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## Table of Contents

**Dwyane Wade's New Magic Number: 45** *Page 2-3*

**Wawasee High School** *Page 4-5*

**Ray Allen Meets Noah for First Time** *Page 6-7*

**Highland High School** *Page 8-9*

**Matt Hancock** *Page 10-11*

**Building the Perfect Arc** *Page 12-16*

**Shooting Tips From Gary Boren** *Page 17*

**Gary Boren and the Dallas Mavericks** *Page 18-20*

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*John Carter with Dallas Mavericks Shooting Coach Gary Boren*

**Hello!** I'm John Carter, CEO of Noah Basketball. I am proud to bring you the newest edition of our Noah Basketball Magazine. We have stuffed it full of stories of Noah Users ranging from High School to the NBA that we know you will love, two of which even include NBA stars Dwyane Wade and Ray Allen. Make sure to also take a look at the "Building the Perfect Arc" article that provides a great explanation of how and why the Noah Instant System will improve your team. Last but not least, we have also included some helpful shooting tips from the Dallas Mavericks Shooting Coach, Gary Boren, which you have to check out!

For many years now we have been collecting data on basketball players from middle school, high school, college and the NBA. We now have data on tens of thousands of players at all levels of the game. We have also conducted significant research with top universities and organizations such as Gonzaga University, Auburn University, North Carolina State University and the National Association of Basketball Coaches. To confirm our research findings, we created a "one of a kind" automated shooter that can simulate any player. We have beyond a shadow of a doubt, determined what makes a great basketball shooter great and we want to share this knowledge with you.

Read through this magazine and learn more about what Noah can do for you and if you have any questions please contact us. We will be hosting clinics around the United States and Canada this year if you're interested in experiencing a FREE Noah Clinic for your team. We hope to see you on the court soon!

Best Regards,

A handwritten signature in black ink that reads "John Carter".

John Carter, CEO, Noah Basketball

# Dwyane Wade's New Magic Number: 45

LeBron James now gives Dwyane Wade some advice before every free throw shot

By Tom Haberstroh, ESPN.com

Dwyane Wade's number is 45 and LeBron James won't let him forget it.

As a friendly reminder, LeBron yells the number at him every time Wade steps to the free throw line.

"45! ... 45! ... 45!"

No, this isn't the number everyone associates with Wade -- that would be "three" -- but this is, in fact, Wade's magic number these days. Believe it or not, 45 is the degree angle that gives Wade the best chance at making free throws.

Confused?

So were a handful of reporters standing inside the Heat's practice facility three weeks ago. It was a Friday afternoon in late January and the reporters were waiting for Wade and LeBron to make themselves available for a routine media session.

But first, Wade had to finish shooting free throws.

Following every shot, a computerized male voice could be heard in the distance reciting a two-digit number.

The numbers kept going.

"39 ... 41 ... 40 ..."

What in the world? Everyone's confusion grew deeper. The numbers weren't increasing so we knew it wasn't counting makes or misses. After anxiously peering around the open gym for the source of the mystery voice, we finally found out where it was coming from: a black machine hanging



from the wall about 20 feet away from Wade. The black box wasn't the only one blurring out a number; a nearby LeBron was shouting numbers too and it was sending Wade into a fit of laughter.

"11! ... 17! ... 12!"

What we found out later, after asking some Heat staffers, was that LeBron was teasing Wade. You see, two years ago, the Heat were the first NBA team to purchase and install a toy called "Noah" that tracks the precise arc of a player's shot (get it, Noah's Arc?). The machine instantly lets you know the degree angle of your shot through a built-in audio speaker.

*"45 is my number, if I shoot 45, I'm a pretty good free throw shooter"*

There's the machine hanging on the wall across from Wade's free throw basket. Wade, as you might have noticed over the years, has a line-drive free throw arc and

LeBron was making sure he knew it during that practice in January. So as Noah shouted out Wade's 39-degree shot arc, LeBron joked that it was closer to 11 degrees. Wade, evidently, got a kick out of it.

Fast forward to Monday's Heat practice when Noah recited some slightly higher numbers after Wade's free throw tries:

"45 ... 47 ... 46"

This time, LeBron was silent and there was no laughter. Wade was stone-faced, nailing free throw after free throw.

"45 is my number," Wade said after his free throw shooting session. "If I shoot 45, I'm a pretty good free throw shooter."

But is that true? Well, Wade started working on stretching his free throw arc with Noah just before that Jan. 20 practice. At that point, he was shooting 71 percent of his free throws, down from his career rate of 77 percent.

But since working with Noah? Wade has shot 82 percent from the charity stripe.



"That machine is great," Wade said. "It's great for me and it's great for other guys to hear when you're making your shots what number you're at. You can feel it. I've been feeling better at the line because of it."

The percentage difference is small enough that the uptick might just be random chance, but Wade thinks there's something to this Noah machine. Just a few weeks ago, he

started at 39 and he's now regularly hitting 45. LeBron's number is 44, Wade relayed to the media.

"When I miss one," Wade said, "he'll come up to me and say 'Hey, that wasn't 45.' Same thing with him. I know what his number is and I know when he's not doing it."

Wade's natural shot doesn't have much arc ("God didn't give me that ability."). But at 30 years old, he's trying to raise that angle from 39 and maintain his new sweet spot at 45.

Next time Wade goes to the free throw line during a game, keep a close eye on LeBron. Chances are you'll catch him doing his best Noah impression. And now you won't be completely confused why he's yelling "45!" in Wade's direction.

*"That machine is great, it's great, it's great for me and it's great for other guys to hear when you're making your shots what number your at. You can feel it. I've been feeling better at the line because of it"*

\*This content is provided as a resource only and does not represent an endorsement of any product by the original author, ESPN.com, or any other entity or individual.



**Member of the 2012  
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# Wawasee Turns Up the Heat with Aggressive 3-PT Barrage

Wawasee High School, Syracuse, IN - Noah Success Story

By Gage Harter, Noah Basketball



At first it appears as a misprint.

Did Wawasee High School sophomore Logan Hatfield really take just five two-point attempts this past season even though he averaged over 14 minutes per game?

"It's true," said the 5-foot-11 guard who missed all his two-point attempts but made 36-of-119 three-pointers.

Located in Syracuse, Ind., Wawasee High School boys team plays a run-and-gun style—defensive rebound, two passes and a three-pointer. The Class 3A school attempted 773 three-pointers compared to just 557 from inside the arc.

Coach Phil Mishler said the team tries to average about 100 possessions a game.

"We like to push the pace and shoot as many times as we can," said Mishler, who led the Warriors to the Indiana State Tournament Final Four in 2005. "We're very guard-oriented so this style complements our talent and skill."

Wawasee averaged 76 points per game and had six players with more than 60 three-point attempts. One player, Grant Ruch, tried 211 three-pointers.

Mishler credits the Noah Select Shooting System for helping his team become better perimeter shooters.

"In the past, we've always told our shooters to concentrate on things like preparing for the shot and thinking about

shot selection," Mishler said. "We didn't want them thinking too much about their shooting form. Noah helps them believe they are shooting with the best form possible. They learn it through repetition and feedback."

The Wawasee program has had Noah for two seasons and work with it primarily on three-point shooting. Since integrating Noah into the program, Wawasee players have used it in 1,729 sessions. Hatfield has practice 147 times with Noah and has an average of Expert I average with a best of Expert III.

*"Before I got on Noah, I was very inconsistent and my shot would miss every which way possible, but now I have consistency with my arc and my distance"*

"Before I got on Noah, I was very inconsistent and my shot would miss every which way possible," Hatfield said. "But now I have consistency with my arc and my distance."

Hatfield and his teammates do 10 Noah sessions per week totaling 250 three-point shots. The team practices so much on Noah that Mishler uses the system's grading scale as a way to allow or limit his players from shooting during a game.

"I hate to tell a player that he's a shooter or not a shooter so we developed a numbering system for three-pointers," Mishler said. "If a player averages Expert III, he has the

green light to shoot anytime he wants to in a game. If a player is below Expert III, then he has to get a pass reversal first before shooting and so on down the skill levels.

"This pushes players to concentrate on obtaining a high level on Noah. Since we shoot so much during a game, we really need to figure out our highest percentage shooters. Noah allows us to identify them."

Senior Ross Stichter was one player who had the green light. He used Noah 82 times and reached the level of Master I shooter. However, he was hurt the majority of the season, but the benefits of Noah showed in his limited stats—22-of-62 three-pointers, 16-of-20 free throws and 7-of-12 on two-pointers in eight games.

Hatfield loves the numbering system and said it allows the players to set a goal and work to achieve it.

"My shot keeps getting better because of Noah," Hatfield said. "I'm real excited about the next two years."

*"If I coached a team, one of the first things I would do is buy a Noah. It not only helps on three pointers, but also free throws. If a team can shoot the ball well, then it's probably going to be very successful"*



**Wawasee High School's basketball program has been using Noah since 2007. Since 07' Wawasee has used their Noah every year and in 2012 they traded in their original system for the upgraded wall-mounted Noah Instant.**

Hatfield said he is surprised that many teams in the region and state don't have a Noah. He's also glad in a way because he believes it's such an advantage for Wāwasee.

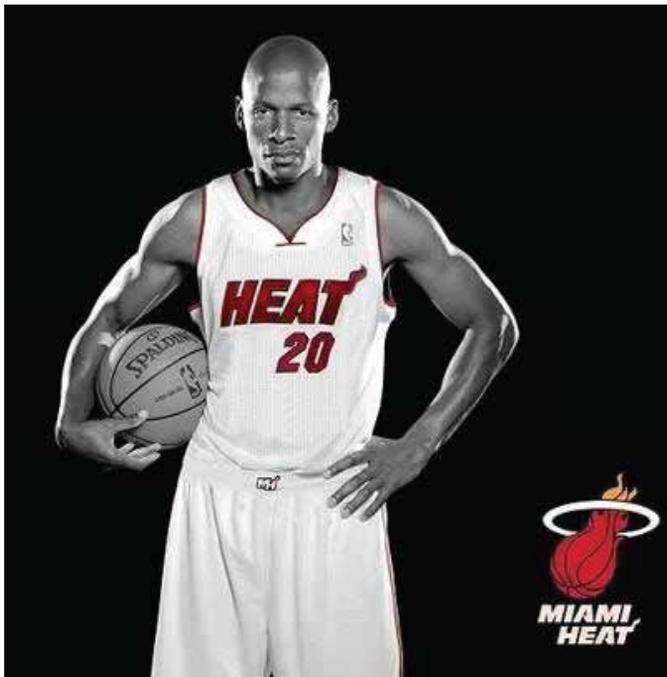
"If I coached a team, one of the first things I would do is buy a Noah," Hatfield said. "It not only helps on three-pointers, but also free throws. If a team can shoot the ball well, then it's probably going to be very successful."

Noah also has inspired a future generation of Warriors. Call the Wawasee High School athletic department and it's likely you'll hear the kind voice of Tammy Hutchinson. Ask her about Noah, and she'll tell you how much her 12-year-old son just loves shooting on the system after trying it out at a Wawasee basketball camp.

# Ray Allen Meets Noah for First Time

Love at First Sight.

By Tom Haberstroh, ESPN.com



MIAMI -- You could say it was love at first sight.

Following the Heat's practice on Saturday, Heat assistant coach Keith Askins introduced Ray Allen to a talking black box on the wall named "Noah."

Noah is a shooter's best friend. The technology tracks a player's shooting arc as the player goes through drills and logs it into its computer for post-workout analysis. Not only that, the machine provides instant verbal feedback, shouting out the exact degree angle at which the shot is projected off the player's hand.

After consulting the instructional poster on the wall next to Noah (get it, Noah's arc?), Allen went to work, firing off an 18-foot jumper.

"Forty," Noah said.

Allen shot another.

"Forty-two."

And another.

"Thirty-seven."

This went on for several minutes as Askins explained the virtues of Noah to Allen as he passed him the ball.

You see, Allen is a shooting perfectionist. Shot after shot, Allen constantly tinkered with his shot arc depending on what Noah told him. (Yes, that's Noah reciting the numbers in between Allen's shots in the above video.)

"That machine's going to keep me around for 10 more years," Allen said. "I didn't know it was here. I'll definitely use it every day."

Noah has been hanging on the Heat practice facility's wall for years. In fact, Dwyane Wade used the machine to help correct his free throw shooting last season. Now, Allen is Noah's latest pupil.

But does Allen really need it? I mean, this is a guy who has made more 3-pointers than any player in NBA history.

Apparently, he does need it.

"Over the past 10 years, I've been in a fight with my jump shot," Allen said, in all seriousness.

"Just tryin' to figure out how to get bigger arc in my shot, how to get my legs involved, to get better lift on it, to get

the ball getting a better angle on it into the air."

Wait, Allen has been at odds with his jumper over the past decade?

"Strange as it seems, yeah."

Impossible.

"When I was in college," Allen began, "I would have a great practice and I'd miss only two or three shots the whole practice. Coach [Jim Calhoun] would always ask me, 'Did you shoot 100 percent?' The answer was always no. If you don't shoot 100 percent, you always have something to strive for."

Remember: perfectionist.

"Me, I'm so particular about it, I want to be perfect," Allen said of his shooting. "Basketball is imperfect, so shooting-wise it's a constant struggle."

But Noah could be a little over the top, no? Couldn't it cause you to be self-conscious, like too many thoughts going through your head?

"A thought in my head would be if I was coming out of the game and someone told me 'You're doing this wrong, you're doing that wrong,'" Allen said. "You don't want those thoughts."

Allen clearly values Noah's contribution. This makes sense; Allen's been receptive to the analytics movement that has gradually impacted the sport. While casually talking about the value of empirical analysis to surrounding reporters, Allen gave a tip of the hat to Boston Celtics assistant GM Mike Zarren, whom the Celtics teammates called "Numbers."

Zarren would keep Allen and his teammates in Boston up to date on their advanced statistics, including plus-minus and per-possession lineup data. But now, in the case of Allen, the student becomes the teacher. After the Heat's preseason game against New Orleans, Allen taught fellow Heat reserve Norris Cole a lesson on plus-minus.

"I was telling Norris, the best thing that we can do is make sure we have great plus-minus numbers," Allen said. "That means we're not giving up leads and we're efficient while we're on the floor."

While single-game plus-minus may be too fluky to hold any real predictive value, it can be of use over the long haul. To Allen, these numbers help him digest a game that is played at blinding speeds.

"It's just information," Allen said. "For us, going into every game, you want that information. It does force you to do something out there ... For improvement, information is key."

But not all statistics are created equal.

"Sometimes it can be too much," Allen said. "'SportsCenter' often comes up with some random stat or fact. This guy scored this many points every Tuesday of this month in his 10-year career and he's leading this category and only two players have done that. Sometimes those figures get kind of crazy."

Almost as crazy as the notion that Ray Allen struggled with his shot over the past 10 years. practice. At that point, he was shooting 71 percent of his free throws, down from his career rate of 77 percent.

*"That machine is going to keep me around for 10 more years. I didn't know it was here. I'll definitely use it everyday"  
- Ray Allen*

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# Utah 4A State Championship Team Believes Free Throw Shooting Wins Games

Highland High School, Salt Lake City, UT

By Gage Harter, Noah Basketball



Overwhelmed with emotion after helping his team win the Utah 4A state championship, Highland High School's Steven Divver gave perhaps the quote of the year.

"We've all been playing together since we could

walk—in the backyard growing up, then on AAU teams," Divver said. "We didn't even hang out with girls until our junior year because we were playing basketball every weekend. And now to finish together on top is just amazing."

Oh the sacrifices of a winner.

Divver and his teammates have indeed come a long way. The 48-42 victory against Bountiful was Coach Keith West's third title in 12 years. He previously led Highland to state championships in 2002 and 2006.

"This one was just as sweet as the others," West said.

West credits his team's foul shooting as a key to its title run. The Rams (22-3) made 14 of 20 free throws in the final game and were 20 of 24 in the semifinals against Lehi. Highland needed all 20 free throws in the 54-52 victory.

"We made nine free throws in the fourth quarter against Lehi," West said. "That was a game that could have gone either way. They shot the lights out. If we don't go 20 of 24 from the line, we don't win the game."

West said his program stresses good free throw shooting and every player knows that before he leaves the gym after practice, he must make 50 from the line.

"That's our commitment and that's been our commitment for the past 8 years," West said. "We had teams lose games because we didn't make free throws. Now the belief is until we start making free throws, we won't win any games."

That's why West got very excited when he first heard about Noah and its ability to drastically improve an individual's and a team's free throw and overall shooting percentage.

"It was last March when I first heard from Noah," West said. "When I saw the free demonstration, I said 'Oh my God.' I was sold on it immediately. I saw the value and what it could do for our program."

*"At the end of the year, Steven was hitting three-pointers and making his free throws. People were asking me, 'where did this come from?' I would tell them, 'from working on Noah and developing confidence.'"*

West got on the phone and convinced others like boosters that Noah had to be part of the school.

"The thought of having Noah was like a total program adjustment," West said.

After the Noah System arrived, West made sure he always had it set up for anyone to use the 30 minutes after school let out and before practice started. He also usually allowed three players to use it after each practice.

His assistant, Gary Trost, a former Brigham Young University center who averaged 10.4 points and 5.3 rebounds over his career, helps West teach shooting. According to West, Trost, who stands 6-foot-10, has always taught players to shoot with arc but now he had the tool to effectively assess each player's optimal degree of arc.

"Gary liked how each shot in a session was important if a player wanted to get a good score," West said. "The players focused on every shot because they understood that even one shot would mess up their chance to get to the Master level." One player, Steven Divver, improved so much that West stopped calling him a "defensive specialist." Divver converted 15 of 32 three-pointers and 21 of 33 free throws. Divver made eight of his 15 threes in the final five games and during a late three-game stretch, he made 11 of 15 free throws.

*"Noah is very specific. It tells you what you've done and what you need to do to get better. It tells you if you've put in the work. If you follow a Noah regimen, you will not only improve your shooting, but also gain the confidence needed to succeed"*

"At the end of the year, Steven was hitting three-pointers and making his free throws," West said. "People were asking me, 'where did this come from?' I would tell them, 'from working on Noah and developing confidence.'"

Another player who benefitted was 6-1 senior guard Sam Orchard, who was already a good shooter, having recorded an 80 percent clip from the line in his junior year. Orchard loved the Noah and it showed on the court. Orchard shot better than 87 percent on free throws for most of his senior season and finished 158 of 194 for 81

percent. He also made 28 three-pointers.

"Sam gets to the line a lot and just being able to make a few more free throws really added to his scoring average," West said. Orchard scored a team-high 16.2 points per game.

But the player who made the most progress with Noah was 6-4 forward Nate Fakahafua, who was a career sub-50 percent free throw shooter. With Noah, Fakahafua improved to 62 percent while making 77 of 124 attempts. In the four playoff games, Fakahafua converted 17 of 23 free throws.

As a team, Highland saw its average bump from 65 percent at the beginning of the season to over 75 percent during league play.

"My big thing is 50 free throws every day," West said. "If you've put in the work, then there's no pressure when you step up to the line. You know you've done the work. Now there's just muscle memory. If you miss, it's not because you haven't done the work. You can walk away knowing you did your best.

"Noah is very specific. It tells you what you've done and what you need to do to get better. It tells you if you've put in the work. If you follow a Noah regimen, you will not only improve your shooting, but also gain the confidence needed to succeed."

Coach West said he isn't worried that spreading the word about Noah might help his opponents.

"I'm really excited about what Noah can do for basketball," West said. "I've had a rival call me and express interest in Noah. Their whole game is shooting. I would hate for them to get one, but they really should."



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# APP



# COMMUNITY

Connect your Apple devices to the Noah Instant to stream your live shooting sessions straight into the palm of your hand. Share your progress via E-mail, Facebook, Twitter and Text Message.

From the MyNoah App, upload your shooting sessions to the Noah Community Website where you can track your progress, compete with other players from around the Country, and become the next Noah Masters.



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-  Tracks Player Workouts and Improvements
-  View and Instantly Share and Compare Arc Plots
-  Record and Review Shooting Sessions



*\*The Noah Community Website will be available Spring of 2013*

-  Upload Arc Plots from the MyNoah App to effectively track your team's progress
-  Face off against other players and teams in Noah Competitions
-  Connect with other Noah Users from around the Country

*\*Must have access to Noah Instant Shooting System*

# Maine Sports Hall of Famer, Matt Hancock, Stands Behind Noah Basketball

By Gage Harter, Noah Basketball



Hancock is one of the most prolific scorers in NCAA Division III college basketball history. He totaled 2,678 points between 1987-90 at Colby College, located in Waterville, Maine. He averaged 26.3 points per game during his four collegiate years.

He still holds the NCAA Division III record for free throw attempts with 928 and converted with 792, which is good for an 85.3 percentage.

The 6-foot-3 guard didn't lose much either. He led Lake Region High School (Maine) to the 1985 Class B state championship and then helped Colby College amass an 80-24 record that included four appearances in the Eastern College Athletic Conference (ECAC) postseason tournament. During his senior season in 1989-90, Hancock earned the NCAA Division III Player of the Year award after leading the Mules to a school-record 26-1 record and an ECAC title.

To recognize and highlight his basketball accomplishments, Hancock was inducted into the Maine Sports Hall of Fame on May 20.

"It was a wonderful honor," Hancock said.

Matt Hancock

Hancock said he was not very fast and not the most athletic. But he was a grinder and never allowed himself to fail. "I think of myself as one of the all-time greatest in terms of never giving in," he told a local newspaper.

So this self-made basketball star, who at 46 still plays the game with the same passion and relentlessness as he did in

For Matt Hancock there's no other place he'd rather shoot a basketball than in a renovated Maine dairy barn. Inside this beautiful structure is a collegiate-level half court complete with a stunning raised panel hardwood floor with foam rubber underneath. The barn features three glass backboards and is wired for sound. There's also a Noah Instant on the wall.

A basketball player can search his whole life for such a place and never find it. Luckily for Hancock, such a place is on his property.

"It's a shooting Mecca," Hancock said of his farm in the Sebago Lake region of Maine. "It's one of the great places to shoot in the world."

Hancock Barn Gym

And shooting is something Hancock knows how to do although he would tell you that he's not a shooter or scorer but someone who just hated to lose.

his youth, found himself very cynical as he entered Lake Region High School gym to check out this thing called Noah.

"I vividly remember walking in as skeptical as you can be," Hancock said. "I thought to myself 'come on, how can this thing work?' Technology can't make you a better player. I entered the gym as a snooty self-made shooter."

Hancock heard about the clinic when a flyer was brought home by one of his three daughters announcing a Noah free clinic hosted by company representative Kevin Powers.

"I didn't go online and check out Noah," Hancock said. "I was sure it didn't work."

Then as Powers demonstrated Noah and its potential to improve shooting, Hancock felt a chill tingle his spine—"of course, it works" were the words bouncing in his head.

"I've always been a front rim shooter," Hancock said. "Immediately after Kevin said, 'you should shoot the ball deep in the basket because the basket is wider,' it made immediate sense. The basket is wider the deeper you shoot it. It was a no-brainer. I went from 'no way' to 'I want one' in five minutes."

*"Of course Noah works. Of course the science works. Shot-after-shot feedback is invaluable. There's nothing like it out there..."*

As Hancock spoke about Noah, the passion was dripping from his words. It was easy to see how he became a great player with such love for the game.

"Of course Noah works," Hancock continued. "Of course the science works. Shot-after-shot feedback is invaluable. There's nothing like it out there. Noah and its instant and cerebral feedback works in a place in the player's mind that goes beyond what a great shooting coach can teach. You relate different from Noah's communication compared to a coach's. "It's really funny thinking now how skeptical I was. I was a knucklehead."

Hancock purchased a system for his barn and chose the

wall-mounted Noah Instant. He hopped on it the day Noah was installed and discovered his shot registered between 43-46 degrees. He earned Expert II level right away.

"I adjusted my shot to shoot deeper in the basket and made 87 straight jumpers," Hancock said. "In my life, I've shot millions of basketballs without instant feedback. I used Noah and made an adjustment in 10 minutes that fixed my shooting dramatically. At age 46, I now shoot correctly."

He took his new stroke to the local men's league and pickup games. Not surprisingly, he drained shot after shot and had teammates and opponents asking "holy cow, what have you been doing?"

Recently, Hancock and his mother watched one of his daughters shoot baskets in the barn. They were relaxing in the patio area on the second floor. Noah's voice echoed throughout the barn with the instant feedback. They wondered if Hancock had Noah back in the day, how many more shots could he have made?

Hancock Shooter

"We just laughed because it probably would have been a lot," Hancock said.

Now Hancock is passing the game to his daughters—Sarah, 10th grade, Cece, 9th grade and Shauna, 4th grade. All three are terrific players and have their father's competitive spirit.

"There are very few ways to have a competitive advantage for the top players," Hancock said. "Everyone is eating right, everyone is in shape, everyone is working on ball handling and rebounding. But with Noah, there is an advantage." Hancock shoots with Noah in his barn two to three times a week and he has additionally come to employ the instantaneous feedback in coaching sessions with his daughters and other players in their community.

"The game of basketball still has real meaning in my life and for whatever reason I still have a real desire to improve a craft I've been working on for over 40 years," Hancock said.

# Building The Perfect Arc

Research shows players need to keep shot arc around 45 degrees

By Mike Austin, Senior Editor for Winning Hoops

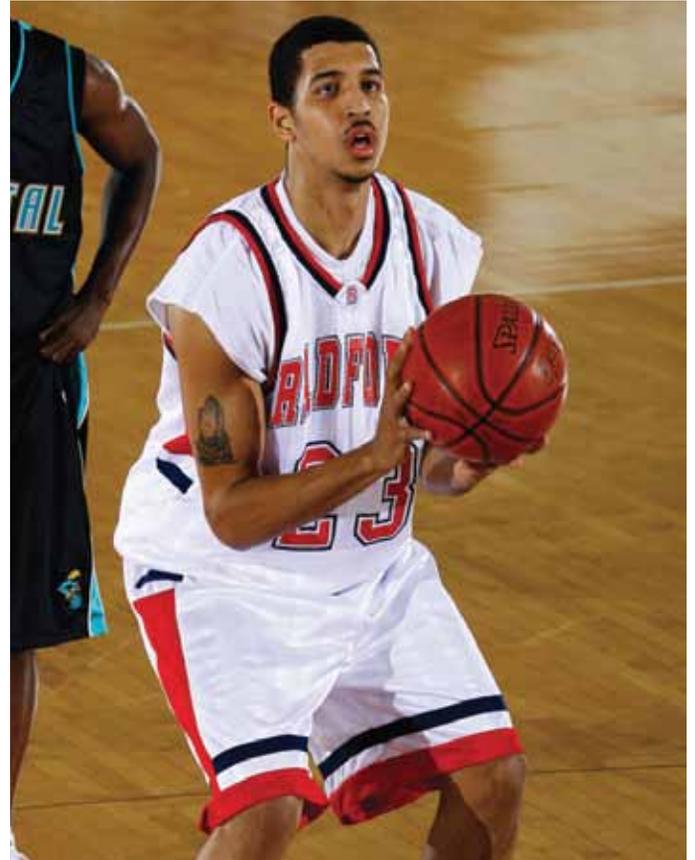
Next time all of your players are in the gym, watch them as they shoot around. Don't look at their mechanics but rather look at the arc of their shot. Is the shot flat? Or, does it seem to touch the clouds in an effort to bring rain down from the sky? Also, do your shooters have a consistent arc or are they just firing the ball at the rim at all angles? For years, coaches have been trying to get their players to shoot with proper mechanics. But, in reality, to turn a good shooter into a great shooter (or a mediocre one into a good one) an athlete must master the art of arc.

How do we know this? Experienced researchers at Noah Basketball have been conducting studies for more than a decade to find the perfect angle and depth (into the rim) a shot should travel to score the most. Alan Marty, the founder of Noah Basketball was the first to take on this challenge when he watched the best shooters in the world. Marty found that these shooters consistently appeared to have the same, medium-height arc on their shots and shoot deep in the basket. But yet, most players haven't figured this out as statistics show that free-throw percentages at the NABA and NCAA levels have not improved since 1958 ( a steady 74 percent and 68 percent respectively).

"There are thousands of coaches and shooting gurus who believe they know the answer to great shooting," says Marty. "Then why, with so many experts available, has foul-shooting percentage remained constant in the NBA and NCAA?"

To reach a conclusion, Marty worked with the likes of Jerry Krause, the National Association of Basketball Coaches research chairman (Who also currently serves as Gonzaga University's director of basketball operations); John Carter, now the CEO of Noah Basketball; and Dr. Thomas Edwards, a NASA scientist. This team has spent years figuring out a substantive, physics and neuroscience-based method for players to make more shots.

Their conclusion is that an average shooter who shoots with an optimal arc of 45 degrees (give or take two



**Making more shots comes down to shooting with medium-height arc.**

degrees) is going to make about 11 percent more free throws than a shooter with a high arc of 53 degrees (68 percent vs. 57 percent). The same holds true going the

*"The company measured well over 10,000 shooters of all different ages and skill levels..."*

other way. That same average 45-degree shooter makes 12 percent more free throws than a flat-arc 35 degree shooter (68 percent vs. 56 percent). Figure 1 shows what a 35-(red line), 45-(green line) and 53-degree (blue line) arc look like.

For very skilled shooters, the same conclusion is found. A very skilled 45-degree-arc shooter averages a make-rate of 96 percent while the 53-degree high arc shooter makes 89 percent and a 35-degree flat-arc shooter makes 80 percent of his or her free throws. Clearly, very skilled shooters make many baskets but they could be making even more shots, which is why this research is so critical.

"Sadly most of the technology and shooting aids in basketball have been validated only by testimonials or someone's opinion," said Krause, "This is not the best validation of what works. The comprehensive Noah approach is a much better way to learn the truth."

"We are the first group to systematically and scientifically confirm what makes great shooters, great," Marty says. In addition to the solid shooting mechanics taught by shooting coaches, players must also master these three shooting principles according to Marty:

- All great shooters shoot the ball straight.
- All great shooters shoot the correct distance (11 inches beyond the front of the rim).
- And all great shooters shoot a consistent, medium height arc of 45-degrees."

## Why 45?

Carter says he took a three-pronged approach to learning and testing the ideal shooting arc for basketball players, which consisted of the following:

### 1 What are the best shooters in the world shooting?

Carter says the research team found out that some of the best shooters, including former NBA All-Stars Chris Mullin and Mark Price, consistently had their shot entry angle in the mid-40-degree range. To arrive at this conclusion, the company measured well over 10,000 shooters of all different ages and skill levels.

**2 What did Dr. Tom Edwards find?** Edwards is the Director for Aerospace at the NASA Ames Research Center. He earned his B.S.E. in Mechanical and Aerospace Engineering at Princeton and holds a Ph.D. and M.S.E. degrees in Aeronautics and Astronautics from Stanford University. Edwards used a detailed mathematical model and determined that the best shooters would have an arc in the mid-40's.

**3 What did the automated shooter find?** The research team wanted to test Dr. Edwards' computer models by shooting real basketballs at real hoops. They built an automated shooting machine that had a programmable

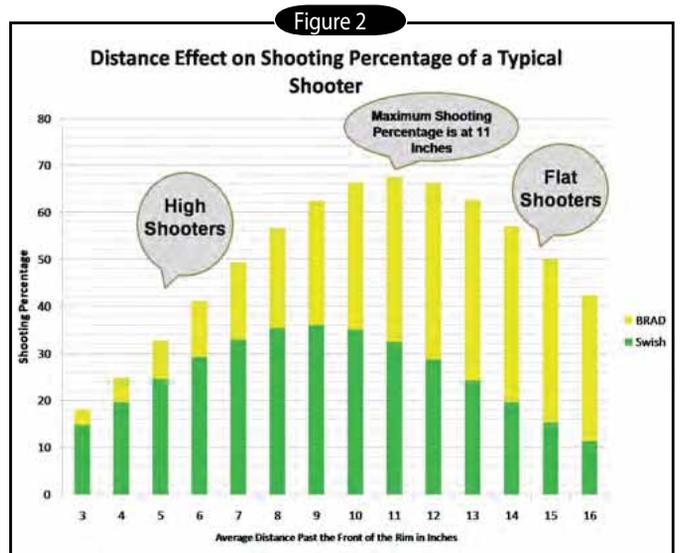
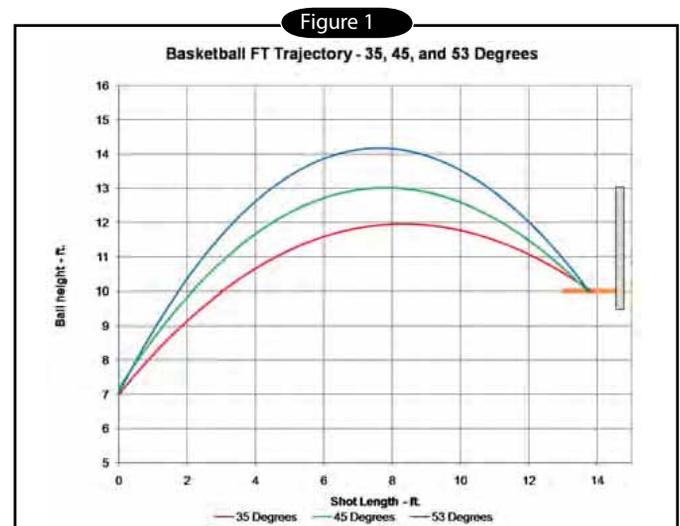
shot height and skill level. The researchers programmed the machine to take 250 free throws at 35-, 40-, 45-, 50- and 55-degree shot-entry level. The angle that made the most shots? You guessed it -- 45 degrees.

## Not Just Arc Alone -- Distance Too

While researchers discovered the perfect arc for shooting, they also wanted to determine the best depth in the rim for making the most shots. Coaches always seem to be stressing to "swish everything", but is that really the best way to instruct players? Carter emphatically says, "no."

"Many players today simply do not shoot the ball deep enough in the basket," Carter explains. "You don't get an extra point for a swish. The research clearly finds that players who shoot the ball deeper in the basket make more shots.

Watch some of the best shooters and you'll see they don't always swish the ball. Instead, they often hit the back



of the rim and score a BRAD shot, which stands for Back Rim and Down."

Carter says, specifically, the spot where a player makes the most shots is when they average shooting 11 inches past the front of the rim. The diameter of a standard rim is 18 inches, so getting the ball two inches past the middle is ideal for shooters.

To get the ball two inches past the middle of the rim, shooters need to focus on their arc. Carter says high-arc shooters generally are short when they miss while line-drive shooters skew toward being too long on their shots (see Figure 2 on previous page).

## Consistency is Final Key

As with most things in the game of basketball, consistency is a major key in making shots. "An inconsistent shooter is never going to be great even if he or she averages a 45-degree arc and 11 inches in depth," explains Carter.

An inconsistent shooter might average 45 degrees but

*"An inconsistent shooter is never going to be great..."*

to do so that player ends up firing up a large number of high 55-degree shots as well as low 35 degree shots. An inconsistent shooter also might average 11 inches of depth in a shot but, again, that only comes from shooting the ball well short and very long to come to the average.

"A great shooter only varies plus or minus two degrees on shot arc. If the shooter puts the same power behind the shot and it's consistently in the mid-40-degree range, the ball is going to go the same distance," says Carter. The evidence is provided in Figures 3, 4, 5 and 6.

And, look at Chris Mullin, (see Figure 7). In this recorded shooting session, Mullin shot 25 three-pointers for Noah Basketball research. He made 24 of those shots and his average angle of entry was 44.5 with a low of 43 and a high of 46.

This is the kind of consistency that builds an NBA career in which he made more shots than he missed (Mullin had a field-goal percentage of 50.9 percent during his 16-year career) and knocked down 86.5 percent of his free throws.

## The Noah System

"We found that the answer to great shooting proposed

by Noah Basketball is validated, "Krause says, "First, we confirmed that all great shooters shoot the ball very straight, seldom to the left or right.

Second, we confirmed that all great shooters shoot the ball the correct distance (deep in the basket), with a good percentage of their made shots hitting the back of the rim before the ball scored. This was an unexpected revelation because most coaches have been teaching that a swish is the best shot to practice. Third, we confirmed that the very best shooters have a consistent, medium-height arc."

All of this research is great for coaches and players to know but, the question remains, how do you actually figure out how to consistently shoot the ball with an entry angle in the mid-40's and a depth distance of 11 inches?

Figure 3

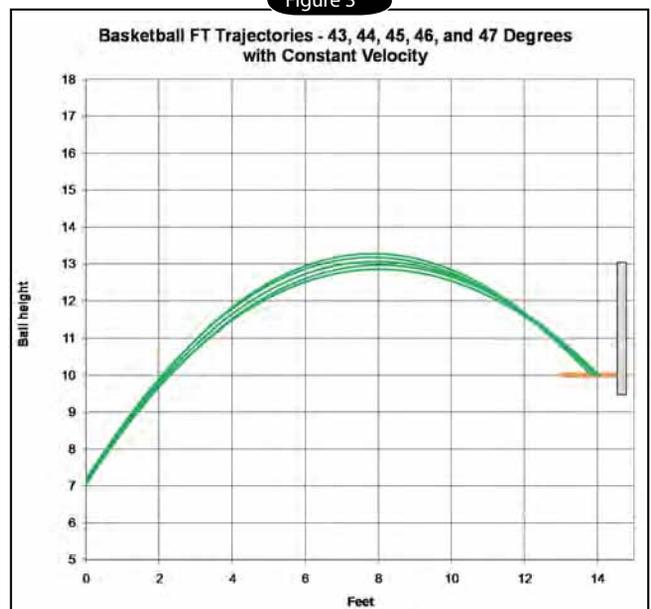
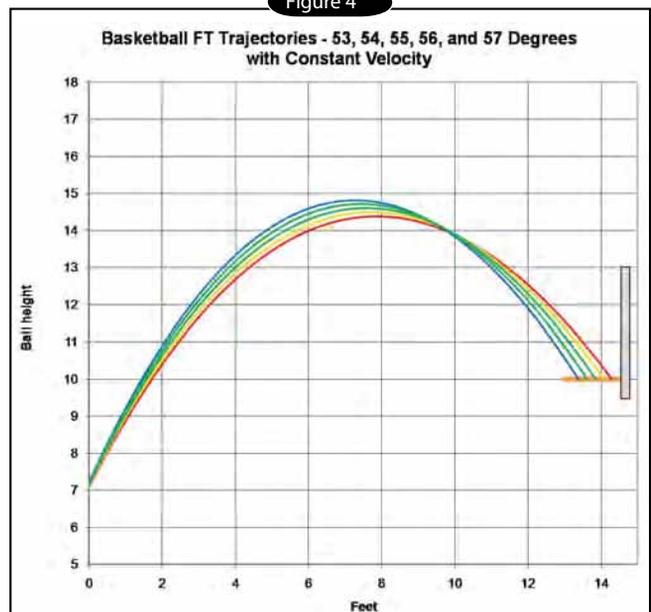


Figure 4



During their quest for answers, the Noah team developed a machine (Noah Select Shooting System) that captures a player's shot arc and shot distance.

When a player releases a shot, the Noah System's "voice" instantly calls out a number, signifying the arc of the shot. It's at this point where players make their corrections. Once the Noah System calls out an arc number in the mid-40's, the player then works on the muscle-memory conditioning. After awhile, a player will get a feel for what a "45 degree shot" is like... and when a shot is too flat or high.

As soon as a player takes a shot, the information is transferred to a laptop computer where players can see their results at the end of a shooting session. The system charts the arc of multiple shots during a single session, which provides a good reminder of how important it is to maintain consistency. In the illustrated examples on the next page, take a look at how the player improved once the medium-height arc was established. In the first example (Figure 8 and 9), the player made 16 out of 25 shots in her "before" session with just a 36-degree arc on her shot (Figure 8), then in the player's "after" session (Figure 9), she made 22 of 25 shots with a 48-degree arc and only a five-degree range throughout her entire session.

In the next example, a player takes 10 shots, makes six and shoots with an average arc of 55 degrees (Figure 10) and an average distance of only 7 inches. Just two minutes later, the player brings her arc down to an average of 47 degrees and makes all 10 shots (figure 11). Notice that her shot distance increased to 12 inches when she lowered her arc.

## Real World Results

Despite all of the scientific proof and available research data, sometimes coaches just need to hear from other coaches that an idea works to give that idea some merit. Several coaches were excited to discuss the benefits of the Noah research and the positive influence it has had on their teams, including men's college basketball's all-time leader in victories, the recently retired Don Meyer of Northern State University (S.D.).

"I wasn't sure what to expect when we got the Noah machine but we had a couple of players just wear it out that first year...and one of them ended up shooting 93 percent from the line that season," says Meyer. "Knowing the research, it helped our players zero in on their arc and their distance. We ended up devising a charting system and recorded highs, lows and averages. We used that information to make up a point system based on distance

and arc. It's something we used in practice a lot and the players really responded.

"It helped me too. After awhile, I could stand on the sideline and see with the naked eye that a shot was going to be too low or to high."

Bobby Luna, head boys basketball coach at Gallatin High School (Tenn.) says having accurate, reliable, immediate information has led to his team shooting much

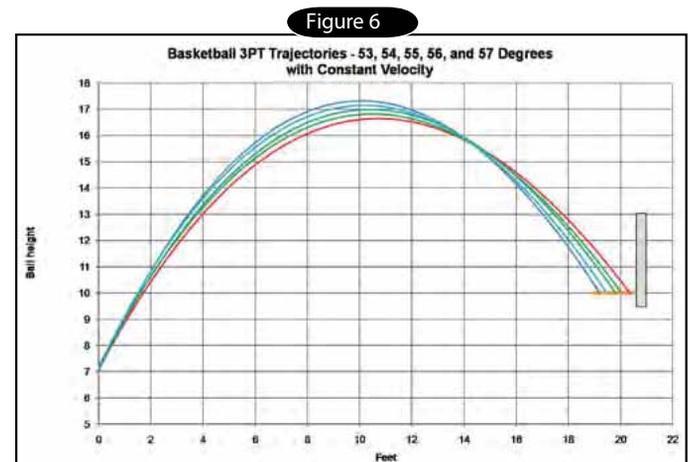
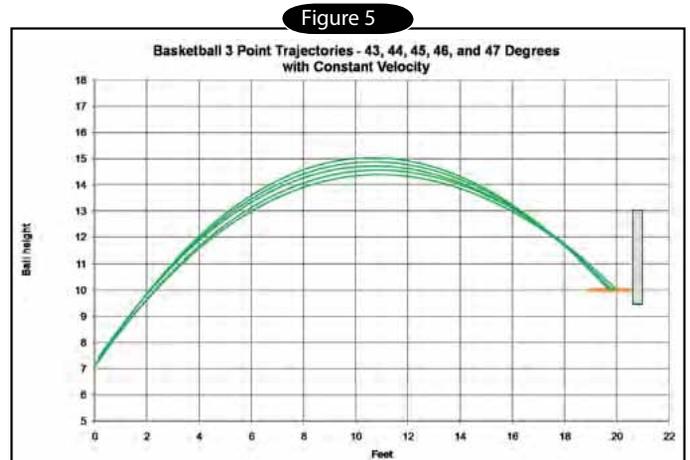
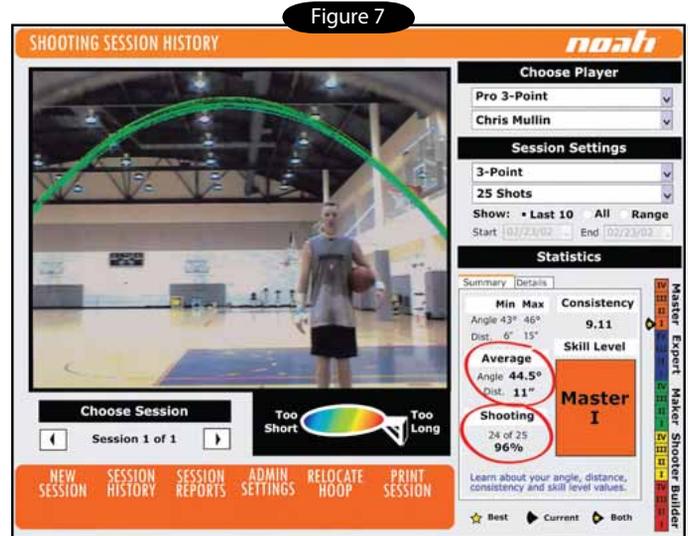


Figure 8

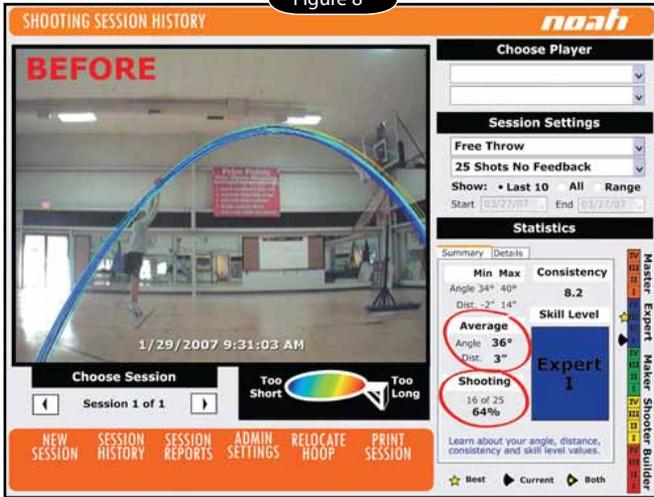


Figure 9

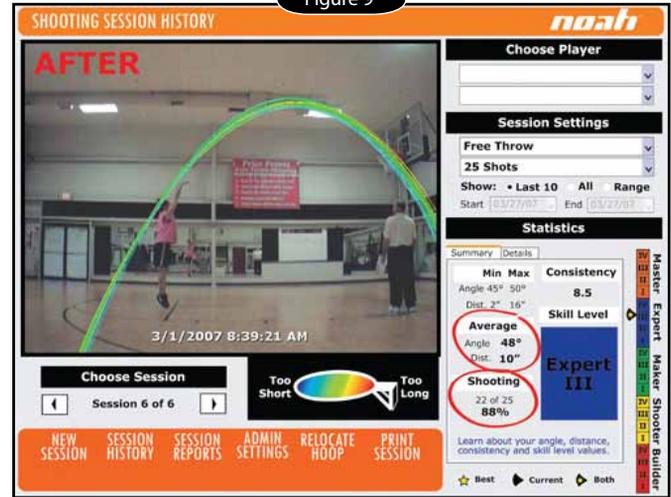


Figure 10

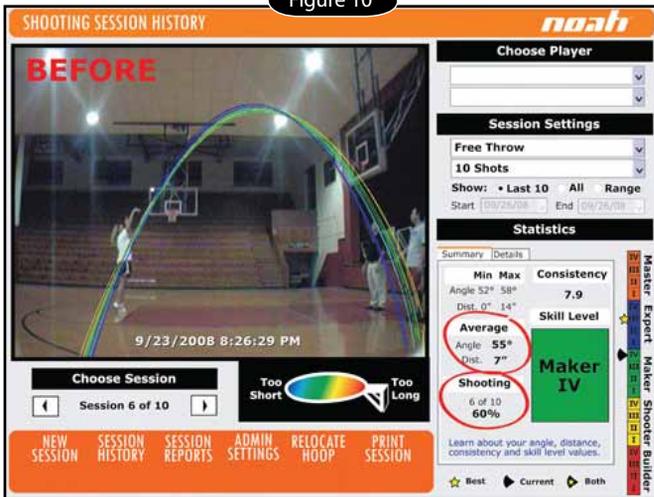


Figure 11



better this year compared to last.

"This generation wants immediate feedback. They also want visual feedback and this system does both. It's the video-game age now, so having a system available that generates immediate statistics is great," Luna says. "Last year, before we learned about Noah's research and system, we shot 58 percent from the free-throw line. This year we advanced farther in the post-season tournament and ended the year shooting 74 percent from the line. One of our better players shot 87 percent from the line for the year, which was a school record, and he made his first 30 free throws of the season.

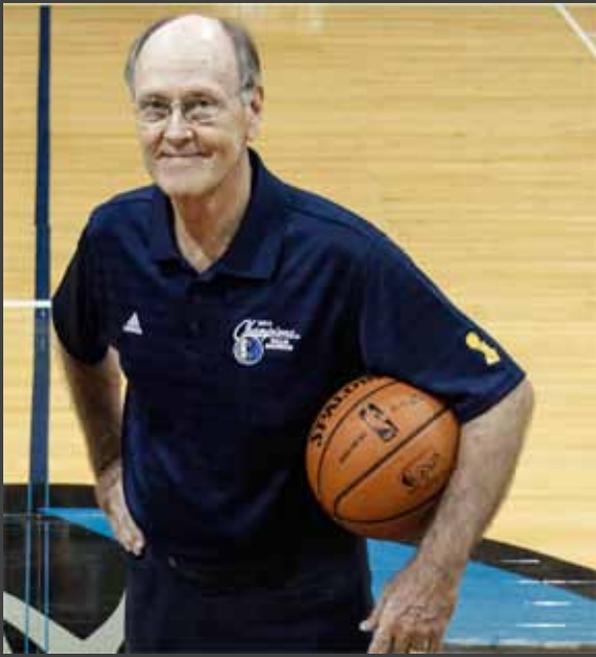
"Eleven of our games came down to the last possession even though we had less talent this year. There were several games where we had to make two free throws late in the game and our players made them. Our players had a lot of confidence in their shots this year."

Luna even mentions that his players were so into the arc numbers, they would break their huddles at times and

say "45" to symbolize that everyone remember to shoot at a 45-degree angle. "The players did not concentrate on making or missing their shots. They were thinking about the arc and the distance...and they ended up making a lot more this year."

Kevin Richards, the girls varsity coach at Grosse Pointe South High School just outside of Detroit, says his players saw immediate, positive results after learning about Noah's research and using the system, and that he had a "breakfast club" of four girls in the offseason who were running through workouts at 6 a.m. just to use the machine.

"The girls saw their stats and numbers increase, so they bought into it," says Richards. "We increased our scoring by 13 points per game from one season to the next once we figured out our proper shooting arcs and distances. We even had a sophomore who shot 52 percent from the free-throw line jump to 78 percent as a junior."



## Shooting Tips from Dallas Mavericks Shooting Coach

# GARY BOREN

Visit [www.basketballshootinginstruction.com](http://www.basketballshootinginstruction.com) to purchase Gary Boren's Shooting Instruction Video.

### ***THE FEET:***

Many players are unaware of what their feet are doing on free throws. When I film players, one of the angles I film is both side and rear views of their feet, with the camera focused in closely, capturing the players feet and lower legs up to about the knees. I look to see if the player is raising both heels together during the shot, to exactly the same height. If one goes higher than the other, the player's body will tilt, which changes the whole physics of the shot, making it harder to shoot it straight.

Another thing this filming reveals is if the player is coming back down on his heels too quickly, which means the body is falling back while the arm is pushing the shot forward, and the brain has trouble calculating the distance on a consistent basis. The follow-through is important throughout sports, and on this shot, the follow-through should consist of the player up on the balls of his feet, perfectly balanced, at the end of the shot.

### ***WHERE TO STAND:***

Many players will take their free throw stance 2,3 or 4 inches behind the foul line. This is the only shot in basketball where you can shoot the shot from exactly the same distance every time, so don't give away that advantage. At least one of the two feet should be right up to the line, and stand there the rest of your basketball career.

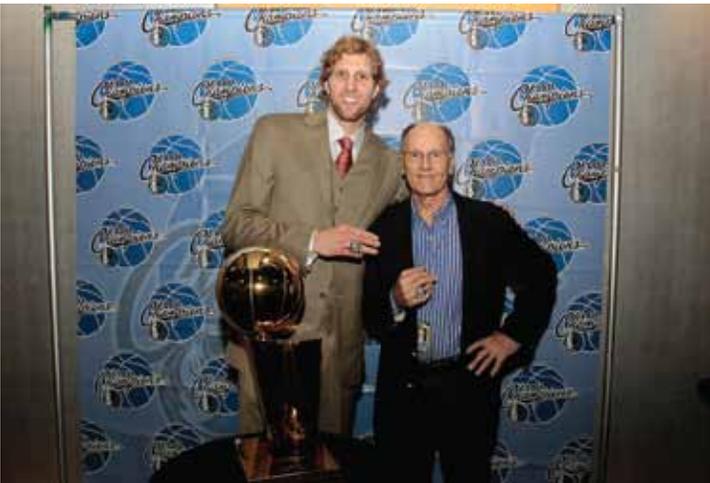
### ***THE TARGET:***

Many of the coaches teach players to look at the front rim, and shoot the ball just over the rim. I have long believed that you should look through the net and focus on the exact middle of the back rim. When you shoot the shot toward that target, the ball should enter somewhere in the back of the hole, and nowhere near the front of the rim. Now that we have Noah, our players can gain instant feedback on their attempt to make the ball enter the rim exactly 11 inches behind the front of the rim. This knowledge also helps on their outside shots, as it makes them more aware of the importance of getting enough arc on the ball, and for sure make it enter somewhere in the back of the rim from any shot angle.

# Dallas Mavericks Shooting Coach Gary Boren and Noah Basketball

## Coaching Free Throw Shooting Better than Ever

By Gage Harer, Noah Basketball



Dallas Mavericks Free Throw Shooting Coach Gary Boren has known about Noah for more than 10 years. Even back then, Boren had no reservations about the young basketball technology company and its Noah shooting system. "I wasn't skeptical about Noah, that's for sure," said Boren, who is the only free throw shooting coach employed by any NBA team. "It starts with the people running the company. I knew Alan Marty (Noah's inventor and Chairman of Noah Basketball) and shortly after that I met John Carter (Noah President & CEO). Once you get to know these guys, you quickly realize they are the genuine article. I saw that they were committed to making Noah better and better."

Indeed. Noah Basketball has improved over the years and now is on the verge of taking the NBA by storm. Boren predicts it will happen soon, since the Miami Heat, Denver Nuggets and Dallas Mavericks all now have the Noah Instant in their practice facilities. "That little dam will break, and every NBA team will want it," Boren said. "We are thrilled to have one in Dallas."

There are a couple of factors why the Noah system has not penetrated the NBA like it has the collegiate and high

school ranks. The NBA world can be pretty cliquish, with coaches and staffs routinely changing from one team to another. Coaches have their systems and ways to do things. Coaches and change often don't go hand-in-hand. Also, the NBA is a players' league and those players must want to adopt new techniques to improve their games. "Over 600 million people play basketball worldwide," Boren said, "and only about 430 make it to the NBA. When they meet me, they think 'who is this bozo getting ready to talk to me about my shot? What if he makes me worse?'" Working around that problem has been a challenge for Boren, but he said that having Noah makes it easier to convince players to accept instruction.

### Gary Boren with Noah

"The instant feedback is what convinces them of the value of Noah," Boren said. Boren gives players Noah's background and tells them that he has followed the progress of the company for years. Then he'll do a Noah session without the instant feedback, so the camera and computer can gather accurate information about the player's current shot. Next Boren will do a session with feedback to show them what they need to do to improve their shot. "We'll talk about whether they are shooting too flat, too high, or not deep enough in the basket," Boren said. At this point and from then on the player knows what must be done to improve his shot, and how to use Noah to help him do it.

*"I'm a free throw coach and I can now coach free throw shooting better than ever, by using Noah"*

Another Noah feature that the players like is the replay. They all want to see themselves, and the ability to provide instant replay of their shot is extremely valuable. The replay, in slow motion if desired, shows if the player is not all the way up to the line, is moving his head, is swaying back his upper body as he shoots, is pulling the string, is not fully extending his arm until the elbow is locked, is not holding the follow through long enough, etc. Most important, Boren can instantly show the players all of the above and much more, by simply walking to the sideline to the Maverick's Noah.

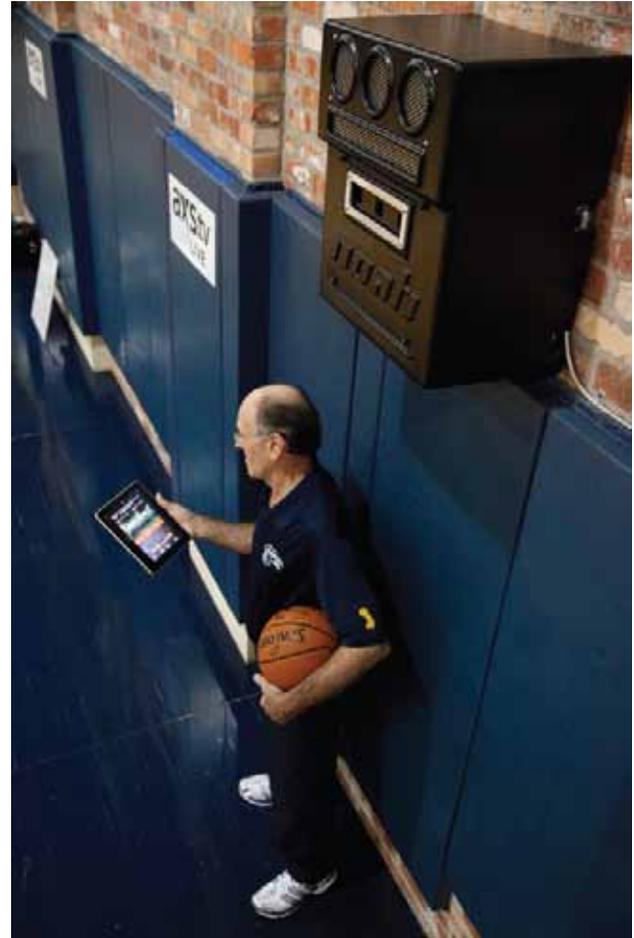
Boren is considered a pioneer in the field of free throw shooting, originally joining the Golden State Warriors in the 1993-94 season. After two years with the Warriors, he served the New York Knicks one season, then followed Don Nelson to Dallas. Since joining the Mavericks in 1997, Dallas has ranked either first or second for free throw shooting percentage in nine of the past 13 seasons, leading the league over that time span with an average of over 80 percent.

Dallas has qualified for the playoffs the past 12 seasons during which time the Mavericks have averaged 81.1 percent from the line, also a league leading average by a wide margin. In a 2003 road playoff game at San Antonio, the Mavericks missed the first free throw, then converted a record 49 free throws in a row. Making 49 of 50, they won the game by 3 points. The 49 straight is a record that may remain unchallenged forever, as it is rare that a team even takes 50 free throws in a game.

Boren is not bashful in telling NBA players about the value of Noah. Boren revealed that Dirk Nowitzki, one of the NBA's greatest forwards of all-time, loves shooting on the Noah Instant. "It was fun watching him use Noah for the first time," Boren said. "I'm standing there and listening to Noah saying 47, 47, 47, 48, 46, 47, etc. I could have told you that Dirk has a consistent arc, but without Noah, it would have been hard to prove."

Boren confirms that Mark Price is the greatest free-throw shooter he's ever seen. Price ranks first on the NBA's career free throw list with a 90.4 percent mark. Price owns a shooting lab in Atlanta where he has been teaching with a Noah for several years.

"What I know about shooting I learned from Mark's father, Denny Price," Boren said. "He was my mentor." In fact, it was Denny Price who helped Boren land in the NBA.



Boren's story is one that he should be required to tell at every social gathering.

It was 1994, and Golden State coach Don Nelson was losing game after game because of his team's poor free throw shooting. Nelson asked his first assistant, Gregg Popovich, to contact "one of those shooting guys."

Many shooting instructors routinely send their resume and references to NBA coaches in hopes of getting a tryout. Boren's resume, with a reference letter from Denny Price among others, caught Popovich's eye. Popovich had great respect for Price. After a telephone interview, Popovich told Boren there was a ticket at the airport, and for him to meet the Warriors in Milwaukee that night. Boren told his wife he was going to Milwaukee and she said "What for?" "The Golden State Warriors want to interview me." She just shook her head, because all she had known at that time was that Boren was shooting a lot of free throws at the health club every day (500 per day for 13 months).

When Boren arrived in Milwaukee, he met the coaches at Nelson's favorite German restaurant, as Nelson had

coached in the city for several years. Finally, Boren met with Nelson, and his assistants Popovich, Paul Pressey and Donnie Nelson in the coach's suite. "Nellie said 'tell us what you know.'" Boren then gave a shooting lesson in the hotel room on how to coach free throws from 10 p.m. until 1 a.m. At that point, Nelson told Boren he was hired, but that if it didn't work, he was going to fire him (this will now be Boren's 19th year in the NBA).

Coach Boren was now the Golden State Warriors new Free Throw Shooting Coach. However, the Warriors were on the first day of a 10-day road trip and Boren had packed clothes for one day. The next night, Boren was sitting on press row at midcourt in Chicago watching Michael Jordan and Scottie Pippen run the court five feet in front of him. He had made it in the NBA.

Boren came to Dallas when Nelson was hired as General Manager in 1997. He has since survived four Head Coaches and is now the longest serving, with one team, special player development coach in the NBA. In 2011, Boren was given an NBA Championship ring when the Mavericks prevailed over the Miami Heat. Complete Mavericks free throw statistics and references from other coaches that have brought Coach Boren in for clinics can be found on his website [www.basketballshootinginstruction.com](http://www.basketballshootinginstruction.com). On that website, a DVD How to Coach Free Throw Shooting can be obtained by going to [www.championshipproductions.com](http://www.championshipproductions.com). Anyone involved or friendly with Noah can buy the DVD at a substantial discount by entering the promotional code NOAH in the shopping cart.

Coach Boren also strongly endorses and promotes the Elk's "Hoop Shoot", a 40-year-old nationwide free throw shooting competition for boys and girls, ages 8 to 13. More than 3 million youngsters participate annually, and each year the six National Champions are honored at the Basketball Hall of Fame in Springfield, Massachusetts. The Elks cover the cost for participants and their families to travel to the State, Regional and National Championships. Please go to [www.elks.org](http://www.elks.org) to learn more about that great service organization and their free throw shooting competition, the "Hoop Shoot."

Coach Boren expresses that he is honored and grateful to now be serving as National Spokesman for Noah. "I'm a free throw coach, Boren said, and I can now coach free throw shooting better than ever, by using Noah."

*"The little dam will break, and every NBA team will want it. We are thrilled to have one in Dallas"*





The MyNoah app is now available on the iTunes App Store! Connect your Apple device to your Noah Instant and stream your shooting sessions straight into the palm of your hand. Share your plots via E-mail, Facebook, Twitter and Text Message to compete with your friends.

\* Must have access to Noah Instant Shooting System



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- Tracks Player Workouts and Improvements
- View and Instantly Share and Compare Arc Plots



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