
Sports Analytics

Future Opportunity And Investment

Disciplines

Data Science (Tobias, Hague)

Kinesiology (Bellar)

Applied Economics (Depken)

Engineering (Rodriguez)

Communication (Grano)

Leaders:

Craig Depken - Professor of Economics Belk College of Business

John Tobias- Sports Analytics Lecturer in School of Data Science

Key Words: Sport, Analytics, Athletes, Business, Communications, Big Data

EXECUTIVE SUMMARY

Sports Analytics refers to the application of data and advanced statistics to measure athlete and team performance and to inform a wide variety of decisions to gain a competitive advantage on and off the field of play. Sports Analytics can also inform public policy in areas such as stadium subsidies, hosting sporting events, and gambling markets. While the market for sports analytics is expected to approach \$4 billion by 2022 (Forbes Magazine), it is often overlooked in academia. Sports Analytics involves two distinct but related fields of research. The first is performance based focusing on efficient body movement, advanced training policies, injury prevention and mitigation to predict on individual and team performance. This area blends kinesiology, engineering, and data science. The second focuses on team dynamics, the business of professional and amateur sports, the economic impact of sports on cities, states, and countries, and how various forms of communication influence fans, athletes, government officials, etc. This area blends economics, finance, communication, public policy, and data science. While many of the members of the team have published in the area of sports, we plan to leverage the growing national interest in sports analytics to motivate industry-based partnerships and research at UNC Charlotte. Initial engagements with all of Charlotte's professional sports teams (football, basketball, baseball, soccer, hockey, and NASCAR), sports media companies (ESPN, SEC network, Fox Sports 1) and athlete development corporations like P3 have shown the potential to not only increase research at UNC Charlotte, but also to create intellectual property for spin off to companies and start-ups (e.g. www.hotrouteanalytics.com founded by Adonis Abdullah, a student). In addition, we believe a robust sports analytics research agenda combined with a partnership with our athletics teams will provide improved student and alumni engagement with the university as our teams and coaches are provided an edge to win through analytics.

Few universities in the United States have focused on creating expertise in sports analytics. The direct experience of team leaders John Tobias and Craig Depken, the former in business and the latter in academic investigation, will let UNC Charlotte stand apart from regional and national peer institutions. To enable UNC Charlotte Sports Analytics to become a future area of unique distinction, research support and investment would include PhD and post-doc hiring, enhancements to technologies in both Kinesiology laboratories, additional tracking and training technology for UNC Charlotte athletics teams, and sourcing of large data sets of sports performance (e.g., PGA's ShotLink and NBA player movement) and societal data (e.g., fan preferences, youth sport participation, tax revenues, and gambling market data). We would expect a tight relationship with the 49er Foundry and Ventureprise to grow entrepreneurship and partner with the dynamic and innovative athletic companies in this space.

EVIDENCE OF STRENGTHS AND EXCELLENCE

While this is an area of future opportunity, initial engagements with all of Charlotte's professional sports teams, sports media companies and athlete development corporations like P3 show the potential to not only drive increased research, but also to create intellectual property for spin off to companies and start-ups (e.g. www.hotrouteanalytics.com by UNC Charlotte student Adonis Abdullah). Player development companies like P3 (premierpitching.com) have been in consultation with and are partnering with our research team. These early conversations and interaction with the UNC Charlotte athletics teams have encouraged us to form this collaboration.

While this is a new collaboration, the skill sets of the investigators are strongly complementary. In the area of sport performance, David Bellar, Doug Hague, and Benny Rodriguez have extensive experience in measuring and evaluating athlete and team performance from the perspective of kinesiology, data science, and engineering. These three have published 42 peer reviewed articles, 2 book chapters, and have been recognized by the national media. Their skill sets complement John Tobias, who is newly associated with academia but has been engaged in sports analytics for ESPN and other business interests for many years. In addition, John bridges the team into the media and communication expertise of Dan Grano and the econometrics skills of Craig Depken. This part of the team has published 87 peer reviewed articles, 34 book chapters, and have been in national media more than 50 times. Their research publication record around professional sports organizations impact on the economic and social well being is outstanding.

Sports analytics is at its early stages of emergence as a separate field from sport management and statistics. This provides an opportunity to stand out from other universities. Current academic involvement in sports analytics is limited to MIT hosting the primary conference for the field over the last several years, with only Syracuse emerging with a defined curriculum with a BS in Sports Analytics. There are a few other universities that have developed concentrations for MS in Analytics degrees, but the field is nascent and UNC Charlotte can quickly develop an area of unique distinction given the strength and existing focus on sports analytics and sports statistics in the School of Data Science, the Belk College of Business, the Lee College of Engineering, and the College of Liberal Arts and Sciences. The collaboration of this team has led to the development of an undergraduate certificate in sports analytics that is expected to launch in Fall 2021.

The sports industry has adopted sports analytics quicker than academia. In fact, all of the Charlotte professional sports teams as well as several sports media companies are already engaged with this research team, have been involved in our classrooms, practicum courses, and have been hiring our students. We are expecting to form an advisory board that would include members from professional teams, amateur sports organizations, sports performance companies, and interested government officials. This advisory board would help invest in and guide the research agenda for this area. These local and regional sports leaders have not only engaged in research focused on sport performance but also on research focusing on business and personnel decisions. The faculty on this proposal have all blended their areas of expertise into the area of sports analytics and we seek to drive further collaboration and lead the country in the emergence of this field. The blending of our expertise in kinesiology, economics, statistics, communication, data science, and engineering provides a unique set of perspectives that will help drive research in this new field.

This team will not only drive a broad research agenda into Sports Analytics, but also bring this research into the curriculum. This team has launched three new sports analytics courses in the last 18 months and proposed a new undergraduate certificate in sports analytics that is expected to launch next fall. We would specifically focus on the recruitment of underrepresented students to the data science and sports analytics industries. According to Forbes, “[w]omen hold only about 13% of sports analytic jobs in the United States.” Front Office Sports stated in 2020 that, “African Americans & Hispanics make up less than 6% of sports stats & analytics jobs in the United States.” One of our team members (Tobias) was recently interviewed by the Boston Globe about the issue of diversity in sports analytics. This research will develop programs and partnerships to introduce underrepresented students to analytics through their interest in sports. Meeting students in their area of interest will highlight not only sports analytics, but also other fields of data science and kinesiology. Finally, being the only School of Data Science in the Carolinas, we can help underrepresented groups that aspire to work in these fields.

The team’s collective research output in the area of sports performance and sports economics includes more than 100 publications in peer-reviewed journals, many instances of national media coverage, and have been principal investigator or co-principal investigator on more than 30 funded projects in the last five years.

ALIGNMENT WITH REGIONAL AND NATIONAL PRIORITIES

Sports analytics aligns with several priorities for UNC Charlotte. First, there is the performance of our athletics teams. Improved performance and wins through the use of analytics will enable the overall growth and health of the University. Alignment of this research with our athletics programs will enable a small conference university to have more success like the Oakland A's in Moneyball. Even the few universities that are starting to develop sports analytics as an academic area are not well connected to their athletics teams. This connection can be a competitive advantage for UNC Charlotte.

Second, we expect the Advisory Board made up of regional professional sports teams and player development companies to be a source of research funding. We foresee professional-team focused research would focus more on the business and economic side of sports as well as how sporting events impact and the cultural community in which they are embedded interact. One of the universities larger donors has several ventures in the region, one of which is a player development company. He has approached this team about deepening the partnership with the university through sports analytics. We believe this is not the only alumnus who could be interested in this type of gift and/or partnership. Further, with more than a 4 billion dollar market in this area, and very few competitors in the space, an organized effort by this group of faculty at UNC Charlotte is very likely to attract significant funding to assist both sports organizations and private companies with sports analytic projects. Just in the greater Charlotte area alone there are professional team sport organizations, NASCAR and multiple racing team headquarters, and large outdoor recreation organizations that could benefit from analytics projects. Outside of the Charlotte area there are national conferences where connections to companies and organizations could be fostered to expand the funding available to the research group.

Third, the National Institutes of Health strategic plan for data science, in combination with research grants on sports injury, will provide grant opportunities (primarily in the kinesiology area of sports injury prevention, specifically longitudinal impacts of youth sports injuries and how to prevent injuries from occurring). In particular with youth sports injuries cost nearly 450 million dollars annually, and carry an increased risk of poor health outcomes later in life. This group possesses the unique skills to analyze data from youth sports organizations to better predict risk of injury and also to communicate those findings effectively to mitigate injury risk. Finally, the NSF has designated "Harnessing the Data Revolution" as one of the [ten big ideas](#) to receive priority in funding. The connection here is to utilize sports analytics to address equity and diversity issues within data science; one clear way to support the increased representation of minorities in STEM disciplines

SUPPORTING DOCUMENTS

Contributor	Title/Appointment	Expertise
Dave Bellar	Professor and Chair Kinesiology	Kinesiology, body dynamics and athlete injury, track and field
Craig Depken	Professor, Economics	Econometrics, sports economics
John Tobias	Lecturer, School of Data Science	Sport analytics in media, professional and Olympic sports
Dan Grano	Professor, Communication	Critical media studies, sports in society
Doug Hague	Professor of Practice and Executive Director, School of Data Science	High school track and cross country data analysis
Benny Rodriguez-Medina	Lab Manager, Electrical and Computer Engineering	Sensors, data collection and analysis of baseball.

Dave Bellar (CHHS Kinesiology) and the Department of Kinesiology have a strong research program in exercise science and training. The Biodynamics Research Laboratory would be a starting point for the deeper partnership across campus to research the link between the body dynamics and sports performance including the avoidance of injury. We have had several external companies including some of the National Governing Bodies of US Sports reach out to our team to discuss potential partnerships (Dave help here? P3, Belk, ?) Dr. Bellar has been a collegiate coach for shot put and is certified to provide training for USA Track and Field. He has published.....

An emerging partnership between Kinesiology and the School of Data Science is evidenced by the proposed undergraduate Sports Analytics certificate. As we gain experience, we expect to continue the development of curriculum into the graduate school as well the research discussed here.

Craig Depken (BCoB Economics) has been researching and publishing in the field of sports economics and business for over 25 years. He is currently president of the North American Association of Sports Economics. In his research, he has covered areas such as free-agency, stadium economics, ticket and concession prices, economic impact of sporting events, fan loyalty, psychological momentum, the economics of the NCAA, and the economics of gambling markets. His writings have covered most professional sports including the NHL, the NFL, MLB, NASCAR, and international soccer. He has also written many articles that focus on topics unique to collegiate sports and the NCAA including competitive balance, NCAA enforcement, and local economic impacts of college sporting events. He has collaborated with graduate and undergraduate students to publish in peer reviewed journals.

John Tobias (School of Data Science) has been blending statistics and sports for more than 15 years through experience working for an NBA Franchise, ESPN, and the Olympics. John joined the School of Data Science in January of 2020, but has taught several courses for us over the last 18 months. John's passion for sports analytics has brought the analytics teams from all of Charlotte's professional sports franchises to the UNC Charlotte classroom and is beginning conversations on how to bring research projects from these teams and organizations to campus. John is in current discussions with ESPN, NBC Sports, and USA Triathlon for potential collaborative efforts. At this current time, no other university in the country has a yearly partnership where students in sports analytics are working with their local professional sports teams.

Benny Rodriguez (LCoE, Electrical and Computer Engineering) has been working with the UNC Charlotte baseball team for player development through analytics, visualization and technology. Add more?

Doug Hague (School of Data Science) has been studying the performance of high school cross country and track and field athletes. He has partnered with Milesplit.com to obtain the performances of athletes from 2016-2020 and has mentored both undergraduate and MS interns in this area.

References:

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