

Chris Brown's *Six Primes* (2014), for retuned piano in 13-limit just intonation, is like a six-course, fifty-minute microtonal meal: The unique flavors of each new course surprise and delight! The idiosyncratic tuning, shifting modes, asymmetrical rhythmic patterns, and expressive moods are engrossing, and even more so upon repeated listening. The composer premiered *Six Primes* at the Center for New Music in San Francisco, California, on June 24, 2014.

Composer, pianist, and electronic musician Chris Brown composes music for traditional instruments, acoustic instruments with interactive electronics, improvisers, and computer networks. With this new piece—drawing on the Rhythmicana ideas of Henry Cowell, the pure keyboard focus of Conlon Nancarrow, the affection for just intonation of Lou Harrison, and the unadulterated clarity of mathematical process of James Tenney—Brown is staunchly positioned, aesthetically, as a West Coast American experimentalist. Upon hearing Brown's masterly performance of this virtuosic, contemporary work, it is surprising to learn that he spent a whole year of his early life practicing almost nothing but Robert Schumann's Piano Concerto in A Minor, Op. 54 (1841), though that explains in part where he got his serious piano chops.

Brown was born in 1953 in Mendota, Illinois, a small town ninety miles west of Chicago, and then spent his first few years in Minneapolis. In 1958, his family moved to the Philippines, where Brown lived from age five until nine while his parents worked as missionaries. There, at five, he started taking piano lessons, learning quickly from Bartók's unconventional and seminal method series *Mikrokosmos*. After the Philippines, the Browns moved to Chicago, where Brown attended public schools. In high school he began studying with Robert MacDowell, a concert pianist at Chicago Musical College of Roosevelt University. While deeply engaged with performing Beethoven, Schumann, and Chopin, he also discovered the mysterious recordings of American composers Charles Ives and Harry Partch in his parents' record collection.

Living in Hyde Park, near the University of Chicago on the city's South Side, Brown spent his years at Kenwood High School surrounded by African-American culture (his class was about eighty percent African-American). The integrated and multicultural neighborhoods of his youth in the Philippines and the South Side of Chicago had an enduring personal and aesthetic influence on the developing musician. Though he had not grown up listening to jazz, he was immersed in a soundscape of soul music, gospel, and Motown, and was peripherally aware of the activities of the Association for the Advancement of Creative Music.

In 1969, for his last year of high school, Brown's father arranged for him to live with a family in Berlin, Germany, where he earned academic credit and studied piano. Applying to college from Berlin, Brown was accepted by the then merely five-year-old University of California, Santa Cruz (UCSC), and he arrived at the redwood-covered, park-like university in 1970, intending to be a history major. He studied in his first years there with Norman O. Brown (author of *Life Against Death* and *Love's Body*), and engaged fully with the humanities, while also studying piano with Sylvia Jenkins, who encouraged him to delve more fully into serious practice. As a result of his efforts, he won a county competition (with the above-mentioned Schumann concerto), and subsequently performed with conductor George Barati and the Santa Cruz Symphony. This would turn out to be the last traditionally "classical" performance of his career as a pianist.

Indeed, Brown's musical perspective was on the brink of radical change. Under the influence of composer-conductor William Brooks, who led an experimental improvisation ensemble without instruments, and later Gordon Mumma, whose arrival at UCSC Brown called "mind blowing," Brown started gravitating toward the instrument-builder, do-it-yourself mentality. Brown studied

circuit building in Mumma's classes, collaborated with electronic musician Carl Fravel on a 53-day-long performance art work, listened to a wide variety of new music from Henry Cowell to John Cage to Karlheinz Stockhausen, and to the environment, while practicing Pauline Oliveros's *Sonic Meditations*. Brown began playing—and with Mumma's expertise, recording—Cowell's early tone cluster pieces for piano. He met local legend Lou Harrison, and began playing some of Harrison's early twelve-tone music. Brown also met Steve Reich, who passed through the Bay Area one summer, and Brown began playing Reich's groundbreaking *Piano Phase*. Through friend Wayne Horvitz, Brown participated in the developing free improvisation scene. In San Francisco he saw Cecil Taylor and the Art Ensemble of Chicago, and he started to investigate the boundaries between these kinds of improvisatory practices and the "indeterminate" practices of composers like Cage and Christian Wolff. At the same time, UCSC's world music program, and professor David B. Kilpatrick in particular, were of central importance to Brown's musical development.

After graduating from UCSC, Brown moved to Palo Alto, and then Menlo Park, the birthplace of Henry Cowell. On the occasion of the American Bicentennial in 1976, Brown performed Cowell pieces in a concert honoring Cowell, at the Menlo Park City Hall. San Francisco contemporary music critic Alfred Frankenstein reviewed the concert and wrote that Brown "remain[ed] in the memory as one of the stars of the occasion."¹ There he met Olive Cowell (Cowell's stepmother), and he became a regular performer at private musical salons in her San Francisco home. Soon, Brown moved to San Francisco, where he joined UCSC friend David Poyourow and composer Tom Nunn building and performing with homemade electroacoustic instruments in the improvisation trio Confluence. Brown deepened his knowledge of and skills with electronics: how to make microphones, design and build circuits, and use computers. During his time in Santa Cruz he had also become interested in tuning: Learning to tune his own piano, he experienced sound in a new, visceral way. He began to tune pianos professionally and supported himself that way during the next fifteen years. All of these ingredients began to percolate into Brown's mature musical practices.

Brown ended up at Mills College in Oakland, California, first as a graduate student—earning an MFA in Electronic Music and Recording Media in 1985—through a collaboration with percussionist William Winant, who encouraged him to study there with David Rosenboom. In hindsight, Mills seems to be the place where Brown was destined to settle. He had seen early concerts of the League of Automatic Music Composers, and was familiar with Mills's reputation for embracing all the elements he was interested in: world music, alternative tuning, improvisation, live electronics, experimental performance practices. He became a founding member of the computer network music band The Hub, including John Bischoff, Scot Gresham-Lancaster, Tim Perkis, Phil Stone, and Mark Trayle. Brown writes of this group: "Inspired by the California tradition of DIY instrument-builders and romanced by soldering irons, microcomputers and coding, we embraced the role of an electronic instrument-builder/composer/performer who could engage simultaneously with all aspects of making music new."² One might also consider the powerful impact of northern California's *Zeitgeist*, and the unique qualities of the place Brown had chosen to remain. In the words of his colleagues Bischoff and Perkis,

¹ Alfred Frankenstein, "Thunder on the Peninsula: Tribute to the Man Who Started It All," *San Francisco Chronicle*, 1976 [n.d.].

² Brown, program notes for Mark Trayle Memorial Concert, held at Mills College, February 13, 2016.

[. . .] the distinctive cultural atmosphere of the San Francisco Bay Area in the seventies and eighties, a rich blend of communal ideologies, radical culture, technical innovation, intellectual ferment, and a hands-on attitude that has been a hallmark of California life since the pioneer days. In the air then there was a sense of new possibilities, and the feeling of the need to build a culture from the ground up. For music, specifically, this meant redefining everything about how it's done, from the instruments and tuning systems to the musical forms, venues, and social relations among players and audiences.³

On the impact of local musical communities and the life of experimentalism within them, Brown himself has written:

Without embracing either its risks or its challenges, the American classical music establishment has recently co-opted the experimentalist musical tradition. As an ethos of novelty and rebellion becomes the norm, it makes sense that interesting work is more likely to be found where the media glare is not, where community can develop because the commercial glare is relatively weak, in the cracks of the global culture where people still invent art to entertain and enliven themselves.⁴

Though here Brown was discussing the music of composers Juan Blanco of Cuba and Jose Maceda of the Philippines, his assessment might be applied to the creative “cracks” of Oakland. More an experimental studio laboratory than an ivory tower, Mills College’s Center for Contemporary Music, where Brown has taught and worked since the mid-eighties, has remained far from the media spotlight, though close to the hearts and hands of composers and performers (and scholars) who carry on the legacy of what Brown rightly calls “the experimentalist musical tradition.”

Six Primes

The best explanation of the piece’s basic materials comes from the composer himself:

Six Primes is composed using the first six prime numbers 2, 3, 5, 7, 11, and 13 to govern both its tuning and temporal structure, including harmony, rhythmic subdivisions, and form. I wrote this music to explore the limits of using the same integer ratios to simultaneously provide melodic, harmonic, and rhythmic materials. The piano must be retuned in just intonation using the tuning system factor of 2, three ratios with highest prime of 3, and two ratios each with highest primes of 5, 7, 11, and 13. This creates a great diversity of interval relationships: whereas 12-tone equal temperament has just twelve distinct intervals, this tuning has 75.⁵

³ Tim Perkis and John Bishoff, “The League of Automatic Music Composers 1978–1983,” liner notes for New World Records 80671 (2007).

⁴ Brown, “Pidgin Musics,” in *Arcana: Musicians on Music*, John Zorn, ed. (New York, NY: Granary Books/Hips Road, 2000): 112.

⁵ Brown, program note [slightly revised] for premiere of *Six Primes*, Center for Contemporary Music, San Francisco, June 24, 2014.

EXAMPLE 1

SIX PRIMES

complete tuning and interval matrix

note ratio	min2	maj2	min3	maj3	perf4	aug4	perf5	min6	maj6	min7	maj7
A 1	13/12	9/8	7/6	5/4	4/3	11/8	3/2	13/8	5/3	7/4	11/6
	139	204	267	386	498	551	702	841	884	969	1049
Bb 13/12	27/26	14/13	15/13	16/13	33/26	18/13	3/2	20/13	21/13	22/13	24/13
	65	128	248	360	413	563	702	746	830	911	1061
B 9/8	28/27	10/9	32/27	11/9	4/3	13/9	40/27	14/9	44/27	16/9	52/27
	63	182	294	347	498	637	680	765	846	996	1135
C 7/6	15/14	8/7	33/28	9/7	39/28	10/7	3/2	11/7	12/7	13/7	27/14
	119	231	284	435	573	618	702	783	933	1072	1137
C# 5/4	16/15	11/10	6/5	13/10	4/3	7/5	22/15	8/5	26/15	9/5	28/15
	112	165	316	454	498	583	663	814	952	1018	1081
D 4/3	33/32	9/8	39/32	5/4	21/16	11/8	3/2	13/8	27/16	7/4	15/8
	53	204	343	386	471	551	702	841	906	969	1088
D# 11/8	12/11	13/11	40/33	14/11	4/3	16/11	52/33	18/11	56/33	20/11	64/33
	151	289	333	418	498	649	787	853	916	1035	1147
E 3/2	13/12	10/9	7/6	11/9	4/3	13/9	3/2	14/9	5/3	16/9	11/6
	139	182	267	347	498	637	702	765	884	996	1049
F 13/8	40/39	14/13	44/39	16/13	4/3	18/13	56/39	20/13	64/39	22/13	24/13
	44	128	209	360	498	563	626	746	858	911	1061
F# 5/3	21/20	11/10	6/5	13/10	27/20	7/5	3/2	8/5	33/20	9/5	39/20
	85	165	316	454	520	583	702	814	867	1018	1156
G 7/4	22/21	8/7	26/21	9/7	4/3	10/7	32/21	11/7	12/7	13/7	40/21
	81	231	370	435	498	618	729	783	933	1072	1116
G# 11/6	12/11	13/11	27/22	14/11	15/11	16/11	3/2	18/11	39/22	20/11	21/11
	151	289	355	418	537	649	702	853	992	1035	1120

The composer chose to negotiate the complexities of those seventy-five intervals by using just four primes at a time in each of the six pieces, limiting the pitch material in each to eight-note modes. The title of each piece is simply the primes used. In addition to the pitch modes, Brown constructed parallel rhythmic modes. His compositional system provided four numbers that specified which pitches and rhythmic subdivisions would be available for each piece. At a larger structural level, the numbers in each piece's title were also used to determine the piece's overall form. All pieces are also organized into sections based on the eleven unique combinations of the four numbers specified by its title:

Each section uses one of all possible 2, 3, and 4 number combinations from the title to provide all pitch and rhythmic material. The length in measures of each section is set by the sum of these numbers, and each section consists of subsections of bars corresponding to each number. Thus each piece defines a harmonic-rhythmic mode, and each section explores a particular subset of it. The purpose of this structure is to hear all of the possible relationships within each piece, each for approximately equal amounts of time; and within the entire set of six pieces to explore all 75 ratios equally and thoroughly. Ratios are specified regardless of their simplicity (consonance) or complexity (dissonance), avoiding schemes of progressing from one of those qualities to another. The materials of the music speak for themselves with their own expressive qualities, whether or not the numbers defining them are recognized.⁶

⁶ Ibid.

EXAMPLE 2

Example 2 shows the first seven bars of the 7-6-5 section from piece 7-6-5-4. The three numbers correspond to three voices in the polyphony, each consisting of a single dyad using two of the ratios prescribed by the number 7 (7:6 and 7:4), 6 (its prime factor is 3, so it specifies 3:2 and 9:8), and 5 (5:4 and 8:5). The top voice is ostinato septuplets that divide two bars into seven beats; the middle voice is in sextuplets over two bars, centering on the second beat of each bar; and the lowest voice divides two bars into quintuplets. The resulting composite rhythm has coincidences in the top and lowest voices every two bars, while the middle voice lands on the second beat of each 2/2 measure. The rhythmic density increases in the first bar and retrogrades in the second one. Its aural effect is a complex strumming of the harmonies 3, 5, and 7, expressed both in pitch and rhythm. With each two bars the pitches in each dyad change, floating mostly stepwise downward in the mode.

EXAMPLE 3

Example 3 includes the 11-bar subsection of the 11-5-4-3 section of that piece, starting at bar 112. Here the four-voice texture subdivides a single bar from top to the third voice by 5, 11, and 4 beats respectively, while the lowest voice divides four bars into two beats. The top voice articulates this quarter-note quintuplet pattern over two bars: 2-1-1-2-1-1-2, while the second voice provides counterpoint articulating an eleven-note pattern: 3-3-2-3. The third voice anchors the composite rhythm with half-note triplets. Pitch material consists of all 8 notes of this mode, moving again sequentially, but in changing directions up and down.

In connecting the numerical material to the creation of both harmony and rhythm, Brown is deliberately drawing on the early twentieth-century experiments of Henry Cowell and Léon Theremin's Rhythmicon machine, which articulated an explicit connection between pitch and rhythm, and allowed for more complex rhythmic layering to be achieved. (Indeed, Brown writes complex temporal counterpoint in *Six Primes*: 7 against 11, 13 against 5, 13 against 11, and so on; when a section in 6 over 8 appears, one's ears are shocked by the regularity.) Brown states: "While it does not seem possible to intuitively recognize the common ratio relationship of pitch intervals to their corresponding rhythmic subdivisions, when both are grouped with the same proportions one learns to appreciate their actual congruence; as each higher prime is added to the vocabulary, new musical experiences obtain."⁷

Among these "new musical experiences" is the sensation that, although modulation is not possible in just intonation, other kinds of "modulations" are occurring constantly, since the pitches have similar but not identical relationships. This intervallic diversity allows many different colors, so to speak, to appear and disappear throughout the modal complexity of each

⁷ Ibid.

piece. The pieces oscillate between driving, pulsed sections and what the composer calls “chorales”: slower, quieter sections that highlight available clusters in a given tuning, and in different registers of the piano. Finally, it is worth noting that although Brown is a gifted and experienced improviser, *Six Primes* is fully notated.

When Brown reflects on all the ideas that went into the making of this formidable piece, he concludes:

I employed this algorithmic control over form in part to evoke the egalitarianism of twelve-tone music, and to divert from monocentric tendencies of modal musics. Within that form, however, I allowed myself to compose freely, using a diversity of melodic, harmonic, and polyphonic ideas. Lou Harrison’s endlessly branching melodies, Cowell’s polyrhythms and tone clusters, Cage’s equanimity and Stockhausen’s deterministic force, the complex minimalism of Morton Feldman, and the harmonious buzz of Ellen Fullman . . . all provided influence and inspiration. I discovered that playing asymmetrical rhythms in odd-numbered subdivisions of a strong pulse can evoke a bebop-like swing. And although I never thought about it during the composing process, I think I hear in its mixture of styles an influence of Ives.⁸

—Amy Beal

Amy C. Beal is Professor of Music at the University of California, Santa Cruz. She is the author of three books: New Music, New Allies: American Experimental Music in West Germany from the Zero Hour to Reunification (2006); Carla Bley (2011); and Johanna Beyer (2015).

Chris Brown (b. 1953), composer, pianist, and electronic musician, makes music with self-designed sonic systems that include acoustic and electroacoustic instruments, interactive software, computer networks, microtonal tunings, and improvisation. His compositions are designs for performances in which people bring to life the musical structures embedded in scores, instruments, and machines.

His early work frequently included electroacoustic instruments he invented and built, like the “Gazamba” (1982), an electric percussion piano featured in *Alternating Currents* (1984), for orchestra and three soloists. He designed and built his own computer-controlled analog signal processing system for the environmental sound piece *Lava* (1992), for brass, percussion, and live electronics. *Talking Drum* (1995-2000), was a MIDI network installation that explored polyrhythm, distance, and resonance in large architectural spaces. He later extended this concept with a homemade low-power FM radio system for the audience interactive installation series *Transmissions* (2002-9) with Guillermo Galindo. He is a member since 1986 of the pioneering computer network music band The Hub. Throughout his career he has composed solos for acoustic instruments with interactive electronics, and for computer alone, using software he writes for his compositions and improvisations. Since 2005 he has written music in just intonation, often integrating rhythmic structures that parallel the proportions used in their tunings.

⁸ Brown, written communication with the author, May 15, 2016.

Recordings of his music are available on New World, Tzadik, Pogus, Intakt, Rastascan, Ecstatic Peace, Red Toucan, Leo, and Artifact Recordings. He has also performed and recorded music by Henry Cowell, Luc Ferrari, José Maceda, John Zorn, David Rosenboom, Larry Ochs, Glenn Spearman, and Wadada Leo Smith; as an improviser he has performed and recorded with Pauline Oliveros, Fred Frith, the Rova Saxophone Quartet, William Winant, and Frank Gratkowski, among many others. He teaches at the Center for Contemporary Music (CCM) at Mills College in Oakland, California. <http://www.cbmuse.com>

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CHRIS BROWN (b. 1953)

SIX PRIMES

Chris Brown, piano

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Six Primes (2014)

for piano in 13-limit just intonation

1. 13-7-6-4 8:53

2. 11-7-6-4 8:01

3. 13-6-5-4 8:49

4. 7-6-5-4 6:55

5. 13-11-8-6 9:20

6. 11-5-4-3 9:05

TT: 51:36