Facebook AI Pluribus defeats top poker professionals in 6-player Texas Hold ’em

reader comments

35 with 27 posters participating

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[embedded content]
This video shows sample hands from Pluribus’ experiment against professional poker players. Cards are turned face up to make it easier to see Pluribus’ strategy. Courtesy of Carnegie-Mellon University.
Poker-playing AIs typically perform well against human opponents when the play is limited to just two players. Now Carnegie Mellon University and Facebook AI research scientists have raised the bar even further with an AI dubbed Pluribus, which took on 15 professional human players in six-player no-limit Texas Hold ‘em and won. The researchers describe how they achieved this feat in a new paper in Science.

Playing more than 5,000 hands each time, five copies of the AI took on two top professional players: Chris “Jesus” Ferguson, six-time winner of World Series of Poker events, and Darren Elias, who currently holds the record for most World Poker Tour titles. Pluribus defeated them both. It did the same in a second experiment, in which Pluribus played five pros at a time, from a pool of 13 human players, for 10,000 hands.

Co-author Tuomas Sandholm of Carnegie Mellon University has been grappling with the unique challenges poker poses for AI for the last 16 years. No-Limit Texas Hold ‘em is a so-called “imperfect information” game, since there are hidden cards

(held by one’s opponents in the hand) and no restrictions on the size of the bet one can make. By contrast, with chess and Go, the status of the playing board and all the pieces are known by all the players. Poker players can (and do) bluff on occasion, so it’s also a game of misleading information.

Claudico begat Libratus

In 2015, Sandholm’s early version of a poker-playing AI, called Claudico, took on four professional players in heads-up Texas Hold ‘em—where there are only two players in the hand—at a Brains vs. Artificial Intelligence tournament at the Rivers Casino in Pittsburgh. After 80,000 hands played over two weeks, Claudico didn’t quite meet the statistical threshold for declaring victory: the margin must be large enough that there is 99.98% certainty that the AI’s victory is not due to chance.

Sandholm *et al*. followed up in 2017 with another AI, dubbed Libratus. This time, rather than focusing on exploiting its opponents’ mistakes, the AI focused on improving its own play—apparently a more reliable approach. “We looked at fixing holes in our own strategy because it makes our own play safer and safer,” Sandholm told IEEE Spectrum at the time. “When you exploit opponents, you open yourself up to exploitation more and more.” The researchers also upped the number of games played to 120,000.

The AI prevailed, even though the four human players tried to conspire against it, coordinating on making strange bet sizes to confuse Libratus. As Ars’ Sam Machkovech wrote at the time, “Libratus emerged victorious after 120,000 combined hands of poker played against four human online-poker pros. Libratus’ $1.7 million margin of victory, combined with so many hands, clears the primary bar: victory with statistical significance.”



Enlarge / Online poker pro Dong Kim took on an AI program called Claudico in 2015. He lost to an updated program, Libratus, in 2017's rematch event.
Carnegie Mellon University

But Libratus was still playing against one other player in heads-up action. A far more challenging conundrum is playing poker with multiple players. So Pluribus builds on that earlier work with Libratus, with a few key innovations to allow it to come up with winning strategies in multiplayer games.

Sandholm and his former graduate student, Noam Brown—who is now working on his PhD with the Facebook Artificial Intelligence Research (FAIR) group—employed "action abstraction" and "information abstraction" approaches to reduce how many different actions the AI must consider when devising its strategy. Whenever Pluribus reaches a point in the game when it must act, it forms a subgame—a representation that provides a finer-grained abstraction of the real game, akin to a blueprint, according to Sandholm.

"It goes back a few actions and does a type of game theoretical reasoning," he said. Each time, Pluribus must come up with four continuation strategies for each of the five

human players via a new limited-lookahead search algorithm. This comes out to “four to the power of six million different continuation strategies overall,” per Sandholm.

Like Libratus, Pluribus does not use poker-specific algorithms; it simply learns the rules of this imperfect information game and then plays against itself to devise its own winning strategy. So Pluribus figured out on its own it was best to devise a mixed strategy of play and being unpredictable—the conventional wisdom among today’s top human players. “We didn’t even say, ‘The strategy should be randomized,'” said Sandholm. “The algorithm automatically figured out that it should be randomized, and in what way, and with what probabilities in what situations.”

No limping

Pluribus actually confirmed one bit of conventional poker-playing wisdom: it’s just not a good idea to “limp” into a hand, that is, calling the big blind rather than folding or raising. The exception, of course, is if you’re in the small blind, when mere calling costs you half as much as the other players. But while human players typically avoid so-called “donk betting“—in which a player ends one round with a call but starts the next round with a bet—Pluribus placed donk bets far more often than its human opponents.

So, “In some ways, Pluribus plays the same way as the humans,” said Sandholm. “In other ways, it plays completely Martian strategies.” Specifically, Pluribus makes unusual bet sizes and is better at randomization.

“Its major strength is its ability to use mixed strategies,” said Elias. “That’s the same thing that humans try to do. It’s a matter of execution for humans—to do this in a perfectly random way and to do so consistently. Most people just can’t.”

“These AIs have really shown there’s a whole additional depth

to the game that humans haven't understood."

"It was incredibly fascinating getting to play against the poker bot and seeing some of the strategies it chose," said Michael "Gags" Gagliano, another participating poker player. "There were several plays that humans simply are not making at all, especially relating to its bet sizing. Bots/AI are an important part in the evolution of poker, and it was amazing to have first-hand experience in this large step toward the future."

This type of AI could be used to design drugs to take on antibiotic-resistant bacteria, for instance, or to improve cybersecurity or military robotic systems. Sandholm cites multi-party negotiation or pricing—such as Amazon, Walmart, and Target trying to come up with the most competitive pricing against each other—as a specific application. Optimal media spending for political campaigns is another example, as well as auction bidding strategies. Sandholm has already licensed much of the poker technology developed in his lab to two startups: Strategic Machine and Strategy Robot. The first startup is interested in gaming and other entertainment applications; Strategy Robot's focus is on defense and intelligence applications.

Potential for fraud

When Libratus beat human players in 2017, there were concerns about whether poker could still be considered a skill-based game and whether online games in particular would soon be dominated by disguised bots. Some took heart in the fact that Libratus needed major supercomputer hardware to analyze its game play and figure out how to improve its play: 15 million core hours and 1,400 CPU cores during live play. But Pluribus needs much less processing capability, completing its blueprint strategy in eight days using just 12,400 core hours and 28 cores during live play.

So is this the death knell for skill-based poker? Well, the algorithm was so successful that the researchers have decided not to release its code. “It could be very dangerous for the poker community,” Brown told Technology Review.

Sandholm acknowledges the risk of sophisticated bots swarming online poker forums, but destroying poker was never his aim, and he still thinks it’s a game of skill. “I have come to love the game, because these AIs have really shown there’s a whole additional depth to the game that humans haven’t understood, even brilliant professional players who have played millions of hands,” he said. “So I’m hoping this will contribute to the excitement of poker as a recreational game.”

DOI: Science, 2019. 10.1126/science.aay2400 (About DOIs).

Listing image by Steve Grayson/WireImage/Getty Images

https://arstechnica.com/?p=1533833

Boom-shaka-laka: Call of Duty’s new “Gunfight” mode is like NBA Jam with guns



Enlarge / Coming October 25. And today, we know more about one cool, new multiplayer twist to the series.
Activision / Infinity Ward

reader comments

21 with 17 posters participating, including story author

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LOS ANGELES—This spring, I visited game studio Infinity Ward to learn about its upcoming "reimagining" of *Call of Duty: Modern Warfare*. During the reveal event, the studio's reps mentioned multiple "pillars" of the upcoming CoD game, set to launch October 25, then focused on the game's single-player missions.

Shortly after that, someone walked into the room and said, “the rest of this event is indefinitely embargoed,” then took the wraps off of arguably the best thing I’ve seen in a CoD game in years: a two-on-two “Gunfight” versus mode.

That embargo is finally up, following an official Gunfight gameplay reveal on Twitch this morning, so now I can finally tell you about a first-person versus mode that combines the original frantic action of 2007’s *CoD4:MW* and the utter tension of *Counter-Strike*. In a gaming landscape forever altered by battle royale modes, Gunfight makes the case that sometimes, less is more.

A more hectic arena

- These first two screens, provided by Activision, are “sweetened” with cinematic flare but at least give an impression of what the Gunfight arenas look like. This is a frantic, indoor battle space.
- And this is the more open-air, jungle level we got to fight in.
- Here’s real-time gameplay, as captured from Twitch streamer Syndicate’s exclusive feed this morning.
- And here’s the rub: the random weapons that players start with at the beginning of every other round.
- Another round, another loadout.
- Trying and failing to capitalize on a brand-new sniper rifle.
- You can see a range of forward-rushing paths to the left and right, in addition to some verticality.
- Another angle of the indoor arena.
- In fitting CoD fashion, every round ends with a kill-cam replay.
- An outdoor, industrial map called Stack.
- Another peek at the Stack level.

Though Infinity Ward representatives likened this mode to

"*Street Fighter* with guns," I'd argue that Gunfight plays out more like a cross between *NBA Jam* and *Goldeneye*. The reason being, this mode has been built with a mix of cramped, specially designed arenas and wild-card weapon possibilities.

Every match of Gunfight begins with four combatants (two teams of two) spawning on opposite ends of a small, mostly symmetrical arena. (I sampled two of these arenas at the May press event, and a third was unveiled during today's Infinity Ward livestream.) Each side's spawn points are static—close enough to require some mad dashing for engagement, but far enough to build a moment of silent, "where might they go" tension.

Each round in these best-of-21 matches sees all soldiers spawning with identical, random loadouts of two weapons—maybe two pistols, maybe one shotgun and one grenade launcher—and marching forward to kill the opposing team. (This random weapon loadout remains static for two rounds before resetting, to clarify.) Weapon damage is comparable to a standard CoD deathmatch, which means it won't take many shots to down a foe. But in the likely case that at least one soldier on each side remains alive after 40 seconds, the objective changes: a flag appears in the dead center of the map, and at this point, a team can win the round by standing next to the flag for three seconds.

While I've seen plenty of cramped, quick-fire deathmatches in my day, something about Gunfight feels different from the most comparable first-person versus mode in recent memory, *Halo 5 Guardians*' "Arena." That mode is a four-on-four affair, which feels massive compared to Gunfight's two-on-two fights, and Arena has more spread-out maps and slower deaths; both of these facts emphasize *Halo 5*'s suite of superpower maneuvers.

No Oddjobs?

The reveal event's Gunfight-exclusive maps reminded me more of something halfway between the first *Modern Warfare* game and the original N64 *Goldeneye*, in terms of relatively flat maps that emphasize diverging paths. During my gameplay, I frequently rushed through hallways toward blind corners as I communicated with my single teammate to claim what territory we could and thus try to gain some control during each incredibly brief round of combat.

The pacing of each round feels like something from *NBA Jam*, in terms of rushes across the court, opportunities to react, and a moment to breathe after either nailing a perfect three-pointer or getting wildly dunked on. Part of that fun comes from Gunfight's clever numerical tweaks, particularly that 40-second flag twist. But I suspect much of the fun factor comes from what Gunfight lacks: any of the series' bolted-on *accoutrements* like killstreaks or custom loadouts. Instead, every round sees you and your opponents reacting to identical, random weapons, and nothing more.

If you're wondering why this multiplayer-centric article about a future CoD game doesn't mention any other modes, that's apparently by design. Activision has already confirmed to Ars that there's more *CoD:MW* news to come. Are we going to see a crazy battle royale mode as an option after all? What shape will the game's more "traditional" multiplayer combat take? Co-op challenges? We don't know, and while we may find out a bunch of stuff during an August 1 Twitch stream, I'm not keen on reporting every little news morsel to come between now and *CoD:MW*'s October launch.

But Gunfight is a very, very good move from a publisher notorious for microtransactions, design bloat, and trend chasing. Gunfight eschews all of those negative trends, and assuming Activision doesn't screw this up somehow, I am happy

to take a moment and call it out as a win on the publisher's part. As part of *CoD:MW*'s base retail package, this mode emphasizes pure, high-speed competition in a really exhilarating way. I'd go so far as to say my brief time with this mode has reawakened a long-forgotten nugget of *Counter-Strike* fandom in my gaming soul. Somehow, Infinity Ward has dehydrated *CS*' "every action matters" philosophy, then injected it into a purer, more concentrated combat experience. I'm thirsty for another hit.

https://arstechnica.com/?p=1534149

Steam uses machine learning for its new game recommendation engine



Enlarge / The new recommendation engine is part of a new

experimental Steam Labs branding.

reader comments

64 with 43 posters participating

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For years now, Valve has been testing new approaches to filter the glut of Steam games down to the ones in which individual users are most likely to show an interest. To that end, the company is today rolling out a machine-learning-powered "Interactive Recommender" trained on "billions of play sessions" from the Steam user base.

In the past, Steam has relied largely on crowd-sourced metadata like user-provided tags, user-curated lists, aggregate review scores, and sales data to drive its recommendation algorithms. But the new Interactive Recommender is different, Valve says, because it works without any initial internal or external information about the games themselves (save for the release date). "Instead, the model learns about the games for itself during the training process," Valve says. "The model infers properties of games by learning what users do, not by looking at other extrinsic data."

Your own playtime history is a core part of this neural-network-driven model. The number of hours you put into each game in your library is compared with that of millions of other Steam users so the neural network can make "informed suggestions" about the kinds of games you might like. "The idea is that if players with broadly similar play habits to you also tend to play another game you haven't tried yet, then that game is likely to be a good recommendation for you," Valve writes.

- A sample of recommendations for my Steam account shows that Steam has my number as a fan of quirky indie games

(I’ve played and enjoyed many of these on other platforms, so it’s pretty spot on).
- The recommendations for our own Sam Machkovech look very different when VR games are excluded…
- …and when VR games are re-enabled.
- Some recent titles that Steam thinks Sam would like. (He, too, owns many of Steam’s recommendations on other services.)
- Some older titles that Steam thinks Sam would like.

This, in turn, should pre-empt issues with developers trying to game the system by choosing popular tags or leaning on positive reviews, as they have with previous recommendation algorithms. “The best way for a developer to optimize for this model is to make a game that people enjoy playing,” Valve writes.

Individual users can tweak the parameters of these AI-powered suggestions to favor games released in a certain time period or games that fall to one side or another on a “popularity” gradient. “We’ve found that, especially for people who play a lot of games, digging into the ‘niche’ end of the range can be a very effective way to find hidden gems,” Valve writes.

Valve admits that this machine learning system isn’t ideal for brand new games, which don’t have enough players from which to glean data, leading to a “cold start” chicken-and-egg effect. Existing systems like Steam’s Discovery Queue should help get those titles in front of their first players, the company writes.

The new recommendation engine is joined by two other experimental products coming out of the newly launched “Steam Labs” brand today. A Micro Trailers page automatically generates six-second video vignettes to represent titles, arranged by genre, while The Automated Show will collect 30 minutes’ worth of footage from the latest Steam releases for easy consumption.

https://arstechnica.com/?p=1534593

Archival footage, audio immerses viewers in Apollo: Missions to the Moon



reader comments

7 with 7 posters participating

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- Walter Schirra in Command Module on Apollo 7. NASA/National Archives and Records Administration
- View of Earth as seen from Moon taken on Apollo 8. NASA/National Archives and Records Administration
- David Scott performing side hatch EVA during Apollo 9.
- View of the Moon as seen from Apollo 10.

- Neil Armstrong inside Lunar Module on Apollo 11.
  NASA/National Archives and Records Administration
- Surface of the Moon as seen from Apollo 11 while in lunar orbit.
- Apollo 11 Lunar Module before docking back with the Command Module.
- Eugene Cernan planting flag on Moon during Apollo 17.
  NASA/National Archives and Records Administration
- Eugene Cernan with Lunar Rover on Moon during Apollo 17.
- David Scott on Moon during Apollo 15.
  NASA/National Archives and Records Administration
- Astronauts on Moon for Apollo 15.
  Public domain
- Recovery of Apollo 11.
  Public domain
- The first container of Apollo 11 lunar samples.

This year makes the 50th anniversary of the first manned lunar landing, so naturally we're seeing a slew of films and TV programs celebrating that milestone, like last year's *First Man* biopic. The latest is a new documentary, *APOLLO: Missions to the Moon*, making its debut on the National Geographic Channel. Ars had the opportunity to sit down with filmmaker Tom Jennings and former NASA engineer Frances "Poppy" Northcutt back in June to talk about the making of the documentary, and revisit this pivotal moment in space history.

NASA's Apollo space program is well-traveled ground in popular media, so Jennings faced quite the challenge in coming up with a fresh take. Fortunately, this is also one of the most well-documented periods in 20th century history. The Emmy and Peabody Award-winning director pieced together his documentary using nothing but hundreds of hours of archival TV footage, radio broadcasts, film and audio from NASA Mission Control, black-box recordings from Apollo capsules—even the occasional home movie. There are no narrators or talking heads, and the end result provides a much more immersive experience for the

viewer than your typical science documentary.

Jennings has used this approach before to produce documentaries about the late Princess Diana and the tragedy of the space shuttle *Challenger*. “Instead of someone telling you what is was like, I wanted to try and create something that’s almost like a motion picture, but everything is real,” he said. “I think that audiences, if they just give it a minute, get drawn in, in a way they might not in a more traditional documentary. For people who lived through it, it’s a way to re-experience it, and for those who aren’t old enough to remember, it’s as close as we can get to experiencing it for the first time.”

The documentary covers most of the Apollo missions. It follows a roughly chronological timeline, beginning with the early days of the space program, mostly skipping over, or briefly summarizing, Apollo missions 2-7, 9-10, 12, and 14-17, before closing with some foreshadowing of the then-nascent space shuttle program. The focus is understandably on the most well-known big moments in US space history: Apollo 8 and the first manned mission to leave Earth and orbit the moon; the first manned lunar landing with Apollo 11; and the nail-biting drama of Apollo 13, forever immortalized in the 1995 film starring Tom Hanks.

Training days

- Apollo 15 astronaut James Irwin explains the ALSEP (Apollo Lunar Surface Experiments Package) at a press conference.
  NASA/National Archives and Records Administration
- Neil Armstrong inside Lunar Module on Apollo 11.
  NASA/National Archives and Records Administration
- Gus Grissom suited up.
  Public domain
- Swigert and Lovell look at manual on Apollo 13.

Public domain

- Astronaut Training Zero G.
  Public domain
- Neil Armstrong tests before Apollo 11.
  Public domain
- Astronauts Stafford, Young and Cernan read an article about an Apollo flight in National Geographic.
  Otis Imboden/National Geographic Creative
- Engineer working on Saturn V.
  Public domain
- Walt Cunningham in CM Apollo 7.
  Public domain
- Lunar Module assembled at Grumman.
  Public domain
- nterior view of the Vehicle Assembly Building showing the second stage of the Saturn launch vehicle being hoisted into position.
- An astronaut pilots the lunar-landing training vehicle.
  Otis Imboden/National Geographic Creative
- Launch Control at Cape Kennedy.
  Public domain
- Flight Director Glynn Lunney in Mission Control during Apollo 7.

In one especially moving moment, we see astronaut Gus Grissom‘s wife, Betty, responding to a question about her feelings on her husband going into space: “How would you feel if your wife were going into space?” Grissom, of course, was supposed to be part of the Apollo 1 crew, but famously perished along with two other astronauts (Ed White and Roger Chaffee) in a cabin fire doing a pre-launch test of the Apollo 1 Command Module in January 1967. The documentary includes snippets of their final words on the surviving black box audio: “Flames! We’re burning up!” (followed by a foreboding silence).

Among the many people featured is Northcutt, the first female

engineer to work in Apollo Mission Control. She helped calculate the return trajectories for the Apollo 8 mission, among other achievements, and was part of the team working round-the-clock to bring the astronauts aboard Apollo 13 home safely.

Northcutt recalled finding the place initially intimidating, but not because she was the only woman. It was the sharp contrast between her quiet, humble office and the noisy, intense environment of Mission Control. Per Northcutt, it was an era dominated more by computers and machines than men. “Going from Mercury to Apollo was orders of magnitude more complex, in terms of the mathematics involved,” she said. With the former, the human computers could rely on slide rules and desk calculators for their back-of-the-envelope calculations. “But when you’re talking about leaving the Earth, you cannot do that with a simple computer,” she said. “Apollo represented the first real use of what we now call Big Data.”

> *“Going from Mercury to Apollo was orders of magnitude more complex.”*

“It certainly was not was expected of me,” Northcutt said of her engineering career. “My parents sent me to college expecting I would get married.” Instead, her high aptitude in mathematics yielded a job offer at a contractor called TRW (now part of Northrup Grumman), and she found herself working on developing computer programs for NASA’s space program. “I was in the right place at the right time and I took advantage of it,” she said. And while her father was proud of her achievements, especially when Northcutt was featured in a national TRW advertisement, he told her that “the only thing that could make him prouder was if he saw my wedding announcement in the local Dayton paper.”

“I’m just sad there aren’t more women now,” said Northcutt, noting that while 30 percent of computer science staff were women in the late 1950s and early 1960s, today that has

dropped to just 18 percent. The culprit? “Hostile work place,” she said. “The internet has spawned this really ugly thing for women. Yes, I experienced sex discrimination [at NASA], but it was not anonymous. I knew at least who the hell it was being a pig.” That’s often not the case in today’s social media-dominated world, where women frequently receive abusive comments, including threats of rape or death, merely for daring to exist in a traditionally male-dominated space. (Needless to say, you won’t find Northcutt—now a Texas-based attorney—on Twitter: “I think it’s a sewer.”)

In addition to the major broadcast networks and NASA’s own extensive archives, Jennings found a treasure trove of archival material from local news stations and media outlets. He went to smaller TV stations in Cleveland, Ohio, and central and south Florida, for instance, asking for any raw footage from that era that might have been preserved. “Oftentimes, [local] reporters are much more colloquial and have longer conversations with people,” he said. “They weren’t limited to a minute and ten seconds for a story, they would use four or five minutes.” And if the raw tapes were preserved—much was lost, alas—there could be hours of priceless archival footage there.

“You have to keep searching and searching until you find enough material to cover the story that you need to tell,” said Jennings. “And then you fill in the mortar between the [narrative] bricks with the unique stuff that really stands out, so that—especially in an anniversary year—we can say ours is a bit different than everyone else’s.”

Go for launch

- Cameras are readied for the impending launch.
  Thomas R. Smith/National Geographic Creative
- President and Mrs. Johnson and Vice President Agnew watch Apollo 11 lift off.

Otis Imboden/National Geographic Creative

- Aerial view of spectators around their campsites awaiting the Apollo 11 launch.
  Otis Imboden/National Geographic Creative
- Boys watch Christmas Eve broadcast from Apollo 8 astronauts in space.
  Bruce Dale/National Geographic Creative
- ABC correspondent Jules Bergman at desk before launch of Apollo 8.
  NASA/National Archives and Records Administration
- Launch of Apollo 8 at Cape Kennedy, Florida.
  NASA/National Archives and Records Administration
- Launch of Apollo 16 at Cape Kennedy, Florida.
  NASA/National Archives and Records Administration
- View of Mission Control during Apollo 11 moonwalk.
- Two technicians relax and watch a live television transmission of man walking on the moon.
  Otis Imboden/National Geographic Creative
- Mike Collins and Valerie Anders (wife of astronaut Bill Anders) in Mission Control.
  Joe Scherschel/National Geographic Creative
- Crew of Apollo 8 on TV.
  Public domain
- Flurry of handshakes erupts after successful launch of Apollo 11.
- The Apollo 9 space vehicle is launched from Kennedy Space Center

APOLLO: Missions to the Moon *debuts July 7, 2019, on the National Geographic Channel, at 9 PM/8 Central.*

Listing image by Public domain

https://arstechnica.com/?p=1532203

Disney’s live-action Mulan looks more like a period drama in first teaser



reader comments

59 with 43 posters participating

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[embedded content]
Yifeu Lu stars in the title role of *Mulan*, Disney’s live action remake of its 1998 animated film.
Disney has dropped a teaser for its forthcoming film, *Mulan*, giving us our first real look at the studio’s live action remake of the classic 1998 animated film.

(Mild spoilers for the 1998 Disney animated film below.)

Both films are based on the Chinese legend, “The Ballad of Hua Mulan,” telling the story of a young woman in the Northern Wei era (spanning 386-536 CE) who takes her father’s place when each family is required to provide one male to serve in the

emperor’s army. In this version, Hua Mulan is already a well-trained fighter—the Arya Stark of Chinese legend—and she serves for 12 years with none of her fellow soldiers ever suspecting her true gender.

Disney’s 1998 animated film broadly follows the traditional storyline, except Mulan is not well-trained when she first runs away. The film also added a love interest, and a catchy original soundtrack. *Mulan* was released to critical acclaim, grossing $304 million worldwide and earning Golden Globe and Oscar nominations. That was a marked improvement on Disney’s prior two animated films, *The Hunchback of Notre Dame* and *Hercules*, but well below the box office success of classics like *Beauty and the Beast, Aladdin*, and T*he Lion King*. But it was good enough to merit a direct-to-video sequel in 2004, and a spot on the roster of the studio’s ongoing live action remakes.

- An idyllic ride
  YouTube/Disney
- Mulan’s family is thrilled to have found a good match for her in marriage.
  YouTube/Disney
- A lovely setting unless you’re Mulan.
  YouTube/Disney
- The art of the tea ceremony.
  YouTube/Disney
- The picture of Chinese womanhood, at least on the surface
  YouTube/Disney
- There are other ways to espouse the virtue of graceful elegance.
  YouTube/Disney
- Training up new recruits to defend the emperor.
  YouTube/Disney
- A show of manliness.
  YouTube/Disney

- Hun warrior Bori Khan (Jason Scott Lee) seeks to avenge his father's death.
  YouTube/Disney
- Game face: on.
  YouTube/Disney
- Mulan takes aim
  YouTube/Disney
- The weapons of war.
  YouTube/Disney
- Grace and agility are an asset in battle.
  YouTube/Disney
- Mulan in the heat of combat.
  YouTube/Disney
- Ready for all takers.
  YouTube/Disney

The remake is being described as more of a "war action drama," and there's only the barest hint of the animated film's soundtrack in the background, but it's still the same essential plot. Per the official synopsis:

> *When the Emperor of China issues a decree that one man per family must serve in the Imperial Army to defend the country from Northern invaders, Hua Mulan, the eldest daughter of an honored warrior, steps in to take the place of her ailing father. Masquerading as a man, Hua Jun, she is tested every step of the way and must harness her inner-strength and embrace her true potential. It is an epic journey that will transform her into an honored warrior and earn her the respect of a grateful nation…and a proud father.*

I am not usually a big fan of Disney's live action remakes of their classic animated films, but I have to admit, this is an effective, sumptuously eye-catching teaser for *Mulan,* one of my favorites in the Disney *oeuvre*. We see our free-spirited heroine (played by Chinese-American actress Liu Yifei) riding her horse across the Chinese countryside, only to come home to

the news that her family's matchmaker has found her an auspicious match. "It is decided," Mulan's father, Hua Zhou (Tzi Ma), says, perhaps sensing his daughter isn't exactly thrilled by the news. "It is what is best for our family."

And of course, Mulan initially submits: "Yes. I will bring honor to us all." Cut to her training in the art of being the perfect Chinese wife, where we are treated to a litany of desired virtues: quiet, composed, graceful, disciplined. But Mulan embodies them in her own way, as we see her secretly practicing martial arts, before running away to take her father's place in the emperor's army to fend off an attack by Hun warrior Bori Khan (Jason Scott Lee)—originally known as Shan You in the original animated film.

Mulan also has a sister, Hua Xiu (Xana Tang) in the live action version, which also includes a new Khan ally: a witch named Xianniang (Gong Li). These elements may derive from the *Sui Tang Romance*, a 17th century tragic novel based on the Mulan legend, in which Mulan has a younger sister and bonds with a fellow female warrior named Xianniang.

Mulan is slated for theatrical release on March 27, 2020.

Listing image by YouTube/Disney

https://arstechnica.com/?p=1532329

Fixing the past: The art of collecting pinball machines

reader comments

20 with 19 posters participating

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- Inside this concrete slab hides the biggest collection of the rarest pinball and electromechanical games ever made.
  Sam Machkovech
- This was taken by standing on a chair in one corner of the venue. You can get a sense of the machine variety here: mostly pinball and electromechanical, with about one-fifth of the space dedicated to video games.
  Sam Machkovech
- This is probably the best representation of the dim lighting in the room.
  Sam Machkovech
- Follow the rules.
  Sam Machkovech
- The rarest machine in the house by far, Midway's *Pinball Circus*. Only two were ever made.
  Sam Machkovech
- We chose not to reproduce most of the information cards so you would have more to read should you visit the venue. But we had to post a few. This one's crucial.
- The VPHoF's oldest pinball machine is from the 1920s. "These things used to be outlawed!" our guide reminded us.
- That old machine sits next to arguably the collection's highest-tech virtual pinball machine.
- An average dive into an older machine. Start with the full, beautifully restored machine.
- Then look closer at the *Atlantis* pin's general body and layout.
- Then zoom in on its information card. You'll possibly need to squint.

- Nearly one third of the room is dedicated to this ’50s and ’60s era of pins.
- A few Elton John-based machines were in the house.
- We did the best we could with the room’s weird lighting, in terms of imbalances thanks to inlaid lights in the machines.
- Abra-ca-dabra! It sure was a different era when Gottlieb made so many pins.
- Imagine if this game’s designers pulled off a mechanical way to arrange dominoes like shown in the art. Even so, it’s a striking design as drawn.
- I’m still floored by how the bouncy balls inside that *Hi-Score Pool* pin worked in action.
- A closer look.
- The collection’s more modern machines flank the wall near the entrance.
- It’s impossible to get a photo that makes *Black Hole* look as good as it does in real life. Its black-on-black-on-black style has an incredible glow and effect.
- More of Gottlieb’s best era.
- A collection so bustling, *Creature Of The Black Lagoon* gets crowded out.
- Not to be confused with *Peppy the Clown*, who appears in the second gallery.
- KISS returned with a modern pin via Stern; this is not that version.
- *Street Fighter II: The Video Game: The Pinball Game.*
- This probably cost less to produce than the related film.
- No shortage of sci-fi-themed pins at the VPHOF.
- Not every day you run into the phrase *Goldeneye 007* flanked by a big Sega logo. This came before Nintendo and Rare’s N64 classic.
- I can think of two Elvira-themed pinball games from the 1980s, including this one.
- One row had a space theme.
- Another angle of those two pins, with *ST:TNG* flanking.

- Continuing the space-license theme.
- A zoom on that Spider-man machine.
- This rare Q-bert machine is a treat.
- Great ramps and action.
- Not many of these exist.
- And even fewer of its *Goin' Nuts* spinoff exist. Like, only 10.
- It's hard to tell from the photo, but this Flintstones cab is gargantuan. About as big as a typical arcade-hall basketball game.
- Giant flippers.
- More Flintstones info.
- Vegas, baby.
- In case the full pinball table didn't make it clear, this is a pinball game. Hold that pinball, Freddy.
- Nightmare's game board.
- For a short spell, a few games capitalized on the popularity of *Caddyshack* by including old white dudes, golf, and pesky gophers. None of them officially mentioned *Caddyshack*.

Pinball is dying, if it's still alive at all. The major manufacturers have moved from creating pinball machines to slot machines for casinos, a business with a much rosier future. With even larger arcades only sporting one or two pinball machines, most likely emblazoned with licensed artwork from a popular movie or TV show, enthusiasts of the game are forced to look backward for their joy, not forward.

"Pinball has seen a steady decline since the 90s. Chicago used to have many manufacturers that cranked out thousands of games each year. In the 80s and 90s, video games became popular and pinball sales suffered," Karl Marsicek explained to Ars. He knows a little bit about the lost art of pinball: his basement houses a collection of machines he has bought and restored. "There is only one manufacturer left, Stern Pinball. They put out about 4 or 5 new titles each year, just a fraction of what

manufacturers were cranking out in Pinball’s glory days.”

As a hobby, collecting and restoring pinball machines is tough. The machines are loud, large, heavy, and expensive. The problem is, if you can’t play a game at your local arcade, the only place left is your own basement. “The many machines that were produced in the ’80s and ’90s have reached the end of their life cycle and are disappearing from bars and pizza joints,” Marsicek said. “Strip mall arcades are just about extinct because of computer games and gaming consoles. So pinball machines are getting hard to find.”

The beginning of the obsession

Everyone remembers their first love, and for Karl, his was named Bad Cats. He first saw the machine at a resort in Indiana, on the way to a club on an early date with his wife. They never made it to the club, although he did pump a significant amount of money into the machine over the next few hours.

“I remember really liking the cheesy art and sounds on the game and thinking, ‘I gotta have one of these!’ I wrote the name of the game and the manufacturer on the back of a business card and stuck it in my wallet, and decided that after we bought a house I’d look into buying one.” It wasn’t an idle threat. Five years later he had his home, and he started looking for that machine. It turned out that Bad Cats was a machine with a low production number, so it wasn’t as simple as sending someone a check. Proving his dedication, he looked for a year, until two units showed up on eBay. He bought the better-looking machine and had it shipped to his house.



//cdn.arstechnica.net/Gaming/pinball1.jpg

The problem? The game didn't work properly when it arrived, and no one in the area knew how to fix it. "But it turned out to be a blessing in disguise because it forced me to open up the game and find resources on the Web. I was eventually able to fix everything that was broken on it and it still sits in my basement," Marcizek said. Soon he knew other pinball enthusiasts and began attending shows. He bought jukeboxes, slot machines, and restored other coin-operated amusements. "But my real passion is with pinball machines," he stressed.

Remember folks, these machines had actual moving parts

Time is not kind to pinball machines. "Electromechanical games—games with score reels instead of digital displays—have hundreds of switch contacts that are engaged when the game is turned on or a ball hits a playfield switch," Marsicek told Ars. "If the machine sits for a long time, corrosion can build up on the switches and when you turn the game on the corrosion can prevent circuits from completing… The switches can be cleaned and adjusted." It's easy to do, but of course this requires a little bit of a time commitment.

“Solid-state games with digital displays typically have 3 AA batteries installed on the boards. The batteries back up custom settings when the game is unplugged, such as pricing info, high scores, etc.” It may seem easy to just swap out the batteries, but if the machines haven’t been taken care of, there can be more issues. “The problem is that the batteries often don’t get changed and start to corrode, then damage the circuit board. Some other components on solid-state games, like capacitors on circuit boards, reach the end of their life expectancy and need to be replaced.”



Ben Kuchera

So what does Marsicek do when he buys a new machine? “Every game is different; some are well maintained by the previous owner and some don’t even power on. Before I try to turn it on, I check to make sure that all the correct fuses are installed and look over the machine for obvious problems like battery corrosion and wires that are broken or have missing/burnt insulation.” The next step is checking any included diagnostic menus for errors, and on older machines he checks each switch and coil to make sure everything is still

in working order. Broken parts are fixed or replaced.

“After that I clean and wax the playfield, replace any missing or worn playfield rubber, replace burnt out light bulbs and install a new ball. Then I call my kids in and we play test it!” It’s not an easy or short process, but the rewards are great. “It sounds like a lot of work, but it’s not usually that bad… The games are designed for commercial use, so if you spend a little time looking things over they will last a long time in a home use environment.”

There are also great resources online. “Clay Harrell has written an online pinball repair guide that outlines maintenance tips for different generations of pinball machines, including steps to take before turning a game on for the first time. I always check his site for additional steps, especially if I am unfamiliar with the game generation or manufacturer. The guides are at http://marvin3m.com/fix.htm.”

http://arstechnica.com/gadgets/2009/07/fixing-the-past-the-art-of-collecting-pinball-machines/

The DMCA bell did not toll for a beloved musician—thus, I could grieve him



Enlarge / Bass guitarist Mark Sandman and saxophonist Dana Colley in concert with their band Morphine in the ’90s.

reader comments

18 with 18 posters participating, including story author

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I’m a firm believer in the power of a live performance. A television broadcast or DVD doesn’t capture the same thing as a theatrical production or a concert. You gotta be there.

But what about when you can’t? What recourse is there when you’re in love with an artist or performer who you can’t physically interact with for any number of reasons?

I’ve thought about this for decades from a few perspectives: as a former full-time music critic; as a frequent chronicler of how information is presented and exchanged online; and perhaps most of all, as a music fan who had one freaking band slip through his hands.

I will never see my favorite songwriter in concert, right in front of me, reacting to my cheers and enthusiasm. But if any performer was going to vanish just as I teetered into my concert-going years, at least this one had some surprises for me five, 10, even 20 years later, all just a few mouse-clicks away.

“I was little, I didn’t know $#!*”

If you’ve heard of the musician in question, Mark Sandman, you likely travel in some select music circles. Sandman was best known as the lead singer and bassist for the Boston-area rock trio Morphine, who rose to mid-level, college-radio fame in the mid-’90s. Theirs was a unique sound: just bass, drums, saxophone, and vocals, swirled together in a style that Sandman dubbed “low rock.” Saxophonist Dana Colley played his baritone sax like a guitar, while Sandman’s unique slide-bass style favored thudding chords and far-from-subtle grooves.

I found out they existed the same way a few thousand people from my generation did: by a quick-hit report on MTV News. The cable channel would occasionally air five-minute vignettes about up-and-coming bands, usually when they’d signed to mid-level record-contract deals. Morphine’s “You Hear It First” snippet wasn’t well preserved; I’ve struggled to find it online over the past 20-plus years, but I can pin it to a specific era and a specific friend who I watched it with. One of those seared-in-the-brain childhood memories.

But at that age, if it wasn’t in a BMG or Columbia House catalog (“10 albums for one penny!”), I pretty much couldn’t buy a CD in question. So my real appreciation of the band was held up a few years, until I started going to the local used CD store to spend whatever part-time job money I hadn’t spent at Software At Cost Plus 10% (an actual store in Dallas for a few years). I flipped through the CD store’s “new arrivals” bin, where the good stuff usually hid before getting

alphabetically sorted by staffers. One time, I found a Morphine motherlode. I bought it all.

Were I typing this article at a music-centric site, I might regale you with a lengthy, overwrought description—one of exhilaration at the band's crunching, unique-sounding riffs, another of my love for Sandman's straight-to-the-gut lyrics, and a third about how foolish I immediately felt for not looking up their albums sooner. Instead, I'll just embed a song.

[embedded content]
"Radar" by Morphine (alternate studio take).
I knew this was outside the normal rock-radio realm of the time, and I also quickly figured out that not every band with a CD at my local store had quite "made it." That was OK for me. I didn't fit in at my school. It was cool to have a band to reinforce that feeling—something weird, edgy, catchy, and poetic that didn't require me to dress like a metalhead or a goth.

But as I hinted earlier, my increasing fandom didn't go according to plan. My hopes of eventually seeing Morphine in concert fell apart 20 years ago this week. On July 3, 1999, Sandman died at the age of 47, shortly after suffering a heart attack in the middle of a concert in Rome. No foul play or drugs were detected; Sandman had a history of congenital heart failure in his family, and he'd brushed aside troubling symptoms earlier that day. The rest of that 1999 summer tour was, unsurprisingly, canceled. I had just turned 18 and would've finally been able to see them at age-restricted venues.

"11 years later, still don't know any better"

I know a lot about Sandman's death. I also know a lot about

the album that was about to launch when he died, about the other bandmates' efforts to create a tribute concert series in the wake of the tragedy, about a pair of documentaries about Sandman's legacy, and more.

I wasn't nearly as encyclopedic about Morphine at the time. In hindsight, I realize how numb I was to Sandman's death. Other musicians I really liked in my teens had come and gone: Kurt Cobain, Layne Staley, and Shannon Hoon, just off the top of my head. And my fascination with music was only beginning to blossom; barely two months after Sandman's death, I had moved to Austin for college, where I became a live-music addict. Between cheap concerts and free file-sharing downloads, I was distracted.

My mourning period for Sandman didn't really land for some time. I've come to realize that's typical for grief, in terms of life events reminding us of the people and things we miss. But my first blush with this about Sandman came from a surprisingly geeky source: Soulseek, one of the many peer-to-peer file-sharing apps that littered the post-Napster landscape. I favored Soulseek's simple interface over the bloated likes of Kazaa and Limewire, and I loved its default encouragement to pick through uploaders' individual libraries. Search for a Weezer song, then pick through a Soulseek uploader's full collection, and you might find other Weezer rarities, if not other exciting new bands.

In Morphine's case, Soulseek introduced me to a surprising number of bootleg concert recordings, which I found while trying to fill out my collection of the band's B-sides. Some of Morphine's bootlegs came from jam-band fans who'd been to the Horde Festival. (Morphine weren't a jam band by any stretch but got booked at Horde for some reason.) Others just came from die-hard fans. Most of these sets included clearly recorded introductory speeches from Sandman: "Ladies and gentlemen, we are Morphine, at your service."

This wasn’t the same as grabbing albums and B-sides. These were documents of a band experience I’d never, ever get to see. I’d finally started going to a ton of concerts (and even bootlegging a few local favorites). For the first time, I felt myself trying, and failing, to fill in the gaps of a missed experience.

[embedded content]
“Virgin Bride” by Morphine.
Still, I loved the songs, so this material tided me over before the handlers of Sandman’s estate began officially unearthing a mountain of posthumous output—enough to make the Tupac Shakur estate blush. Sandman invested in a home studio early in his career, which he dubbed “Hi-N-Dry Studios,” and there, he put countless experiments and musical ruminations down on tape (not on hard drives). This was still the era of the B-side and single, which meant a few of these weird one-off songs had reached retail before his 1999 passing. (A personal, macabre favorite is above.)

The first major issuance of posthumous material came from a 2004 three-disc box set, simply titled *Sandbox*, which included a surprising number of entirely new songs. Sandman dabbled in a number of side projects, particularly the trippy, techno-laced Hypnosonics, and I was overjoyed to finally get my hands on more recorded examples of his oeuvre. The sentiment quickly grew bittersweet. Was it easier to miss Sandman with more songs to enjoy? Or was it harder to miss him with the realization of how surprising and diverse his output really was?

In the years since *Sandbox*‘s launch, even more music has emerged. What’s more, his musical legacy has fallen into a strangely sweet spot on the Internet: big enough to have a huge number of fans uploading all manner of bootlegs and rarities, yet small enough to avoid a DMCA smackdown. I cannot recall any videos from my long-running “SANDMAN/MORPHINE” bookmark folder drying up due to a copyright claim, in spite

of his biggest studio albums being available for purchase (let alone some snazzy vinyl re-releases).

“It’s way too late for me to change”

The best stuff all seems to come from one YouTube channel, in operation for a little over two years, with a strange nickname attached: Sito Lupion. As I’m writing this from the perspective of a fan, not an embedded member of the Boston music scene, I don’t have any personal insight about who this person might be. But as a rabid Mark Sandman fan, I can assure you, they have some incredible level of access to Sandman’s personal archives.

Bootlegs. Previously unreleased songs. Rare VHS rips of TV appearances. Alternate studio takes of the band’s biggest hits. Versions of songs that have previously only been released on vinyl (meaning, no digital-download option).

Sito Lupion’s channel includes a few videos of the band’s hits, clearly tailored for newcomers, but most of the channel plays out like a gift to the hundreds of people who, like me, became infatuated with Sandman’s brief-and-shining period of artistic output. Even in the week-long run-up to this week’s sad anniversary, the channel managed to post entirely new songs and recordings.

As a result, I’ve gotten to “attend” dozens of concerts that I otherwise never got to see as a kid. Morphine rarely toured the American South, and when they did, their shows were usually at 18+ or 21+ clubs, which wasn’t much help for my born-in-1981 self. I’ve since attended concerts featuring the band’s remaining members (Twinemen, Vapors of Morphine), and I’m glad for it. Dana Colley in particular is a saxophone player beyond compare (and I say this as a guy who both loves certain jazz eras and detests most rock bands’ experiments

with wind instruments).

“I hope I’m sittin’ on the back porch”

[embedded content]
“Take Me With You” by Morphine.
But Sandman was *the* guy, and on the Internet, to me, he still is. I’ve gotten to see so many Morphine shows on YouTube that I have started to pick up on band mannerisms, on slight experiments and alterations of a given song, on the band’s ability to pace their setlists and keep audiences in a frenzy. I’ve watched Mark’s eyes look steadfastly at a crowd, through bright lights and thick smoke, while telling the same sad stories he’d told the others: “You look like rain.” “Candy says she wants me with her, down in Candyland.” “She said, ‘Fill it up and send it back.'”

The Internet is sometimes a terrifying place. So many semi-anonymous voices make so much noise, all clamoring desperately for attention, for real-time appreciation, for responses that can be numerically valued. Loving an artist like Mark Sandman feels like a completely different feedback loop than that. One where songs are shared, memorized, and celebrated in sweaty, dingy communities like record shops and nightclubs. Where noise, feedback, and cheering become their own symphony, a combined din that sees people coming together to be lovesick, sad, hurt, and healing together.

Sandman was a product of that era, and the Internet (meaning, its many denizens and the sites that let them share and host songs and videos) did the next best thing for me. The Internet waited for me to catch up as an adult, as someone willing to face emotions and grief, and made sure I had a front-row seat to Sandman’s sermons about all of it when I was ready. So, thanks for that, Mark and friends.

It’s the kind of thanks that easily gets lost in copyright debates, where estate handlers clutch pearls and giant companies battle the possibility of expiring copyright laws. My story is but one anecdote (and one that doesn’t take Sandman’s surviving family and record labels into account). I don’t mean to flatly beg for all leaked music to be free, with no compensation or attribution. I just mean to say that this artist’s online collection has made grief a little easier for the hundreds who subscribe to his memory. Whether your own artistic grief lands with Sandman or any other artist given a new lease on life via the Internet, I invite you to join me.

https://arstechnica.com/?p=1531003

Behind the 12-year-old Wii Sports hoax that briefly fooled the Internet

reader comments

25 with 23 posters participating

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Before his resignation in late 2017, Uber’s then-CEO Travis Kalanick faced more than his fair share of scandals. But by far the most (read: least) important of these was Kalanick’s oft–repeated claim that, at one point, he “held the world’s second-highest score for the Nintendo Wii Tennis video game,” as a New York Times profile confidently stated without qualification.

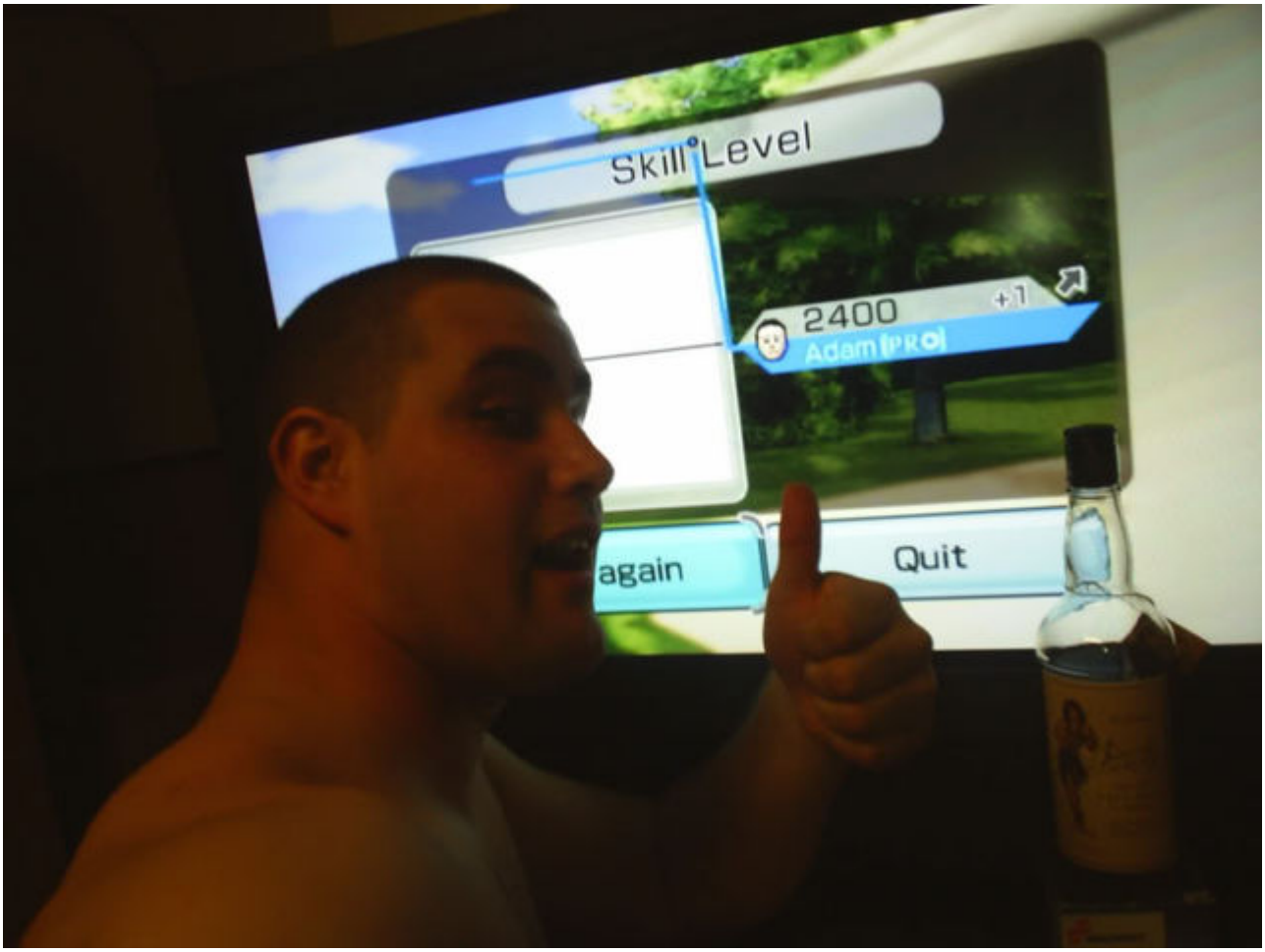
Ars dug deep to get at the truth of this claim, publishing a 3,000-word expose that proved definitively (read: probably) that Kalanick was really just confused about what it means to have a “high score” in a game like *Wii Sports Tennis*.

Now, over two years after that blockbuster report shook the world of tech-executive video game high-score competition, new information has come to light that has the potential to revolutionize our understanding of this important (read: pointless) story yet again.

Wait, what happened?

First, a partial recap: the closest thing *Wii Sports Tennis* has to an overarching “score” is the player’s “skill level.” That’s the Elo-style measure of performance that goes up and down depending on how well you do against the computer-controlled AI.

Based on a formula derived by a truly obsessive *Wii Sports* Tennis player, it takes roughly 160 perfect 40-Love matches against the game’s computer opponents to raise your skill level to 2399. After that, the skill level asymptotically approaches but never quite reaches the mythical 2400, since the game’s internal decimal always gets rounded down to 2399 for the on-screen display.



Enlarge / Unless there's some magical, unknown way to alter photos, this is definitive proof of a 2400 *Wii Sports* skill rating.

The only semi-credible claim to the contrary comes from an unsigned post to defunct Web host 250free back in early 2007 (archived here). The anonymous poster (who posed with a Mii avatar named "Adam") wrote that it took "nearly 20,000 games" and over 900 hours of play across 78 days to get from a 2399 rating to a 2400 rating. A counter displayed on that page suggests more than 60,000 people read Adam's story.

The truth of that anonymous claim was always questionable, even with the "photographic evidence" of Adam posing in front of a screen showing a 2400 rating. The important thing, for our purposes, was that the claim itself existed online in the late 2000s, when Kalanick could plausibly find it and perhaps cite it as evidence that his presumed 2399 rating was "tied for second."

A message from the past

Keep all that in mind and imagine my reaction when I got an email that led off with the line “My name is Adam Haller, and I’m the shirtless guy in the 2400 Wii Tennis picture.”



Enlarge / Our little “Adam” is all grown up, and he found a shirt!

Haller, who later confirmed his identity with a more modern (shirted) photo, went on to lay out the details of his hoax from more than 10 years prior (lightly edited here for clarity):

> *I just wanted to let you know that there was a global leader-board at some point for Wii Tennis. It wasn’t hosted directly by Nintendo but a website similar to highscores.com (I can’t recall the exact URL) [Editor’s note: He may be thinking of the defunct wii-records.com].*
>
> *What I can remember is that, when I played this game, I spent*

> *a few weeks getting to the score of 2399 and at that time took the picture. Afterwards, I decided to Photoshop the picture to say 2400 instead. Mainly to mess with a friend of mine who I played with a lot. I submitted the photo to the ranking website, and for some time they had me in the top slot, but they kept asking for video confirmation, which I obviously couldn't give them. They eventually removed me.*
>
> *During that same time period, I created a website on 250free.com to blog about it. I then submitted that website to Digg and created several fake accounts to up-vote it a few times until it got some traction. I also posted the website to several other Wii Sports forums, under false accounts to give it additional hype. I relished in the comments people posted about it, some claiming they had been trying for weeks to achieve the same thing, which is likely impossible to do. I thought it was funny to imagine people trying to match this impossible feat.*
>
> …
>
> *I hope this information hasn't come out too late. I no longer like the idea of people spending a crazy amount of time to match the 2400 score thinking its possible when it's not.*

There you have it. A confession, from "Adam" himself, that the claimed 2400 skill rating that was once recognized far and wide (read: on some old Web forums and a defunct online high-score board with a half-remembered URL) was a hoax!

On the one hand, this is good news for Kalanick, who can now be completely confident that his presumed 2399 skill rating is not "tied for second" in the world but actually tied for first! That "rating" isn't really a "high score" achievement akin to a perfect game of *Pac-Man* or anything, but it does show a decent amount of singleminded devotion and repetition on Kalanick's part. So good for him.

On the other hand, it means Kalanick was apparently among those fooled by some shirtless trickster who happened to have access to a digital camera and some basic Photoshop skills in 2007. As usual, the moral of the story is to be intensely skeptical of anything you read on the Internet. Even this!

Listing image by Adam Haller

https://arstechnica.com/?p=1531589

Space and booze, an anecdotal history

reader comments

15 with 10 posters participating, including story author

Share this story

- Since this is a cocktail conference, *every* seminar needs a tasting. This riff on an Old Fashioned was inspired by Comet Lovejoy, “which is effectively a massive Old Fashioned—alcohol and sugar—slinging itself along the universe,” said bartender Tristan Stephenson.
  Nathan Mattise
- The final tasting arrived in these appropriately science-y vials…
  Nathan Mattise
- Nathan Mattise

NEW ORLEANS—”Half a century ago, this was an essential part of spaceman culture,” said Jeffrey Kluger, senior writer at *Time*

and author of the book that inspired *Apollo 13*. Presenting at the world's best alcohol event, Kluger wasn't referring to old astronaut traditions like military experience or crew cuts. "Test pilots were male, under 6-feet tall, and had to be a tough and tireless drinker."

Tales of the Cocktail 2016 continued the conference's trend of sneaking science into a series of bar industry seminars. Food scientists from Bacardi discussed internal testing on carbonation in liquor, and alcohol alchemist Camper English unveiled his tireless research on the compounds and combinations that can be lethal (or at least really, really bad) when unleashed in our cocktails. But this year's schedule also featured what seemed like a peculiarity—a panel titled "Cosmic Cocktails: The Final Frontier" that outlined the informal history of NASA and drinking.

According to Kluger, the intertwining of highballs and high altitudes was inescapable—a natural evolution of the downtime imbibing of previous military generations. For many of the US' early space pioneers, this part of training took place outside Southern California's Edwards Air Force Base at a vast and communal pub in the Mojave Desert called the Happy Bottom Riding Club (fittingly considering its clientele, the bar was created by Pancho Barnes, a pioneering female pilot who had bested Amelia Earhart's air speed record at age 29).

"Chuck Yeager, Buzz Aldrin, Al Shephard all learned to fly at Edwards, and at the Happy Bottom they learned to drink," Kluger said. He soon brought up author Tom Wolfe's famous look at early space culture, *The Right Stuff*, which conveniently namechecks Pancho's when discussing the drinking base with a flight habit.

"Yeager didn't go to Pancho's and knock back a few because two days later the big test was coming up," Wolfe writes. "Nor did he knock back a few because it was the weekend. No, he knocked back a few because night had come and he was a pilot at Muroc.

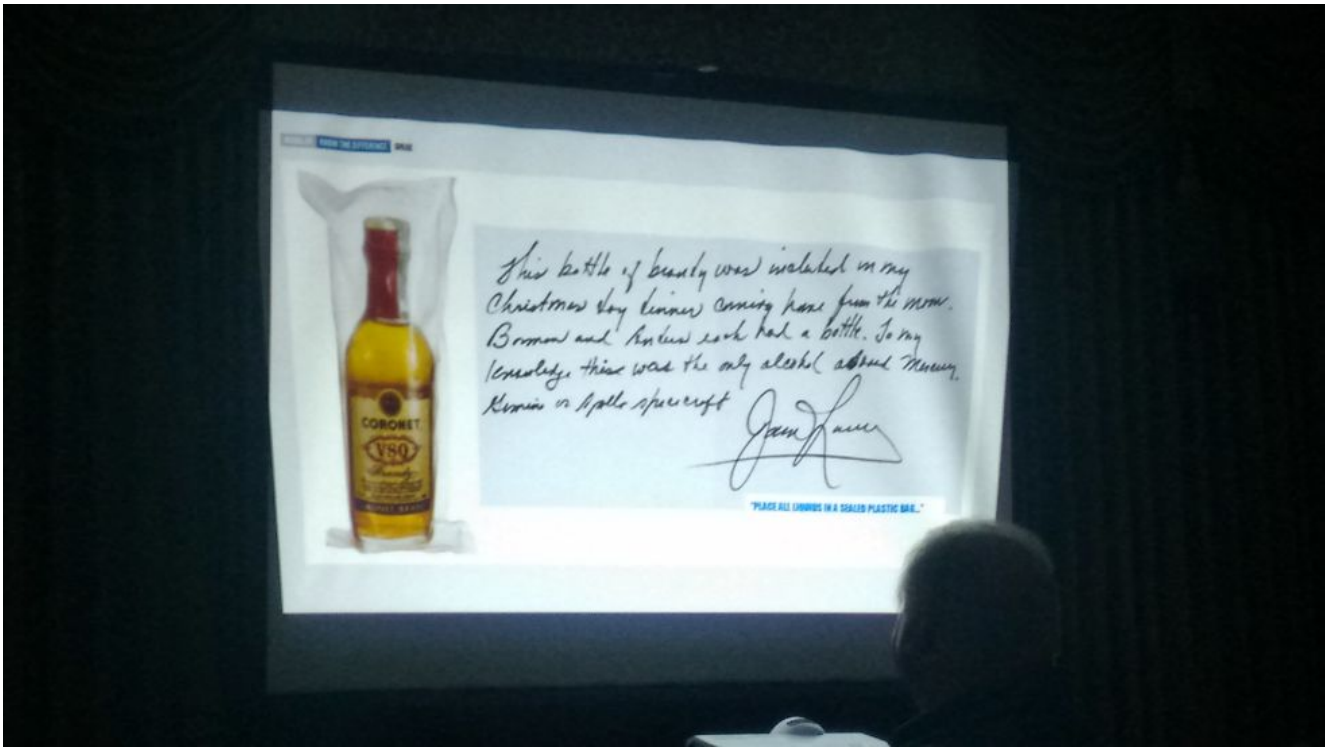
In keeping with the military tradition of Flying & Drinking, that was what you did for no other reason than that the sun had gone down."

Bars still thrive near NASA bases, Kluger pointed out, but the protocol for space travel has become more controlled. "With the nature of modern space travel, you have to trade the open environment of Earth for a sealed environment," he said. "What you eat, what you drink, and what you breathe is parceled out. There's not a lot of room for drinking alcohol."

NASA had and continues to have a "no alcohol" policy for orbit, but some booze has made it to space. Kluger cited Apollo 8 (1968) as the earliest example. While Commander Frank Borman, Command Module Pilot James Lovell, and Lunar Module Pilot William Anders became the first crew to travel beyond low Earth orbit and see the far side of the Moon, they were also astro-alcohol pioneers.

Apollo 8 flew over the Christmas holiday, so NASA wanted its crew to have a proper meal, according to Kluger. The writer mentioned dehydrated bacon cubes and turkey gravy stuffing tied in fireproof ribbon and warmed by a hot air gun. And the drink? Coronet Brandy.

"They were to become the first humans to drink above the world," Kluger says. "But Borman confiscated the bottles. 'If there's any problem with this spacecraft, they're going to blame the brandy.'" (Kluger recently visited with all three men, and they each still have unopened, future-collectors'-items nips of Coronet.)



Enlarge / “This bottle of brandy was included in my Christmas Day dinner coming home from the Moon. Borman and Anders each had a bottle. To my knowledge, this was the only alcohol aboard Mercury, Gemini, and Apollo spacecraft.—James Lovell”
Nathan Mattise (slides from TOTC and Jeffrey Kluger)

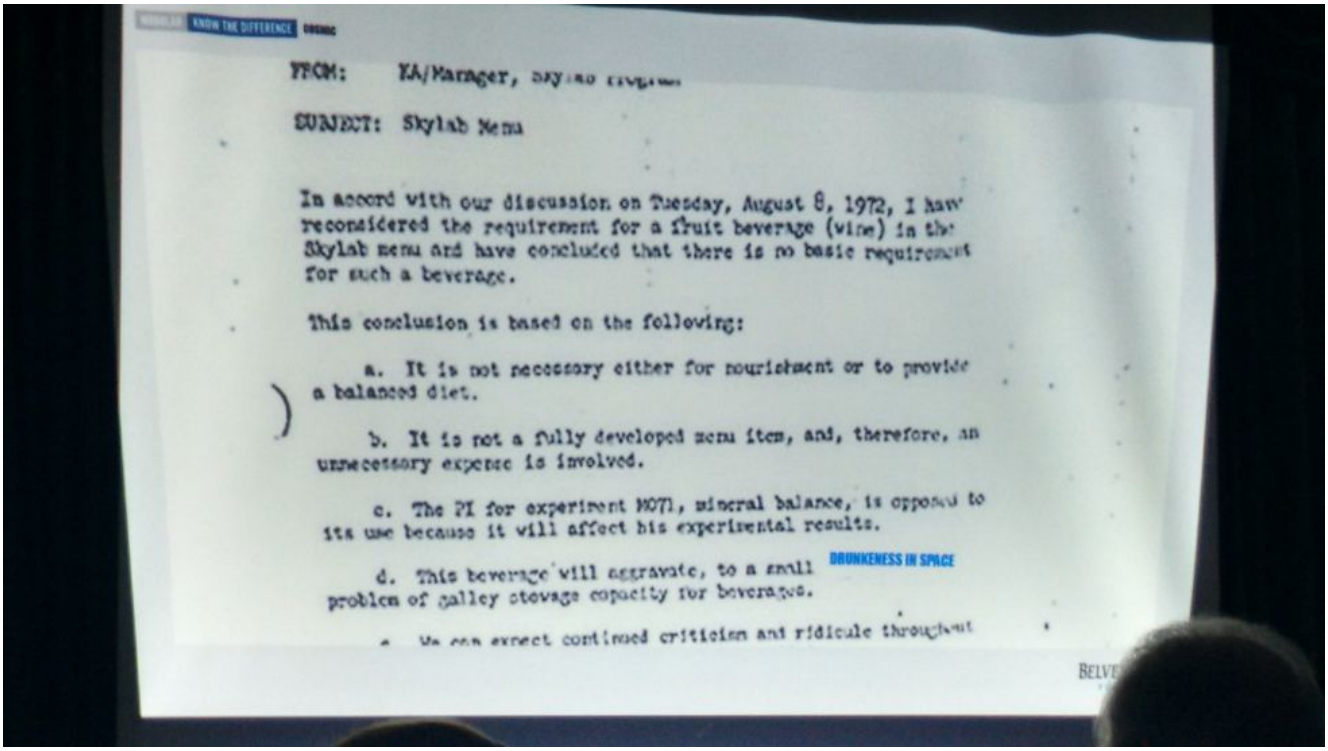
But just as humanity wouldn’t be kept from the Moon, humanity in space couldn’t be kept from a beverage. Just before the Apollo 11 crew took humanity’s one small step, they took mankind’s first sip, too. Buzz Aldrin had quietly brought some wine and bread from his church to celebrate Communion. “NASA didn’t really talk about it—government agency and religion, after all—so he radioed down for a moment of silence to simply give thanks,” Kluger said. Only Neil Armstrong witnessed the historic event, but Aldrin later wrote about the experience and shared with the public: “I poured the wine into the chalice, the wine curled slowly and gracefully up the side of the cup.”

(A booze bonus for those pioneers: when the Apollo 11 crew came back and prepared for three weeks of quarantine, NASA had an appropriate care package. “To make confinement easier, they were met with a bottle of scotch and ice,” Kluger said. “To make it harder, they were met with Richard Nixon.”)

In 1972, NASA formally visited the idea of alcohol in space. As aspirational missions grew longer in duration, the agency wanted astronauts to have higher-quality creature comforts (so, better food and possibly wine or liquor). Partnering with UC Davis to vet ideas for use on the Skylab space station, NASA's top proposal initially involved sherry. Since the dessert wine must be heated during the creation process, it was viewed as very stable and unlikely to change during the reprocessing and repackaging necessary to send a liquid to space. Testing was set to commence. (As Gizmodo points out, *The Milwaukee Journal* went so far as to declare: "the era of prohibition is about to end in space.")

Sadly, space sherry was not meant to be. When tested in the fabled Vomit Comet, imbibers embraced the stereotype. Another NASA official soon caused further backlash when he mentioned the testing in a public forum. Eventually Kenneth S. Kleinknecht, Skylab's manager in Houston, sent out an official memo concluding there was "no basic requirement for such a beverage." In 2006, space historian Jennifer Ross-Nazzal acquired Kleinknecht's memo through a Freedom of Information Act, and Kluger shared her findings during his presentation:

> *This conclusion is based on the following:*
>
> *a. It is not necessary either for nourishment or to provide a balanced diet.*
>
> *b. It is not a fully developed menu item, and, therefore, an unnecessary expense is involved.*
>
> *c. The PI for experiment MO71, mineral balance, is opposed to its use because it will affect his experimental results.*
>
> *d. This beverage will aggravate, to a small degree, a minor problem of galley stowage capacity for beverage.*
>
> *e. We can expect continued criticism and ridicule throughout the Skylab Program if such a beverage is provided.*



Enlarge / Jennifer Ross-Nazzal with the best FOIA ever.
Nathan Mattise (slides from TOTC and Jeffrey Kluger)

Today, there's still no alcohol in space under NASA's supervision (Scott Kelly waited until he got home to have his first beer). But Russian cosmonauts—who, in the past, *have* enjoyed alcohol in space—may be keeping their own traditions alive. In 2010, a retired cosmonaut revealed that authorities would sneak alcohol into supply missions for Mir to keep spirits high and stress low. The ISS currently has Russian segments side-by-side with the American portion. "There are no accounts of Americans going to Russians for a shot or two," Kluger said. "But experts agree what happens in the Russian segment stays in the Russian segment."

The future of space and booze may ultimately be rosier. High-profile experiments like Coors helping a grad student ferment beer in space or Ardbeg testing out whiskey aging in zero-gravity speak to our future desires for both self-sustaining space resources and beyond-Earth tourism. NASA itself might have even furthered the cause earlier this year when it learned that tech intended to make Martian resources usable could also recycle fermentation-created CO2 for brewers.

Kluger’s co-presenter, bartender Tristan Stephenson, was quick to point out that our drinking habits would need to adapt to the conditions. In particular, carbonated options like champagne, beer, or a Tom Collins likely wouldn’t be viable.

“Aesthetically, bubbles don’t work the same,” Stephenson said. “When prepared on Earth, bubbles are more buoyant, and they travel up. In space, there is no up, and they clump in the middle until disturbed. It kind of looks like a congealed mess.”

Beyond looks, the bigger issue would be how those bubbles work within astronauts. On Earth, as Stephenson pointed out, gravity helps keep what we ingest down. Gases then separate and rise, leading to burps. But in space, gases, solids, and liquids can intertwine without gravity to separate them. “You can’t burp in space,” he said. “Well, you can, but you’d probably throw up at the same time.”

So for future space tourists to enjoy anything-and-soda after switching from scotch, artificial gravity will need to become more widespread. “It’s possible. A rotating cylinder or wheel on a station can create enough centrifugal force to give you a gravity-type effect,” Stephenson said. “But creating a rotation deck on a space station is quite a lot of work for a gin and tonic.”

Listing image by Nathan Mattise

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Adieu Thrones, bye Avengers—this is the TV/film we're eyeing for the rest of 2019



reader comments

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Coming into 2019, it felt like pop culture only had two things on its mind: the final season of *Game of Thrones* and the final chapter in Marvel's *Avengers* saga. Looking back from the half-way point in the year, hey, at least one of those delivered.

Of course, pop culture is never that straightforward or simple, and 2019 so far has brought plenty of delightful surprises. Netflix finally hit on another series with the loop-y *Russian Doll.* Jordan Peele followed up perhaps the most beloved horror movie in years with another winner

called *Us.* And maybe HBO didn't please everyone with the last chapter in Westeros, but seemingly *everyone* has adored the company's surprise historical hit, *Chernobyl*, to say nothing of the (currently airing) delightfully weird supernatural comedy, *Los Espookys.*

But we're getting ahead of ourselves. Around Ars, we don't really indulge in Best Of list-making until December rolls around, and there's a simple reason for that: six more months of highly anticipated stuff and out-of-nowhere surprises await all of us. So as folks work their way through a certain hyped Hawkins, Indiana, show this weekend, don't worry about binging too fast and being without something new and exciting on the horizon. Here's the pop culture from the rest of 2019 that already has us counting down the days.

[embedded content]
The trailer for the first season of *Mindhunter.*

Netflix's second-best show?

With *Stranger Things*' new season out as of this round-up and *Mr. Robot*'s final season not officially pegged to Christmas time yet, the obvious candidates for 2019's best-yet-to-come have been taken off the table. And something like Fantastic Fest—the annual Austin, Texas, genre film event that brought us alien love documentaries, Anne Hathaway as kaiju, and a film entirely set in a 911 dispatch center—can practically top my anticipation rankings every year.

So instead, my mind travels back in time to 1970s' Pittsburgh and DC to an unlikely trio trying to read the minds of a more deranged set. Netflix's *Mindhunter* originally seemed like a quick but forgettable green light: grab a dude from *Hamilton*, make him some kind of authority figure in a crime thing, and darken up the story a bit. Then I watched the show's first David Fincher-produced season and suddenly understood why everyone obsesses over true crime as a genre. *Mindhunter* is

much, much smarter than your average *Law & Order* as it follows the origins of the FBI's criminal profiling division while it attempts to understand the known serial killers of the era in order to prevent future ones from striking.

Jonathan Groff (the *Hamilton* guy) plays upstart FBI agent Holden Ford, a man obsessed with the job and with making his way up the bureau food chain. His odd-couple (err, trio) team of Bill Tench (Holt McCallany as a grizzled, skeptical FBI vet) and Wendy Carr (Anna Torv as an academic psychologist in it for the research data) sizzles every time they're interacting in a scene. That's saying something considering how dynamite Ford's direct interactions with killers can be (Cameron Britton is a revelation as serial killer Ed Kemper, an intimidating physical presence happy to indulge in a little narcissistic "talk about yourself" exercise regularly). The show demonstrates, at times in cringing detail, that the line between hyper-focused good guy and demented, dangerous villain may be thinner than anyone cares to admit. And with all-time evil like Richard Speck showing up S1, the stakes are likely about to get even dicier for Ford and co. as they move further into the era of Charles Manson et al.
—Nathan Mattise, Features Editor

[embedded content]
The one trailer that needs no introduction.

Star Wars Episode IX: The Rise of Skywalker

I suspect I will never like the name, no matter how I end up feeling about the film. But Star Wars was foundational media for me as a kid. The first fanwear I ever remember having was a set of R2-D2 Underoos. John Williams' soaring scores are entirely why I ended up playing French horn. The original trilogy, especially the soundtracks, are part of what set me on the path that eventually led to film school, arts

criticism, and, indirectly, my entire career.

My inner six-year-old is still giddy at what I've gotten to see on the big screen in *The Force Awakens* and *The Last Jedi*. And my outer adult is giddy at the fact that I can bring my actual six-year-old daughter with me to see this conclusion in the theater later this year.
—Kate Cox, Tech Policy Reporter

- Things are not going as planned in the trailer for *Ready or Not*.
- Of course the zombie outbreak spreads in *Little Monsters*.
  YouTube/Sundance Institute
- Jesse Custer (Dominic Cooper) faces off against childhood nemesis Jody (Jeremy Childs) in the season 3 finale of *Preacher*.

All the horror comedies

I'm most looking forward to a couple of quirky entries in the horror/black comedy genre. Up first: *Ready or Not*, from Fox Searchlight, is slated for theatrical release on August 23, 2019. Grace (Samara Weaving) is thrilled to be marrying into a wealthy gaming dynasty, the Le Domas family. Her eccentric new in-laws insist it's family tradition to play a game at midnight after the wedding; only then will she be a true member of the family. The game: Hide and Seek, except it turns out that Grace is the prey who must elude detection until dawn to avoid being killed in a bizarre ritual sacrifice. The trailer makes this film look smart and wickedly funny, especially given her in-laws' utter incompetence with weaponry. Learn to shoot a crossbow already!

From there, I turn to *Little Monsters* starring Lupita Nyong'o as Miss Caroline, a perky kindergarten schoolteacher who takes

her kids on a field trip to Pleasant Valley Farm just as a zombie outbreak occurs. The innocent excursion turns into a bloody fight for survival, and Miss Caroline must protect her young charges not just from the physical threat, but the threat to their innocence. She's helped by a failed musician named Dave (Alexander England), who's tagging along in hopes of winning her affections, and Teddy McGiggle (Josh Gad), a children's entertainer who also has romantic designs on Miss Caroline. Based on footage released by Sundance earlier this year, it looks like a blast—sort of *Zombieland* meets *Kindergarten Cop*. And I am here for that. The film doesn't yet have an official theatrical release date, but it's still playing the festival circuit (like Toronto's Fantasia Fest later this month).

Finally, the fourth and final season of *Preacher* debuts on AMC August 4, 2019. It's based on the DC comic series by Garth Ennis and Steve Dillon, and it follows the adventures of Jesse Custer (Dominic Cooper), a conman turned preacher who inexplicably becomes the case host for an entity known as Genesis (i.e., the embodiment of the World of God). That makes him a target for a religious order called the Grail, who wants to wield Genesis for its own nefarious purposes. In our year-end Best of TV list for 2018, we singled out a scene filled with a rapid succession of exploding Messiah clones, trying and failing to serve as host to Genesis. The sequence captured "all the over-the-top irreverence and operatic violence (and sometimes downright sacrilege) that we've come to expect from this singular series."

By season three's end, Jesse and the gang were heading for a showdown with Herr Starr (Pip Torrens) and the Grail for control of Genesis. If past seasons are any indication, it's going to be an insane, bloody, unpredictable ride.
—Jennifer Ouellette, Senior Culture and Science Reporter

Listing image by YouTube/Sundance Institute

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