

SpORts Newsletter

Issue No. 3, Summer 2008

Editor: Michael J. Fry

Welcome

Hello fellow INFORMS SpORts section Members,

I hope everyone has had a productive and enjoyable past year. As you enjoy a well-deserved summer break (hopefully!), please take time to read through our latest **OR in Sports (SpORts) Newsletter**. Feedback on the newsletter, suggestions for future content or just comments in general are always welcome. Please send comments to Mike Fry at mike.fry@uc.edu.

Be sure to check out the following articles in this issue of the newsletter:

- A report on the general state of the section and an update form Jim Cochran, SpORts President. Jim discusses: a proposed SpORts anthology; officer

elections for SpORts; as well as an overview of a multitude of exciting upcoming conferences and SpORts-related events.

- INFORMS summaries: Jeff Ohlmann provides a wrap up of the SpORts sessions from Seattle and Joel Sokol offers a preview of SpORts for Washington D.C. in October 2008.
- We provide a partial list of SpORts articles appearing recently in journals.
- Joel Sokol writes about his experiences in generating popular media interest in his SpORts-related research. Joel offers very informative advice and helpful tips for getting more exposure for SpORts research.
- Mike Fry presents a review of the book *The Wages of Wins* by Berri, Schmidt and Brook.
- Wayne Winston discusses his much-publicized work with Jeff Sagarin in developing player ratings for the NBA in the article "Moneyball and the NBA."

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President's Report

The Past Year:

SpORts continues to be INFORMS' fastest growing section. Even after instituting modest dues in 2006, the section retained over 300 members (many of whom are students or retirees who do not pay dues). As you read this newsletter, you will find that the SpORts section has been a very active section - several (well-attended) sponsored sessions at conferences, a well-developed web site, a newsletter, and joint activities with the American Statistical Association's section on Statistics in Sports. Over the past two years the section has used most of the dues it to

jointly sponsor sports-related conferences and symposia.

In 2007 SpORts cosponsored two very successful events: the 2007 *Symposium on Statistics and Operations Research in Baseball* (2007 SSORB, <http://mitch.watnik.com/symposium.html>) and the 2007 *New England Symposium On Statistics In Sports* (NESSIS, <http://www.amstat.org/chapters/boston/nessis07.html>). Congratulations to organizers Mitch Watnick (2007 SSORB) and Mark Glickma

and Scott Evans (NESSIS) on jobs well done!

SpORts cosponsored these events in an effort to i) raise awareness of operations research and its myriad contributions to sports, ii) raise awareness (and membership) of INFORMS and its SpORts section, iii) provide the members of SpORts with opportunities to present their sports-related research, learn about other sports-related research efforts, and interact with others interested in applying operations research to sports, and iv) build relationships with other sports-related sections and

organizations. I believe these efforts have been extremely successful and that this money has been very well spent (I would be very interested to learn whether you share my opinion).

The section owes a great deal to Vice Chair - Programs Joel Sokol, Vice Chair - Publications Mike Fry, and Secretary - Treasurer: Jeff Ohlmann. The great amount of time, energy, and creativity these three inaugural officers have given to the Sp**OR**ts section have enabled the section's rapid establishment and growth, and the section and INFORMS sincerely appreciate their efforts! Please let them know by e-mail, telephone, or in person at the upcoming INFORMS Conference (October 12-15 in Washington, D.C.) how much you have appreciated their efforts.

We hope to continue to expand the section and its activities - contact me, Joel, Mike, or Jeff if you would like to suggest a new initiative/activity or would like to get involved. I would also like to hear from prospective new members, so please give my contact information to anyone you know who is interested in joining the Sp**OR**ts section.

**- Jim Cochran,
Sp**OR**ts President**

Upcoming Officer Elections

Sp**OR**ts will hold its third biannual election electronically in September and October of 2008 – I hope each of you will consider nominating someone or running for one of the section's four offices (Chair, Vice Chair – Programs, Vice Chair, Publications, and Secretary – Treasurer) - self nominations are allowed and *strongly encouraged*. **If you would like to run for or discuss the duties of any of these offices, please contact me by August 15 at jcochran@latech.edu or (318) 257-3445.**

Proposed Anthology of Operations Research in Sports

In 2006, the current section officers (Jim Cochran, Mike Fry, Jeff Ohlmann, and Joel Sokol) began working on the proposed *Anthology of Operations Research in Sports*; this book would be similar in scope and content to the

Anthology of Statistics in Sports, co-edited by Jim Albert, Jay Bennett, and Jim Cochran and published by SIAM Publishing in 2005 (<http://www.ec-securehost.com/SIAM/SA16.html>). We have developed an exhaustive (we hope) list of all sports-related articles published by INFORMS journals through 2005, rated these articles on their readability and appropriateness, and ranked them relative to these ratings. We are now discussing this project with potential publishers, but are still open to discussing the project with other publishers, so please let me know if you are aware of a publisher who would like to consider this book.

Symposium on Statistics and Operations Research in Baseball

The second Symposium on Statistics and Operations Research in Baseball (2008 SSORB, http://w4.stern.nyu.edu/ioms/events.cfm?doc_id=7983) will be a meeting of the baseball, industrial, and academic worlds. The focus is on how Statistics and Operations Research methodology is used within baseball and associated businesses and on how baseball inspires the expansion of the frontiers of Statistics and Operations Research as scientific fields. The theme of this year's Symposium is "The Economics of Baseball." The Symposium will consist of a panel discussion in the morning where members of the media, major league baseball, economists, city government, and others will discuss various current issues in baseball where statistical and operations research modeling can be (and are) used. In the afternoon, there

will be a set of short (20-25 minute) seminars.

The meeting is scheduled for Wednesday July 16, 2008 from 10:00 a.m. - 5:30 p.m. and will be held in the Henry Kaufman Management Center at the New York University Leonard N. Stern School of Business. The school is very accessible - you can get there via the R, N, W (to 8th Street), A, B, C, D, E, F, V (to W. 4th Street), or #6 (to Astor Place) subway line.

As with the 2007 SSORB, this meeting has been scheduled for the day after the MLB All-Star game in the city in which the MLB All-Star game is to be played. This has enabled symposium organizer Jeffrey Simonoff to assemble a terrific program that includes many speakers affiliated with MLB. Confirmed speakers include:

- Heather Campbell, Development Consultant and former Vice President, Media Networks and Brand Integration, ESPN
- Dennis Coates, Professor of Economics, University of Maryland Baltimore County
- Gary Hoenig, General Manager, ESPN Publishing, and Editor in Chief, ESPN The Magazine
- Ginger Zhe Jin, Assistant Professor of Economics, University of Maryland
- Michael Kalt, Senior Vice President, Development and Business Affairs, Tampa Bay Rays, and former senior advisor to the New York City Deputy Mayor for Economic Development
- Jeffrey Ohlmann, Assistant Professor of Management Sciences, University of Iowa
- Scott Rosner, Associate Director, Wharton Sports Business Initiative, University of Pennsylvania

- Christopher Rump, Assistant Professor of Applied Statistics and Operations Research, Bowling Green State University
- Alan Schwarz, Reporter, *The New York Times*
- Nate Silver, Columnist, *Baseball Prospectus*
- J. Cole Smith, Associate Professor of Industrial and Systems Engineering, University of Florida
- Jason Winfree, Assistant Professor of Sport Management, University of Michigan
- Andrew Zimbalist, Robert A. Woods Professor of Economics, Smith College

Of course, it is essential that all 2008 SSORB participants secure hotel accommodations early (it is in New York City during the MLB All-Star break!).

SSORB 2008 is jointly sponsored by the Information, Operations and Management Sciences Department of the New York University Leonard N. Stern School of Business; the Section on Statistics in Sports of the American Statistical Association; and the Section on Operations Research in Sports of the Institute for Operations Research and the Management Sciences.

Standard registration fee for the 2008 SSORB is \$65; students may register for \$30 (proof of student status required). Members of the ASA Section on Statistics in Sports and members of the INFORMS Section on Operations Research in Sports may register for \$25. Guaranteed registration closes on July 9, 2008. If space is available, registration will be permitted after that date at the higher fees, except that reduced fees for members of the ASA and INFORMS sections will not be available. Registration fees can be paid using cash, check, or credit card (Master Card, Visa, or American Express).

In order to register for the Symposium please download the form at <http://pages.stern.nyu.edu/~jsimonof/registration.pdf>, print it out, and either mail it to the address given or fax it to the number given with your payment information.

For more information, please contact symposium organizer Jeffrey Simonoff (jsimonof@stern.nyu.edu).

INFORMS SpORts section is proud to cosponsor this event and encourages you to attend – this promises to be a very exciting symposium.

2008 Northern California Symposium on Statistics and Operations Research in Sports

The 2008 Northern California Symposium on Statistics and Operations Research in Sports (NCSSORS, <http://ncssors.wikidot.com/>) is a meeting of academics and professionals with sports teams, sports media, and universities to present original research and discuss the pressing issues in the field of sports statistics.

The meeting will take place at Menlo College in Atherton, California on Saturday, October 18, 2008. It is sponsored jointly by [Menlo College](#), [The Journal of Quantitative Analysis in Sports](#), [Statistics in Sports Section of the American Statistical Association](#), and [INFORMS](#). The symposium will include traditional oral presentations, research posters and a panel discussion. The proceedings of the symposium will be published in a special issue of the *Journal of Quantitative Analysis in Sports (JQAS)*.

The submission deadline for abstracts for talks and posters was June 22, 2008. Information on how to register for the (NCSSORS) can be found at <http://ncssors.wikidot.com/registration>. Please contact Ben Alamar (balamar@menlo.edu), the organizer of the symposium,

with any questions. Visit <http://groups.google.com/group/ncssors> to join the NCSSORS email group and receive updated information as it becomes available.

INFORMS SpORts section is also proud to cosponsor this event and encourages you to attend – this promises to be another very exciting symposium.

2008 Joint Pre-Olympic Congress on Sports Science and Engineering

The 2008 Joint Pre-Olympic Congress on Sports Science and Engineering will be held in Nanjing, China on August 5-7, 2008. This is immediately prior to the Beijing 2008 Olympic Games (<http://en.beijing2008.cn/>) which are scheduled to start on the evening of August 8th. This is a good chance to bring us together to discuss our favorite topics (statistics and sports) and experience the Olympic Games in Beijing (I have no idea about the availability of tickets to various events, though!).

The congress, which will be organized by the IACSS (International Association of Computer Science in Sport) and Nanjing University of Science and Technology, will focus on Computation, Mathematics, Engineering, Mechanics, Management, Modelling, Statistics, Operations Research, Economics, Physics, and System Engineering in sports.

Nanjing should also provide the congress participants with many other opportunities. The city, with a population of over five million, has been the capital of China several times, and so has a rich cultural history. It is surrounded by the Yangtze River and encircled by mountains and hills, and the center of the city features the Xuanwu and Mochou lakes and

Purple Mountain. Nanjing is a ninety minute flight from Beijing and a two hour high-speed train ride from Shanghai.

For more information about this conference, please visit the official conference website at <http://olympiccongress.org>. This will be an outstanding conference and a beautiful venue, and I hope to see many of you there.

A Sports Oriented Journal

The *International Journal of Sports Science and Engineering (IJSSE)*, is a multidisciplinary journal that publishes original research and applied papers on sport science and sports engineering, including the application of system science and system engineering, mathematics and statistics, computer and information, mechanics and physics, material and textiles, operations research and management, modeling and simulation, medicine and biology, measurement and design, electric and machine engineering for sports, physical education, exercise, game and human movement. The journal, which is published both in print and online and is edited in China (but is now published in English), was formerly published as the *Journal of Sports Mathematics and System Engineering*. The journal has a truly international Editorial Board, with representatives from the People's Republic of China, the US, England, Austria, New Zealand, Nigeria, Canada, Australia, Wales, Hong Kong, the Netherlands, Ireland, Germany. *IJSSE* invites you to submit papers to the journal - for guidelines see <http://www.worldacademicunion.com/journal/SSCI/>.

17th Annual Arnoff Lecture

Michael Trick, Professor of Operations Research at the Tepper School of Business, Carnegie Mellon University, delivered the 17th Annual Arnoff Lecture (<http://www.business.uc.edu/departments/qaom/arnoff>) at the University of Cincinnati on June 4, 2008. In his presentation "Sports Scheduling and the Practice of Operations Research," Mike discussed his experiences in scheduling college basketball, major league baseball, and other sports, and showed

how operations research is revolutionizing the way sports scheduling is done. The Arnoff Lecture series is sponsored by the Department of Quantitative Analysis & Operations Management (<http://www.business.uc.edu/departments/qaom>) of the University of Cincinnati College of Business.

2008 Business Meeting

The section has scheduled its 2008 business meeting for Tuesday, October 14. This is consistent with the change from the usual Sunday meeting that we made last year. We did this because many members and potential members also belong to other subdivisions and have multiple business meetings to attend on the Sunday and Monday evenings during the annual INFORMS Conference. While we recognized that many section members may be unable to attend a Tuesday evening business meeting, we felt this change would enable the section to attract a larger crowd for the SpORts business meeting (which was supported by the results from last year). We look forward to seeing you at this business meeting – remember to keep the Tuesday evening of the 2008 INFORMS Conference open on your schedule and check the SpORts website for updates.

**- Jim Cochran,
SpORts President**

A Report from Seattle

At the 2007 INFORMS Annual Meeting in Seattle, SpORts sponsored two technical sessions. Both sessions were well attended and there was engaging discourse between the speakers and audience. A wide range of topics (and methodologies) were discussed, including match scheduling (integer programming), in-game play-calling strategy (game theory), player selection in a league draft (stochastic optimization), player evaluation (statistical analysis), as well as outcome modeling for soccer matches and playoff series in baseball and basketball (statistical analysis and Markov chains).

**- Jeffrey Ohlmann,
Secretary/Treasurer**

Upcoming SpORts in Washington D.C.

At the upcoming INFORMS meeting in D.C. this October, there will be two sessions sponsored by SpORts. The first session, chaired by Nicholas Hall, focuses on sports management and includes talks on such diverse topics as setting the cut at PGA tour events, understanding how football fans select teams to root for, and helping a Major League baseball team prepare for the annual draft. The second session, chaired by Lori Houghtalen, focuses on OR applications in basketball: assessing offensive strategies, accounting for imbalanced schedules, studying NCAA tournament seeds, and resolving a discrepancy in the measurement of home-court advantage.

**- Joel Sokol, Vice
Chair – Programs**

Reading for SpORts

The *Journal of Quantitative Analysis in Sports* is an excellent source for quantitative sports-related research, <http://www.bepress.com/jqas/>.

Computers & Operations Research dedicated an entire special issue to sports (Vol. 33(7), 2006).

Other recent academic articles relating to sports include:

“Optimal timing of switches between product sales for sports and entertainment tickets,” by Drake et al. *Naval Research Logistics*, Vol. 55(1), 2008.

“Round robin scheduling – a survey,” by Rasmussen and Trick. *European Journal of Operational Research*, Vol. 188 (3), 2008.

“Fair referee assignments for professional sports leagues,” by Yavuz et al. *Computers & Operations Research*, Vol. 35(9), 2008.

“Scheduling a triple round robin tournament for the best Danish soccer league,” by Rasmussen, *European Journal of Operational Research*, Vol. 185(2), 2008.

“Scheduling English football fixtures over holiday periods,” by Kendall. *Journal of the Operational Research Society*, Vol. 59, 2008.

“Score calculation from final tournament tables,” by Pehlivan and Nabiyeu. *Computers & Operations Research*, 2008.

“The importance of a match in a tournament,” by Scarf and Shi. *Computers and Operations Research*, 2008.

“Optimal strategies for sports betting pools,” by Clair and Letscher. *Operations Research*, Vol. 55(6), 2007.

“Scheduling the Chilean soccer league by integer programming,” by Duran et al. *Interfaces*, Vol. 37(6), 2007.

“Construction of balanced sports schedules using partitions into subleagues,” by Geinoz et al. *Operations Research Letters*, 2007.

“Sports league scheduling: Graph-and resource-based models,” by Drexl and Knust, *Omega*. Vol. 35 (5), 2007.

“A branch-and-price algorithm for scheduling sports leagues,” by Briskorn and Drexl. *Journal of the Operational Research Society* (2007).

“IP models for round robin tournaments,” by Briskorn and Drexl. *Computers and Operations Research* (2007).

“Heuristics for the mirrored traveling tournament problem,” by Ribeiro and Urrutia. *European Journal of Operational Research*, Vol. 179 (3), 2007.

“A Benders approach for the constrained minimum break problem,” Rasmussen and Trick. *European Journal of Operational Research*, Vol 177 (1), 2007.

Book Review: *The Wages of Wins* by Berri et al.

The Wages of Wins is billed as “*Freakonomics* meets ESPN” and there is a lot of truth in this claim. The book is written by three sports economists (David Berri, Martin Schmidt and Stacey Brook) and draws mainly from their own personal research papers, but also incorporates related research done by others. The overall theme of the book is based on

debunking common sports ‘myths’ that are espoused by coaches and media pundits.

Some of the sports myths examined include the belief that Major League Baseball’s inequitable team spending leads to less competition in the sport and that the MVP award in the NBA actually goes to the player that most benefits their team.

The strongest sections in the book deal with the authors’ work in examining player salaries and competitive imbalance. The authors present research that argues that not only is MLB more competitive now than at any other time in its history, but fans don’t particularly care about competitive imbalance in sports. These findings are based on an examination of historical attendance figures and team won-loss records.

The authors also claim that team owners are unable to simply purchase fans’ loyalty because team payroll and winning are surprisingly not highly correlated in general (whatever personal feelings you may have about the New York Yankees and George Steinbrenner aside). The authors explain that it is very difficult to predict individual player success in a given year based on historical data; thus, owners cannot simply buy the best players and produce wins.

Interestingly, the National Basketball Association seems to be an outlier among the major sports leagues in many ways. The authors claim that competitive imbalance does exist in the NBA, but it is not caused by differences in team spending. Rather it is due to what they refer to as the “short supply of tall people.” This refers to the fact that the limited pool of ridiculously tall, athletic individuals leads to an inherent shortage of NBA-caliber players, and hence, competitive imbalance results.

As a nice complement to the work done by Wayne Winston profiled in this newsletter, *The Wages of Wins* also delves into how to appropriately value NBA players. The authors find ample evidence that point scoring in the NBA is overvalued and that other skills (e.g., rebounding, defense, etc.) may not be appropriately rewarded. This further reinforces the inability of owners to “buy wins” since the skills that actually lead to wins in the NBA are not the skills that are best rewarded.

The writing style in *The Wages of Wins* is casual and non-technical, but enough details are provided to understand the basics of the analysis. For the interested reader, detailed endnotes provide additional details and references. Most of the material draws more from statistics and econometrics than true operations research models. However, this book is yet another example of analytical models applied to sports reaching a wide audience. It should provide many ideas for further SpORts research. I very much enjoyed this book and I recommend it to all interested SpORts members.

- Mike Fry, Vice Chair –
Publications

Getting Media Exposure for Your SpORts Research

by Joel Sokol, Vice Chair –
Programs

For the past few years, I (and my collaborators Paul Kvam and George Nemhauser) have been lucky enough to receive a fair amount of media attention for our work in predicting the outcomes of NCAA basketball tournament games. We’ve been in the front-page story on ESPN.com, written an invited column in the New York Times, been mentioned in PC World, conducted a number of live TV and radio interviews, had our story picked up off of wire services by numerous media outlets, and even been mentioned on NPR. (And that’s not even the full list.) It hasn’t all been easy, so here are some lessons I’ve learned that might help you if you find yourself in the same situation.

1. If you think you’ve done some research that might be interesting to the general public, contact your university’s (or company’s) media relations specialist – they have much better connections than you or I do, and their job is to get your organization’s name out into the public eye. This is something we never thought to do, and we almost missed our first big chance to get the word out; at the last minute Georgia Tech’s media relations people heard of our work and were able to get us local TV coverage, but only because we happened to have correctly predicted Georgia Tech’s run to the Final Four. In subsequent years, given adequate notice, our media relations department was able to get us national attention that benefited us and Georgia Tech.

2. Trust the professionals. A few minutes of phrasing critique by the New York Times editor made my column much more compelling. (“Wow, you wrote that sentence?” asked my wife. No, I wrote a much duller version that the editor rephrased into the best line of the column. That’s why he works for the Times and I don’t.) A couple of basic suggestions from Georgia Tech’s media professionals (even things as simple as “a dark-colored shirt will look much better”) made me look much better on TV, and a show host’s advice on hand placement saved me from looking fidgety and insecure.

3. Plan your keyword strategy ahead of time. I discovered the hard way that it’s very difficult to get “logistic regression”, “Markov chain”, “Georgia Tech”, “H. Milton Stewart School of Industrial and Systems Engineering”

(what a mouthful!), “Operations Research”, and “Statistics” all into one 5-minute interview, especially if I didn’t have any phrases or stock answers planned ahead of time for that purpose. I still don’t really know a good answer for this, though; I found that most writers left out “Operations Research”, so unless it was a live interview I often didn’t succeed in getting the name of our profession out there.

4. Finally, be receptive to unsolicited responses from people who’ve read/seen/heard about your research. First of all, it’s just the polite thing to do. And second, you never know what might come of it – for example, one response explained a seemingly-anomalous result we had been puzzled by. And my favorite response came from a New York Times reader who had successfully used our research and wanted to show his thanks by making a contribution to my favorite charity!

Moneyball and the NBA

by Wayne Winston

Many of you have probably read Michael Lewis’ excellent book *Moneyball* which explains how the Oakland A’s baseball team used math to help select players. For the last 10 years the A’s have had a much smaller payroll than the Yankee’s and have been just about as successful on the field as the Yankees. In baseball it is fairly easy to evaluate hitter’s abilities because the pitcher hitter interaction is so crucial to the game. By the way evaluating pitchers is much more difficult, but we will leave a discussion of this matter to a future article

. Recently many NBA teams (including at least New Jersey, Dallas, Cleveland,

Denver, Boston, and Houston) have tried to use mathematics to improve NBA team performance. In fact, Daryl Morey, the general manager of the Houston Rockets has an M.B.A. from M.I.T. and was hired primarily because of his knowledge of the math/basketball interface.

Since 2000 noted sports handicapper Jeff Sagarin (his ratings are published in USA Today) and myself have worked for the Dallas Mavericks. Our primary role has been to rate players and lineups. Rating NBA players is much harder than rating baseball players because basketball is a team game and there is no analogy to baseball's hitter pitcher interaction. To rate NBA players we look at every second of every game and look at who is on the court for each team and how the score of the game changes. Then we can use a regression like technique to determine the effect of each player on the score of the game. We note that **due to extensive multicollinearity issues you cannot just run a straight multiple regression**. For example, the 2000 Indiana Pacers almost always substituted Travis Best for Mark Jackson. A straight regression would not be able to determine whether a good time segment for the Pacers was due to Jackson being in or Best being out. We have developed our own (secret) method for correcting for this multicollinearity problem.

Essentially our method is a modified adjusted +/- system. A player's

+/- is simply the number of points per 48 minutes by which a player's team defeats his opponents when the player is on the court. Unfortunately if you rate players by pure +/- you will find no player from a bad team ranking highly. For example, none of the Top 40 players in Pure +/- for the 2007-2008 season played for a team that won less than 48 games. The great LeBron James ranked #73 in the league in pure +/- . When you adjust for who a player plays with and who he plays against (as well as home court edge), you find LeBron moves up to being the 6th best player in the NBA (Kobe Bryant is #1!).

Once we rate players it is a simple matter to rate lineups. For example, suppose a lineup beats their opponents by 10 points in 48 minutes. Suppose we add up the strength of the opposing player's faced by this lineup and suppose they average out to +5. Then we would rate this lineup as +15 points per 48 minutes. For example, we find that the little used LA Lakers lineup of Bryant, Odom, Turiaf, Farmar and

Radmonovic has a +50 rating, having outscored their opponents by 23 points in 21 minutes. The Lakers should probably play this lineup more often!

We also rate player's performance against each team. We find, for example, that the main reason that the Spurs beat the Suns is that Tony Parker plays great against Steve Nash.

The interest in the sports/math interface is growing as new data becomes available. More detailed video breakdowns of basketball and football games will yield a treasure trove of data for OR/MS analysts to analyze. If you are interested in math and sports you might want to check out my book *Sportsamatics* which will be published by Princeton University Press in March 2009.

Wayne Winston is Professor of Operations and Decision Technologies and Eli Lilly & Co Faculty Fellow in the Kelley School of Business at Indiana University.

His forthcoming book, Sportsamatics, will be published by the Princeton University Press in March 2009.