

**Title: Hair Braiding is Technology: Nontsikelelo Mutiti's Ruka.**

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**Ruka (To braid/ to knit/ to weave)**, a project created by artist/designer Nontsikelelo Mutiti, collects and experiments with information and fosters audience participation. Specifically, the artist engages tangible and digital media production that dovetails with hands-on braiding, crafts, physical construction and design, and material play. An exploration of Nontsikelelo's production techniques seems especially promising in the domains of mathematics and digital media (computer programming and electronic textiles), which include the development of web-based tools that explore different braiding techniques and use algorithmic calculations to repeat and animate tiles created by Nontsikelelo. This essay looks at the role that vernacular art and crafts (i.e., hair braiding) plays in the engagement of these other areas, beginning with the sample.

### **The Sample**

In media production such as visual art, textile design, and music, sampling is defined as the act of taking a portion from one source and reusing it to create a new project. Hip hop was the first popular music genre based on the art of sampling—being born from 1970s DJs who experimented with manipulating vinyl on two turntables and an audio mixer.<sup>1</sup> The sample is a discreet unit of information (i.e., a sound, shape, or motif) that can be repeated to create a pattern. Samples in Nontsikelelo's *Session at Recess* include black

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<sup>1</sup> Lott, R. "History of Sampling," Joyful Noise Recordings:  
<http://www.joyfulnoiserecordings.com/journal/akai-mpc-2000the-history-of-sampling>

hair combs, afro hair picks with black fist handles, Roman letterforms, and hair braider business cards. Other types of samples are squares, triangles, and the 'y-shaped' plaits that make up a braid or cornrow. Lines or rows made from these plaits create patterns. Patterns are repeated to create unique designs. During her Session, Nontsikelelo produced an archive of samples, patterns, and materials using hair braiding's formal qualities of repetition and diagramming as a starting point.<sup>2</sup>

### **Pattern and Repetition**

Braiding forms a complex pattern by intertwining three or more strands of flexible material such as fibers and hair. Because of the time it takes to braid hair, people often socialize while braiding and having their hair done. The process of braiding is a unifying gesture; it brings people together. Likewise, braiding practice carries on a tradition of bonding between experts and the next generation.

*To begin braiding, use a medium- to fine-toothed comb to part the hair isolating a patch of hair of a desired size.*

The handles of many African hair combs contain political, religious or cultural references.<sup>3</sup> Combs dating from pre-dynastic Egypt to modern day have used the black power fist that became a political symbol for achieving self-determination for people of

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<sup>2</sup> "Nontsikelelo Mutiti." Africanah. Africanah, 6 Mar. 2014. Web. 4 Jul. 2014.

<http://africanah.org/nontsikelelo-mutiti>

<sup>3</sup> Tulloch, C. (2008). "Resounding power of the Afro comb," 124-25, in G. Biddle-Perry and S. Cheang (eds.), *Hair styling culture and fashion*, 128-39.

African descent.<sup>4</sup> The 1960s movement in the U.S. emphasized racial pride and the creation of black political and cultural institutions to nurture and promote black collective interests and advance black values.<sup>5</sup> With Black Power came the "Black is beautiful" cultural movement that aimed to dispel the notion that black people's natural features, such as hair, are inherently ugly. The movement is largely responsible for the popularity of the Afro, braids and cornrows.

Braids are often used figuratively to represent interweaving, knitting, or combination, such as in "She braided many different ideas into a new whole." Patterns, rhythms and participation in the interweaving of materials are at the heart *Ruka (To braid/ to knit/ to weave)*. The unpredictable, innovative rhythms and patterns in cornrows are similar to those found in Central and South African textiles and other creative, cultural forms, such as rap music.<sup>6</sup>

Repetition in African Diasporan creative expression is most prevalent in performance such as rhythm in music, dance and language.<sup>7</sup> The organizing force that produces this aesthetic is rhythm or the ongoing recurrence of a beat. Repetitive words and multiple, conflicting rhythms are important elements of African performance and its American

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<sup>4</sup> Scott, James. Wilson. (1976). *The black revolts: racial stratification in the U.S.A.: the politics of estate, caste, and class in the American society*. Cambridge, MA: Schenkman Pub.

<sup>5</sup> Appiah, A., & Gates, H. L. (1999). *Africana: the encyclopedia of the African and African American experience*. New York: Basic Civitas Books, p. 262.

<sup>6</sup> Wahlman, M. S. (2001). *Signs and Symbols: African Images in African-American Quilts*. New York: The Museum of American Folk Art.

<sup>7</sup> Snead, J. A., (1984). "Repetition as a figure of black culture," in *Black Literature and Literary Theory*, ed. Henry Louis Gates, Jr. New York, NY: Methuen & Co, Ltd, p. 68.

descendants – gospel/spirituals, blues and jazz. Although most often discussed in music, the polyrhythm aesthetic can also be found in cornrowing and technology. Music theorist Adam Rudolph notes the weaving of threads or “thematic fibers” in repeated patterns of rhythmic regularity and irregularity as polyrhythm.<sup>8</sup>

*To begin cornrowing, use a medium- to fine-toothed comb to part the hair isolating a row of hair of a desired width. The width of a single row of hair ranges from thin to thick. A thin width allows you to fit more cornrows on the head.*

Cornrows are a traditional African style of hair grooming where the hair is braided very close to the scalp, using an underhand, upward motion to produce a continuous, raised row. Cornrows are often formed in simple, straight lines (rows), but they can also be formed in complicated geometric or curvilinear designs. Cornrows are sometimes adorned with beads or cowry shells. Depending on the region of the world, cornrows are worn by men, women, or both.

Cornrow braids are not only widespread in Africa, they are also quite ancient. Cornrows may be as old as 500 B.C. As Peters notes in her essay on black hairstyle history: “Hieroglyphs and sculptures dating back thousands of years illustrate the attention Africans have paid to their hair. Braids were etched into the back of the head of the

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<sup>8</sup> Rudolph, A. (2010). “Music and Mysticism, Rhythm and Form: A Blues Romance in 12 Parts.” *Arcana V*. New York: Distributed Art Publishers.

majestic sphinx.”<sup>9</sup>

*Now you know in which direction you're braiding. Go to the beginning of the hair row and separate a small section of the hair into three groups. The left group of hair strands will be A. The middle group will be B. The right group will be C.*

The process of cornrowing recalls African practices that have survived the Middle Passage, i.e. the weaving or interweaving of cultures, identities, images, fabric, and sounds. This reinforcement (weaving) is perhaps how African Americans were able to endure slavery in the West.

### **Polyrhythms and Algorithmic Modeling**

Polyrhythms are where the magic is conjured. Odd versus even, dynamics and accents, it's all language,” he says. On occasion, he even layers conflicting rhythms on top of one another to create more complicated patterns.<sup>10</sup>

*Hold A between the 2nd and 3rd fingers from the pinky and B between the index finger and the thumb of your left hand. Hold C with the thumb and index finger of your right hand. In a fluid motion, use the right index finger to grab A from the left hand and bring*

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<sup>9</sup> Peters, J. C. (1992) "Braids, cornrows, dreadlocks, and hair wraps: An African continuum." In *Festival of Michigan Folk Life*. Michigan State University Museum.

<sup>10</sup> Opperman, D. (2013). "Polyrhythms and Afro-futurism: 10 Things You Need to Know About Afrikan Sciences," XLR8R: <http://www.xlr8r.com/features/2013/11/polyrhythms-and-afro-futurism-10>.

*it under B and over C. Use the left index finger to carry over C simultaneously grabbing hair from the row of hair underneath.*

To define polyrhythms, it is necessary to establish a definition of rhythm that comes from the original Indo-European word meaning ‘to flow.’ Flow requires movement such as the hair braider’s motions that repeat a process. Samples (i.e., plaits, combs and sounds) that materialize during this production build visual polyrhythms developed through overlapping two patterns, resulting in a third, deeper pattern.

*Continue until the row of hair is braided. Repeat steps 1 through 4 with a new row of hair.*

In mathematical terms, the braiding of hair shows the formal possibilities of geometric variation. Hair braiding demonstrates an inclination for interrupting the expected line; braids are composed through juxtapositions of sharply differing units and abrupt shifts of form. Certain patterns are amenable or open to algorithmic modeling—but ‘amenable’ need not connote the simple—a square is easier to simulate and repeat but the process of braiding, knitting or weaving these shapes into designs is more about complexity arising from simplicity. In other words, it is not the braid itself but the act of interweaving shapes that form the intricate patterns that unify the design.

In mathematics and computing the algorithm is a step-by-step procedure for calculations. Algorithmic art is often referred to as computer-generated art. However, traditional hair

braiders do not use computers to make their calculations. Floor tiles screenprinted with tessellating patterns by Nontsikelelo are algorithmic; each tile consists of a group of cornrows, designed in such a way that different shapes are formed depending on how the tiles are arranged. Thus, the story of the artist, designer or braider must be encoded in some way into the algorithm. Hair braiding is a technology.

In computing, braiding is a two-way design negotiation or loop: the artist creates the design, the programmer writes a code that applies it, and people use the program to create new designs. After attending a workshop during Nontsikelelo's Session, Jeanine Meyer wrote software that produces simulations of two and three-strand twist.<sup>11</sup> Users of the software can choose from a set of colors or a single color with a border. They can specify the tightness of the weave and if the outside strand goes over or under. A "shake" feature produces a braid with the loose weaving that is then unraveled step-by-step.

Other web-based programs are used to regenerate braiding and weaving practices. The Cornrow Curves software developed at Rensselaer Polytechnic Institute, or RPI, under the tutelage of Dr. Ron Eglash, lets people use their geometric knowledge from cornrow hairstyles to create their own simulated designs on the computer.<sup>12</sup> Cornrow Curves is part of a suite of Culturally Situated Design Tools, or CSDTs that teach technical skills and mathematics principles as users simulate original cultural artifacts and develop their

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<sup>11</sup> Jeanine Meyer. (2014). "A Web Program to Illustrate Braiding [developer notes]. New York: Purchase College.

<sup>12</sup> Eglash, R. (2006). Cornrow Curves [computer software]. New York: RPI: [http://csdt.rpi.edu/african/CORNROW\\_CURVES/cornrow\\_homepage.html](http://csdt.rpi.edu/african/CORNROW_CURVES/cornrow_homepage.html).

own creations.

CSDTs have been developed using a visual, drag-and-drop programming language that is an extended reimplement of the Scratch program developed at MIT. Scratch was derived from the DJ turntablist technique of scratching, relating the ease of mixing sounds to the ease of mixing projects. Using this platform Eglash/RPI developed a tool that simulates Nontsikelelo's braided tiles. CSDTs are linked to four principles: 'deep design themes,' 'anti-primitivist representations,' 'translation, not just modeling,' and 'dynamic rather than static views of culture.'<sup>13</sup> The tool uses four geometric concepts—translation, rotation, reflection and dilation—to simulate the floor tile designs.

The addition of sound created by the mbira in the development of the Ruka CSDT is particularly relevant because it is a key traditional instrument used for divination in the tribe of Nontsikelelo's father. The mbira—another form of technology—consists of a wooden board with attached staggered metal keys. On first glance, the instrument looks very similar to a comb. Mbira music, like much of the sub-Saharan African music traditions, is based on polyrhythm. Mbira master Abraham Dumisani Maraire introduced this music in the U.S., initiating a flourishing of Zimbabwean music in the Pacific Northwest that continues to spread in the 21st century.<sup>14</sup> Tendai 'Baba' Maraire, member of the Seattle-based experimental hip-hop duo Shabazz Palaces, is the son of Dumisani

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<sup>13</sup> Eglash, R. Bennett, A., O'Donnell, C., Jennings, S., Cintonino, M. (2006) "Culturally Situated Design Tools: Ethnocomputing from Field Site to Classroom," in *American Anthropologist*, Vol. 108, Issue 2, pp. 347–362.

<sup>14</sup> Adzenyah, A. K., Tucker, J. C., & Maraire, D. (1997). *Let Your Voice Be Heard! Songs from Ghana and Zimbabwe*. World Music Press.



Maraire and carries on this tradition.

Hair braiding is part of a historical and cultural tradition that has spread throughout the African Diaspora and in other cultures across the globe. Nontsikelelo Mutiti's reconceptualization of African hair braiding supports the study of the technical skill involved in braiding/knitting/weaving, as well as provides a space to document and interpret these processes and forms through multiple media formats. Hair braiding as a technology fosters creativity and innovation, spanning many disciplines and production methods that include African music and textiles, hip-hop, and even culturally situated design software development. **Ruka (To braid/ to knit/ to weave)** is one aspect of a domain that deserves much wider knowledge, research, analysis and practice.