GENETIK: An analytical study of the contemporary gamelan music of Dewa Ketut Alit

by

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STATEMENT OF ORIGINALITY

This is to certify that to the best of my knowledge, the content of this thesis is my own work. This thesis has not been submitted for any degree or other purposes.

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ABSTRACT

This thesis seeks to reveal the innovative compositional methods in Balinese composer Dewa Ketut Alit’s 2012 work for Gamelan Salukat ‘Genetik’ through transcription and analysis. In this experimental work inspired by concepts of genetics, Alit strips gamelan music down to its core elements (its genes) and through many innovative compositional processes creates unexpected new structures, melodies, rhythms, sonorities, and textural combinations. Many of these new sounds are only possible with his new instruments, which, through an expansion of the hybrid instruments developed in the 1980s, afford Alit greater opportunity for pitch exploration. Analysis accompanied by transcription excerpts will reveal the high degree of innovation in Alit’s music, exemplifying some of the ways in which contemporary Balinese gamelan composers are breaking away from the institutionalised musical conventions of the 20th century. While contributing to the ongoing documentation of contemporary styles in 21st century Bali, this paper deviates from a more conventional ethnographic methodology, shifting the focus to analysis, which is undergoing a renaissance in ethnomusicology.
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PREFACE

My connection

Over the past four years I have travelled to Bali five times to study Balinese gamelan to further my interests as a composer, performer and budding ethnomusicologist. My primary contact point in Bali for accessing teachers, performances, and many other opportunities for cultural exchange and learning, has been the gamelan ensemble Çudamani, which was created by three brothers, all virtuoso musicians. The group is based in Pengosekan, a village known for both innovation and preservation of music, near the cultural hub of Ubud. Whilst studying with two of the brothers in particular—Dewa Rai and Dewa Berata—I became aware of their extended family, and one particular brother became a bit of a legend to me—the supposed rebel and third brother Dewa Alit. I heard his name on my first trip, saw his house from over the fence on my second trip, heard his music live and finally met him on the third trip. While for some he is a renegade with crazy ideas beyond the current time, for others including myself, he is a gifted composer and an inspiring innovator.

I have since become intimately acquainted with all his music, some for gamelan ensembles, some for fusion bands and some for European and American contemporary music ensembles. During my last three trips we have become close friends and it has been truly inspirational to learn from him through both formal interviews and casual discussions. Since the mid 2000s, Alit stepped away from his position as the official composer for Çudamani and started his own group—Gamelan Salukat. The ensemble is dedicated to performing experimental works and Alit has now written several albums’ worth of new works for this ensemble. In 2019, I was extremely fortunate to have the opportunity for one of my own compositions to be recorded by Salukat.

On my first listening to Alit’s 31-minute 2012 work ‘Genetik’ for Salukat, I immediately recognised his exceptional qualities as a composer. Upon each successive listening, new and clever nuances became apparent and its expressive power still strikes me. ‘Genetik’ is significant in many aspects, and I have formed connections with it as a composer, performer and researcher. It is ripe for analysis, discussion and learning, and until now has not been explored in detail, despite its importance in Balinese musical development and also its interest to scholars. To be able to understand and appreciate Alit’s work, a number of background topics must first be addressed.
1. INTRODUCTION

Bali has many rich and diverse musical traditions and styles, ranging from sacred temple music to extravagant contemporary ‘Kreasi Baru Gong Kebyar’ productions, now an institution at the annual Arts Festival (*Pesta Kesenian Bali*, or PKB). However, some composers are exploring approaches beyond those typical of the 20th century. One such composer is Dewa Ketut Alit (b. 1973), who is pioneering this change through his innovative music played on new gamelan instruments of his own devising, by his equally innovative ensemble, Gamelan Salukat.

Between teaching gamelan overseas and managing Salukat, Alit is constantly rethinking how music can be created, performed and perceived in his efforts to keep Balinese music “the master of its own house” (Alit, 2012, 1). Alit seeks to disentangle music from religion, eschewing the notion that Balinese gamelan music has sustained itself because of its importance to the predominant religion in Bali (Agama Hindu Bali). Alit’s key aim is to give gamelan music new meaning by creating a new context for it as “art music”, allowing it to sustain itself in broader contexts.

Genetik (2012) is an experimental work that is intended to be appreciated from a purely aesthetic viewpoint, and in many ways it does not adhere to Balinese traditional musical practice, which is an oral tradition. Possibly the most significant way in which it breaks from tradition is that it is notated. Naturally, a piece created without notation and then transmitted orally undergoes a fundamentally different creative process and will undergo change in the transmission process. The act of notation characteristically involves considerable forethought. This allows the composer’s exact intentions to remain clear beyond their lifetime, but crucially shifts the priorities of the music’s process of creation.

A particular way in which notation has influenced Genetik’s construction is that it has been notated in separate instrumental parts. The fundamental difference between this and traditional gamelan creative practice is that, traditionally, parts are not independent but interdependent—normally a whole is created through a generative process from a core structure. In the case of Genetik, material components are modular and can be lifted and combined with any other part to create a new whole. Given this important difference, let us now construct a specific methodology. I encourage readers who have not yet listened to Genetik to do so¹, as it will give important context to the forthcoming discussions.

¹ [https://www.dropbox.com/s/qhm74vqbfa351e/Genetic%20CD%20audio.m4a?dl=0](https://www.dropbox.com/s/qhm74vqbfa351e/Genetic%20CD%20audio.m4a?dl=0)
1.1 Aims and objectives

The major aim of this thesis is to offer some insight into the many unique facets of Alit’s composition ‘Genetik’. This will be achieved through an analysis of the work accompanied by a full transcription. Through my analysis, I will reveal aspects of the new musical language that Alit has been creating and continues to develop, thus contributing to the ongoing body of research into contemporary Balinese music. As mentioned earlier, Genetik is a contemporary piece that both breaks with and develops traditional forms. Thus, a further significance of the following documentation of Alit’s breakaway from traditional models is that it responds to Stephen Blum’s critique of the stereotype of “‘non-Western’ composers as ‘prisoners of tradition’” and answers his call for “more discussion of how contemporary composers and performers (in all parts of the world) understand themselves as interrogating traditions” (Blum in Roeder and Tenzer, 2011, 386).

1.1.1 Previous analytical studies of Alit’s music

While Alit is referenced in many ethnographic accounts of contemporary Balinese musical practice, there are only four analytically focused papers, one of which allows for only a superficial understanding of his music. Vitale’s 2002 article successfully blends ethnography with analysis and specifically discusses ‘Geregel’ (2000), one of Alit’s compositions for semaradana instruments. Vitale does make Alit’s conceptions clear but tries too hard to fit the work into existing Balinese models, for example the faint structural resemblance to kawitan-bapang-pengecet sectional paradigms, despite Alit’s renunciation of such models. Additionally, while he analyses modal changes using Balinese terminology, his prioritisation of pitch as a structural organiser appears to be a hangover from Western analysis. In Vitale’s defence, however, at the time of Geregel’s creation (about 20 years ago), Alit’s distinctive compositional practice was yet to be established, and it does thus conform more closely to contemporary paradigms from the late 20th century.

Following this, Andrew McGraw (2005) takes a close look at ‘Pengastung Kara’, a less radical work by Alit from around the same time. McGraw’s analysis places this work as the most conventional piece in a line-up of seven, and like Vitale, compares the piece with conventional archetypes. After that, Genetik was discussed in Peter Steele’s “Balinese Hybridities” (2013). In this paper he does well to orient Alit’s aims and goals with Genetik, but this paper was written before a recording of Genetik was made, thus preventing a detailed
analysis. Since then, Alit’s more recent work has been summarised in Tenzer’s 2018 paper on a composition from 2016/17.

The present paper therefore serves as an intermediary account of Alit’s music, between the earlier semaradana (see glossary or following chapter) work examined in Vitale 2002 and McGraw 2005 and the entirely new tuning system that Tenzer 2018 looks at. It picks up from the cursory glance at Genetik by Steele in 2013, providing a more complete view of the work in light of its recording on CD, making a close analysis more accessible.

I will analyse Genetik both by aligning my analytical priorities with those of the composer’s conceptions of Genetik’s structures in order to authentically convey them, as well as by offering alternative perspectives, which will be my own subjective interpretations. Hopefully a sensitive combination of both will allow a useful unpacking of how the piece works. To reveal Genetik’s innovative elements, some comparison to traditional models will be necessary, and the following chapter is intended to assist readers not familiar with the fundamental cultural and technical aspects of Balinese gamelan music to better appreciate the nature and extent of Alit’s compositional innovation.

1.2 Methodology

The two main research tools used in this thesis are transcription and analysis. This section discusses how these two methods have been used and treated in ethnomusicology in recent times.

1.2.1 Notational process

Notation has been controversial in ethnomusicology. The primary concern has been, as with analysis, the authentic representation of music from the perspective of the musicians for whom the music is endemic. Western staff notation has often been criticised for prioritising certain musical elements over others, and for not being able to accurately convey all aspects of the music. With gamelan music for example, a factor that is especially difficult to represent is tuning (see the next chapter for an explanation of tuning systems), which is far from consistent across Bali, rendering different performances of the same piece quite different in perceived character.

Roeder and Tenzer (2012) present an analytical study of Balinese gong kebyar repertoire where they suggest that notation can offer perceptions of the music that are otherwise inaccessible to both Western and Balinese musicians, listeners, and appreciators.
However, their own comparison of their separately made transcriptions reveals that a transcription is strongly limited by perception, both in terms of what is possible to be perceived as well as what a transcriber’s training, expertise and understanding allows them to perceive. They conclude that the most useful transcription and analytical methods are achieved through compromise, one that takes into account Balinese conceptions, acknowledges aspects that are not fixed in performance (but are conceptually fixed through the act of notation), while successfully revealing nuanced experiences that might not be possible through listening alone.

To reveal such nuances as well as the larger structure and design in ‘Genetik’ more clearly, I have transcribed it (see Appendix). Roeder and Tenzer’s paper discusses ‘Gabor’, a piece that lies in the Balinese oral tradition and as such was not notated in any form prior to their paper. Additionally, Gabor has flexible elements and as it is part of the regular repertoires of many ensembles around Bali, there are many recordings that have appreciable differences. Genetik differs from Gabor in a few important ways: it was originally composed with notation, it was written for a particular set of instruments unique in Bali, and while it has been performed on multiple occasions, it also boasts a definitive high-quality CD recording. Now that these instruments have been retuned and no longer exist in any recognisable form, a new set would have to be forged for the piece to be performed again, thus the CD will likely be the only form in which Genetik continues to be heard.

Given these important differences, the act of transcription in this instance obviates some of these issues. Alit’s own handwritten cipher notation has been an invaluable resource in clarifying elements that are either very difficult or impossible to perceive from the recording. For example, Fig.1.1 shows an excerpt from Alit’s score where there are four simultaneous interlocking parts. Due to their speed and timbral complexity it was nearly impossible to distinguish from the CD alone that there were in fact four parts, let alone how the parts were divided between players.

Fig.1.1: Excerpt from Alit’s notation of Genetik, showing four simultaneous interlocking reong parts.
However, on closer scrutiny, it quickly became apparent that there were a few discrepancies between the recording and the score, which were either introduced by the composer in rehearsal or through the performance practice of the musicians. Thus, a compromise has been made between the score and CD recording: wherever possible, my notation has been changed to reflect the CD, which represents the most recent and widespread form of the work (to my knowledge there exist only three copies of the score, Alit’s personal copy, one in the MIT Library in Boston, and the one in my possession used to create my transcription).

A sustained criticism of transcription, however, is that it cannot represent the entire experience of a piece of music. Even in the Western canon, the written score was never really intended for that purpose, rather it initially functioned as a memory aid, and then as a set of instructions to facilitate performance. However, it has since also become a means to preserve music through documentation and analyse it through visual representation. My transcription aims more at the latter—it will allow Western audiences and scholars to appreciate the piece through notation’s ability to communicate to this particular audience. But it is important to remember that it fails to represent some of the highly complex sonic phenomena that are a part of the experience of this piece. To Alit, even the CD recording fails to capture all of the psychoacoustic effects created by the instruments as a result of their tuning when performed live. As I personally did not experience the work live before Alit retuned the instruments, I am not able to comment on this. However, it seems that many of these aspects are incidental, and do not have a significant place in this analytical account.

1.2.2 Analysis

What is analysis? Contrasted with synthesis, analysis is the breaking down of something into its constituent components, usually for the purpose of comprehensive consideration. How does this take shape in the field of music, specifically the consideration of non-western musics?

John Roeder summarises the analytical approaches taken by the writers of “Analytical Studies in World Music” (2006):

“going beyond an inventory of generic technical features, contributors highlighted the music’s individuality, focusing on distinctive ways of shaping time. ... To scholars it exemplified how music theory more broadly constructed (not as a codification of Western harmonic practice, but as symbolic systems for conveying musical knowledge) can serve ethnomusicology’s consideration of
music in culture, by enabling the description and comparison of sound patterns, and of the cognitive schemas that shape how they are heard.” (Roeder and Tenzer, 2011, 3)

Many of the subjects discussed in “Analytical Studies in World Music” are “traditional” music styles, and so key elements must be generalised to fit a discussion of contemporary music. One key element in this description of analysis is the idea of “ways of shaping time”. The concept of time-shaping places musical structure as the highest priority both in the creation and analysis of music. Crucially, this shifts the priorities away from pitch, which in western music often takes precedence. Thus, in the context of documenting innovative musical practice, modelling my analysis with time-shaping in mind perhaps allows it to be more closely aligned with the priorities of the composer, especially one who does not share my western background.

Cultural sensitivity is another crucial consideration, and Guck warns of our unwitting bias:

“Analyses necessarily bear the traces of the personal sensibilities, experiences, and inclinations of their authors ... At the same time, analysts use the vocabularies, concepts and methods we’ve learnt or chosen. Our personal inclinations and commitments shade into our interpersonal and cultural backgrounds and commitments” (Guck, 2006, 197):

Western analysts have often faced criticism for their use of Western-leaning methodologies. For example, as Peter Steele (2013) helpfully summarises:

“Andrew McGraw critiques Michael Tenzer’s structuralist analysis of Balinese melody for reinforcing Eurocentric paradigms of musical thought ... McGraw strives for an authenticity ... towards the ways in which Balinese musicians think.” (Steele, 2013, 28)

McGraw’s criticism is certainly important for understanding how more traditional, conventional gamelan music works. However, as Genetik breaks many conventions regarding the basic construction of Balinese music, is notated, and is influenced by Western thought, it follows that it can be treated differently, and approached with a degree of Western perspective.

Another key point is that through analysis, music can be compared in new ways. Although comparative methods fell out of fashion in ethnomusicology long ago, Roeder suggests that they still have some utility (2011). Much of Tenzer’s recent works view comparative methods in a new light, proposing that comparative analysis of time transformation can “integrate diverse musical perspectives ... [and create] new experiences of music” in a contemporary, cross-cultural world (Tenzer, 2013).
The following chapter intends to situate Alit’s work within its social and musical contexts and provide readers not familiar with Balinese music with enough background to understand the comparative analysis which follows. While Alit’s music is a serious player in global trends of cross-cultural exploration in music, Tenzer (2018) notes that “though now experienced with Western instrumentation and notation, Alit’s medium remains the gamelan just as the piano was Chopin’s”. It is this important to recognise Alit’s innovative compositional practice and the development of his ensemble—Gamelan Salukat—as a consequence of his Balinese cultural origins.

2.1 Music in Bali

As a result of the inheritance of performing arts traditions from Java followed by the Hindu incursion and subsequent relative isolation for almost four centuries until the Dutch colonisation of northern Bali in the 1840s, Bali has evolved quite differently from the rest of Indonesia. Music has thus had a long history of “assimilation and combination” (Tenzer, 2000), but has nonetheless developed many unique and distinctive traditions.

2.1.1 A brief introduction to Balinese gamelan

To summarise the distinctive features of Balinese gamelan music, below are two accounts of it. McPhee was one of the earliest researchers of Balinese music, and noted the particularity of it, while Tenzer, a more recent researcher gives an overall impression.

The Balinese recordings in particular had a polyrhythmic complexity, an animation and metallic shimmer, like nothing I had ever heard. (McPhee, 1966, xiii)

... a splendid aural feast in the sounds of gamelan. Emanating perpetually from communities all over the island of Bali, its sonorities sail over the ricefields ... showering the air with brilliant cascades of metallic sound, lonely whispering melodies, grandiose and clangourous marches, virtuosic rhythms... (Tenzer, 2011, 14)

Both descriptions highlight the metallic sound created by the distinctive bronze percussion instruments found in most Balinese gamelan ensembles. As well as bronze, there are also bamboo percussion instruments, bamboo flutes and drums—all of which have different performative contexts, instrumental combinations and repertoires, since the

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2 Beginning in the late 15th century with the migration into Bali of the Javanese Majapahit Buddhist-Hindu rulers and their entire courts (Barth, 1993, 18)
Balinese conception of gamelan is complicated - “the word gamelan could mean an orchestra of some forty players or a small ensemble of four or five” (McPhee, 1966).

There is a particular hierarchy to the orchestration and texture of conventional gamelan music that Tenzer describes as being “most efficiently characterized as heterophonic, with rhythmically and registrally stratified orchestral layers that align on the same scale tone at regular metric accents” (2018). This results in an inverted pyramid, where slow moving core melodies are progressively elaborated in faster mensural relationships at each higher register. Commonly, the highest pitch layer displays the uniquely Balinese language of interlocking parts—called kotekan—a composite cross-rhythmic layer of highly nuanced melodic elaboration, joining the dots between primary melodic tones (see Fig.2.1).

![Fig.2.1: The pitch/speed textural hierarchy of Balinese gamelan. (Vitale, 1990)](image)

McPhee (1966) noted the “unbelievable” musical activity on the island in the 1930s, seen both in the number of active ensembles, and the diversity of musical styles that those ensembles played. Gamelan still retains a large and important place in Balinese culture, but now faces new challenges of growing globalisation, modernisation, institutionalisation, mass tourism, and younger generations losing interest in their own culture.

### 2.1.2 The bronze gamelan lineage

Gamelan Salukat (Dewa Alit’s new ensemble) is a large bronze ensemble, so the development of bronze ensembles (gamelan krawang) in particular warrants discussion. Figure 2.2 shows a number of important ensembles and their relative historical influence on each other, in terms of both their physical development and the transfer of repertoires and other functions. There is not much known specifically about the tua period, where myths and

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3 Since beginning to explore this music, I have noticed in passing that the resultant textural shape of the link between pitch and speed resembles the shape of the harmonic series.

4 A poem by Noel Coward who visited in the 1930s jokingly confirms this: “As I mentioned this morning to Charlie, there is far too much music in Bali... The whole thing’s a little too clever, and there’s too much artistic endeavour.”
Legends about the origins and development of *gamelan* instruments create a hazy picture. Additionally, it must be noted that due to the huge ravines that divided the island until quite recently, some more localised developments occurred without the potential to become widespread (Tenzer, 2011, 26).

One general trend to note is that ensembles evolved from 7-tone tunings into a preference for particular 5-tone tunings, but this is now gradually reverting back to heptatonicism. Selonding is an anomaly in that it is made of iron (not bronze), has unknown origins, and in terms of instrument construction, bears only faint resemblance to other ensembles. The 7-tone instruments of *gong luang* most likely came from Java (Sudirana, 2013, 80) and the later 5-tone *gong gede* was adapted from this (Herbst, 2009, 14). Ancient Javanese, Hindu and native Balinese dramas were told through *gamelan gambuh*, an ensemble characterised by long, deep flutes which “has had a profound influence on every style that has followed” (Tenzer, 1985, 12). In the *madya* period, courts and royal households privately sponsored players of the courtly *semar pegulingan* ensembles, who reinvigorated *gambuh* repertoire. A few factors led to the development of the now ubiquitous 5-tone *gong kebyar* ensembles, including the breakdown of feudal rule following the establishment of Dutch colonial administration, and the democratisation of the arts as a result of both of these influences (Herbst, 2009, 7). Gong kebyar took much from the repertoires of *gong gede* and

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**Fig.2.2: Evolution of gamelan ensembles in Bali. (Drawn from McPhee, 1966; Tenzer 2011; Sudirana, 2013; Watson, 2016)**
gamelan pelegongan (Herbst, 2009, 17). This early 20th century period was marked by great change and experimentation, and today most village communities own at least one gong kebyar for both temple rituals and entertainment.

McPhee “critiques the emerging kebyar genre” as being “a gradual process of degradation” (Steele, 2013, 51). This erosion took place through both the loss of instruments (many semar pegulingan ensembles were melted down to create kebyar instruments) and repertoire, the latter through either the forgetting of older compositions or their ‘kebyarification’ (Herbst, 2009, 4). Thus, ISI5 (Institute of the Arts, Indonesia) Denpasar was created in 1967 in part to help preserve older ensembles and their repertoires. However, the hegemony of having only one institution to serve this function has inevitably decreased local diversity, an issue still being debated (Tenzer, 2011, 30).

Gamelan Gong Semaradana is a recent innovation—a set of hybrid instruments allowing for both the preservation of older styles and repertories and the continuance of the ever-popular kebyar repertoire, continuing the history of “assimilation and combination”. Gamelan Salukat is the next iteration in this trend of returning to 7-tone tunings, which we will now look at in closer detail.

2.1.3 Tuning and scales

One factor that has not yet become fully standardised as a result of centralisation in Bali is tuning. Nowhere on the island is there a tuning benchmark similar to A=440Hz in the West. Although over some centuries different styles have become apparent, each gamelan maker usually has their own distinctive tastes, as they tune by ear to their preferred “feeling”. Although there are some regional trends, gong-smiths living right next door to each other will likely have different nuanced preferences.

Bali’s modal system is derived from a 7-tone tuning system (for two examples, see Fig.2.3&2.4). Saih pitu (meaning set of seven, inherited from Javanese Pelog), is a parent scale from which pentatonic modal subsets are generated.

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5 ISI has had several name changes—it was first called ASTI, then STSI now ISI.
Fig. 2.3: Saih pitu from Krobokan village (McPhee, 1966, 41)

Fig. 2.4: Saih pitu of the Semaradana ensemble, Sanggar Çudamani (Vitale, 2002, 11)

While these two charts\(^6\) both start on a note quite close to C#, their relative intervallic sequence is considerably contrasting. To navigate the wide range of tunings and the 7-tone landscape, a pentatonic solfege is used.

The ding-dong-deng-dung-dang solfege is universally known and used in Bali. It provides a clear sense of orientation within the mode, and an unambiguous means of communication between musicians. Any musician can convey melodies to another with near perfect accuracy, no matter how much variation might exist between their respective gamelan tunings (Vitale, 2002, 61)

To create the pentatonic modal subsets, the process is as follows - from any given starting note of the heptatonic parent scale, select the next two pitches, skip one, then select the next two pitches, skip one, and then the octave is reached. Theoretically, seven different modes can be created through this process on each of the seven pitches of saih pitu (see Fig.2.5). In the diagram, solfege syllables are abbreviated to their vowels\(^7\) (e.g. ding is ‘i’), and blank squares indicate a pitch not used in that mode. Additionally, where all seven tones are used melodically, musicians use diphthongs to refer to the two pitches skipped in each mode, e.g. between deng and dung is deung. Alit used this system both to notate ‘Genetik’ in cipher notation and to communicate it to his musicians (who mostly do not read notation).

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\(^6\) The two charts were chosen to facilitate comparison as well as to illustrate tuning trends.

\(^7\) The Aksara Bali vowel diacritics seen in Fig.2.5, which are used by Alit and others to notate music also communicate only the vowel, not the full word as spoken by musicians.
Of these seven modes, only three are commonly heard in traditional repertoires - *selisir*, *tembung*, and *sunaren* (listed in order of average frequency), and of these three, *selisir* is by far the most common, as on the instruments of the prevalent *kebyar* ensemble this is the only mode available. The two ‘slendro’ modes are named thus due to their intervallic similarity to the separate tuning system used for *gender wayang* and *angklung* ensembles. The final two modes in the above table are theoretical extensions of the generation process and have no universal naming conventions. Dewa Alit’s use of the names *wargasari* and *kartika* is out of reverence for the ancient *gong luang* ensembles that sometimes use this nomenclature.

The courtly *semar pegulingan* ensembles mentioned before derived much of their repertoire from the melodies of *gambuh*, which primarily used the three most common modes (*selisir*, *tembung* and *sunaren*). Given that its repertoire favoured particular modes, and some were used infrequently, the development of *gong gedé* and *gong kebyar* instruments saw the subtraction of the infrequently used pitches (and keys) in favour of the more commonly used ones, especially the notes of the now ubiquitous *selisir*. This meant that the required pitches were on adjacent keys of the instruments, thus increasing ease of playing by obviating the need to jump over keys not in the mode, and thereby compounding the prevalence of this mode in the repertoire.

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8 Some *gong luang* musicians who use these names might not be referring to the same set of pitches, as there are wide regional differences in terminology. One thing that is common between two studies of *gong luang* (McPhee, 1966 on the *gong luang* in Ampuan; and Sudirana, 2013 on the *gong luang* in Seseh) and Alit’s terminology is that *kartika* is built on the 7th degree of the parent scale. However, the tunings of *saih pitu* in *gong luang* and Gamelan Salukat are quite different, so comparison is moot.
To facilitate the continuance and renewal of older repertoires, the aforementioned gong semaradana hybrid instruments were developed. The lower octave of a gangsa⁹ semaradana (12-keyed metallophone in a semaradana ensemble) is identical to that of a 10-keyed gangs kebyar, while the upper octave has two extra keys, allowing for the full saih pitu scale to be played in a limited one-octave range (see Fig.2.6).

![Diagram](image)

**Fig.2.6: The progression from 5-tone gradually back to 7-tone. Note that pitch names are closest in Western pitch to Gamelan Salukat on the recording of ‘Genetik, and identical pitches are shown on all three instruments for ease of comparison.**

As seen in the diagram, Salukat fully returns to 7-tone tuning through a two-note addition to Semaradana instruments. Alit initially experimented by expanding the range of the reong and trompong of Gamelan Čudamani, the semaradana ensemble of which he was formerly a member. Applying this to all the instruments was an obvious next step and was one of the motivations for creating Gamelan Salukat. One consequence of this pitch expansion is that seven-tone melodies are now not bound by a one-octave constraint, resulting in freer contours. Having established the basis for the development of Gamelan Salukat’s instruments, I will now widen the scope to contextualise Alit’s music within contemporary Balinese culture.

### 2.2 Dewa Alit

Dewa Alit is a contemporary Balinese composer (b. 1973) who now also composes for Western ensembles, and teaches gamelan overseas in between running his own gamelan ensemble ‘Gamelan Salukat’, based in Pengosekan village, Ubud, Bali.

#### 2.2.1 Alit’s perspective on Balinese culture

Dewa Alit sees Balinese culture from the inside out, and vice versa. For many years now he has travelled overseas to teach and perform gamelan music and has become acquainted with Western perspectives on gamelan. Although he appreciates his island’s

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⁹ **gangsa** is a generic name for the upper register metallophones that typically play melodic elaborations in bronze gamelan ensembles. See glossary.
impressive and distinctive cultural heritage, he sees himself as a force of change, attempting to break the ‘prisoner of tradition’ stereotype (Blum in Tenzer, 2011, 386).

In my interviews with him, Alit frequently uses the phrase “music in packets”. He says that since tourism has become so big in Bali, gamelan groups have tailored their performances to the interests of foreign tourists, creating a packaged “product” of gamelan music. However, he admits that many Balinese musicians depend on selling their culture, ironically creating an imperative to maintain it.

Bali is extremely lucky to have a form of traditional gamelan music of such depth and meaning. This cultural wealth begs to be well-cared for and is foundational to the future sustainability of traditional music. It is part of our cultural design that gives Bali its unique reputation. Cultural preservationists must be aware that this does not happen on its own. It is born of a lengthy process from generation to generation ... However, ... with “living traditions” there is an inevitable contradiction. Gamelan is only considered as a musical medium, in severely limited circumstances. It is bound to the idea of “living tradition.” Rules, which at root are merely guidelines, have come to frame composition of tabuh. ... If we, as Balinese grow apathetic towards the core issues involved in the development of our own artistic forms, then should we just hope that non-Balinese will take care of that which we have forgotten? (Alit, 2012)

With the imperative to preserve culture in this way comes many limiting factors, and Alit is critical of these limitations. He appears to be implicitly critical of the presence of collaborative artistic projects involving gamelan music created and performed by non-Balinese. He encourages Balinese musicians to be innovative, and leads the charge himself, through the creation and presentation of works like Genetik with purely aesthetic intent. It may be some time before this new context for gamelan music catches on. Alit now runs a concert series at the venue Bentara Budaya Bali, which is becoming an important performance space for many artistic projects from across the island. From my own experience attending Salukat’s concerts there, the audiences are still small, but they are there and they are growing.

2.2.2 Aims with Gamelan Salukat

Alit sees himself as one of the triggers that ‘future sustainability’ requires. He does this of course by composing new works, but also by creating an environment where young

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10 Translated by Peter Steele, see the appendix of Steele, 2013.
11 Desa Ketewel, Kecamatan Sukawati, Kabupaten Gianyar.
musicians can express themselves in new ways. Gamelan Salukat is his vessel for creating these works.

Balinese gamelan music ... needs to be ever-changing and without borders. This mission has motivated me to design and build Gamelan Salukat and form a sekehe (community club) to perform new music on these instruments. This strategy has enabled me to more freely realize new musical ideas in a strongly traditional environment. It is a situation analogous to contemporary Bali itself. This gives my work meaning not only because it retains a traditional identity. Much more importantly, it empowers and positions gamelan music to be the “master of its own house” until it can give birth to a musical lifestyle that is resilient against the increasingly pervasive onslaught of global capitalism. (Alit, 2012)

As mentioned before, a motivating factor for the creation of Gamelan Salukat was the creation of expanded 7-tone instruments. Since the composition of ‘Genetik’ in 2011/12 (and hence beyond the scope of this paper), Alit has retuned his instruments to a radically non-Balinese tuning (see Tenzer, 2018).

Salukat’s musicians have developed many new performance techniques to enable them to play his music. For example, using the ding-dong solfege is difficult with the extended range (and now unfamiliar tuning) of the new instruments and so the musicians primarily use key numbers to communicate with each other. Vitale specifies that Bali’s solfege “provides a clear orientation within the mode” (2002), whereas the various free heptatonic melodies in ‘Genetik’ lie outside the pentatonic territory in which the solfege is best suited. Alit has noted the challenges of working outside the pentatonic realm that he and his musicians are familiar with, due to the necessity of being able to sing melodies in their learning and performance practice, but more fundamentally, to the fact that pentatonism is a core part of the way they conceive of music generally.

“I just imagined the melody [when I was composing it]. The sound wasn’t clear to me in my ear. And then I just taught it to them (the musicians), even I got confused. ... the musicians - they just remembered the note, the key. It’s very hard for them to memorize at first because they couldn’t understand where the melody was going yet. And the sound is new. Then later they can hear the melody.” (Alit, pers. comm. 2019)

This experimentation has attracted many young gamelan musicians from a wider locale who are open to the idea. They are all busy young people seeking work in modern-day Bali as well as fulfilling their obligations to Bali’s traditional customs (adat). This is the new generation of change he wishes to see come into being—where there is space for new music, and Balinese people adapt themselves to this new way of life. He has also expanded these young musicians’ opportunities to include CD recording and international touring and
collaboration, e.g. with New York ensemble ‘Bang on a Can’. This has allowed the ensemble to fit into the modern era whilst retaining its cultural identity in a sustainable way.

2.2.3 Aims with ‘Genetik’

The name ‘Genetik’ arises from Alit’s inspiration for the piece— the science of genetics and evolution. The quote below from his essay about ‘Genetik’ explains this conceptual approach, which is how he imbues his music with artistic intent and meaning.

The idea began through my own intellectual explorations concerning the relationship and influence of genetics in creating natural and sustainable change from generation to generation. Something considered different from or even destructive towards the existing conditions (DNA, sound, or the source of ideas) may not necessarily be detrimental. In fact, such differences may become more advantageous when put into contact with other ways of life and may accidentally yet serendipitously connect immediately with this new context. … The forms that support new life are often first considered destructive, but then later revolutionize existing frameworks with new forms and attitudes in a process of transformation. (Alit, 2012)

While Genetik does explore many new forms, it also expands on existing structures in a way that invites a listener in, while also opening them up to new experiences. For Alit, it is not a matter of throwing out tradition, but adding to it in a meaningful way. Within Genetik this concept also manifests literally, with visual references to the helical shape of DNA (Fig.2.7).

![Fig.2.7 The Jublag and Jegog melody in ‘Genetik’ at 10’40”-50” (bb.32-35) as seen in Sonic Visualiser, revealing Alit’s visual representation of DNA’s helical shape.](image)

For Alit, this way of conceptualising new forms and attitudes has been a helpful framework that continues beyond Genetik.
3. ANALYSIS of ‘GENETIK’

Using excerpts of my transcription of Genetik, the work will be broken down into structure, pitch, rhythm and texture to reveal its inner workings.

3.1 Structure

An important structural feature of the work is its use of “material”. Inspired by the way that the four nucleotides G, T, C, and A can be assembled in countless combinations to create the organic building blocks of different cellular components, Alit’s blocks of material are re-configured in many different ways, each with a different character or orchestrational effect. This unconstrained reconfiguration of modular material is new to Balinese gamelan music.

First, let us look at the large-scale structure over the course of the 31 minutes of the piece (see Fig.3.1). Alit refers to each of the five sections of the work as a “Gen” (meaning gene), so Gen I, Gen II (using roman numerals), and so on to refer to the large formal sections of the piece. For the purposes of this analysis, the word section will only be used in reference to these. Within these sections are subsections, which are given Hindu-Arabic numerals. Within each subsection are the material modules, which will be referred to using ABC lettering. One important thing to note is that Gen I and Gen II share the same material, whereas the material for each of the remaining sections is distinct and contained only within that section.

![Fig.3.1: The five formal sections of Genetik with a waveform diagram illustrating its dynamic shape and density.](image)

Most of Gen I (composed in Singapore, April 2011) is extremely sparse, with tempi driven by the musicians’ synchronised breathing rates, and explores the fundamental resonances of the instruments by using noretn strokes. Gen II rearranges the material from

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12 Alit uses lettering to refer to the material in his score but uses the same lettering in each section, although the material represented by a particular letter differs from section to section. For clarity I will use different letters where the material is different.

13 See glossary for explanation.
Gen I through various orchestrational processes. Gen III (composed in Singapore/Bali, April 2011) is highly energetic, featuring fast interlocking kotekan-like figurations and some smaller scale orchestrational effects using modular material arrangements. Gen IV (composed in Bali, May 2011) is characterised by polyphonic interweaving of multi-modal melodies, and Gen V ties the work off with a free 7-tone melody and percussive decorations provided by the gangsas (metallophones) each playing with two mallets.

This 5-part structure does not bear much resemblance to traditional tripartite models. Nevertheless, in terms of character, and with a stretch of the imagination, the sparse resonances of Gen I could be likened to the fragmented pauses of a kebyar opening. Gen III has a resolute feeling and a fast, regular tempo that could be argued to resemble a bapang, while the slow long-form melodies in Gen IV do remind me of the character of a pengawak, and the “relaxed tunefulness” (Vitale, 2002) of a pengecet can be felt in Gen V. However, Alit has mentioned to me that he “does not think that way” (pers. comm., 2019), and thus, the above comparison does not offer a culturally sensitive way to appreciate the form and conception of the work. Rather, each section could be felt more independently, as each has different structural concepts and other distinguishing elements, as will be illustrated below. I will now break down the structure of each section into its subsections and show the material layouts.

3.1.1 Gen I

As mentioned before, the material from Gen I and Gen II is shared; Gen I introduces the three material modules in sequence and Gen II develops these through modular reassembly until reaching a climax. The first two subsections of Gen I (twice through the A material, the second time with gong) moves at the tempo of the musicians’ breath. The players allow their upper bodies to rise and fall with their breath, visually syncing up at this relatively glacial tempo, which on the recording comes across as almost ametric. Following this very serene opening, the denser and faster B and C material is introduced. These subsections are each 6 bars of 15 beats long. The following diagram illustrates the structure.

<table>
<thead>
<tr>
<th>Subsection</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gangsas</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Reyong</td>
<td>-</td>
<td>-</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Jb+Jg</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Gong</td>
<td>-</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
</tbody>
</table>

*Fig.3.2: Gen I structure bb.1-19.*
3.1.2 Gen II

From bar 26, using the material lettering from Gen I, we can map out the material modules to reveal that Alit has rearranged them as a way of developing the section and achieving textural variety (see Fig.3.3). Each column below is 6 bars of 15 beats, as in Gen I. Looking at the first 3 columns of Fig.3.3, we can see he has arranged the kantilan and pemade parts of these first three metered subsections of Gen II in a way that yields three unique combinations of the instrumental parts (Kt1 with Pd1, Kt1 with Pd2, Kt2 with Pd2), creating orchestral variety. While not exhaustive, it is methodical. At column 4, the reong parts are then heard on their own, the kentuk (timekeeping instrument) is introduced, and the tempo becomes more resolute. From here the intensity builds in volume, tempo and texture, peaking in the 8th subsection, where the gangsas begin to use a technique called gores (equivalent to a glissando\(^\text{14}\)), creating a rich, dense sonority for the final climax. This is followed by a short reprise of the slow sonorities of Gen I’s first subsection (not shown below), adding up to a total of 9 subsections in all.

<table>
<thead>
<tr>
<th>Subsection</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tempo (bpm)</td>
<td>120</td>
<td>150</td>
<td>-</td>
<td>160+ktk</td>
<td>-</td>
<td>180</td>
<td>-</td>
</tr>
<tr>
<td>Kantilan 1</td>
<td>B</td>
<td></td>
<td>B</td>
<td></td>
<td></td>
<td>B</td>
<td>C gores</td>
</tr>
<tr>
<td>Kantilan 2</td>
<td></td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Pemade 1</td>
<td></td>
<td></td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Pemade 2</td>
<td>B</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>B</td>
</tr>
<tr>
<td>Reong</td>
<td></td>
<td></td>
<td></td>
<td>B</td>
<td>C</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Jb + Jg</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Gong</td>
<td></td>
<td>A gores</td>
<td>B gores</td>
<td>A gores</td>
<td>A</td>
<td>C</td>
<td>A</td>
</tr>
</tbody>
</table>

*Fig.3.3: Gen II structural matrix beginning b.26-68, or 10:02 of the recording.*

3.1.3 Gen III

After the return to Gen I’s slow opening sonorities, a melody of irregular phrase lengths decorated by fast interlocking parts is introduced (beginning at 17:12 of the recording or bar 74). Using all new material, Gen III has 7 subsections (as demarked in Alit’s score), the

\(^{14}\) See glossary for more detail.
proportions of which relate to the number 8 in some way. Material D has 8 phrases, Material E totals 8 bars of 15/8, and the 5th and 6th subsections add up to 8 bars of 15/4 (see Fig. 3.4). Time signatures of 15 continue to be important in Gen III, a recurring theme from Gen I and II. In terms of crotchet lengths, the subsections have some interesting properties. Material D has a total of 61 crotchet beats. Material E is always played twice, which totals 60 crotchet, making a subsection that is one beat shorter than the D material. Finally, the F and G sections, while quite distinct in terms of material, are both of irregular lengths (C is 75 crotchet, D is 45), which when combined total 120 crotchet.

The framework of the number 60 is the clearest way to appreciate Alit’s design here. Material E has 8 phrases, which he skews one step away from the traditional quadripartite proportions through the use of the 15/8 time signature (totalling 60 beats). Material D twists this even sense of proportion through its irregular phrase lengths that total one beat greater, 61 beats, an effect which may not necessarily be perceived on a first listen. After the first four subsections, the length becomes somewhat predictable, and so Material F serves to stretch this expectation, while Material G contracts it. When looking at these two subsections as a whole, we can see that the division point is off-centre, stretching the square proportions of conventional practice.

Apart from its proportions, this section is driven by a dramatic arc. The first 5 subsections have dynamic ups and downs, generally serving to build impetus. The 6th subsection suddenly drops down to a very soft dynamic but not without retaining a bubbling intensity. In the final subsection, the reprise of Material E creates a climactic point, with the addition of a reong part, as well as the first entry of the kendang (drum).

<table>
<thead>
<tr>
<th>Subsect.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>lengths</td>
<td>61 beats</td>
<td>60 beats</td>
<td>61 beats</td>
<td>61 beats</td>
<td>120 beats</td>
<td>75 beats</td>
<td>45 beats</td>
</tr>
<tr>
<td>Gangsas</td>
<td>D</td>
<td>E</td>
<td>E</td>
<td>-</td>
<td>D</td>
<td>F</td>
<td>G</td>
</tr>
<tr>
<td>Reong</td>
<td>-</td>
<td>-</td>
<td>D</td>
<td>D</td>
<td>F</td>
<td>G</td>
<td>E</td>
</tr>
<tr>
<td>Jb+Jg</td>
<td>D</td>
<td>Holding pattern</td>
<td>D</td>
<td>D</td>
<td>Holding pattern</td>
<td>Holding pattern</td>
<td>Holding pattern</td>
</tr>
<tr>
<td>Gong</td>
<td>D</td>
<td>E</td>
<td>E</td>
<td>D</td>
<td>D</td>
<td>F</td>
<td>G</td>
</tr>
</tbody>
</table>

*Fig. 3.4: Gen III diagram of materials and proportions.*
3.1.4 Gen IV

Gen IV has 5 subsections, each of which is 9 bars of 18/4 at a markedly slower tempo than the previous section. Gen IV develops through its use of texture, interweaving each instrument’s material to create polyphony. Additionally, each instrument is in a different pentatonic mode of Alit’s expanded modal system seen in Fig.2.5. Fig.3.5 shows how Alit has spread out the different material across the instruments. Each column represents 9 bars of 18/4.

<table>
<thead>
<tr>
<th>Subsect.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kantilan</td>
<td>-</td>
<td>H</td>
<td>I</td>
<td>J</td>
<td></td>
</tr>
<tr>
<td>Pemade</td>
<td>-</td>
<td>H</td>
<td>I</td>
<td>J</td>
<td></td>
</tr>
<tr>
<td>Reong</td>
<td>-</td>
<td>H</td>
<td></td>
<td>I</td>
<td>H</td>
</tr>
<tr>
<td>Suling</td>
<td>H</td>
<td>I</td>
<td>H</td>
<td>I</td>
<td>Trans to H</td>
</tr>
<tr>
<td>Jb + Jg</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Kd+Gong</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>H</td>
</tr>
</tbody>
</table>

*Fig.3.5: Gen IV material layout.*

In terms of dramatic architecture, each subsection starts at a low intensity and builds in both tempo and density until the start of the next subsection, which releases and dissipates the energy from the build. Within the shell of this predictable structure as marked by the kendang cycle, the recombination of material modules creates variety in mood and texture. By the 5th subsection, much of the material has become familiar and it comes to a natural conclusion with a feeling of readiness to move on to the final section.

3.1.5 Gen V

Gen V is more irregular in its metric structure than the previous four sections. This whole section is played twice, with increased intensity the second time through. From a macro perspective, it forms something similar to a Western antecedent-consequent shape (see illustration in Fig.3.6), where we hear the seven phrases of Material K, then a partial repeat of the K melody before taking an alternative trajectory to the longer Material L to end the entire composition. The K melody relates to the Jublag part from Material D of Gen III in the sense of its stop-start feeling created by brief silences between melodic phrases.
Many concepts here do not have a close analogue to Balinese conventional structures. In Gen II and IV, the reordering of material modules as an orchestral, dramatic and structural tool is a striking expression of the concept of genetics. Gen III’s proportions explicitly subvert conventional structures, and the resemblance to antecedent-consequent form in Gen V shows influence from Western canonical forms, whilst remaining distinctively unsquare through uneven time signatures and phrase numbers.

3.2 Pitch

This section will discuss the ways in which Alit uses pitch, both in horizontal and vertical terms. This will include his use of modes, the ways he creates melodies, and the kinds of vertical sonorities that are explored in the work.

3.2.1 Use of modes

In Gen IV, Alit assigns each instrument one or more modes. Fig.3.7 shows what modes are played in the five subsections of Gen IV. A few interesting features of modal usage in Gen IV include the fact that Kartika and Selisir are not used at all, and that the textural density and the modal densities are linked, in that both intensify for the duration of the section, and the final two subsections use five modes simultaneously, creating a dense tapestry of modalities. The seven Balinese modes have distinctive characters and contexts (see Vitale, 2002), and would conventionally be heard only one at a time. In Alit’s pieces before Genetik, he experimented with very rapid modal changes and brief periods of overlap between two modes. To Balinese listeners, hearing so many modes at once in Gen IV would be a new experience.
<table>
<thead>
<tr>
<th>Subsect.</th>
<th>1 (2 modes)</th>
<th>2 (4 modes)</th>
<th>3 (4 modes)</th>
<th>4 (5 modes)</th>
<th>5 (5 modes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kantilan</td>
<td>-</td>
<td>Slendro Alit</td>
<td>Slendro Alit</td>
<td>Slendro Alit</td>
<td>Slendro Alit</td>
</tr>
<tr>
<td>Pemade</td>
<td>-</td>
<td>Sunaren</td>
<td>Sunaren</td>
<td>Sunaren</td>
<td>Sunaren</td>
</tr>
<tr>
<td>Reong</td>
<td>-</td>
<td>Slendro Ageng</td>
<td>-</td>
<td>Slendro Ageng</td>
<td>Slendro Ageng</td>
</tr>
<tr>
<td>Suling</td>
<td>Wargasari</td>
<td>Sunaren</td>
<td>Wargasari</td>
<td>Sunaren</td>
<td>*Wargasari</td>
</tr>
<tr>
<td>Jublag</td>
<td>Slendro Ageng</td>
<td>Slendro Ageng</td>
<td>Slendro Ageng</td>
<td>Tembung</td>
<td>Tembung</td>
</tr>
<tr>
<td>Jegogan</td>
<td>Wargasari</td>
<td>Wargasari</td>
<td>Wargasari</td>
<td>Wargasari</td>
<td>Wargasari</td>
</tr>
</tbody>
</table>

*Fig.3.7: Gen IV modal arrangement, bb.143-188. *The asterisk indicates a one-bar modulatory transition back to Wargasari.*

While there are six instruments here, the suling part alternates between Wargasari and Sunaren, which are doubled by other instruments, resulting in five modes simultaneously in subsections 4 and 5. For example, in the first subsection, the suling is in Wargasari with the Pemade for the second subsection.

There are patterns of melodic dialogue between instruments, creating modal conversations and allusions through the different qualities of each mode. One way that Alit links the multiplicity of tonalities is through the Balinese solfege system (see Fig.2.5). Sometimes overlapping phrases played by different instruments will begin on the same solfege syllable of a different mode (see Fig.3.8).

*Fig.3.8: Phrase overlap achieved through parallel solfege syllables at bar 173-4.*

Looking at each instrument in Gen IV separately, modal usage is for the most part similar to conventional use in that they are mostly confined to one mode, and where they do change (Jublag and Suling parts only) this occurs at the beginning of a new subsection (with the exception of the suling modulation in the 5th subsection, which happens within 8 beats).
Vitale’s 2002 paper already notes Alit’s rapid changes between modes. In this respect, Genetik is not a step forward; the innovative feature is the simultaneous layering of multiple modes.

Gen III also uses multiple modes in the core melody of Material D (Fig.3.9). However, here Alit changes mode every two phrases (each bar being a phrase). These rapid changes combined with each phrase using only three notes of the mode masks a clear sense of modality. Further compounding this ambiguous modal use is the fact that the elaborative interlocking parts are not limited to the modes and move freely through all seven notes of saih pitu.

Fig.3.9: Mode changes in the core melody (Jublag part) of Gen III, Material D, b.74.

The core melody (Suling and Jublag parts) of Gen V could also be analysed similarly (see Fig.3.10), although Alit says he didn’t conceive of the melody in this way; rather it was an attempt at using all seven notes equally. This analysis seems somewhat forced—mode changes often happen mid-phrase and the 6th phrase cannot be fully explained using modes.

Fig.3.10: Mode changes in the core melody (Jublag and Suling part) of Gen V, material K.
These particular instances are the only times during the work where modes are used, so for the most part, Alit is not constrained by pentatonicism. In Gen IV, it is for allusive effect, and the other two examples are veiled or quite ambiguous.

### 3.2.2 Melodic formation

As mentioned earlier, Alit uses a two-dimensional view of the double-helix shape of DNA as an inspiration for the shape of his melodies in ‘Genetik’. The first instance of this is in the Jublag and Jegogan parts in the B Material of Gen I. Alit uses the ranges of the instruments to construct the melody. Playing with two panggul (mallets), the Jublag and Jegog players start at their outermost keys and move stepwise towards their centre key and back out at different rates. The Jublag moves every 5 beats. The Jegog lags behind for the first 3 bars, forming an isorhythm with the Jublag. To complete the 6 bars of 15/4 (90 beats), the melodic contour is adapted, as shown in Fig.3.11.

![Fig.3.11: Jublag and Jegog parts, showing the DNA shape created through melodic contour, Material B.](image)

For section C, Alit now realises this flattened helical shape in a more linear way, where there are essentially two melodic strands moving in contrary motion to each other in alternation. In Fig.3.12, the notes played by the upper “voice” are shown in red, the lower voice in blue.
Fig. 3.12: Jublag part in Material C of Gen I/II, revealing the DNA shape created through alternating melodic strands moving in contrary motion.

The next manifestation of this shape is in the two pairs of simultaneous kotekan parts (total of 4 interlocking parts) in Gen III. The overall effect is again created through contrary motion. In Fig.3.13 the red and blue arrows show the general trajectory from the lowest or highest keys of the extended range of Salukat’s gangsas in the two polos parts, and the sangsigh parts interlock appropriately and with empat intervals (see next section). This is also quite significant in that it overlays two strands of kotekan.

Fig. 3.13: Two pairs of kotekan parts moving in contrary motion to create a helical shape.
3.2.3 Vertical pitch relationships

In Balinese convention, apart from the octave, only one other kind of vertical pitch combination is often used. This concept is usually referred to as “empat” (four) or “ngempat” (a verb form of the number four), meaning to play the key 4 keys higher in the mode than the primary melodic note (usually the polos note in kotekan). Due to the scalic system on kebyar instruments, however, this process can generate intervals resembling a Western tritone, 5th, or major 6th. For the Balinese, it seems that the resultant interval is not of importance, rather it is a spatial concept. Alit has taken this concept and applied it in saih pitu, resulting in ‘4ths’ being added to the list of possible sonorities (see Fig.3.14). Additionally, he expanded this concept to include notes three keys lower (see b.76).

![Fig.3.14: Kotekan parts in the first 4 bars of Material D, Gen III, revealing that the sangsih part plays 4 keys higher or lower as well as 3 keys lower than the polos. The sangsih part is indicated in red with stems up.](image)

This expanded system explains a lot of the gangsa sonorities in isolation. For example, at the start of Gen III, the simultaneities in the interlocking parts are all 4 keys higher, except on the full saih pitu instruments, where the resultant intervals are close to Western 4ths. In the third bar however, there are instances of something akin to a Western ‘3rd’ being created by the combination of two keys. There are instances of this occurring in village ensembles (Alit, pers. comm., 2019) playing conventional repertoire, so this is not an entirely unprecedented development, but it is not yet commonplace.

However, this isolated view of one part does not reveal the whole story. As mentioned earlier, each instrumental part is quite independent in terms of pitch. While the system observed in the kotekan part above makes sense on its own, in relation to the Jublag melody played simultaneously many other intervals are not explainable in terms of conventional empat intervals. For example, at the same time as the initial semiquavers in bar 74 (Eb and A, above) the Jublag plays a Bb, the Jegog a D, and all 5 gongs are struck at once. This sonority does not conform to Balinese convention and given that many other examples of this kind can be found in Genetik, it seems that to Alit one pitch can be combined with any other.
3.3 Rhythm

This section aims to break down Alit’s rhythmic vocabulary and durational processes.

3.3.1 Time signatures

As mentioned in section 3.1 of this chapter, the number 15 is significant throughout the work. He treats this number in many different ways. In Gen I, he predominantly breaks this down into 3 groups of 5 beats (indicated by dotted barlines in the score), which is most clearly demarcated by the gong part. However, in the fifth bar of the first section he divides 15 down the middle into 2 halves of 7.5 beats. Once the tempo picks up in Gen II at bar 44 (subsection 5), this divisional concept becomes fully realised (see Fig.3.15). The kentuk part methodically exhausts many of the possible divisions of 15, including some decimal factors. To develop this texture, Alit then adds a second kentuk part in canon with the first part, beginning at the 4th division (bar 47 below). While the kentuk normally serves a timekeeping function, here it serves less to delineate the pulse than to augment the rhythmic fabric.

![Fig.3.15: Kentuk part, Gen II, section 4, bar 44. 6 different divisions of 15.](image)

In Gen III the core melody has a few interesting durational properties. Firstly, it uses a mensurally halved version of the 2nd division pattern from Fig.3.15 (bar 45) as a motivic feature, dividing 15 into 7.5 crotchets (bars 74-77 in Fig.3.16). This could be also seen as two groups of 5, the second group a halving of the first into quavers (see bar 75 below). In the second line Alit now expands the time signature vocabulary to include 13 and 18, contractions and extensions of the still important 15 (see quaver groupings in bars 78-81).

![Fig.3.16: Jublag part, Gen III, Material D](image)
In contrast to the rest of the work, Gen IV has a very consistent, even metre. Each section is 9 bars of 18/4. This much longer beat structure gives room for lots of divisional ambiguity. For example, in bar 156 (see Fig.3.17), the gong marks the larger 18 beat structure, the Jegogan part divides 18 into three 6-beat groups, the pemade divides 18 into 9 x 2-beats, and the Jublag divides 18 into 12 x 1.5. The kantilan part does not divide 18 evenly but uses irregular combinations of 3s and 5s. The effect created by these multiple divisions is a strong sense of anticipation before the moment of convergence where the rhythms finally align. These moments of convergence drive the dramatic arc of Gen IV within each subsection. This style of cross-rhythmic layering has become a trademark of Alit’s style, especially in Tanah Sedang Bicara, the companion work on the CD with Genetik.

Fig.3.17: Different divisions of 18 in bar 156, Gen IV.

3.3.2 Rhythmic effects (diminution, cross-rhythms)

The melody in Gen V features some interesting effects created by juxtaposing two augmented and diminished versions of the same rhythm. In b.185 (see Fig.3.18), Alit uses a minim then a crotchet pattern to create a 2:1 ratio, implying a slow compound meter. In the next bar, he halves these values to a crotchet then a quaver to create a doubly fast compound meter. At the end of each phrase, there is a disruptive final note—mostly a minim (4 quavers), and in later phrases, 5 quavers. The gangsa parts add to this disruption with accented staccato notes then a rest, creating a kind of stop-start dialogue effect supported by the switching between these two mensural layers of compound time.
increased frequency of

In the final climactic subsection of Gen III (beginning at b.130), in the reong part there are two motifs in dialogue with each other. A is primarily a rhythmic motif that uses the rim hit ‘ceng’ and is characterised by groups of 5 quavers, while B is a melodic fragment in slendro alit. The overall effect seen in Fig.3.19 is one of increasing density and this is created by the increased frequency of diminished forms of these two motifs.

At bar 208 (see Fig.3.20), where Material L of Gen V starts, Alit returns to 15/4 and there is another instance of his characteristic cross-rhythmic layering, as well as continued work with division. While the 3s and 5s in some parts (green and orange) divide the bar equally (but naturally come in and out of phase with each other over the course of the bar), other parts use 4, 6 and 7 in various combinations to fill the bar. As mentioned above, this
kind of rhythmic polyphony is one of the trademarks of Alit’s style. In more conventional Balinese music, you could reasonably expect to hear two simultaneous pulse groupings (e.g. groups of 3 semiquavers in kotekan against a foursquare backdrop), but Alit’s level of rhythmic density is a significant stretch of the conventional mould.

Fig.3.20: Layers of different divisions in Gen V, bar 205.

Another expression of this independence can be seen in Gen I, where the rhythmic periodicity reflects the textural stratification of the instruments—an inverted pyramid shape stretched out over a framework of 90-beats (see Fig.3.21). The four independent gangssa parts all align every 15th beat. The Jublag has a slow-moving core melody, with the Jegogan lagging behind (see Fig.3.11), similar to the role it would conventionally take (only playing every other note of the Jublag part). There is a strong sense of tension built through this rhythmic independence which is then released at the point of alignment on beat 90.

Fig.3.21: Periods of cyclic parts in Gen I, bb.7-12.
3.4 Texture and orchestration

As mentioned in chapter 2.1.1, there is a particular hierarchy to the texture and orchestration of conventional gamelan music—"heterophony, with rhythmically and registrally stratified orchestral layers that align on the same scale tone at regular metric accents" (Tenzer, 2018). In notation, this is seen as an inverted pyramid shape, with faster rhythmic values the higher the instrument's pitch. Let us see how Alit either conforms to or subverts this structure. Additionally, we will explore some of his innovative orchestral ideas.

3.4.1 Texture

The third subsection of Gen I (from bb.7-12) does not use kotekan, but rather a new language of interlocking in the gangsa parts based on the technique “noret” (lit. to scratch), which can be likened to a fast grace note on an adjacent key. The four gangsa parts interlock to create a unique composite texture, which seems to function as a substitute for kotekan. Simultaneously, the reong parts have two through-composed, non-cyclic lines, highlighting the reong’s percussive effects. The combination of these two elements creates a busy, mechanical texture.

As mentioned earlier, Gen I features a dense polyphonic style. While previous innovations in Gamelan have opened up the possibility of using two or maybe three countermelodies, Gen IV far exceeds this with as many as five independent layers of melody operating simultaneously, and the drum part adding a 6th layer (see Fig.3.17). However, in Gen IV, there are some interesting instances of ensemble interaction, where Alit integrates parts instead of simply stacking them. For example, the drummers play the same cycle 5 times over, while the other parts switch between up to three different materials (see Fig.3.5). These parts sometimes come into alignment with the drum part, then stray from it, as seen in bb.177-178.
In Fig.3.23, there are 7 instrumental lines, but some pairs overlap or only play in the gaps of the other part. I have grouped parts that are interacting with each other using the same colours and indicated where instruments respond antiphonally to others in their group with arrows. Consequently, there are essentially 4 melodic strands, with the kantilan and pemade dialoguing with each other, as do the Jublag and Jegogan. In the second half of bar 177, the pemade is in close synchrony with the kendang, but then in bar 178, the reong takes over this role. Alit says that this was partly inspired by the way instruments interact and intertwine in the music of *gamelan gambang* and *gong luang*. This idea also leaks into Alit’s orchestration concepts, as revealed in the following section.

### 3.4.2 Orchestration

Recalling Alit’s methodical use of different material combinations in Gen II, Gen III features an orchestration dialogue that systematically uses all possible combinations of orchestral resources. In the first line of Fig.3.22, the kantilan parts are paired with the two higher reong parts, creating a top-heavy timbre, which dialogues with the pemade and lower reong parts. This pairing is swapped halfway through 112, where now the low reong is paired with the high kantilan, and the low pemade with the high reong. This recombination of registers creates a crossover effect that can be seen as an expression of the concepts of genetics.
One final innovative technique can be found in Gen V, where the gangsa players play with two mallets (*dimainkan dengan dua panggul*) in a percussive style similar to reong technique and also using a damping style borrowed from gender wayang. The pemade players’ right hands are instructed to play two notes above the written left-hand note (*tangan kanan dua not ke kanan*) while the kantilan players use their left hands to play two keys below the right. Fig.3.24 shows footage from a rehearsal\(^{15}\) of Gen V showing the player on the right damping with both mallets (*panggul*) as in reong technique, while the player on the left damps with the heels of his hands as in gender technique.

\(^{15}\) Many thanks to Wayne Vitale for providing this footage from a Salukat rehearsal in July 2011.

\(^{16}\) Musicians: LEFT: I Dewa Gede Artayasa, RIGHT: I Putu Prima Putra.
4. CONCLUSION

Genetik represents a significant expansion and development of conventional Balinese gamelan forms, and this analytical account of the work highlights Alit’s innovative practice. Significantly, however, I would assert that a detailed analysis of Genetik reveals that it does not reject traditional forms to such an extent that it might alienate a more conservative listener as it contains strong, singable melodies and other elements that would be familiar to them. I would argue that Alit’s consummate control over musical elements illustrates that he is no ‘prisoner of tradition’, but rather that he is a master of his own Balinese musical identity and not constrained by it. This is evidenced by his expansion of traditional forms, as well as his development of entirely new forms.

I would acknowledge that my analytical methodology is inevitably infused with my own experience, but hopefully Alit’s intentions and concepts come through. In a contemporary cross-cultural world with compositions that traverse traditional east-west boundaries, it follows that analytical methods of such music might also transcend borders and reveal nuances of interest to diverse backgrounds and perspectives.

While the separation of musical elements in Chapter 3 has lent clarity and focus to the analysis, it strikes me that one of the most remarkable aspects of the piece is the way all of its constituent components have been integrated to create a satisfying whole that is much more than the sum of its part and which, as a listening experience, cannot be broken down.

Alit has successfully achieved the goal of imbuing his music with conceptual meaning as a way of opening up new ways to appreciate gamelan music and give it a new context in a rapidly changing Balinese society. He is still ahead of his game, as Tenzer 2018 reveals, but what this analysis offers is a window into the mind of the composer and it is my sincere hope that it will lead others to appreciate his music as much as I do.
5. GLOSSARY

baru - lit. new. Refers to the contemporary period of gamelan music, since kebyar—1915 onwards (Sudirana, 2013, 82).

ceng/byot/byong - see second page of score in appendix for reong percussive effects.

empat - the number 4. In verb form “ngempat”, it refers to the technique of playing the key 4 keys higher than the core melodic note. Also called kempyung.

gangsa - treble metallophone instruments that usually play kotekan in kebyar pieces. Refers to both pemade and kantilan collectively.

gores - lit. scrape. In contrast to noret (see below), gores refers to the playing of many notes (sometimes the entire range of a gangsa) in quick succession, which can be likened to a glissando. Alit also uses gores to instruct the gong player to scrape the face of a large gong with the wooden handle of a panggul.

jegogan/jegog - the deepest metallophone instruments in a krawang ensemble, often playing at the same rate as the gong, using a gapped version of the pokok/core melody.

jublag - also called calung, this tenor range instrument usually plays the pokok.

kantilan - highest octave gangsa.

kawitan-bapang-penget - a common structural format for kreasi baru compositions - see Vitale 2002 for an in-depth description of the characters of each of these sections.

kebyar - lit. to burst open. Refers to the 20th century style of gamelan works characterised by explosive musical gestures such as a sudden, loud full-ensemble chord played at the very beginning of a piece. Can also refer to any section of a piece where such gestures occur. These sections are often very free in tempo and are sudden and unpredictable.

kempli - in kebyar repertoire, this instrument is a time-keeping instrument, serving to keep the ensemble together. In lelambatan repertoire (and some other older styles), it has a colotomic function, playing simultaneously with the gong.

kendang - double-headed drum played horizontally in a player’s lap. See second page of score in the Appendix for playing position and drum strokes.

kentuk - a time-keeping instrument, possibly a recent borrowing from Javanese gamelan (usually called ketuk). (According to Alit, kentuk is a higher pitch than kempli).

kotekan - “Melodic interlocking parts, especially as played by kantilan and pemadé; their composite rhythm characteristically subdivides the beat into four parts.” (Tenzer 2000:452). It is the fastest mensural layer in the conventional heterophonic hierarchy.

krawang - lit. bronze. Gamelan krawang is a general term that refers to ensembles in Bali containing primarily bronze instruments, as distinct from those that contain bamboo instruments (Herbst, 2009, 29). Krawang ensembles may also contain kendang, suling and other instruments that are not made from bronze.

kreasi baru - (also tabuh kreasi baru) lit. “new creation”. Refers to modern compositions, especially those created for PKB (the Bali Arts Festival).
madya - lit. middle. Refers to the middle historical period of Balinese gamelan development.

noret - “To scratch’ as in lighting a match (korét); usually refers to the mallet technique—the physical action rather than the sound itself—of rapidly playing three tones in the same direction as a quasi–glissando, though there are occasionally two–note noret strokes found in the first two sections of Genetik, which in contrast to gores are more like grace notes as they only encompass two notes.

panggul - mallet.

pelog - The term used in Java for the 7-tone scale known in Bali as saih pitu.

pemade - lower octave gangsa.

pokok - the core melody in a Balinese gamelan work, usually played by the calung/jublag, forming the melodic framework from which elaborations such as kotekan are constructed.

reong - often referred to as kettle gong chimes, played in a row by 4 musicians.

semaradana - A seven-tone gamelan devised by I Wayan Beratha in 1986. (McGraw, 2005). It is a hybrid combination of the selisir mode found on gong kebyar instruments and saih pitu. See Page 12 and Fig.2.6.

slendro - Balinese and Javanese term for the five-tone scale found most notably on gender wayang instruments. Slendro is also used to name those pentatonic modes from saih pitu which resemble slendro. Despite the ability to generate slendro-like modes from saih pitu, slendro is said by most musicians to have evolved as a separate tuning system, which approximates an equi-pentatonic tuning.

saih pitu - lit. set of seven. Refers to the seven-tone scale from which the Balinese modal system is derived. In Java this scale is known as pelog.

suling - Indonesian 6-holed end-blown bamboo flute.

tua - lit. old. Refers to the oldest historical period in the development of Balinese gamelan music.
6. APPENDIX

6.1 Transcription of Genetik

DEWA KETUT ALIT

Genetik

musik baru untuk Gamelan Salukat
(new music for Gamelan Salukat)
2012

transcribed by Oscar Smith

"Gamelan music reminds me of genetics. Genes fit together to create the whole person and the layers of gamelan fit together to create music. It is genetic."

-Sarah Ferreira

"Learning gamelan music is like genetics. It means little when you only look at a small section, but step back and the pieces fit together like DNA."
Reong

boss hits
byong byot pyek ke/ceng

Kendang

Wadon (female) drum strokes
deg det ka kum tong

Lanang (male) drum strokes
lug dut pak pung teng

Gongs

Notated pitches are closest Western pitches to the Hertz values below. Pitches sound 1 octave lower than notated.

-53Hz ~62Hz ~75Hz ~83Hz ~96Hz ~106Hz ~113Hz

Indicates gores (gong face scrape)
At the speed of the musicians' breath

20 These 6 bars not notated using exact rhythms

26 Beginning a little slower \( \frac{3}{1} \) poco accel.

29

32 Gaining momentum \( \frac{3}{1} \)
7. WORKS CITED:


