

# If the [sports] shoe fits



by Judy Hill

Whether they are in sneakers, oxfords, or flip-flops, these alumni are stepping into a variety of roles in the competitive world of sports. While academia, technology, medicine, and business surely all beckon for Caltech alumni, combining a passion for athletics with skills honed at the Institute—discipline, innovation, insight, and an unstoppable work ethic—has led some to singular success in athletics, from the front court to the front office.

## The team player

For **Nasser Al-Rayes** (BS '17), who now plays professional basketball in his native Qatar, college was always equally about basketball and academics. He chose Caltech because he wanted a challenging and fulfilling academic environment. He chose to play basketball at Caltech with, he says, “the vision of leading the team to its first SCIAC [Southern California Intercollegiate Athletic Conference] title in over 50 years.” Although that did not happen, the team did shatter many program records during his tenure, including finishing fifth in the conference in back-to-back years.

Collaboration was a way of life for Al-Rayes at Caltech, where he pursued an option in mechanical engineering. “The very basic idea of collaboration, that two brains are better than one, has become very important to me, whether it’s a group project or seeking another perspective on a big life decision,” he says. “I always want to know others’ perspectives since there is a good chance someone else will have looked at a situation in a different way than I have and can offer a varying perspective that I would not have considered on my own.”

Surprisingly, he says, that sort of mind-set is rare in professional basketball, despite it being a sport predicated on the ideas of teams and teamwork. “Many athletes are quite headstrong and don’t seek or want other perspectives, especially during times of adversity. I firmly believe that only when the ability to collaborate fails does adversity prevail. This is especially true when working on a team trying to achieve a common goal, like, in my case, winning a game.”

The other big takeaway from Caltech for Al-Rayes was the importance of grit. “I remember upperclassmen warning me that this place would make it very hard to maintain a high-level training regimen in basketball and that I could run the possibility of burning out,” he says. “But Caltech never crushed my love and passion for athletic competition.”

Al-Rayes’s dream of playing professionally began in high school and, after signing with an agent while at Caltech, he fielded

interest and offers from teams in Denmark, Portugal, and Spain. Ultimately, he signed with the Al Sadd Sports Club in Doha soon after graduation, happy to be able to spend time back where he grew up but also preparing for his post-basketball life by taking online classes to continue his education. Al-Rayes admits the first few months of playing professionally were hard: his coaches expected more from him and were even harder on him than he was used to. Still, he says, “I never got discouraged. I kept my nose to the grindstone. Caltech taught me to be tough.”

## The free safety

That ingrained ethos of hard work, of doing whatever it takes to get the job done, would benefit a Caltech alum in any profession. As **Collin Murphy** (BS '13) found, it is particularly helpful in the grueling and unpredictable environment of a start-up company.

A software engineer for the Pasadena-based BallerTV, a subscription streaming service for amateur-athletics events, Murphy spends his days putting out fires large and small. Though he gets to show up for work close to noon and wear flip-flops in the office, the work is demanding, he says. When not refining apps or working on coding, Murphy might be traveling to Dallas to guide a team contracted to broadcast a game, designing an email template for a colleague, or reviewing statistics for the weekend’s events to make sure they make sense, “because sometimes data can be a little wonky.” He also meets with coaches, knows how to set up a camera, and is, as he puts it, “pretty much just kind of a free safety covering anything that needs to be done.”



Nasser Al-Rayes (top) and Collin Murphy (bottom, #22)



From left: Dean Oliver; Eldar Akhmetgaliyev and Arian Forouhar; Ari Kaplan



Half the staff of Baller TV are Caltech alumni, many recruited by Murphy himself. “Yeah, I hired my friends,” he says. “The lead developer, Christophe Kunesh [BS ’13], played on the basketball team with me. Ping Chen [BS ’14] and Chan-Hee Koh [BS ’14] are both software engineers here, and all three of us were in Page House.”

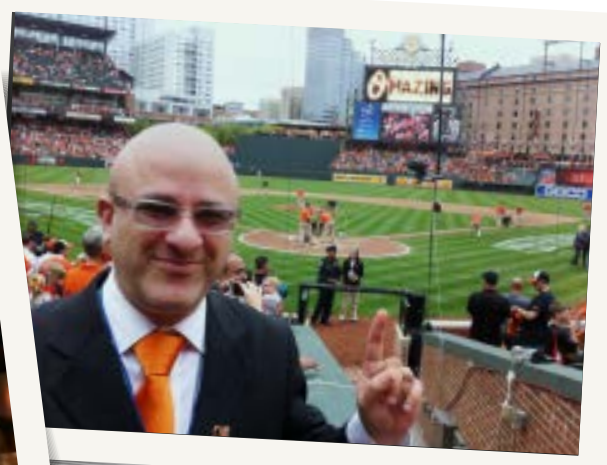
Beyond the easy camaraderie, Murphy, who was a double major in computer science and business, economics, and management at Caltech, says he likes to hire Caltech alumni because of their work ethic. “I think we just know how to work hard to get a project done,” he says. “Working until two, three in the morning, or just through the night, that’s the kind of thing you get used to as an undergrad, and I think that carries forward. We’re not working on problem sets, but they are problems nonetheless.”

With a Caltech grad, says Murphy, “the problem is never going to be ‘we didn’t give it a good-enough go, effort-wise.’ That’s not going to be a problem for us. I think everyone kind of knows how to push themselves through really tough 14-hour days, to work through it.”

## The scientist-analyst

The field of sabermetrics—which involves the analysis of data gathered during a sports game as a way to improve player value and game strategy—has grown by leaps and bounds since the early 2000s, gaining national recognition with Michael Lewis’s 2003 book *Moneyball: The Art of Winning an Unfair Game*.

A year before that, **Dean Oliver** (BS ’90) had written a primer on basketball analytics called *Basketball on Paper*,



which laid out the statistical tools that could be used to build a better basketball team.

“That was effectively my business card,” says Oliver. At the time Oliver’s book came out, he was an environmental consultant; he leveraged its publication to get his foot in the door with sports organizations. By 2004, he had secured a position with the Seattle Supersonics, where he provided the front office, coaches, and scouts a statistical interpretation of what they were seeing on a game-by-game basis; he also advised on the draft. Stints with the Denver Nuggets, the Sacramento Kings, and ESPN—which started an analytics group in 2011—followed. Now Oliver is with TruMedia Networks, a data-analytics company that works across multiple sports, including football, baseball, and soccer. Oliver recently recruited another Caltech alum, T.J. Creath (BS ’95), a former basketball teammate, to the company.

Oliver says his Caltech education gave him an edge in terms of learning how to see beyond the statistics. “A lot of people who get into this field come from a statistics or programming background, and those are very useful, but I think what I learned at Caltech was how to piece things together.”

He adds, “Being an environmental engineer, I understand how water gets from here to there or how air gets from here to there. You have to understand the physical system and then you can apply statistics to it, and that perspective—that there is a physical mechanism, not just a statistical model—is something I don’t see as much in other people who are doing sports analytics. They use statistical models and machine learning but are blind to the concept that basketball is played in groups—a system of players—which behave in a more deterministic way than people with purely statistical backgrounds can understand. I definitely feel that there is a fundamental science, a system of rules, that sits in sports. It’s just not as obvious.”

Read more about these Caltech alumni and meet others who have found their niche in sports at [magazine.caltech.edu/post/if-the-sports-shoe-fits](http://magazine.caltech.edu/post/if-the-sports-shoe-fits)

## The digital storytellers

**Arian Forouhar** (PhD ’06), who founded MOCAP Analytics in 2012 with fellow Caltech alum **Eldar Akhmetgaliyev** (PhD ’16), spent a lot of time “thinking of ways to apply the innovative technologies developed in the lab to sports” while pursuing his doctorate.

The Silicon Valley start-up (which was acquired by sports-data company Sportradar in 2017) focused on making sense of tracking data on professional players. “MOCAP’s mission was to become the world’s best sports data storytellers,” says Forouhar. What the pair developed, explains Akhmetgaliyev was “a way to use machine learning and artificial intelligence to extract insights from tracking data.”

In basketball, for example, they came up with a way to measure the quality of shot selection by estimating how much each team or player *should* have scored on these shots. By comparing actual scores with expected scores, they could estimate the amount of luck contributing to an outcome. MOCAP developed algorithms to measure on-court chemistry between players, create video-game-style player profiles, and describe similarities between players based on skill or style.

They started with the Golden State Warriors and have worked with other professional teams as well as leagues, data collectors, and athlete-management systems to process data from thousands of games. In football, for example, they are using data collected from RFID tags underneath player shoulder pads to build the most accurate model to predict a run or pass before the snap.

“During my doctoral work at Caltech, we used novel imaging tools and techniques to gain insights into heart development,” says Forouhar. “The interesting thing is that we gained these insights about the system by studying moving dots—flowing blood cells and pumping myocardial cells. In our work at MOCAP and Sportradar, we’ve been able to make sense of sports systems by studying other moving dots—in this case, players and a ball.”

## The data visionary

A decade ago, when huge amounts of new data on baseball pitching—detailing everything from how the ball spins to how hard it is hit—became available, **Ari Kaplan** (BS ’92) saw an opportunity to use that information to provide valuable insights to major league teams.

“For me, the fun is doing something that hasn’t been done before, innovating,” says Kaplan, who started his baseball career with a SURF project and then co-founded the sports-analytics company AriBall (now Scoutables). Kaplan, who has worked with two-thirds of Major League Baseball’s teams, was recently hired by the Chicago Cubs to launch and run their analytics and research-and-development departments, helping the organization to become World Champions in 2016 for the first time since 1908. He is now special consultant to the general manager of the Baltimore Orioles.

“It’s very exciting to give recommendations for signing a player based on your own insights. It’s especially rewarding to find a player who everyone else is overlooking and make a recommendation to sign him, and then see him end up the home run champion of the year or in the All-Star Game.”

In addition to being involved with player recruitment, Kaplan also developed software to automate scouting reports and to use data to enhance game strategy on the field.

Lately, Kaplan has dived into the vast amounts of information available on fielding. “I’m trying to understand what the meaning of that information is,” says Kaplan. “It’s easy to get data, but it’s hard to put meaning behind it and take action on it.” He also is looking at behavioral science and the intangibles of personality, and how people work together as teammates.

“I like to try to use that innovative spirit that I experienced at Caltech,” says Kaplan. “It’s not just tweaking existing work and making it incrementally better. It’s coming up with completely new ideas, new technologies, new industries.”

