TEACHER'S EDITION

THE YOUNG MUSICIAN'S TEXTBOOK

in tune

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HOW TO PLAY TAYLOR SWIFT'S "SHAKE IT OFF"

METRIC MODULATION

TURN HEADS WITH TEMPO CHANGES

JACOB COLLIER

A Musical Polyglot Steps Into The Limelight And Completes His Four-Album Masterwork

- Technology Marches Forward
- Tips for New(er) Teachers
- The Tao of In Tune
- A Meeting of Music Education Minds

Five hundred Purdue "All-American" Marching Band alumni returned for Homecoming to celebrate the 100th anniversary of the Block P formation and to help create the world's largest Block P on the Ross-Ade gridiron at halftime of the Northwestern game.

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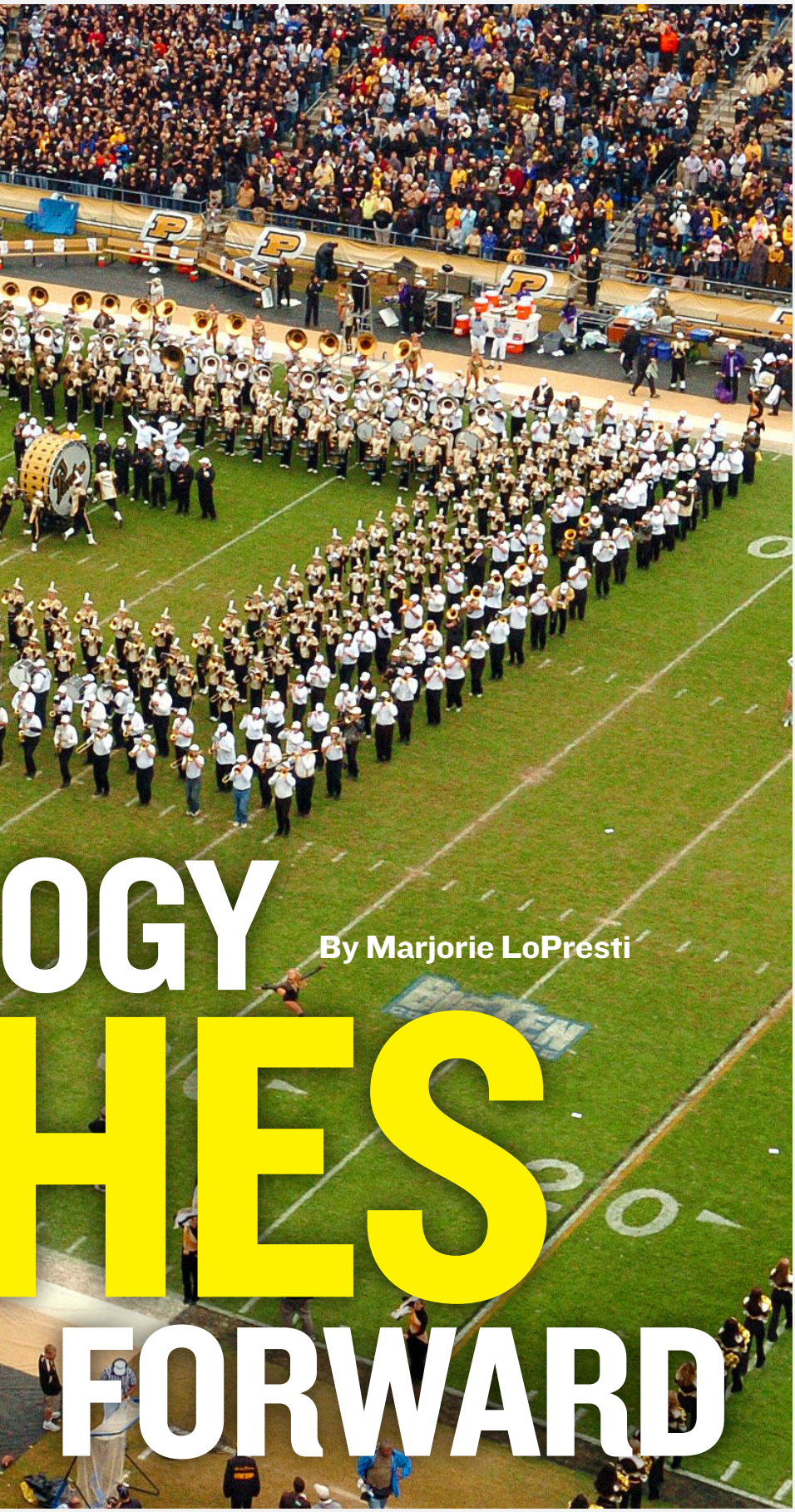
Photo: Purdue News Service photo/David Umberger



OGY HES FORWARD

By Marjorie LoPresti

THEN: Once upon a time, teenagers at most marching band camps practiced on football fields till dusk in shorts and t-shirts.

NOW: Same scene, but in some camps, kids wear heads-up display glasses too. Their music, drill, and real-time feedback is displayed on lenses, while they can still see and hear all around them. The tech is controlled from a director's central hub, with the power to enable, disable, and reconfigure group or individual displays.

Sound far-fetched? Perhaps, but I would have paid serious money for that tech when I was a high school marching band M&M instructor, and I bet you would have too.

As most instructors know, marching musicians have been around on the battlefield and documented in parade formation since the Ottoman Empire. In the 1700s, the Turkish musicians, sometimes known as Janissary bands, heavily influenced the music of Haydn, Mozart, and Beethoven. During that time, the improved technology of woodwind and valved brass instruments made mobile music-making more reliable and appealing. By 1749, every British regiment had a military band. Military bands in the U.S. followed in short order.

The birth of school marching bands associated with football can be traced to Indiana in 1845, with the establishment of the University of Notre Dame Band of the Fighting Irish. Pictorial formation marching began in 1907 when Perdue University's All American Marching Band formed the letter "P." During the same year, the Marching Illini of the University of Illinois performed the first half time show. The first national high school marching band contest was held in Chicago, 1923. Following WWI, marching bands exploded across the country, with contests too numerous to be organized into a national championship. The modern field show has its roots in A.R. Casavant's "Precision Drill" of the 1950s, with moving formations and transformations.

TECH FOR MARCHING BAND

Things have changed greatly since the days of hand-written arrangements and straight-line drill. Currently available technology tools for marching bands fall into several broad categories:

- Communication, organization, and inventory tools like CutTime, Charms, and many general organization tools

Marching Illini of the University of Illinois

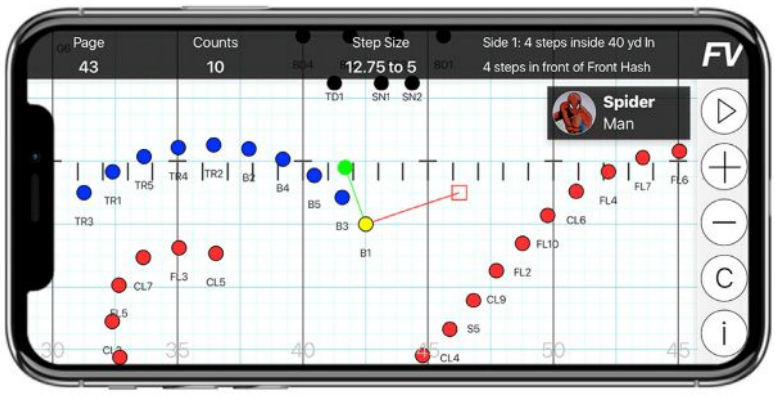
- Some ensembles have added electronic instruments and amplification
- The use of performance-oriented tools for reading music, practice, assessment, plus essentials like metronomes and tuners have proliferated
- Creativity software for music composition/notation and drill design is available

Teachers and performers across disciplines have begun employing a variety of technology tools to aid individual music learning, practice, and assessment. Nearly everyone has added tuners, metronomes, and even score readers to their phones. Practice software like Make Music Cloud (SmartMusic), PracticeFirst, and newer tools like Crescendo are being used in high school and college marching bands to prep for auditions and performances while providing real-time feedback on musical accuracy. However, drill software does not yet provide individualized feedback (except in my dream for the future.)

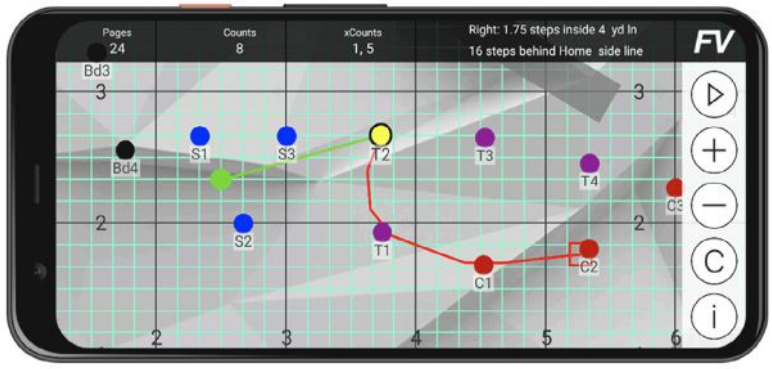
DRILL DESIGN SOFTWARE

While still in high school, I saw Pyware for the first time. That early version was awkward to use—so much so that hand-drawn drill charts were faster. On the field, each section leader held a set of photocopies. Today, marching band directors can leverage sophisticated software to create, analyze and visualize formations in 3-D. Tools include *Pyware 3D*, *EnVision* (Box5 Software), *Precision* (National Association of Military Marching Bands), and *Micro Marching League* (developed by Joe Lesko).

Pyware is the dominant player, with its **Ultimate Drill Book/UDB app** *(http://tinyurl.com/it216marching2)*. If you have not seen UDB, imagine Google Maps for marching. The drill transfers directly from Pyware, and individual players can manage how they see their 'spots' with precise paths and step size to each.



Ultimate Drill Book/UDB app



Love "Sousa's March Mania"? Create Your Own Tournament with Music League

SINCE 2014, THE "PRESIDENT'S OWN" has hosted an online music listening competition called "Sousa's March Mania." The tournament brackets 32 musical marches. Each weekday, voters select from the head-to-head matchup of the day, ultimately resulting in one winning Sousa march for the year. This year's Mania begins on March 4, 2024. More information and brackets are available for download at http://tinyurl.com/it216marching

With an app called MusicLeague, anyone can start a themed tournament, with participants voting for their favorites in a category. As the teacher, you might set up a round for British Wind Band Music. Students can set up rounds too, giving you a window into what music is trending outside of your school band program. https://app.musicleague.com/

AI AND MARCHING BAND

AI is everywhere now, and its use was the recurring theme at the January 2024 Consumer Electronics Show. Will AI begin to create new drill designs? Probably, but not anytime soon. The cost is high, and potential revenue is not optimistic. Because there is so much going on in the video of a single show, every dot in every frame would need to be isolated in order to model the whole show. The process would then need to be repeated thousands of times to train the machine learning model. A generative algorithm for drill design responsive enough to adjust to any size ensemble, with custom numbers of performers in each musical and visual section, would then need to be developed and tested.

AI is, however, currently being tested for marching assessment. AI was the judge at the 76th Army Day Parade in Lucknow, India this past January. AI analyzed video capture from multiple cameras of each contingent's formation in real-time as it passed the reviewing area. The AI adjudication of the precision of each unit was under human experts' supervision, but the computer could measure movement and uniformity of the contingent precisely in millimeters. Clearly, AI adjudication is in its infancy. This latest application could only handle standard parade formation, which is nothing like the variability in a field show.

As far as music generation, AI is much farther along. For well over a decade, music notation software has provided some auto-arrange features. Online tools like open.ai's Musenet, AIVA, and dozens of pop music generators can help get a composition started. No one is replacing you just yet. AI generators are drawing on their algorithms and libraries of pre-existing music. It's still up to you to provide your unique touch and customization.

CES, SEMICONDUCTORS AND MARCHING BAND

As evidenced by the companies participating in the 2024 Consumer Electronic Show (CES), AI is predicted to touch every aspect of life. "The opportunity in AI is so significant that it touches every bit of creative work. It will start slow, then broaden out." (Jonathan Curtis in *Barron's,* February 5, 2024) A similar integration of AI was predicted in the peer-reviewed paper "FAIME: A Framework for AI-Assisted Musical Devices" (*The Internet of Things,* December 16, 2022). How could everything incorporate AI? Think about the evolution of semiconductor chips. Moore's Law of Electronics (1965) projected that the number of transistors on a single semiconductor chip would double every two years. Chips have become smaller, more powerful, less expensive, and ubiquitous. In the next wave, chips are going 3-D as 'stacked' chips. When these chips meet AI and are in every conceivable device, the amount of real-time computing and feedback for individuals will be unparalleled.

Ultimately, economics and potential profit, drive development. An estimated three million students take part in the marching arts each year across high school, college and the drum corps universe. What if suddenly every ensemble needs a piece of tech for every member? Assessment sensors could be incorporated into every instrument, providing instantaneous performance feedback without a microphone. The prototype in India for assessing straight line marching is just the beginning for AI in the marching arts. Maybe wearable heads-up devices on the marching band practice field aren't such a pipe dream. T

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