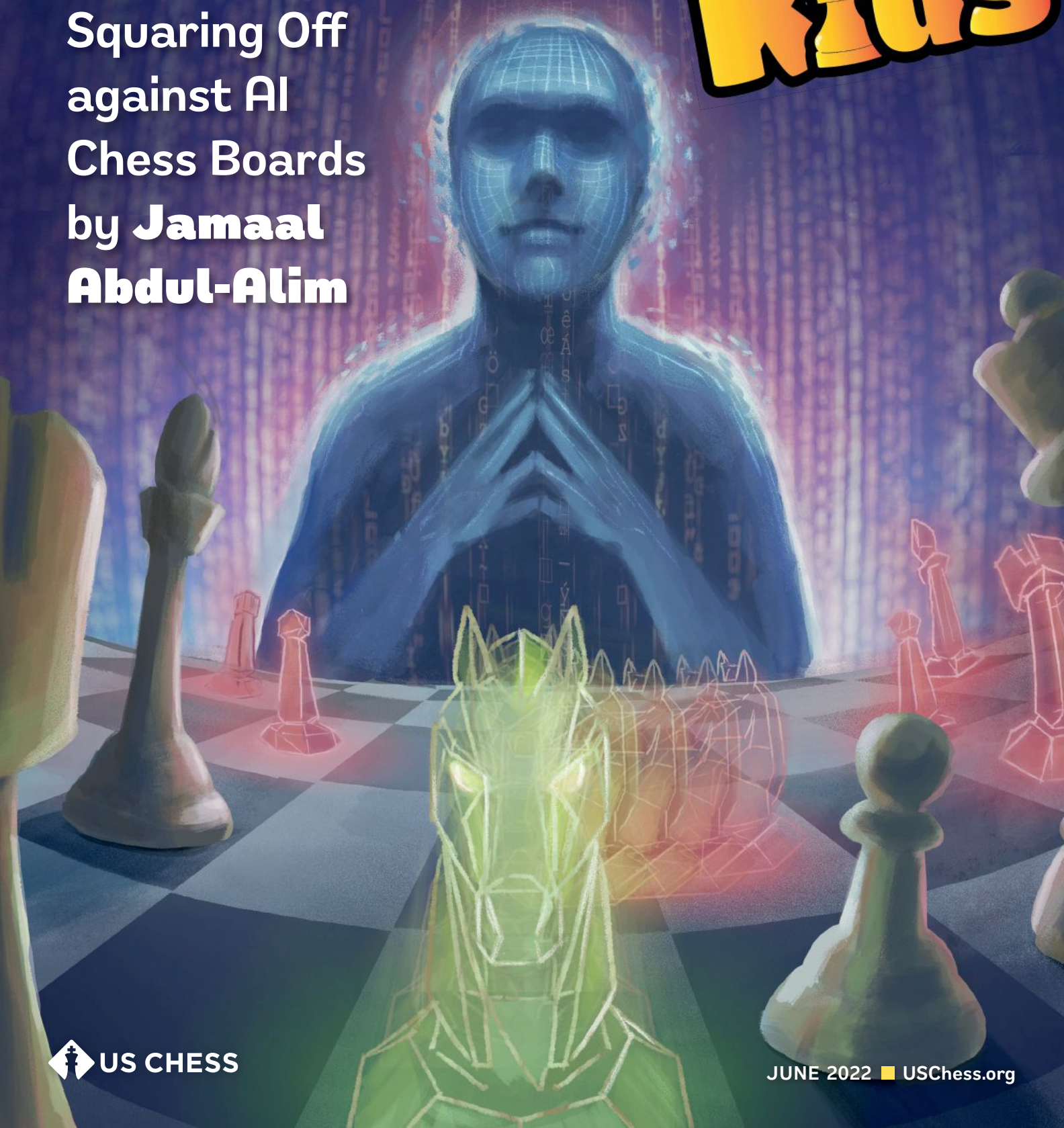# CHESSLIFE
Kids

Squaring Off against AI Chess Boards
by **Jamaal Abdul-Alim**

SQUARING OFF

BY **JAMAAL ABDUL-ALIM**

WHENEVER I BRING out my new Artificial Intelligence (AI) chess board that moves the pieces all by itself, my chess buddies always ask me to set the app that goes with the board to the highest level.

That would be level 20, which plays with an insanely high Elo rating of 3380. To put that figure into perspective, consider the fact that 3380 is more than 500 points higher than the rating of world champion Magnus Carlsen — the highest-rated player on the planet — who had a rating of 2864 as of April 2022.

Even though the top level for the AI board is stratospherically higher than the world's best player, my friends still want to play at that level. They believe the heightened competition will sharpen their game.

"To be the best one must play the best," my friend Chino says in explaining why he wants to play my AI chess board at nothing less than the highest level.

"One must actively learn from their mistakes," Chino continues. "I know I'm getting stronger because although I may be losing, I can predict the way the computer is going to win."

Indeed, Chino did in fact predict how my AI chess board would beat him when I brought the board to a private chess function in Washington, D.C., where we both reside, in early 2022.

Some of my friends want to play the board at the highest level so they can brag about how they defeated the machine if they win.

"I want to play at the highest level so I can beat it," says my good friend Johnny Blaze, who played against the board at one of D.C.'s most popular chess hot spots — the McDonald's across the street from Howard University — shortly after I got the board a few days before Christmas 2021. "To play at that level is definitely gonna be a great experience."

But is playing against a chess board connected to AI actually a good way to improve your chess?

A lot of people might be quick to say "yes." But sometimes, the best answer isn't always the most popular one. Which is why I decided to take my new AI chess board to have it play against one of the wisest men in the world of computer chess.

His name is GM Larry Kaufman.

A computer chess champion

Why do I think GM Kaufman is supremely qualified to speak about whether my new AI chessboard is an effective training tool? Well, for starters, Kaufman is the guy who co-developed a chess engine called Komodo.

In case you haven't heard, Komodo just happens to be the 2019 World Computer Chess Champion. I figure if this guy can design a championship-winning chess engine, he ought to have some pretty deep insights into my new AI chess board, officially known as the "Grand Kingdom Set" and manufactured under the brand name SquareOff.

So earlier this year, I put the board in a cargo bag and took it out to play against Kaufman at his home in Bethesda, Maryland.

Kaufman already had a board that was kinda like my new AI board. It's called a Revelation II, and it uses DGT — that stands for digital game technology — and inlaid lights that show you where to move the pieces being played by the computer program to which it is connected.

The difference with Revelation II, which uses Komodo's technology, is that you have to manually move the pieces to the squares suggested by the board. But with the SquareOff board, the pieces move by themselves.

"It's in a different category," Kaufman says when I ask him where my new AI board stands within the history of all the computerized chess boards that he's seen over the years.

"I very much like the concept," Kaufman continues. "It is novel to have it move its own pieces rather than look to see where the light

GM Larry Kaufman

is on and have to make the move for it. That's valuable to the extent that you find it annoying that you have to make the move for [the computer]. It's nice to not have to do that."

Kaufman was eager to play against the AI board. Unlike my chess buddies who always want me to crank it up to the highest level, Kaufman had me set the app to level 16, which plays at an Elo rating of 2205. Kaufman is currently rated at 2280.

It was interesting and sometimes funny to see Kaufman talk at the board as he got drawn deeper and deeper into the game against my SquareOff board.

"Really? That's a brave move," Kaufman said at the board during the first game, which unfolded as follows. Kaufman had the white pieces.

1. e4 e6 2. d4 d5 3. Nd2 Ne7 4. Ngf3 Ng6 5. g3 h6 6. Bg2 b6 7. exd5 exd5 8. O-O Nc6 9. c4 Bd6 10. cxd5 Nce7

11. Nc4 b5 12. Nce5 Bf5 13. Qe2
"Computers are materialistic. I'm guessing if I go here, it's going to defend the b-pawn."

13. ... Qb8 14. Nc6 Qc8 15. Qxb5 Nxc6 16. dxc6 O-O 17. d5 Re8
"I think I should bother his bishop. Yeah, that's a good move. Oh, I'm not so sure."

18. Nd4 Be4
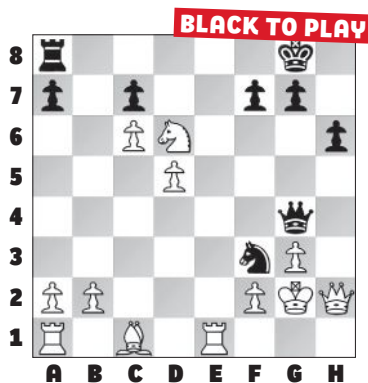"OK, you wanna trade bishops? I don't think I object. Do I object to that?"

19. Bxe4 Rxe4
"I think I should try to attack the rook. Or I could attack the bishop."

20. Qd3 Re5 21. Nb5 Qh3 22. Qf3 Nh4 23. Qh1 Rh5
"Oh, he's trying to be ... uh oh. I better be careful. He's threatening something very nasty here."

24. Re1 Qg4 25. Nxd6 Nf3+ 26. Kg2 Rxh2+ 27. Qxh2

BLACK TO PLAY

27. ... Nxe1+

"I'm gonna lose my queen. This is not good."

28. Kf1 Nc2 29. Nb7 Qd1+ 30. Kg2 Ne1+ 31. Kh1 Nf3+ 32. Kg2 Ne1+

"Oh, looks like he wants a draw. Ok, I'll be happy."

33. Kh1 Nf3+ 34. Kg2 Nxh2

"Oh, he did take the queen. He was just toying, only *pretending* he wanted a draw."

35. Kxh2 Qf1 36. f4

"f4. I don't see anything terrible happening. Oh, yes I do. Game is lost. Oh, no."

36. ... Re8, White resigned.

Kaufman said the SquareOff board, which relies on the Stockfish 11 chess engine, is sneaky because it plays weak at first — and might even blunder — to make you think

you have a chance to win, but then it starts to play really strong as the game continues.

"The game itself felt somewhat like playing the computer in the sense that it was obvious it was playing at a low level in the early stages and it made some moves that no human with that rating would make, but later started playing above its level," Kaufman observed after he played the board. "It felt like playing a human who doesn't know a lot about chess because he's very good at attacking your king."

Kaufman's analysis was largely confirmed when I uploaded the PGN for an analysis by one of the avatar "coaches" on *Chess.com.* Indeed, "David," the *Chess.com* avatar coach, concluded that one player was winning but then gave away the game. The

coach also concluded that **13. ... Qb8** from the above game was a blunder because it overlooked an opportunity to develop a piece.

Kaufman played against my AI board again — this time as Black — but lost the second game as well.

"I gotta say, it's strange play," Kaufman said afterwards. "It appears that it plays positionally way below that level, but tactically way above that level, which is not

a simulation of a human. That's actually the reason that we don't do that approach in Komodo, because we don't think that's a good way to go — to have it play weak positionally and strong tactically. But that's the way Stockfish does it."

Even though Kaufman lost to my board, the competition wasn't over. Kaufman still wanted my AI board to play against his

championship-winning Komodo. We set up a time for later that week to let Komodo get a crack at the SquareOff board. We agreed to play the game by calling out the moves over the phone.

"Phenomenal" play

My chess buddies didn't seem to be upset by Kaufman's conclusion that my AI board actually plays weak and then strong to throw off opponents.

Johnny Blaze, for instance, said, "That's great, that's phenomenal," when I shared Kaufman's observation about how the board plays weak to lull opponents into thinking they can win but then starts to make super-strong moves toward the end.

"I think that's something we do as humans, too," Johnny Blaze

says. "We start out — a lot of us — to see where our opponent is and then in the middle game we turn on the heat."

My friend Chino said the fact that the chessboard plays weak first and then strong actually makes the game more interesting.

"Chess becomes interesting as soon as strong players leave the book or what's most common," Chino says.

Competition on the horizon

SquareOff isn't the only game in town when it comes to AI chess boards and chess boards that move the pieces by themselves. A company called Wonder Substance plans to release a similar AI chessboard called Phantom.

The creators of the Phantom board sound like they are in direct competition with SquareOff.

Here's a blurb about the Phantom board. *"To make the best autonomous chess set in the world, we created a sophisticated sensor array that detects the precise location of every piece, and a fast, silent mechanism that moves the pieces smoothly across the board, **like magic**, for the most amazing chess experience you will ever have."*

The part about the "silent

mechanism" sounds like they're throwing a little shade at SquareOff, because gadgetry inside the SquareOff board makes some noise when it's getting ready to make a move.

A history of chess automation

In some ways, chess boards that move pieces by themselves are nothing new. One of the most famous examples is the Chess Automaton, also known as the Turk, which first appeared in the court of Maria Theresa, the empress of Austria-Hungary, in 1769.

According to an article on *history.com*:

"In a bid to impress the empress, an inventor and royal advisor named Wolfgang von Kempelen had vowed to build an automaton whose illusion and spectacle would surpass anything she had seen before. Intrigued, Maria Theresa granted him a leave of absence to work on his mystery project. Kempelen resurfaced just six months later with the machine that would become known as the Turk."

The Turk was designed to make it seem like a mechanical player was taking on challengers. But in reality, the machine had a secret compartment where a chess

master would operate the Turk from inside to make killer moves.

Doubtful spectators had been guessing all along that the Turk was too good to be true. Its secret got exposed in 1827 when two young boys from Baltimore were said to have climbed a roof to watch the Chess Automaton in action and found William Schlumberger — its operator and a master chess player — coming out of the back of it.

More recently, GM Kaufman points out, a board called Fidelity Phantom — which also made moves on its own — appeared in the 1980s, but its play wasn't very strong.

When GM Kaufman found out I paid about $400 for my SquareOff board, he remarked: "That's not too bad. That was about what the Fidelity Phantom was more than 30 years ago. That's kind of funny because $400 now is a lot cheaper than $400 thirty years ago."

A college experience

The day after my SquareOff board defeated GM Kaufman, I took it to the "Little Chapel" inside Carnegie Hall on the campus of Howard University, where members of the campus chess club had assembled for a "Chess & Chill" event.

A dozen or so boards had been set up throughout the room, but the SquareOff board soon became the center of attention as I invited students to play against the board.

The first student to step up was a student named Goodness Atanda, a sophomore at Howard, where he is majoring in computer engineering.

"It was fascinating. It was cool," Atanda says of his experience playing against SquareOff. "When I was playing the game, I was like, 'This is everything I am: Chess. Computer engineering.' This is the work of a computer engineer."

Game against Komodo

GM Kaufman has a theory on why SquareOff uses Stockfish: It's free and open source. Linking the SquareOff board to Komodo, on the other hand, would have required a paid agreement between the two.

Which makes a game between SquareOff and Komodo a good test of whether it's true that you get what you pay for.

When I called GM Kaufman to have my SquareOff board play against Komodo, I was somehow optimistic that — since my board has a rating above 3300 — it had a good chance of winning.

However, SquareOff could not claim victory: Komodo won both games, as White and as Black.

A worthy investment?

You might be wondering if I have an opinion on whether a SquareOff board is something you should ask your parents to buy.

I would totally understand if you succumbed to the desire to have something like this that is at the cutting edge of chess technology. But if your parents asked me if I would recommend buying this particular model for a kid, I would hesitate because the board seems really delicate and has to be handled with a fair amount of care. A different, less expensive model — one built with travel in mind — might be more suitable.

Also, I would totally understand if you and your family decided to wait a bit and see what kind of AI boards come to market over the next year or so.

Technology is constantly evolving, so you can rest assured that an even better version — whether from one company or another — is on the way. But so far this version has proven to be pretty fun, too, and few things are more enjoyable than having something new that attracts interest from others.

People ask me all the time if I play the SquareOff board at home. I really don't play it by myself that much. I actually get more enjoyment from the board when I take it out in public and watch it play against different people.

No matter who my board plays — whether it be a senior like GM Kaufman or young college students like members of the Howard University Chess Club, or my good chess buddies Chino and Johnny Blaze — the experience always seems to teach me something new.

PROS AND CONS OF THE GRAND KINGDOM SET

Five things I like:

- The "wow" factor associated with the fact that the pieces move by themselves.

- The PGNs are automatically generated and available in the future for download or analysis.

- It's fun to watch your friends play an "invisible" player.

- It gives you a way to play against a chess computer without having to sit at a computer.

- It inspires creativity.

Five things I don't like:

- It's not easy to carry. I bought a special bag from SquareOff but I still hadn't got it as of the writing of this article. In my opinion, they should just build the price of the bag into the set and make sure every AI chessboard comes with a carrying bag. I also wonder if I should have bought a different model SquareOff that's easier to transport. The Grand Kingdom Set seems like it should stay at home.

- Sometimes the magnetic pieces will drag other pieces with them as they come off the board.

- If something goes wrong in a game, you may not be able to complete the game simply because of your inability to figure out what went wrong. (However, you can reset the pieces to the position in question, so all is not really lost).

- The moves don't always register on the first time.

- Sometimes the board malfunctions. For instance, one time it didn't take a piece off the board before it moved to the square in question and I had to take the captured piece off myself. The company says to call tech support whenever stuff like that happens.