

Intercultural Song Composition: Integrating the *Nirai* of Okinawan Instrument into *Sape* of Bornean Musical Traditions

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The *nirai* is a four-string hybrid instrument that combines characteristics of the Okinawan sanshin with those of a standard guitar, developed by the brand K. Yairi. Designed for ease of performance, the instrument employs a default open-fifth tuning in the key of G (G2–D3–G3–D4, from the fourth to the first string). Owing to its non-standard tuning and simplified design, conventional Western notation systems—such as standard guitar tablature—are less commonly applied. As a result, performers typically rely on aural learning or adapt musical materials to suit the instrument's tuning, which yields a diatonic rather than a fully chromatic scale. Knowledge is generated through the act of composing, arranging, and performing original musical works as research artefacts. The research methods include the development of customized notation scores specific to *nirai*, as well as duet performances with selected local traditional instruments. The findings demonstrate that the timbral and modal characteristics of the *Nirai* integrate effectively with indigenous Bornean instruments, the *sape*, revealing its potential as a mediating tool for intercultural musical dialogue. This study contributes practice-led insights into alternative tuning systems, compositional strategies, and notation approaches, reinforcing the value of creative practice as a mode of musical knowledge production.

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INTRODUCTION

Nirai is a four-string hybrid instrument developed by K. Yairi that integrates structural and timbral features of the Okinawan sanshin with those of the standard guitar (Day 2023). Designed for accessibility, it retains the sonic identity of the sanshin while adopting a more straightforward, folk-oriented playing approach. Its default open-fifth tuning in the key of G (G2–D3–G3–D4) produces a predominantly diatonic pitch framework, distinguishing it from chromatic guitar systems and shaping its melodic and harmonic affordances (Duin *et al.* 2025). This tuning system situates the *nirai* within a modal musical logic that aligns closely with Okinawan folk traditions and aural transmission practices. Hybrid Okinawan instruments closely related to the *nirai* have been employed within contemporary popular music as markers of regional identity. The band

BEGIN from Ishigaki Island has played a significant role in popularizing instruments such as the *Ichigo Ichie* and the *sanrere*, both of which blend sanshin design with guitar- and ukulele- like features (Johnson 2013). Through the integration of these instruments in performance and recording, BEGIN articulates an Okinawan island aesthetic within a modern songwriting framework, as evidenced in works such as *Nadasōsō* (涙そうそう), *Tropical Foods* (トロピカルフーズ), and *Shimanchu no Takara* (島人ぬ宝) (Gillan 2009). These practices demonstrate how hybrid instruments mediate between tradition and popular music, enabling cultural continuity while allowing stylistic adaptation. Despite this visibility, scholarly and compositional engagement with the *nirai* itself remains limited. Existing usage is largely concentrated within Okinawan folk and popular repertoires, with relatively little exploration of its application in intercultural or cross-regional musical contexts (Johnson 2013). Its non-standard tuning and diatonic constraints further restrict its adoption within Western notation-based compositional systems, contributing to its marginalization in broader contemporary music practice. Consequently, the *nirai* has yet to be systematically examined as a creative tool beyond its original cultural environment. Applying the *nirai* to the composition of Bornean-inspired songs extends its cultural and sonic possibilities, allowing new understandings of tuning systems, timbre, and intercultural musical interaction to emerge through practice. By situating the *nirai* within Bornean musical idioms, this study responds directly to the limited literature on the instrument and contributes new knowledge through creative experimentation and reflective compositional processes.



Fig. 1. (a) The *nirai* guitar; and (b) The *sape*

To produce a pleasant sound, the *nirai* is composed entirely of solid wood. The fingerboard is made of rosewood, the body, neck, side, and back are made of mahogany, and the top is made of spruce (Duin *et al.* 2025). The spruce woods are seasoned using steady winds in large quantities to produce tone wood, which are kept for decades before being used. This process guarantees long-term instrument stability. Inadequately seasoned wood will not be stable, which can cause a number of problems, including poor intonation,

splitting, top lifting, and neck warping. Its appearance is more straightforward because it lacks all ornamental inlays, giving it a more folk instrument vibe. As a result, features such as knots, flaws, and wood grain patterns are regarded as contributing to the instrument's distinct personality. With the finest materials that have been naturally dried for more than ten years, the antique-style color tones and rough finishing produce a deep sound. This musical instrument is still under development. Continuous enhancements are being made even now while it is being produced.

The Kayan and Kenyah people of Borneo play the *sape*, a traditional lute (Hamdan *et al.* 2023). Carved from a single piece of wood, it is a plucked string instrument featuring frets and a neck. It is composed of meranti from the tropical *Shorea* tree species, which has a density of 415 to 885 kg/m³ and light hardwood from merdang (*Cinnamomum porrectum*), a member of the *Lauraceae* family. The wood serves as a resonator and is carved. The modern *sape* has six strings, whereas the old *sape* has three or four. The *sape* and the *nirai* guitar are depicted in Figs. 1a and 1b, respectively.

EXPERIMENTAL

This study adopts a practice-based research (PaR) approach in which original musical compositions function as primary research artefacts. Four original tunes were composed and arranged specifically for the *nirai* instrument in dialogue with Bornean musical idioms. With its open-fifth tuning scheme (G2–D3–G3–D4), the *nirai* can be incorporated into Bornean musical contexts, especially in relationship with the *sape*, which become the main focus that drove the study. Both Okinawan and Bornean traditions' common modal traits, timbral compatibility, and non-functional harmonic techniques influenced the musical direction. The original compositions were composed as experimental platforms which explore a musical compositional parameter, including: a) Drone-based harmonic structures; b) Modal melodic development; c) Extended harmony; and d) Textural interaction between *nirai* and *sape*. Adaptive techniques such as chosen fret, implied harmony, and inversion-based voicing were necessary due to the *nirai*'s tuning limitations. Each composition was notated in full score and supported by audio recordings to document the compositional and performative outcomes of the research process. These works collectively form an experimental platform through which the tuning, harmonic potential, and intercultural adaptability of the *nirai* were systematically explored. Two original compositions were completed and tested through studio-based production using a condenser microphone, audio interface, and Logic Pro as the digital audio workstation. The recordings were mixed and mastered in WAV format at 48 kHz/24-bit, ensuring high-fidelity documentation of the sonic outcomes. Both works, were arranged in solo and duet formats, allowing the *nirai* to be evaluated in different ensemble contexts. These recordings functioned as primary research artefacts through which the instrument's tonal, harmonic, and intercultural potential could be assessed in relation to Bornean musical materials. Results were obtained by combining:

- 1) score-based analysis (harmonic and structural analysis at the bar level).
- 2) performance-based reflection (instrumental skill and ergonomic adaptability).
- 3) auditory analysis (timbre, texture, and ensemble balance).

By using this approach, it was ensured that performance practice and compositional structure interacted directly to provide insights.

Among these works, two representative compositions are discussed in this article: *nirai* Opus 1 No. 1 (Fig. 2) and *nirai* Opus 2 No. 1 (Fig. 3), both composed by the author, Duin. Two pieces, *Nirai* Opus 1 No. 1 and *Nirai* Opus 2 No. 1, were chosen for a thorough investigation. These compositions were picked because they exhibit opposing but complimentary compositional techniques:

- 1) Opus 1 No. 1: focuses on harmonic expansion and extended sonorities.
- 2) Opus 2 No. 1: emphasizes interlocking texture and rhythmic interaction.

When combined, they offer a representative foundation for analyzing the harmonic, textural, and intercultural potential of the *nirai*. These pieces were conceived as compositional laboratories, allowing the investigation of harmonic density, melodic phrasing, and instrumental interaction between the *nirai* and accompanying instruments. Through iterative cycles of composing, rehearsing, performing, and revising, each piece was refined to test how the *nirai*'s open-fifth tuning could be used to generate harmonic support, counter-melodies, and textural layers within *sape* musical settings.

Harmonic analysis focused on how the *nirai*'s tuning could support extended sonorities despite its limited pitch set. The instrument was found to produce a wide variety of timbral and harmonic effects, particularly through the use of extended chord tones such as ninths, elevenths, and thirteenth. These tones were realized by selectively identifying scale degrees that could be sustained or implied within the open-string framework. Although the lowest open string (G2) functions as a tonal anchor, harmonic variety was achieved through pedal-point techniques and chord inversions, enabling the creation of harmonic motion without violating the instrument's tuning constraints.

Performance practice analysis further examined how players adapt physically and musically to the *nirai*. The instrument's four strings are tuned in perfect fifths, requiring the performer to reconceptualize chord formation and voice leading. As a result, the composer-performer developed alternative fingering strategies to support harmonic progression and melodic continuity. One common technique involves using a single index finger to stop multiple strings, producing a sonority similar to a power chord (root and fifth). While this approach emphasizes tonal stability, additional fingers may be introduced selectively to articulate melodic color, harmonic extensions, or contrapuntal lines, depending on the musical context (Duin *et al.* 2025). Through these adaptive playing strategies, the *nirai* was shown to be capable of supporting both structural harmony and expressive melodic shaping within the composed works.

Together, these compositional and performance experiments demonstrate how the *nirai* can function as an effective intercultural instrument, capable of engaging with *sape* musical materials while retaining its Okinawan sonic identity. By treating composition and performance as intertwined modes of inquiry, this PaR methodology generates new practical knowledge about tuning systems, harmonic construction, and cross-cultural instrumental adaptation.

Figure 2 shows *nirai* Opus 1 No. 1. The opening section of *nirai* Opus 1 No. 1 (Bar 1–8) demonstrates the use of open-fifth tuning (G2–D3–G3–D4) as a harmonic pedal to accompany a *sape* melody with Bornean influences. A *sape* is a traditional Bornean plucked lute, an important stringed instrument for the Orang Ulu people of Sarawak and Kalimantan, with a lengthy shape and melodious sound.

'Nirai' Op1
no.1

composed by Ezra Alfandy

The musical score is written for two instruments: Sape and Nirai. It is in 4/4 time and G major. The score is divided into several sections with specific performance instructions:

- Section 1 (Measures 1-6):** Tempo $\text{♩} = 95$ *rubato*. Chords: G5, G(9,13) omit 3, E♭maj7/G, G(♯11,13), G(9,13) omit 3. Section A (Measures 7-11) is marked $\text{♩} = 77$ *cantabile with ornamentations*. Nirai has a 'let ring' instruction at measure 11.
- Section 2 (Measures 12-17):** Nirai has a 'let ring' instruction at measure 12. Sape has a '2nd time played' instruction at measure 13 and an 'improvisation' section (measures 14-17) indicated by a slash. Chords: G(9,13) omit 3, G(9,♭13), G(9) omit 3, G(9) omit 3. Nirai has a 'let ring' instruction at measure 17.
- Section 3 (Measures 18-22):** Section B (Measures 18-22) is marked $\text{♩} = 77$ *cantabile with ornamentations*. Nirai has a 'let ring' instruction at measure 18.
- Section 4 (Measures 23-29):** Nirai has a 'let ring' instruction at measure 23. Sape has a 'rit.' (ritardando) instruction at measure 24.
- Section 5 (Measures 30-34):** Chords: G(9,13) omit 3, G(9,♭13), G(9) omit 3, G(9) omit 3. Nirai has a 'let ring' instruction at measure 30.

Fig. 2. Nirai Op.1 No.1

'Nirai' Op2

no.1

composed by Ezra Alfandy

$\text{♩} = 70$
rubato
'melody can double with Sape

G5 G(6,9) Ebmaj7/G G(add9)

5 A A1

9 G5 G(6,9) Ebmaj7/G F/G G(add9)

13 let ring - - - - - let ring - - - - - let ring - - - - -

16 1. 2. D.S. al Fine G5

19 let ring - - - - - let ring - - - - -

23 G(6,9) Ebmaj7/G F/G G(add9) rit. Fine

Fig. 3. Nirai Op.2 No.1

The *sape* open strings 1 through 6 have notes F3, F3, A3, Bb3, G3, and C4, respectively. String 1 has 17 frets. Strings 2 through 6 are for drone purposes with no fret. The open string 1 and frets 1 through 17 have notes F3, G3, A3, Bb3, C4, D4, E4, F4, G4, A4, Bb4, C5, D5, E5, F5, G5, A5, and C6. String 1 has 2 octaves in the F major key with a jumping note in the third octave, which consists of F5, G5, A5, and C6 only (Hamdan *et al.* 2023). Despite the diatonic tuning system, the use of extended harmonics (G9, G13) articulated through selective fretting over open strings on *nirai* Opus 1 No. 1 (Bar 9–16) produces a rich sonority. *Nirai* Opus 1 No. 1 (Bars 17–24): The *nirai* part's pedal-point method and inversion-based chord voicings permit harmonic motion while preserving the open-string resonance.

Figure 3 shows *nirai* Opus 2 No. 1. The interlocking textures between the *nirai* and *sape* instruments in *nirai* Opus 2 No. 1 (Bar 1–12) show how the *nirai* supports melodic contour rather than acting as a fully chromatic accompanying instrument. *Nirai* Opus 2 No. 1 (Bar 20–28): To create harmonic clarity within the *nirai*'s tuning limitations, power-chord structures (root–fifth) are used in conjunction with melodic embellishments.

In Fig. 2. *Nirai* Opus 1 No. 1: Bars 1-8 illustrate drone-based harmonic support using open strings (G2-D3). Bars 9-16 demonstrate implied extended harmony (G13) through selective fretting. Bars 17-24 show inversion-based voicing and pedal-point, enabling harmonic motion without functional progression. In Fig. 3. *Nirai* Opus 2 No. 1: Bars 1-12 demonstrate interlocking textures between *nirai* and *sape*, forming a heterophonic ensemble structure. Bars 20-28 illustrate the use of power-chord formations (root–fifth) combined with melodic embellishment to achieve harmonic clarity within tuning constraints.

RESULTS AND DISCUSSION

Analysis of *Nirai* Opus 1 No.1

Bars 1-8: Establishment of Drone-Based Harmonic Field (see Fig 2, bars 1-8)

The opening section (Bars 1-8) establishes a drone-based harmonic foundation centred on the open strings G2 and D3 of the *nirai*. Rather than forming functional chord progressions, these sustained pitches act as a pedal point, stabilising the tonal centre. Following this, the *sape* provides a melody that uses modal inflection to establish a diatonic framework. In particular, the use of F-natural introduces a subtle variation from the traditional G major structure. This leads to a modal mixture in which the *sape* adds melodic fluidity and the *nirai* preserves tonal stability. This part can be thought of as arranged texturally, with:

- 1) *Nirai*: harmonic drone layer
- 2) *Sape*: melodic foreground

Bars 9-16: Implied Extended Harmony (see Fig 2, bars 9-16)

Extended harmonics are produced in Bars 9-16 by introducing selective fretting over open strings, which improves harmonic density. For instance, despite the omission of the third (B), the combination of G (root), D (fifth), and E (13th) results in an assumed G13 sonority. This omission reinforces a non-Western, modal harmonic logic by avoiding functional harmonic resolution. As a result, the harmonic effect is suggestive rather than declarative, depending on the listener's perception to finish the chord structure.

Bars 17-24: Harmonic Motion via Inversion and Pedal Point (see Fig 2, bars 17-24)

In this section, harmonic motion is achieved without abandoning the open-string resonance. Instead of traditional chord changes, the composer employs:

- 1) inversion-based voicings.
- 2) partial chord structures.

This produces a flowing harmonic texture that is consistent with both Okinawan and Bornean aesthetic standards by allowing harmonic diversity while preserving a continuous drone.

Analysis of *Nirai* Opus 2 No.1*Bars 1-12: Texture Interlocking (see Fig 3, bars 1-12)*

The transition from harmonic emphasis to textural interaction is evident in the initial part. The *nirai* offers harmonic and rhythmic assistance. The *sape* plays melodic bits that rhythmically interlock. The interaction is dialogic rather than ordered, with both instruments adding to a polyphonic texture.

Bars 20-28: Power-Chord Structures and Structural Clarity (see Fig 3, bars 20-28)

In Bars 20-28, the *nirai* employs power-chord formations (root–fifth) using single-finger barring techniques. This produces:

- 1) strong tonal grounding.
- 2) minimal harmonic ambiguity.

These structures are then ornamented with melodic embellishments, allowing the *nirai* to oscillate between:

- 1) harmonic support.
- 2) melodic participation.

This dual role enhances the intercultural interaction by balancing structural clarity with expressive flexibility.

The open-fifth tuning of the *nirai* is crucial in determining harmonic and textural organization, according to an analysis of the composed compositions. The *nirai* is a mix between a drone-based instrument and a harmonic accompaniment rather than a traditional chordal instrument. While allowing upper voices to express melodic and harmonic movement, the prolonged open strings, especially the G2 and D3, serve as pedal points that stabilize the tonal center. This characteristic worked particularly well with *sape* instruments, whose modal and linear phrasing complements the diatonic structure of the *nirai*. Instead of using entire vertical voicings, it was discovered that selective fingering and partial chord construction might provide extended harmonies, such as ninths, elevenths, and thirteenths. These prolonged tones add harmonic depth to *Nirai's* Opus 1 No. 1 without detracting from the instrument's resonant open strings. The combination of open strings and fretted notes implies harmony instead of traditional triadic blocks, creating a floating, layered sonority that enhances the sustained timbre of *sape* instruments. With this method, the *nirai* can serve as a harmonic colorist within the group texture in addition to being an accompaniment. Performance analysis also shows that the *nirai's* physical design promotes a reconsideration of guitar-based approach. Power-chord sonorities (root and fifth) are created when a single-finger barring technique is used. These sonorities offer structural integrity while providing room for melodic embellishment.

The *Nirai* Opus 2 No. 1 approach enables the musician to effortlessly transition between harmonic regions without interfering with the resonance of the instrument. The *nirai's* identity as an approachable yet musically varied instrument is reinforced by the sporadic insertion of extra fingers to increase simplicity. These results show that the *nirai* is especially well adapted to intercultural composition from the standpoint of practice-based research. The modal and drone-based elements present in many Borneo musical traditions readily complement its tuning and timbral properties. The *nirai* promotes a dialogic interaction between the Okinawan and Borneo Dayak sound worlds rather than imposing Western harmonic complexity, enabling compositional experimentation to produce new hybrid soundscapes. As a result, the composed works serve as both musical compositions and research artifacts that demonstrate how different tuning systems can produce innovative harmonic techniques and cross-cultural musical meanings.

The findings show that the *nirai's* unique 'folk instrument' timbre contributes to its successful integration into *sape* musical styles. Its open-string sustain and mid-range resonance enhance the timbral character and melodic contour of *sape* instruments, while additional percussion elements like *gendang* and *cajón* give structural drive and groove. The Borneo songs' modal and lyrical qualities are reinforced by the *nirai*, which serves as a supporting harmonic and textural layer rather than competing for aural space. The study demonstrates that the *nirai* offers a broader harmonic palette than is often believed from a creative and performance standpoint.

The research shows that many chord forms and extended harmonies can be achieved using inventive fingering techniques, even though its default technique promotes the use of power chords (root–fifth structures generated with a single finger). The harmonic texture is made richer and more colorful by the addition of ninths, elevenths, and other extensions, which enables the *nirai* to transition from simple accompaniment to a more expressive harmonic role. However, a thorough comprehension of the *nirai's* technical and harmonic limits is necessary for its efficient application.

The instrument may create four-part textures and fulfill its function as a harmonic backdrop by selectively omitting chord tones, even if its tuning limits the creation of full chromatic chords. It was discovered that chord types like G (add9) and D (add11) with an omitted fifth were especially useful in this situation. These techniques increase the expressive options accessible to composers and performers by allowing extended harmonies to be expressed within the limitations of open-fifth tuning. The *nirai's* harmonic signature is also shaped by its tuning, which starts at G2 on the lowest open string. The *nirai* occupies a somewhat greater low-register range than the guitar, whose lowest open string is E2.

The clarity and resonance of the instrument's mid and upper levels may be diminished by returning, even though it can be utilized to extend the lower register. But it was discovered that *sape* solo instruments were particularly well supported by the *nirai's* powerful mid-range response, which allowed melody lines to stay prominent while the *nirai* supplied harmonic grounding. In general, the results show that the *nirai* is a good fit for international group environments. It can serve as a link between Okinawa and Borneo musical traditions thanks to its tuning system, timbral identity, and adaptive performance skills. Additionally, the instrument is still mainly untapped when it comes to alternative guitar techniques like drop tunings, which include lowering one or more strings to produce new harmonic possibilities.

Non-standard tunings and altered string combinations, like Jacob Collier's five-string guitar with symmetrical open tunings (D–A–E–A–D), have been shown by modern experimental artists to produce new musical vocabularies (Owen 2025). In this regard, the *nirai* offers a great deal of room for new development, making it an ideal location for continued practice-based and cross-cultural musical experimentation.

CONCLUSIONS

1. When combined with *sape*, the *nirai* instrument may be utilized as an intercultural composing medium despite its non-standard, open-fifth tuning, and diatonic limitations. Original compositions were created and analyzed as research artifacts using a practice-based research approach, showing how the *nirai's* tuning, timbral qualities, and adaptive performance techniques support harmonic colorization and modal interaction rather than traditional chromatic accompaniment.
2. The *nirai* may produce extended harmonies within its tuning constraints by using implied chord structures, pedal-point techniques, and selective fingering. The *nirai* maintains its unique musical character while enhancing melodic contour and ensemble texture, also, enhanced by native rhythmic elements.
3. The musical composition offers practice-driven insights into adaptable notation and performance techniques, intercultural composition, and alternate tuning systems. It presents the *nirai* as a workable mediation tool for additional intercultural and practice-based musical research and reaffirms the importance of creative activity as a means of producing musical knowledge.

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