Kiowa, an endangered Kiowa-Tanoan language of Oklahoma, presents three distinct surface tones, high, falling, and low, as illustrated by the minimal triples in (1):

(1) án 3SG.G.3PL.O hɔ́ː ‘get.imp’ ñ ‘here’
án ‘awaken.imp’ hɔ̂ː ‘go get.imp’ ê 3DU.A.1SG.G.3SG.O
àn HAB hɔ̀ː ‘yes’ ñ ‘when.SAME’

Little is known of tone in Tanoan, but its grammatical role in Kiowa is uncharacteristically complex for an indigenous language of the US. For example, it derives interrogatives from indefinites (2-left), has a complex distribution across the principal parts of the verb (see falling tones in (2-right)), and encodes argument information in agreement prefixes, both via minimal triples in the prefix itself (3-left) or via high/low alternations (underlined) on the subsequent verb (3-right):

(2) háːtel hɔ̂ndé háːgʰyá NEG PF.MOD PF.IMP IMPF.IMP
someone something somewhere áː-mɔː áː-t’ɔː áː-yîː ‘come’
háːtel hɔ̂ndé háːgʰyá héːbː-ɔː háːbɛ-tɔː ‘bring in’
who.Q what.Q where.Q ɔ́ː-mɔː ɔ́ː-tɔː ɔ̂ː- ɔ̂ː-yîː ‘give’

(3) gɔ́ yá á gɔ́-bɔːtɔː:NEG mén-gùːgùː
1SG.A.3SG.O 1SG.S 1SGA.2SGG.3SGO-see.MOD 2DU.A.3DUO-hit.NEG

This paper presents a high-level, theory-neutral account of Kiowa tone grammar. First, I present the processes that account for the tone contours of the vast bulk of phonological words of the language, positing two underlying tone markers and two processes of tone assignment. Second, I account for systematic exceptions via operations on underlying markers triggered in specific contexts.

The correspondence between lexical items and their surface tones is not one-to-one. In isolation áː ‘trees’, éː ‘seeds’, and íː ‘child’ are all high. However, compounded with hɛː ‘without’, three contours emerge (HL, HH, LH) (4-left). A minimal triple is given in (4-right):

(4) áː-hɛː éː-hɛː íː-hɛː kʰɔ́ː-hɛː kʰɔ́ː-hɛː kʰɔ́ː-hɛː
treeless seedless childless shoulderless blanketless trouserless

The rightward lowering in ‘treeless’ affects all tones that follow it. In (5-left), all-high kʰɔ́ːp-dɔ́ː-t’ɔː ‘will have ache’ becomes all low following ɔ́l-thó ‘head’. Moreover, lowering can start midword (5-right).

‘apparently have headache’ ‘will suffer illness’ ‘will have toothache’

By contrast, the lowering involved in ‘childless’ affects only specific lexical items and only when they are at the left edge of polysyllables: íː ‘child’ does not lower in póː-íː-(hɛː) ‘(without) beaver kit’.

To capture these effects, I propose that the stored representation of Kiowa lexemes includes two autosegmental markers, notated ’ and ‘. (One can think of these as floating tones with specific association rules, or as metrical grid brackets, or as devices from other theories.) High tone is assigned from
the leftmost left mark ' to the leftmost right mark ' (highlighted by overlining below); low is assigned elsewhere. (For legibility, ' is placed at the start of the syllable, but onsets are irrelevant to tone.)

(6) UR: ˹kʰop-˼dx: t'ɔː; ˹kʰop-˼mda-˼dx: t'ɔː; ˹altʰq-˼kʰop-˼mda-˼dx: t'ɔː; ˼nso-˼kʰop-˼dx:
SR: kʰop-dɔː-t'ɔː; kʰop-˼mda-dɔː-t'ɔː; ˼ltʰq-kʰop-˼mda-dɔː-t'ɔː; ˼nso-˼kʰop-˼dx:

Lexemes without underlying markers receive default ' before the last (rightmost) syllable:

(7) UR: ˼mɔːsɔ ˼mɔːsɔ-iː; ˼mɔːsɔ-˼hęː;
Edge: ˼iː mɔːsɔ ˼mɔːsɔ-iː; ˼mɔːsɔ-˼hęː;
SR: ˼iː mɔːsɔ ˼mɔːsɔ-iː; ˼mɔːsɔ-˼hęː: [crow-child-priv]

This set up immediately derives high tone spreading from “nonlowering highs” (˹x) to lexemes like (7). (8) shows that ᵁʰçois ‘water’ is a nonlowering high (it does not lower ḥęː ‘without’) and that it spreads high tone onto the underlying lows of (7). (Right edge marking omitted, as it is redundant.)

(8) UR: ᵁʰçois-˼hęː; ᵁʰçois-mɔːsɔ; ᵁʰçois-mɔːs-iː; ᵁʰçois-mɔːs-iː-˼hęː;
SR: ᵁʰçois-˼hęː; ᵁʰçois-mɔːs-iː; ᵁʰçois-mɔːs-iː-˼hęː; [’without cormorant young’]

The set up also yields a representation of falling tone—as a rhyme-internal ‘’—that correctly derives that falling has the same rightward effect as tone-lowerers like á: ‘trees’. Whereas kʰɔː: ‘bank’ (nonlowering high) leaves dɔːt’ɔː: ‘will be’ high, kʰɔː: ‘cold’ (tone lowerer) and kʰɔː: ‘cut’ both lower it:

(9) UR: ᵁʰ País-˼dx: t'ɔː; ᵁʰ País-˼dx: t'ɔː; ᵁʰ País-˼dx: t'ɔː;
SR: kʰɔː-dɔː-t'ɔː; kʰɔː-dɔː-t'ɔː; kʰɔː-dɔː-t'ɔː;

The processes above account for the vast bulk of Kiowa words. However, exceptions are numerous—but systemic. First, there must be a further underlying marker. Everything given so far ensures that words maximally have one peak (stretch of high tones). But (3-left) shows that interrogatives can have two. Repeat peaks are most frequent in synchronically undecomposable animal names. For current purposes, I posit _, which ends a peak but, unlike ‘, does not bring the rightwards search for other ‘s to a halt. Possibly reflecting diachrony, these marks are only ever lexeme internal.

(10) UR: ᵁʰoⁿ-de ᵁʰoⁿ-de em’ha-˼me’ em’ha-˼me’-˼kʰqg’va
SR: ᵁʰândé ᵁʰândé [something,Ǫ] ᵁʰhâːmé ᵁʰhâːmé-˼kʰqg’va [ant-black]

Other exceptions are modelled via deletion of ‘ and ‘. For instance, pén is a tone-lowerer (e.g., pén-tǐ: ‘butcher-mod’) but the imperfective evidential (amongst other morphemes) resists lowering (pén-è: > pénɛː, not *pénɛː). The process can be modelled by deletion of ‘ preceding IMPF.EVID: ‘pen’ ➔ ‘pen. This resistance does not apply falling tone (e.g., ᵁʰ-yaː > ᵁʰaːyìː ‘raise-IMPF.EVID’). Negation is more resistant, though, triggering ‘-deletion not only at the right edge, but anywhere in the preceding syllable (e.g., ‘ha’: ➔ ‘hai’), resulting in falling tones becoming high (e.g., ᵁʰ-ɣóː > ᵁʰaːɣóː, not *ⁿʰaːɣóː). A case of ‘-deletion arises in a specific syntagmatic (rather than morphophonological) configuration: a nonlowering high is lowered when it is the middle of three syllables, the first of which is low. E.g., ˼m ‘make’ is a nonlowering high (˼m-˼k’ː ‘maker’) and tɔː ‘house’ is underlingly low (tɔː-˼hęː: ‘houseless’). Yet ‘housebuilder’ is not tɔː-˼m-˼k’ː (L’H/H), but tɔː-˼m-˼k’ː (LL’H) with the ‘ of ˼m deleted.

These examples illustrate the fascinating intricacy of Kiowa tone grammar. The full paper will also show how falling tone is distributed amongst principle parts of the verb (suggesting that ‘ can metathesise with the final mora of the root), that tone assignment can precede suffixation or the reverse (suggesting existence of affix levels in Kiowa), and that root tone sometimes spreads onto affixes only under rather extraordinary conditions (e.g., only if the root ends and the affix begins with k, p, or t; hence, kʰóp-k’ːa ‘mountain-LOC’ spreads high onto k’ːa, but ˼l-˼k’ːa ‘hair-LOC’ does not).