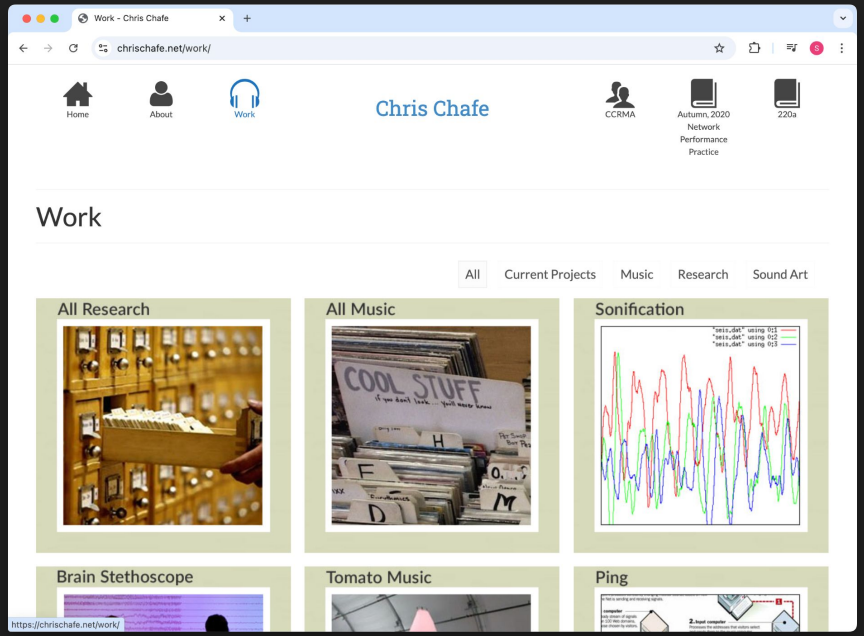
Scientists using sonification in their work

Link

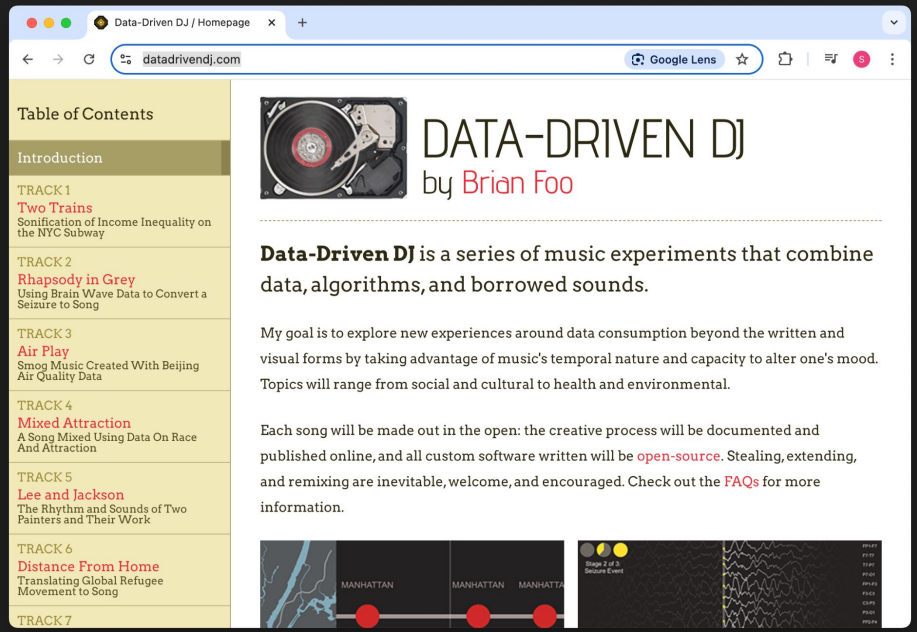


Artists using sonification in their work

Chris Chafe



Brian Foo



My work

My interest in sonification arose from “seeing sound” in the environment around me - lifting melody from the landscape.


Weather Box, 2014
Listen
CERTIFICATE OF AUTHENTICITY
This is to certify that the
accompanying Weather Box is
an authentic, limited-editi
artwork by Sara Bouchard,
published by Fuse Works.
Weather Box, 2014
Cardboard, wood, music bo
mechanism; 12 digital pri
on Canson Infinity Rag
Box: approx. 2.5" x 3.5"
Punch cards: 1.625" x 22
dition No.___ of 20 (&
Place Weather Box
flat surface when p
ch card firmly - do not
crank handle to
tact with water.
ight. Enjoy!
(c)20
sarabou
WEATHER BOX
JANUARY 2014
WEATHER BOX
Central Park, NY,NY
Elevation: +150 ft.
Latitude: 40.7778
Longitude: -73.969
°F
70
60
50
40
30
20
10
0
mph
35
25
15
5
in.
6+
5
4
3
2
1
0
1
2
3
4
5
6
7

U.S. Department of Commerce
National Oceanic & Atmospheric Administration

QUALITY CONTROLLED LOCAL CLIMATOLOGICAL DATA (final) HOURLY OBSERVATIONS TABLE CENTRAL PARK (94728) NEW YORK, NY (03/2014)

National Climatic Data Center
Federal Building
151 Patton Avenue
Asheville, North Carolina 28801

Elevation: 130 ft. above sea level
Latitude: 40.778
Longitude: -73.969
Data Version: VER3

Date	Time (LST)	Station Type	Sky Conditions	Visibility (SM)	Weather Type	Dry Bulb Temp		Wet Bulb Temp		Dew Point Temp		Rel Humd %	Wind Speed (MPH)	Wind Dir	Wind Gusts (MPH)	Station Pressure (in. hg)	Press Tend	Net 3-hr Chg (mb)	Sea Level Pressure (in. hg)	Report Type	Precip. Total (in)	Alti-meter (in. hg)
						(F)	(C)	(F)	(C)	(F)	(C)											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
01	0051	11	CLR	10.00		21	-6.1	16	-8.9	-2	-18.9	36	3	270		30.26			30.41	AA		30.43
01	0151	11	CLR	10.00		22	-5.6	17	-8.1	2	-16.7	42	0	000		30.26			30.40	AA		30.43
01	0251	11	CLR	10.00		22	-5.6	18	-8.0	4	-15.6	46	6	270		30.25			30.40	AA		30.42
01	0351	11	CLR	10.00		21	-6.1	17	-8.3	5	-15.0	50	3	VR		30.24			30.39	AA		30.41
01	0451	11	CLR	10.00		20	-6.7	16	-8.8	4	-15.6	50	0	000		30.24			30.39	AA		30.41
01	0551	11	CLR	10.00		21	-6.1	17	-8.4	4	-15.6	48	0	000		30.23			30.38	AA		30.40
01	0651	11	CLR	10.00		21	-6.1	17	-8.2	6	-14.4	52	6	030		30.22			30.37	AA		30.39
01	0751	11	CLR	10.00		24	-4.4	20	-6.8	8	-13.3	50	5	170		30.23			30.38	AA		30.40
01	0851	11	CLR	10.00		27	-2.8	22	-5.4	10	-12.2	49	5	170		30.25			30.39	AA		30.42
01	0951	11	CLR	10.00		28	-2.2	23	-4.9	11	-11.7	49	6	VR		30.23			30.38	AA		30.40
01	1051	11	CLR	10.00		31	-0.6	25	-3.9	10	-12.2	41	8	170		30.21			30.36	AA		30.38
01	1151	11	CLR	10.00		35	1.7	28	-2.4	11	-11.7	37	7	150		30.19			30.34	AA		30.36
01	1251	11	CLR	10.00		35	1.7	28	-2.2	13	-10.6	40	3	VR		30.14			30.29	AA		30.31
01	1351	11	CLR	10.00		35	1.7	28	-2.4	11	-11.7	37	7	VR	16	30.12			30.27	AA		30.29
01	1451	11	CLR	10.00		37	2.8	29	-1.6	12	-11.1	36	5	VR		30.09			30.24	AA		30.26
01	1551	11	OVC100	10.00		36	2.2	28	-1.9	12	-11.1	37	5	VR		30.09			30.24	AA		30.26
01	1651	11	OVC100	10.00		37	2.8	29	-1.8	10	-12.2	33	8	270		30.08			30.23	AA		30.25
01	1751	11	BKN110	10.00		37	2.8	29	-1.7	11	-11.7	34	7	270		30.05			30.20	AA		30.22
01	1851	11	OVC085	10.00		36	2.2	28	-2.1	11	-11.7	35	0	000		30.07			30.22	AA		30.24
01	1951	11	OVC080	10.00		36	2.2	29	-1.6	15	-9.4	42	5	270		30.05			30.20	AA		30.22
01	2051	11	OVC080	10.00		37	2.8	29	-1.4	14	-10.0	39	9	260		30.04			30.19	AA		30.21
01	2151	11	BKN075 OVC100	10.00		36	2.2	30	-1.0	19	-7.2	50	0	000		30.04			30.19	AA		30.21
01	2251	11	OVC080	10.00		35	1.7	29	-1.5	18	-7.8	50	3	240		30.02			30.17	AA		30.19
01	2351	11	OVC080	10.00		36	2.2	29	-1.7	14	-10.0	40	5	VR		30.00			30.15	AA		30.17
02	0051	11	SCT080	10.00		36	2.2	29	-1.7	14	-10.0	40	9	270		29.98			30.13	AA		30.15
02	0151	11	BKN080	10.00		36	2.2	29	-1.7	14	-10.0	40	7	VR		29.97			30.12	AA		30.14
02	0251	11	BKN080	10.00		35	1.7	28	-2.0	14	-10.0	42	M	M		29.94			30.09	AA		30.11
02	0351	11	OVC070	10.00		35	1.7	28	-1.9	15	-9.4	44	7	240		29.93			30.08	AA		30.10
02	0451	11	OVC070	10.00		36	2.2	29	-1.4	16	-8.9	44	5	VR		29.93			30.07	AA		30.10
02	0551	11	OVC065	10.00		36	2.2	30	-1.3	17	-8.3	46	5	250		29.90			30.05	AA		30.07
02	0651	11	OVC055	10.00		36	2.2	30	-1.0	19	-7.2	50	3	VR		29.93			30.08	AA		30.10
02	0751	11	OVC043	10.00		36	2.2	30	-1.1	18	-7.8	48	0	000		29.93			30.08	AA		30.10
02	0851	11	OVC055	10.00		37	2.8	30	-0.9	17	-8.3	44	0	000		29.93			30.07	AA		30.10
02	0951	11	OVC060	10.00		38	3.3	31	-0.5	18	-7.8	44	3	290		29.93			30.08	AA		30.10
02	1051	11	FEW055 OVC065	10.00		38	3.3	31	-0.5	18	-7.8	44	0	000		29.92			30.07	AA		30.09
02	1151	11	OVC070	9.00		38	3.3	31	-0.3	19	-7.2	46	3	VR		29.91			30.05	AA		30.08
02	1251	11	SCT100	10.00		39	3.9	32	0.2	21	-6.1	48	6	360		29.86			30.01	AA		30.03
02	1351	11	OVC110	9.00		39	3.9	32	0.2	21	-6.1	48	0	000		29.83			29.98	AA		30.00
02	1451	11	OVC095	9.00		39	3.9	33	0.4	22	-5.6	51	5	VR		29.85			29.99	AA		30.02
02	1551	11	BKN065 OVC080	9.00		40	4.4	34	0.9	23	-5.0	51	8	340		29.85			29.99	AA		30.02
02	1651	11	FEW039 BKN060 OVC070	10.00		38	3.3	32	-0.0	21	-6.1	50	3	VR		29.87			30.01	AA		30.04
02	1751	11	SCT036 OVC048	10.00		37	2.8	32	-0.2	22	-5.6	55	0	000		29.87			30.02	AA	T	30.04
02	1851	11	BKN043 OVC055	10.00		37	2.8	31	-0.5	20	-6.7	50	3	VR		29.87			30.01	AA		30.04
02	1951	11	OVC041	10.00		37	2.8	30	-1.1	16	-8.9	42	0	000		29.85			30.00	AA		30.02
02	2051	11	OVC045	10.00		36	2.2	29	-1.4	16	-8.9	44	7	310		29.87			30.01	AA		30.04
02	2151	11	OVC046	10.00		35	1.7	29	-1.8	16	-8.9	46	6	VR		29.87			30.01	AA		30.04
02	2251	11	OVC050	10.00		34	1.1	28	-2.3	15	-9.4	46	M	M		29.87			30.01	AA		30.04

I originally sourced and analyzed data by hand! Data from NOAA.gov

2014 CHART

Search Sheet

Home Insert Page Layout Formulas Data Review View Share

P53 30

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI	AJ	AK
1		MAR	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C			MAR	C	D	E	F	G	A	B	C	D	E	F	G	A	B	C		
2		TEMP		0	5	10	15	20	25	30	35	40	45	50	55	60	65			TEMP		0	5	10	15	20	25	30	35	40	45	50	55	60	65		
3		PREC	0.5	1	1.5	2	2.5	3	3.5	0.5	1	1.5	2	2.5	3	3.5	4			PREC	0.5	1	1.5	2	2.5	3	3.5	0.5	1	1.5	2	2.5	3	3.5	4		
4		WIND	3	6	9	15	20	25	30	35	6	9	15	20	25	30	35			WIND	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45		
5	1	12an	0					21											1	12an	0					21										
6		6am		6				21												6am		6				21										
7		12pm		7							35									12pm		7							35							
8		6pm		7							37									6pm		7							37							
9	2	12am		5							36								2	12am		5							36							
10		6am		5							36									6am		5							36							
11		12pm	##									40								12pm	##									40						
12		6pm	0								37									6pm	0								37							
13	3	12am	3							32								0	3	12am	3							32							
14		6am				14		22												6am					14	22									
15		12pm			8			20												12pm				8		20									
16		6pm		7				22												6pm		7				22									
17	4	12am		5			16												4	12am		5				16									
18		6am			9		13													6am			9			13									
19		12pm	3						23											12pm	3						23								
20		6pm	3							28										6pm	3							28							
21	5	12am	3							29									5	12am	3							29							
22		6am	3							28										6am	3							28							
23		12pm	3								37									12pm	3								37						
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34		6am	3							35										6am	3							35							
35		12pm		5											54					12pm		5											54		
36		6pm				13								52						6pm				13								52			
37	9	12an	0										43						9	12an	0										43			
38		6am		5						37										6am		5						37							
39		12pm			11							40								12pm				11					40						
40		6pm			8								43							6pm			8								43			
41	10	12am		5								39							10	12am		5								39				
42		6am	3									38								6am	3									38				
43		12pm		7									46							12pm		7									46			
44		6pm		5										50						6pm		5										50		
45	11	12am		7									47						11	12am		7									47			
46		6am			8									48						6am			8									48		
47		12pm		7													64			12pm		7												64
48		6pm	0													62				6pm	0												62		
49	12	12an	3												55				12	12an	3												55		
50		6am			8								45							6am			8								45			
51		12pm	0.4/0												53			0.4		12pm	0.4/0												53		
52		6pm		6						0.4					53			0.4		6pm		6						0.4					53		
53	13	12am			10				30	32						30			13	12am			10					32		30					
54		6am					20	19							25					6am						19	20	25							
55		12pm				16			23							29				12pm					16		23			29					
56		6pm				14	22		25					22						6pm					14		25								22
57	14	12am		7				22											14	12am		7					22								
58		6am		5					24											6am		5					24								
59		12pm		6							36									12pm		6							36						
60		6pm			8								44							6pm			8								44			
61	15	12am		6									44						15	12am		6									44			
62		6am	3											48						6am	3											48		
63		12pm			11											58				12pm				11										58		

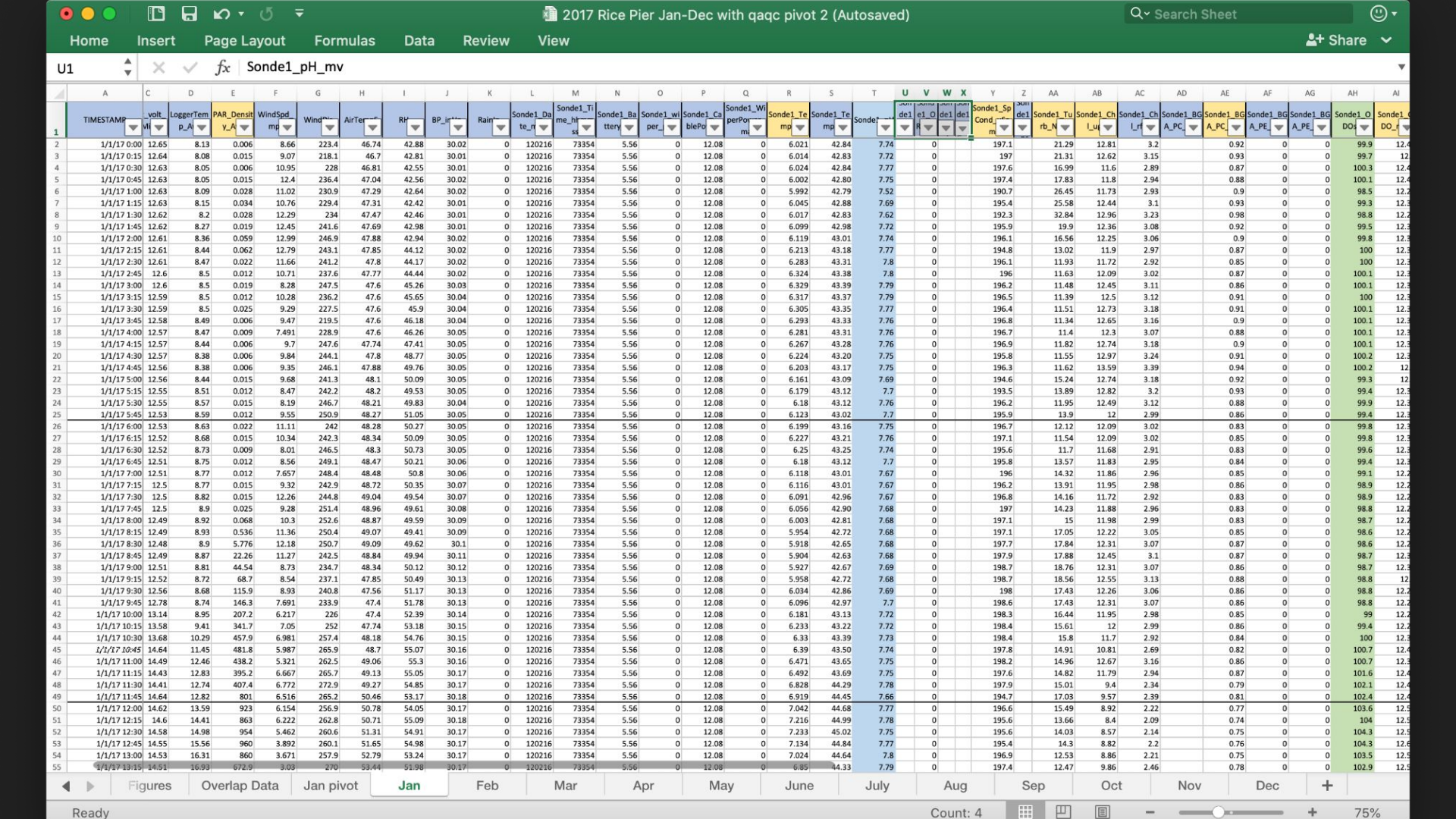
Sheet3 Sheet4 Sheet5 Sheet6 Sheet7 Sheet9 Sheet8 Sheet10 Sheet11 Sheet12

My early sonifications were low-tech, rooted in folk music and conveyed intimacy.

Catskills Songline, 2016

[Listen]

Breathe, River (2019) incorporated a year's worth of water quality data from the James River in Richmond, VA (obtained from VCU Rice Rivers Center)


2017 Rice Pier Jan-Dec with qaqc pivot 2 (Autosaved)
Search Sheet
Home
Insert
Page Layout
Formulas
Data
Review
View
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U1
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Figures
Overlap Data
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Sep
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Nov
Dec
Ready
Count: 4
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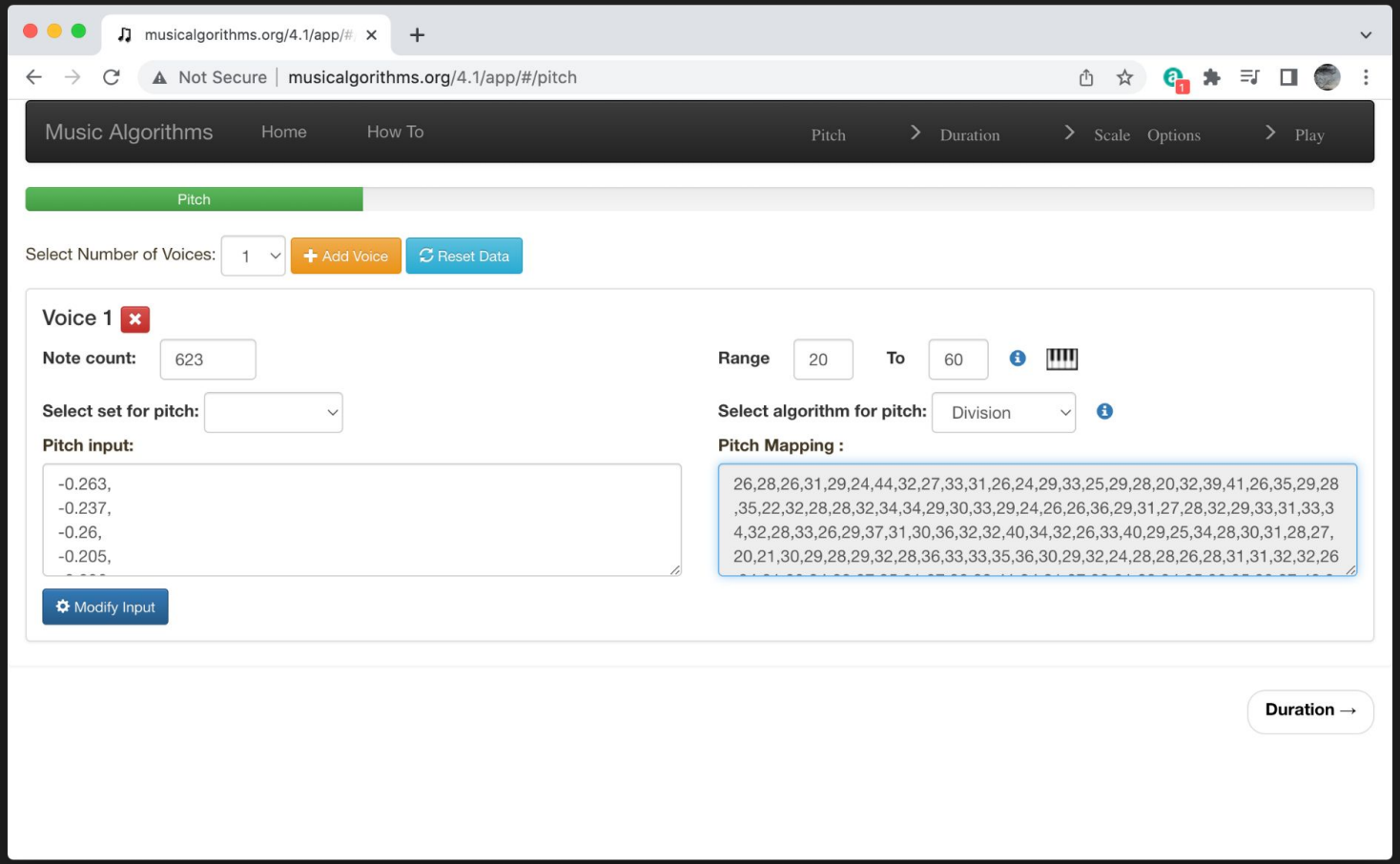
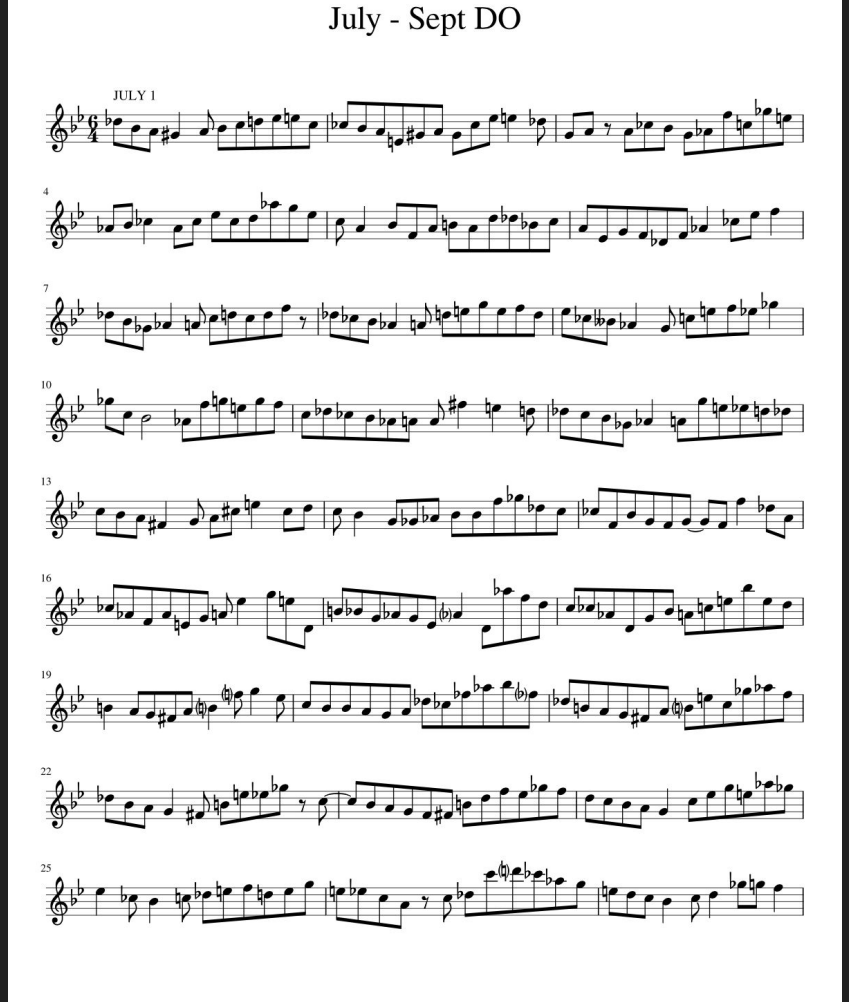


The website Musicalgorithms.org aided me in mapping the data to MIDI values

I then pulled the MIDI into a music scoring program before recording the piece with a tenor saxophonist.

(Repeated values are expressed in longer durations or rests.)



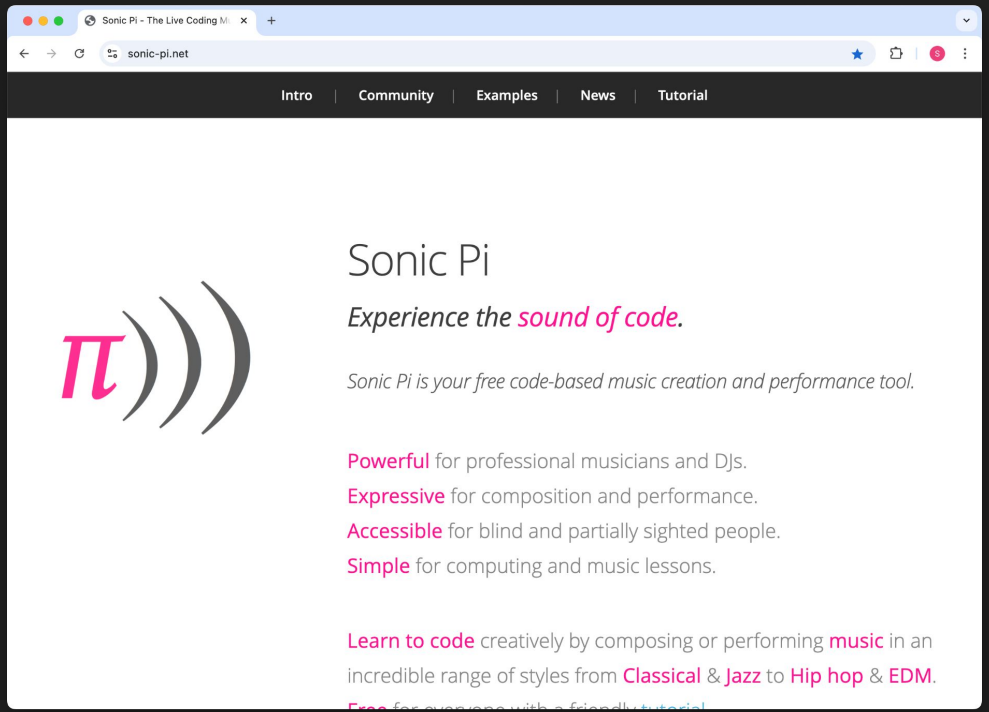
Sonic Pi software…

Listen to this sonification sketch

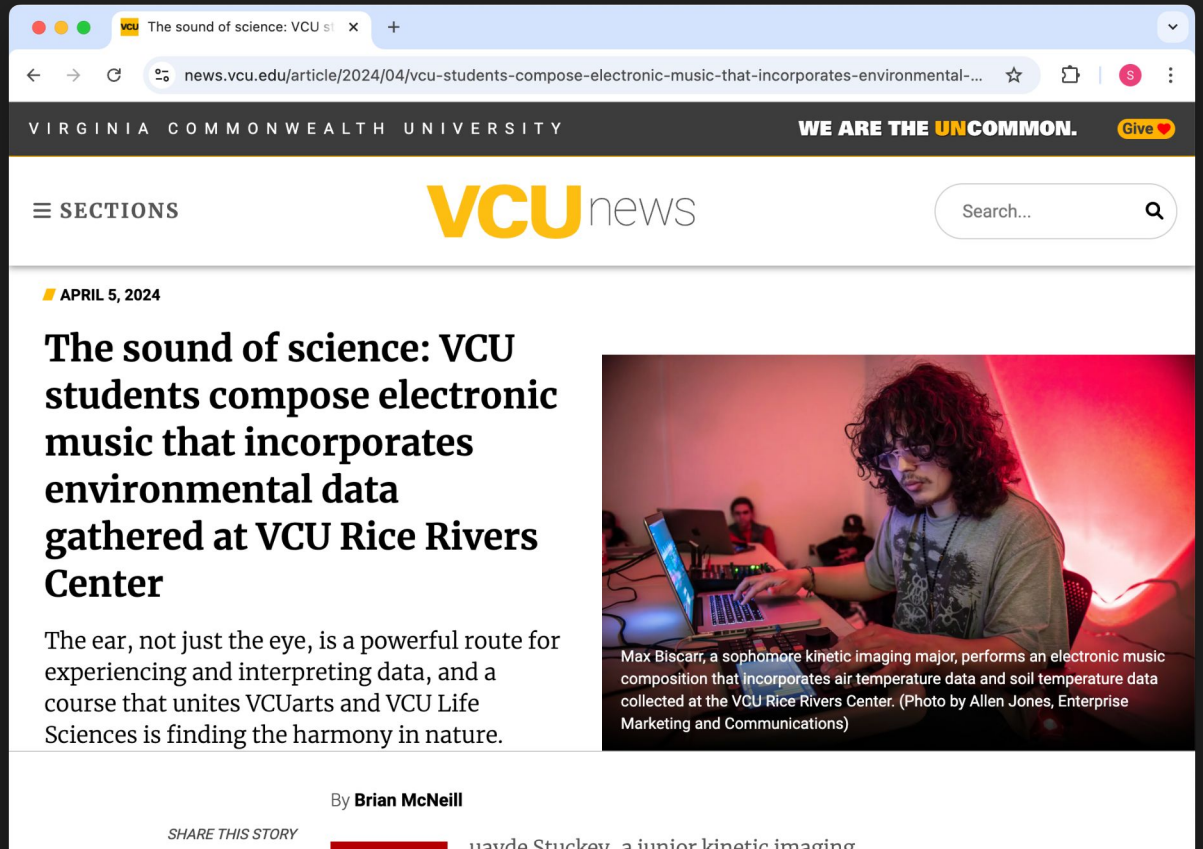
In 2021, I started incorporating Sonic Pi, a live coding software, into my work.
Sonic Pi is built in Ruby and can easily read spreadsheets with a specialized line of code.

Forest for the Trees (2023) incorporated accelerometer data from microcontrollers placed in trees outside the gallery. I used Sonic Pi to trigger sound samples in different ways depending on the data streaming in through OSC (Open Sound Control).

I discovered in Sonic Pi a powerful, open-ended tool for creative sonification and developed a VCUarts class to share my techniques.



My art students worked with FLUXNET data! [Link]



The sound of science: VCU st

news.vcu.edu/article/2024/04/vcu-students-compose-electronic-music-that-incorporates-environmental-...

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SECTIONS

VCU news

Search...

APRIL 5, 2024

The sound of science: VCU students compose electronic music that incorporates environmental data gathered at VCU Rice Rivers Center

The ear, not just the eye, is a powerful route for experiencing and interpreting data, and a course that unites VCUarts and VCU Life Sciences is finding the harmony in nature.

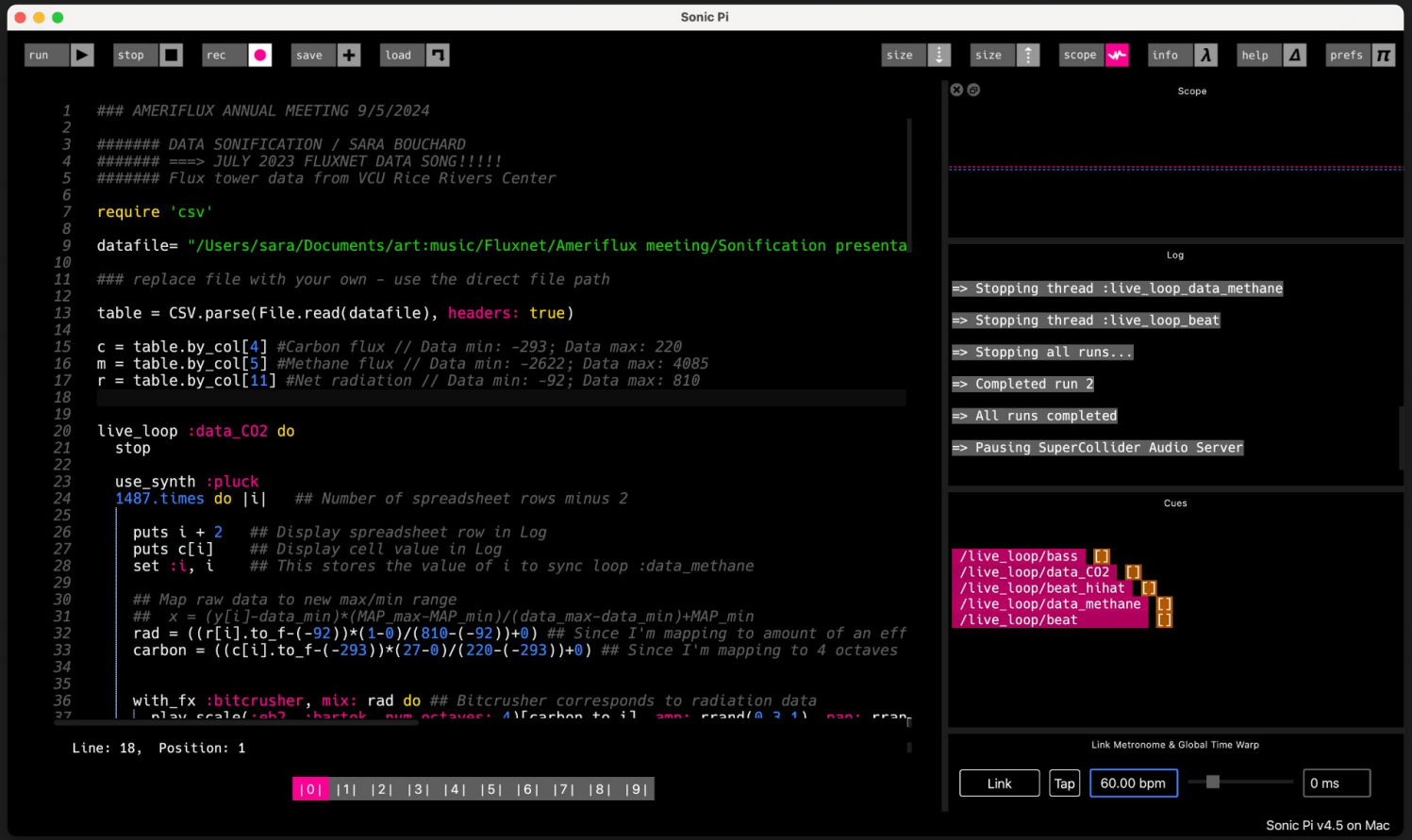
Max Biscarr, a sophomore kinetic imaging major, performs an electronic music composition that incorporates air temperature data and soil temperature data collected at the VCU Rice Rivers Center. (Photo by Allen Jones, Enterprise Marketing and Communications)

By **Brian McNeill**

SHARE THIS STORY

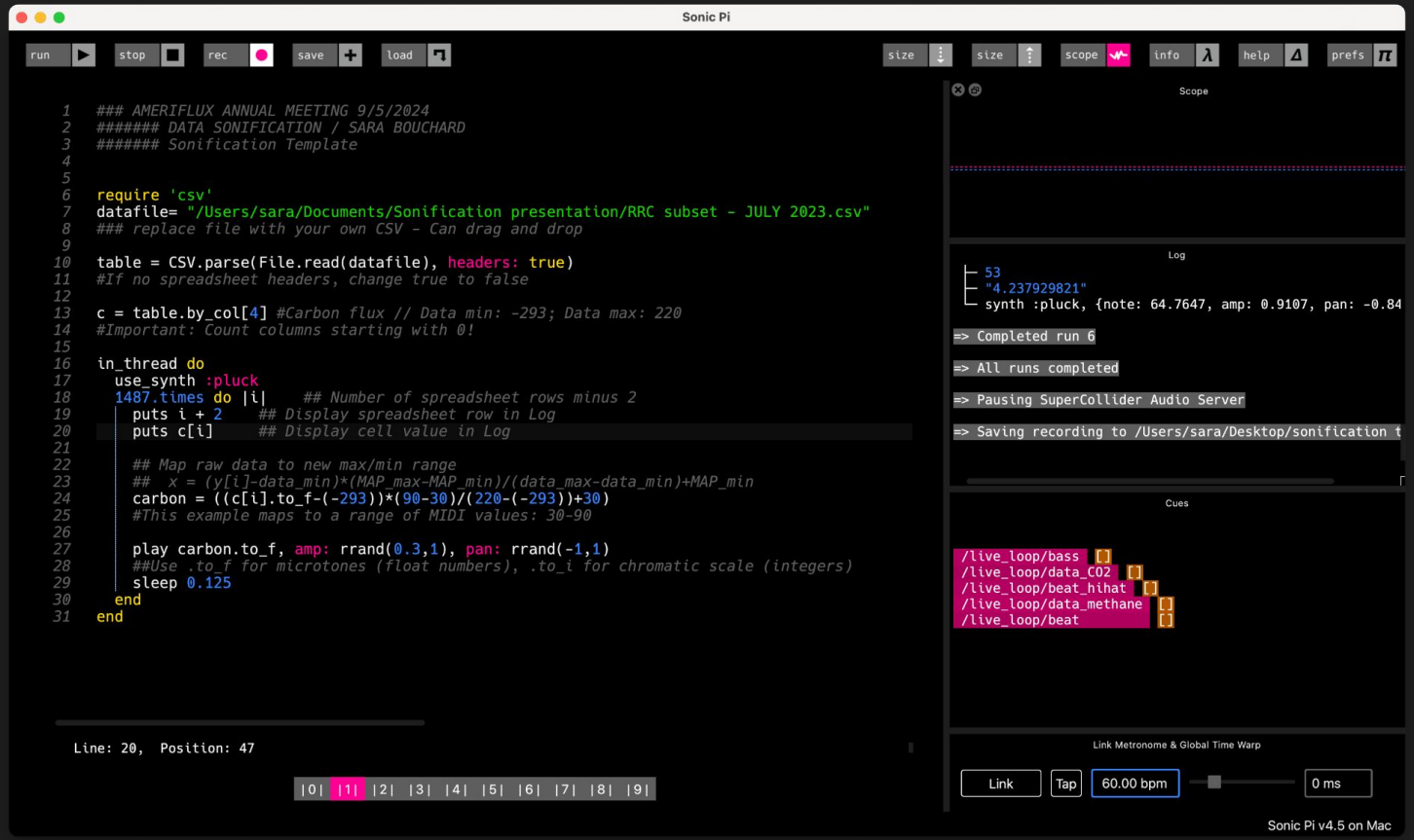
uayde Stuckey, a junior kinetic imaging

Students took a field trip to the flux tower at VCU Rice Rivers Center, hosted by Chris Gough

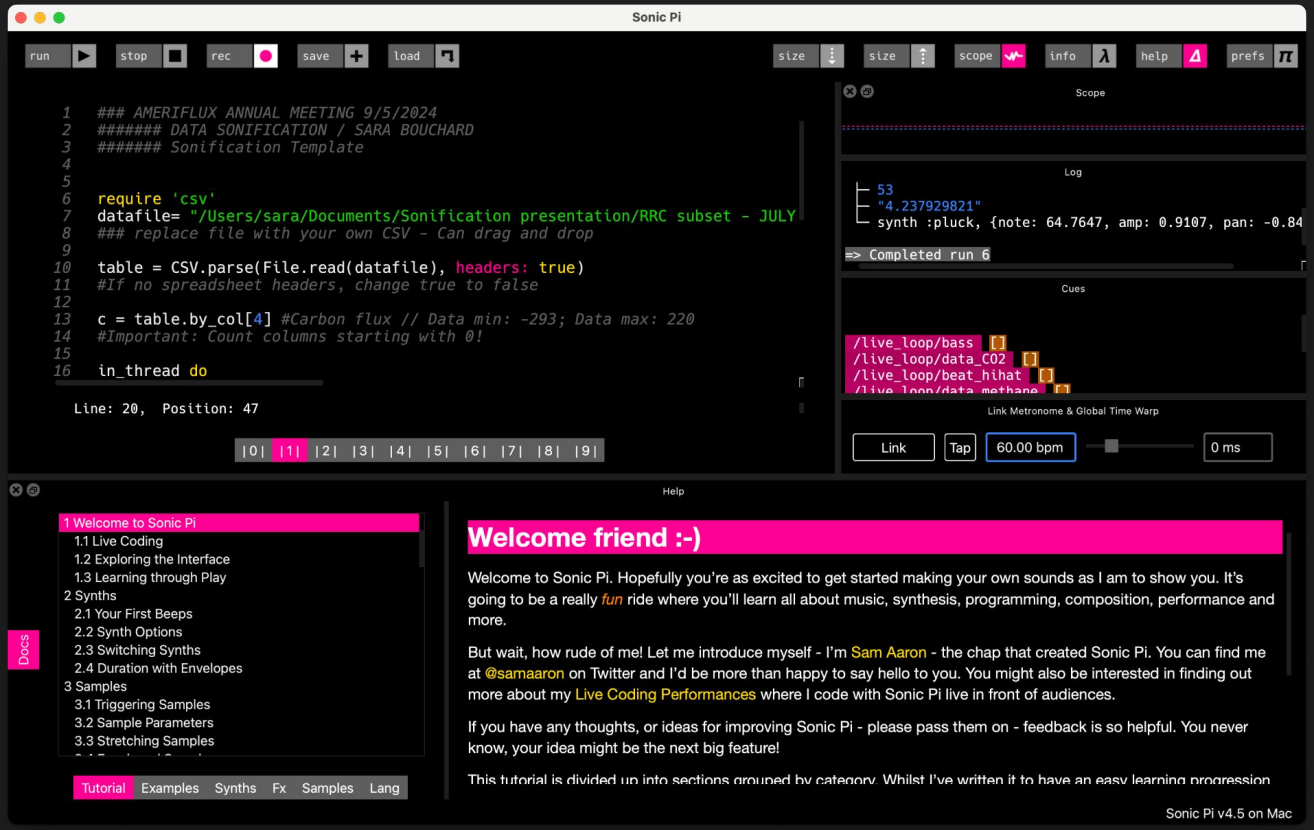


My contribution to the class “algorave” (link to come)

Learn Sonic Pi + listen to your own data!



Basic sonification template for mapping parameters to pitch.
(Can also map to volume or amount of an effect. Output range would be 0-1.)



Sonic Pi has a fantastic built-in tutorial. But it doesn't cover sonification, so take a look and email me for Ruby templates!

Why sonify?

What can be gained from experiencing data with our ears?

Why sonify?

Data processing perspective:

- Our ears are better than our eyes at identifying patterns within large data sets

- Accessibility for the blind

- Real-time feedback

Communications perspective:

- Creates a novel, immersive experience

- Music carries emotional resonance

- Grabs people's attention and helps them remember the story behind the data

- Community-building and support around climate change anxiety + action

Considerations

Who is the audience? (Scientists or general public?)

How can the presentation best serve the story behind the data?

How closely does the presentation need to adhere to the data? (Depends on audience)

What role can sonification play within the FLUXNET community?

Resources

Podcast & Sonification Community
Loud Numbers

Website for creating sonifications
Two Tone

Live Coding Software
(Platform built in Ruby, can be used for sonification with Sara's template)
Sonic Pi

Additional Articles

Making Numbers Louder: Telling Data Stories with Sound
Duncan Geere, Miriam Quick, Datajournalism.com

How a Blind Astronomer Found a Way to Hear the Stars
Wanda Diaz Merced, TED 2016

Sound the Alarm: Data Sonification as a Tool for Climate Action
Ableton.com

Thank you!

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